Appendices

Appendix A

Scoping Document - Mouse River Enhanced Flood Protection Plan Environmental Impact Statement

SCOPING DOCUMENT

MOUSE RIVER ENHANCED FLOOD PROTECTION PLAN

ENVIRONMENTAL IMPACT STATEMENT

Version – February 29, 2016

Contents

BACKGROUND

The Souris River (alternatively known as the Mouse River) is an approximately 435 mile long river that begins in the southeastern portion of the Canadian province of Saskatchewan, flows south and east through north central North Dakota, and then turns north before returning to Canada in southwest Manitoba.

Most of the annual flow on the Souris River is attributed to snow melt and spring rains. In June 2011, heavy rains in the upstream portions of the watershed exceeded the storage capacity of upstream reservoirs already full from the April snowmelt. Flows of approximately 27,400 cubic feet per second (cfs), as estimated at the Broadway Bridge in Minot, overwhelmed the existing Federal flood risk management projects (designed to pass 5,000 cfs from Burlington to Minot) and emergency flood fighting efforts, causing the evacuation of approximately 11,000 people and creating damages valued at more than $690 million to an estimated 4,700 structures.

As a result of the 2011 flood of record, the North Dakota State Water Commission was tasked with developing a flood risk reduction plan for the North Dakota portion of the Souris River Basin. Recommendations for addressing flooding concerns were made in a series of documents including the Preliminary Engineering Report[1] and the Rural Flood Risk Reduction Alternatives Evaluation[2]. The compilation of recommended features has become known as the Mouse River Enhanced Flood Protection Plan (MREFPP). The MREFPP is a basin-wide program developed to reduce flood risk throughout all four North Dakota counties along the Mouse River. The Souris River Joint Water Resources Board (SRJB) has proposed construction on portions of the MREFPP in Minot. The reach of the Souris River from upstream of Burlington to downstream of Minot has been selected for evaluation in the environmental impact statement due to the hydraulic characteristics of this portion of the river and the more immediate need for the project within this reach given the risks and damages sustained as a result of the 2011 flood.

Implementation of the MREFPP is expected to take over 25 years and involves the construction of more than 20 phases. Urban features of the MREFPP include about 18 miles of new levees, 1.4 miles of

[1] The Mouse River Enhance Flood Protection – Preliminary Engineering Report. 2012. Prepared for the North Dakota Water Commission by the team of Barr Engineering Co., Ackerman-Estvold Engineering, Moore Engineering, and CPS, Ltd. http://mouseriverplan.com/urban-flood-control/

[2] Rural Flood Risk Reduction Alternatives Evaluation. 2013. Prepared for the North Dakota Water Commission by the team of Barr Engineering Co., Ackerman-Estvold Engineering, Moore Engineering and CPS, Ltd. http://mouseriverplan.com/project-overview/rural-flood-risk-reduction-alternatives-evaluation/

channel realignment, 2 high-flow bypasses, 2.8 miles of new floodwalls, 6 bridge modifications, and 126 acres of overbank excavation.

PROJECT PURPOSE AND NEED

The SRJB has defined the purpose and need for the project as follows:

> *"Reduce the risk of property damage and loss of life in the more densely populated reach of the river due to flooding from floods of similar magnitude to the 2011 flood of record, regardless of where the precipitation occurs in the Mouse River basin; and maintain operation of critical elements of the public transportation system during and after a flood event of similar magnitude to the flood of record."*

FEDERAL INVOLVEMENT

The SRJB has submitted a request to the U.S. Army Corps of Engineers (USACE) to alter existing federal flood risk management projects in the Souris River Basin. The Secretary of the Army, on the recommendation of the Chief of Engineers, has been given the authority to grant permissions to alter public works projects built by or under control of the United States, through Section 14 of the Rivers and Harbors Act of 1899 and codified in 33 USC 408 (hereafter referred to as Section 408), as long as the proposed activity will not be injurious to the public interest and will not impair the usefulness of the project(s).

The SRJB will also submit an application to the USACE Regulatory Program for discharges of fill material in waters of the United States, an action permitted under Section 404 of the Clean Water Act in 33 USC 1344 (hereafter referred to as Section 404 permit).

The issuance of Section 408 permissions and Section 404 permits are considered to be federal actions, therefore requiring compliance with federal laws including, but not limited to, the National Environmental Policy Act of 1969 (NEPA), the National Historical Preservation Act of 1966 (NHPA) and the Endangered Species Act of 1973 (ESA).

From the information submitted by the SRJB and discussions with other regulatory agencies it was determined that the proposed actions have the potential for significant impacts to the environment, and

therefore an Environmental Impact Statement (EIS) will be prepared in compliance with the NEPA. Though the project will be built and permitted in a number of phases, the EIS will be completed as a programmatic document for the entire Burlington through Minot stretch of the project. This urbanized reach of the Souris River Basin experienced most of the damages during the 2011 flood of record.

PURPOSE OF THIS SCOPING DOCUMENT

The primary purpose of this scoping document is to summarize the information gathered during project scoping so that it can be used to inform the planning and evaluation of the project as it moves forward. A secondary purpose of this document is to inform interested parties of the issues that have been raised through scoping and to identify how those issues will be addressed.

Scoping is a continual process conducted throughout project planning. This scoping document may be updated periodically with comments as they are submitted during the preparation and review of the programmatic EIS.

SCOPING PROCESS

Scoping is conducted early in the planning of a project to determine the issues to be addressed. Public meetings were held in Burlington on April 8, 2015, and in Minot on April 9, 2015. Attendance was at the meetings included 3 individuals at Burlington and approximately 30 in Minot. The USACE published a Notice of Intent in the Federal Register (Vol. 80, 137) on July 17, 2015, indicating the intent to prepare a programmatic EIS for the proposed project features and other closely associated features that are anticipated to take place from Burlington through Minot in the foreseeable future. An additional public scoping meeting was then held in Minot on August 19, 2015, with approximately 40 members of the public in attendance.

The USACE also conducted consultation meetings with local, state, and federal agencies on October 1, 2014; January 29, 2015; and May 27, 2015, to provide an overview of the project and solicit comments.

In addition, the SRJB has held numerous public meetings and has solicited and responded to thousands of comments and questions dating back to 2011. Comments collected at these meetings will also be considered during the preparation of the EIS.

SUMMARIZED SCOPING COMMENTS AND RESPONSES

Numerous written and verbal comments have been provided regarding the proposed project and have been summarized in this scoping document with responses. The comments received can be generally categorized into 7 areas:

- Project Purpose and Authority
- Alternatives
- Design
- Existing System and Temporary Protection
- Flood Insurance and FEMA Certification
- Buyouts and Relocations
- Other issues

All substantive comments will be taken into consideration during project planning.

A. Project Scope and Authority

Sub-category A.1: Why is the USACE involved in this process and why does an EIS need to be prepared if it will only delay implementation of the flood control project?

Response A.1: The project, as proposed, would alter several existing federal flood risk management projects. Any temporary or permanent alterations to USACE federally authorized civil works projects requires granted permission from the Secretary of the Army as written in Section 14 of the Rivers Act of 1899 and codified in 33 USC 408 (commonly referred to as Section 408 permissions). In addition, the project proposes to add dredged or fill material to the Souris River channel and adjacent wetlands considered to be waters of the United States, an action in which the USACE is responsible for permitting under Section 404 of the Clean Water Act. Granting permissions through Section 408 and the issuance of a Section 404 permits are both considered Federal actions, requiring environmental review per the National Environmental Policy Act (NEPA).

The NEPA is meant to encourage consideration of environmental impacts and transparently share those impacts with the public and other interested parties. Through early coordination and public comment, the USACE determined that the proposed project had the potential to significantly affect the quality of the human environment. This determination has led to the decision to prepare a detailed assessment of environmental impacts in the form of an environmental impact statement (EIS).

Sub-category A.2: The proposed project does not solve one of the contributing factors to the 2011 flooding which was the perceived mis-operation of upstream dams which caused large emergency releases during the June 2011 floods.

Response A.2: The current operational plans for Canadian and Lake Darling dams are covered under an international treaty and agreement. The International Souris River Board has proposed a plan of study that would evaluate the operations of these reservoirs to allow additional operational flexibility to deal with run-off and increased precipitation. This EIS is being formulated for changes and additions to an existing federal flood risk management projects within the basin. The SRJB has no authority to modify the operation of existing dams on the Souris River system.

Additionally, modifications to the operations plans of the reservoirs on the system will not meet the stated purpose of the project which is to reduce the risk of flooding for an event similar to 2011, regardless of where the precipitation occurs. The effectiveness of reservoir operational modifications is dependent on the precipitation occurring in a location upstream of the reservoirs.

Sub-category A.3: All the discussion of the flood protection alternatives seems to neglect the downstream communities from Minot. Why are the effects and possible protection measures to downstream communities not developed in this document?

Response A.3: Currently only 3 segments/phases of the MREFPP will be submitted for Section 408 permissions and Section 404 permitting. All three of these phases lie within the Burlington to Minot reach of the overall MREFPP. Impacts associated with these 3 phases could not be meaningfully distinguished from other phases along this stretch. Therefore, a programmatic document considering the effects of all features from Burlington through Minot was determined to be the most appropriate.

Preliminary hydraulic modeling has indicated that there would be minimal changes to flood stage or flood frequency to the communities downstream of the Burlington through Minot reach. Effects to those downstream communities will be analyzed in the EIS if impacts are revealed during the document's preparation. Subsequent environmental review for the communities downstream of Minot will likely be required in the future if flood risk reduction features move forward in these areas.

Sub-category A.4: How was the proposed alternative selected? Will the Corps of Engineers have the final say in approving an alternative?

Response A.4: The requestor's preferred alternative was developed by the Souris River Joint Board (SRJB) through extensive outreach with local governing units and the public following the 2011 flood. Outreach was performed throughout the basin. Input from this outreach was used to evaluate alternatives and ultimately formulate the MREFPP that is currently proposed. Several additional alternatives were evaluated during the development of the Preliminary Engineering Report, including constructing new or additional storage on the Souris River system, modifications to the operations of existing dams, upstream diversions of the Souris River along the international border and upstream of the Lake Darling Dam, diversions of the Souris River north and south of Minot, a tunnel beneath Minot and buying out the entire floodplain. The requestor's preferred alternative was identified by the SRJB as the least damaging alternative that, when considered in the context of environmental, social and economic impacts, meets the purpose and need.

The USACE will determine whether or not Section 408 permissions and Section 404 permits are granted for the project. Section 408 permissions for the alterations to the existing federal project will be granted if they are determined to not be injurious to the public interest or affect the federal project's ability to meet its authorized purpose. A Section 404 permit can only be issued for the least environmentally damaging practicable alternative (LEDPA).

B. Alternatives

Sub-category B.1: The proposed project is extremely costly and the likelihood of a flood event equal to the one experienced in 2011 is very remote. Will plans be evaluated that provide protection to lower levels?

Response B.1:

The SRJB has established the design level of the project (27,400 cfs) based on what occurred in 2011 so that the risk of property and life loss would be minimized should a similar event occur in the future. Following development of the Preliminary Engineering Report, the SRJB and the City of Minot commissioned a study to evaluate the costs associated with constructing a flood risk reduction system to a lower design level, with the intent of being able to flood fight or fully construct the features to a design level of 27,400 cfs in the future. The potential cost savings were a modest 6% cost reduction for reducing the design level from 27,400 cfs to 10,000 cfs. As a result, the SRJB and the City of Minot chose to maintain the design level of 27,400 cfs.

The EIS will consider alternatives that meet the purpose and need statement supplied by the SRJB which specifies flood risk reduction for flood levels similar to those experienced in 2011. Therefore, plans that provide flood protection less than 27,400 cfs will not be evaluated.

Sub-category B.2: There were a number of alternatives that have been discussed to relieve flooding along the Souris River including the raise of Lake Darling, the 49th parallel diversion, and tunnels. Why weren't these alternatives chosen for the proposed project?

Response B.2: During the development of the MREFPP, the SRJB evaluated several alternatives, including constructing new or additional storage on the Souris River system, modifications to the operations of existing dams, upstream diversions of the Souris River along the international border and upstream of the Lake Darling Dam, diversions of the Souris River north and south of Minot, a tunnel beneath Minot and buying out the entire floodplain. The requestor's preferred alternative was identified by the SRJB as the least damaging alternative, that when considered in the context of environmental, social and economic impacts, meets the purpose and need.

The EIS will also evaluate these and a number of other alternatives to varying degrees based on environmental impacts, cost, and the feasibility of the actions.

