Oreapolis Wetland Mitigation Bank

Site Development Plan

Cass County, Nebraska

Project No. NH-75-2 (168)
Control No. 21849F

August 2011

HDR Project No. 58932

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OREAPOLIS MITIGATION BANK – SITE DEVELOPMENT PLAN

Project Number NH-75-2 (168)
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1.0 PROJECT OVERVIEW AND OBJECTIVES

1.1 Project Summary and Location

As authorized by the U.S. Army Corps of Engineers (USACE) on February 18, 2010 via Department of the Army, Clean Water Act (CWA) Section 404 Permit No. 2010-00317-KEA (see Appendix A), the Nebraska Department of Roads (NDOR) is proposing to construct the Oreapolis Mitigation Site/Bank (the Site or the Bank) south of Bellevue and east of U.S. Highway 75 (See Figure 1: Project Location). More specifically, the Site occupies a portion of the northeast ¼ of the north ½ of Section 1, Township 12 North, Range 13 East, Cass County, Nebraska. The Site would occupy a 50 acre agricultural parcel, and following construction, would ultimately develop 36.9 acres of palustrine emergent (PEM) wetlands, 6.4 acres of palustrine forested (PFO) wetlands, and 4,266 linear feet of stream channel.

The Site is flat and adjacent to a channelized waterway that forms the northern Site perimeter. The Site is also bordered by a wooded community to the south, and an agricultural field to the west. Runoff from the Project Area drains into the channelized waterway that ultimately flows into the nearby Schilling Wildlife Management Area and eventually the Missouri River. The Site is located in HUC 102400 – Missouri-Nishnabotna, 01 – Keg-Weeping Water (see Figure 2 Hydrologic Unit Codes), the Missouri Alluvial Plain Ecoregion, and the Iowa and Missouri Deep Loess Hills Major Land Resource Area (MLRA).

1.1.1 Project Background

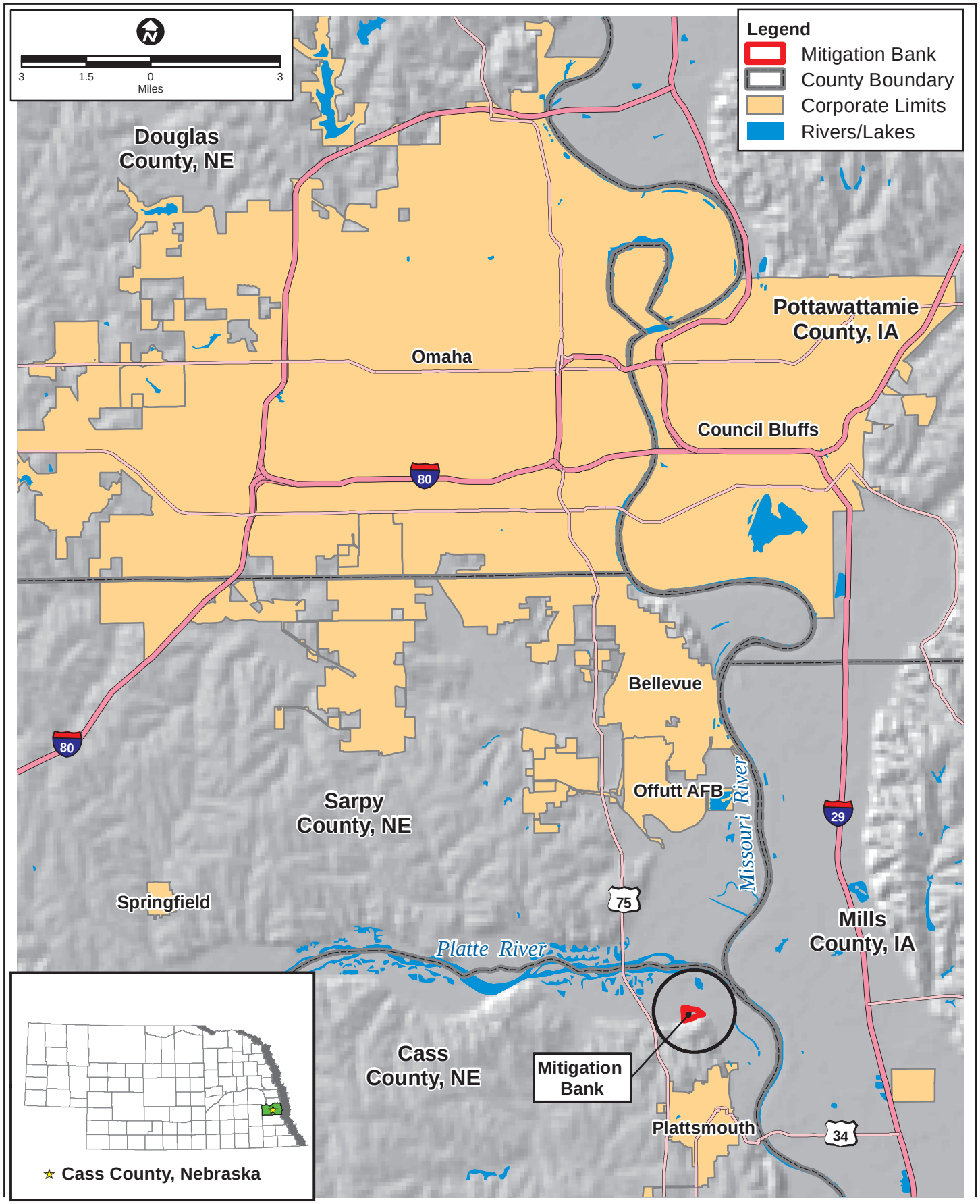
Extensive coordination with USACE has occurred regarding Bank development:

- Submittal and processing of two comprehensive CWA Section 404 Individual Permit Applications in which the Site was identified as the Mitigation Plan
- Submittal and processing of one CWA Section 404 Nationwide Permit Application for construction of the Oreapolis Mitigation Site
- Multiple agency meetings that preceded the noted permit applications

Through the noted scoping and coordination efforts, USACE has determined that the Site is of adequate size and appropriate location to fulfill the mitigation requirements of Department of the Army Permits 2003-10140-WEH (U.S. 34 Bellevue Bridge) and 2007-00796-WEH (U.S. 75 Plattsmouth to Bellevue). In association with this Site Development Plan, and in accordance with NDOR's Umbrella Mitigation Banking Agreement, surplus wetland mitigation that results at the Site will be coordinated with Nebraska's Interagency Review Team (IRT) and "banked" for allocation toward future project impacts.

The diversion and storage of surface water, associated with Site development, was authorized by the Nebraska Department of Natural Resources on May 9, 2011 (see Appendix A).

A Floodplain Development Permit for the project was authorized by the City of Plattsmouth, Nebraska on January 25, 2010 (see Appendix A).



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Project Location

NDOR Oreapolis Wetland Mitigation Bank
Project No. NH-75-2(168) Control No. 21849F
Cass County, Nebraska

NDOR
Nebraska
Department of Roads

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FIGURE
1

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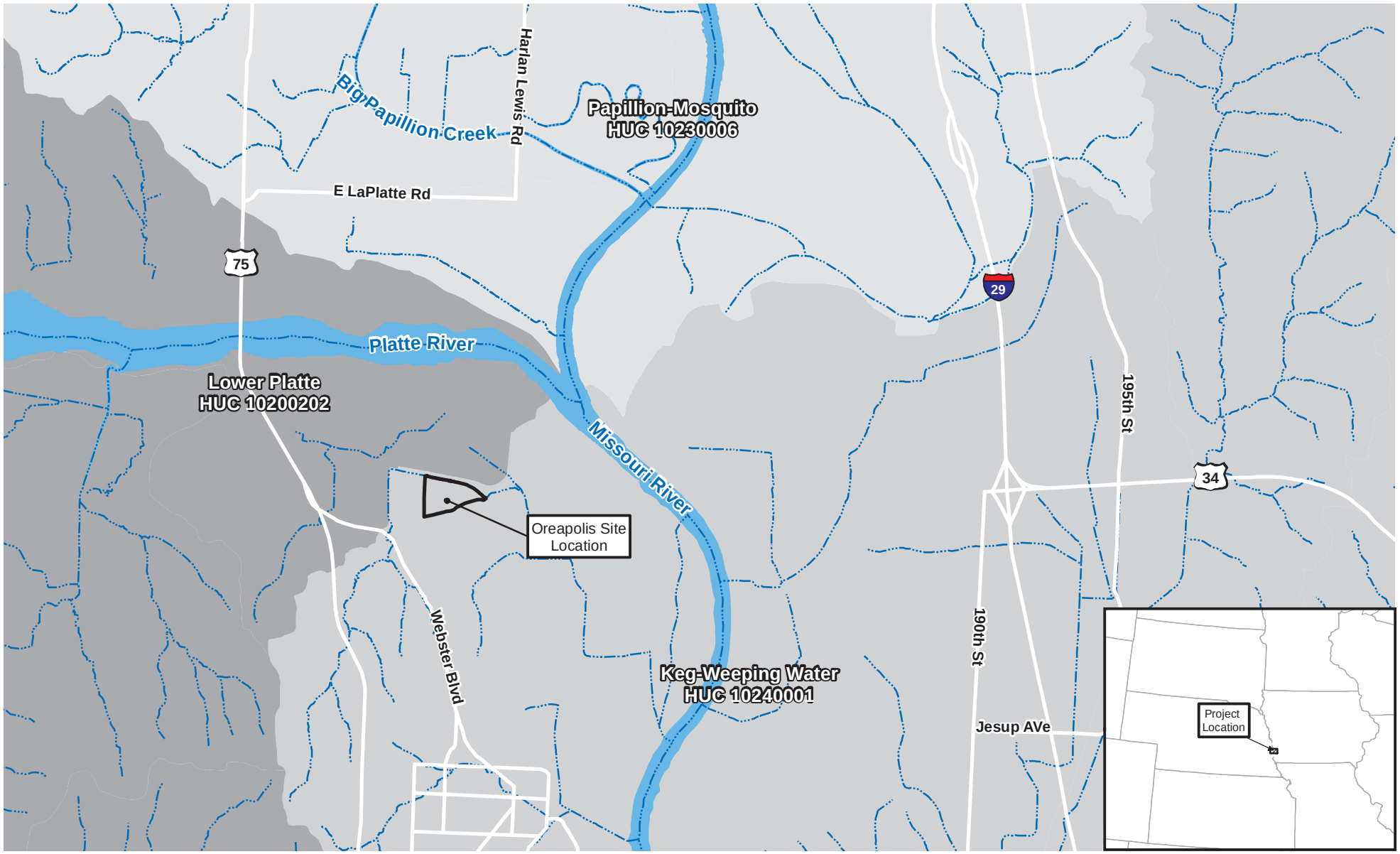

Legend

- Oreapolis Mitigation Site
- Waterway
- Lower Platte HUC 8
- Papillion - Mosquito HUC 8
- Keg - Weeping Water HUC 8

0 0.5 1 Miles

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Hydrologic Unit Codes

NDOR Oreapolils Wetland Mitigation Site
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FIGURE
2

1.2 Factors for Site Selection

Multiple factors were considered for Site selection:

1) Relative elevation
2) Available hydrology
3) Proximity to U.S. 75 and U.S. 34 Highway Projects

1.2.1 Relative Elevation

Although the area to be occupied by the Site has functioned as an agricultural parcel for many years, the area itself lies in a historical floodplain. The Site's occupation of the historical floodplain, and its associated and relative elevation, allow for minimal excavation requirements in order to achieve surface and subsurface wetland hydrology.

1.2.2 Available Hydrology

Beyond the occurrence of the Site within the historical floodplain and its proximity to groundwater, the Site is also bordered to the north by a channelized agricultural drainage that feeds the easterly adjacent Schilling Wildlife Management Area, and eventually the Missouri River. As detailed in Section 3.0, development of the Site involves the engineered diversion of normal flows from this drainage onto the Site.

1.2.3 Site-Specific Project Mitigation

Site selection is strengthened by the Site's ability to provide compensatory wetland mitigation to both the US-34 and US-Highway75 projects. The Site would not only be ecologically beneficial to the water quality and wildlife habitat of the area, but it would also decrease necessary regulatory oversight and workload by minimizing the amount of mitigation sites to be monitored and decreasing the amount of site monitoring reports to be reviewed.

1.2.3.1 U.S. Highway 34 - Bellevue Bridge Project

In Nebraska, the US 34 project is expected to impact 4.97 acres of palustrine emergent (PEM) wetlands with a Nebraska Wetland Subclass of riverine floodplain moderate to slow permeability with minimal out of bank flooding (Cowardin et al., December 1979; U.S. Department of Agriculture [USDA] Natural Resources Conservation Service (NRCS), no date). Impacts would result from fill associated with the proposed roadway embankment and associated drainage structures.

Consistent with Department of the Army Clean Water Act Section 404 Permit No. 2003-10140-WEH (US-34 Bellevue Bridge), the Site will provide compensatory wetland mitigation for the US 34 Bellevue Bridge Project in the form of 9.74 acres of mitigation wetland development. No stream mitigation is required for the US 34 project.

1.2.3.2 U.S. Highway 75 - Plattsmouth to Bellevue Project

The US 75 Plattsmouth to Bellevue Project would result in unavoidable, permanent impacts on 7.06 wetland acres. The following lists the anticipated wetland impacts by Cowardin Wetland Classification:

- 5.15 acres of palustrine emergent, temporarily flooded wetlands (PEMA)
- 0.54 acre of palustrine emergent, seasonally flooded wetlands (PEMC)
- 1.36 acres of palustrine forested, temporarily flooded wetlands (PFOA)
- 0.01 acre of palustrine scrub-shrub, temporarily flooded wetlands (PSSA)

Approximately 5,679 linear feet of stream channel will also be impacted by the US 75 Plattsmouth to Bellevue Project.

The Site will provide compensatory wetland mitigation for the US 75 project by developing 14.12 wetland mitigation acres. It will also allocate 1,557 linear feet of constructed stream channel as compensatory stream mitigation for the US 75 project.[1]

1.3 Purpose, Goals, and Objectives

The primary purpose of the Project is to provide compensatory wetland mitigation for the U.S. 75 Plattsmouth to Bellevue Project and the U.S. 34 Bellevue Bridge Project. The secondary Project purpose is to develop certified wetland and stream mitigation credits for allocation toward unavoidable resource impacts resulting from future/undetermined NDOR projects.

The Project is needed because collectively, the U.S. 75 Plattsmouth to Bellevue and U.S. 34 Bellevue Bridge projects are recognized as important transportation infrastructure projects by the Federal Highway Administration, the State of Nebraska, and the State of Iowa, and because these projects result in unavoidable impacts to waters of the U.S. and therefore require compensatory wetland mitigation in accordance with 33 CFR 332.

The goals, and corresponding objectives, of this plan are specified in the following subsections:

1.3.1 Goal No. 1: Develop a Diverse Habitat of Wetlands, Uplands, and Stream Channel

Specific objectives are as follows:

- Restore a 50-acre agricultural parcel into 36.9 acres of palustrine emergent (PEM) and 6.4 acres of palustrine forested (PFO) wetlands. Wetland restoration is intended to provide wildlife habitat, water quality benefits, and flood storage (as specified in Goals 2 and 3).
- Create 4,266 linear feet of meandering stream channel. Stream channel creation will provide surface hydrology to the restored wetlands via frequent overbanking and will provide riverine habitat within its banks.
- Create 2.8 acres of upland buffer along the western Site boundary. Buffer creation would act to filter sediment and agricultural contaminants, prior to surface water runoff reaching the restored wetland areas.

[1] The US 75 Project also requires on-site stream mitigation, not associated with the Oreapolis Site, to mitigate the balance of project-induced stream impacts.

1.3.2 Goal No. 2: Enhance Water Quality and Wildlife Habitat Consistent with the Nebraska Natural Legacy Project

The Site lies in close proximity to, and drains to, the Missouri River, which is designated as a biologically unique landscape in Nebraska's Tallgrass Prairie Ecoregion by the Nebraska Natural Legacy Project (Nebraska Game and Parks Commission [NGPC], August 2005). The Nebraska Natural Legacy Project describes the existing landscape of the Missouri River as follows:

- Prior to Missouri River channel alterations, the river's floodplain was a mosaic of oxbow lakes, backwater marshes, wet prairies, and floodplain forests.
- Attempts to "tame" the Missouri River have resulted in the draining of floodplain wetlands below Gavins Point Dam.
- A lack of properly timed river flows has impacted the hydrology of floodplain wetlands.
- The majority of the floodplain is now in cropland.

The Nebraska Natural Legacy Project goes on to state that wetland drainage and conversion constitutes a specific stress that affects Missouri River species and habitat. In efforts to alleviate this stress from the Missouri River landscape, the Nebraska Natural Legacy Project has identified the restoration of natural plant communities (e.g., wetlands, prairies, and woodlands) on the river floodplain and terraces as a specific Missouri River conservation strategy.

Construction of the Site would be consistent with the Missouri River conservation strategy identified by the Nebraska Natural Legacy Project. Specifically, the following objectives, related to water quality, wildlife habitat, and flood storage functions of the Missouri River landscape would be enhanced through construction of the Site:

- Water Quality – Surface water from an existing, channelized drainageway would be diverted onto the Site where flow velocities would decrease, allowing suspended sediment to settle out of the water column. Additionally, the Site would be seeded and planted with appropriate wetland species that would provide nutrient uptake functions. Ultimately, the quality of the water discharged from the Site is expected to be higher than the water that enters the Site.
- Wildlife Habitat – The Site is expected to provide valuable habitat for waterfowl and shorebirds, amphibians, reptiles, invertebrates, pheasants, deer, and other resident wildlife. Further, the Site is expected to supplement the wildlife habitat that exists at the nearby NGPC-administered Schilling Wildlife Management Area.
- Flood Storage – The Site would provide for storage of backwater resulting from significant Missouri River flows. As detailed in Section 3.1, there is a 10 percent annual chance that the Site will flood as a result of backwater from the Missouri River. This function would minimize potential damage to adjacent properties and associated agriculture.

1.3.3 Goal No. 3: Provide Benefits to the Overall Watershed, including Pallid Sturgeon Habitat and Documented Wetland Losses

Beyond the general water quality and wildlife habitat benefits that the Site would provide to the Missouri River landscape, the Site would also allow specific benefits to the Federally endangered pallid

sturgeon (*Scaphirynchus albus*). The Site lies within a Recovery-Priority Management Area for the pallid sturgeon, as defined by the *Pallid Sturgeon Recovery Plan* (U.S. Fish and Wildlife Service [USFWS], November 7, 1993). Further, the USFWS *Biological Opinion on the Platte River Recovery Implementation Program* states that the lower Platte River (particularly its confluence with the Missouri River) is highly important pallid sturgeon habitat in a part of the range that USFWS believes is crucial to the species' continued existence and ability to recover (USFWS, June 16, 2006). If habitat restoration occurs, the middle section of the species range may show the greatest overall potential for maintaining the continued existence and eventual recovery of the species (USFWS, June 16, 2006).

One factor noted to affect pallid sturgeon near the Site is the exposure to environmental contaminants (USFWS, June 16, 2006). Specifically, it has been determined that environmental contaminants may be adversely affecting sturgeon reproduction near the Site and that pallid sturgeon may be especially at risk to these contaminants (USFWS, June 16, 2006).

As noted in Section 1.3.2, the Site would provide water quality benefits to the Missouri River by filtering sediment and nutrient loads from surface drainage that would be conveyed through the Site prior to its confluence with the Missouri River. This Site function would directly benefit pallid sturgeon by decreasing the species' exposure to environmental contaminants and lessening the potential for impaired reproductive functions.

1.4 Geographic Service Area

The geographic service area (GSA) equates the geographic boundary in which the Site is authorized to provide compensatory mitigation, as required by Department of the Army, Clean Water Act Section 404 permits. For GSA determination purposes, the 8-Digit Hydrologic Unit Code (HUC) watershed was used as the baseline GSA for the Site. In order to determine whether or not biological, physical, and/or chemical justification exists to expand the GSA to adjacent watersheds, a GSA Checklist (Appendix B of NDOR's Umbrella Mitigation Banking Agreement) was completed for the Site.

As summarized in Table 1, the Site watershed is compatible with four adjacent watersheds, in terms of many of the determined GSA considerations. These considerations include the presence of 303(d) listed streams, species habitat, lands with specific management goals, and general area classifications. Based on the summary of findings included in Table 1 and the more detailed findings listed in the GSA Checklist and associated IRT approval of the GSA, the GSA includes the following watersheds (see Figure 3):

- Keg-Weeping Water (10240001)
- Lower Platte (10200202)
- Big Papillion Mosquito (10230006)
- Nishnabotna (10240004)
- Tarkio-Wolf (10240005)

The Little Nemaha watershed (10240006) is also adjacent to the Site watershed, but was found to be inconsistent with the Site watershed for GSA considerations (see Table 1). The Salt watershed (10200203) also lies adjacent to the Site watershed; however, the Salt watershed was not analyzed for GSA considerations based on its understood occurrence in differing landscapes.

