



Oreapolis Wetland Mitigation Site

Cass County, Nebraska

U.S. 75 PLATTSMOUTH to BELLEVUE COMPENSATORY WETLAND MITIGATION PLAN

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U.S. HIGHWAY – 75 PLATTSMOUTH TO BELLEVUE COMPENSATORY MITIGATION PLAN

Oreapolis Wetland Mitigation Site Cass and Sarpy Counties, Nebraska

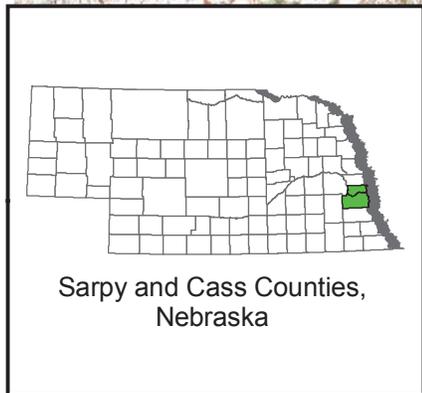
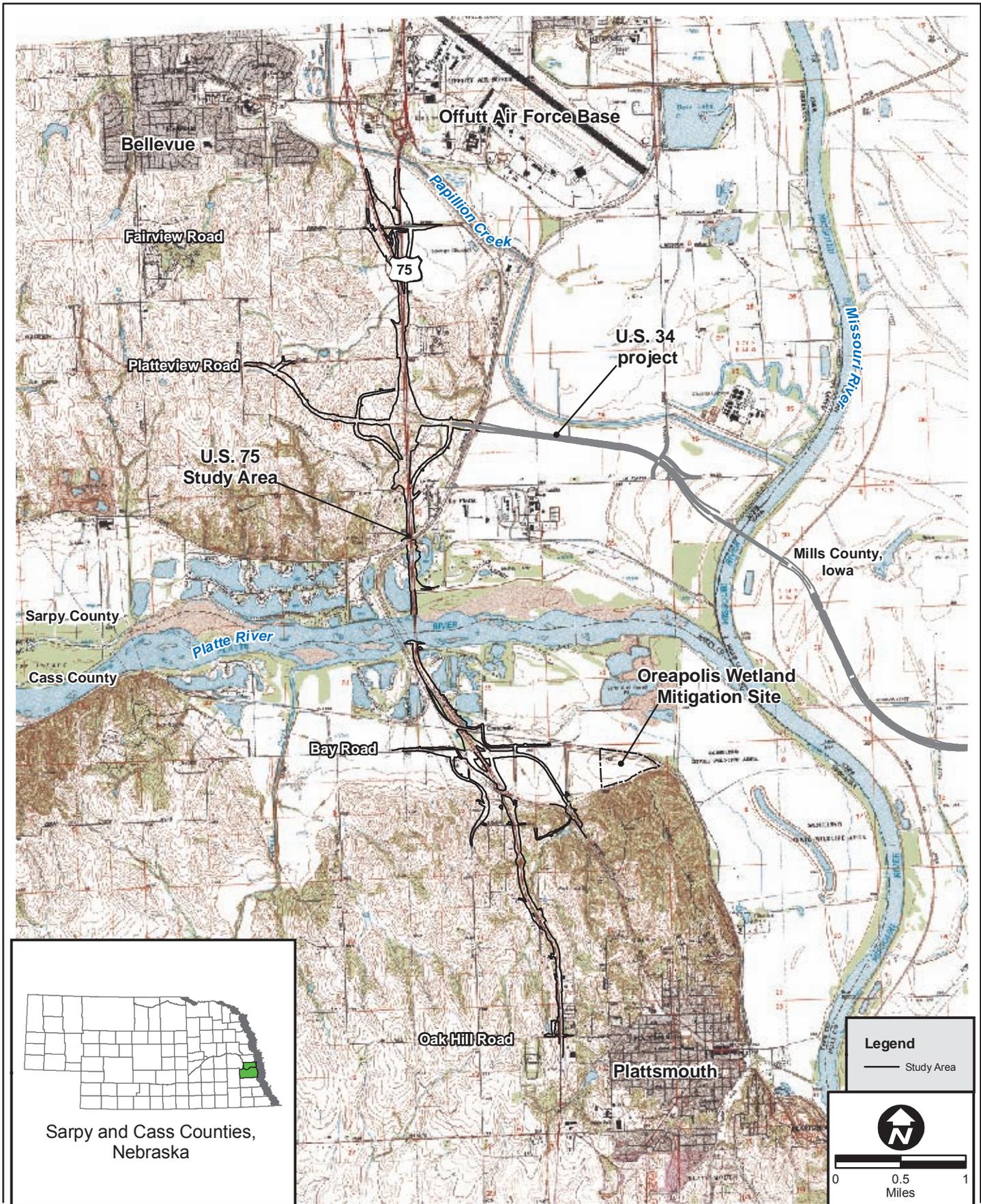
1.0 INTRODUCTION

As detailed in the Nebraska Department of Roads' (NDOR's) Clean Water Act Section 404 Individual Permit (IP) Application for the U.S. Highway 75 (U.S. 75) Plattsmouth to Bellevue Project, NDOR is finalizing plans to reconstruct 6.8 miles of U.S. Highway 75 (U.S. 75) to a four-lane divided highway from Plattsmouth to Bellevue in Cass and Sarpy counties, Nebraska (Project) (see Figure 1, Project Location). The Project also includes multiple bridges that would be added or improved (including improvements to the northbound and southbound Platte River bridges) and realignments of county and frontage roads.

Wetlands and linear waters of the U.S. were delineated along the Project corridor in October 2005, June 2009, and October 2009. The results of the wetland delineations and the Project plans were used to determine the anticipated Project impacts, as detailed in the Project's IP Application.

This Compensatory Mitigation Plan (Plan) is intended to successfully mitigate unavoidable Project impacts to waters of the U.S., and waters of the state¹, via wetland creation at the proposed Oreapolis Wetland Mitigation Site (Site).

¹ In order to comply with Nebraska Title 117 (Nebraska Surface Water Quality Standards – Antidegradation Clause), NDOR is proposing to mitigate both isolated and roadside ditch wetland impacts at the Oreapolis Wetland Mitigation Site. Conversely, NDOR is not proposing mitigation for impacts to non-wetland, non-stream open water areas (sand pits). During a December 4, 2008 pre-application meeting, the USACE project representative stated that impacts to these types of open water areas are not a Clean Water Act Section 404 concern.



Source: USGS 7.5 Minute Quadrangle, Plattsmouth Nebraska



Project Location Map

U.S. 75 – Plattsmouth to Bellevue
Sarpy and Cass Counties, Nebraska
Compensory Mitigation Plan

DATE	
FIGURE	1

2.0 MITIGATION GOALS AND OBJECTIVES

The following addresses the functions that would be lost at the impact sites, the functions to be gained at the Site, and the overall watershed improvements to be gained.

2.1 Functions Lost at Impact Sites

The Project would result in unavoidable, permanent impacts on 7.06 acres of wetlands from fill associated with the proposed roadway embankment and associated drainage structures. The following lists the anticipated wetland impacts (Cowardin et al., 1979):

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

The 7.06 acres of wetlands provide minimal to moderate wetland function, as follows:

- Flood storage – The proximity of the wetlands to an existing highway as well as their relatively small size provides little flood storage capability.
- Wildlife habitat – The affected wetlands are in close proximity to an existing highway surrounded by actively cultivated row crop production or urban/suburban growth. Therefore these wetlands are not conducive to wildlife occupation.
- Biodiversity – The majority of the affected emergent wetlands exhibit a monoculture of reed canary grass (*Phalaris arundinacea*).
- Water quality – The affected wetlands collect roadway runoff, providing a water quality function.

The Project would also result in the loss of 5,679 linear feet of tributaries to Papillion Creek, the Missouri River, and the Platte River. These tributaries are highly eroded, are dry channels, or have been manipulated with an impoundment. All flow through some culvert or pipe because of the existing roadway.

In addition, NDOR has designed site-specific stream mitigation at various locations that are detailed in PCN Attachment C.

2.2 Functions to Be Gained at the Mitigation Site

2.2.1 General Site Goals

NDOR is proposing on-site, compensatory wetland mitigation at the Site to offset unavoidable wetland impacts resulting from the Project. The Site would be constructed on an approximately 50-acre parcel in the northeast ¼ of the north ½ of Section 1, Township 12 North, Range 13 East, in Cass County, Nebraska (see Appendix A, Baseline Wetland Delineation Report, Figure 1). NDOR is proposing to restore hydrology to approximately 40.6 acres of palustrine emergent (PEM) wetlands and 6.5 acres of palustrine forested (PFO) wetlands. All wetlands restored on the Site would be classified, according to the Nebraska Wetland Subclass, as riverine floodplain (moderate to slow permeability with minimal out-of-bank flooding) or riverine channel (USDA NRCS, no date).

2.2.2 Nebraska Natural Legacy Project

The function of the wetlands restored at the Site would far surpass the minimal and temporal function of the affected wetlands. The entire Project area either drains to the Missouri River or to the Lower Platte River, which in turn drains to the Missouri River. The Site lies along, and drains to, the Missouri River, which, like the Lower Platte River, is designated by the Nebraska Natural Legacy Project² as a biologically unique landscape in Nebraska's Tallgrass Prairie Ecoregion (Nebraska Game and Parks Commission [NGPC], 2005). The Nebraska Natural Legacy Project describes the 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 affected 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 on the Missouri River landscape, the Nebraska Natural Legacy Project has identified the restoration of natural plant communities (such as wetlands, prairies, and woodlands) on the river floodplain and terraces as a specific Missouri River conservation strategy.

² The Nebraska Natural Legacy Project has developed and is implementing a blueprint for conserving Nebraska's flora, fauna, and natural habitats through the proactive, voluntary conservation actions of partners, communities, and individuals.

Construction of the Site would be consistent with the Missouri River conservation strategy identified by the Nebraska Natural Legacy Project. Specifically, the Site would enhance water quality and wildlife habitat functions of the Missouri River landscape as follows:

- Water quality – Surface water from an existing, channelized drainageway would be diverted onto the Site, where flow velocities would dramatically decrease, thus 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 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.

2.3 Overall Watershed Improvements to Be Gained by the Site

2.3.1 Pallid Sturgeon Recovery

Beyond the general water quality and wildlife habitat benefits that the Site would provide to the Missouri River landscape (as detailed in Section 2.2, Functions to Be Gained at the Mitigation Site), 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], 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, 2006). If habitat restoration occurs, the middle range of the species³ may show the greatest overall potential for maintaining the continued existence and eventual recovery of the species (USFWS, 2006).