Sub-category B.3: How much has the initial capacity of the channel been reduced due to sedimentation? Could dredging of the existing channel be completed to provide additional conveyance capacity?

Response B.3: Based on survey information gathered since the 2011 flood, particularly in the more populated areas from Burlington through Minot channel capacity has generally been increased due to erosion and scour caused by the 2011 event.

C. Design

Sub-Category C.1: How do the proposed alternatives deal with interior drainage for the new leveed areas? Some areas may become an effective "bathtub" for interior drainage.

Response C.1: The proposed plan includes gravity outlets, pump stations, ponding areas and other facilities to manage interior runoff and to reduce the risk of interior flooding from what currently exists. The proposed plan also includes seepage management systems that will manage the risk of levee failure due to seepage and associated piping of foundation materials. Design of the system will take into account groundwater levels that will occur on the landside of the levees. In addition, analysis of runoff from the leveed areas is a key consideration of all

levee systems and must be completed to meet the requirements of the Section 408 and FEMA's levee accreditation criteria.

Sub-category C.2: There are several existing dead loops along the river from past projects that have become cesspools with poor water quality. Many of the proposed alternatives evaluated in the past would create additional dead loops in the system. Are there design considerations that can be taken to increase water quality in the dead loops? Can the dead loops be filled to create valuable recreational areas?

Response C.2: The dead loops as currently being proposed are being used for interior runoff collection to pond interior runoff. The use of these existing loops reduces the size of the required pumping stations.

Additionally, fill placed within the dead loops would require permitting under Section 404.

Sub-category C.3: Have any new hydrology studies/models been completed based on the 2011 flood conditions? What level of protection does 27,400 cfs capacity give us?

Response C.3: Since the 2011 event, the Federal Emergency Management Agency (FEMA) has begun a Flood Insurance Study (FIS) update for Ward County, ND. Based on the preliminary information available to date, it appears the 100-yr flow will increase from 5,000 cubic feet per second (CFS) to approximately 10,000 cubic feet per second (CFS) and the 500-yr flow will decrease from 40,000 CFS to approximately 20,000 CFS.

Sub-category C.5: Why are the main channels completely closed off during high flows? Wouldn't it be more effective to use the channels to convey some flow during floods, thereby reducing the size of the diversion channels?

Response C.5:

By completely closing off the main channels during high flows, it eliminates the need to significantly upgrade or reconstruct the existing levees along the Mouse River that are bypassed by the high flow diversion channels. The reconstruction of the existing levees along the Mouse River would exacerbate social impacts by requiring significantly more property acquisitions, environmental impacts, and increased cost.

Sub-category C.6: Using floodwalls along the entire project alignment could reduce the number of buyouts required. Why weren't larger sections of floodwalls utilized?

Response C.6: During the development of the MREFPP the construction of additional floodwalls was considered and was determined to be too costly. In general floodwalls are 5 to 10 times more expensive per linear foot than a levee. Constructing floodwalls along the existing levee alignments would also significantly increase the flood level associated with the flood of record resulting in the need to construct even higher, more expensive floodwalls. While the associated smaller footprint of a floodwall is desirable, the benefits are generally outweighed by the costs of constructing the floodwalls. Floodwalls are being utilized in portions of the system in which major infrastructure exists and prohibits the placement of earthen levees.

D. Existing System and Temporary Protection

Sub-category D.1: Will the phased construction of the project lead to increased flood risks for certain areas before the entire project is complete?

Response D.1: It is possible that the phasing of construction could result in increased flood risk in certain locations while construction is ongoing. These interim impacts will be evaluated and disclosed as part of the EIS development.

Sub-category D.2: What are the plans to repair the current levee systems prior to the construction of the full project and will the new project have the same maintenance/upkeep requirements as the old federal project?

Response D.2: Following the 2011 event all temporary emergency levees were removed and many project repairs were completed under Public Law 84-99 (post-flood assistance). Since 2011 the Souris River Joint Water Resource Board (SRJB), Ward County Water Resources District, and the city of Minot have been undergoing efforts to prepare a System Wide Improvement Framework (SWIF) plan. The SWIF process is a requirement to remain eligible under PL 84-99 and is a detailed plan developed by the local sponsor to address existing project deficiencies and reduce flood risk. The SWIF plan is intended to be a specific document that guides sponsor activities based on risk and includes anticipated milestones for correcting existing project deficiencies. The SWIF will be reviewed and approved by the USACE. The SWIF provides detailed commitments for resolving existing deficiencies based on available budget. The SWIF actions will take into consideration the improvements proposed under the MREFPP. The SWIF actions have independent utility from the MREFPP.

Sub-category D.4: How long will it take to complete the entire project and provide continuous flood protection for the area? Is there any way to expedite construction of the individual features?

Response D.4: Based on current funding stream and avenues it is anticipated it will take more than 25 years to complete all phases within the defined scope area (Burlington, ND through Minot, ND). In order to expedite the project, additional funding sources would need to be identified.

E. Flood Insurance and FEMA Accreditation

Sub-category E.1: What is the certification process going forward with our current levee system and what level of protection will we have? Can we receive assistance if another flood comes before the full project is complete?

Response E.1: The certification process for FEMA is only for the 1% annual chance flood (100 year flood); and to meet those requirements a professional engineer or the USACE must certify the levee as specified in 44 Code of Federal Regulation (CFR) 65.10. In addition to the certification the community/levee owner must have an acceptable operation and maintenance plan.

The issue of receiving assistance to repair the levee if another flood occurs for the flood control along the Mouse River is likely not within FEMA's responsibility. USACE and other federal agencies have programs, such as USACEs Rehabilitation and Inspection Program (RIP) PL 84-99.

Sub-category E.2: After the project is completed can there be a certification process for a greater than 100-year flood? Can a certification be granted for lower than the 100-year flood before the full project is completed?

Response E.2: FEMA provides accreditation for, levees that are certified as providing protection to 44 CRF 65.10 standards or higher. An accredited levee will be shown as providing protection to the 100-year event and there by having no mandatory purchase requirement for those structures being protected by the levee.

FEMA will not provide accreditation until a levee system provides protection against the 100-year flood. As individual levee systems are completed during the project lifecycle and are certified as providing protection to 65.10 standards or higher, they can be accredited and shown as providing protection to the 100-year flood.

Sub-category E.3: What will happen to flood insurance rates when the flood map is revised in 2017 and after the full project is completed?

Response E.3: If the levee/floodwalls are built and certified the "protected area" on the landward side of the levee/floodwall is no longer considered a Special Flood Hazard Area (SFHA), and insurance is not required by FEMA. However, it still may be required by the lending

institution. When the map is revised those structures moving into the high hazard area will have a mandatory purchase requirement if they have a federally back mortgage. FEMA recommends individuals work with their insurance agents on exact quotes.

Sub-category E.4: Several residents who had flood insurance were not able to get as much money for their homes as people without flood insurance. Does having flood insurance reduce the amount of post flood assistance a homeowner can receive?

Response E.4: Normally those individuals with flood insurance receive an actual payment based on the level of insurance they purchase and the damage to the structure. Those individuals that receive disaster relief usually get a loan. For a 1-4 person single family residential structure, the National Flood Insurance Program (NFIP) has a maximum coverage amount of $250,000 for the structure and $100,000 for content coverage. If a structure is valued greater than the maximum coverage amount, supplemental coverage would be needed to fill the gap in coverage.

In addition, disaster relief should NOT duplicate insurance payments. Disaster funds may be used to cover damage that was not paid for by insurance. Also, when applying for disaster assistance, the property owner must identify any other sources of funds that may be reasonably available to the property owner, including proceeds expected or received from a flood insurance claim. The source and amount of duplication is documented by FEMA and the final disaster assistance payment would be reduced by the same amount received by that property owner from all other sources, including flood insurance claim payments paid to that property owner. When providing disaster recovery assistance to homeowners, FEMA must ensure that there is no duplication of benefits between what a property owner would get from a flood insurance policy claim and from the FEMA disaster assistance program.

F. Buyouts and Relocations

Sub-category F.1: What were the factors used in determining which homes would be bought out. Are there any plans to deal with flood damaged homes that were not repaired or bought out?

Response F.1: The city of Minot has three categories of properties that are being purchased. The first were properties identified immediately after the flood and prior to the preliminary design of the flood control project. These properties were purchased to provide better access to the existing levee system.

The second category is those properties that are identified within the footprint of the flood risk management project identified in the Preliminary Engineering Report and subsequent designs.

The third category of properties the city has purchased are those that are blighted or abandoned. In addition, for properties that are blighted or abandoned, the city has taken the necessary steps to ensure the properties are safe. These steps include debris removal, fencing, weed control, etc.

Subsequently, the city of Minot was incorporated into HUD's Community Block Development Grant Disaster Recovery (CBDG-DR) program for the 2011 disasters. Under this program, the city received two CDBG-DR funding allocations: B-12-MT-38-0001; and B-13-MS-38-0001.

The first allocation (B-12-MT-38-0001), approved in 2012 involved acquisition of flood damaged properties near the Mouse River, on a voluntary basis, subject to funding availability. The acquisition of properties under this program typically involved acquisition of the lot, all structures and mineral rights. All existing structures from the acquired properties were removed as part of this effort.

The second allocation (B-13-MS-38-0001), approved in 2013 involved buying properties located within the flood inundation area. Property buyouts were comprised of single and multi-family residences, mobile homes and pads, religious establishments, and commercial establishments. Once the purchase was completed, all existing structures were removed with the intent the

parcel would remain as open space or be utilized in the proposed flood control measures (i.e., flood levee system).

Subcategory F.2: How was the buyout price determined? Did the condition of repaired or rebuilt homes affect the price buyout price?

Response F.2: The city has two primary phases of acquisition. The first phase was immediately after the flood but before the preliminary design was completed. During this phase, the pre-flood assessed value plus 15 percent was used to acquire the property. The 15 percent addition to the assessed value equaled fair market value prior to the flood. The 15 percent addition was determined through consultation with the city assessor and the Ward County assessor.

The second phase of acquisitions relies on fair market value. If the property has been rehabilitated or reconstructed, a current appraisal is obtained, which is also reviewed by a review appraiser.

If the property has not been rehabilitated or reconstructed an appraisal is done to assess the fair market value of the property prior to the flood. This appraisal is also reviewed by a review appraiser.

G. Other

Sub-category G.1: When the diversion channels are built many of the accesses to my neighborhood will be blocked off. Will the flood control project limit the access or increase the response time of emergency vehicles to my neighborhood?

Response G.1: No, to the contrary, one of the reasons that the diversions were included in the preferred alternative is that they will decrease the number of roadway closure structures that are required during a large flood event. The transportation system will be more resilient with the diversions and other elements of the project in place and emergency response time will be similar or improved.

Sub-category G.2: The flood eliminated much of the affordable housing in Minot either by flood damage or increased demand for housing. Was there a higher proportion of low income housing taken out during the development of project plans? Are the demographics of areas being considered with the phased approach?

Response G.2: In compliance with Executive Order 12898 federal agencies must identify and address any disproportionately high and adverse human health or environmental effects to minority or low-income populations. With the phased approach there will be some increased flood risk to unprotected areas during the construction of the project. The EIS will examine the areas that may incur increased flood risk during construction and identify demographic information in these areas.

PLANNED SCOPE OF ANALYSIS

Although only plans for phases 1, 2, and 3 of the MREFPP will be submitted for Section 408 permissions and Section 404 permits, the environmental effects of features described in the larger Burlington through Minot portion of the project will be evaluated in the programmatic EIS. This stretch was chosen for the scope of analysis as features from Burlington through Minot: (1) appear to have hydraulic effects that are mostly separable from other portions of the MREFPP; (2) are so intimately connected that they could not be meaningfully distinguished independently; and (3) are considered a conceivable representation of the reasonable and foreseeable future.

Features proposed immediately upstream of Sawyer, in Sawyer, between Sawyer and Velva, in Velva, and in Mouse River Park will not be evaluated in detail as part of this document. The hydraulic effects from features built in these areas appear have minimal overlap with those from the Burlington through Minot reach. Phases in these areas may be subject to additional analysis and compliance with NEPA as they move forward in the future.

A programmatic EIS has been chosen as the format in which to disclose impacts for the Burlington through Minot reach. The programmatic document will serve as the NEPA

document for all phases in which impacts can be assessed adequately. It is likely that changes to features and alignments will occur due to the project's anticipated size, the lengthy period of construction, and uncertainty associated with the preliminary designs included in the Preliminary Engineering Report. Subsequent NEPA documents may be required to disclose appreciable changes in impacts as project details are refined. The programmatic EIS can be referenced to in future NEPA documents to limit repetitive discussion and overall document size.