Table 1. Geographic Service Area Considerations

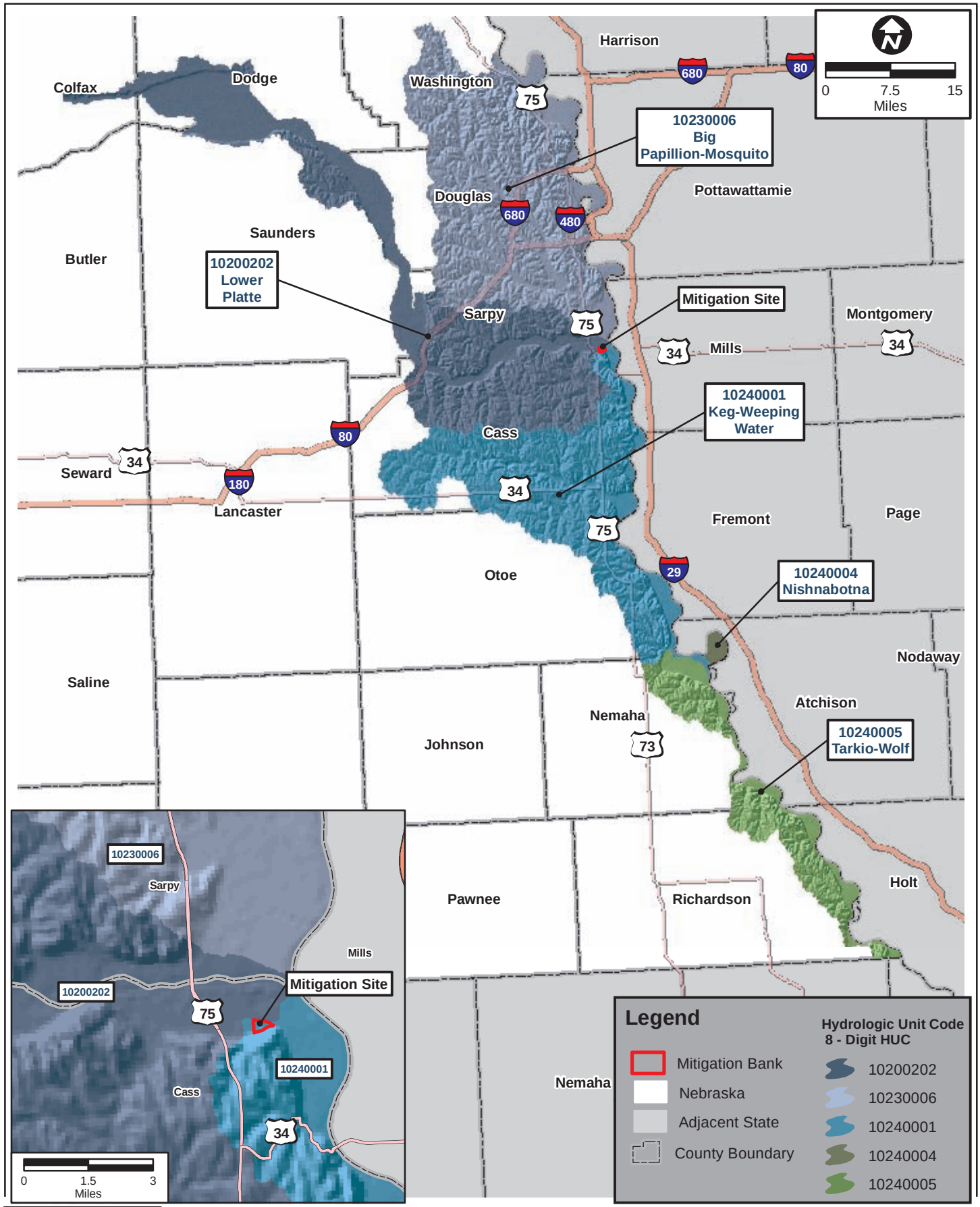
Consideration[1]	Site Watershed	Adjacent Watersheds				
	Keg-Weeping Water (10240001)[2]	Lower Platte (10200202)[2]	Big Papillion Mosquito (10230006)[2]	Nishnabotna (10240004)[2]	Tarkio-Wolf (10240005)[2]	Little Nemaha (10240006)[3]
Watershed Review						
303(d) Listed Stream	X	X	X	X	X	X
Special Waters/Aquatic Habitats	X	X	X	X	X	--
Aquatic Goals	X	X	X	X	X	X
Increased Development	X	X	X	--	--	X
Habitat Review						
Federal T&E Species Habitat	X	X	X	X	X	X
Ecoregion Compatibility	N/A	X	X	X	X	--
MLRA Compatibility	N/A	X	X	X	X	--
Ecoregion of Nebraska Compatibility	X	X	X	X	X	X
Biologically Unique Landscape	X	X	X	X	X	--
Nebraska Landscape Compatibility	N/A	X	--	X	X	X
Habitat Goals	X	X	X	X	X	--
State T&E Species Habitat	X	X	X	X	X	X
Total Positive Considerations	**N/A**	**12**	**11**	**11**	**11**	**7**

Notes:

1 *An "X" represents a positive consideration (the consideration is present or satisfied within the watershed) and is favorable for watershed incorporation into the geographical service area. Further detail on these considerations is provided in the Geographical Service Area Checklist.*

2 *Watersheds included in the GSA based on compatibilities with listed GSA considerations.*

3 *Watershed not included in the GSA based on inconsistencies with listed GSA considerations.*



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Geographic Service Area

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Cass County, Nebraska
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FIGURE
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1.5 Financial Assurances

NDOR will own, maintain full control, and be responsible for the management and long-term maintenance of the Bank. NDOR will be responsible for securing adequate funding for operation and maintenance of the Bank during its operational life, as well as for the long-term management of the wetlands and stream.

NDOR is a governmental unit with taxing authority and the financial capability to implement mitigation banking. Thus, NDOR has access to the necessary financial resources to fund Bank needs, including long-term management and unforeseen events.

1.6 Real Estate Provision for Site Protection

NDOR will initially assume sole ownership and establish a permanent conservation easement that would protect the Site's wetland functions by deterring development or practices that could handicap its functionality. NDOR shall submit the draft conservation easement to USACE for review. NDOR shall also provide copies of the signed purchase agreement and the executed conservation easement to USACE upon execution. The conservation easement would also be filed with Cass County, Nebraska. If NDOR relinquishes ownership of the Site, the conservation easement would protect the developed Site resources in perpetuity. The following depict specific requirements of the conservation easement, as provided by USACE in authorizations 2003-10140-WEH (U.S. 34 Bellevue Bridge) and 2007-00796-WEH (U.S. 75 Plattsmouth to Bellevue):

- There shall be no construction or placement of structures or mobile homes, fences, signs, billboards or other advertising material, or other structures, whether temporary or permanent, on the land.
- There shall be no tilling, draining, excavating, dredging, mining, drilling or removal of topsoil, loam, peat, sand, gravel, rock, minerals or other materials.
- There shall be no building of roads or paths for vehicular or pedestrian travel or any change in the topography of the land.
- There shall be no removal, destruction, or cutting of trees or plants, spraying with biocides, insecticides, or pesticides, grazing of animals, farming, tilling of soil, or other agricultural activity. Maintenance activities are acceptable upon approval from the Corps. Noxious weed control is allowed, but must be documented in monitoring.
- There shall be no operation of all-terrain vehicles or any other type of motorized vehicle on the land, except for pre-existing access roads at the mitigation site. All-terrain vehicles may be used for maintenance and monitoring.
- This Covenant of Dedication may be changed, modified or revoked only upon written approval of the District Engineer of the Omaha District of the U.S. Army Corps of Engineers. To be effective, such approval must be witnessed, authenticated, and recorded pursuant to the law of the State of Nebraska. This Covenant needs to be reviewed by the Corps of Engineers prior to signature to assure compliance with permit conditions.
- This Covenant is made in perpetuity such that the present owner and its heirs and assigns forever shall be bound by the terms and conditions set forth herein.

1.7 Implementation Schedule

Because the Site will provide project-specific mitigation for projects already commenced and due to grading overlap amongst these projects, construction is currently underway. Excavated material resulting from Site development will be used as fill material for the Nebraska approach of the US-34 Bellevue Bridge Project.

The certification of wetland mitigation bank credits would not be requested until USACE verifies that the Site meets all project-specific mitigation obligations, including the anticipated five year monitoring condition. At which time that USACE determines that all project-specific mitigation obligations have been met, wetland mitigation bank credits would be requested for surplus mitigation wetlands that have shown consistent establishment on the Site.

2.0 BASELINE DESCRIPTION OF MITIGATION SITE

2.1 Aquatic Resources

Wetlands within the Site were delineated using the routine method detailed in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual (Environmental Laboratory 1987) (see Appendix B). Identified wetland areas were classified according to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., December 1979) and associated Nebraska wetland subclasses (U.S. Army Corps of Engineers [USACE], Omaha District).

Field delineations determined that two wetlands, totaling 0.59 acre, currently exist on the parcel. The first is a palustrine emergent community within, and adjacent to, an unnamed tributary. The Riverine Channel designation of the Nebraska Wetland Subclass best describes the resources in this area. The other wetland is also an emergent community within a depression adjacent to an unnamed stream channel. The Floodplain Depressional designation of the Nebraska Wetland Subclass best describes the resources in this area.

An unnamed tributary of the Missouri River is the only defined stream channel in the Study Area (see Appendix B). This waterway lies along the northern perimeter of the Study Area and parallels the BNSF Railway Company tracks.

2.1.1 Impacts to Aquatic Resources

The grading limits, associated with Site improvements, would result in approximately 0.01 acre of wetland impact and an additional 0.18 acre of wetland enhancement. See Appendix B: Baseline Wetland Delineation for a summary of anticipated wetland impacts and enhancement. In addition, 131 linear feet of the channelized drainage ditch will be impacted by diversion structures (see Figure 4: Existing Wetlands and Waters of the U.S.). The detailed characteristics of these wetland areas are discussed within the wetland delineation completed for the site (see Appendix B).

Table 2. Baseline Wetland Delineation

Plot ID	Cowardin Wetland Type	Nebraska Wetland Subclass	Dominant Species	Area (acres)	Impacted Area (acres)	Enhanced Area (acres)
5	PEMA	Riverine Channel	*Phalaris arundinacea* (H) FACW+ 100%	0.15	0.01	0.00
6	PEMA	Floodplain Depressional	*Phalaris arundinacea* (H) FACW+ 100%	0.44	0.00	0.18
			TOTALS	**0.59**	**0.01**	**0.18**

Consistent with Department of the Army Clean Water Act Section 404 Permit No. 2010-00317-KEA (Oreapolis Mitigation Site), no compensatory wetland mitigation is required of actual Site construction/development. That is, no debiting of eventual credits would be allocated to the Site construction itself.

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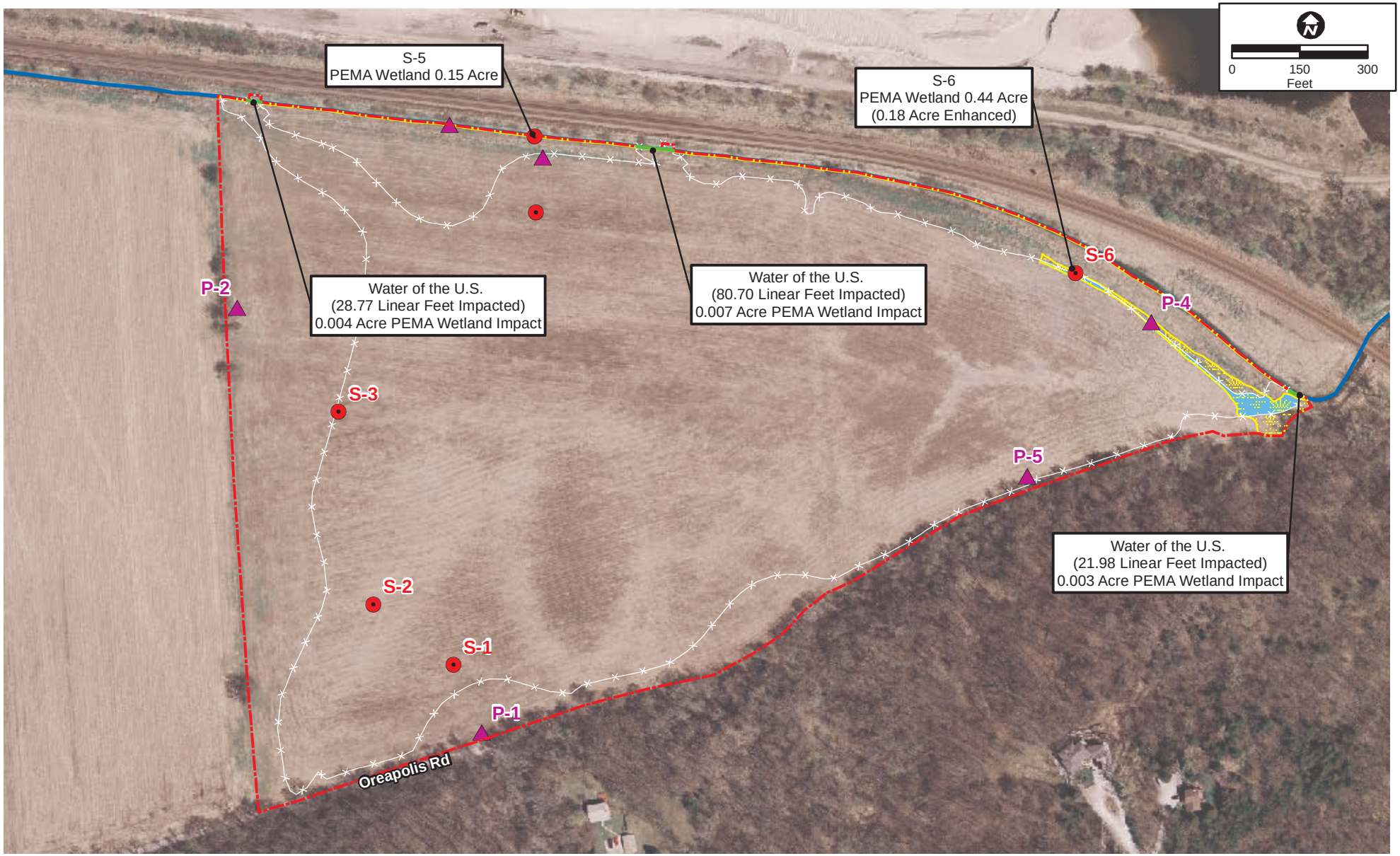

Legend

- Photo Point
- Sample Plot
- Study Area - Grading Limits
- Water of the U.S. - Impacted Water of the U.S.
- Palustrine Emergent Wetland - Enhanced Wetland

Aerial Imagery: 2010 MAPA

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Existing Wetlands and Waters of the U.S.

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FIGURE
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2.2 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) and the Nebraska Game and Parks Commission (NGPC) were consulted regarding federally- or state-listed species that may occur on the Site (see Appendix A). The USFWS determined that four species (western prairie fringed orchid, pallid sturgeon, interior least tern and piping plover) may exist within the Project Area. Furthermore, on August 27, 2008 they concurred with the Determination of Effects listed in NDOR's Biological Evaluation: the Project would not adversely affect designated species or critical habitat. Similarly, NGPC determined that the Site would have no effect on any state-listed threatened or endangered species on November 17, 2008.

2.3 Cultural Resources

Consultation with the Nebraska State Historical Society was conducted in order to determine whether elements of archaeological significance exist on the Site. On February 13, 2008, the Nebraska State Historical Society provided documentation that no recorded historical resources exist on the property and that no survey for unrecorded resources is required (see Appendix A).

2.4 Soils

According to the U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey Geographic (SSURGO) database for Cass County, Nebraska, there are five mapped soil types within the Study Area. The following lists the soils and provides basic principles, including whether or not they are considered hydric.

- Albaton silty clay, 0 to 1 percent slopes (Ab): This deep, nearly level, poorly drained soil is on the Platte and Missouri River bottom lands. Ab is hydric.
- Colo silty clay loam, 0 to 2 percent slopes (Co): This deep, nearly level, somewhat poorly drained soil is on occasionally flooded bottom lands. Co is hydric.
- Haynie silt loam, 0 to 2 percent slopes (Ha): This deep, nearly level, moderately well drained soil is on bottom lands along major rivers. Ha is not hydric.
- Kennebec silt loam, 0 to 2 percent slopes (Ke): This deep, nearly level, moderately well drained soil is on bottom lands. Ke is partially hydric.
- Marshall silty clay loam, 2 to 5 percent slopes (MaC): This deep, gently sloping, well drained soil is on wide ridgetops and upland side slopes. Ha is not hydric.

NDOR also performed five geotechnical soil borings on the Site in May 2006. Results of the borings are provided in Appendix C. Generally, Site soils consist of lean and fat clays with trace to 30 percent occurrence of fine sand in the upper 7 to 11 feet. Below the surface layer, silty sand and poorly graded sand are more prevalent. Overall, it is thought that the soils on the Site are conducive to surface water ponding and wetland development.

2.5 Hydrology

Existing Site hydrology is limited due to the unnamed ditch that collects and conveys local drainage around the Site to the north. The sources of the limited hydrology that currently reach the Site are: 1) surface runoff from hills to the south (about 0.3 square mile of drainage area), 2) groundwater, and 3) rainfall on the Site itself (about 50 acres).

2.6 Vegetation

Although the Site has been historically used for agricultural production, the Site was fallow during the field delineation. Noted vegetation included hardy species that are highly adaptable: Canada horseweed (*Conyza canadensis*), reed canary grass (*Phalaris arundinacea*), switchgrass (*Panicum virgatum*), and giant foxtail (*Setaria sativa*).

During the Site's wetland delineation, vegetation was examined and mapped into three communities within the Site boundary. One of the three communities exhibits hydrophytic vegetation. See Figure 5 for an illustration of community boundaries and Table 3 for dominant species within each community.

Table 3. Vegetation Community Species List

Community ID Number	Dominant Plant Species	Stratum	Relative Cover (%)	Indicator Status	Dominant Species that are Hydrophytic (%)
V-I	Bristlegrass (*Setaria faberi*)	Herb	60	UPL	0
	Canada Horseweed *(Conyza Canadensis*)		30	FACU	
V-2	Marijuana (*Cannabis sativa*)		40	FACU-	50
	Reed canarygrass *(Phalaris arundinacea*)		20	FACW	
	Velvet leaf (*Abutilon theophrasti*)		20	FACU	
	Switchgrass (*Panicum virgatum*)		20	FAC	
V-3	Reed canarygrass (*Phalaris arundinacea*)		100	FACW	100

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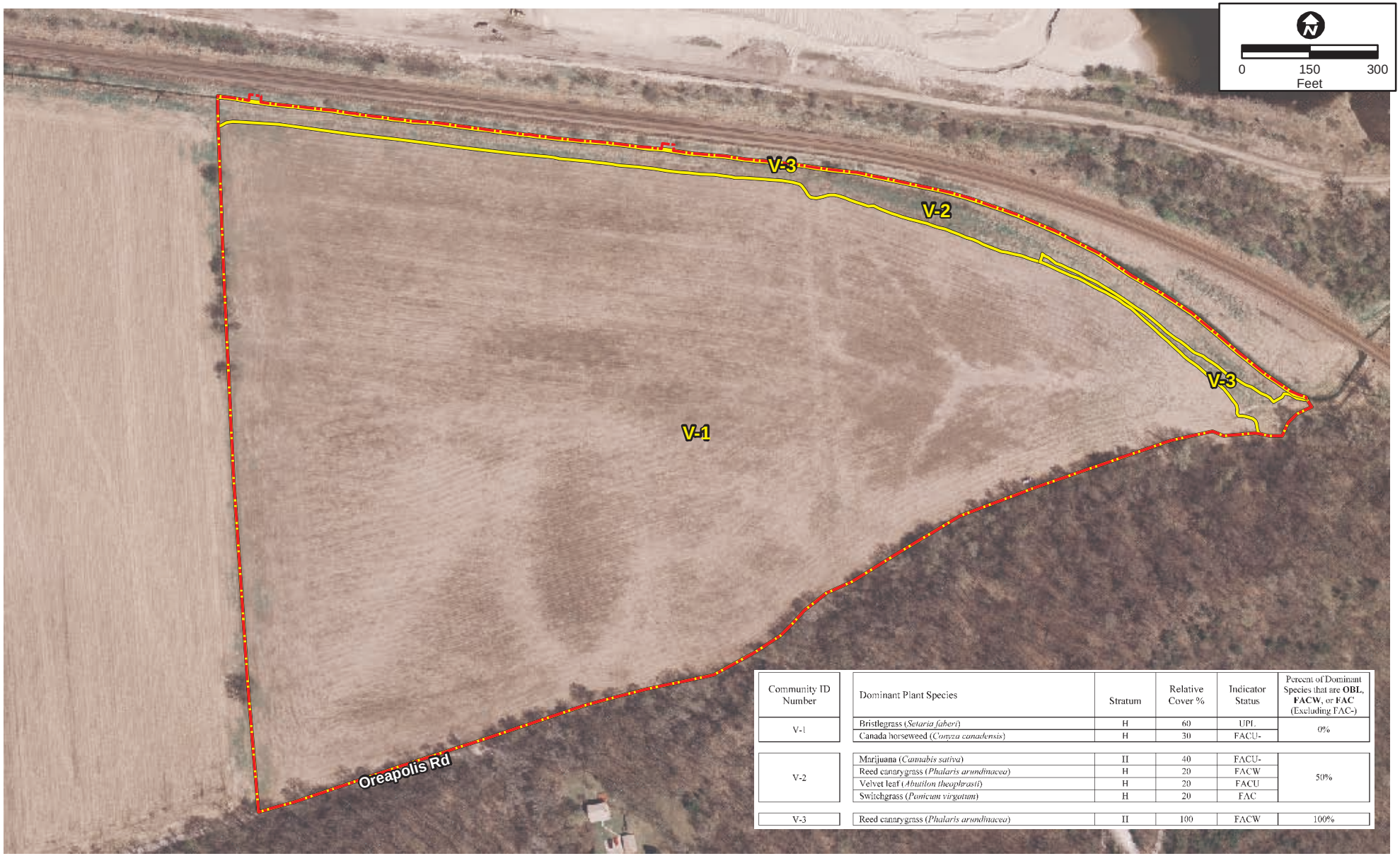

Community ID Number	Dominant Plant Species	Stratum	Relative Cover %	Indicator Status	Percent of Dominant Species that are **OBL**, **FACW**, or **FAC** (Excluding FAC-)
V-1	Bristlegrass (*Setaria faberi*)	H	60	UPL	0%
	Canada horseweed (*Conyza canadensis*)	H	30	FACU-	
V-2	Marijuana (*Cannabis sativa*)	H	40	FACU-	50%
	Reed canarygrass (*Phalaris arundinacea*)	H	20	FACW	
	Velvet leaf (*Abutilon theophrasti*)	H	20	FACU	
	Switchgrass (*Panicum virgatum*)	H	20	FAC	
V-3	Reed canarygrass (*Phalaris arundinacea*)	H	100	FACW	100%

Legend

Vegetative Communities

Study Area

Aerial Imagery: 2011 MAPA

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Existing Vegetative Communities

NDOR Oreapolis Wetland Mitigation Site
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Cass County, Nebraska
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FIGURE
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3.0 CONSTRUCTION WORK PLAN

The following sheets from the Oreapolis Mitigation Site Plans are provided in Appendix D

- General Site Plan
- Grading Project
- Wetland Grading Plan Key Map
- Wetland Seeding Plan
- Wetland Planting Plan

Generally, the Site plan consists of diverting water onto the Site from the existing, channelized drainageway that bounds the Site to the north and impounding the diverted water via an engineered structure that restricts outlet flows. Ultimately, the Site is designed to develop 36.9 acres of PEM wetlands, 6.4 acres of PFO wetlands, and 4,266 linear feet of stream channel.

3.1 Hydrology

Proposed flow diversions would results in 75 percent of the existing drainageway's normal flows being conveyed onto the Site via two gabion structures (50 percent of the original flow by the first structure and 50 percent of the remaining flow by the second structure). The remaining 25 percent of normal flows would continue conveyance within the existing drainageway. Once diverted flows enter the Site, they would be conveyed through the Site via a meandering, constructed channel that is designed to frequently overbank onto adjacent depressional areas and result in emergent wetland development. Additionally, water would be impeded from leaving the Site via a third gabion structure at the Site's outlet. The engineered outlet restriction would back water onto the Site and result in varied shallow water (wetland) habitat due to engineered, shallow excavations that would provide depth variation throughout the Site.

A water budget (hydraulic model) was performed in support of Site development (see Appendix E). Associated findings determined that the proposed Site improvements would provide wetland hydrology, adequate to support a majority of hydrophytic species. Notable findings of the water budget are as follows:

- The 2-year peak discharge of the adjacent drainage is contained within the ditch (assuming no breach of the "levee" or "berm")
- Beginning between the 2-year and the 10-year event, the railroad bridge located near the proposed Site outlet significantly influences stream hydraulics, creating a backwater effect.
- The 10-year peak discharge overtops the berms in a number of locations and results in flooding of the entire Site.
- Overtopping of the meandering channel, proposed to convey diverted flow through the Site, can be anticipated if channel depths are in the range of 1.0 to 2.5 feet.
- There is a 10 percent annual chance that the Site will flood as a result of backwater from the Missouri River.