One factor noted to affect pallid sturgeon near the Site is the exposure to environmental contaminants. 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 2006).

As noted in Section 2.2, 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.

³ The middle range is the pallid sturgeon habitat located between Gavins Point Dam near Yankton, SD to the confluence of the Missouri and Mississippi rivers (USFWS 2006). The Oreapolis Mitigation Site falls within this area.

2.3.2 Watershed Scale

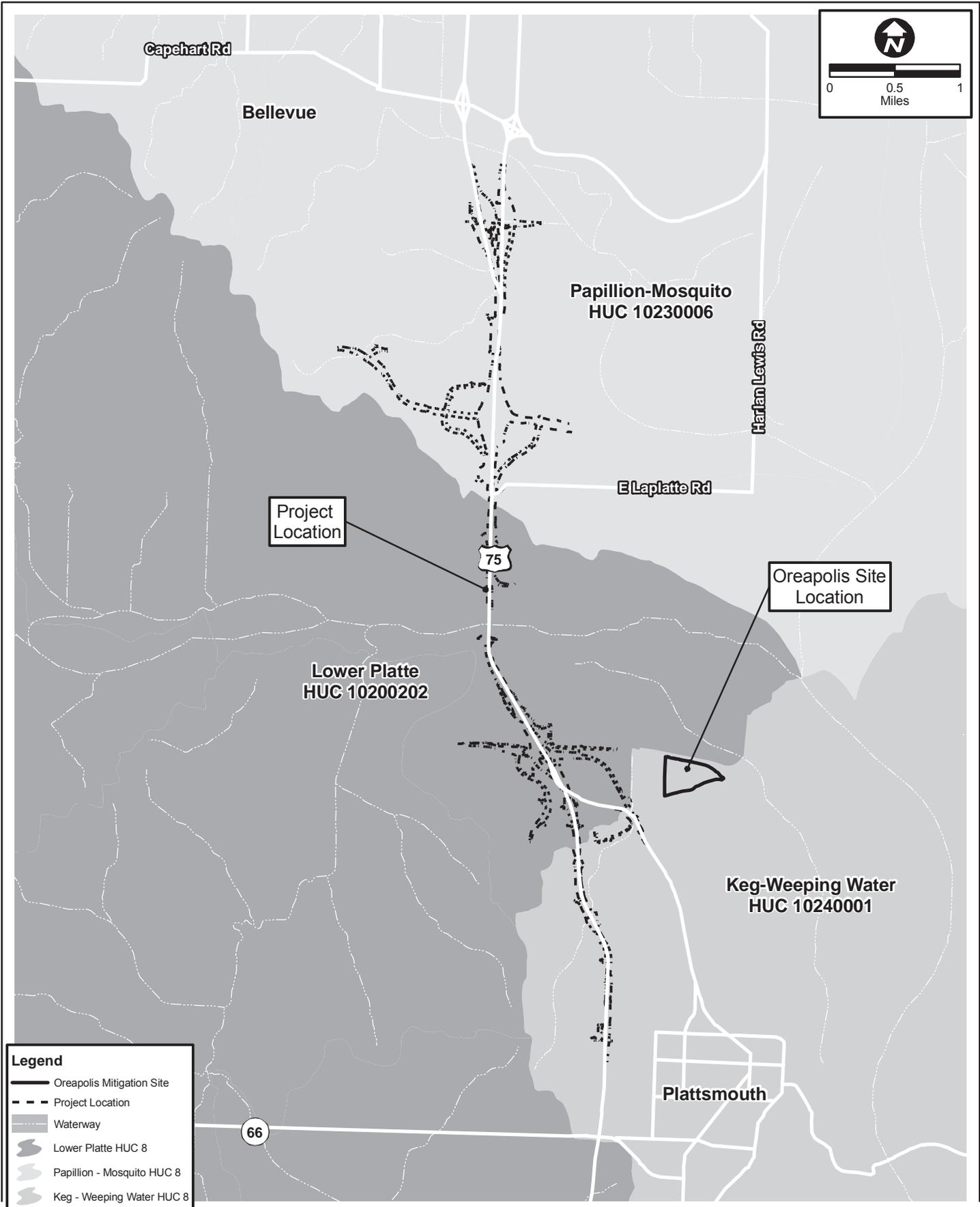
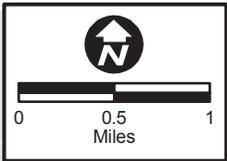
The U.S. Army Corps of Engineers' Guidance for Compensatory Mitigation and Mitigation Banking in the Omaha District (USACE, August 2005) has required that compensatory wetland mitigation occur within the same 8-digit Hydrologic Unit Code (HUC) as the Project impacts (U.S. Army Corps of Engineers [USACE], 2005). Under this scenario, the Site would be unacceptable for Project mitigation because the Site is located in HUC 102400 – Missouri-Nishnabotna, 01 – Keg-Weeping Water while the Project impacts occur in three separate HUCs: HUC 102400 – Missouri Nishnabotna, 01 – Keg-Weeping Water; HUC 102300 – Missouri-Little Sioux, 06 – Big Papillion-Mosquito; and HUC 102002 – Lower Platte, 02 – Lower Platte (see Figure 2, Hydrologic Unit Codes). However, the USACE guidance document goes on to state that “this guidance may be subject to change subsequent to the receipt of additional national guidance on this issue.” Additional national guidance was published in the form of the April 10, 2008, Compensatory Mitigation for Losses of Aquatic Resources: Final Rule (33 Code of Federal Regulations [CFR] 332). The Final Rule is less restrictive in allowable mitigation area and provides justification for the out-of-HUC Site, as follows:

- 33 CFR 332.2 defines watershed as “a land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean.”
- 33 CFR 332.3(b)(1) states that “...In general, the required compensatory mitigation should be located within the same watershed as the impact...”

Based on this definition of “watershed” and the lack of specified mitigation restrictions within any designated HUC, the Site would appropriately mitigate Project impacts because both the Site and the Project would ultimately drain to the Missouri River (in very close proximity to one another). Furthermore, 33 CFR 332.3(c)(4) allows the district engineer flexibility in determining the appropriate size of watershed to consider in determining appropriate compensatory wetland mitigation, as follows:

33 CFR 332.3(c)(4) states that “[t]he size of watershed addressed using a watershed approach should not be larger than is appropriate to ensure that the aquatic resources provided through compensation activities will effectively compensate for adverse environmental impacts resulting from activities authorized by [Department of the Army] permits. The district engineer should consider relevant environmental factors and appropriate locally developed standards and criteria when determining the appropriate watershed scale in guiding compensation activities.”

Based on the wetland functions that the Site would provide in combination with the relative proximity to the Project impacts and their joint drainage to the Missouri River, NDOR is of the opinion that the Site would provide effective compensation for the unavoidable impacts of the Project on waters of the U.S.



Legend

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

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Hydrologic Unit Codes

U.S. 75 – Plattsmouth to Bellevue
Sарy and Cass Counties, Nebraska
Compensory Mitigation Plan

DATE
FIGURE
2

3.0 BASELINE INFORMATION

The following addresses the existing hydrology, vegetation, and soils at the impact sites and the Site.

3.1 Existing Hydrology

3.1.1 Impact Sites

Hydrology at the impact sites is the result of linear drainageways or groundwater. The wetlands that were formed along linear drainageways fluctuate from dry to inundated as the flows in the channel fluctuate. The wetlands fed from groundwater may be more permanent.

3.1.2 Oreapolis Wetland Mitigation Site

Hydrology for the Site would be obtained by diverting flows from an existing, channelized drainageway. A comprehensive water budget was performed for the Site. Results of the water budget indicate that the Site would receive and maintain hydrology sufficient to sustain wetland conditions.

3.2 Existing Vegetation

3.2.1 Impact Sites

Most of the PEM wetlands are dominated by reed canary grass (*Phalaris arundinacea*), with a smaller representation of prairie cordgrass (*Spartina pectinata*), cattail (*Typha angustifolia*), yellow nutsedge (*Cyperus esculentus*), and curlytop knotweed (*Polygonum lapathifolium*). The PFO wetlands are dominated by a combination of cottonwood (*Populus deltoides*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), and narrowleaf willow (*Salix exigua*). The single PSS wetland is dominated by narrowleaf willow (*Salix exigua*).

3.2.2 Oreapolis Wetland Mitigation Site

The Site currently sits fallow and is not used for active agricultural production; however, historical uses of the Site were agricultural.

3.3 Soils

3.3.1 Impact Sites

Mapped soil series for each impact site were determined by reviewing the soil survey for Sarpy County (USDA Soil Conservation Service [SCS], 1975) and Cass County (USDA SCS, 1984). The Wetland Delineation Report for the Project (NDOR, 2007) is included as Attachment B of the PCN for the Project and contains detailed information on mapped soil series.

3.3.2 Oreapolis Wetland Mitigation Site

Mapped soil series for the Site were determined by reviewing the soil survey for Cass County (USDA SCS, 1984). The Baseline Wetland Delineation Report for the Site is included as

Appendix A and contains detailed information on mapped soil series (NDOR, 2009). In addition, NDOR performed five geotechnical soil borings on the Site in May 2006. A summary of boring results is provided in Section 5.2, Soils, and detailed results are included in Appendix B, NDOR Geotechnical Soil Borings.

4.0 SITE SELECTION AND JUSTIFICATION

4.1.1 Mitigation Type

Based on NDOR's understanding of acceptable mitigation types, as defined in Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (33 CFR 332), NDOR selected the following compensatory mitigation type:

1. Permittee-Responsible Mitigation Under a Watershed Approach (33 CFR 332(b)(4)) and/or Permittee-Responsible Mitigation Through On-Site and In-Kind Mitigation (33 CFR 332(b)(4)) – NDOR proposes that Site improvements would qualify under one of these mitigation types, and would be effective in mitigating unavoidable impacts to waters of the U.S.

4.1.2 Additional Mitigation Applications

Although the Site has been designed to mitigate all impacts of the US-75 Project in-kind at a mitigation ratio of 2:1 (approximately 11.38 acres of PEM/C wetland and approximately 2.74 acres of PFO wetland), not all of the wetlands restored on the Site are intended to mitigate impacts associated with the US-75 Project:

1. The initial mitigation wetland surplus (remaining following allocation of the mitigation required for the US-75 Project) would be allocated to offset unavoidable wetland impacts associated with NDOR's US-34 Bellevue Bridge Project (see Figure 1: Project Location) at an anticipated 2:1 mitigation ratio. The US-34 project will be constructed concurrent with the US-75 Project and is functionally linked to the US-75 Project via the proposed intersection of US-75 and US-34 at relocated Platteview Road.
2. The ultimate mitigation wetland surplus (remaining following allocation of the mitigation required for both the US-75 and US-34 Projects) would be certified as wetland mitigation bank credits and allocated as compensatory wetland mitigation for unspecified future projects.