The EIS will identify a number of management measures and project features, that when combined, help to achieve the requestor's purpose and need statement (listed in the Project Purpose and Need Section). Management measures and features will be combined into distinct plans or alternatives which will then be evaluated for environmental impacts. The programmatic EIS will discuss the effects from a wide range of alternatives but will focus on the requestor's proposed action and the no-action alternative.

The requestor's proposed action will consist of measures as generally laid out in the MREFPP Preliminary Engineering Report. Slight changes to the MREFPP have been made since the Preliminary Engineering Report and will be reflected in the EIS.

The no-action alternative can have two distinct interpretations that must be considered. One situation would include an alternative based on current management while the other would involve no activity or alternative implementation at all.

Management measures, such as emergency flood fighting activities, are currently executed in the basin based on snowpack, hydrological conditions, and anticipated forecasts. While the extent and magnitude of these actions are dependent on the timing and severity of the forecasted conditions, there are particular actions that are most likely to occur. For instance, in the Burlington through Minot area there are discontinuous levees that when connected and raised by emergency flood fighting measures, provide flood risk reduction to flows of 10,000 cubic feet per second (cfs). Emergency flood fighting actions to connect and raise these levees can be considered likely measures. The most likely management measures will be combined to form the "no-action alternative based on current management."

The other no-action alternative to be considered would occur in the event of an unexpected, extreme weather event. In this scenario, a rapid rise in the river would not allow for emergency flood fighting to be carried out as normal. This alternative would assume the implementation of no flood fighting actions.

The impacts associated with reasonable action alternatives, including the requester's preferred alternative, would be compared in relation to both of the no-action alternatives as previously described. Impacts would include the physical, biological, social, and cultural effects associated with not only the construction of flood risk management features but also the areas that would experience changes in the depth, duration, and frequency of floodwaters. This includes areas both upstream and downstream of the immediate project area.

Flood impacts of alternatives may not be evident at all discharges and therefore the extent of impacts will be evaluated at various discharges. The federal flood risk reduction projects from Burlington through Minot were designed to pass flows under 5,000 cfs in the river channel; this will serve as the lower bound of discharges to be evaluated in the EIS. The 2011 flood of record had an estimated discharge of 27,400 cfs through Minot. The requestor has proposed to build features to protect against floodwaters up to this magnitude Environmental impacts associated with flows contained by these features will require assessment. Intermediate discharges between 5,000 and 27,400 cfs will also be used to assess impacts caused by alternatives. The intermediate discharges that identify the appreciable changes in impacts will be chosen but have not been determined at this time.

Interim impacts will also be evaluated in the EIS to show areas that may take on additional flood risks for an extended period of time during the overall project construction. Project features are anticipated to be built in phases over the next 25 years or more. As features are built in the floodplain and protect areas that would otherwise be flooded, water will be displaced to other locations that do not have protection. Until the entire project is complete, unprotected or less protected areas may encounter increases in flood depth, duration, and frequency as a result. It is not feasible to look at the flood stage and flood frequency changes

associated with every phase of the project. Interim impacts will be evaluated at strategically chosen periods or construction stages to depict the largest changes.

The USACE Regulatory Branch is responsible for permitting the discharge of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act. Given the scope of the project, compliance with the Environmental Protection Agency's 404(b)(1) Guidelines is required. The Guidelines dictate that the USACE can only permit the least damaging practicable alternative (LEDPA). The programmatic EIS may be sufficient for Section 404 permitting purposes for all phases in which the LEDPA has been identified. Subsequent phases will likely require additional NEPA compliance documentation and identification of the LEDPA at that time.

Appendix B

No-Action Alternative 2

Appendix B

Evaluation of No-Action Alternative 2 – No Flood Fight

October 2016

Appendix B
Evaluation of No-Action Alternative 2 – No Flood Fight

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1.0 Background

Flooding of the Souris River (locally referred to as the Mouse River) severely damaged homes, businesses, public facilities, infrastructure, and rural areas in the Souris River Basin in 2011. Following the flooding, the North Dakota State Water Commission had the Mouse River Enhanced Flood Protection – Preliminary Engineering Report (PER, reference [1]) prepared as a guiding document to help reduce the risk of damages from river flows comparable to those experienced in 2011. The PER evaluated various flood risk reduction features and alignments that would provide protection for floods similar to 2011. Ultimately a number of levees, floodwalls, river diversions and closure features, transportation closure structures, interior pump stations, and properties buyouts were combined in the PER to form what has become known as the Mouse River Enhanced Flood Protection Project (Project).

The anticipated construction of the Project would occur in a number of phases over a period of more than 25 years, depending on available funding. To proceed with the construction of the Project, the Souris River Joint Water Resources Board (SRJB) is seeking attainment of all permissions and permits that would be required for construction of the initial phases of the Project.

Features of the Project would alter existing U.S. Army Corps of Engineers (USACE) flood risk reduction projects, known collectively as the Souris River Basin Project. To alter an existing project, the USACE must review the proposed Project's actions to ensure that alterations are not injurious to the public interest or affect the project's ability to meet its authorized purpose. Once this has been determined, the USACE may grant permission to alter the project under Section 14 of the Rivers and Harbors Act of 1899 (33 USC 408, hereafter referred to as Section 408). In addition, the Project would also place fill material in waters of the United States, requiring a USACE permit under Section 404 of the Clean Water Act (33 CFR 323).

The SRJB has requested Section 408 permission and have coordinated with USACE staff on the Section 404 permit; they will be referred to as the requester in this document. Both Section 408 permission and Section 404 permitting are considered federal actions for which environmental compliance with the National Environmental Policy Act (NEPA) is required.

NEPA documents analyze the impacts of proposed actions to prevent or eliminate damage to the environment and stimulate the health and welfare of society. The NEPA requires that alternative analysis include the evaluation of a no-action alternative which would serve as the baseline for which the impacts of the proposed action are measured. The primary no-action alternative being evaluated in this NEPA document is based on the existing flood risk reduction features along with a successful flood fight to 10,000 cfs, as this is the most likely scenario to unfold in a flood event. Collectively, the features being proposed for construction will be referred to as the Requester's Preferred Alternative.

However, an unexpected, extreme weather event, where flood waters rise rapidly and do not allow enough time for emergency flood fighting could also occur. This scenario is of lower probability but would generally result in higher intensity impacts when used as a baseline compared to those of the successful flood fight to 10,000 cfs. The event in which there is no flood fighting activities will be referred

to as the No-Action Alternative 2 in this appendix and will be used as supplemental information to that presented in the Environmental Impact Statement (EIS).

More detailed information on the Project background, planning, and permitting is available in the main text of the EIS.

2.0 No-Action Alternative 2

No-Action Alternative 2 would rely on existing infrastructure as the only flood risk reduction measures; no additional emergency flood fighting or human intervention is considered in this scenario. Existing infrastructure includes flood risk reduction features constructed as part of the Souris River Basin Project, including channel modifications, earthen levees, ponding areas, and pump stations that provide protection to 5,000 cfs. With flows over 5,000 cfs, water would circumvent many of the discontinuous levees throughout the project area and flooding would occur. This scenario could occur with an unexpected, extreme weather event, where flood waters rise rapidly and do not allow enough time for emergency flood fighting. Additional information on the existing infrastructure is provided in Section 2.2.5.1 of the EIS.

3.0 Affected Environment

A detailed description of the affected environment, including geology, soils, groundwater, surface waters, floodplain, wetlands, biological resources, land use, infrastructure, contaminated sites, socioeconomics, recreation features, aesthetics, visual resources, historic and cultural resources, air quality, and noise conditions, is provided in Section 3 of the EIS.

4.0 Environmental Consequences

This section describes the potential environmental and social consequences that would be expected with flooding for the No-Action Alternative 2 and for the Requester's Preferred Alternative. Alternatives were evaluated for flood-related effects at three flood discharges: 5,000 cfs, 10,000 cfs, and 27,400 cfs.

The Requester's Preferred Alternative consists of alignments and features as described in Section 2.1 of the EIS. The No-Action Alternative 2 assumes the general containment of floodwaters within the river channel until 5,000 cfs, with flooding at larger flows; this will be the baseline for which impacts of the Requester's Preferred Alternative are measured.

Because of the size and prolonged construction period of 25+ years, detailed plans are only available for the first few phases of the Requester's Preferred Alternative. Site-specific impacts will be assessed for these areas where value is added. Plans for the remaining portions of the Project are conceptual in nature and impacts will be evaluated more generally.

In general, the Requester's Preferred Alternative shows more benefits at lower intensity floods (under 10,000 cfs) when compared to the No-Action Alternative 2 rather than the primary no-action scenario of a successful flood fight to 10,000 cfs. Benefits are primarily to structures and properties that would otherwise be inundated. The environmental consequences for No-Action Alternative 2 will focus on these areas.

The natural resources in the project area have been highly degraded from development and previous river alterations. For many of the resources listed in the following sections, the marginal differences in impacts are not appreciable between the two no-action alternatives. Therefore, only a brief description will be provided in this appendix, with references to sections of the main document for more detail.

4.1 Geology, Soils, and Groundwater

4.1.1 **Requester's Preferred Alternative**

Geology, soils, and groundwater impacts associated with the Requester's Preferred Alternative in relation to the No-Action Alternative 2 would not be appreciably different than those for the No-Action alternative evaluated in the EIS. Additional information on impacts to these resources is provided in Section 4.1 of the EIS.

4.1.2 No-Action Alternative 2

No-Action Alternative 2 would result in inundation of soils during flooding. Soils would be temporarily affected by inundation, but the effects would not be permanent. Inundation would not result in temporary or permanent effects to geologic or groundwater resources.

The acreage of prime farmland that would be flooded under No-Action Alternative 2 is shown in Table B4-1. Flooding could have temporary adverse effects on prime farmland, such as diminished yields

or loss of one season's crop, depending on the timing of the flooding. Inundation is not expected to result in permanent adverse effects to prime farmland.

Table B4-1 Inundation of Prime Farmland under No-Action Alternative 2 (acres)

	Flood Scenario		
	5,000 cfs	10,000 cfs	27,400 cfs
Requester's Preferred Alternative(1)	387	962	1,436
No-Action Alternative 2	433	1,336	2,265

(1) In addition, 300 acres of prime farmland would be directly impacted from the construction of the Requester's Preferred Alternative.

4.2 Surface Waters

4.2.1 Requester's Preferred Alternative

Constructing, operating, and maintaining the Requester's Preferred Alternative would result in temporary and permanent impacts on surface water resources. Impacts to the Mouse River, the floodplain, and wetlands associated with the Requester's Preferred Alternative, would not be appreciably different in relation to the No-Action Alternative 2 than the primary no-action alternative evaluated in the EIS. More detailed information on surface water impacts is provided in Section 4.2 of the EIS.

4.2.2 No-Action Alternative 2

Under No-Action Alternative 2, surface water resources would continue to function as described in Section 4.2 of the EIS, except low areas in the existing levee systems would remain unplugged. Without emergency flood-fighting, overland flooding would begin to occur once the river channel became overwhelmed, at approximately 5,000 cfs. Because no new flood risk-reduction features would be constructed, there would be no direct impacts to water resources.

Mouse River

Most of the existing levee segments along the Mouse River are high enough to withstand a 10,000 cfs flood event, however because of gaps in the levees at roadways, the Mouse River would begin overtopping some existing levee systems at flows between 5,000 cfs and 10,000 cfs, causing flood-related damages to public infrastructure and private properties behind the levees.

Higher velocities of water flowing through the system during large flood events would continue to cause riverbank erosion if left unmanaged. During high flows, the Mouse River could also be susceptible to altering its course by cutting new channels on the landscape, primarily in a few rural locations with extreme oxbows.

No-Action Alternative 2 would not be anticipated to alter impairment status or existing impoundment functions along the Mouse River.

Floodplain

Floodplain areas would remain unchanged under No-Action Alternative 2. The effective regulatory floodplain is based on a peak discharge of 5,000 cfs, which is largely confined to the channel through the project reach. Flows exceeding 5,000 cfs could potentially overtop existing flood risk-reduction features. Most existing flood risk-reduction features, however, do not begin to overtop until flows are higher than 10,000 cfs.

FEMA is in the process of updating the hydrology used to define the one-percent annual chance discharge. This would redefine the regulatory floodplain as being the inundation area from a 10,000 cfs flood event. Similar to No-Action Alternative 2, FEMA's mapping of the regulatory floodplain assumes no flood fight. Under No-Action Alternative 2, much of the area that was inundated during 2011 would be mapped into the floodplain and require thousands of property owners to purchase flood insurance.