3.2 Soils

Beyond the shallow excavations and associated soil analysis, performed in accordance with the Site's Baseline Wetland Delineation Report (see Section 2.4), NDOR performed five geotechnical soil borings on the Site in May 2006. Results of the borings are provided in Appendix C. Generally, Site soils consist of lean and fat clays with trace to 30 percent occurrence of fine sand in the upper 7 to 11 feet. Below the surface layer, silty sand and poorly graded sand are more prevalent. Overall, it is thought that the soils on the Site are conducive to surface water ponding and wetland development.

3.3 Vegetation

Occupation of desirable hydrophytes will be facilitated by large-scale Site seeding and tree planting. NDOR will use its typical emergent wetland seed mix on the 36.9 acres of proposed emergent wetland (see Appendix D for the seeding plan and Appendix F for the seed mixes). Areas proposed for forested wetland mitigation will be planted with numerous woody species, as specified in the Wetland Planting Plan (Appendix D). Lastly and as a result of March 2010 USACE coordination, a 50-foot wide buffer strip will be produced along the western boundary of the Site. This area will be planted with the Site's wetland seed mix, but would be considered buffer for credit accounting purposes (4:1 mitigation ratio instead of 1:1 mitigation ratio).

3.4 Construction Timing

Site construction is currently underway. The following considerations explain why construction was commenced prior to completion of the Site Development Plan:

- The Site is intended to provide project-specific mitigation for projects already commenced (in addition to wetland mitigation bank credits).
- Consistent with the Bellevue Bridge Study Record of Decision (FHWA and Iowa DOT, December 14, 2007), any excess material resulting from Site development will be used as fill material for the Nebraska approach of the US-34 Bellevue Bridge Project. The use of this material for this purpose would lessen the need for contractor-supplied fill and would ultimately deter the need for on-site borrow, which could result in Platte River depletions due to exposed groundwater evaporation.
- All necessary permits have been obtained.

4.0 PERFORMANCE STANDARDS

4.1 Performance Standards for Wetland Mitigation

- **Performance Standard 1**: Revegetation in the upland buffer strip shall be acceptable when ground cover equates 75 percent of total aerial cover by the approved seed mix.
- **Performance Standard 2**: Wetland plant species shall have a minimum of 80 percent aerial cover by the fifth growing season after construction (NDOR will make reasonable efforts to control the establishment of undesirable plant species, purple loose-strife (*Lythrum salicaria*) for example, within the wetland).
- **Performance Standard 3**: Survival of 75 percent of the total tree plantings depicted in the Site's planting plan. Additional trees would be planted, as necessary, to achieve a 75 percent survival rate.

4.2 Performance Standards for Stream Mitigation

Stream mitigation will be considered successful if:

- Overall bank erosion is moderated by vegetation, and there are no apparent culturally induced catastrophic failures; the channel is stable with no active downcutting occurring
- The stream is maintaining the pattern, profile and dimension of design
- Within the stream bed and adjacent banks, 10-30% coverage by habitat features favorable for stream faunal colonization and cover.
- The riparian buffer vegetation is achieving the same target cover as the wetland criteria

5.0 MONITORING REQUIREMENTS AND PLAN

5.1 Responsible Parties

NDOR is responsible for annual Site monitoring and reporting. NDOR reserves the right to employ an outside contractor to perform this action.

5.2 Data Collection, Assessment Tools and Methodologies

In efforts to accurately document Site development, NDOR would implement its standard wetland mitigation monitoring practices on the Site. Specifically, annual Site monitoring would consist of vegetation community, hydrology, and wetland boundary mapping along three or four established sampling transects. The north/south transects would be established during the first monitoring event to comprehensively sample areas representative of the entire Site. Additionally, the transects would facilitate the documentation of transitions between upland and wetland areas and between different wetland types. The established transects would be used throughout the necessary Site monitoring period to document a chronology of changes in the amounts and types of wetlands that develop on the Site. Additionally, ground-level site photographs would be taken at regular intervals from common locations.

In addition to NDOR's standard wetland monitoring protocols, Site-specific monitoring protocols are also necessary at the Site. This is due to the Site acting to mitigate two projects (authorized by two separate Department of the Army Permits) and potentially developing subsequent wetland mitigation banking credits.

The Site will be spatially divided into three areas and the mitigation wetlands that development on the Site will be designated to: 1) the US-34 project, 2) the US-75 project, and 3) wetland mitigation bank credit certification. The spatial divisions of the Site would be dynamic and would move, as necessary, to provide required site-specific mitigation for the US-75 and US-34 projects. With this in mind, it is initially thought that the area located at the eastern Site extreme will be the first area to develop functional emergent mitigation wetlands; therefore and consistent with current construction schedules for the projects, this area is initially allocated to provide compensatory mitigation to the US-34 Project. Moving westward and along the southern Site boundary, the second area would be initially allocated to provide compensatory emergent and forested wetland mitigation to the US-75 Project. The surplus area, located at the western end of the Site, would be considered for wetland mitigation bank credit certification. The initial spatial Site divisions are provided in Figure 6: Dynamic Site Divisions.

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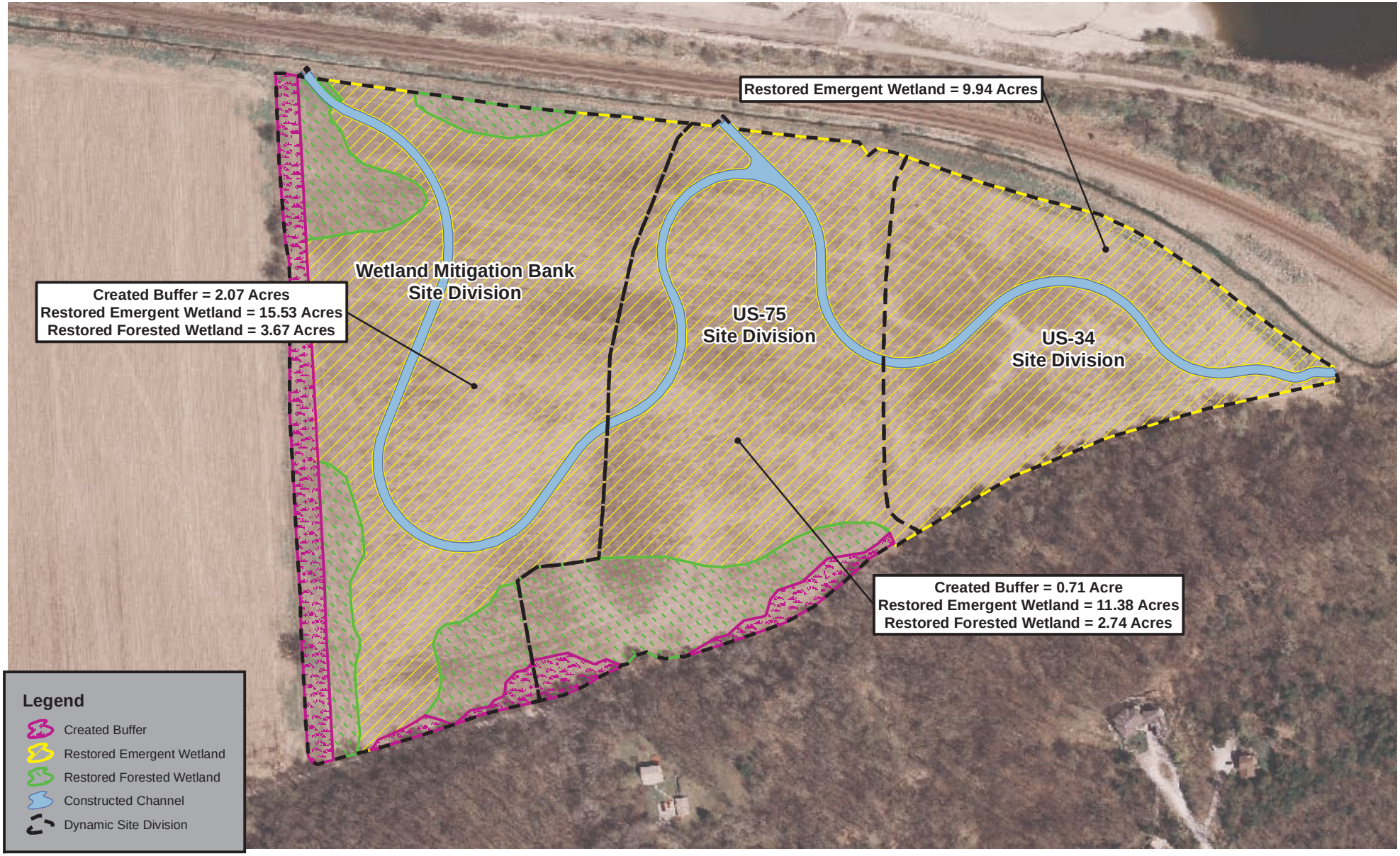

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Aerial Imagery: 2010 MAPA

HDR

Dynamic Site Divisions

NDOR Oreapolis Wetland Mitigation Site
Project No. NH-75-2(155) Control No. 21849
Cass County, Nebraska
Site Development Plan

NDOR
Nebraska
Department of Roads

DATE
August 2011

FIGURE
6

5.2.1 Wetland

Wetland monitoring will consist of Global Positioning System (GPS) mapping of the wetland vegetation communities and Site hydrology, observation of changes in soil characteristics, and collection of ground level site photos taken at regular intervals from common locations.

Annual monitoring reports of the wetland mitigation site will be submitted to USACE, Nebraska Regulatory Office, to ensure that Site is developing properly. Wetland monitoring reports will be performed according to the following procedure:

1. Monitoring reports shall be done following Part IV Section E (Comprehensive Determinations) of the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, January 1987).
2. A set of as-built plans of Site will serve as a baseline for future monitoring, with locations marked for observation photos.
3. Photos taken at observation points, and showing all representative areas of the Site, will be taken at least once a year during the growing season.
4. Annual monitoring reports for the Site will be due on December 1 of the monitored years.
5. If the Site is considered to be failing at any time, NDOR will coordinate with USACE and implement corrective action.

The following sections detail each monitoring procedure.

5.2.1.1 Ground-level Photography

The following steps will be used for this procedure:

1. Select permanent photo points during the first site visit. A sufficient number of points will be selected to document site design characteristics.
2. Record photo point designation and orientation.
3. Document the location, number, and orientation of each photo. Photos will be taken at each site visit.

In addition to the permanent photo point locations, additional photos will be taken to support other notable conditions, such as erosion control, remedial actions, and additional site activities. Location and orientation of these photos will be recorded and noted as additional locations to visit (depending on site characteristic) in subsequent monitoring events.

Photographs will be used as qualitative and supportive documentation to show that hydrology and vegetation permit conditions have been met. In addition, a multiple-year sequence of photographs shows development of vegetative communities.

The final product will contain the following: aerial photographs that show the location and orientation of all photos and an MS Word document that contains photos for all permanent photo point locations as well as any additional photos.

5.2.1.2 Hydrology Determination

The following steps will be used for this procedure:

1. Document the presence of primary hydrology indicators at hydrology sample points and through visual observation of inundation and/or saturation, watermarks, drift lines, sediment deposits, and drainage patterns.
2. Document secondary hydrology indicators at each hydrology sample point, including oxidized root channels in the upper 12 inches, local soil surveys, water-stained leaves, and the FAC-Neutral test.
3. Map hydrology sample points and the wetland hydrology boundaries on as-built plans or aerial photographs while in the field.

The hydrology data gathered will be used to identify and map the hydrologic conditions at the mitigation site. On-site hydrology data will be collected to provide an inventory of hydrology indicators present throughout the mitigation site, with data recorded at each hydrology sample point.

The result of the hydrology determination will be documented on as-built plans or aerial photographs with the wetland hydrology boundary indicated.

5.2.1.3 Soils Determination

The following steps will be used for this procedure:

1. Locate soil sample locations in each mapped or observed soil type. In addition, the points should be located across the gradient from wetland to upland.
2. Give each soil sample location a permanent designation (e.g., S1, S2, etc.).
3. Identify the location of all soils sample locations on as-built plans or aerial photographs. If the sample locations are found to be inadequate, they can be moved but reasons for the relocations will be provided.
4. Dig a pit or take a soil sample with a soil probe at each soil sample location.
5. Describe and record data on the profile, including a description of soil texture, soil color, presence of redox features, and thickness of each horizon. It is important to describe the soil profile immediately after completion of construction but prior to inundation. This will allow for documentation of any changes in soils as a result of the creation.
6. If necessary, sample additional locations to define where the hydric soil characteristics begin or end.

The soils data gathered can be used for both evaluating Site suitability for wetland creation and documenting hydric soil development. When used to evaluate the development of soils, it is important that post construction but pre-inundation or saturation conditions be documented. This will provide the baseline data needed for making comparison with future samples. Any changes in the profile descriptions will be compared and documented. In particular, changes in the abundance, size, and contrast of redox features will be noted.

The result of the soils determination will be documentation of site conditions and as-built plans or aerial photographs showing field sample locations.

5.2.1.4 Vegetation Evaluation

The routine method from the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, January 1987) will be used for determining plant communities at the site. The method is outlined below.

1. During the annual field visit, a representative observation point within each community will be selected (may change from year to year).
2. Characterize each plant community by visually determining and recording the dominant species for the herbaceous, tree, shrub, and woody vine layers. Use of the National List of Plant Species That Occur in Wetlands: Central Plains (Region 5) (USFWS, 1988) will be used to determine the indicator status for each species. In addition, document the aerial coverage of bare soil.
3. Determine and document whether hydrophytic vegetation is present using the 50:20 Rule.
4. Note any significant non-dominant, invasive, or colonizing species that provide additional evidence that the community is, or is not, developing into a hydrophytic community.
5. Determine what areas of emergent plant communities have achieved 80 percent canopy cover. Map these areas on aerial photographs.
6. Determine whether or not tree plantings have a 75 percent survival rate.

5.2.1.5 Wetland Boundary Delineation

The wetland boundaries are determined based on the presence of hydrology and hydrophytic vegetation. This procedure will use the data collected from the hydrology and vegetation procedures to determine and map the wetland boundary. The boundary will be based on overlaying the hydrology and vegetation maps. Hydric soils can take many years to form. As defined in the *Field Guide for Wetland Delineation: 1987 Corps of Engineers Manual* (Section F, subsection 4) (Wetland Training Institute, Inc., 1995), if changes in hydrology have occurred so recently as to not allow hydric soils to develop and if wetland hydrology and vegetation are present, the area is a wetland. Soil samples will be documented (Soils Field Form) at strategic hydrology sample points but are for supplemental information only and will not be used in determining wetland boundaries.

The following steps will be used for this procedure:

1. Determine the wetland boundary in accordance with standard wetland delineation criteria (1987 Manual).
2. Classify the wetlands according to Cowardin et al. (1979).
3. Measure the area of each wetland type.
4. Record the wetland types and areas.
5. Determine the areas that meet or exceed the performance standards.

The final product of this procedure will be a map showing the wetland boundaries and acres that meet the performance standards.

5.2.2 Stream

General stream monitoring techniques will follow the basic guidelines outlined within the wetlands monitoring section above and will include GPS mapping of the stream, monitoring of any observed changes in stream profile, and ground level site photos taken at regular intervals from common locations. Annual monitoring reports would be submitted to USACE.

5.2.3 Mitigation Site Monitoring Report

5.2.3.1 Standard Reporting Protocols

Annual Site monitoring reports will be submitted to the USACE Wehrspann Regulatory Office to document Site development. Monitoring reports would identify both the amount and type of wetlands that develop on the Site by mapping and describing wetland hydrology and vegetation. By interpreting the data included in the monitoring report, NDOR and USACE would determine whether Site development is adequate and whether the Site's performance standards are being met. Lastly, the monitoring report would provide NDOR and USACE information sufficient to determine whether corrective actions are necessary.

5.2.3.2 Site-Specific Reporting Protocols

A modified wetland mitigation monitoring report will be developed for Site monitoring. In addition to figures that include the dynamic Site divisions (previously noted) the reports will also include an accounting section that documents mitigation wetland development in relation to 1) the US-34 Project, 2) the US-75 Project, and 3) surplus mitigation acres that may be considered for wetland mitigation bank credit certification. Specific mitigation wetland acreages will be quantified and qualitatively discussed relative to each project requiring site-specific mitigation. That is, the reports will provide a detailed discussion on how the Site is developing relative to the site-specific mitigation requirements of the US-34 and US-75 projects. Additionally, the reports will provide a more generalized discussion relative to surplus mitigation wetland development.

6.0 CONTINGENCY PLANS AND REMEDIAL ACTIONS

If, during the monitoring period, it is determined that the Site is failing to meet conditions described in all applicable Section 404 Permits, NDOR would evaluate potential causes for Site failure and would take appropriate corrective measures to assure that the Site meets the permit conditions. Potential corrective actions may include modification of water diversion and control structures and additional seeding or tree planting. If, after corrective measures have been taken, the Site continues to fail to meet the requirements of the permits, NDOR would seek an alternative site in order to be in compliance with the permits.

In the event that NDOR fails to implement necessary remedial actions within 30 calendar days after notification by USACE or another authorizing agency, or within an established time frame agreed upon by USACE, the IRT (acting through the Chair) will notify NDOR and the appropriate authorizing agency(ies) and will recommend appropriate remedial actions.

7.0 LONG-TERM MANAGEMENT PROVISIONS

The operational life of the Site will terminate under the following conditions: 1) USACE has released NDOR from mitigation requirements associated with the project-specific portion of the Site; 2) compensatory mitigation credits have been exhausted; 3) banking activity is voluntarily terminated with written notice from NDOR; and 4) it has been determined that the Site is functionally mature and/or self-sustaining.

NDOR will either provide long-term management or will deed the Site over to another State or conservation agency. Regardless, the wetlands, streams, and/or other aquatic resources at the Site will be protected in perpetuity via a permanent conservation easement.

8.0 WETLAND MITIGATION CREDITS

NDOR will not request the certification of wetland mitigation bank credits until USACE has verified that the Site meets all site-specific mitigation obligations, including the five year monitoring condition anticipated to be included in the Section 404 permits for both the US 34 and US 75 projects. At which time that USACE determines that all site-specific mitigation obligations have been met, wetland mitigation bank credits would be requested for surplus mitigation wetlands that have shown consistent establishment on the Site.

8.1 Credit Production

Following the USACE determination that all site-specific mitigation obligations have been met (as noted above) wetland and stream credits would be produced at the Site in association with the surplus creation of wetland area and stream length. Table 4 presents the maximum amount of surplus wetland area and stream length that may develop at the Site.

Table 4. Potential Resources for Credit Banking

PEM Floodplain Depressional Wetlands (ac)	PFO Floodplain Depressional Wetlands (ac)	Buffer (ac)	Stream Channel (lf)
15.5	3.7	2.0	2,929

Minimum credit ratios have been established in accordance with The U.S. Army Corps of Engineers' Guidance for Compensatory Mitigation and Mitigation Banking in the Omaha District (USACE, August 2005). These ratios are detailed in NDOR's Umbrella Mitigation Banking Agreement (NDOR, July 2011); credits certified at the Site will be produced based on these ratios.

Stream mitigation credits produced at the Bank will be determined by the total linear feet of stream channel meeting the performance standards identified in Section 4.2. However, the Omaha District 2011 Operational Draft of the Nebraska Stream Condition Assessment Procedure, or another USACE-approved stream assessment methodology, can be implemented if project-specific stream impacts requiring a functional assessment are to be mitigated by the Bank.

8.2 Credit Availability

Because credits would not be made available until USACE releases NDOR from all site-specific (US-34 and US-75) mitigation requirements, pre-crediting (in terms of authorizing credits following Site Development Plan Approval or Site Construction Completion) is not applicable to the Site. Pre-crediting may still apply to surplus mitigation wetlands that satisfy Regional Supplement wetland criteria, but are pending certification from the Nebraska Interagency Review Team (IRT). A general schedule of credit availability, including allowable pre-crediting, is provided in Table 5. Credit ratios are based on the threshold, or minimum, ratios defined by USACE (August 2005).

Table 5. General Schedule of Credit Availability

Status of Mitigation Bank Site	Minimum Threshold Credit Ratio	Percentage of Available Credits Released	Cumulative Percentage of Available Credits Released
Regional Supplement Wetland Criteria Satisfied	1:1	30%[1]	30%
Site Ecologically Sound (i.e. certified)[2]	1:1	70%[3]	100%

Source: USACE, August 2005.

Notes:

1 *Based on total anticipated credits.*

2 *Based on established performance standards.*

3 *Based on total areas meeting established performance standards; partial certification is allowable.*

8.3 Compensation Ratios

Compensation ratios for both wetland and stream mitigation credits are detailed in NDOR's Umbrella Mitigation Banking Agreement (NDOR, July 2011); compensation ratios and associated credit debiting from the Site will follow the protocols contained therein.

9.0 REFERENCES

33 CFR 332. Compensatory Mitigation for Losses of Aquatic Resources; Final Rule.

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. December 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Department of the Interior, Washington D.C. Available online at http://www.fws.gov/nwi/Pubs_Reports/Class_Manual/class_titlepg.htm.

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Environmental Laboratory. September 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region. Technical Report ERDC/EL TR-08-27. U.S. Army Corps of Engineers, U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

National Research Council. 1995. Wetlands: Characteristics and boundaries. Washington, DC: National Academy Press.

NDOR. July 2011. Umbrella Mitigation Banking Agreement.

NDOR. January 2009. Oreapolis Wetland Mitigation Site Baseline Wetland Delineation Report.

NGPC. August 2005. The Nebraska Natural Legacy Project: A Comprehensive Wildlife Conservation Strategy. Lincoln, Nebraska. Available online at http://www.ngpc.state.ne.us/wildlife/programs/legacy/review.asp.

USACE. November 1, 2010. USACE Correspondence to NDOR Concerning CWA Section 404 Authorization of the US-75 Plattsmouth to Bellevue Project. Department of the Army Reference No. 2007-00796.

USACE. April 23, 2010. USACE Correspondence to Iowa DOT and NDOR Concerning CWA Section 404 Authorization of the US-34 Bellevue Bridge Project. Department of the Army Reference No. 2003-10140.

USACE. August 2005. The U.S. Army Corps of Engineers' Guidance for Compensatory Mitigation and Mitigation Banking in the Omaha District. Available online at https://www.nwo.usace.army.mil/html/op-r/guidance-aug05.pdf.

USDA NRCS. No date. Nebraska Wetland Subclasses, Attachment K. Prepared jointly by NRCS, USACE, and NGPC.

USDA SCS. March 1984. Soil Survey of Cass County, Nebraska.

USFWS. November 7, 1993. Pallid Sturgeon (Scaphirhynchus albus) Recovery Plan. Bismarck, ND: U.S. Fish and Wildlife Service. Available online at http://www.fws.gov/yellowstonerivercoordinator/pallid%20recovery%20plan.pdf.

USFWS. June 16, 2006. Biological Opinion on the Platte River Recovery Implementation Program. Available online at http://www.fws.gov/filedownloads/ftp%5Fregion6%5Fupload/Platte%20River%20Final%20Biological%20Opinion/Platte_River_FBO(June16).pdf.