The immediate proximity of the US-75 and US-34 projects to one another justifies the approach of a single wetland mitigation site. The single 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, thereby decreasing the amount of site monitoring reports to be reviewed. Lastly, and in addition to providing compensatory mitigation to both the US-75 and US-34 projects, Site selection is further strengthened by the potential for wetland mitigation credit certification. Details regarding mitigation wetland accounting and monitoring methods are provided in Section 8.2.

4.1.3 Potential for Expansion

Site selection is further justified by the potential for future Site expansion. The Site lies immediately east of a 58-acre agricultural parcel that, if necessary, could potentially be acquired by NDOR and easily incorporated into the existing Site plan. Through engineered design and construction, the 58-acre parcel would likely facilitate an expansion of the existing Site's goal of emergent wetland, forested wetland, and stream channel development.

5.0 MITIGATION WORK PLAN

5.1 Construction Plan

The following sheets from the Oreapolis Wetland Mitigation Site Plan Set are provided in Appendix C:

- Plan Set Cover Page
- General Site Plan
- Wetland Grading Plan
- Inlet/Outlet Location
- 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 40.6 acres of PEM wetlands, 6.5 acres of PFO wetlands, and 4,266 linear feet of stream channel.

More specifically, 75 percent of the normal flows of the existing drainageway would be 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 overbank frequently 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.

5.2 Soils

Beyond the shallow excavations and associated soil analysis, performed in accordance with the Baseline Wetland Delineation Report for the Site (see Appendix A), NDOR performed five geotechnical soil borings on the Site in May 2006 (see Appendix B for results of the borings). 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.

5.3 Vegetation

Occupation of desirable hydrophytes would be facilitated by large-scale seeding and tree planting on the Site. NDOR would use its typical emergent wetland seed mix on the 40.6 acres of proposed emergent wetland (see Appendix C, Oreapolis Wetland Mitigation Site Plan, for the seeding plan and Appendix D for the seed mixes). Areas proposed for forested wetland mitigation would be planted with numerous woody species, as specified and shown in the Wetland Planting Plan included in Appendix C.

5.4 Construction Timing

Site construction is proposed for 2010 and would occur prior to, or consistent with any Project impacts. As Site construction would occur well in advance of Project impacts associated with distant Project phases, the temporal loss of wetland function, associated with the normal scenario of mitigation occurring concurrent with impacts, would be lessened.

Consistent with the Record of Decision for the U.S. 34 project (FHWA and Iowa DOT, 2007), any excess material resulting from Site development would be used as fill material for the Nebraska approach of the U.S. 34 Missouri River Bridge. The use of this material for the project 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.

6.0 SUCCESS CRITERIA

Success criteria are defined as the satisfaction of all three required wetland parameters (vegetation, hydrology, and hydric soils) in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). The Site would be considered a success when it develops an area of emergent and forested wetlands sufficient to offset the area of Project impacts at the mitigation ratio determined appropriate by USACE.⁴

⁴ NDOR anticipates that the USACE-determined mitigation ratio would not exceed 2:1. Furthermore, NDOR understands that the USACE-determined mitigation ratio may be less than 2:1 due to mitigation construction occurring prior to impacts, resulting in decreased loss of temporal wetland function.

7.0 SITE PROTECTION AND MAINTENANCE

NDOR is committed to protecting the Site and assuring that it provides its intended wetland function in perpetuity. To this end, NDOR would place a conservation easement on the Site that would protect its wetland functions by deterring development or practices that could handicap the functionality of the Site. The conservation easement would be filed with Cass County.

8.0 MONITORING PLAN

8.1 Standard Monitoring and Reporting Protocols

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, observed changes in soil characteristics would be documented and ground-level site photographs would be taken at regular intervals from common locations.

Annual Site monitoring reports would 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 success criteria are being met. Lastly, the monitoring report would provide NDOR and USACE information sufficient to determine whether corrective actions are necessary.

8.2 Site-Specific Monitoring and Reporting Protocols

In addition to NDOR's standard wetland monitoring protocols (see Section 8.1), 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 that will serve to mitigate the US-75 and US-34 projects, and potentially provide wetland mitigation bank credits. 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 3.

A modified wetland mitigation monitoring report will be developed for Site monitoring. In addition to figures that include the dynamic Site divisions, noted above, the reports will also include an accounting section that documents mitigation wetland development in relation to 1) the US-75 Project, 2) the US-34 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-75 and US-34 projects. Additionally, the reports will provide a more generalized discussion relative to surplus mitigation wetland development.

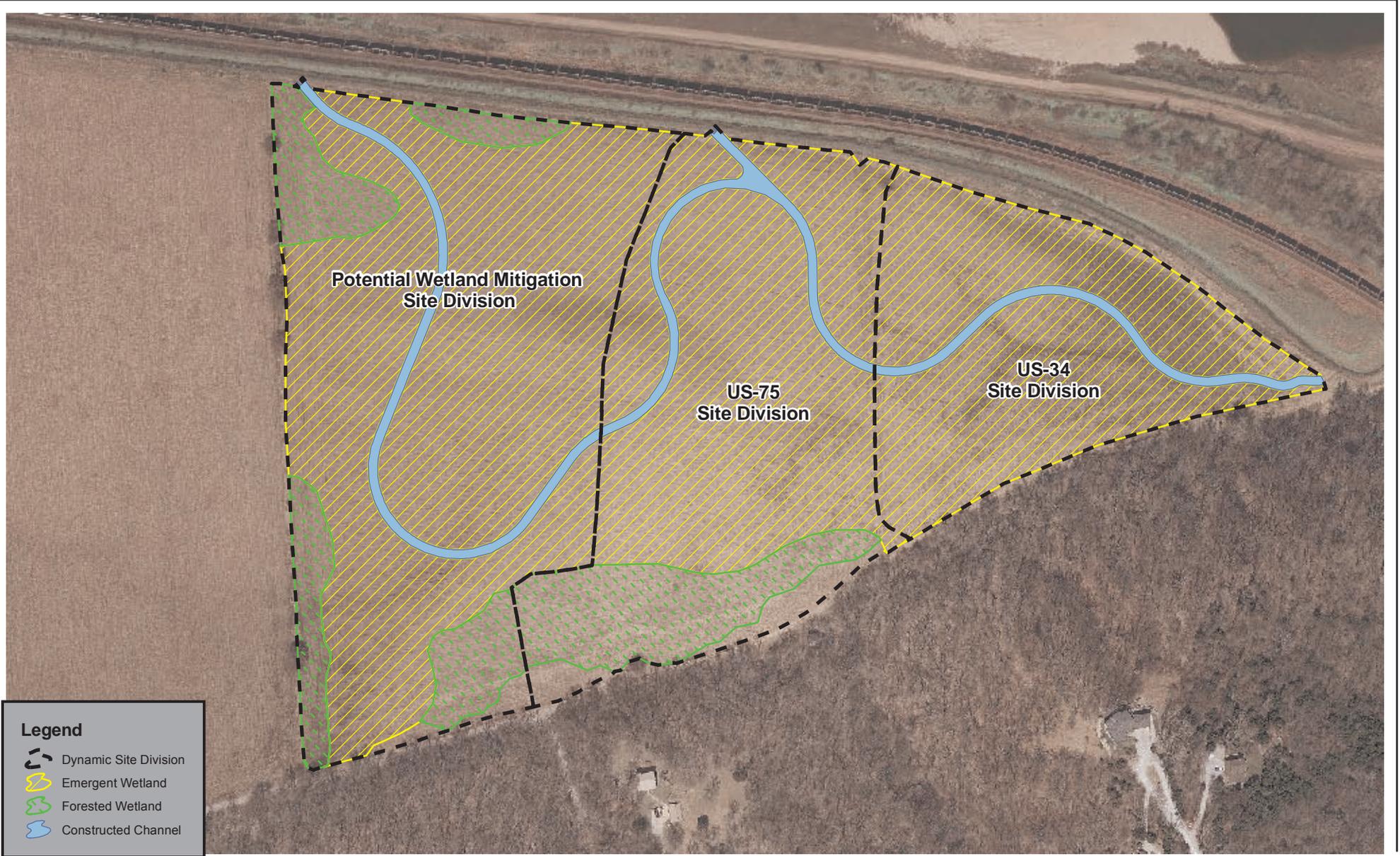
The certification of wetland mitigation bank credits will not be requested until USACE has verified that the Site meets all site-specific mitigation obligations, including the anticipated five year monitoring condition. At which time that USACE determines that all site-specific mitigation obligations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

9.0 ADAPTIVE MANAGEMENT PLAN

If at any time during the monitoring period it is determined that the Site is failing to meet success criteria for an area sufficient to satisfy the anticipated mitigation condition of the pending Project permit, NDOR would assume responsibility for required corrective actions. In addition, NDOR would be responsible for the regular maintenance of the Site.

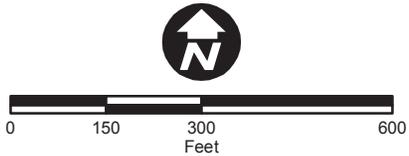
10.0 FINANCIAL ASSURANCES

NDOR would be responsible for all costs associated with Site construction, maintenance, protection, and monitoring. NDOR has adequate funding to facilitate all noted Site costs.



Legend

- Dynamic Site Division
- Emergent Wetland
- Forested Wetland
- Constructed Channel



Aerial Imagery: 2007 MAPA



Dynamic Site Divisions

U.S. 75 – Plattsmouth to Bellevue
Sarpy and Cass Counties, Nebraska
Compensory Mitigation Plan



DATE
FIGURE
3

11.0 REFERENCES

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APPENDIX A
BASELINE WETLAND DELINEATION REPORT



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*SM

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Appendix A Routine Wetland Determination Data Forms
 Appendix B Waters of the U.S. Determination Data Forms
 Appendix C Site Photographs

Prepared by:

 HDR ENGINEERING, INC.
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 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.