Wetland

No-Action Alternative 2 would not directly affect wetlands. During flood events greater than 5,000 cfs, wetlands near the Mouse River could become inundated and, depending on conditions, could remain inundated for longer periods than normal. Wetlands that are inundated with either more water or for longer duration than usual may be vulnerable to seasonal vegetation die-off or transition to different wetland plant community types. This, however, is natural for wetlands found in floodplains and may result in a periodic change that promotes wetland resilience.

4.3 Biological Resources

4.3.1 **Requester's Preferred Alternative**

Constructing, operating, and maintaining the Requester's Preferred Alternative could temporarily and permanently affect biological resources, as described in Section 4.3 of the EIS. Impacts to vegetation, fish and wildlife, threatened and endangered species, and other unique and sensitive resources associated with the Requester's Preferred Alternative, would not be appreciably different in relation to the No-Action Alternative 2 than the primary no-action alternative evaluated in the EIS.

4.3.2 No-Action Alternative 2

The following subsections describe potential effects of No-Action Alternative 2 on vegetation, fish and wildlife, or threatened and endangered species. Potential effects under three flow conditions are considered: 5,000 cfs, 10,000 cfs, and 27,400 cfs. The estimated inundation areas associated with these flow conditions are described in Section 2.2.5 of the EIS.

Vegetation

Under No-Action Alternative 2, high-water events would continue to have mostly minor impacts on vegetation communities. Effects would include potential loss of trees and shrubs due to high flow velocity or prolonged inundation. Depending on the timing and duration of high-water events, there would also be potential disruption in seasonal reproductive cycles (e.g., flowering or seed production). These impacts would be temporary, as the majority of the plant community types in the project area have adapted in

some degree to periodic flooding and episodic inundation. The magnitude of the impacts under No-Action Alternative 2 would be expected to increase along a gradient between the 5,000 cfs flow condition and the 27,400 cfs flow condition.

Fish and Wildlife

Under No-Action Alternative 2, wildlife species in the project area would be periodically displaced during high water events, and fish species would temporarily relocate to slower backwaters off of the main channel. Periodic high water events and their resulting effects on fish and wildlife are naturally occurring and in some instances can be beneficial. The magnitude and duration of the impacts under No-Action Alternative 2 would be expected to increase along a gradient between the 5,000 cfs flow condition and the 27,400 cfs flow condition. Specifically, the extent of fish stranding under No-Action Alternative 2 would be larger under the 27,400 cfs flow conditions than under the 5,000 cfs or 10,000 cfs flow conditions. This is because the flooded area resulting from the 27,400 cfs flow condition would be greater, allowing fish to stray further from the river channel and thereby increasing the likelihood of stranding as the waters recede. However, foraging and spawning opportunities could be improved during flood events.

Endangered and Threatened Species

There have not been any reports of federally endangered or threatened species identified in the 27,400 cfs inundation area from Burlington to just downstream of Minot, nor is the habitat of these areas believed to support any of the six federally-listed species identified in Ward County. Therefore, the inundation of the floodplain at flows of 27,400 cfs are not believed to have any effect on endangered or threatened species.

4.4 Land Use and Infrastructure

4.4.1 **Requester's Preferred Alternative**

Constructing, operating, and maintaining the Requester's Preferred Alternative could both positively and negatively affect existing and potential land use. Impacts to infrastructure and land use associated with the Requester's Preferred Alternative, would not be appreciably different in relation to the No-Action Alternative 2 than the primary no-action alternative evaluated in the EIS. More detailed information on land use and infrastructure impacts is provided in Section 4.4.1 of the EIS.

4.4.2 No-Action Alternative 2

The following subsections describe potential impacts to land use and infrastructure of No-Action Alternative 2. Under No-Action Alternative 2, areas adjacent to the Mouse River throughout the Project reach would continue to be at risk for flood events greater than 5,000 cfs. The areas at risk for inundation primarily include portions of Burlington, rural residential developments downstream of Burlington, and a large portion of Minot.

Existing/Potential Land Use

In flood events greater than 5,000 cfs, floodwaters would flow through gaps in the existing levees. This would adversely affect land use in the project area. Potential adverse effects range from minor to

significant, increasing in severity with higher water levels. Under No-Action Alternative 2, a flood event of 5,000 cfs would not affect existing and potential land use within the project area. Modifications to the river channel were designed to contain flood flows up to 5,000 cfs, and inundated areas would be within the existing FEMA floodplain. Minor adverse effects would begin to occur as flood events top 5,000 cfs and small areas (e.g., less than a couple of blocks) are inundated. Clean up and restoration would take days to weeks. Land use in inundated areas would be temporarily disrupted, but designated uses would resume after flood clean-up and recovery.

Under No-Action Alternative 2, a flood event of 10,000 cfs would substantially and adversely affect existing and potential land uses. Flood flows of 10,000 cfs would overtop existing flood risk-reduction elements, and land designated as residential, commercial, industrial, rural (agricultural) and open space would be inundated. In agricultural areas this could result in erosion and sedimentation and could disrupt seasonal cultivation and crop productivity. Within urban areas, a 10,000 cfs flood event could result in weeks to months of clean up and restoration at residential, commercial, industrial, institutional, and recreational properties.

Under No-Action Alternative 2, flood event of 27,400 cfs would significantly and adversely affect existing and potential land uses. Flood flows of 27,400 cfs would inundate, erode, and sediment agricultural and open space areas. Destruction and damage to agricultural equipment and ancillary structures could disrupt crop productivity. Permanent adverse effects to agricultural productivity could cause abandonment of fields, prolonged delay in cultivation or diminished crop productivity. Within urban areas, the flooding of whole communities with multiple residential, commercial, industrial, and/or recreational properties would occur. Many of these properties would become permanently unusable, or too costly and challenging to restore, resulting in permanent an unplanned land use changes. Clean up and recovery from such an event would take many months and possibly several years.

Infrastructure

Under No-Action Alternative 2, flows above 5,000 cfs would begin to induce flood damages by circumventing existing levees and adversely affecting infrastructure in the project area. Frequent or continual exposure to flooding adversely affects the structural integrity of roads and utilities over time. Adverse effects could also include the inundation of residential, commercial, industrial, and recreational properties.

Under No-Action Alternative 2, a flood event of 5,000 would not affect infrastructure, because the existing federal project would protect areas from flows at this level.

Under No-Action Alternative 2, a flood event of 10,000 cfs would substantially and adversely affect infrastructure in the project area. Floods would disrupt access and services, damage infrastructure, and hamper subsequent clean-up and repair efforts.

Under No-Action Alternative 2, a flood event of 27,400 cfs would significantly and adversely affect infrastructure in the affected area, especially in Burlington and in central and west-central Minot. This alternative would cause long-term disruptions and destruction of the infrastructure in the project area,

resulting in widespread impacts that would be felt regionally and potentially statewide. Significant clean-up and repair efforts could last for months, if not years.

Transportation

Under No-Action Alternative 2, local, regional, and state governments and agencies would continue to monitor roadway and traffic circulation conditions, pursuing improvements throughout the project area as needed. Local roads and bridges near the Mouse River would continue to experience localized flooding and closures during high water conditions.

Under No-Action Alternative 2, a flood event of 5,000 cfs would not affect existing transportation systems. With flows greater than 10,000 cfs transportation systems in the affected area would experience adverse impacts. A flood event greater than 10,000 would inundate transportation system serving local and regional destinations. Access disruptions could last hours to days, followed by subsequent clean-up and repair that could last days to months. Alternative transportation routes could be used, causing minor and temporary adverse impacts for the movement of people and goods.

No-Action Alternative 2 with a flood event of 27,400 cfs would significantly and adversely affect transportation systems in the affected area. Transportation systems serving local, regional, and statewide destinations would be inundated. This alternative could result in long-term access disruptions to the regional and state economy and would reduce the ability to move people and goods. Significant clean-up and transportation system repairs could last weeks to months or beyond.

Utilities and Public Services

With a 5,000 cfs flood, No-Action Alternative 2 would not affect utilities and public services in the affected area. Impacts to these resources for flood flows of 10,000 cfs and 27,400 cfs would vary along the project reach. With flows of 10,000 cfs and greater, public and private underground utilities would be submerged. Adverse effects to utilities could include degradation of structural integrity or backflow of floodwaters entering or accumulating through the systems. Services could be disrupted for an extended period, and subsequently restoring the affected areas could be costly.

No-Action Alternative 2 would not directly affect emergency services department headquarters. Adverse effects on transportation systems could, however, lead to increased response times for police, fire, and emergency medical response services and inability to readily access all neighborhoods and communities.

4.5 Contaminated Sites

4.5.1 Requester's Preferred Alternative

Several sites containing hazardous materials and petroleum products have been identified in the project area. Potential impacts associated with these existing sites include construction impacts resulting from disturbance of contaminated soil or groundwater, impacts associated with demolition of buildings containing hazardous building materials, and excavation of debris in fill soil. Potential impacts from contaminated sites associated with the construction of Requester's Preferred Alternative, would not be appreciably different in relation to the No-Action Alternative 2 than the primary no-action alternative

evaluated in the EIS. More detailed information on potential impacts to contaminated sites is provided in Section 4.5 of the EIS.

4.5.2 No-Action Alternative 2

General Impacts

No ground-disturbing activities would result from No-Action Alternative 2 and thus no potentially contaminated sites would be directly affected by this alternative. However, river flows greater than 10,000 cfs could result in the inundation of potentially contaminated sites and the dispersion of contaminants from these sites. Sites with storage tanks and septic systems could be inundated, causing them to overflow, spreading the contents throughout the environment, and potentially contaminating soil, groundwater, and surface waters. Known potentially contaminated sites that could be flooded at various flood scenarios are shown in Table B4-2.

Table B4-2 Potentially Contaminated Sites That Could Be Flooded Under Various Flood Scenarios for No-Action Alternative 2

	5,000 cfs (50-Year) Impact	Over 10,000 cfs (100-Year) Impact	27,400 cfs (2011 Flood) Impact
Alan Kurth Olds Nissan			X
Enerbase			X
Farmers Union Oil Company			X
Fed Ex			X
Ferrellgas Fuel			X
Firestone Store Of Minot			X
Keelbler Company			X
Keller Paving and Landscaping		X	X
Magic City Lumber Inc			X
Main Electric Construction Inc.			X
Minot Farmers Elevator		X	X
Minot Fire Department			X
Porter Brothers			X
Robinson Insulation Minot Plant			X
Schatz Retread			X
Souris River - West Minot			X
Werner Oil Company			X

Site-Specific Impacts

Phase 1 (Fourth Avenue NE), Phase 2 (Napa Valley), and Phase 3 (Forest Road)

Several properties within the Fourth Avenue NE area currently use or have historically used hazardous substances or petroleum products. No impacts on these potentially contaminated sites would be expected with flows under 10, 000 cfs; however, floods of 27,400 cfs would inundate some of these properties, including Porter Brothers and Werner Oil Company. If these properties were inundated, hazardous substances and petroleum products may be released into the environment, potentially contaminating soil, groundwater, and surface waters.

No-Action Alternative 2 would not affect any contaminated sites in the Napa Valley or Forest Road areas.

4.6 Socioeconomics

4.6.1 **Requester's Preferred Alternative**

Constructing, operating, and maintaining the Requester's Preferred Alternative could cause businesses and homes to be relocated and could affect property values, tax revenue, regional growth, employment, business activity, community cohesion, community growth and development, and environmental justice. The nature of socioeconomic impacts relative to the No-Action Alternative 2 would not be appreciably different than those described in Section 4.6 of the EIS.

4.6.2 No-Action Alternative 2

Under No-Action Alternative 2 areas adjacent to the Mouse River throughout the project area would continue to be at risk for flood events greater than 5,000 cfs. With flood flows greater than 5,000 cfs, the existing channel would be overwhelmed which would generate minor to significant adverse effects to existing socioeconomic circumstances through displacement and cleanup efforts.

Under No-Action Alternative 2, a flood event of 5,000 cfs would generate minimal socioeconomic impacts. Existing flood risk-reduction elements are designed to contain flood flows up to 5,000 cfs, however some parcels would still be inundated

Under No-Action Alternative 2, a flood event of 10,000 cfs would overtop existing flood risk-reduction features, and portions of Burlington, Harrison Township, Minot, and a small portion of Nedrose and Sundre Townships would be inundated, damaging homes, businesses, and public infrastructure. The extent of inundation would substantially and adversely affect individuals, communities, and local economic activity.