Appendix A

Permits and Agency Concurrences

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NEBRASKA REGULATORY OFFICE – KEARNEY
2214 2ND AVENUE
KEARNEY, NEBRASKA 68847-5315

https://www.nwo.usace.army.mil/html/od-rne/nehome.html

REPLY TO
ATTENTION OF

February 18, 2010

Mr. Tim Weander
Nebraska Department of Roads
4425 South 108th Street
Omaha, Nebraska 68154

RE: 2010-00317-KEA

Dear Mr. Weander:

We have reviewed your request for Department of the Army authorization to construct two diversion structures in an unnamed tributary of the Missouri River and one outlet structure in an adjacent wetland of this unnamed tributary. The structures are proposed to establish approximately 47 acres of riverine floodplain wetlands and 4,266 linear feet of stream channel at the Oreapolis mitigation site. The site is located in the Northeast ¼ of Section 1, Township 12 North, Range 13 East, Cass County, Nebraska.

We have prepared a preliminary jurisdictional determination (JD) for the site which is a written indication that waterways within your project area may be waters of the U.S. Such waters have been treated as jurisdictional waters of the U.S. for purposes of computation of impacts and compensatory mitigation requirements. If you concur with the findings of the enclosed preliminary JD, please sign it and return it to the letterhead address within two weeks.

If you believe the preliminary JD is inaccurate, you may request this office complete an approved JD prior to your commencement of any work in a water of the U.S. An approved JD is an official determination regarding the presence or absence of waters of the U.S. Completion of an approved JD may require coordination with the U.S. Environmental Protection Agency.

If you do not want the U.S. Army Corps of Engineers (Corps) to complete an approved JD, you may proceed with the proposed project in accordance with the terms and conditions of Department of the Army Nationwide Permit No. **27** found in the March 12, 2007 Federal Register (72 FR 11092), Reissuance of Nationwide Permits. Enclosed is a fact sheet that fully describes this Nationwide Permit and lists the General and Regional Conditions that must be complied with.

This authorization is subject to the following Regional Condition(s):

1. All areas disturbed by construction shall be revegetated with appropriate perennial, native grasses and forbs and maintained in this condition. *Phalaris arundinacea* (Reed Canary Grass), *Lythrum salicaria* (Purple Loosestrife), *Bromus inermus* (Smooth Brome), *Phragmites, sp.* (Common Reed, River Reed) and *Tamarix, sp.* (Salt Cedar), are *NOT*

appropriate choices of vegetation. The disturbed areas shall be reseeded concurrent with the project or immediately upon completion. Revegetation shall be acceptable when ground cover of desirable species reaches 75%. If this seeding cannot be accomplished by September 15 the year of project completion, then an erosion blanket shall be placed on the disturbed areas. The erosion blanket shall remain in place until ground cover of desirable species reaches 75%. If the seeding can be accomplished by September 15, all seeded areas shall be properly mulched to prevent additional erosion.

2. The permittee and/or the permittee's contractor or any of the employees, subcontractors or other persons working in the performance of a contract or contracts to complete the work authorized herein, shall cease work and report the discovery of any previously unknown historic or archeological remains to the Nebraska Regulatory Office. Notification shall be by telephone or FAX within 24 hours of the discovery and in writing within 48 hours. Work shall not resume until the permittee is notified by the Nebraska Regulatory Office.

Although an individual Department of the Army permit will not be required for the project, this does not eliminate the requirement that you obtain any other applicable Federal, state, tribal or local permits as required. Please note that deviations from the original plans and specifications of your project could require additional authorization from this office.

You are responsible for all work accomplished in accordance with the terms and conditions of the Nationwide Permit. If a contractor or other authorized representative will be accomplishing the work authorized by the Nationwide Permit in your behalf, it is strongly recommended that they be provided a copy of this letter and the attached conditions so that they are aware of the limitations of the applicable Nationwide Permit. Any activity that fails to comply with all of the terms and conditions of the Nationwide Permit will be considered unauthorized and subject to appropriate enforcement action.

In compliance with General Condition 26, the attached Compliance Certification form must be signed and returned to the address listed upon completion of the authorized work and any required mitigation.

This verification will be valid until **February 18, 2012**.

Should you at any time become aware that either an endangered and/or threatened species or its critical habitat exists within the project area, you must immediately notify this office.

The Omaha District, Regulatory Branch, is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our website at http://per2.nwp.usace.army.mil/survey.html. If you do not have Internet access, you may call and request a paper copy of the survey that you can complete and return to us by mail or fax.

If you have any questions concerning this determination or jurisdiction, please feel free to contact Mr. Keith Tillotson at (308) 234-1403 and reference Nationwide Permit No. 2010-00317-KEA.

Sincerely,

John L. Moeschen
Nebraska State Program Manager

Enclosure

Copy Furnished:

DEQ (Hickman)
NDOR (Jurgens)
NDOR (Vagts)

STATE OF NEBRASKA

THE DEPARTMENT OF NATURAL RESOURCES

In the Matter of Application A-18725	)	Case 013-10CC
	)	
	)	**FINAL ORDER**
Water Division 1-F	)	

BACKGROUND

1. On November 8, 2010, Nebraska Department of Roads (NDOR) filed in the Department of Natural Resources (Department) application A-18725 for a permit to impound water, specifications according to *Title 457 Neb. Admin. Code* Chapter 11, and plan P-17737. Collectively, the application and plan are referred to as the Oreapolis Wetland Mitigation Project.

2. Public notices of the application and opportunity to object and request a hearing on the application prior to its final consideration by NDNR were published in local newspapers. A local landowner, Harriet D. Holman, timely filed an objection and request for hearing on December 30, 2010.

3. Both the objector and applicant were represented by legal counsel. The objection/pleading was timely answered by the applicant and a prehearing conference was held to expedite the proceeding.

4. A hearing on the matter was held April 13, 2011 and a record was made of the hearing.

5. The Director has reviewed this record, and being fully advised on the matter makes the following findings of fact and conclusions of law.

FINDINGS OF FACT

1. Public notice and opportunity to be heard on the proposed project were timely provided by the applicant and NDNR. Record, P. 53-58, 64-97

2. No diversion structure construction or diversion of the subject water has been done prior to a final decision on this application by DNR. Record, P. 62-63

3. The objector's property is upstream of the project and she expresses no legal interest in the water subject to the appropriation or any intent to apply the water to her beneficial use. Record, pp. 62-63,99-128

4. The application was made, and the project was designed, to provide mitigation of wetlands removed by NDOR as a result of road projects currently planned or underway in Eastern Nebraska and as a requirement of U.S. Corps of Engineers as necessary environmental mitigation under the U.S. National Environmental Policy Act for those road projects. Record, P. 11-12, 64-97;Exhibits 14,15,16,18

5. The project provides flood prevention enhancement of any risk of water backing up on to the objector's upstream property due to amount of soil removed for purposes of the project. Record, pp. 99-128

6. The wetland that will result from the project is not detrimental to the public welfare. Record,pp.70-93, Exhibits 14,15,16,18

CONCLUSIONS OF LAW

1. The governing law for a final determination in the matter of a hearing on the application is Neb. Rev. Stat. Section 46-235 (1),which states in part "… if there is unappropriated water…if such application and appropriation when perfected are not otherwise detrimental to the public welfare, and if denial of the application is not demanded by the public interest, the department shall approve the application…".

2. The Objector has the burden of proof in her petition for denial of the application. Neb. Rev. Stat. Section 61-206

3. The Objector has not met the burden of proof that the application is detrimental to public welfare.

4. The Objector has not met the burden of proof that denial is demanded by the public interest.

5. DNR has no reason not to approve the application based upon the evidence presented in the hearing.

6. The application should be approved based upon consideration of the information presented in NDOR's application, the Department's file, and record of the proceeding.

ORDER

IT IS HEREBY ORDERED Application A-18725 and plan P-17737 are APPROVED subject to the following limitations and conditions:

1. The source of water is a tributary to the Missouri River.

2. The priority date is November 8, 2010.

3. The amount of water that may be diverted shall not exceed 17.6 acre-feet per year to be stored in NDOR Oreapolis Wetland Mitigation Site. NDOR Oreapolis Wetland Mitigation Site will be located in the NE¼ of Section 1, Township 12 North, Range 13 East of the 6th P.M. in Cass County.

4. The appropriator must comply with all relevant statutes. This includes, but is not limited to, the following:

   A. Notify the Department of any change in ownership or address.

   B. Receive approval prior to taking any action that changes the storage capacity of these reservoirs, plan P-17737, or the type of appropriation.

5. The appropriator must comply with the following deadlines.

   A. Construction of the diversion works must begin within twelve months of the signing date of this Order. The appropriator must proceed diligently with the construction unless interrupted by some unavoidable and natural cause.

B. Construction of the diversion works must be completed by October 1, 2012.

ADDITIONAL INFORMATION

Failure to comply with all laws and regulations pertaining to surface water appropriations and any orders issued by the Director of the Department of Natural Resources may result in the cancellation of the appropriation, temporary closing of the appropriation, administrative penalty, criminal prosecution, or any combination thereof.

DEPARTMENT OF NATURAL RESOURCES

May 9, 2011

Brian P. Dunnigan, P.E., Director

Any person with sufficient legal interest who has been or may be substantially affected by this approval may appeal pursuant to Neb. Rev. Stat. Section 61-207. Such appeal must be received by the Department at its Lincoln office (4th Floor, Nebraska State Office Building, 301 Centennial Mall South, P.O. Box 94676, Lincoln, Nebraska 68509-4676) within 30 days of the date of the Approval and be accompanied by filing fee and bond according to Nebraska Supreme Court Rules.

A copy of this order was posted on the Department's website. Copies of this order of approval and plan P-17737 were provided to the Department's field office in Lincoln, Nebraska. A copy of this order of approval was mailed to the following:

Andrew D. Weist, P.E.
HDR
8404 Indian Hills Drive
Omaha, NE 68114

Copies of this order of approval and plan P-17737 were mailed on May 10, 2011, to the following:

Dale Vagts
Nebraska Dept. of Roads
1500 Highway 2
Lincoln, Nebraska 68509

David V. Chebatoris
Svoboda and Chebatoris
202 W. Eldors Ave., P.O. Box 207
Weeping Water, NE 68463-0207

Jennifer A. Huxoll
Nebraska Dept. of Roads
P.O. Box 94759
Lincoln, NE 68509-4759

Harriet D. Holman
415 Oreapolis Rd.
Plattsmouth, NE 68048

RECEIVED
JAN 25 2010
ENVIRONMENTAL SECTION

Nebraska Department of Roads

Floodplain/Floodway Development Permit/Application

Permit Application No.
Date: 1/13/10

This form is used for any man-made change to improved or unimproved transportation facility, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations, or storage of equipment or materials.

Nebraska Department of Roads will obtain all other necessary federal, state, or local permits *(e.g., Corps of Engineers 404 Permit, Local Levee District, etc.)*

1.	Name of Applicant:	Nebraska Department of Roads PO Box 94759 Lincoln NE 68509-4759
2.	Type and Use of Development:	Wetland Restoration
3.	Specific Location of Development:	Sec. 01 T12N R13E
4.	Complete this section if the proposed development involves the improvement of a structure *(i.e., walled and roofed building).*	Pre-Improvement Value of Structure: $ Cost of Improvement: $

The following section is to be completed by the community official:

5. Is the development Substantial Improvement? *(see #4)* ☐ Yes ☐ No
6. Is the development in an identified floodplain? ☐ Yes ☐ No

If Yes, complete the following:

a. Elevation of the Base *(100-Year)* Flood _____ Ft. MSL/NGVD 29 or NAVD 88

b. Elevation/Floodproofing Requirement *(if applicable)* _____ Ft. MSL/NGVD 29 or NAVD 88

c. Is the development in a designed Floodway?

☒ Yes New structures for human habitation are prohibited. For any other Floodway development, the NDOR must provide certification by a registered professional engineer that the development would result in no increase along the floodway water surface profile.

☐ No If a floodway has not been designated, the NDOR may be required to submit hydraulic data demonstrating that the proposed development will not increase flood heights more than one foot at any location.

If the development is in a floodplain, the following shall apply:

This permit is issued with the condition that the lowest floor *(including basement)* of a new or substantially improved nonresidential building will be elevated or floodproofed at least one foot above the base flood elevation. NDOR will provide certification by a registered Engineer, Architect, or Land Surveyor that these provisions are met.

All provisions of the Plattsmouth *(County or City)* Floodplain Management Resolution/Ordinance (Number 1419) shall be complied with.

Kevin Jayson — Local Authorizing Official (Name & Title) — 1/25/10 — Date

Dale Vogts for Jason Jurgens — NDOR Environmental Permits Manager — 14 Jan 2010 — Date

Project Name: Oreapolis Wetland Mitigation Site	
Project No.: NH-75-2(168)	
Control No.: 21849F	Structure No.:

Certification and Compliance
Floodplain and Floodway
Regulations

Structure No. Oreapolis Wetland Mitigation Site
County Cass County
Project Name Oreapolis Wetland Mitigation Site
Stream Un-named Waterway

Project No. NH-75-2(168)
Control No. 21849f
S 1 T 12N R 13E

F.E.M.A. Community - Name City of Plattsmouth, Cass County, Nebraska
Panel No. 310033 0001 B
Effective Date March 1, 1978

TYPE OF STRUCTURE

☐ Bridge ☐ Concrete Box Culvert
X Other No bridge or culvert work

TYPE OF IMPROVEMENT

☐ Modify Existing ☐ Replace Existing
X Other Wetland Restoration

Grade Change: ☐ Yes ☐ No ☐ N/A

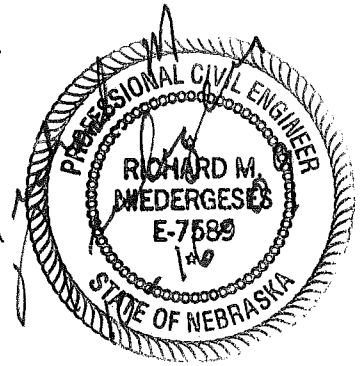
X Other Soil to be wasted from mitigation site to be used as borrow/fill for Webster Blvd Relocate

THE FOLLOWING IS HEREBY CERTIFIED

X Floodplain (without Designated Floodway) or Flood Fringe
Proposed construction will not increase the base (100 year) flood heights more than one foot at any location.

☐ Designated Floodway
Proposed construction will result in no rise along the base (100 year) floodway water surface profile.

Signature Richard M. Wedergeses
Roadway Design Division Hydraulics Unit



Registration Number E-7589
Date 10-16-09

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
203 West Second Street
Grand Island, Nebraska 68801

August 27, 2008

Mr. Eric Zach
Planning and Project Development Division
Nebraska Department of Roads
1500 Highway 2
P.O. Box 94759
Lincoln, NE 68509-4759

RE: Biological Evaluation, Oreapolis Wetland Mitigation Bank, Cass County, Nebraska, Control Number: 21849f, Project Number: NH-75-2 (168)

Dear Mr. Zach:

The U.S. Fish and Wildlife Service (Service) has received a request to initiate consultation pursuant to section 7 of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) on August 21, 2008, for a proposed constructed wetland mitigation bank project, Oreapolis Wetland Mitigation Bank, located approximately two miles north of Plattsmouth (Section 1, Township 12 North Range 13 East), in Cass County, Nebraska, Control Number: 21849F, Project Number: NH-75-2 (168). The Randall Schilling Wildlife Management Area, managed by the Nebraska Game and Parks Commission, is located just east of the proposed wetland bank. The proposed project was identified as a priority project for the Nebraska Department of Roads (NDOR) on August 25, 2008. The project involves the construction of a 50-acre wetland complex including a constructed channel, forested, upland and emergent wetlands. The purpose and scope of this wetland bank is for mitigation associated with wetland impacts for the Plattsmouth to Bellevue Highway 75 expressway project. This construction is not anticipating impacts to wetlands or waterways but intends to create or enhance the wetland mitigation bank and surrounding wetland complex. NDOR has recommended that the project's implemented Stormwater Pollution Prevention Program (SWPPP) will provide for erosion control measures to protect waterways. Borrow needs are not anticipated.

AUTHORITY

The Service has responsibility, under a number of authorities, for conservation and management of fish and wildlife resources. Chief among the federal statutes with which our office deals with are the Endangered Species Act (ESA) of 1973 (87 Stat.

884, as amended; 16 U.S.C. 1531 *et seq.*), Fish and Wildlife Coordination Act (FWCA) (488 Stat. 401; 16 U.S.C. 661 *et seq.*), Bald and Golden Eagle Protection Act (the Eagle Act) (16 U.S.C. 703-712, as amended), and Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712, as amended). Compliance with all of these statutes and regulations are required for compliance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4321-4347). In addition to these statues, the Service has authority under several other legislative, regulatory, and executive mandates to promote the conservation of fish and wildlife resources for the benefit of the American public.

Endangered Species Act

Proposed Project

Pursuant to section 7 of ESA, every federal agency, in consultation or conference with the Service, is required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed or proposed species and/or result in the destruction or adverse modification of designated and/or proposed critical habitat. In accordance with section 7(a)(2) of ESA, the lead federal agency or its designated representative should determine if any federally listed threatened or endangered species and/or designated/proposed critical habitat would be directly and/or indirectly affected by this proposed project. The assessment of potential impacts (direct and indirect) must include an "effect" or "no effect" determination and be presented to the Service in writing. If the Service agrees with the lead federal agency or designee's determination, this office would provide a letter of concurrence. If federally listed species and/or designated/proposed critical habitat would be adversely affected by this action, the lead federal agency would need to formally request further section 7 consultation with the Service prior to making any irretrievable or irreversible commitments of resources in support of the proposed highway construction project.

In accordance with section 7 of ESA, the Service has determined that the following federally listed species may occur in the proposed project area or be affected by the proposed project:

Listed Species	Expected Occurrence
Western prairie fringed orchid (*Platanthera praeclara*)	Tallgrass prairie and wet meadows
Pallid sturgeon (*Scaphirhynchus albus*)	Missouri, Elkhorn and Lower Platte Rivers
Interior least tern (*Sterna antillarum*)	Migration, nesting
Piping plover (*Charadrius melodus*)	Migration, nesting

Western prairie fringed orchid

The western prairie fringed orchid, federally listed as threatened, inhabits tall-grass calcareous silt loam or sub-irrigated sand prairies. Declines in the western prairie fringed orchid populations have been caused by the drainage and conversion of its habitats to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and the application of herbicides. Populations are known to occur in Boone, Cherry, Dodge, Garfield, Grant, Greeley, Hall, Holt, Lancaster, Loup, Madison, Otoe, Pierce, Rock, Saline, Sarpy, Seward, and Wheeler counties, and may occur at other sites in Nebraska. Suitable habitat is unavailable for the western prairie fringed orchid at the proposed project site.

Pallid Sturgeon

The pallid sturgeon was officially listed as an endangered species on September 6, 1990. In Nebraska, the pallid sturgeon is found in the Missouri, Elkhorn, and lower Platte Rivers. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that provided macrohabitat requirements for the pallid sturgeon, a species that is associated with diverse aquatic habitats. These habitats historically were dynamic and in a constant state of change due to influences from the natural hydrograph, and sediment and runoff inputs from an enormous watershed spanning portions of ten states. Navigation, channelization and bank stabilization, and hydropower generation projects have caused the widespread loss of this diverse array of dynamic habitats once provided to pallid sturgeon on the Missouri River, resulting in a precipitous decline in populations of the species. It is unlikely that the proposed project would have an adverse affect on the pallid sturgeon due the scope of this project.

Least Tern and Piping Plover

The least tern, federally listed as endangered, and the piping plover, federally listed as threatened, nest on unvegetated or sparsely vegetated sandbars in river channels. The nesting season for the least tern and piping plover is from April 15 through September 15. Least terns feed on small fish in the river and piping plovers forage for invertebrates on exposed beach substrates. The Service has designated critical habitat for the northern Great Plains breeding population of the piping plover on segments of the Missouri, Loup, Platte, and Niobrara rivers. Habitat included in the designation is comprised solely of river channel and riverine sandbars within the high banks. Due to the scope of the project, it is unlikely that the least tern and piping plover would be adversely impacted.

In accordance with section 7(a)(2) of ESA, the NDOR has determined in its BE on behalf of the FHWA that the proposed project would not adversely affect federally listed species or result in the destruction of adverse modification of designated critical habitat. The Service, based on a review of the BE, topographic maps, and aerial photography, concurs with the FHWA/NDOR's determination that the proposed project would not adversely affect federally listed species or designated critical habitat. However, if project plans change (i.e. offsite borrow is needed, additional channel

impacts are identified, shooflies/temporary roads are necessary) or new information on federally listed species or designated critical habitat becomes available, this determination may be reconsidered.

REVIEW, COMMENTS, AND RECOMMENDATIONS ON THE PROPOSED PROJECT ACTION UNDER OTHER FISH AND WILDLIFE STATUTES

The Bald and Golden Eagle Protection Act

The Eagle Act provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) by prohibition, except under certain specific conditions, the taking, possession, and commercial use of such birds. The golden eagle is found in arid, open country with grassland for foraging in western Nebraska and usually near buttes or canyons which serve as nesting sites. Golden eagles are often a permanent resident in the Pine Ridge area of Nebraska. Bald eagles utilize mature, forested riparian areas near rivers, streams, lakes, and wetlands. Bald eagles occur along all the major river systems in Nebraska. The bald eagle southward migration begins as early as October and the wintering period extends from December – March. Additionally, many eagles nest in Nebraska from mid-February through mid-July. Disturbances within 0.5-mile of an active nest or within line-of-sight of the nest could cause eagles to discontinue nest building or to abandon eggs. Both bald and golden eagles frequent river systems in Nebraska during the winter where open water and forested corridors provide feeding, perching, and roosting habitats, respectively. The frequency and duration of eagle use of these habitats in the winter depends upon ice and weather conditions. Human disturbances and loss of wintering habitat can cause undue stress leading to cessation of feeding and failure to meet winter thermoregulatory requirements. These affects can reduce the carrying capacity of preferred wintering habitat and reproductive success for the species. To comply with the Eagle Act, it is recommended that the project proponent determine whether the proposed project would impact bald or golden eagles. If it is determined that either species could be affected by the proposed project, the Service recommends that the project proponent notify this office as well as the Nebraska Game and Parks Commission (Commission) for guidance regarding avoiding adverse impacts to bald and golden eagles.

Migratory Bird Treaty Act

The proposed project is subject to regulations of MBTA. Under the MBTA, construction activities in grassland, wetland, stream, and woodland habitats, and those that occur on bridges (e.g., which may affect swallow nests on bridge girders) that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Nebraska occurs during the period of April 1 to July 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15, whereas sedge wrens which occur in some wetland habitats normally nest from July 15 to September 10. If the proposed project is planned to occur during the primary nesting season or at any other time that may result in the "take" of nesting migratory birds, NDOR should refer to the

"Recommended Procedures for Compliance With the Migratory Bird Treaty Act" document that was provided under cover of a January 5, 2007, letter from Mitch King, the Service's Region 6 Director, to NDOR Director, John Craig.