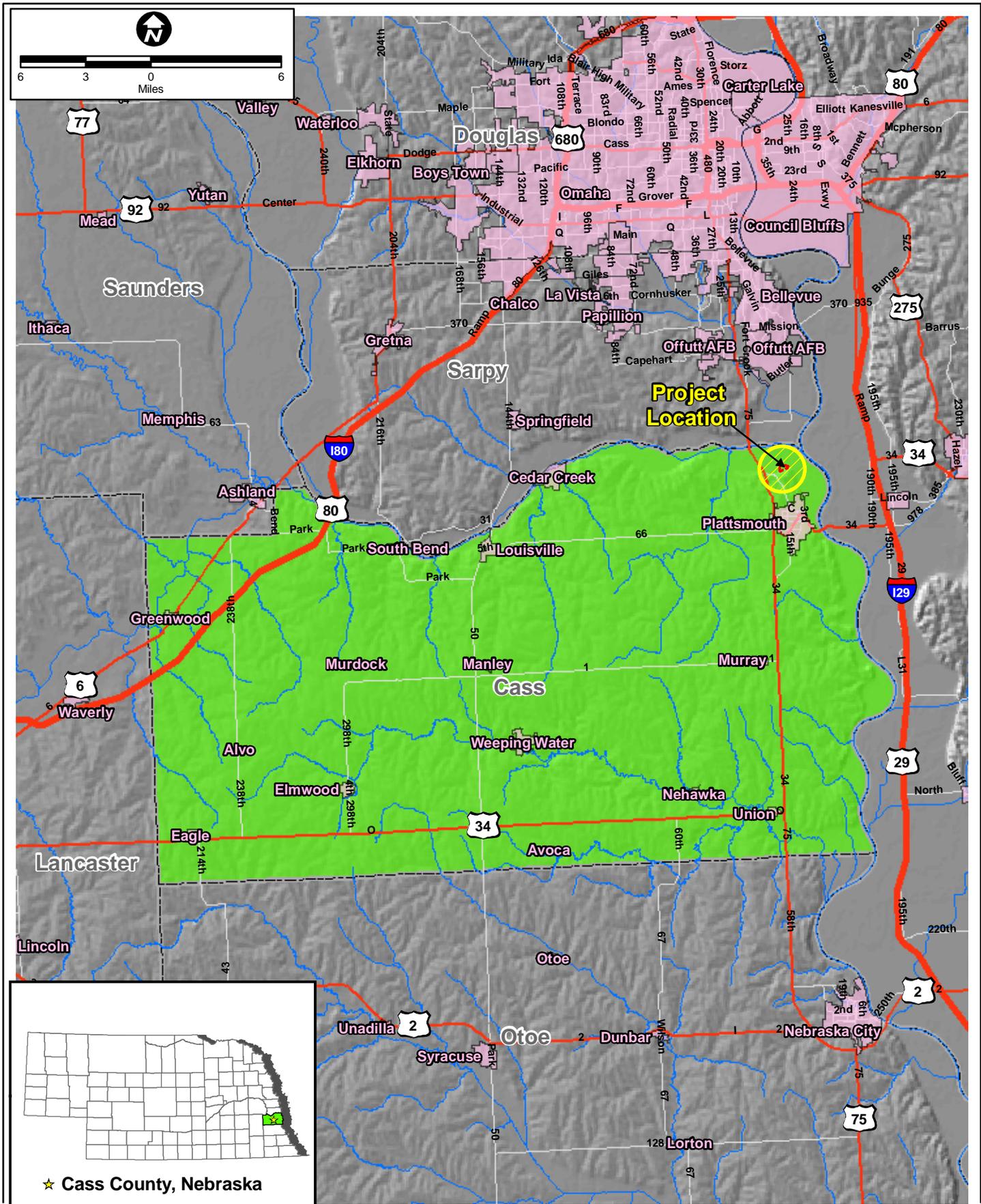
1.2 Study Area

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.



★ Cass County, Nebraska



Project Location Map

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



DATE
 January 2009

FIGURE
 1

2.0 DELINEATION OF WATERS OF THE U.S.

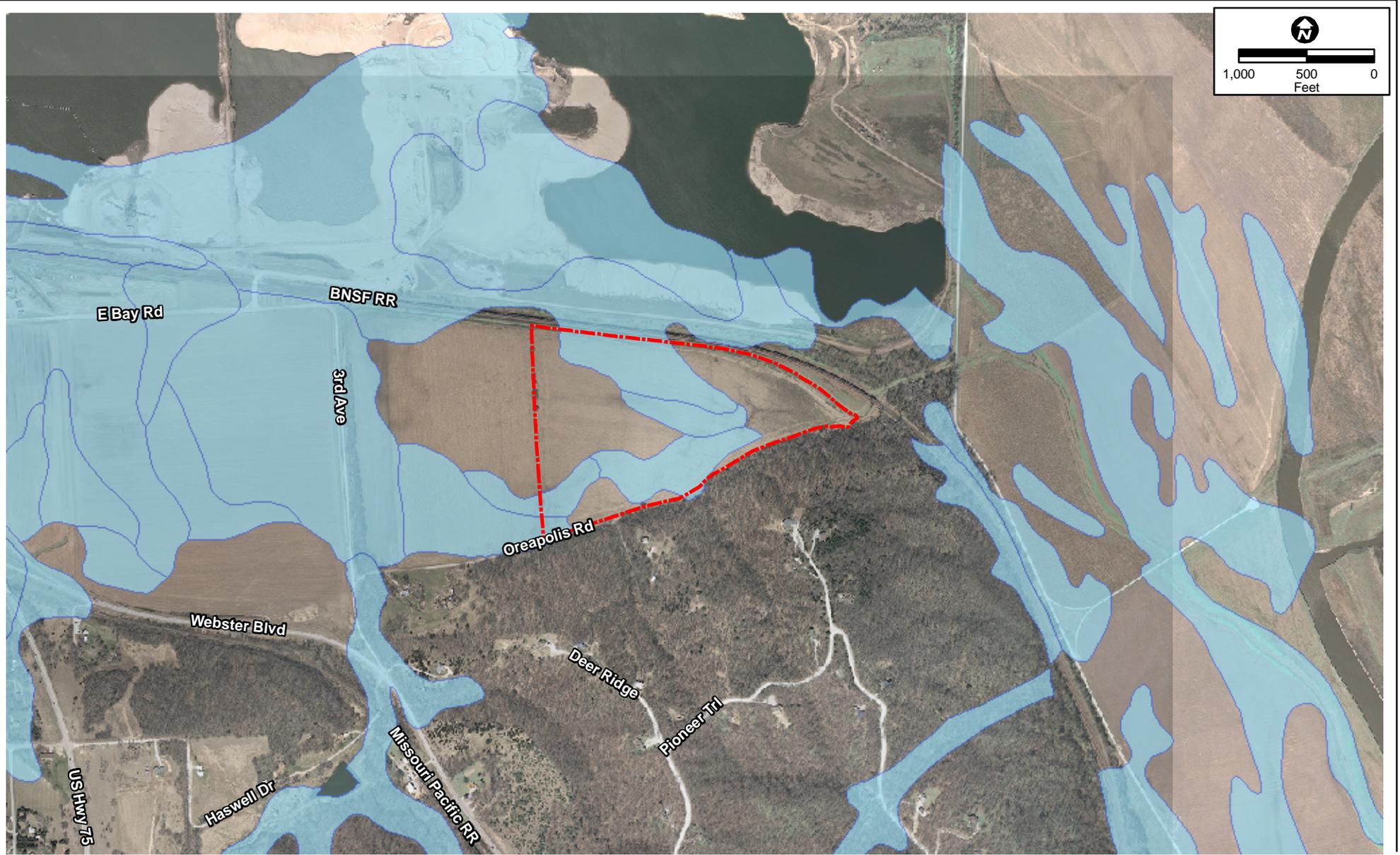
2.1 Methods

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.



Legend

-  Hydric Soils
-  Study Area

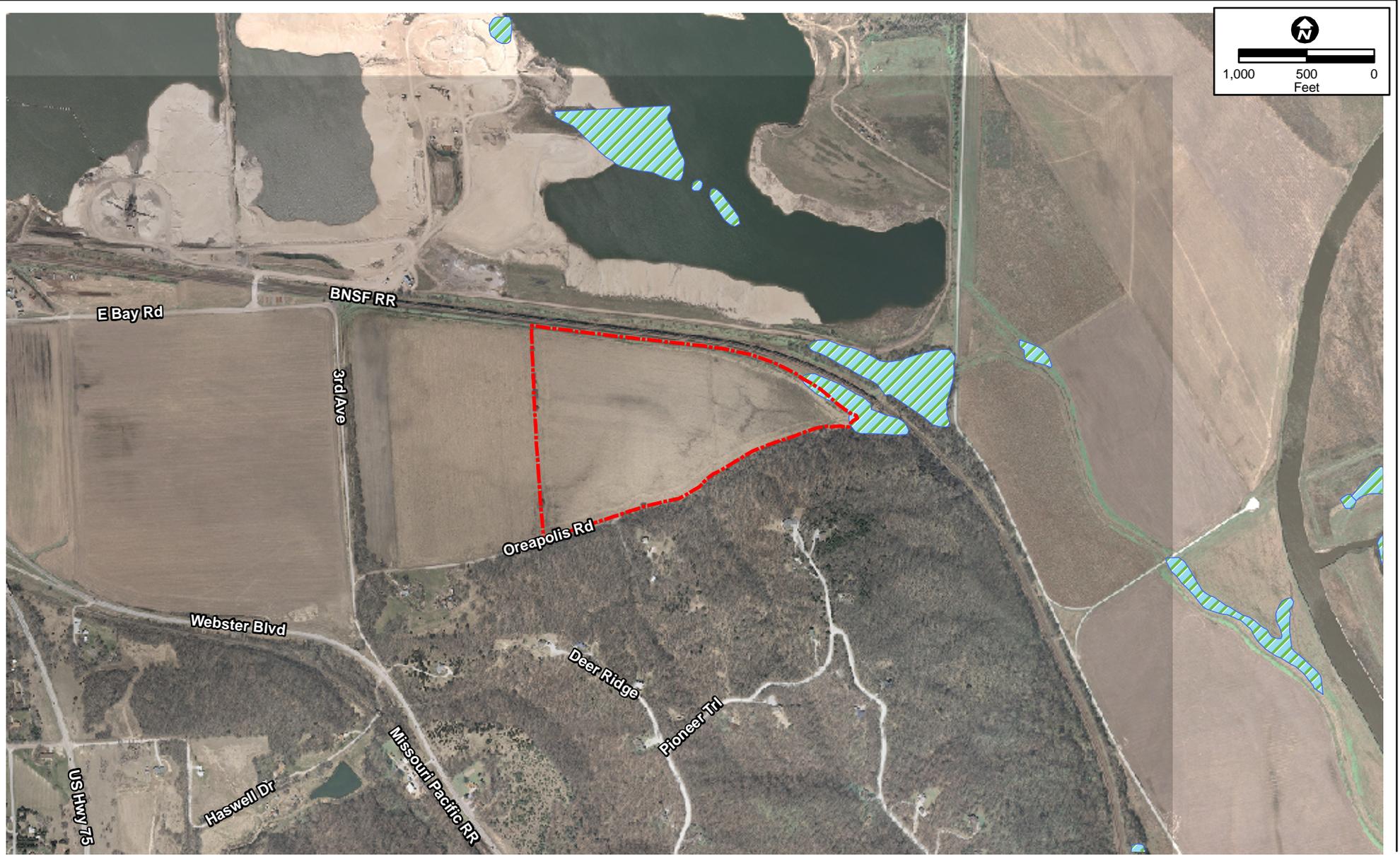


Hydric Soils Within Project Vicinity

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



DATE	January 2009
FIGURE	2



Legend

-  NWI
-  Study Area



NWI Within Project Vicinity

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



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 Wetlands⁵				
5	PEMA	Riverine Channel	<i>Phalaris arundinacea</i> (H) FACW+ 100%	0.15
6	PEMA	Floodplain Depressional	<i>Phalaris arundinacea</i> (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