Under No-Action Alternative 2, a flood event of 27,400 cfs would result in significant adverse socioeconomic effects, as there would be substantial damages similar to those experienced in 2011. Flooding would inundate a large number of parcels (Table B4-3), temporarily or permanently affecting communities and businesses. Damages to some properties could be permanent, as the cost of clean-up might be prohibitive. This could result in permanent loss of homes and businesses in the inundated area, leading to loss of community and permanent relocation of residents and businesses.

Table B4-3 Number of Inundated Parcels: No-Action Alternative 2 under Three Flow Conditions (5,000 cfs, 10,000 cfs, 27,400 cfs)

	5,000 cfs			10,000 cfs			27,400 cfs		
Community	Parcels Without Structures	Parcels With Structures	Total Parcels	Parcels Without Structures	Parcels With Structures	Total Parcels	Parcels Without Structures	Parcels With Structures	Total Parcels
City of Burlington	14	9	23	44	46	90	95	140	235
Burlington Township	45	33	78	92	70	162	71	66	137
Harrison Township	109	92	201	124	125	249	193	230	423
City of Minot	226	164	390	780	2,659	3,439	1,016	3,605	4,621
Nedrose Township	101	82	183	142	117	259	158	154	312
Sundre Township	13	9	22	12	19	31	23	15	38
Total	**508**	**389**	**897**	**1,194**	**3,036**	**4,230**	**1,556**	**4,210**	**5,766**

4.7 Recreation

4.7.1 Requester's Preferred Alternative

Permanent benefits of the Requester's Preferred Alternative on recreational opportunities and recreational areas within the project area would include providing more connections to use of local parks and trails systems, and the establishment of the Mouse River Valley greenway system. Adverse effects could include temporary disruption during construction and permanent loss of designated recreational lands for flood risk-reduction use. Impacts to recreation relative to the No-Action Alternative 2 would not be appreciably different than those described in Section 4.7 of the EIS.

4.7.2 No-Action Alternative 2

As no flood risk-reduction improvements would be made under No-Action Alternative 2, existing conditions would remain. Without flood risk-reduction improvements, however, the risk of flooding and the adverse impacts to recreational facilities associated with flooding would continue. Flood events under 10,000 cfs would affect recreational facilities within and adjacent to the anticipated 100-year floodplain (Table B4-4).

Under No-Action Alternative 2, a flood event of 5,000 cfs would somewhat affect recreational facilities adjacent to and within the current 100-year floodplain by causing disruptions in use when inundated.

A flood event of 10,000 cfs would inundate portions of Burlington, Harrison Township, Minot, Nedrose Township, and a small portion of Sundre Township, damaging existing recreational facilities and

infrastructure. Uses of existing recreational facilities would be restricted until flood waters receded and cleanup and restoration were completed.

A flood event of 27,400 cfs would significantly damage existing facilities and infrastructure, erode soil, and uproot vegetation. Recreational facilities and trails would be unusable until cleaned up and restored, and some recreational facilities might never be fully restored to their former condition. This would permanently reduce the quality and quantity of recreational opportunities within the affected area.

Table B4-4 Inundation of Recreational Facilities

	5,000 cfs		10,000 cfs		27,400 cfs	
Location Name	No-Action Alt. 2	Preferred Action	No-Action Alt. 2	Preferred Action	No-Action Alt. 2	Preferred Action
Burlington City Park	X	X	X	X	X	X
Corbett Field and Rink			X		X	
Dakota Bark Park					X	
Green Valley Park			X		X	
Hammond Park			X		X	
Jack Hoeven Baseball Park					X	
Leech Park			X		X	
Moose Park	X	X	X	X	X	X
North Dakota State Fairgrounds / Nodak Speedway / Dacotah Flat Track			X		X	
Nubbin Park	X		X		X	
Oak Park	X		X		X	
Old Settlers Park	X	X	X	X	X	X
Riverside Park	X		X		X	
Roosevelt Park / Zoo	X	X	X	X	X	X
Roughrider Campground	X	X	X	X	X	X
Souris Valley Golf Course	X	X	X	X	X	X
Vardon Golf Club	X	X	X	X	X	X
Via-View Park			X		X	
Wee Links Golf Course	X	X	X	X	X	X
Total Locations Inundated:	**11**	**8**	**17**	**8**	**19**	**8**

4.8 Aesthetics and Visual Resources

4.8.1 Requester's Preferred Alternative

General impacts to the landscape's existing aesthetic value and visual resources from constructing, operating, and maintaining the Requester's Preferred Alternative would include changes in vegetative cover, topography, water resources, and built structures. The benefits of the Requester's Preferred Alternative would be greater when using No-Action Alternative 2 as a baseline than when using the

primary no-action alternative, as described in Section 4.8 of the EIS. This is because the destruction and debris from flooding would begin at a 5,000 cfs flood event rather than 10,000 cfs.

4.8.2 No-Action Alternative 2

Under No-Action Alternative 2 a flood event of 5,000 cfs would somewhat affect existing aesthetic and visual resources. Existing flood risk-reduction elements are designed to contain flood flows up to 5,000 cfs. During a 5,000 cfs flood event, residents, walkers, and bikers with a view of the river could experience minor aesthetic impacts as the river would be at a higher stage than normal. Clean up and restoration could take days to weeks.

A flood event of 10,000 cfs or higher would substantially affect aesthetic and visual resources within the affected area. At flows between 5,000 and 10,000 cfs, areas behind the discontinuous levees would be flooded. At flows over 10,000 cfs other flood risk-reduction features would be overtopped, inundating portions of Burlington, Harrison Township, Minot, Nedrose Township, and a small portion of Sundre Township. Effects would be most pronounced in residential areas near the Mouse River corridor, as adjacent residences would have the highest viewer sensitivity and the highest risk of becoming inundated. In agricultural portions of the affected area, aesthetic impacts would be experienced at greater distances, due to the lack of visual obstructions.

Flooding would cover public and private land and infrastructure with standing water, dramatically altering existing views. As waters recede, debris, sedimentation, and damaged vegetation and infrastructure would be revealed. Cleanup and restoration efforts could require an increased presence of construction or debris removal services, causing temporary visual contrast and increased noise and traffic. Viewsheds and landscapes would be restored within days to weeks.

Under No-Action Alternative 2, a flood event of 27,400 cfs would significantly damage existing aesthetic and visual resources. Flood waters would be expanded in all directions from the existing Mouse River corridor, and would inundate private and public land and infrastructure. During the flood of 2011, land was inundated with 2 to 15 feet of water, with water covering some homes all the way to the eaves.

As flood waters recede, they would reveal the destruction as described previously. Cleanup and restoration activities in some areas could take months, and some natural and structural landmarks could be permanently damaged. On the other hand, damaged structures that are demolished would introduce open space, which could also permanently affect the existing aesthetics of a landscape.

4.9 Historic and Cultural Resources

4.9.1 **Requester's Preferred Alternative**

Constructing, operating, and maintaining the Requester's Preferred Alternative could temporarily and permanently affect historic and cultural resources as described in Sections 4.9.1 and 4.9.3 of the EIS.

4.9.2 No-Action Alternative 2

The Class I Cultural Resources Survey which identified all known archaeological sites and historic structures within one mile of the Requester's Preferred Alternative, encompasses the inundation area associated with No-Action Alternative 2, however, this alternative would result in flooding beyond the boundaries considered by the Class III Archaeological Survey and Class III Standing Structure Survey conducted specifically for Phases 1-3 of the Project. Additional analysis identified historic districts and structures throughout the City of Minot CDBG-DR Program. To fully evaluate the current and affected environment for No-Action Alternative 2, additional surveys would be necessary. This general impact assessment has been conducted by reviewing No-Action Alternative 2 in relation to the historic and cultural resources identified in the existing surveys for the Requester's Preferred Alternative.

Within Minot, under No-Action Alternative 2, flood flows of 10,000 cfs and 27,400 cfs would inundate several known historic structures (Table B4-5). Flood flows up to 5,000 cfs would have no effect, as the existing flood risk-reduction elements were designed for this level of flood flow and inundated areas would be within the current FEMA floodplain.

Table B4-5 Previously Listed, Recommended Eligible or Potentially Eligible Properties

SITS No.	Address	Feature	NRHP Status
32WD568	414 1st St. NW	Dwelling, Single Unit	Recommended Individually Eligible
32WD507	103 4th Ave. NW	Dwelling, Single Unit	Recommended Individually Eligible
32WD514	422 4th Ave. NW	Dwelling, Single Unit	Recommended Individually Eligible
32WD515	426 4th Ave. NW	Dwelling, Single Unit	Listed
32WD516	504 4th Ave. NW	Dwelling, Single Unit	Recommended Individually Eligible
32WD517	510 4th Ave. NW	Dwelling, Single Unit	Listed
32WD1622	120 5th Ave. NW	Church Complex and Cemetery	Recommended Eligible
32WD861	812 Main St. N	Church, Catholic	Recommended Individually Eligible
32WD652	400 3rd St. NE	Minot Mill	Recommended Individually Eligible
32WD681	25 5th St. NE	Dwelling, Single Unit	Listed
32WD1631	Varies	Soo Line Railroad	Recommended Individually Eligible

Outside of Minot and within the Requester's Preferred Alternative, flood scenarios between 10,000 cfs and 27,400 cfs, have the potential to affect the following known sites:

- Prehistoric Archaeological Site (32WD24)
- Soo Line – Canadian Pacific Railroad Historic Archaeological Sites (32WD1631)
- Historic Vallejo Farm (32WD34)
- Historic Bridge (32WD1613)
- Historic Bridge (32WD1615)

- Historic Bridge (32WD1841)

The prehistoric archaeological site (32WD24), located between Minot and Burlington in the vicinity of the Mouse River corridor has the potential to be flooded at flows above 5,000 cfs. The existing site condition is unknown however, this site has been inundated by previous flood events.

No-Action Alternative 2 would not directly affect the Soo Line (now Canadian Pacific) Railway (32WD1631) as this alternative would not modify the railway corridor, however portions of the railway could be flooded and sustain flood damage. With 10,000 cfs flood flows, the Soo Line Railway would be inundated in the Vardon Golf Course area and areas outside of western Minot. Throughout Minot, from the Forest Road area, downstream through the Roosevelt Park area, the Soo Line tracks would be flooded. Flows of 27,400 cfs would expand the level of inundation, and more of the track would be flooded.

The historic Vallejo Farm (32WD34) and bridges (32WD1613, 32WD1615, and 32WD1841), located within and just outside of Minot, would be affected under No-Action Alternative 2 with flows of 10,000 cfs and 27,400 cfs.

4.10 Air Quality and Noise

4.10.1 Requester's Preferred Alternative

Constructing and operating the Requester's Preferred Alternative would result in direct and indirect emissions of criteria air pollutants and greenhouse gases (GHGs). These emissions would result in minor, primarily localized impacts. There would be no appreciable change from what is described in Section 4.10 of the EIS.

4.10.2 No-Action Alternative 2

Under the No-Action Alternative 2 there would be no change from existing air quality conditions described in Section 3.10 of the EIS.

4.11 Human Health and Safety

4.11.1 Requester's Preferred Alternative

There could be temporary adverse effects to human health and safety during the construction of the Project. However, the Project would provide long-term benefits to human health and safety once functional. More information on these effects is provided in Section 4.11 of the EIS.

4.11.2 No-Action Alternative 2

Human Health

No-Action Alternative 2 would have adverse impacts on human health during flood events and from the resulting unhealthy conditions that are created in the flood-damaged areas. Residents in flood-prone areas would be required to follow emergency health precautions to protect their health during and after flood events.

Safety

No-Action Alternative 2 would have temporary adverse effects on human safety from flooding, when flood waters, the evacuation process, and flood cleanup would expose residents and workers to unsafe conditions along the flooded river. There would be continual risks of loss of lives or injuries during flood events under the No-Action Alternative 2, as in 2011 when two elderly residents in Burlington died as the result of the flooding.

4.12 Interim Impacts

With the Requester's Preferred Alternative, flood risk reduction features would be built in phases over the next 25 or more years. As phases are constructed, portions of the project area would be positioned behind new levees and floodwalls, reducing their risk of flooding. However, excluding these areas from the floodplain may cause increases in the frequency, depth, and duration of flooding to areas where the Project has yet to be constructed. The increased flood risk would occur in specific locations throughout the area until all phases of the Project have been completed; these impacts will be referred to as interim impacts in the following section. Interim impacts to most resource areas described earlier would not be appreciably different during the construction of the Project. However, changes in flood depth and area of inundation do have the potential to substantially alter the intensity of flood impacts on structures, which is the focus of this section.