The Service appreciates the opportunity to provide comments on this proposed project and the assistance by the NDOR to protect federal trust fish and wildlife species in Nebraska. Should you have any questions regarding these comments, please contact Ms. Brooke Stansberry within our office at Brooke_Stansberry@fws.gov or at (308) 382-6468, extension 16.

Sincerely,

John Cochnar

John Cochnar
Deputy Nebraska Field Supervisor

cc: USACE; Omaha, NE (Attn: John Moeschen)
NGPC; Lincoln, NE (Attn: Kristal Stoner)
NGPC; Lincoln, NE (Attn: Carey Grell)
NDOR; Lincoln, NE (Attn: Leonard Sand)

Nebraska Game and Parks Commission
2200 N. 33rd St. / P.O. Box 30370 / Lincoln, NE 68503-0370
Phone: 402-471-0641/ Fax: 402-471-5528 / www.OutdoorNebraska.org

November 17, 2008

Eric Zach
Nebraska Department of Roads
1500 Highway 2
Lincoln, NE 68509

Re: Oreapolis Wetland Bank, 75-2(168), CN 21849F

Dear Mr. Zach,

Please make reference to your letter dated August 19th, 2008. This letter is in response to your request for a review of this project's potential impacts to threatened and endangered species in Cass County, Nebraska. As we understand it, the project involves construction of a 50 acre wetland bank as mitigation for the Plattsmouth to Bellevue Highway 75 project. Biologists with the Nebraska Game and Parks Commission are involved in the design of this wetland. We have completed our review of the proposed sites under Neb. Rev. Stat. § 37-807 (3) of the Nongame and Endangered Species Conservation Act and we offer the following comments.

There are least terns and piping plovers near this project, however given the level of traffic in the vicinity of the project and the scope of the project, it is unlikely that construction would impact these species. Therefore, we have determined that the proposed project will have "No Effect" on any state listed threatened or endangered species. We made these determinations based on a review of the material you sent, aerial photographs, topographic maps and our Nebraska Natural Heritage Database.

Based upon the submitted information, we have no objection to the proposal as currently planned. However, should the plans be modified, we recommend that you reinitiate consultation with the Nebraska Game and Parks Commission.

All federally listed threatened and endangered species are also state listed. For assessment of potential impacts on federally listed, candidate or proposed threatened or endangered species, please contact John Cochnar, Nebraska Field Office, U.S. Fish and Wildlife Service, 203 W. Second St., Grand Island, NE 68801.

Thank you for the opportunity to comment. If you have any questions or need additional information, please feel free to contact me.

Sincerely,

Kristal J. Stoner
Environmental Analyst Supervisor
Nebraska Natural Heritage Program
Nebraska Game and Parks Commission
(402) 471-5444, Kristal.stoner@ngpc.ne.gov

CC: John Cochnar, USFWS
Brooke Stansberry, USFWS

NEBRASKA STATE HISTORICAL SOCIETY
1500 R STREET, P.O.BOX 82554, LINCOLN, NE 68501-2554
(402) 471-3270 Fax: (402) 471-3100 1-800-833-6747 www.nebraskahistory.org

13 February 2008

Jon C. Barber
Planning & Project Development
Department of Roads
P.O. Box 94759
Lincoln, NE 68509-4759

Re: NH-75-2(165)
Fairview Road Interchange and Oreapolis Bank Site
Sarpy Co.
H.P. #9609-074-01

Dear Mr. Barber:

A review of our files indicates that the referenced project does not contain recorded historic resources. It is our opinion that no survey for unrecorded cultural resources will be required. Your undertaking, in our opinion, will have no effect for archaeological, architectural, or historic properties. This review does not constitute the opinions of any Tribes that may have an interest in Traditional Cultural Properties potentially affected by this project.

There is, however, always the possibility that previously unsuspected archaeological remains may be uncovered during the process of project construction. We therefore request that this office be notified immediately under such circumstances so that an evaluation of the remains may be made, along with recommendations for future action.

Sincerely,

Terry Steinacher
H.P. Archaeologist

Concurrence:

L. Robert Puschendorf
Deputy NeSHPO

Appendix B
Baseline Wetland Delineation

OREAPOLIS WETLAND MITIGATION SITE
BASELINE WETLAND DELINEATION REPORT

NDOR PROJECT NUMBER NH-75-2-(155)
NDOR CONTROL NUMBER 21849

January 2009

Prepared by:

HDR | ONE COMPANY
Many Solutions℠

TABLE OF CONTENTS

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List of Figures

List of Appendices

Prepared by:
HDR ENGINEERING, INC.
8404 Indian Hills Drive
Omaha, Nebraska 68114-4049

OREAPOLIS WETLAND MITIGATION SITE
BASELINE WETLAND DELINEATION REPORT

NDOR PROJECT NUMBER NH-75-2-(155)
NDOR CONTROL NUMBER 21849

1.0 PROJECT BACKGROUND

1.1 Planning

The Nebraska Department of Roads (NDOR) is currently finalizing design for the reconstruction on U.S. 75 and U.S. 34 in Sarpy and Cass Counties. As a result of the projects, construction impacts to existing wetlands are inevitable. To compensate for wetland losses on the projects and future wetland impacts in the service area, NDOR proposes to develop a mitigation site design to restore stream channel and emergent/ forested wetlands on a site adjacent to U.S. 75 and the Platte River in Cass County, Nebraska.

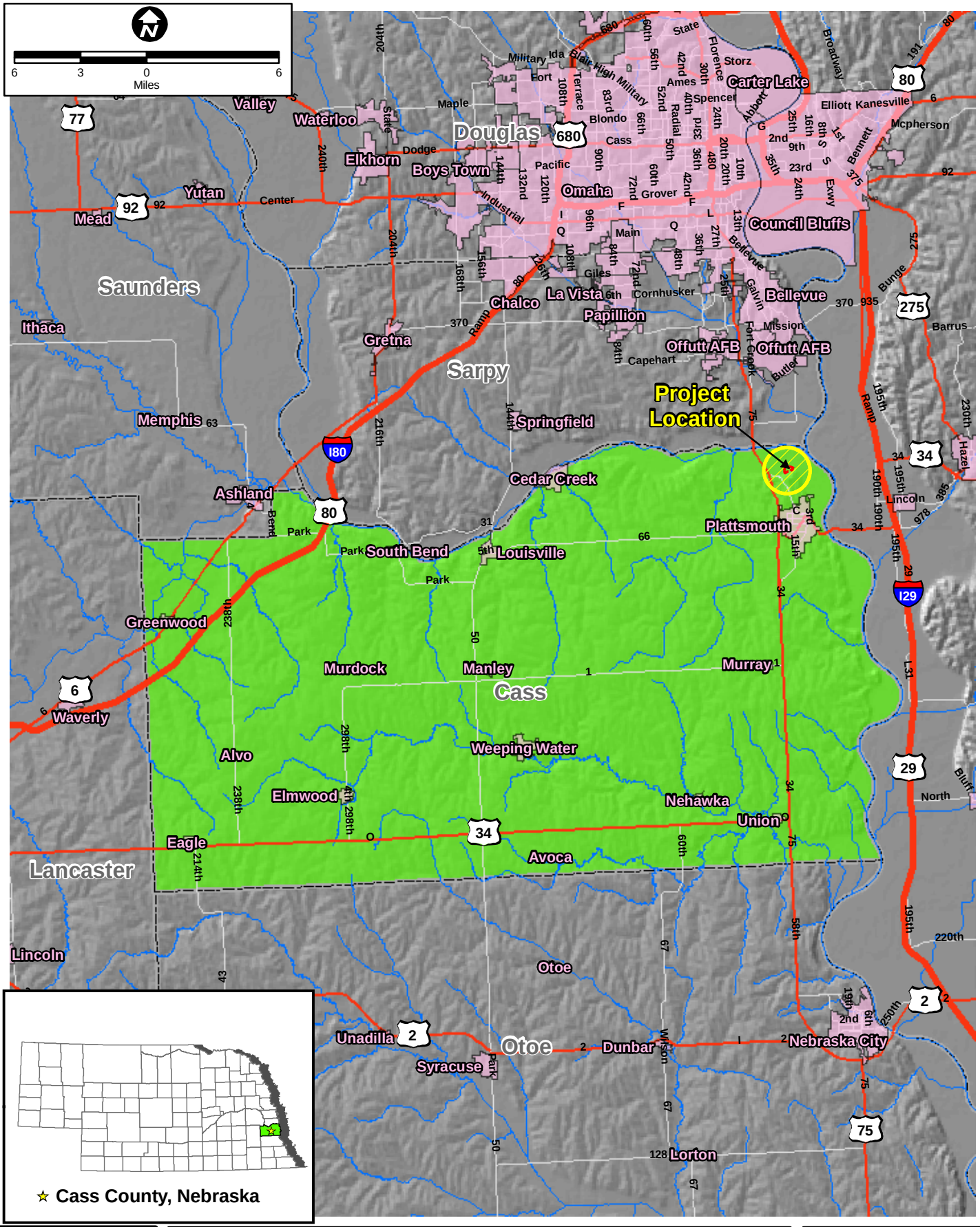
1.2 Study Area

For purposes of delineating wetlands and waters of the U.S., a Study Area was determined. The Study Area is located in the northeast ¼ of the north ½ of section 1, Township 12 North, Range 13 East, Cass County, Nebraska (See Figure 1 Project Location Map). The Study Area is approximately 50 acres of agricultural land. The land currently sits fallow and is not being used for production. The Study Area consists of flat ground adjacent to a channelized waterway that forms perimeter to the north, a wooded community to the south, and an agricultural field to the west. Runoff from the Study Area drains into the channelized waterway that ultimately feeds into the Schilling State Wildlife Area and eventually the Missouri River.

1.3 Soils

According to the U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey Geographic (SSURGO) database for Cass County, Nebraska, there are five mapped soil types within the Study Area. The following lists the soils and provides basic principles, including whether or not they are considered hydric.

- Albaton silty clay, 0 to 1 percent slopes (Ab): This deep, nearly level, poorly drained soil is on the Platte and Missouri River bottom lands. Ab is hydric.
- Colo silty clay loam, 0 to 2 percent slopes (Co): This deep, nearly level, somewhat poorly drained soil is on occasionally flooded bottom lands. Co is hydric.
- Haynie silt loam, 0 to 2 percent slopes (Ha): This deep, nearly level, moderately well drained soil is on bottom lands along major rivers. Ha is not hydric.
- Kennebec silt loam, 0 to 2 percent slopes (Ke): This deep, nearly level, moderately well drained soil is on bottom lands. Ke is partially hydric.
- Marshall silty clay loam, 2 to 5 percent slopes (MaC): This deep, gently sloping, well drained soil is on wide ridgetops and upland side slopes. Ha is not hydric.



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Project Location Map

NDOR Oreapolis Wetland Mitigation Site
Sec. 1, T12N, R13E
Cass County, Nebraska
Baseline Wetland Delineation Report

HDR

NDOR
Nebraska
Department of Roads

DATE
January 2009

FIGURE
1

2.0 DELINEATION OF WATERS OF THE U.S.

2.1 Methods

On behalf of NDOR, HDR Engineering, Inc. (HDR) conducted a wetland and waters of the U.S. delineation on October 21, 2008. Identified wetland areas were classified according to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., December 1979) and associated Nebraska wetland subclasses (U.S. Army Corps of Engineers [USACE], Omaha District).

Prior to the field delineations, a desktop survey was conducted using National Wetlands Inventory (NWI) maps, U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey Geographic (SSURGO) database for Cass County, Nebraska and Metropolitan Area Planning Agency 2007 aerial imagery to identify possible waters of the U.S. and areas historically prone to wetland development (see Figure 2, Hydric Soils Within Project Vicinity and Figure 3, NWI Within Project Vicinity).

Wetland delineations were conducted on October 21, 2008, in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, January 1987). Plant species and hydrology indicators were noted and soil samples were taken to determine the presence of hydric soils. Soil profiles were compared to those identified in the Cass County Soil Survey to confirm the mapped soil types (USDA NRCS, 1984). The *National List of Plant Species That Occur in Wetlands: Central Plains (Region 5)* (U.S. Fish and Wildlife Service, National Ecology Research Center, 1988) was used to determine wetland indicator status of vegetation present in the Study Area.

A "Routine Wetland Determination Data Form" was completed for each survey point (Plot ID), including uplands. These forms are presented in Appendix A. Plot IDs and wetland boundaries were mapped in the field using global positioning system (GPS) technology. Non-wetland, potentially jurisdictional waters of the U.S. were also identified and are summarized in this report.

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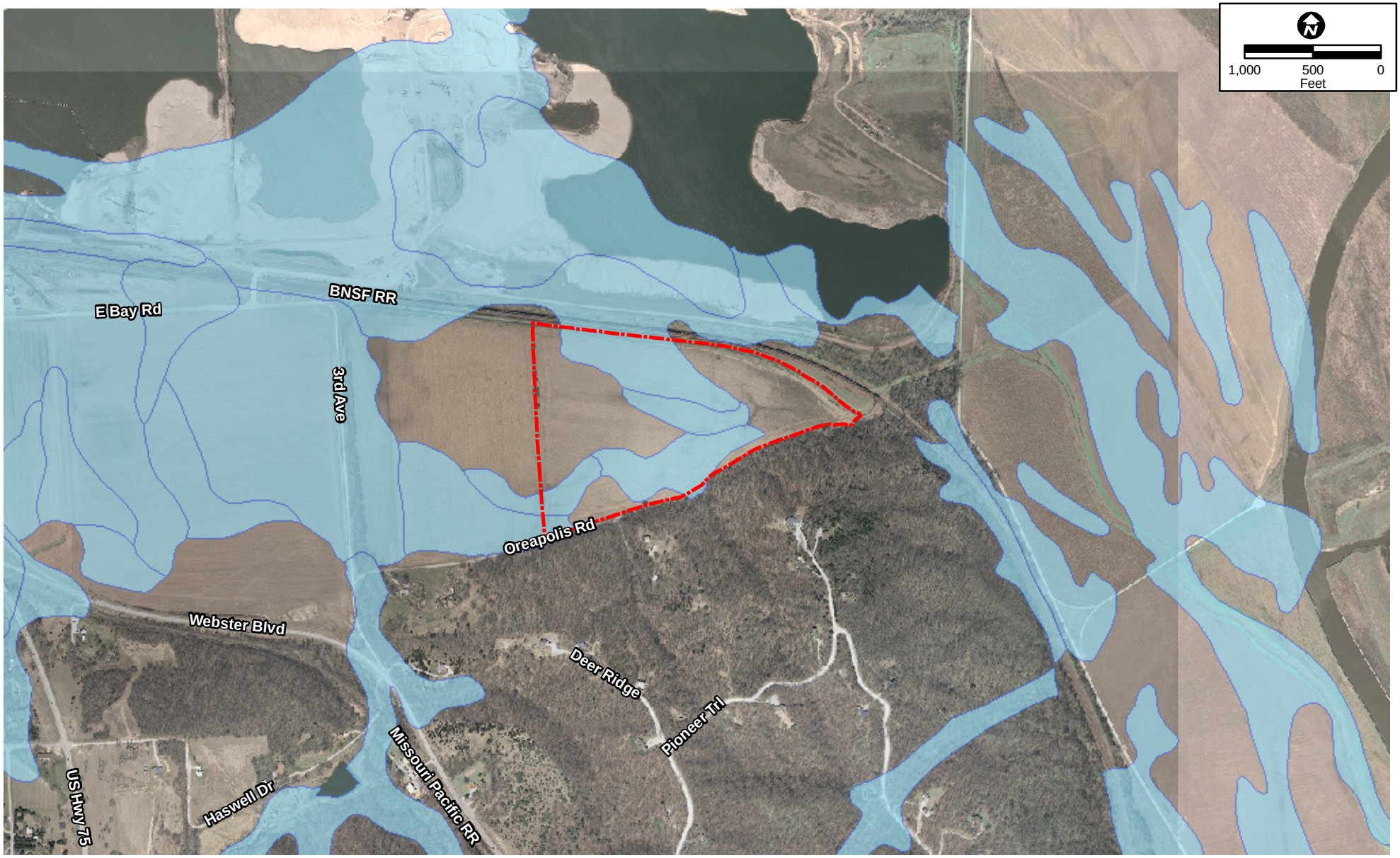


Legend

- Hydric Soils
- Study Area

Aerial Imagery: 2007 MAPA

HDR

Hydric Soils Within Project Vicinity

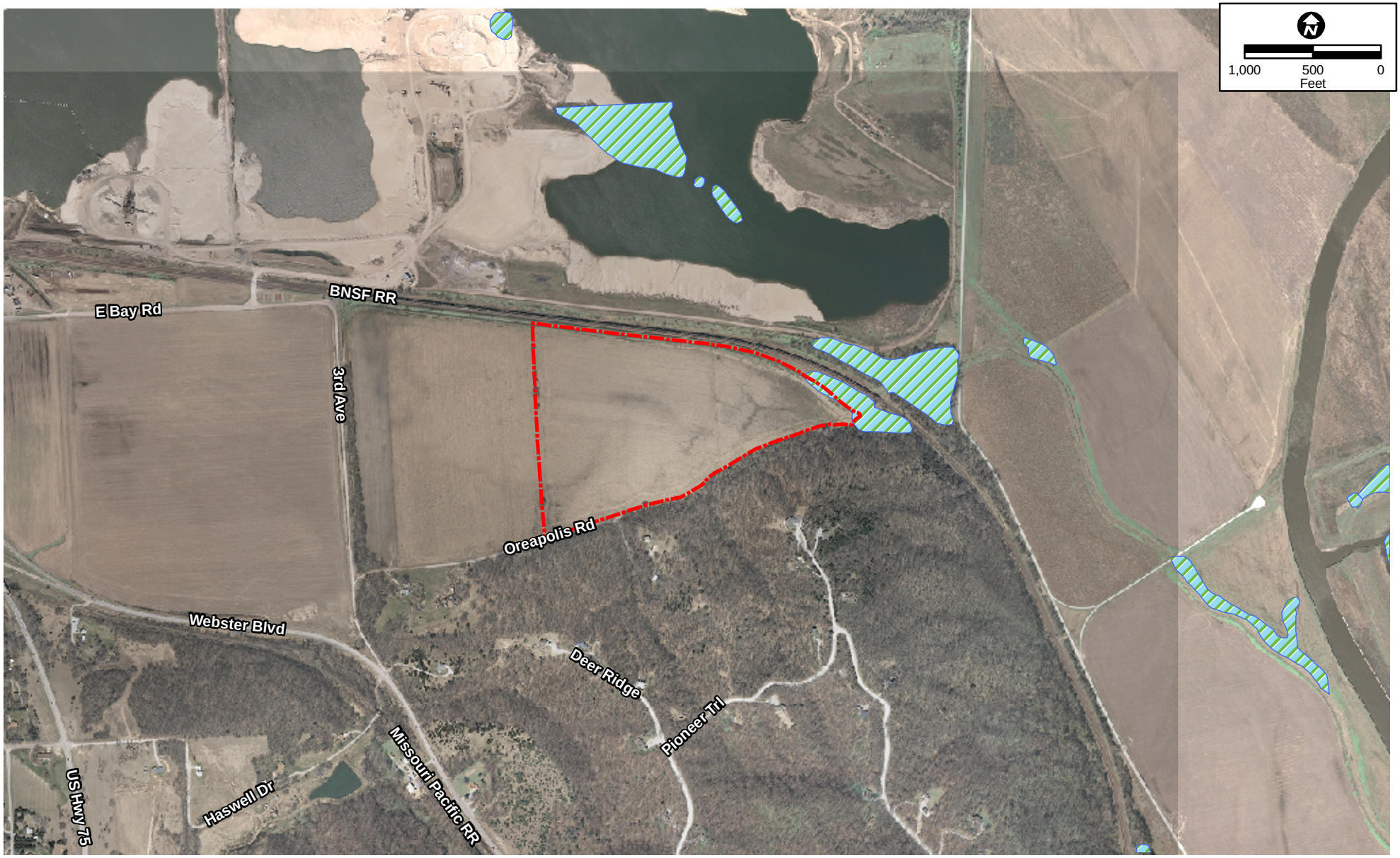
NDOR Oreapolis Wetland Mitigation Site
Sec. 1, T12N, R13E
Cass County, Nebraska
Baseline Wetland Delineation Report

NDOR
Nebraska
Department of Roads

DATE
January 2009

FIGURE
2

HDR,Omaha;Z:\NDOR\58932_Lower_Platte_Mitigation\map_docs\mxd\Wetland_Report_Figures,Dec.08



Legend

NWI

Study Area

Aerial Imagery: 2007 MAPA

HDR

NWI Within Project Vicinity

NDOR Oreapolis Wetland Mitigation Site
Sec. 1, T12N, R13E
Cass County, Nebraska
Baseline Wetland Delineation Report

NDOR
Nebraska
Department of Roads

DATE
January 2009

FIGURE
3

2.2 Wetland Delineation Results and Potentially Jurisdictional Determinations

During the October 2008 delineation, a total of six sample locations were surveyed for wetland criteria in accordance with the *Corps of Engineers Wetlands Delineation Manual*. Two of the six sample locations meet all wetland criteria (see Table 1). The field delineation identified palustrine emergent (PEM) wetlands within the Study Area. All delineated wetlands are preliminary determined to be jurisdictional under the Clean Water Act Section 404. Wetland acreages were determined by calculating the area of the wetland located within the Study Area.

In addition, one linear water of the U.S., with a wetland fringe, was identified. See Appendix B for the waters of the U.S. determination form and Figure 4 for potential wetland and waters of the U.S. locations (Plot ID locations are also identified). Site photographs are available in Appendix D.