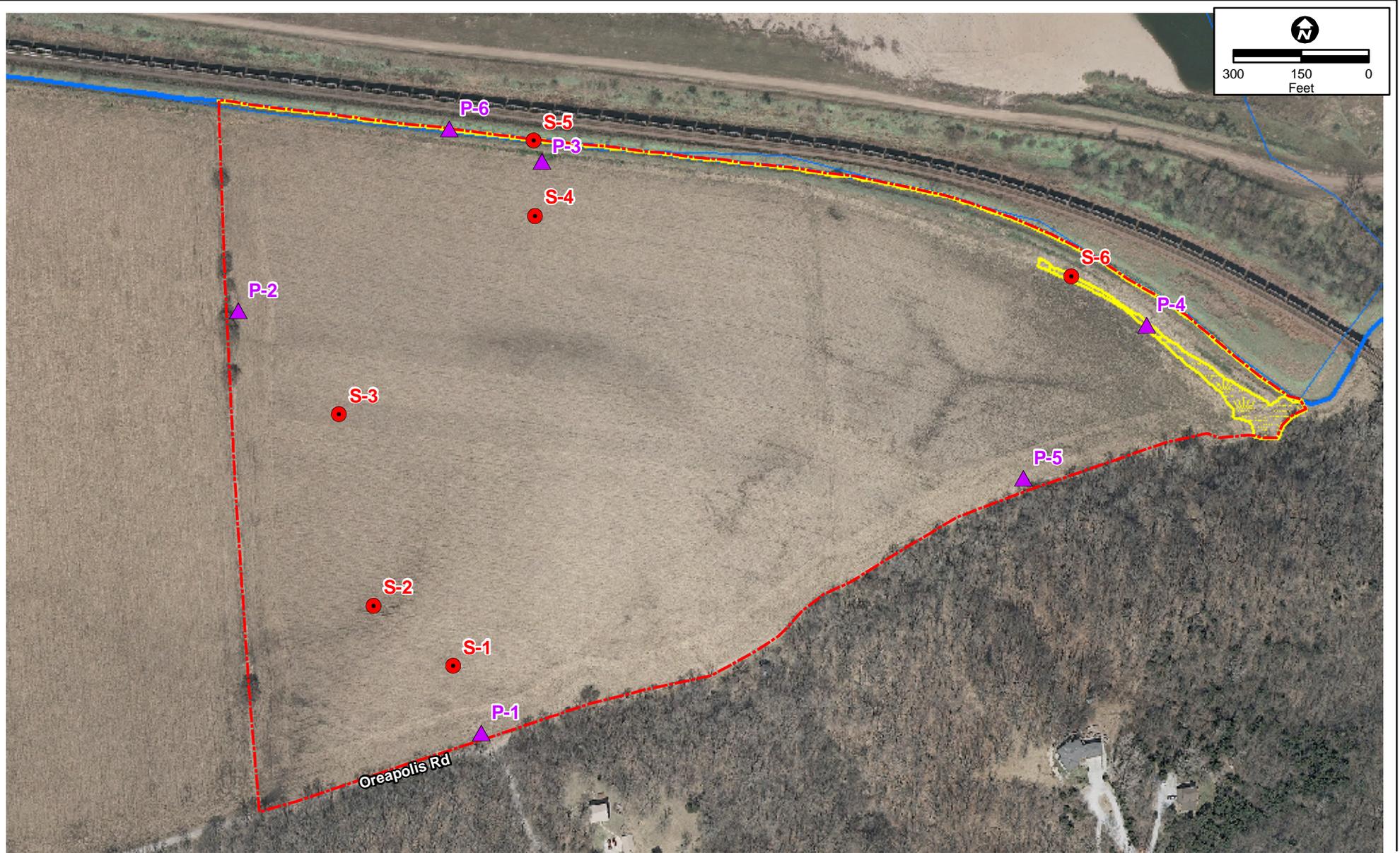
³ H = Herbaceous, FACW = Facultative Wetland (67-99% in wetland), + = tendency toward wetter, - = tendency toward drier.

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.



Legend

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

Aerial Imagery: 2007 MAPA



Wetlands and Waters of the U.S.

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



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 (<i>Setaria faberi</i>)	H	60	UPL	0%
	Canada horseweed (<i>Conyza canadensis</i>)	H	30	FACU-	
V-2	Marijuana (<i>Cannabis sativa</i>)	H	40	FACU-	50%
	Reed canarygrass (<i>Phalaris arundinacea</i>)	H	20	FACW	
	Velvet leaf (<i>Abutilon theophrasti</i>)	H	20	FACU	
	Switchgrass (<i>Panicum virgatum</i>)	H	20	FAC	
V-3	Reed canarygrass (<i>Phalaris arundinacea</i>)	H	100	FACW	100%



Legend

-  Vegetative Communities
-  Study Area



Vegetative Communities

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



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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: --
Is The Site Significantly Disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Station ID:
Is The Area A Potential Problem Area? (Mollisols) (If yes, define below.) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Plot ID: 1
Land form description: Agricultural field left fallow.	

VEGETATION

Dominant Species				Non Dominant Species			
<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>	<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>
1. <i>Setaria faberi</i>	UPL	Herb.	90	1. --	--	--	--
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Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-)						0	
Remarks: Percent dominance based on aerial coverage by layer.							

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, Or Tide Gauge <input checked="" type="checkbox"/> Aerial Photos (2007 MAPA) <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available Field Observations: Depth of Surface Water: <u>None</u> (in.) Depth to Free Water: <u>None to 40</u> (in.) Depth to Saturated Soil: <u>None to 40</u> (in.)	Wetland Hydrology Indicators: <input checked="" type="checkbox"/> None Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or More Required): <input type="checkbox"/> Oxidized Root Channels In Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test 0:1 <input type="checkbox"/> Other (Explain in Remarks)
Remarks: No hydrology indicators were present at this sampling location.	

(Series and Phase): Marshall silty clay loam, 2 to 5% slopes		Drainage Class: well drained			
Taxonomy (Subgroup): Fine-silty, mixed, mesic Typic Hapludolls		Field Observations Confirm			
		Mapped Type? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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
20-30	--	10YR 4/3	-- --	-- --	silt loam
30-40	--	10YR 5/3	-- --	-- --	silt loam
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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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: --
Is The Site Significantly Disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Station ID:
Is The Area A Potential Problem Area? (Mollisols) (If yes, define below.) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Plot ID: 2
Land form description: Agricultural field left fallow.	

VEGETATION

Dominant Species				Non Dominant Species			
<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>	<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>
1. <i>Setaria faberi</i>	UPL	Herb.	80	1. --	--	--	--
2. --	--	--	--	2. --	--	--	--
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Percent of Dominant Species That Are OBL, FACW, Or FAC (Excluding FAC-)						0	
Remarks: Percent dominance based on aerial coverage by layer.							

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, Or Tide Gauge <input checked="" type="checkbox"/> Aerial Photos (2007 MAPA) <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: <input type="checkbox"/> None Primary Indicators: <input checked="" type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or More Required): <input type="checkbox"/> Oxidized Root Channels In Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test 0:1 <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>1</u> (in.) Depth to Free Water: <u>0</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks: Standing water was present in a small depression adjacent to the sample location.	

(Series and Phase): Colo silty clay loam, 0 to 2% slopes
 Drainage Class: poorly drained
 Field Observations Confirm
 Taxonomy (Subgroup): Fine-silty, mixed, mesic Cumulic Endoaquolls
 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
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- Hydric Soil Indicators:
- | | |
|---|---|
| <input type="checkbox"/> Histosol | <input type="checkbox"/> Concretions |
| <input type="checkbox"/> Histic Epipedon | <input type="checkbox"/> High Organic Content In Surface Layer In Sandy Soils |
| <input type="checkbox"/> Sulfidic Odor | <input type="checkbox"/> Organic Streaking In Sandy Soils |
| <input type="checkbox"/> Aquic Moisture Regime | <input type="checkbox"/> Listed On Local Hydric Soils List |
| <input type="checkbox"/> Reducing Conditions | <input type="checkbox"/> Listed On National Hydric Soils List |
| <input checked="" type="checkbox"/> Gleyed Or Low-Chroma Colors | <input type="checkbox"/> Other (Explain In Remarks) |

Remarks: The soil profile displayed low-choma colors.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is This Sampling Point Within A Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Wetland Hydrology Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Hydric Soils Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: --
Is The Site Significantly Disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Station ID:
Is The Area A Potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If yes, define below.)	Plot ID: 3
Land form description: Agricultural field left fallow.	

VEGETATION

Dominant Species				Non Dominant Species			
<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>	<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>
1. <i>Setaria faberi</i>	UPL	Herb.	40	1. --	--	--	--
2. <i>Conyza canadensis</i>	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

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, Or Tide Gauge <input checked="" type="checkbox"/> Aerial Photos (2007 MAPA) <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: <input checked="" type="checkbox"/> None Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or More Required): <input type="checkbox"/> Oxidized Root Channels In Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test 0:2 <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>None</u> (in.) Depth to Free Water: <u>None to 42</u> (in.) Depth to Saturated Soil: <u>None to 42</u> (in.)	
Remarks: No hydrology indicators were present at this sample location.	

(Series and Phase): Haynie silt loam, 0 to 2% slopes
 Drainage Class: Well drained
 Field Observations Confirm
 Taxonomy (Subgroup): Coarse-silty, mixed, mesic Mollic Udifluvents
 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
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
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- Hydric Soil Indicators:
- | | |
|--|---|
| <input type="checkbox"/> Histosol | <input type="checkbox"/> Concretions |
| <input type="checkbox"/> Histic Epipedon | <input type="checkbox"/> High Organic Content In Surface Layer In Sandy Soils |
| <input type="checkbox"/> Sulfidic Odor | <input type="checkbox"/> Organic Streaking In Sandy Soils |
| <input type="checkbox"/> Aquic Moisture Regime | <input type="checkbox"/> Listed On Local Hydric Soils List |
| <input type="checkbox"/> Reducing Conditions | <input type="checkbox"/> Listed On National Hydric Soils List |
| <input type="checkbox"/> Gleyed Or Low-Chroma Colors | <input type="checkbox"/> Other (Explain In Remarks) |

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is This Sampling Point Within A Wetland?
Wetland Hydrology Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Hydric Soils Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: --
Is The Site Significantly Disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Station ID:
Is The Area A Potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If yes, define below.)	Plot ID: 4
Land form description: Agricultural field left fallow.	