Interim impacts were evaluated for four construction stages (Stages 1, 1.5, 2, and 3). Construction stages are a combination of Project phases, that when combined, would provide independent flood risk reduction for a sizable portion of the project area. A detailed description of the Project stages is provided in Section 4.13 of the EIS.

In the EIS, interim impacts for each construction stage were assessed relative to the primary no-action alternative, which assumes a successful flood fight up to 10,000 cfs. The assessment in this appendix uses the No-Action Alternative 2 as the baseline to measure impacts. Consequently, increases in flood depth and/or duration caused by the Requester's Preferred Alternative, would affect more and more structures with increasing severity. Substantially more structures are inundated during the 10,000 cfs event when no flood fight is assumed for existing and interim Project conditions. Section 4.13.3 of the EIS provides additional information on interim impacts.

4.12.1 Flood Events

Interim impacts were evaluated for the 5,000 cfs, 10,000 cfs and 27,400 cfs flood events. The 5,000 cfs flood event was selected for the following reasons: it is the discharge for which modifications to the Souris River were designed to pass flood flows; it is the FEMA effective 100-year (1-percent annual chance) flood flow for Ward County; and it is the maximum target discharge through Minot that governs releases from Lake Darling Dam and Canadian reservoirs during a flood fight. The 10,000 cfs event was selected because it is FEMA's proposed 100-year flood flow for Ward County as well as being the approximate flow to which the existing discontinuous levees can provide protection by filling the gaps (evaluated as the primary No-Action Alternative in the EIS). The 27,400 cfs flood event was selected because it is the flood of record and the design flood for the Requester's Preferred Alternative.

4.12.2 Summary of Interim Impacts

The Requester's Preferred Alternative would progressively block off areas of the floodplain from inundation. Properties in these areas would have a reduced flood risk, however, blocking off portions of the floodplain would tend to increase the depth of flooding in other areas. Higher flooding would also cause waters to flow into areas that wouldn't flood under existing conditions. Inundation depth changes are shown in a series of maps provided in Attachment B-1 to this appendix. These maps show the areas inundated and the areas that would be taken out of the floodplain and converted to dry land for each construction stage at 5,000 cfs, 10,000 cfs, and 27,400 cfs. The following inundation areas are represented on the maps: areas that would no longer be inundated; areas that would be inundated with water depths expected to be less than 0.1 feet; areas where the inundation depth increases by 0.1 feet to 0.5 feet, and areas where the inundation depth increases by more than 0.5 feet.

Table B4-6 summarizes the approximate number of structures that are located within each of these areas. Structure counts were developed using LiDAR survey and aerial imagery. Counted structures include homes, businesses, garages, sheds, barns, and other outbuildings. The approximate number of affected structures are presented as a range because the number of structures in the project area changes regularly; there are on-going buyouts and the demolition of properties. The structure counts exclude structures that are located within the Project footprint and would need to be purchased prior to construction. There is also uncertainty associated with when a given structure would be flooded. The analysis assumes that the first floor elevation of structures is the LiDAR-based elevation at the centroid of the structure.

At flows of 5,000 cfs there would be few structures affected by changes in inundation during the construction of the Requester's Preferred Alternative.

At 10,000 cfs the majority of increased inundation for structures would occur after the construction of Stages 1.5 and 2. After the construction of Stage 1.5 up to 1,000 structures could have increased inundation of 0.1 to 0.5 feet and approximately 350 to 370 structures would have increases in excess of 0.5 feet. However, the construction of Stage 1.5 would provide flood risk reduction for over 1,500 structures. Construction of Stage 2 would result in about 300 structures with 0.1 to 0.5 feet of increased inundation, while nearly 500 structures would likely see more than 0.5 feet of increased inundation. The number of protected structures would increase to around 2,300 structures with the completion of Stage 2. The construction of Stage 3 would substantially decrease the number of structures adversely affected by increased inundation, while approximately 2,800 structures would be protected.

At flows of 27,000 cfs extensive flooding would occur throughout the project area without construction of substantial flood risk reduction features. Construction of Stage 1 would increase inundation for approximately 5,200, 70, and 80 structures by less than 0.1 feet, 0.1 to 0.5 feet, and more than 0.5 feet, respectively. The number of structures with increased inundation would generally decrease with each sequential stage of construction. However, increases of 0.1 to 0.5 feet would be seen after the construction of Stage 1.5 to around 170 structures and increases of greater than 0.5 feet would be seen at approximately 700 structures. Ultimately, the construction of all stages (i.e., completion of the entire Project) would result in the 5,300 structures no longer being inundated at flows of 27,000 cfs.

Table B4-6 No-Action Alternative 2: Summary of Inundation Changes for Structures

Inundation Changes by Peak Flood Flow[1]	Approximate number of structures inundated during construction of the Project				
5,000 cfs	**Construction Stage 1**	**Construction Stage 1.5**	**Construction Stage 2**	**Construction Stage 3**	**Construction Stage 4**
Less than 0.1 feet[2]	30 to 50	30 to 50	30 to 50	10 to 30	10 to 30
0.1 to 0.5 feet	0	0	0	0	0 to 10
More than 0.5 feet	0	0	0	0	0
No Longer Inundated	0	0	0	10 to 30	10 to 30

10,000 cfs	**Construction Stage 1**	**Construction Stage 1.5**	**Construction Stage 2**	**Construction Stage 3**	**Construction Stage 4**
Less than 0.1 feet[2]	2650 to 2750	80 to 100	10 to 30	10 to 30	60 to 80
0.1 to 0.5 feet	10 to 30	980 to 1000	290 to 310	50 to 70	0 to 20
More than 0.5 feet	0	350 to 370	470 to 490	30 to 50	0 to 20
No Longer Inundated	150 to 170	1510 to 1610	2260 to 2360	2730 to 2830	2750 to 2850

27,400 cfs	**Construction Stage 1**	**Construction Stage 1.5**	**Construction Stage 2**	**Construction Stage 3**	**Construction Stage 4**
Less than 0.1 feet[2]	5120 to 5220	4690 to 4790	580 to 600	220 to 240	50 to 70
0.1 to 0.5 feet	60 to 80	160 to 180	60 to 80	50 to 70	50 to 70
More than 0.5 feet	70 to 90	50 to 70	690 to 710	70 to 90	60 to 80
No Longer Inundated	180 to 200	520 to 540	4130 to 4230	5090 to 5190	to 5370

(1) Maps in Appendix K show the areas that correspond to the four different inundation change categories in this table.
(2) Flood elevation changes of less than 0.1 feet includes areas where the flood elevation decreases.

Changes in the inundation area between the Requester's Preferred Alternative and the No-Action Alternative 2 were calculated for three geographic areas: Upstream of Minot; Minot; and downstream of Minot. Upstream of Minot is defined as areas upstream of the U.S. Highway 83 Bypass bridge to immediately upstream of the confluence of the Mouse and Des Lacs Rivers. Minot is defined as the area between the U.S. Highway 83 Bypass bridge and the U.S. Highway 2 bridge. Downstream of Minot is defined as the area between the U.S. Highway 2 bridge and just downstream of the Thirty-Seventh Avenue SE bridge.

In all geographic areas, the net number of acres inundated was reduced or relatively insignificant for flows throughout the implementation of the Project stages. The amount of newly inundated lands at the conclusion of construction would total approximately 201, 185, and 71 acres for the 5,000 cfs, 10,000 cfs, and 27,400 cfs flows, respectively. However, the amount of land no longer inundated would total 273, 1624, and 2,806 acres under these flows. Figure B4-1 shows the total area inundated for a given flood event in the three evaluation areas (upstream of Minot, Minot, and downstream of Minot). This figure illustrates how the Project would have the biggest reductions of inundation area after construction of

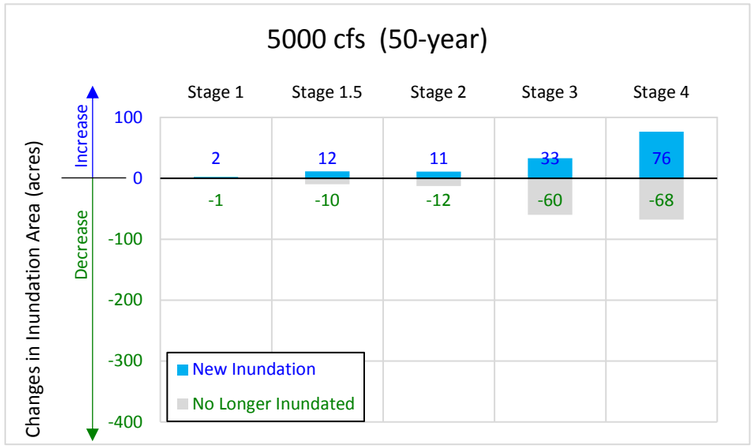
Stage 2 in Minot. Figure B4-2 shows how the Project progressively reduces the area being inundated with minimal inundation area increases in adjacent areas.

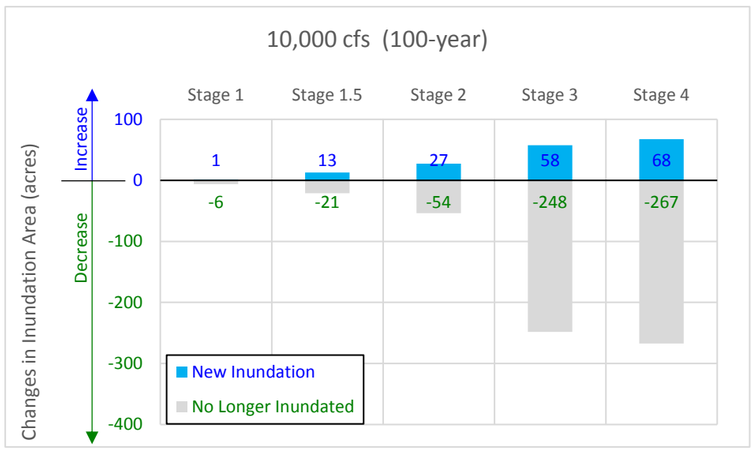
n.c.: no change from existing conditions
5: inundation area increases by 5 acres compared to existing condition
-5: inundation area decreases by 5 acres compared to existing conditions

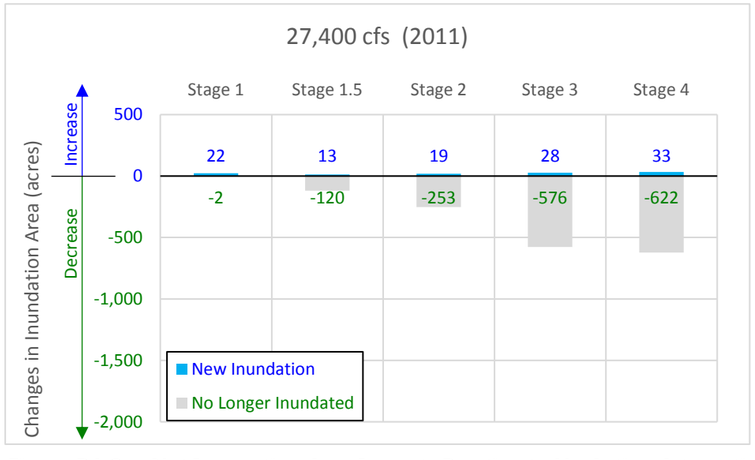
Figure B4-1 Net Inundation Area Changes Relative to No Action Alternative 2 - No Flood Fight

No Action Alternative 2 - No Flood Fight Inundation Area Changes - All Construction Stages 50-year, 100-year, 2011