Table 1. Wetland Delineation Results

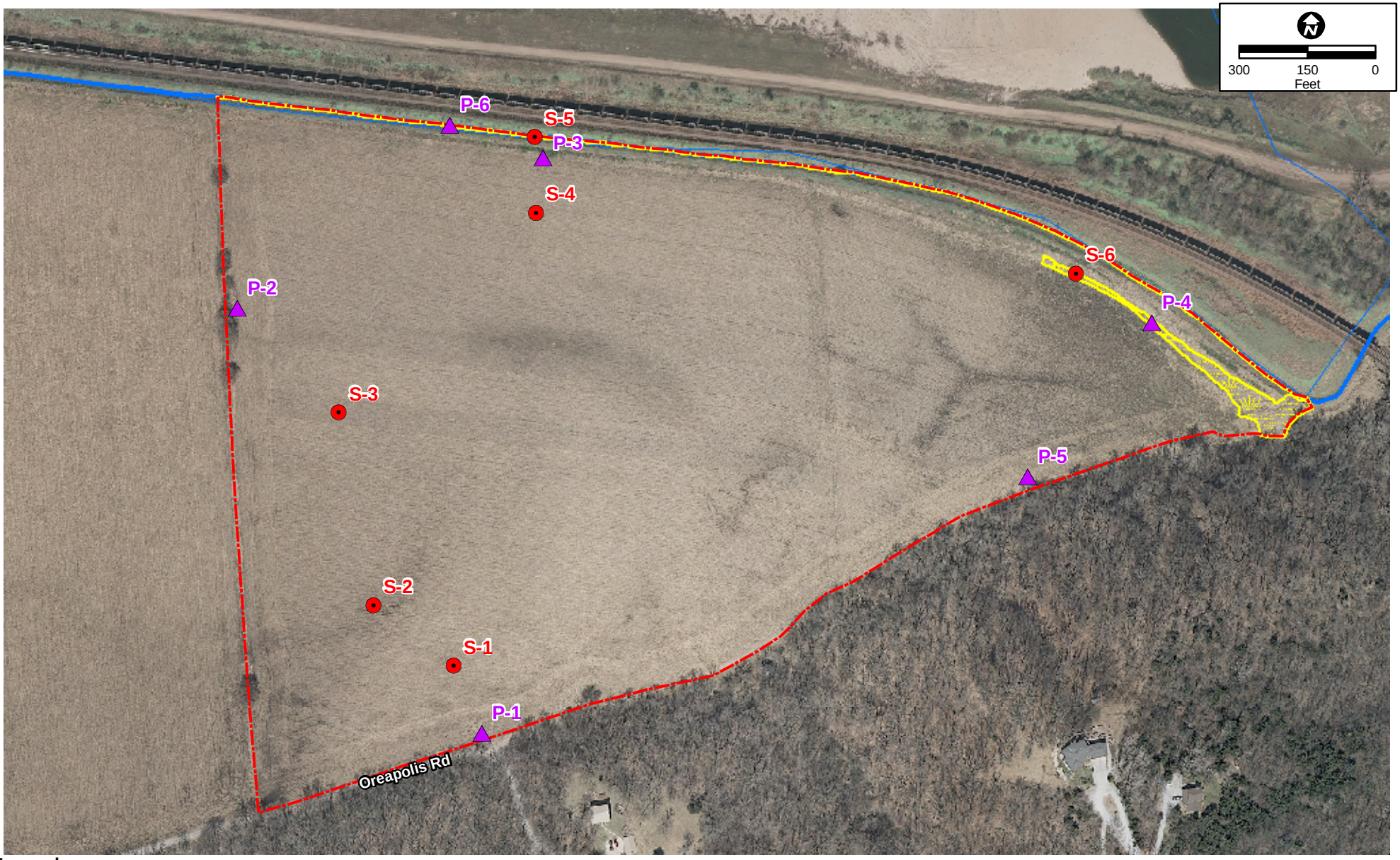
Plot ID[1]	Cowardin Wetland Type[2]	Nebraska Wetland Subclass	Dominant Vegetation Species[3, 4]	Area (acres)
Potentially Jurisdictional Wetlands[5]				
5	PEMA	Riverine Channel	*Phalaris arundinacea* (H) FACW+ 100%	0.15
6	PEMA	Floodplain Depressional	*Phalaris arundinacea* (H) FACW+ 100%	0.44
			TOTAL Potentially Jurisdictional Wetland	***0.59***

Notes:
1 Plot ID's 1-4 are Upland.
2 PEMA = Palustrine Emergent Temporarily Flooded
3 H = Herbaceous, FACW = Facultative Wetland (67-99% in wetland), + = tendency toward wetter, - = tendency toward drier.
4 Percentages provided for each species are the aerial percent dominance (not relative percent dominance) of that species in the stratum identified.
5 Areas have been determined to be jurisdictional by HDR, but are labeled "Potentially Jurisdictional," as final jurisdictional determination is subject to U.S. Army Corps of Engineers and EPA review.

The following provides a brief narrative on the delineated wetlands.

- Plot ID 5 (PEMA) – Emergent community within, and adjacent to, an unnamed tributary of the Missouri River, which was field determined to be potentially jurisdictional (see WUS ID 1). The Riverine Channel designation is the Nebraska Wetland Subclass that best describes the resources in this area.
- Plot ID 6 (PEMA) – Emergent community within a depression adjacent to the stream channel (see WUS ID 1), which was field determined to be potentially jurisdictional. The Floodplain Depressional designation is the Nebraska Wetland Subclass that best describes the resources in this area.

HDR,Omaha;Z:\NDOR\58932_Lower_Platte_Mitigation\map_docs\mxd\Wetland_Report_Figures,Dec.08



Legend

- Photo Point
- Sample Plot
- Water of the U.S.
- Palustrine Emergent Wetland - 0.58 Acre
- Study Area

Aerial Imagery: 2007 MAPA

HDR

Wetlands and Waters of the U.S.

NDOR Oreapolis Wetland Mitigation Site
Sec. 1, T12N, R13E
Cass County, Nebraska
Baseline Wetland Delineation Report

NDOR
Nebraska
Department of Roads

DATE
January 2009

FIGURE
4

2.3 Non-Wetland, Potential Waters of the U.S.

An unnamed tributary of the Missouri River is the only non-wetland, potential waters of the U.S., identified within the Study Area. This waterway lies along the northern perimeter of the Study Area and runs parallel to the BNSF railroad track. The waterway has been determined to be jurisdictional due to the presence of base flow at least seasonally (typically 3 months of the year) (EPA, U.S. Department of the Army, 2007). Appendix B contains the waters of the U.S. determination form, and Figure 4 displays the location of the waterway.

3.0 VEGETATION COMMUNITIES

In addition to conducting wetland delineations and identifying other non-wetland, potential waters of the U.S., HDR classified vegetation communities within the Study Area. Vegetation was examined and mapped into three communities within the site boundary. See Figure 5 for an illustration of community boundaries and the Vegetation Community List (Table 2) for dominant species within each mapped community. One of the three communities exhibits hydrophytic vegetation, with greater than 50% of the total number of dominant species having an indicator status of FAC or wetter.

Table 2. Vegetation Community Species List

Community ID Number	Dominant Plant Species	Stratum	Relative Cover %	Indicator Status	Percent of Dominant Species that are **OBL**, **FACW**, or **FAC** (Excluding FAC-)
V-1	Bristlegrass (*Setaria faberi*)	H	60	UPL	0%
	Canada horseweed (*Conyza canadensis*)	H	30	FACU-	
V-2	Marijuana (*Cannabis sativa*)	H	40	FACU-	50%
	Reed canarygrass (*Phalaris arundinacea*)	H	20	FACW	
	Velvet leaf (*Abutilon theophrasti*)	H	20	FACU	
	Switchgrass (*Panicum virgatum*)	H	20	FAC	
V-3	Reed canarygrass (*Phalaris arundinacea*)	H	100	FACW	100%

HDR,Omaha;Z:\NDOR\58932_Lower_Platte_Mitigation\map_docs\mxd\Wetland_Report_Figures,Dec.08

Legend

Vegetative Communities

Study Area

Aerial Imagery: 2007 MAPA

HDR

Vegetative Communities

NDOR Oreapolis Wetland Mitigation Site
Sec. 1, T12N, R13E
Cass County, Nebraska
Baseline Wetland Delineation Report

NDOR
Nebraska
Department of Roads

DATE
January 2009

FIGURE
5

5.0 BIBLIOGRAPHY

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APPENDIX A

ROUTINE WETLAND DETERMINATION DATA FORMS

ROUTINE WETLAND DETERMINATION DATA FORM

Project/Site: Oreapolis Wetland Mitigation Site				Date:	10/21/2008
Applicant/Owner: Nebraska Department of Roads				County:	Cass
Investigator: Travis Talbitzer				State:	Nebraska
Do Normal Circumstances Exist On The Site?	☑ Yes	☐ No		Community ID:	--
Is The Site Significantly Disturbed (Atypical Situation)?	☐ Yes	☑ No		Station ID:	
Is The Area A Potential Problem Area? (Mollisols)	☑ Yes	☐ No		Plot ID:	1
(If yes, define below.)					
Land form description: Agricultual field left fallow.					

VEGETATION

Dominant Species					**Non Dominant Species**			
	Scientific Name	Indicator	Stratum	%	*Scientific Name*	Indicator	Stratum	%
1.	*Setaria faberi*	UPL	Herb.	90	1. --	--	--	--
2.	--	--	--	--	2. --	--	--	--
3.	--	--	--	--	3. --	--	--	--
4.	--	--	--	--	4. --	--	--	--
5.	--	--	--	--	5. --	--	--	--
6.	--	--	--	--	6. --	--	--	--
7.	--	--	--	--	7. --	--	--	--
8.	--	--	--	--	8. --	--	--	--
9.	--	--	--	--	9. --	--	--	--
10.	--	--	--	--	10. --	--	--	--

Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-) 0

Remarks: Percent dominance based on aerial coverage by layer.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, Or Tide Gauge
- ☑ Aerial Photos (2007 MAPA)
- ☐ Other

☐ No Recorded Data Available

Field Observations:
- Depth of Surface Water: None (in.)
- Depth to Free Water: None to 40 (in.)
- Depth to Saturated Soil: None to 40 (in.)

Wetland Hydrology Indicators:
- ☑ None

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or More Required):
- ☐ Oxidized Root Channels In Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test 0:1
- ☐ Other (Explain in Remarks)

Remarks: No hydrology indicators were present at this sampling location.

SOILS

(Series and Phase): Marshall silty clay loam, 2 to 5% slopes

Drainage Class: well drained

Field Observations Confirm Mapped Type? ☐ Yes ☑ No

Taxonomy (Subgroup): Fine-silty, mixed, mesic Typic Hapludolls

Profile Description:

Depth (Inches):	Horizon:	Matrix Color (Munsell Moist):	Mottle Colors (Munsell Moist):	Mottle Abundance/Contrast	Texture, Concretions, Structure, Etc.
0-20	--	10YR 3/2	-- --	-- --	silt loam
20-30	--	10YR 4/3	-- --	-- --	silt loam
30-40	--	10YR 5/3	-- --	-- --	silt loam
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed Or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content In Surface Layer In Sandy Soils
- ☐ Organic Streaking In Sandy Soils
- ☐ Listed On Local Hydric Soils List
- ☐ Listed On National Hydric Soils List
- ☐ Other (Explain In Remarks)

Remarks: The soil profile did not display any hydric soil indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐ Yes	☑ No
Wetland Hydrology Present?	☐ Yes	☑ No
Hydric Soils Present?	☐ Yes	☑ No

Is This Sampling Point Within A Wetland? ☐ Yes ☑ No

Remarks: The area characterized by this dataform is not a wetland due to the lack of hydrophytic vegetation, wetland hydrology, and hydric soil indicators.

ROUTINE WETLAND DETERMINATION DATA FORM

Project/Site: Oreapolis Wetland Mitigation Site				Date:	10/21/2008
Applicant/Owner: Nebraska Department of Roads				County:	Cass
Investigator: Travis Talbitzer				State:	Nebraska
Do Normal Circumstances Exist On The Site?	☑ Yes	☐ No		Community ID:	--
Is The Site Significantly Disturbed (Atypical Situation)?	☐ Yes	☑ No		Station ID:	
Is The Area A Potential Problem Area? (Mollisols)	☑ Yes	☐ No		Plot ID:	2
(If yes, define below.)					

Land form description: Agricultual field left fallow.

VEGETATION

Dominant Species

	Scientific Name	Indicator	Stratum	%
1.	*Setaria faberi*	UPL	Herb.	80
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--

Non Dominant Species

	Scientific Name	Indicator	Stratum	%
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--

Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-) 0

Remarks: Percent dominance based on aerial coverage by layer.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, Or Tide Gauge
- ☑ Aerial Photos (2007 MAPA)
- ☐ Other

☐ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:
- ☐ None

Primary Indicators:
- ☑ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or More Required):
- ☐ Oxidized Root Channels In Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test 0:1
- ☐ Other (Explain in Remarks)

Remarks: Standing water was present in a small depression adjacent to the sample location.

SOILS

(Series and Phase): Colo silty clay loam, 0 to 2% slopes

Drainage Class: poorly drained

Taxonomy (Subgroup): Fine-silty, mixed, mesic Cumulic Endoaquolls

Field Observations Confirm Mapped Type? ☐ Yes ☑ No

Profile Description:

Depth (Inches):	Horizon:	Matrix Color (Munsell Moist):	Mottle Colors (Munsell Moist):	Mottle Abundance/Contrast	Texture, Concretions, Structure, Etc.
0-10	--	10YR 3/1	-- --	-- --	silty clay loam
10-42	--	10YR 2/1	-- --	-- --	clay loam
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed Or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content In Surface Layer In Sandy Soils
- ☐ Organic Streaking In Sandy Soils
- ☐ Listed On Local Hydric Soils List
- ☐ Listed On National Hydric Soils List
- ☐ Other (Explain In Remarks)

Remarks: The soil profile displayed low-choma colors.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐ Yes	☑ No
Wetland Hydrology Present?	☑ Yes	☐ No
Hydric Soils Present?	☑ Yes	☐ No

Is This Sampling Point Within A Wetland? ☐ Yes ☑ No

Remarks: The area characterized by this dataform is not a wetland due to the lack of hydrophytic vegetation and despite the presence of wetland hydrology, and hydric soil indicators.

ROUTINE WETLAND DETERMINATION DATA FORM

Project/Site: Oreapolis Wetland Mitigation Site				Date:	10/21/2008
Applicant/Owner: Nebraska Department of Roads				County:	Cass
Investigator: Travis Talbitzer				State:	Nebraska
Do Normal Circumstances Exist On The Site?	☑ Yes	☐ No		Community ID:	--
Is The Site Significantly Disturbed (Atypical Situation)?	☐ Yes	☑ No		Station ID:	
Is The Area A Potential Problem Area?	☐ Yes	☑ No		Plot ID:	3
(If yes, define below.)					

Land form description: Agricultual field left fallow.

VEGETATION

Dominant Species					Non Dominant Species				
	Scientific Name	Indicator	Stratum	%		*Scientific Name*	Indicator	Stratum	%
1.	*Setaria faberi*	UPL	Herb.	40	1.	--	--	--	--
2.	*Conyza canadensis*	FACU-	Herb.	40	2.	--	--	--	--
3.	--	--	--	--	3.	--	--	--	--
4.	--	--	--	--	4.	--	--	--	--
5.	--	--	--	--	5.	--	--	--	--
6.	--	--	--	--	6.	--	--	--	--
7.	--	--	--	--	7.	--	--	--	--
8.	--	--	--	--	8.	--	--	--	--
9.	--	--	--	--	9.	--	--	--	--
10.	--	--	--	--	10.	--	--	--	--

Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-) 0

Remarks: Percent dominance based on aerial coverage by layer.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, Or Tide Gauge
- ☑ Aerial Photos (2007 MAPA)
- ☐ Other

☐ No Recorded Data Available

Field Observations:
- Depth of Surface Water: None (in.)
- Depth to Free Water: None to 42 (in.)
- Depth to Saturated Soil: None to 42 (in.)

Wetland Hydrology Indicators:
- ☑ None

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or More Required):
- ☐ Oxidized Root Channels In Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test 0:2
- ☐ Other (Explain in Remarks)

Remarks: No hydrology indicators were present at this sample location.

SOILS

(Series and Phase): Haynie silt loam, 0 to 2% slopes

Drainage Class: Well drained

Taxonomy (Subgroup): Coarse-silty, mixed, mesic Mollic Udifluvents

Field Observations Confirm Mapped Type? ☐ Yes ☑ No

Profile Description:

Depth (Inches):	Horizon:	Matrix Color (Munsell Moist):	Mottle Colors (Munsell Moist):	Mottle Abundance/Contrast	Texture, Concretions, Structure, Etc.
0-20	--	10YR 3/2	-- --	-- --	silty clay loam
20-36	--	10YR 2/1	-- --	-- --	sandy clay loam
36-42	--	10YR 3/1	-- --	-- --	silty clay loam
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed Or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content In Surface Layer In Sandy Soils
- ☐ Organic Streaking In Sandy Soils
- ☐ Listed On Local Hydric Soils List
- ☐ Listed On National Hydric Soils List
- ☐ Other (Explain In Remarks)

Remarks: The soil profile did not display any hydric soil indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐ Yes	☑ No
Wetland Hydrology Present?	☐ Yes	☑ No
Hydric Soils Present?	☐ Yes	☑ No

Is This Sampling Point Within A Wetland? ☐ Yes ☑ No

Remarks: The area characterized by this dataform is not a wetland due to the lack of hydrophytic vegetation, wetland hydrology, and hydric soil indicators.

ROUTINE WETLAND DETERMINATION DATA FORM

Project/Site: Oreapolis Wetland Mitigation Site			Date:	10/21/2008
Applicant/Owner: Nebraska Department of Roads			County:	Cass
Investigator: Travis Talbitzer			State:	Nebraska
Do Normal Circumstances Exist On The Site?	☑ Yes	☐ No	Community ID:	--
Is The Site Significantly Disturbed (Atypical Situation)?	☐ Yes	☑ No	Station ID:	
Is The Area A Potential Problem Area?	☐ Yes	☑ No	Plot ID:	4
(If yes, define below.)				

Land form description: Agricultual field left fallow.

VEGETATION

Dominant Species					**Non Dominant Species**				
	Scientific Name	Indicator	Stratum	%		*Scientific Name*	Indicator	Stratum	%
1.	*Setaria faberi*	UPL	Herb.	40	1.	--	--	--	--
2.	*Conyza canadensis*	FACU-	Herb.	40	2.	--	--	--	--
3.	--	--	--	--	3.	--	--	--	--
4.	--	--	--	--	4.	--	--	--	--
5.	--	--	--	--	5.	--	--	--	--
6.	--	--	--	--	6.	--	--	--	--
7.	--	--	--	--	7.	--	--	--	--
8.	--	--	--	--	8.	--	--	--	--
9.	--	--	--	--	9.	--	--	--	--
10.	--	--	--	--	10.	--	--	--	--

Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-) 0

Remarks: Percent dominance based on aerial coverage by layer.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, Or Tide Gauge
- ☑ Aerial Photos (2007 MAPA)
- ☐ Other

☐ No Recorded Data Available

Field Observations:
- Depth of Surface Water: None (in.)
- Depth to Free Water: None to 42 (in.)
- Depth to Saturated Soil: None to 42 (in.)

Wetland Hydrology Indicators:
- ☑ None

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or More Required):
- ☐ Oxidized Root Channels In Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test 0:2
- ☐ Other (Explain in Remarks)

Remarks: No hydrology indicators were present at this sample location.

SOILS

(Series and Phase): Albaton silty clay, 0 to 1% slopes

Drainage Class: Poorly drained

Taxonomy (Subgroup): Very-fine, montmorillonitic, mesic Vertic Fluvaque

Field Observations Confirm Mapped Type? ☐ Yes ☑ No

Profile Description:

Depth (Inches):	Horizon:	Matrix Color (Munsell Moist):	Mottle Colors (Munsell Moist):	Mottle Abundance/Contrast	Texture, Concretions, Structure, Etc.
0-20	--	10YR 3/2	-- --	-- --	silt loam
20-36	--	10YR 4/2	-- --	-- --	sandy clay loam
36-42	--	10YR 2/1	-- --	-- --	silty clay loam
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed Or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content In Surface Layer In Sandy Soils
- ☐ Organic Streaking In Sandy Soils
- ☐ Listed On Local Hydric Soils List
- ☐ Listed On National Hydric Soils List
- ☐ Other (Explain In Remarks)

Remarks: The soil profile did not display any hydric soil indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐ Yes	☑ No
Wetland Hydrology Present?	☐ Yes	☑ No
Hydric Soils Present?	☐ Yes	☑ No

Is This Sampling Point Within A Wetland? ☐ Yes ☑ No

Remarks: The area characterized by this dataform is not a wetland due to the lack of hydrophytic vegetation, wetland hydrology, and hydric soil indicators.

ROUTINE WETLAND DETERMINATION DATA FORM

Project/Site: Oreapolis Wetland Mitigation Site				Date:	10/21/2008
Applicant/Owner: Nebraska Department of Roads				County:	Cass
Investigator: Travis Talbitzer				State:	Nebraska
Do Normal Circumstances Exist On The Site?	☑ Yes	☐ No		Community ID:	--
Is The Site Significantly Disturbed (Atypical Situation)?	☐ Yes	☑ No		Station ID:	
Is The Area A Potential Problem Area?	☐ Yes	☑ No		Plot ID:	5
(If yes, define below.)					

Land form description: Streambed of channel.

VEGETATION

Dominant Species

	Scientific Name	Indicator	Stratum	%
1.	*Phalaris arundinacea*	FACW+	Herb.	100
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--

Non Dominant Species

	Scientific Name	Indicator	Stratum	%
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--

Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-) 100%

Remarks: Percent dominance based on aerial coverage by layer.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, Or Tide Gauge
- ☑ Aerial Photos (2007 MAPA)
- ☐ Other

☐ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 5 (in.)
- Depth to Free Water: NA (in.)
- Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:
- ☐ None

Primary Indicators:
- ☑ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☑ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or More Required):
- ☐ Oxidized Root Channels In Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test 1:0
- ☐ Other (Explain in Remarks)

Remarks: This sample location was located within the streambed and was inundated 4-6". The channel was flowing at the time of the site visit. No soil pit was taken.

SOILS

(Series and Phase): Albaton silty clay, 0 to 1% slopes

Drainage Class: Poorly drained

Taxonomy (Subgroup): Very-fine, montmorillonitic, mesic Vertic Fluvaque

Field Observations Confirm Mapped Type? ☐ Yes ☑ No

Profile Description:

Depth (Inches):	Horizon:	Matrix Color (Munsell Moist):	Mottle Colors (Munsell Moist):	Mottle Abundance/Contrast	Texture, Concretions, Structure, Etc.
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Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed Or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content In Surface Layer In Sandy Soils
- ☐ Organic Streaking In Sandy Soils
- ☐ Listed On Local Hydric Soils List
- ☐ Listed On National Hydric Soils List
- ☑ Other (Explain In Remarks)

Remarks: No soil pit was taken due to inundation with a clearly definable depression (streambed) and the presence of dominant FACW+ hydrophytic vegetation, soils presumed hydric by definition.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☑ Yes	☐ No
Wetland Hydrology Present?	☑ Yes	☐ No
Hydric Soils Present?	☑ Yes	☐ No

Is This Sampling Point Within A Wetland? ☑ Yes ☐ No

Remarks: The area characterized by this dataform is a wetland due to the presence of hydrophytic vegetation, primary and secondary indicators of wetland hydrology, and soils that are assumed hydric.

ROUTINE WETLAND DETERMINATION DATA FORM

Project/Site: Oreapolis Wetland Mitigation Site				Date:	10/21/2008
Applicant/Owner: Nebraska Department of Roads				County:	Cass
Investigator: Travis Talbitzer				State:	Nebraska
Do Normal Circumstances Exist On The Site?	☑ Yes	☐ No		Community ID:	--
Is The Site Significantly Disturbed (Atypical Situation)?	☐ Yes	☑ No		Station ID:	
Is The Area A Potential Problem Area?	☐ Yes	☑ No		Plot ID:	6
(If yes, define below.)					

Land form description: Depressional area parallel to the berm on the north and fallow agricultural field to the south.