VEGETATION

Dominant Species				Non Dominant Species			
<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>	<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>
1. <i>Setaria faberi</i>	UPL	Herb.	40	1. --	--	--	--
2. <i>Conyza canadensis</i>	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

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, Or Tide Gauge <input checked="" type="checkbox"/> Aerial Photos (2007 MAPA) <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: <input checked="" type="checkbox"/> None Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or More Required): <input type="checkbox"/> Oxidized Root Channels In Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test 0:2 <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>None</u> (in.) Depth to Free Water: <u>None to 42</u> (in.) Depth to Saturated Soil: <u>None to 42</u> (in.)	
Remarks: No hydrology indicators were present at this sample location.	

(Series and Phase): Albaton silty clay, 0 to 1% slopes
 Drainage Class: Poorly drained
 Field Observations Confirm
 Taxonomy (Subgroup): Very-fine, montmorillonitic, mesic Vertic Fluvaque
 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
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
--	--	-- --	-- --	-- --	--
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- Hydric Soil Indicators:
- | | |
|--|---|
| <input type="checkbox"/> Histosol | <input type="checkbox"/> Concretions |
| <input type="checkbox"/> Histic Epipedon | <input type="checkbox"/> High Organic Content In Surface Layer In Sandy Soils |
| <input type="checkbox"/> Sulfidic Odor | <input type="checkbox"/> Organic Streaking In Sandy Soils |
| <input type="checkbox"/> Aquic Moisture Regime | <input type="checkbox"/> Listed On Local Hydric Soils List |
| <input type="checkbox"/> Reducing Conditions | <input type="checkbox"/> Listed On National Hydric Soils List |
| <input type="checkbox"/> Gleyed Or Low-Chroma Colors | <input type="checkbox"/> Other (Explain In Remarks) |

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is This Sampling Point Within A Wetland?
Wetland Hydrology Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Hydric Soils Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: --
Is The Site Significantly Disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Station ID:
Is The Area A Potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If yes, define below.)	Plot ID: 5
Land form description: Streambed of channel.	

VEGETATION

Dominant Species				Non Dominant Species			
<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>	<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>
1. <i>Phalaris arundinacea</i>	FACW+	Herb.	100	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-)						100%	
Remarks: Percent dominance based on aerial coverage by layer.							

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, Or Tide Gauge <input checked="" type="checkbox"/> Aerial Photos (2007 MAPA) <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available Field Observations: Depth of Surface Water: <u>5</u> (in.) Depth to Free Water: <u>NA</u> (in.) Depth to Saturated Soil: <u>NA</u> (in.)	Wetland Hydrology Indicators: <input type="checkbox"/> None Primary Indicators: <input checked="" type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or More Required): <input type="checkbox"/> Oxidized Root Channels In Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test 1:0 <input type="checkbox"/> 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.	

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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: --
Is The Site Significantly Disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Station ID:
Is The Area A Potential Problem Area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If yes, define below.)	Plot ID: 6
Land form description: Depressional area parallel to the berm on the north and fallow agricultural field to the south.	

VEGETATION

Dominant Species				Non Dominant Species			
<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>	<u>Scientific Name</u>	<u>Indicator</u>	<u>Stratum</u>	<u>%</u>
1. <i>Phalaris arundinacea</i>	FACW+	Herb.	100	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-)						100%	
Remarks: Percent dominance based on aerial coverage by layer.							

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, Or Tide Gauge <input checked="" type="checkbox"/> Aerial Photos (2007 MAPA) <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: <input type="checkbox"/> None Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or More Required): <input type="checkbox"/> Oxidized Root Channels In Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test 1:0 <input checked="" type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>None</u> (in.) Depth to Free Water: <u>None to 36</u> (in.) Depth to Saturated Soil: <u>None to 36</u> (in.)	
Remarks: This sample location was located within a depressional area.	

(Series and Phase): Haynie silt loam, 0 to 2% slopes Drainage Class: Well drained

Field Observations Confirm

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

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:

- | | |
|---|---|
| <input type="checkbox"/> Histosol | <input type="checkbox"/> Concretions |
| <input type="checkbox"/> Histic Epipedon | <input type="checkbox"/> High Organic Content In Surface Layer In Sandy Soils |
| <input type="checkbox"/> Sulfidic Odor | <input type="checkbox"/> Organic Streaking In Sandy Soils |
| <input type="checkbox"/> Aquic Moisture Regime | <input type="checkbox"/> Listed On Local Hydric Soils List |
| <input type="checkbox"/> Reducing Conditions | <input type="checkbox"/> Listed On National Hydric Soils List |
| <input checked="" type="checkbox"/> Gleyed Or Low-Chroma Colors | <input type="checkbox"/> Other (Explain In Remarks) |

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is This Sampling Point Within A Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Wetland Hydrology Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Hydric Soils Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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 Applicant/Owner: Nebraska Department of Roads Investigator: Travis Talbitzer	Date: 10/21/2008 County: Cass State: Nebraska WUS ID: 1 Drainage Area:
<p style="text-align: center;"><u>Details of Stream Crossing:</u></p> Type of structure proposed to convey flow: Dimensions: Is this watercourse named? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Name(s): Unnamed tributary of the Missouri River	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.

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

Stream has defined bed and bank? OR	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Remarks: Channel with berm flowing west to east 4 to 6" in depth.
Stream has identifiable OHWM? OR	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Stream is actively sorting sediment?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	WUS Criteria: <input checked="" type="checkbox"/> Meets <input type="checkbox"/> Fails

*satisfied by 1 or more "yes" answers.

Hydrologic Data

Flow regime:	Data sources: USGS Plattsmouth, NE 7.5 minute quadrangle
<input checked="" type="checkbox"/> Perennial flow	<u>Direct observation</u>
<input type="checkbox"/> Intermittent flow	<input type="checkbox"/> Gaging Station:
<input type="checkbox"/> Ephemeral flow	<input type="checkbox"/> Other:
	<u>Indirect knowledge</u>
	<input checked="" type="checkbox"/> USGS mapping: Perennial
	<input type="checkbox"/> USDA mapping: --
	<input type="checkbox"/> 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.

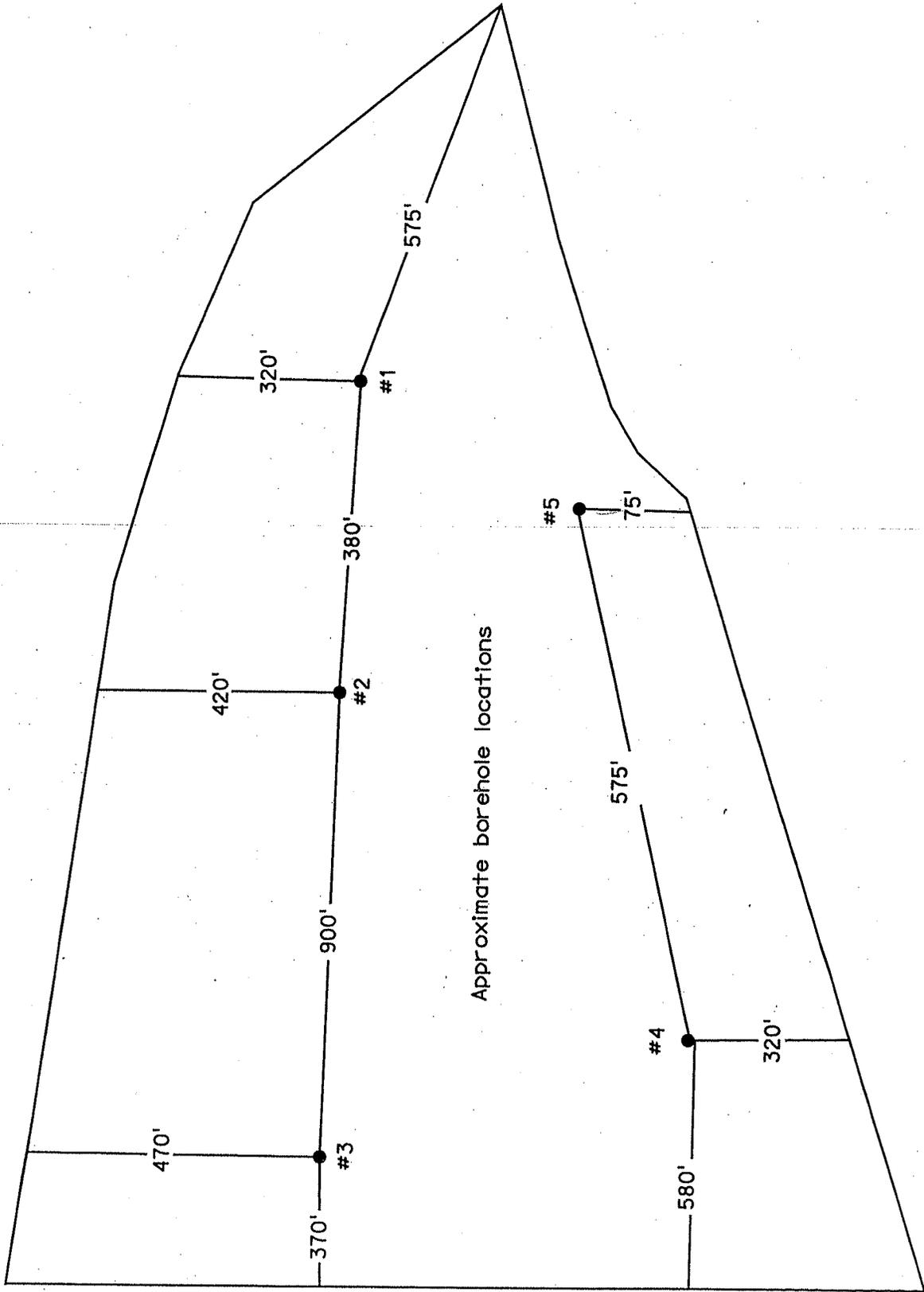


Stream Channel Upstream (West)

Stream Channel Downstream (East)

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

APPENDIX B
NDOR GEOTECHNICAL SOIL BORINGS



Approximate borehole locations

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	W-101	CH SP	Fat Clay; trace of fine sand; high plastic; dark brown (Alluvium)	8.5		5	48	29
	9.00-15.00				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 C
OREAPOLIS WETLAND MITIGATION SITE PLAN