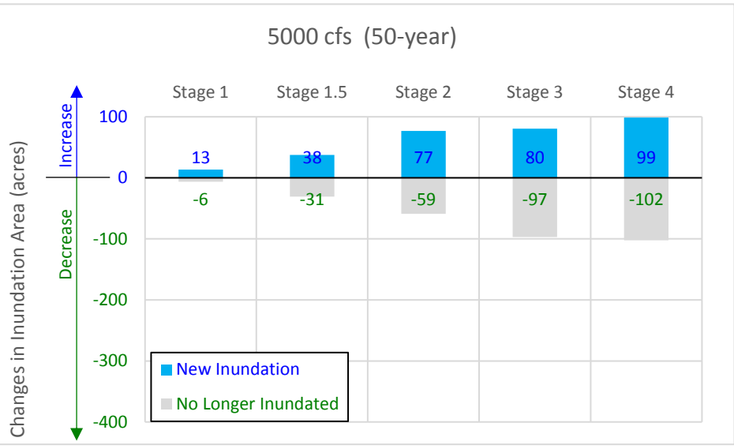
Upstream of Minot

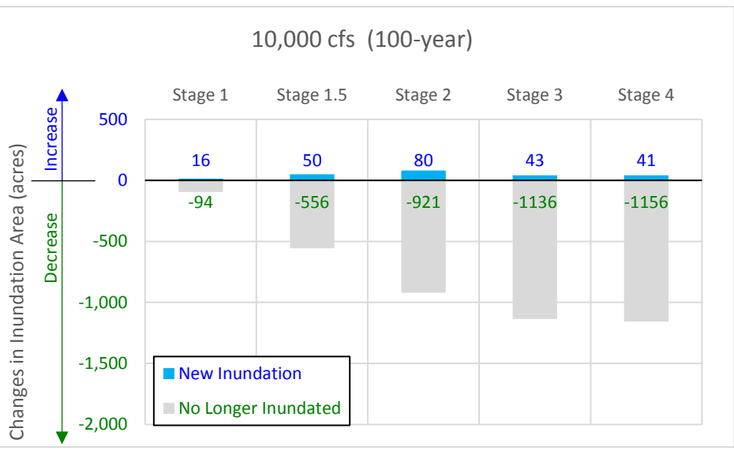


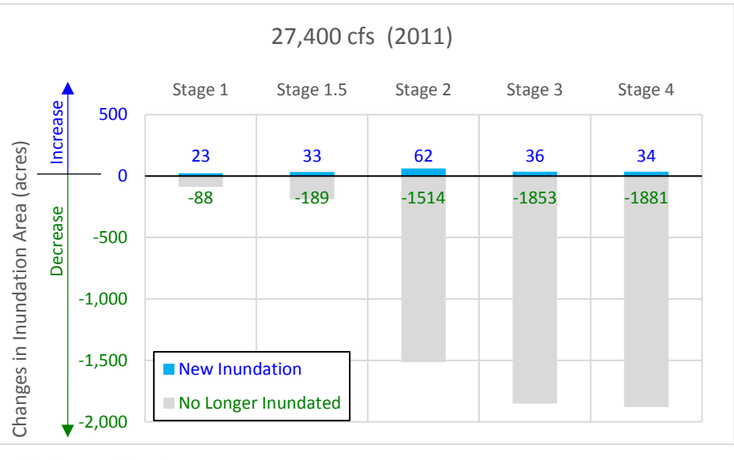




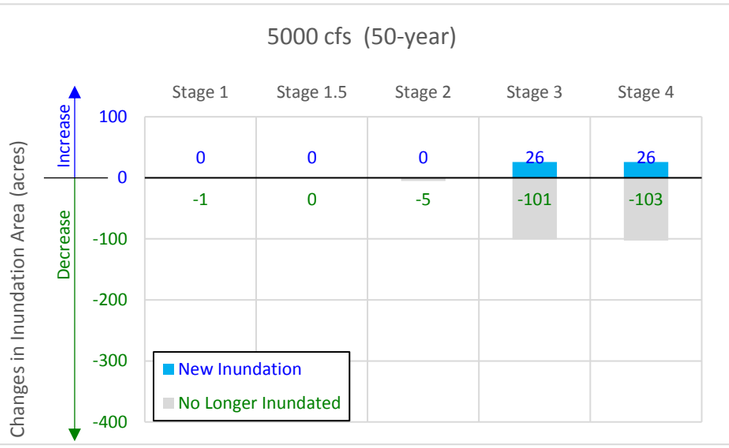
Minot

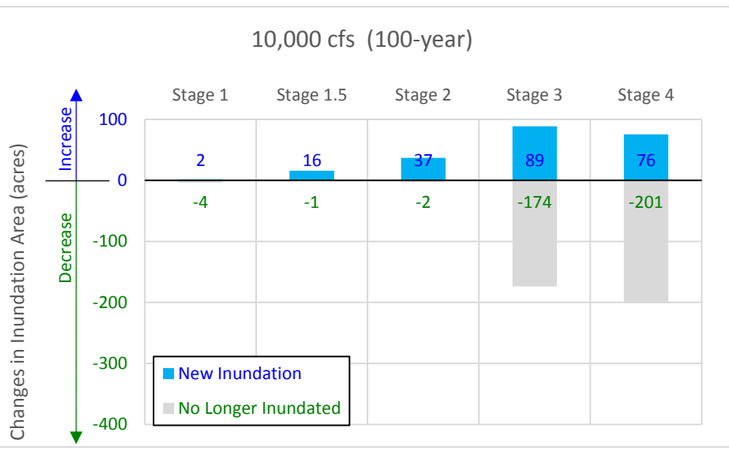






Downstream of Minot





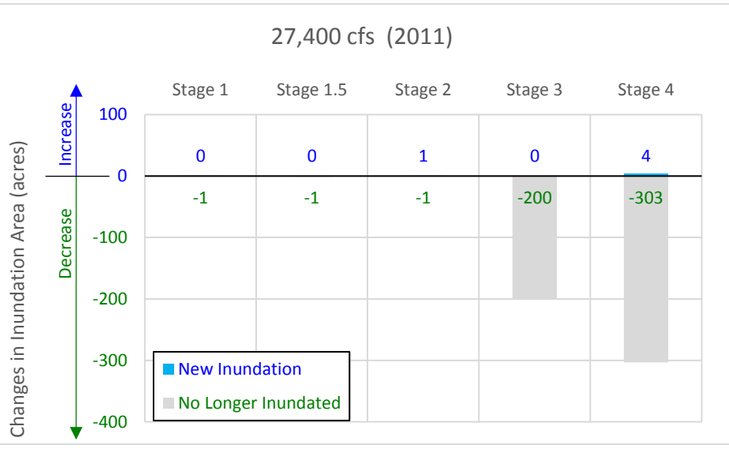


Figure B4-2 Net Inundation Area Impacts Relative to No Action Altnerative 2 - No Flood Fight

5.0 Agency and Public Involvement

Agency coordination and public involvement have been ongoing throughout the development of the Project. See Section 5.0 of the EIS for a comprehensive list of meetings used to obtain agency and public input on the Project.

6.0 Major Findings and Conclusions

In this appendix, the effects of the Requester's Preferred Alternative and the No-Action Alternative 2 have been analyzed for natural and cultural resources, land use and infrastructure, socioeconomics, recreation, aesthetics, and air and noise quality. Generally speaking, construction activities of the Requester's Preferred Alternative would have temporary adverse effects on many of these areas. However, long-term permanent changes would substantially reduce or prevent numerous adverse effects brought about by flooding.

7.0 References

[1] Barr Engineering Co., Ackerman-Estvold Engineering, Moore Engineering and CPS, Ltd, *Mouse River Enhanced Flood Protection Plan – Preliminary Engineering Report,* 2012.

Attachment B-1

Interim Impacts Maps – No Action Alternative 2

CITY OF BURLINGTON

CITY OF MINOT

83

B83

2

B2

B52

52

Number of Structures in Shaded Areas
30 to 50
0
0
0

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 5k-Alt2-Stage1

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

5,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

1

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

Barr Footer: ArcGIS 10.4, 2016-10-10 13:22 File: I:\Client\Mouse_River\Work_Orders\Part_3\Tasks\Hyd_Modeling\Maps\Job2_409Submittal2\20160926_Interim_Impacts\Baseline 1\Map 5k-Alt2-Stage1 5 - Interim Impacts 5k cfs B1 CS-1.mxd User: jrv

CITY OF BURLINGTON

CITY OF MINOT

2

83

B83

B2

B52

52

Number of Structures in Shaded Areas
30 to 50
0
0
0

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 5k-Alt2-Stage1.5

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

5,000 CFS

NO ACTION ALTERNATIVE

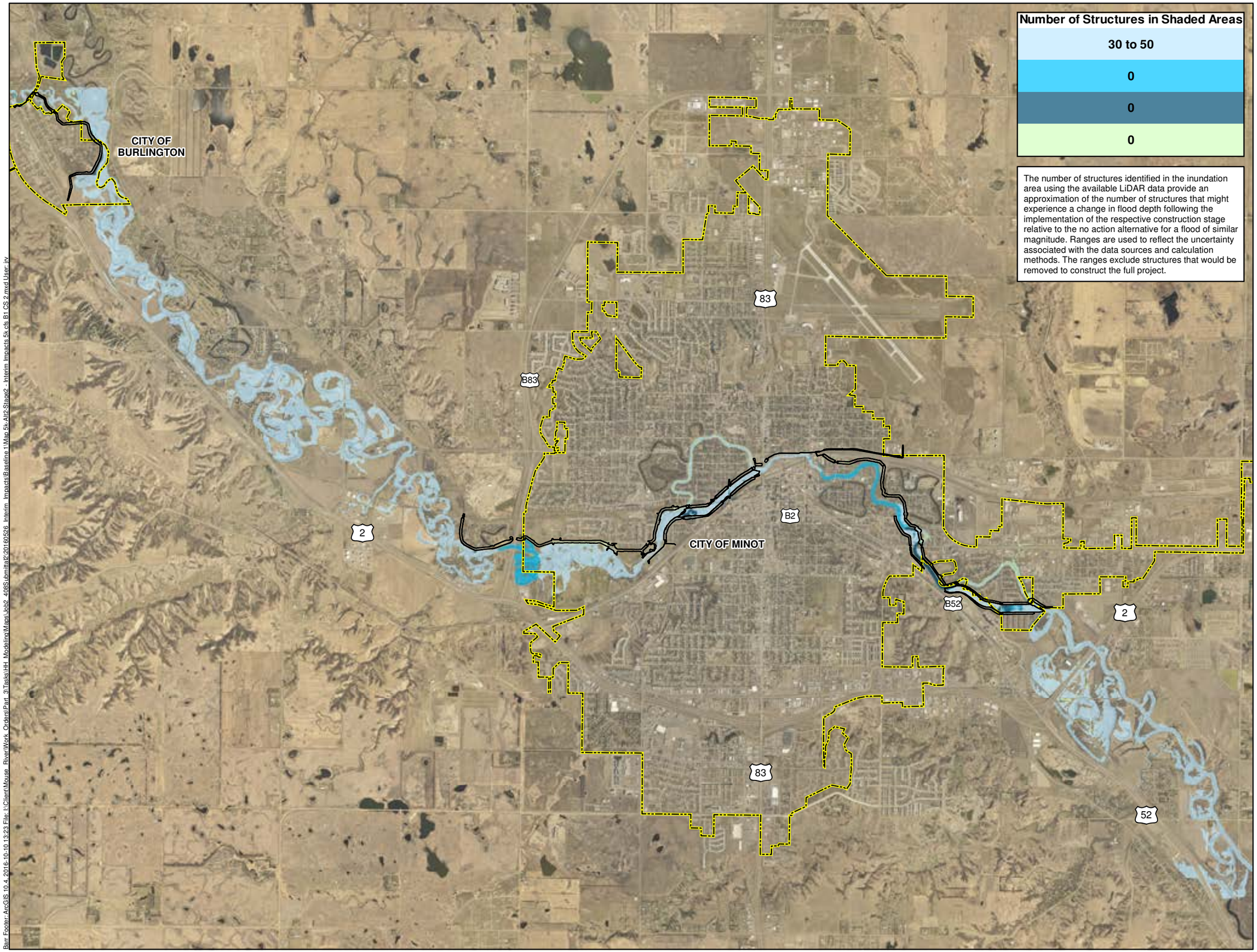
2

CONSTRUCTION STAGE

1.5

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

Esri Footer: ArcGIS 10.4, 2016-10-10 13:05 File: I:\Client\Mouse_River\Work_Orders\Part_3\Tasks\HH_Modeling\Maps\tab2_408\Submittal\20160526_Interim_Impacts\Baseline1\Map 5k-Alt2-Stage1.5 - Interim Impacts 5k cfs B1 CS-1.5.mxd User: jrv



Number of Structures in Shaded Areas
30 to 50
0
0
0

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 5k-Alt2-Stage2

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

5,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

2

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

Esri Footer: ArcGIS 10.4 2016-10-10 13:23 File: I:\Client\Mouse_River\Work_Orders\Part_3\Tasks\HH_Modeling\Maps\tab2_408\S\dmittal\20160526_Interim_Impacts\Baseline1\Map 5k-Alt2-Stage2_ Interim Impacts 5k.efs B1 CS 2.mxd User: rv