VEGETATION

Dominant Species

	Scientific Name	Indicator	Stratum	%
1.	*Phalaris arundinacea*	FACW+	Herb.	100
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--

Non Dominant Species

	Scientific Name	Indicator	Stratum	%
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--

Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-) 100%

Remarks: Percent dominance based on aerial coverage by layer.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, Or Tide Gauge
- ☑ Aerial Photos (2007 MAPA)
- ☐ Other

☐ No Recorded Data Available

Field Observations:
- Depth of Surface Water: None (in.)
- Depth to Free Water: None to 36 (in.)
- Depth to Saturated Soil: None to 36 (in.)

Wetland Hydrology Indicators:
- ☐ None

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or More Required):
- ☐ Oxidized Root Channels In Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test 1:0
- ☑ Other (Explain in Remarks)

Remarks: This sample location was located within a depressional area.

SOILS

(Series and Phase): Haynie silt loam, 0 to 2% slopes

Drainage Class: Well drained

Taxonomy (Subgroup): Coarse-silty, mixed, mesic Mollic Udifluvents

Field Observations Confirm Mapped Type? ☐ Yes ☑ No

Profile Description:

Depth (Inches):	Horizon:	Matrix Color (Munsell Moist):	Mottle Colors (Munsell Moist):	Mottle Abundance/Contrast	Texture, Concretions, Structure, Etc.
0-20	--	10YR 4/1	5YR 4/6	common fine prominent	silty clay loam
20-36	--	10YR 4/2	-- --	-- --	silt loam
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Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed Or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content In Surface Layer In Sandy Soils
- ☐ Organic Streaking In Sandy Soils
- ☐ Listed On Local Hydric Soils List
- ☐ Listed On National Hydric Soils List
- ☐ Other (Explain In Remarks)

Remarks: The soil profile displayed low-chroma colors and redoximorphic features within the upper 20".

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☑ Yes	☐ No
Wetland Hydrology Present?	☑ Yes	☐ No
Hydric Soils Present?	☑ Yes	☐ No

Is This Sampling Point Within A Wetland? ☑ Yes ☐ No

Remarks: The area characterized by this dataform is a wetland due to the presence of hydrophytic vegetation, secondary indicators of wetland hydrology, and hydric soil indicators.

APPENDIX B

WATERS OF THE U.S. DETERMINATION DATA FORMS

WATERS OF THE U.S. DETERMINATION DATA FORM

Project/Site: Oreapolis Wetland Mitigation Site	Date: 10/21/2008
Applicant/Owner: Nebraska Department of Roads	County: Cass
Investigator: Travis Talbitzer	State: Nebraska
Details of Stream Crossing:	WUS ID: 1
Type of structure proposed to convey flow:	Drainage Area:
Dimensions:	Remarks: Stream located between two berms, there is a railroad to the north and a fallow agricultural field to the south.Reedcanary grass within, and adjacent to, the channel.
Is this watercourse named? ☐ Yes ☑ No	
Name(s): Unnamed tributary of the Missouri River	

Channel Morphology Criteria* (check all applicable and describe in Remarks)

Stream has defined bed and bank? OR	☑ Yes	☐ No	Remarks: Channel with berm flowing west to east 4 to 6" in depth.
Stream has identifiable OHWM? OR	☑ Yes	☐ No	
Stream is actively sorting sediment?	☑ Yes	☐ No	**WUS Criteria:** ☑ Meets ☐ Fails

*satisfied by 1 or more "yes" answers.

Hydrologic Data

Flow regime:

- ☑ Perennial flow
- ☐ Intermittent flow
- ☐ Ephemeral flow

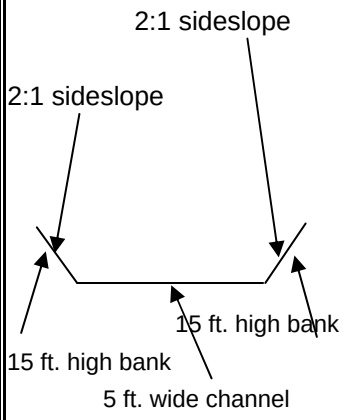
Data sources: USGS Plattsmouth, NE 7.5 minute quadrangle

Direct observation
- ☐ Gaging Station:
- ☐ Other:

Indirect knowledge
- ☑ USGS mapping: Perennial
- ☐ USDA mapping: --
- ☐ Other:

Site Sketch/Photo

Typical Channel X Section



APPENDIX C

SITE PHOTOGRAPHS

Photo Point 1. NDOR Oreapolis Wetland Bank Site. Orientation: West-North-East 10-21-08.

Photo Point 2. NDOR Oreapolis Wetland Bank Site. Orientation: North-West-South 10-21-08.

Photo Point 3. NDOR Oreapolis Wetland Bank Site. Orientation: West-South-East 10-21-08.

Photo Point 4. NDOR Oreapolis Wetland Bank Site. Orientation: West-South-East 10-21-08.

Photo Point 5. NDOR Oreapolis Wetland Bank Site. Orientation: West-South-East 10-21-08.

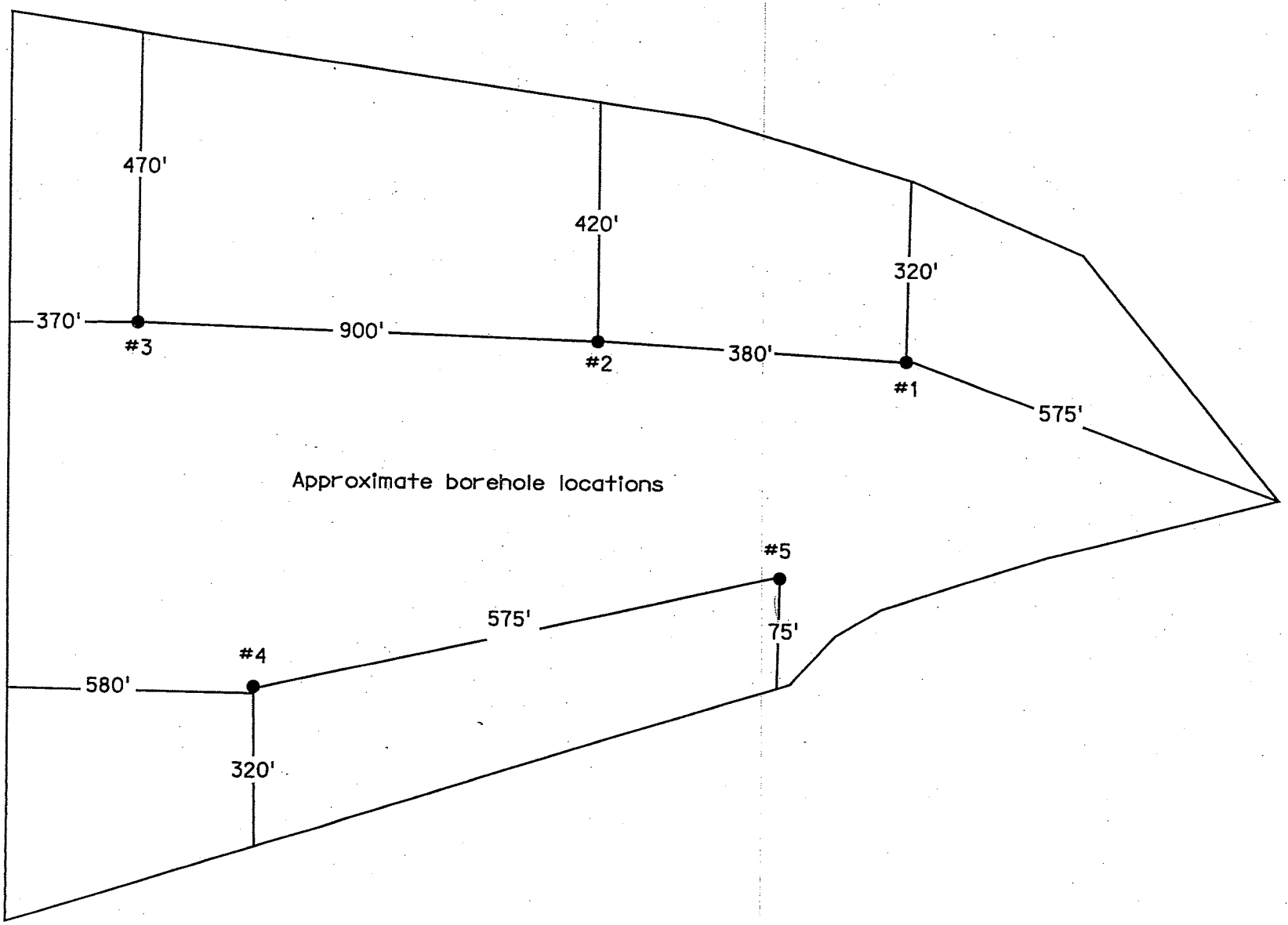
Stream Channel Upstream (West)

Stream Channel Downstream (East)

Photo Point 6. NDOR Oreapolis Wetland Bank Site. Wetland fringe along stream channel. 10-21-08.

Appendix C

Soil Borings


470'
420'
320'
370'
900'
380'
#3
#2
#1
575'
Approximate borehole locations
#5
575'
75'
#4
580'
320'

Nebraska Department of Roads
Material and Research Division
Geotechnical Section-Soil Survey Unit
Tabulation of Soil Survey Borings

Project Number: 75-2(155)
Project Name: Plattsmouth to Bellevue

Control No: 21849
Date: 5/12/2006

Location	Depth (Ft)	Sample No	Similar To	USCS Symbol	Soil Description	Water Level	% Moist.	% 200	P.I.	G.I.
++1	0.00-4.50	W-100		CL	Lean Clay with sand; 15-30% fine sand; medium plastic; dark brown (Alluvium)	9.1		16	26	16
	4.50-15.00	W-101		SP	Poorly graded sand; 95-100% fine to coarse sand; trace of (0-5%) silty fines (Alluvium)			97	NP	-2
++2	0.00-8.00		W-100	CL	Lean Clay with sand; 15-30% fine sand; medium plastic; dark brown (Alluvium)	9.9		16	26	16
	8.00-15.00		W-101	SP	Poorly graded sand; 95-100% fine to coarse sand; trace of (0-5%) silty fines (Alluvium)			97	NP	-2
++3	0.00-9.00	W-1		CH	Fat Clay; trace of fine sand; high plastic; dark brown (Alluvium)	8.5		5	48	29
	9.00-15.00		W-101	SP	Poorly graded sand; 95-100% fine to coarse sand; trace of (0-5%) silty fines (Alluvium)			97	NP	-2
++4	0.00-11.00	W-2		ML	Silt with sand; 15-30% fine sand; non-plastic Tan (Alluvium)	11.6		21	NP	8
	11.00-15.00	W-3		SM	Silty sand; 70-85% fine sand; 15-30% silty fines (Alluvium)			81	NP	0
++5	0.00-7.00	W-4		CL	Lean Clay; trace of fine sand; medium plastic Tan (Alluvium)	15.0		3	8	8
	7.00-12.00	W-5		CL	Lean Clay; 5-15% fine sand; medium plastic; dark brown (Alluvium)			8	22	13
	12.00-15.00		W-3	SM	Silty sand; 70-85% fine sand; 15-30% silty fines (Alluvium)			81	NP	0

Appendix D

Site Plans

PROJECT NO.	SHEET NO.
NH-75-2(168)	2-W1

C.N. 21849F

0 100' 200' 400'

SCALE

EAST BAY RD.

BNSF RR

3RD AVE.

GRADING PROJECT

2050

2055

2060

2065

2070

RELOCATED WEBSTER BLVD.

2075

OREAPOLIS RD.

EXISTING WEBSTER BLVD.

UPRR

2080

2085

WETLAND MITIGATION SITE

E 2993000 E 2993500 E 2994000 E 2994500 E 2995000 E 2995500

N 522500 N 522000 N 521500 N 521000

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

PROFESSIONAL CIVIL ENGINEER
RICHARD W. NIEDERGESES
E-7589
STATE OF NEBRASKA

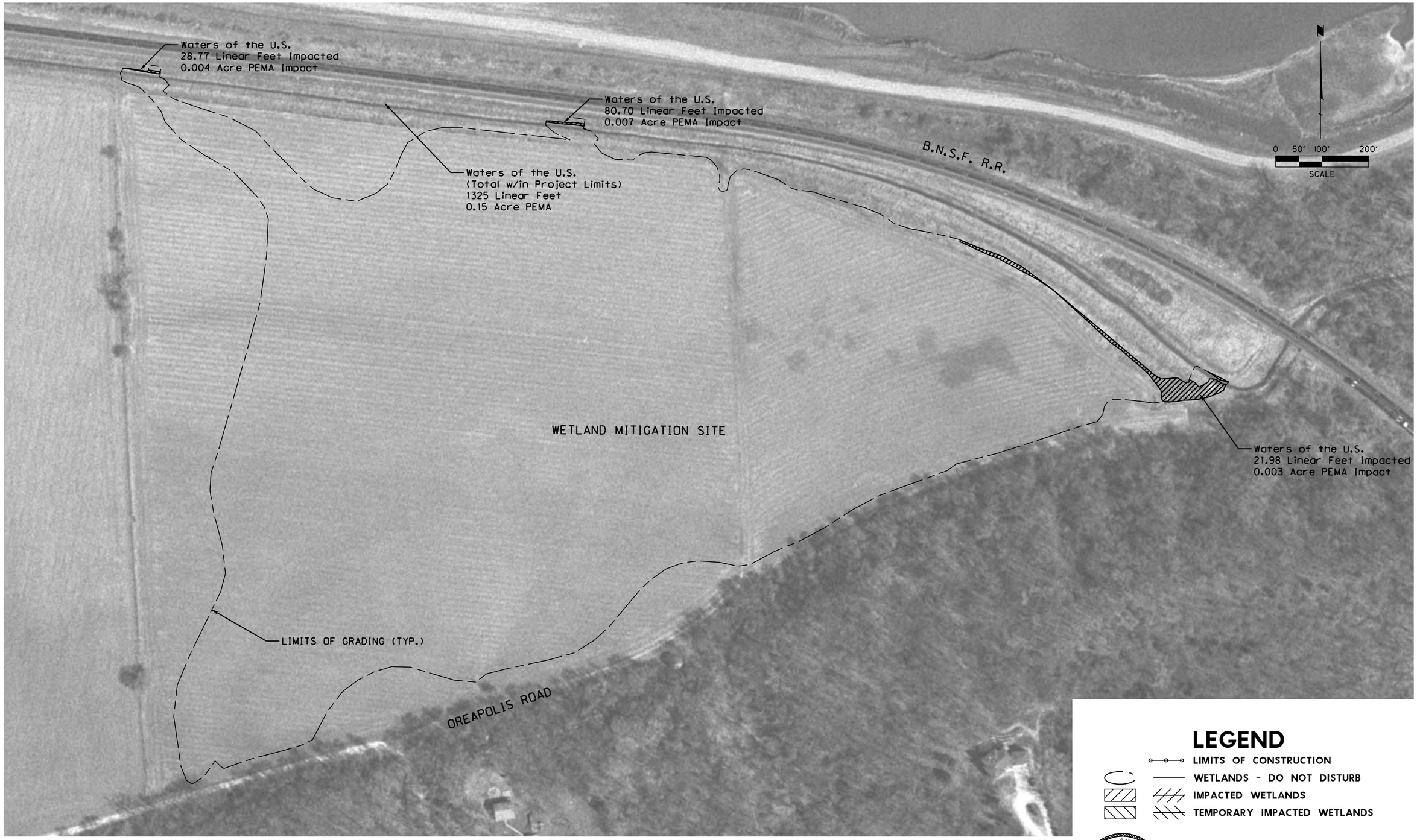
GENERAL SITE PLAN

Plot Date: 4/20/2010 11:00:06 AM
User: dvolk
Filename: ...\21849FCA01.DGN

DGNSPEC$$$$$$$$$$$$
SCALE$$$$$$$$$$$$

PROJECT NO.	SHEET NO.
NH-75-2(168)	2-W4

C.N. 21849F



LEGEND

- LIMITS OF CONSTRUCTION
- WETLANDS - DO NOT DISTURB
- IMPACTED WETLANDS
- TEMPORARY IMPACTED WETLANDS

OREAPOLIS WETLANDS MITIGATION SITE

CASS COUNTY

PROFESSIONAL CIVIL ENGINEER
RICHARD M. NIEDERGESES
E-7589
STATE OF NEBRASKA

DATE: 4-10-98
FLIGHT: 8587
SCALE:

GRADING PROJECT

Plot Date: 4/20/2010 11:01:07 AM
User: dvolk
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DGNSPEC$$$$$$$$$$$
SCALE$$$$$$$$$$$$

PROJECT NO.	SHEET NO.
NH-75-2(168)	2-L1

C.N. 21849F

SHEET 2L3

SHEET 2L2

SHEET 2L4

E 2993000 E 2993500 E 2994000 E 2994500 E 2995000 E 2995500

N 522500 N 522000 N 521500 N 521000

0 50' 100' 200'

SCALE

Limits of Grading (Typ.)

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

965.33 FL CMP 18" X 26" CMCP

PROFESSIONAL CIVIL ENGINEER
RICHARD M. NIEDERGESES
E-7589
STATE OF NEBRASKA

NOTES:

1. SEE SHEET 2-W1 FOR GENERAL SITE PLAN.
2. SEE SHEET 2-H1 FOR CENTERLINE CONTROL PLAN.
3. SEE SHEETS 2-L2 THROUGH 2-L4 FOR SPOT ELEVATIONS.
4. SEE SHEET 2-L5 FOR INLET/OUTLET LOCATION PLAN.

WETLAND GRADING PLAN KEY MAP

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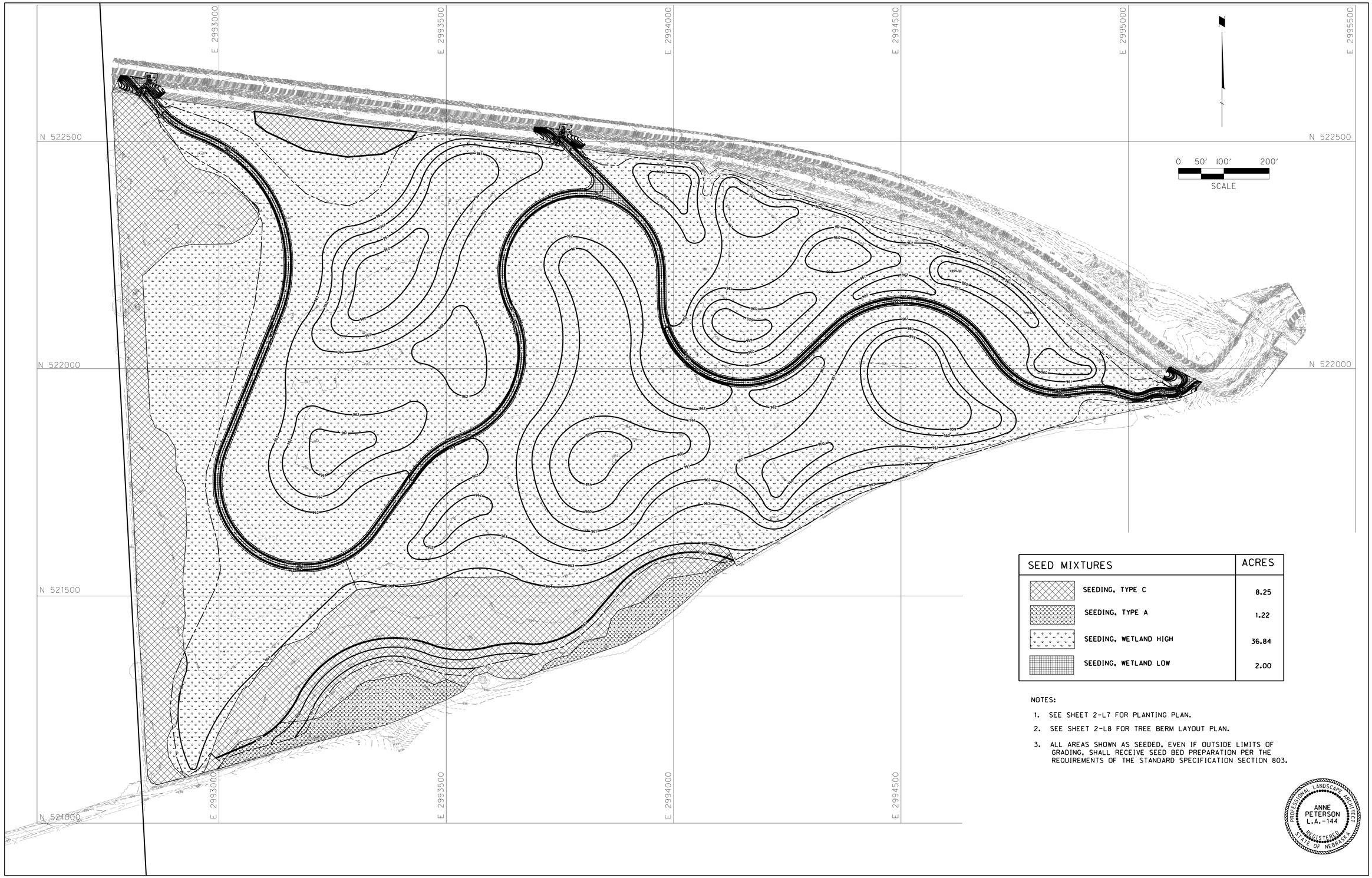
DGNSPEC$$$$$$$$$$$$
SCALE$$$$$$$$$$$$

PROJECT NO.	SHEET NO.
NH-75-2(168)	2-L6

C.N. 21849F



SEED MIXTURES	ACRES
SEEDING, TYPE C	8.25
SEEDING, TYPE A	1.22
SEEDING, WETLAND HIGH	36.84
SEEDING, WETLAND LOW	2.00

NOTES:

1. SEE SHEET 2-L7 FOR PLANTING PLAN.
2. SEE SHEET 2-L8 FOR TREE BERM LAYOUT PLAN.
3. ALL AREAS SHOWN AS SEEDED, EVEN IF OUTSIDE LIMITS OF GRADING, SHALL RECEIVE SEED BED PREPARATION PER THE REQUIREMENTS OF THE STANDARD SPECIFICATION SECTION 803.