STATE OF NEBRASKA DEPARTMENT OF ROADS

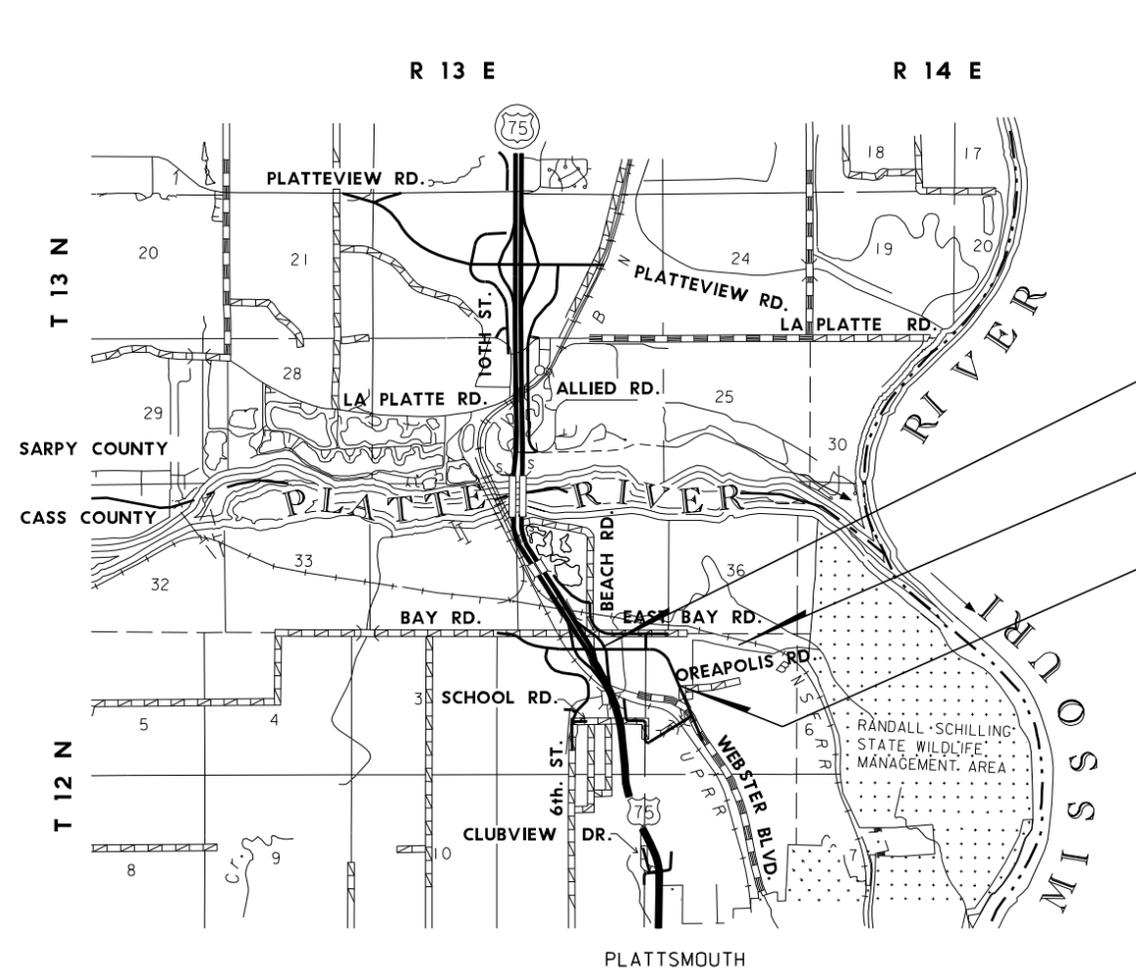
WETLANDS CONSTRUCTION PLANS

OREAPOLIS WETLAND MITIGATION SITE

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE PAGE
2T-1	TYPICAL SECTIONS
2N-1	NOTE AND DETAILS
2K-1	SUMMARY OF SOILS AND GEOTECHNICAL INFORMATION
2W-1	GENERAL SITE PLAN
2W-2 TO 2W-4	WETLAND AERIAL PHOTO SHEETS
2H-1 TO 2H-6	HORIZONTAL ALIGNMENT AND CONTROL POINTS
2L-1 TO 2L-11	GRADING, SPOT ELEVATIONS, INLET/OUTLET PLAN & PLANTING SHEETS
3 TO 5	PLAN AND PROFILE SHEETS
6	EARTHWORK DATA SHEET
R1 TO R3	RIGHT OF WAY INFORMATION SHEETS
X-1 TO X-6	CHANNEL CROSS-SECTIONS
X-7 TO X-15	ROADWAY CROSS-SECTIONS

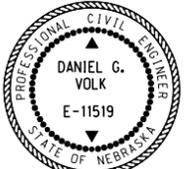
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 Filename: ...COVERSHT.DGN

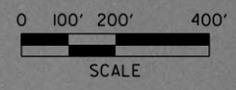


BEGIN RELOCATED WEBSTER
BLVD. GRADING PROJECT
STATION 2035+00

MITIGATION SITE

END RELOCATED WEBSTER
BLVD. GRADING PROJECT
STATION 2073+00



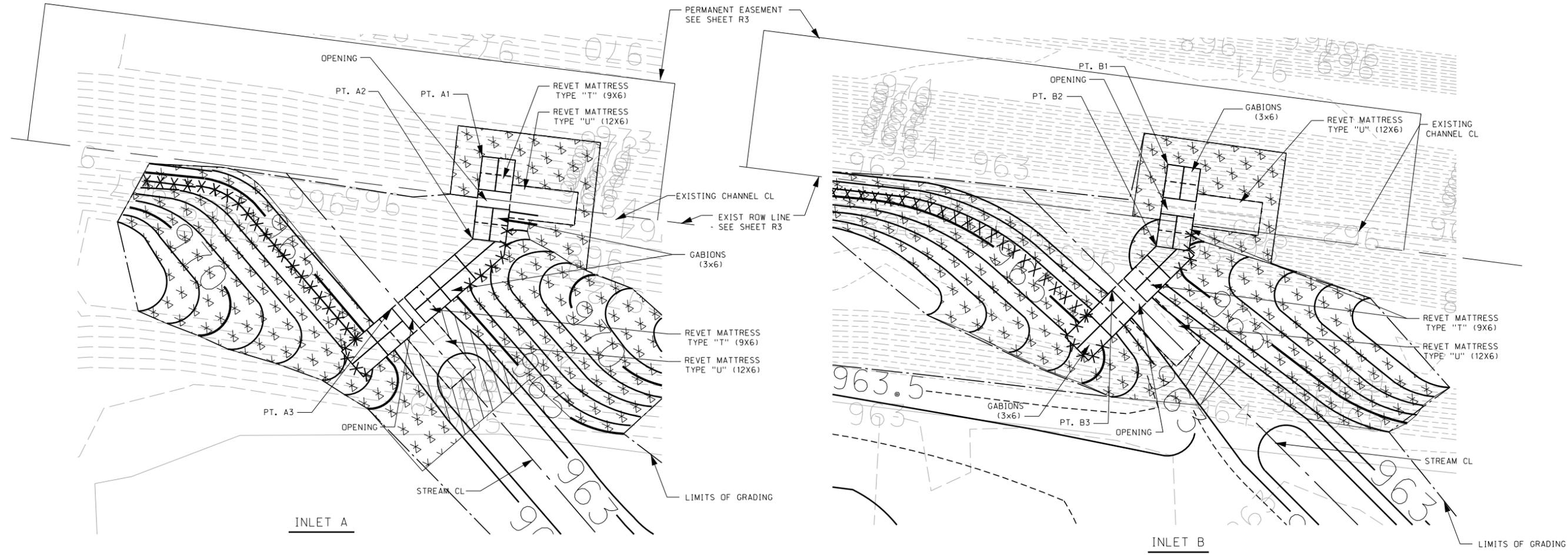
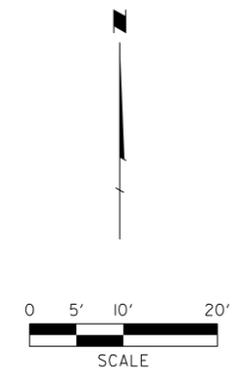


WETLAND MITIGATION SITE

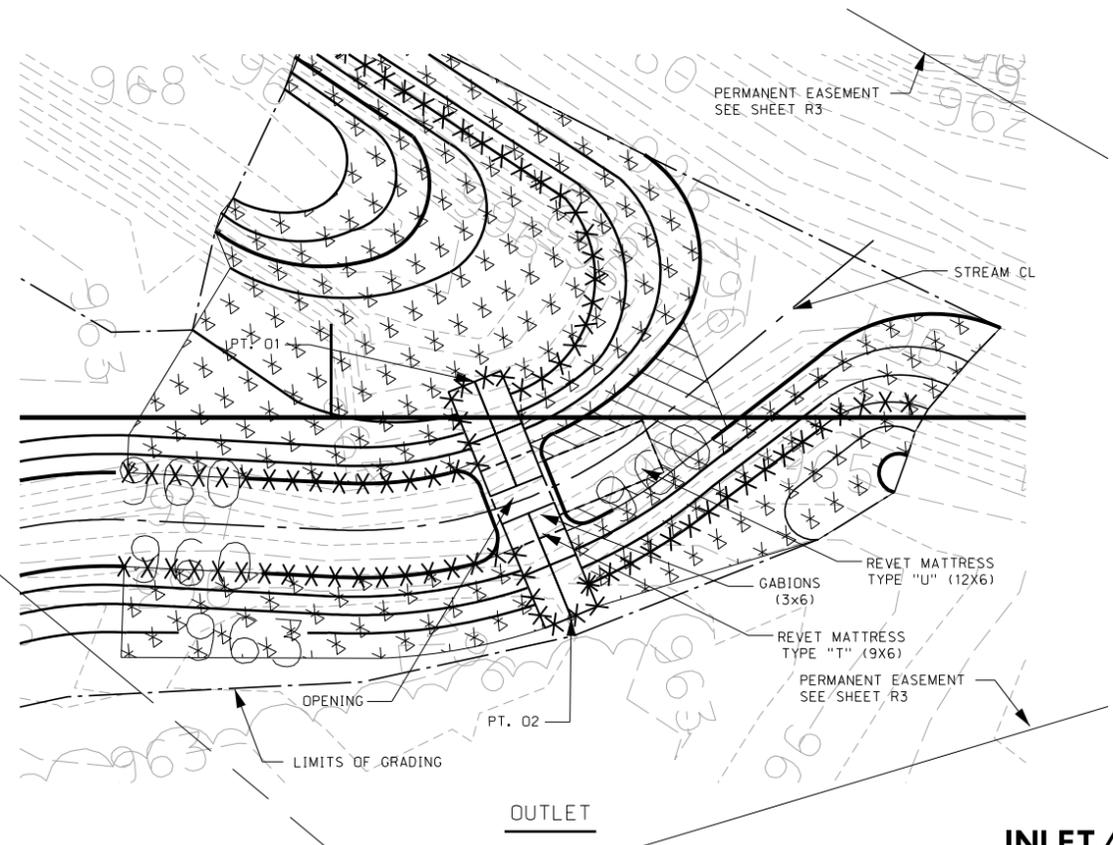


Plot Date: 3/3/2009 4:51:29 PM
User: cwork
Filename: ...21849FCA01.DGN





GABION LOCATION		
PT ID	NORTHING	EASTING
A1	522646.00	2992843.44
A2	522631.03	2992841.70
A3	522618.43	2992827.04
B1	522532.78	2993755.00
B2	522517.93	2993752.91
B3	522509.96	2993744.91
O1	521963.85	2995105.28
O2	521938.72	2995115.57



XXXXXXXXX BUILD EROSION CHECK, TYPE COIR, SPECIAL PLAN _C

STATION	TO STATION	SIDE	LIN. FT.
INLET A		-	80
INLET B		-	85
OUTLET		-	220

XXXXXX BUILD EROSION CONTROL-CLASS 1F, PLAN 501-R5

STATION	TO STATION	SIDE	WIDTH	SO. YDS.
INLET A		-	VARIES	270
INLET B		-	VARIES	257
OUTLET		-	VARIES	315

XXXXXX BUILD EROSION CONTROL-CLASS 2C, PLAN 501-R5

STATION	TO STATION	SIDE	WIDTH	SO. YDS.
INLET A		-	VARIES	20
INLET B		-	VARIES	10
OUTLET		-	VARIES	24

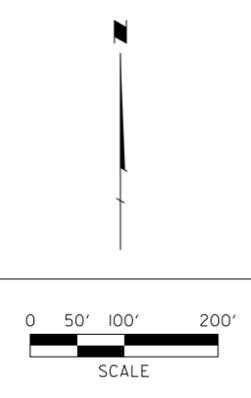
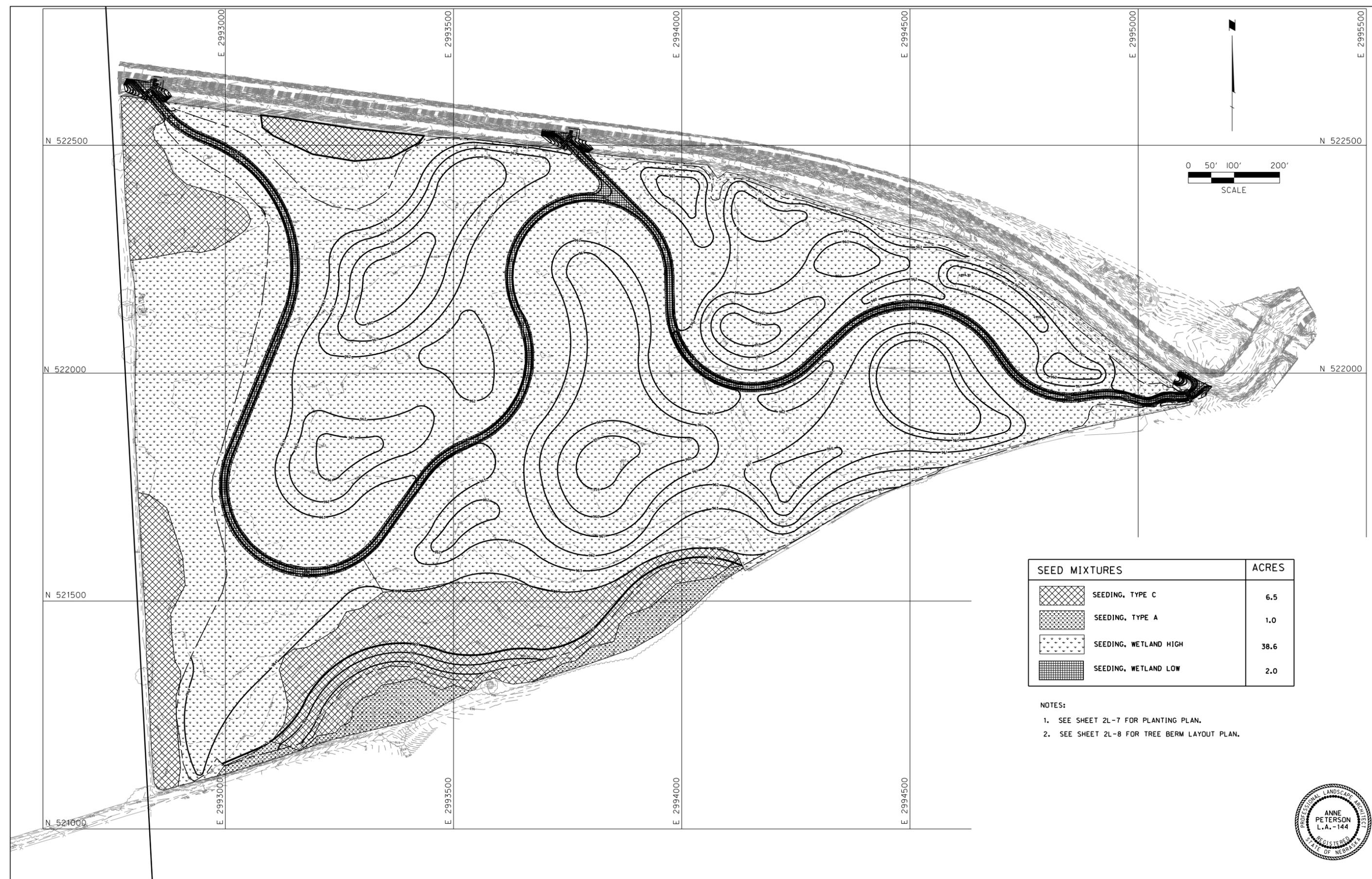
- NOTES:
- SEE SHEET 2L-1 FOR GRADING PLAN.
 - SEE SHEETS 2L-2 THROUGH 2L-4 FOR SPOT ELEVATIONS.
 - SEE SHEET 2L-5 FOR INLET AND OUTLET LOCATION PLAN.
 - SEE SHEET 2N-1 FOR INLET AND OUTLET DETAILS.

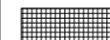


INLET/OUTLET LOCATION & EROSION CONTROL PLAN

Plot Date: 3/26/2009 2:16:17 PM
User: cwork
Filename: ... 21849FCH2.DGN

Plot Date: 3/3/2009 4:54:36 PM
 User: dwoik
 Filename: ... \21849F\CM06.DGN



SEED MIXTURES		ACRES
	SEEDING, TYPE C	6.5
	SEEDING, TYPE A	1.0
	SEEDING, WETLAND HIGH	38.6
	SEEDING, WETLAND LOW	2.0

- NOTES:
1. SEE SHEET 2L-7 FOR PLANTING PLAN.
 2. SEE SHEET 2L-8 FOR TREE BERM LAYOUT PLAN.



WETLAND SEEDING PLAN

APPENDIX D
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 (<i>Spartina pectinata</i>)	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 (<i>Rudbeckia hirta</i>)	90		0.4
Black Samson (<i>Echinacea angustifolia</i>)	90		0.3
Compass plant (<i>Silphium laciniatum</i>)	60		0.4
Yarrow (<i>Achillea millefolium</i>)	85		0.2
Blue vervain (<i>Verbena hastata</i>)	75		0.2
Grayhead prairie coneflower (<i>Ratibida pinnata</i>)	85		0.75
Shell-leaf penstemon (<i>Penstemon grandiflorus</i>)	75		0.2
Pitcher sage (<i>Salvia azurea</i>)	75		0.3
New England aster (<i>Aster novae-angliae</i>)	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 ₂ O ₅)	0 lbs.

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

Nitrogen (Total Available)	0 lbs.
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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.
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Seeding

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

Type "Wetland Low"	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 (<i>Calamagrostis canadensis</i>)	65		0.2
Fox sedge (<i>Carex vulpinoidea</i>)	85		0.5
Short-beaked sedge (<i>Carex brevior</i>)	75		0.75
Soft-stem bulrush (<i>Schoenoplectus tabernaemontani</i>)	80		0.75
Giant burreed (<i>Sparganium eurycarpum</i>)	65		0.5
Big bluestem – Pawnee, Roundtree, Bonanza	60		3
Indiangrass – NE-54, Oto, Holt	90		3
Switchgrass – Pathfinder, Blackwell, Trallblazer	90		1.5
Prairie cordgrass (<i>Spartina pectinata</i>)	75		0.25
Beggartick (<i>Bidens cernua</i>)	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 ₂ O ₅)	0 lbs.

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

Nitrogen (Total Available)	0 lbs.
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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.
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Seeding

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

Type "Wetland High"	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 (<i>Glyceria striata</i>)	75		0.2
Awl-fruited sedge (<i>Carex stipata</i>)	85		1
Short-beaked sedge (<i>Carex brevior</i>)	85		0.75
Fox sedge (<i>Carex vulpinoidea</i>)	85		0.5
Spike rush (<i>Eleocharis palustris</i>)	60		0.2
Big bluestem – Pawnee, Bonanza, Roundtree	60		2.5
Rice cutgrass (<i>Leersia oryzoides</i>)	50		0.25
Arrowhead (<i>Sagittaria latifolia</i>)	80		3
Water plantain (<i>Alisma plantago-aquatica</i>)	80		0.5
Joe-pye weed (<i>Eupatorium perfoliatum</i>)	75		0.2
Swamp milkweed (<i>Asclepias incarnata</i>)	90		0.2
New England aster (<i>Aster novae-angliae</i>)	75		0.2
Blue vervain (<i>Verbena hastata</i>)	75		0.2
Water horehound (<i>Lycopus americanus</i>)	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 ₂ O 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 "C"	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 (<i>Carex vulpinoidea</i>)	85		0.5
Prairie cordgrass (<i>Spartina pectinata</i>)	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 (<i>Aster novae-angliae</i>)	90		0.2
Blue flag iris (<i>Iris virginica</i>)	75		0.25
Cup plant (<i>Silphium perfoliatum</i>)	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 ₂ O 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 (<i>Sporobolus cryptandrus</i>)	90	0.1
Partridge pea – Platte, Inoculated	90	0.2
Purple prairie clover – Kanab, 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 ₂ O ₅)	23 or 24 lbs.

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

Nitrogen (Total Available)	0 lbs.
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