PROFESSIONAL LANDSCAPE ARCHITECT
ANNE PETERSON
L.A.-144
REGISTERED STATE OF NEBRASKA

WETLAND SEEDING PLAN

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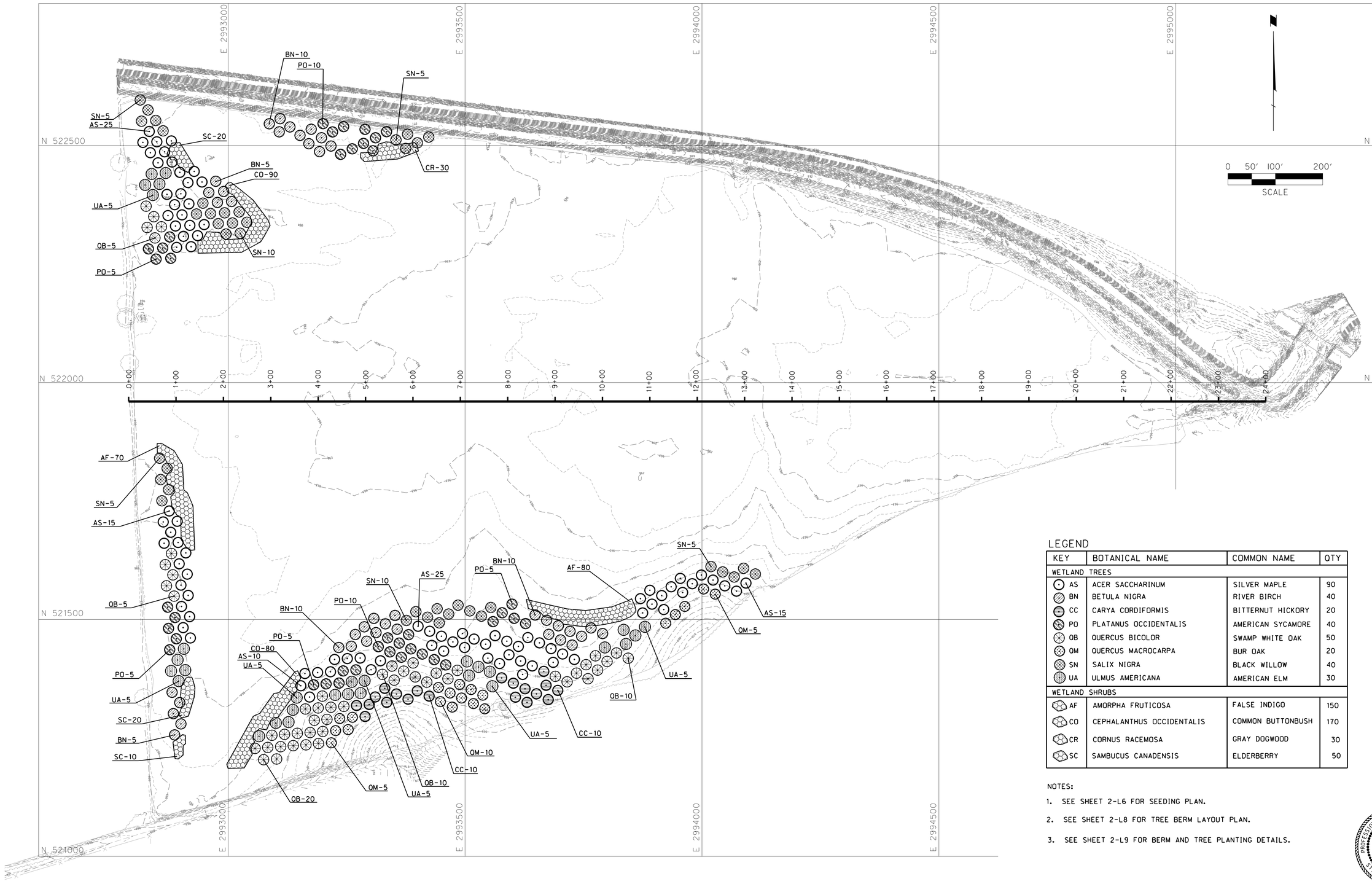
SCALE:$$$$$$$$$$$$

PROJECT NO.	SHEET NO.
NH-75-2(168)	2-L7

C.N. 21849F



LEGEND

KEY	BOTANICAL NAME	COMMON NAME	QTY
WETLAND TREES			
AS	ACER SACCHARINUM	SILVER MAPLE	90
BN	BETULA NIGRA	RIVER BIRCH	40
CC	CARYA CORDIFORMIS	BITTERNUT HICKORY	20
PO	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	40
QB	QUERCUS BICOLOR	SWAMP WHITE OAK	50
QM	QUERCUS MACROCARPA	BUR OAK	20
SN	SALIX NIGRA	BLACK WILLOW	40
UA	ULMUS AMERICANA	AMERICAN ELM	30
WETLAND SHRUBS			
AF	AMORPHA FRUTICOSA	FALSE INDIGO	150
CO	CEPHALANTHUS OCCIDENTALIS	COMMON BUTTONBUSH	170
CR	CORNUS RACEMOSA	GRAY DOGWOOD	30
SC	SAMBUCUS CANADENSIS	ELDERBERRY	50

NOTES:

1. SEE SHEET 2-L6 FOR SEEDING PLAN.
2. SEE SHEET 2-L8 FOR TREE BERM LAYOUT PLAN.
3. SEE SHEET 2-L9 FOR BERM AND TREE PLANTING DETAILS.

PROFESSIONAL LANDSCAPE ARCHITECT
ANNE PETERSON
L.A.-144
REGISTERED
STATE OF NEBRASKA

WETLAND PLANTING PLAN

Plot Date: 4/20/2010 10:50:47 AM
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DGNSPEC$$$$$$$$$$$$
SCALE$$$$$$$$$$$$

Appendix E
Water Budget

HDR | ONE COMPANY *Many Solutions*℠

Technical Memorandum

To: NDOR	
From: HDR	Project: NDOR – Lower Platte Mitigation Bank
CC:	
Date: March 6, 2008	Job No: NH-75-2(155) – NDOR 58932 – HDR

RE: Hydrologic and Hydraulic Analyses for Lower Platte Mitigation Bank

Introduction

Hydrologic and hydraulic analyses were performed for the Lower Platte Mitigation Bank site to evaluate its potential for wetland mitigation. The site is located within Section 1, T 12 N, R 13 E, in Cass County, Nebraska. The primary water source for the proposed mitigation site is an unnamed ditch that runs generally west to east on the north side of the site. In addition to flow conveyed by the ditch, sources of water include surface runoff from hills to the south (about 0.3 square miles of drainage area), groundwater, and rainfall on the site itself (about 50 acres). The 2-year event was identified as the event of interest in considering the ditch's contribution to the proposed wetland.

Data Collection and Methodology

As shown on the City of Plattsmouth, Nebraska, Flood Insurance Rate Map, most of the site is located in a Zone A8 floodplain associated with Platte River flooding (FEMA 1978). Zone A8 would now be called Zone AE and indicates an area is subject to inundation by a base (1% annual chance) flood and has established base flood elevations. A Zone B area is defined along the southern edge of the site, indicating moderate or minimal hazard and possible local drainage problems.

A search for surface water and other gages was conducted on the U.S. Geological Survey Surface-Water Data for the Nation website (USGS 2007). There are no gages on the unnamed ditch or any tributary streams.

As indicated, the primary water source for the proposed mitigation site is the unnamed ditch on the north side of the property. Regression equations and modeling were selected for hydrologic and hydraulic analysis, respectively, given the nature of water delivery to the site.

Hydrology

About 4,500 feet upstream from the site, the ditch passes through a series of structures (noted from upstream to downstream): UPRR Railroad, Haswell Dr., Webster Blvd., and Oreapolis Rd. Under proposed conditions, the Haswell Dr. crossing will be eliminated and the structure at Webster Blvd. will be a triple 12-ft by 12-ft RCB culvert. Cass County is responsible for the Oreapolis Rd. structure; it is assumed that conveyance is and will be adequate for low flow conditions.

Peak discharges were calculated for the proposed Webster Blvd. structure using NDOR regression equations (NDOR 2006). The mitigation site is located in Hydrologic Region 3 and receives 28 inches of precipitation annually (on average). The contributing drainage area to Webster Blvd. is 1.72 square miles, and the stream slope is 72.2 ft./mi. Peak discharges for various recurrence intervals are shown in Table 1.

Table 1 – Peak Discharges at Webster Blvd.

Recurrence Interval, yrs	Peak Discharge, cfs
2	290
10	1,410
50	3,465
100	4,720

Due to the limited additional drainage area between the proposed Webster Blvd. structure and the upstream end of the mitigation site, these peak discharges were adopted.

Hydraulics

Information was gathered from multiple sources to create a hydraulic model for the unnamed ditch using HEC-RAS 3.1.3 developed by the U.S. Army Corps of Engineers. Cross section data and river stationing were generated using GEOPAK. Manning's n values were estimated based on site photographs, land use and vegetation. Cowan's method (as documented by Chow) and the HEC-RAS Hydraulic Reference Manual, Version 3.1 were also used to develop Manning's n values.

A number of hydraulic scenarios were evaluated. This memo is not intended to capture the details of model development; rather, a brief description of scenarios and key results are presented.

Existing Conditions

Two hydraulic models were prepared for existing conditions: one with levees defined on both north and south ditch berms and one without levees defined on either berm. The 2-year peak discharge is contained within the ditch (assuming no breach of the "levee" or "berm").

A railroad bridge is located near the downstream end of the mitigation site. Little survey data was available for the structure itself, but the limits of the bridge were well defined by the topographic contours. With this information, key dimensions were scaled from a photograph. While approximate in nature, the modeling of the bridge is deemed adequate. Beginning somewhere between the 2-year and the 10-year event, the bridge significantly influences stream hydraulics, creating a backwater effect.

The 10-year peak discharge overtops the berms in a number of locations. In the hydraulic model, this overtopping results in a dramatic change in conveyance area as the flow changes from being confined in the ditch to spreading over the width of the mitigation site. This dramatic change in conveyance area makes the 10-year results unreliable. During the 10-year event it is anticipated that the mitigation site would be flooded due to 1) overtopping of the ditch's south berm and/or 2) backwater caused by the downstream railroad bridge.

Bankfull Flow: Peak Velocity Condition

To adequately design any berms, gabions, or other means of diverting flow to the proposed mitigation site, it was necessary to determine the maximum velocity in the existing ditch. To determine this velocity, the levees in the existing conditions model were raised such that right and left bank levee elevations were equal. A "bankfull flow" discharge was adjusted in 50 cfs increments until the flow was just below the overtopping point for this adjusted levee condition. As one levee was set higher than its true condition, the bankfull discharge is conservative (high). The levee adjustment was necessary to avoid a rapid change in conveyance area as described for the 10-year existing conditions model. **The maximum velocity in the existing ditch for this "bankful flow" condition is 6.5 fps**.

Proposed Conditions: Meandering Channel, 2-Year Flow

Proposed conditions were modeled as follows:

- **Flow** - 2-year event split flow assuming 50/50 split at each diversion: 290 cfs at upstream end of model; at first diversion, 145 cfs in ditch and 145 cfs in meandering channel; after second diversion, 72.5 cfs in ditch and 217.5 cfs in meandering channel; 290 cfs at confluence just upstream of railroad bridge.
- **Diversions** – Each diversion was modeled by placing an obstruction in the channel (assumed to represent gabions). The elevation of the obstructions was set 3 feet above the thalweg (low point of the channel), and the width of the opening between the obstructions was also 3 feet. The thalweg of the first diversion was set to 963.03 ft.; the thalweg of the second diversion was set to 961.43 ft. Above the obstructions, the area of the opening in the south berm was modeled with about twice the cross-sectional area of the ditch. For the first (upstream) diversion, this required 9-foot wide benches and 3H:1V side slopes. For the second (mid-site) diversion, this required 15-foot wide benches and 3H:1V side slopes.
- **Meandering Channel –** The meandering channel was modeled as a trapezoidal section with a bottom width of 10 feet and 5H:1V side slopes. The cross sections were entered with a depth of 5 feet. *It is not intended that the meandering channel be 5 feet deep*. The intent of the model was to observe the depth results and determine how deep the channel should be to provide for overbank flows to reach the shallow depressions and other areas of vegetation. The slope of the proposed channel is 0.0011 ft/ft and is based on lowering the downstream end 1 ft. relative to the existing thalweg.
- **Outlet Cross Section** – The outlet cross section (the most downstream cross section in the mitigation site) was modeled with a 3-foot bottom width and 3H:1V side slopes from a bottom elevation of 958.35 ft. up to an elevation of 963 ft. An obstruction was placed across the channel to an elevation of 960 ft. The bench elevation (963 ft.) is set 1 ft below 964 ft., which is the approximate elevation of the western edge of the site. The expanded flow area above this elevation will be utilized before flooding of the upstream property would occur. On the right bank side, this bench at elevation 963 ft. is 30 ft. wide and then has 3H:1V side slopes until it intersects the existing cross section. The cross-sectional area of the proposed outlet cross section exceeds that of the existing cross section at all elevations.

Depths in the proposed meandering channel, as modeled, ranged from about 2.9 feet at the upstream end to 5.2 feet at the downstream end (just upstream of the outlet cross section). As noted previously, it is not intended that the channel be designed to accommodate these depths. The model shows that overtopping can be anticipated if channel depths are designed to be in the range of 1 to 2.5 feet.

Just upstream of the confluence near the site outlet, the existing conditions model yielded a water surface elevation (WSEL) of 963.40 ft. The proposed conditions model yielded WSELs of 963.51 ft. in the ditch and 963.50 ft. in the proposed meandering channel. If the meandering channel is designed to overtop as described, any minor effect of a change in the water surface profile upstream is anticipated to be inconsequential. Flows will be confined to either the ditch or the mitigation site.

Approximate Proposed Conditions

In an effort to determine the affect of the proposed design for higher discharges, a copy of the existing conditions model with no levees was made. Ditch obstructions were added at locations near the diversions in the proposed model. The proposed outlet cross section was incorporated into the corresponding existing conditions cross section. This "approximate proposed conditions" model does not reflect the detail of the meandering channel and shallow ponding areas, but it does approximate the storage that would occur in the mitigation site assuming that the south berm is opened. The 10-year results were unreliable as the flow exceeded the capacity of some of the modeled cross sections. An intermediate (between the 2-year and 10-year event) discharge of 700 cfs was modeled. At the combined ditch and site outlet cross section, the computed WSEL for this intermediate event was 965.71 ft. In the existing conditions (no levee) model, the WSEL at this same location was computed to be 965.67 ft. The difference is small, and in both cases the hydraulics are controlled by the downstream railroad bridge.

A more accurate assessment of proposed conditions would require an unsteady flow model and the incorporation of weirs and storage areas into the proposed geometry.

Other Information

This memo is focused primarily on runoff events from the (upstream) contributing drainage area. It should be noted that the site is also affected by Missouri River flooding. The site is located just upstream of Missouri River Mile 595. 10-year WSELs near the mitigation site differ among published studies:

- Flood Insurance Study of City of Plattsmouth, NE – 962.2 ft. NGVD 1929;
- Flood Insurance Study of County of Mills, IA – 962.7 ft. NGVD 1929;
- Upper Mississippi River System Flow Frequency Study – 964.4 ft. NGVD 1929.

Though the predicted WSELs differ, it is concluded that at the mitigation site, there is a 10% annual chance of backwater flooding from the Missouri River.

References

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[NDOR] Nebraska Department of Roads. 2006. Drainage Design and Erosion Control Manual. http://www.nebraskatransportation.org/roadway-design/dd-ec-manual.htm. Accessed 1 May 2007.

[USACE] U.S. Army Corps of Engineers. 2002. HEC-RAS River Analysis System Hydraulic Reference Manual.

[USACE] U.S. Army Corps of Engineers, Omaha District. November 2003. *Upper Mississippi River System Flow Frequency Study, Hydrology and Hydraulics, Appendix F: Missouri River*.

[USGS] U.S. Geological Survey. Surface-Water Data for the Nation. http://waterdata.usgs.gov/nwis/sw. Accessed 1 May 2007.

Appendix F

Seed Mixes

Seeding

Subsection 803.02 in the Standard Specifications is amended to include the following:

Type "A"	Minimum Purity	Broadcast or Hydraulic Seeder Application Rate in lb. of Pure Live Seed/Acre	Approved Mechanical Drill Application Rate in lb. of Pure Live Seed/Acre
Slender wheatgrass	85		2.5
Canada wildrye – Mandan, Neb./IA native	85		4
Western wheatgrass – Flintlock, Barton	85		5
Virginia wildrye – Omaha, Nebr. native	85		7
Switchgrass – Pathfinder, Blackwell, Trailblazer	90		1
Indiangrass – NE-54, Oto, Holt	90		3
Big bluestem – Pawnee, Roundtree, Bonanza	60		3
Little bluestem – Aldous, Blaze, Camper	60		2
Prairie cordgrass (Spartina pectinata)	75		0.25
Sideoats grama – Butte, El Reno, Trailway	75		3
Partridge pea – inoculated	90		0.5
Roundhead lespedeza - inoculated	90		0.25
Blackeyed Susan (Rudbeckia hirta)	90		0.4
Black Samson (Echinacea angustifolia)	90		0.3
Compass plant (Silphium laciniatum)	60		0.4
Yarrow (Achillea millefolium)	85		0.2
Blue vervain (Verbena hastata)	75		0.2
Grayhead prairie coneflower (Ratibida pinnata)	85		0.75
Shell-leaf penstemon (Penstemon grandiflorus)	75		0.2
Pitcher sage (Salvia azurea)	75		0.3
New England aster (Aster novae-angliae)	90		0.1
Oats/Wheat*	90		13

* Wheat in the fall

All seed shall be origin Nebraska, adjoining states, or as specified. A contractor proposing to use a substitute variety, or origin shall submit for the engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application per Acre (Minimum)
Available Nitrogen (N_2)	0 lbs.
Available Phosphoric Acid (P_2O_5)	0 lbs.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (Total Available)	0 lbs.

The contractor may, at his option, apply granular urea formaldehyde in lieu of the sulphur coated urea fertilizer at the following rate:

Nitrogen (Total Available)	0 lbs.

Seeding

Subsection 803.02 in the Standard Specifications is amended to include the following:

Type "Channel"	Minimum Purity	Broadcast or Hydraulic Seeder Application Rate in lb. of Pure Live Seed/Acre	Approved Mechanical Drill Application Rate in lb. of Pure Live Seed/Acre
Slender wheatgrass	85		2.5
Bluejoint (Calamagrostis canadensis)	65		0.2
Fox sedge (Carex vulpinoidea)	85		0.5
Short-beaked sedge (Carex brevior)	75		0.75
Soft-stem bulrush (Schoenoplectus tabernaemontani)	80		0.75
Giant burreed (Sparganium eurycarpum)	65		0.5
Big bluestem – Pawnee, Roundtree, Bonanza	60		3
Indiangrass – NE-54, Oto, Holt	90		3
Switchgrass – Pathfinder, Blackwell, Trailblazer	90		1.5
Prairie cordgrass (Spartina pectinata)	75		0.25
Beggartick (Bidens cernua)	90		0.25
Oats/Wheat*	90		10

* Wheat in the fall

All seed shall be origin Nebraska, adjoining states, or as specified. A contractor proposing to use a substitute variety, or origin shall submit for the engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application per Acre (Minimum)
Available Nitrogen (N_2)	0 lbs.
Available Phosphoric Acid (P_2O_5)	0 lbs.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (Total Available)	0 lbs.

The contractor may, at his option, apply granular urea formaldehyde in lieu of the sulphur coated urea fertilizer at the following rate:

Nitrogen (Total Available)	0 lbs.

Seeding

Subsection 803.02 in the Standard Specifications is amended to include the following:

Type "Emergent Wetland"	Minimum Purity	Broadcast or Hydraulic Seeder Application Rate in lb. of Pure Live Seed/Acre	Approved Mechanical Drill Application Rate in lb. of Pure Live Seed/Acre
Canada wildrye – Mandan, Neb./IA native	85		3
Fowl manna grass (Glyceria striata)	75		0.2
Awl-fruited sedge (Carex stipata)	85		1
Short-beaked sedge (Carex brevior)	85		0.75
Fox sedge (Carex vulpinoidea)	85		0.5
Spike rush (Eleocharis palustris)	60		0.2
Big bluestem – Pawnee, Bonanza, Roundtree	60		2.5
Rice cutgrass (Leersia oryzoides)	50		0.25
Arrowhead (Sagittaria latifolia)	80		3
Water plantain (Alisma plantago-aquatica)	80		0.5
Joe-pye weed (Eupatorium perfoliatum)	75		0.2
Swamp milkweed (Asclepias incarnata)	90		0.2
New England aster (Aster novae-angliae)	75		0.2
Blue vervain (Verbena hastata)	75		0.2
Water horehound (Lycopus americanus)	90		0.2

All seeds shall be origin Nebraska, adjoining states, or as specified. A contractor proposing to use a substitute variety shall submit for the engineer's consideration a seed tag representing the seed, which shows the variety, origin and analysis of the seed.

Rate of application of inorganic fertilizer shall be:

	Rate of Application per 1000 SY (Min.)
Available Nitrogen (N_2)	0 lb.
Available Phosphoric Acid (P_2O_5)	0 lb.

Rate of application of granular sulphur coated urea fertilizer or urea-formaldehyde fertilizer shall be:

	Rate of application per 1000 SY (Min.)
Nitrogen (Total Available)	0 lb.

Seeding

Subsection 803.02 in the Standard Specifications is amended to include the following:

Type "Tree Planting Areas"	Minimum Purity	Broadcast or Hydraulic Seeder Application Rate in lb. of Pure Live Seed/Acre	Approved Mechanical Drill Application Rate in lb. of Pure Live Seed/Acre
Virginia wildrye – Omaha, native	85		6
Slender wheatgrass	85		2.5
Canada wildrye – Mandan, Neb./IA native	85		5
Fox sedge (Carex vulpinoidea)	85		0.5
Prairie cordgrass (Spartina pectinata)	75		0.5
Indiangrass – NE-54, Oto, Holt	75		4
Big bluestem – Pawnee, Roundtree, Bonanza	60		4
Switchgrass – Blackwell, Pathfinder, Trailblazer	90		0.75
New England aster (Aster novae-angliae)	90		0.2
Blue flag iris (Iris virginica)	75		0.25
Cup plant (Silphium perfoliatum)	75		0.4
Oats/Wheat*	90		12

* Wheat in the fall

All seeds shall be origin Nebraska, adjoining states, or as specified. A contractor proposing to use a substitute variety shall submit for the engineer's consideration a seed tag representing the seed, which shows the variety, origin and analysis of the seed.

Rate of application of inorganic fertilizer shall be:

	Rate of Application per 1000 SY (Min.)
Available Nitrogen (N_2)	0 lb.
Available Phosphoric Acid (P_2O_5)	0 lb.

Rate of application of granular sulphur coated urea fertilizer or urea-formaldehyde fertilizer shall be:

	Rate of application per 1000 SY (Min.)
Nitrogen (Total Available)	0 lb.

Erosion Control

Subsection 807.02 in the Standard Specifications is amended to include the following:

Erosion Control	Minimum Purity	Approved Mechanical Drill Application Rate in lb. of Pure Live Seed/1000 SY
Canada wildrye – Mandan, Neb./IA native	85	1
Slender wheatgrass	85	0.75
Perennial ryegrass – Linn	85	1.5
Western wheatgrass – Flintlock, Barton	85	1.5
Blue grama – NE, IA, KS	30	0.3
Little bluestem – Aldous, Blaze, Camper	60	0.6
Sideoats grama – Butte, El Reno, Trailway	75	1
Sand dropseed (Sporobolus cryptandrus)	90	0.1
Partridge pea – Platte, inoculated	90	0.2
Purple prairie clover – Kaneb, inoculated	90	0.1
Oats/Wheat*	90	4.5

* Wheat in the fall

All seed shall be origin Nebraska, adjoining states, or as specified. A contractor proposing to use a substitute variety, or origin shall submit for the engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application per Acre (Minimum)
Available Nitrogen (N_2)	8 or 9 lbs.
Available Phosphoric Acid (P_2O_5)	23 or 24 lbs.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (Total Available)	0 lbs.