CITY OF BURLINGTON

CITY OF MINOT

83

B83

2

B2

B52

52

Number of Structures in Shaded Areas
10 to 30
0
0
10 to 30

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 5k-Alt2-Stage3

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

5,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

3

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

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CITY OF BURLINGTON

CITY OF MINOT

2

83

B83

B2

B52

52

Number of Structures in Shaded Areas
10 to 30
0 to 10
0
10 to 30

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 5k-Alt2-Stage4

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

5,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

4

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

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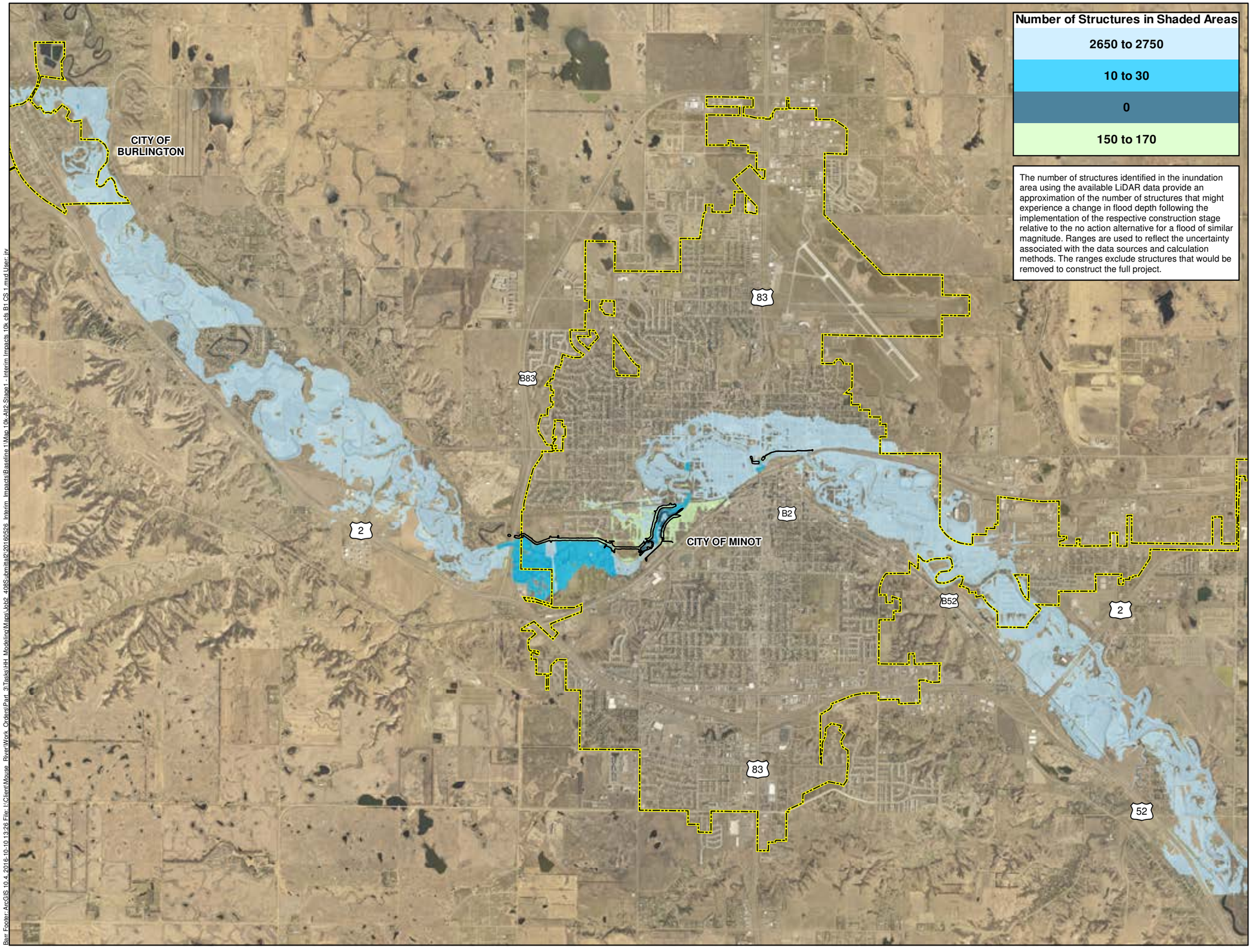

Number of Structures in Shaded Areas
2650 to 2750
10 to 30
0
150 to 170

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 10k-Alt2-Stage1

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

10,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

1

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

CITY OF BURLINGTON

CITY OF MINOT

83

B83

2

B2

B52

52

Number of Structures in Shaded Areas
80 to 100
980 to 1000
350 to 370
1510 to 1610

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 10k-Alt2-Stage1.5

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

10,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

1.5

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

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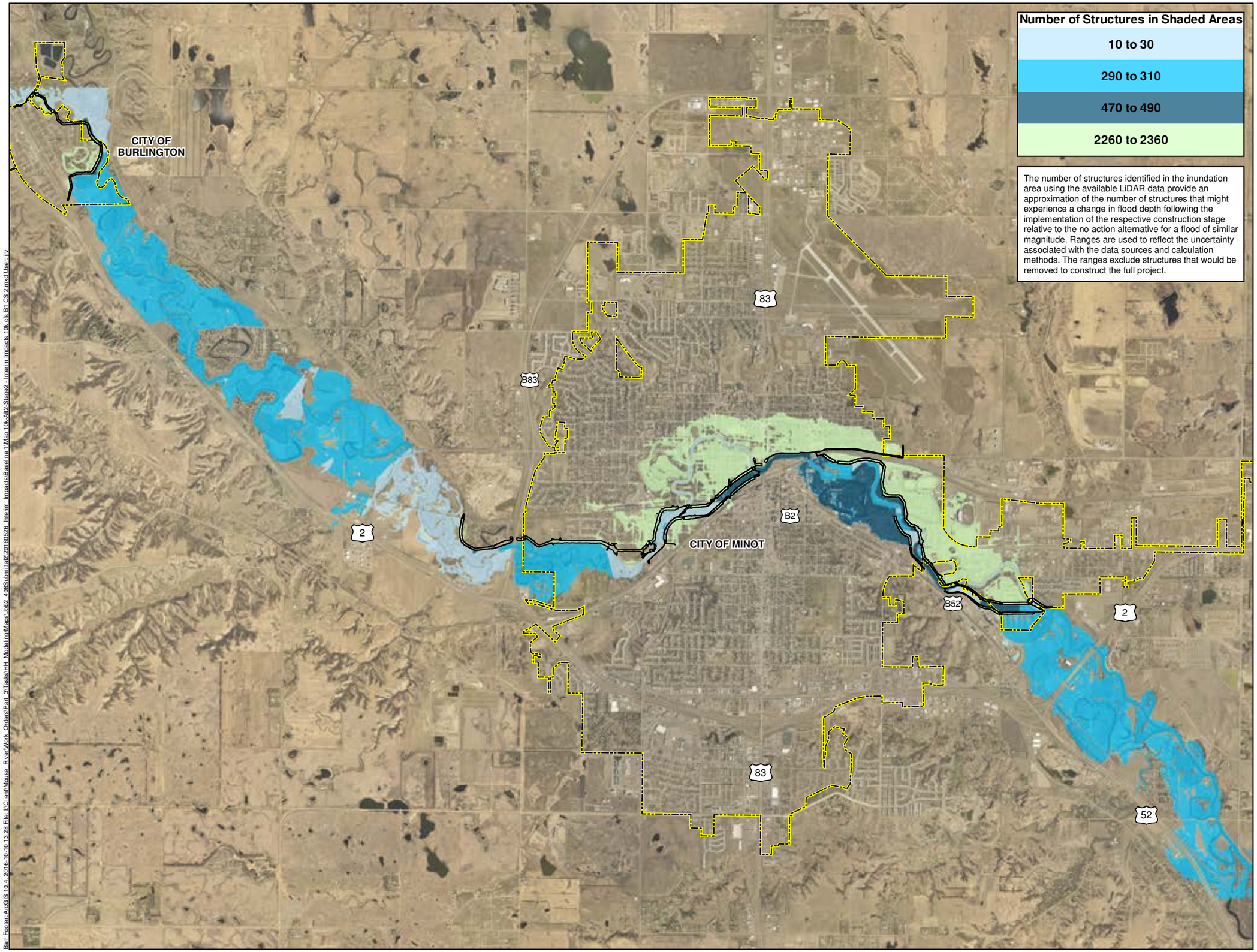


Number of Structures in Shaded Areas
10 to 30
290 to 310
470 to 490
2260 to 2360

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 10k-Alt2-Stage2

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

10,000 CFS

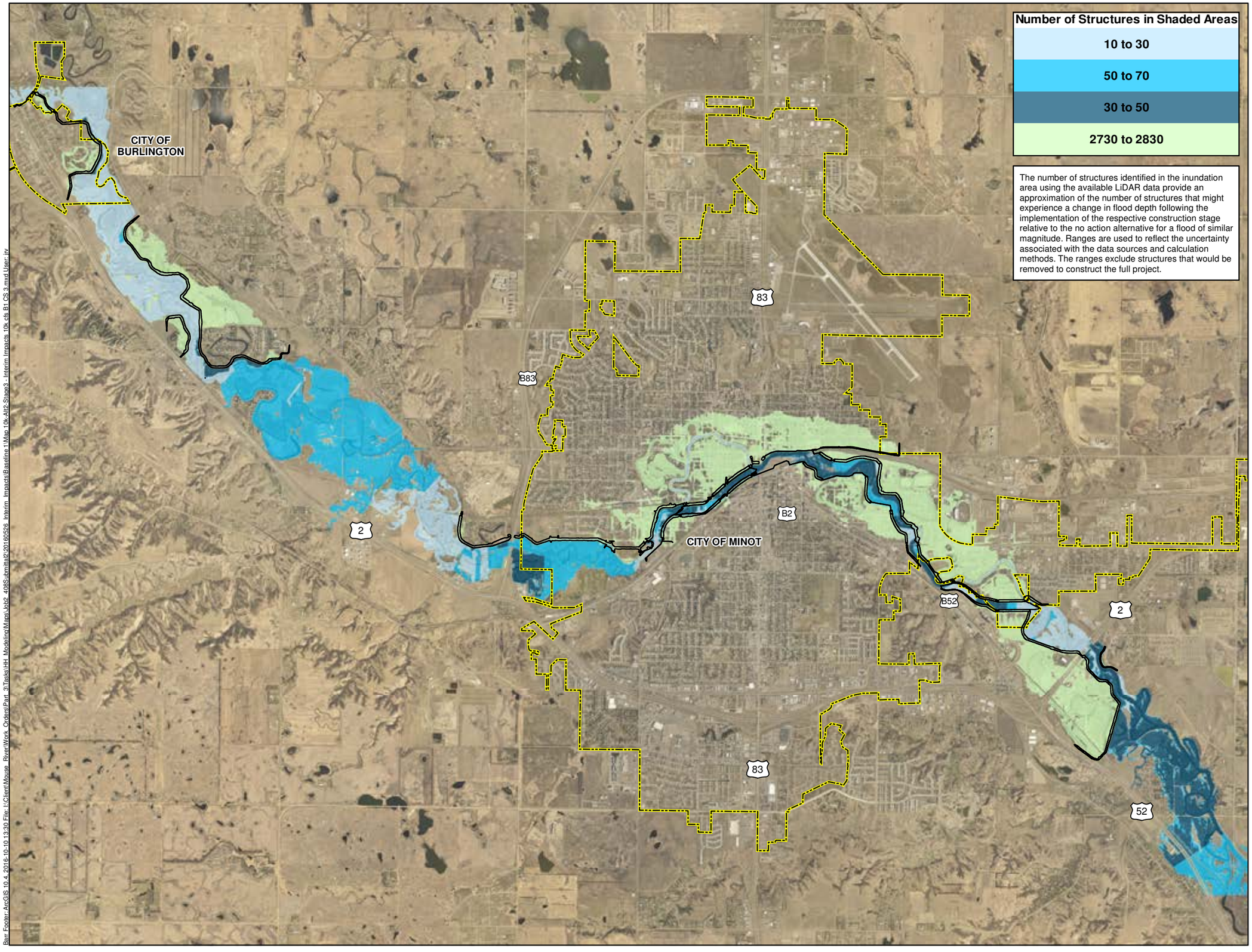
NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

2

Mouse River Enhanced Flood Protection Project
Minot, North Dakota



Number of Structures in Shaded Areas
10 to 30
50 to 70
30 to 50
2730 to 2830

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 10k-Alt2-Stage3

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

10,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

3

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

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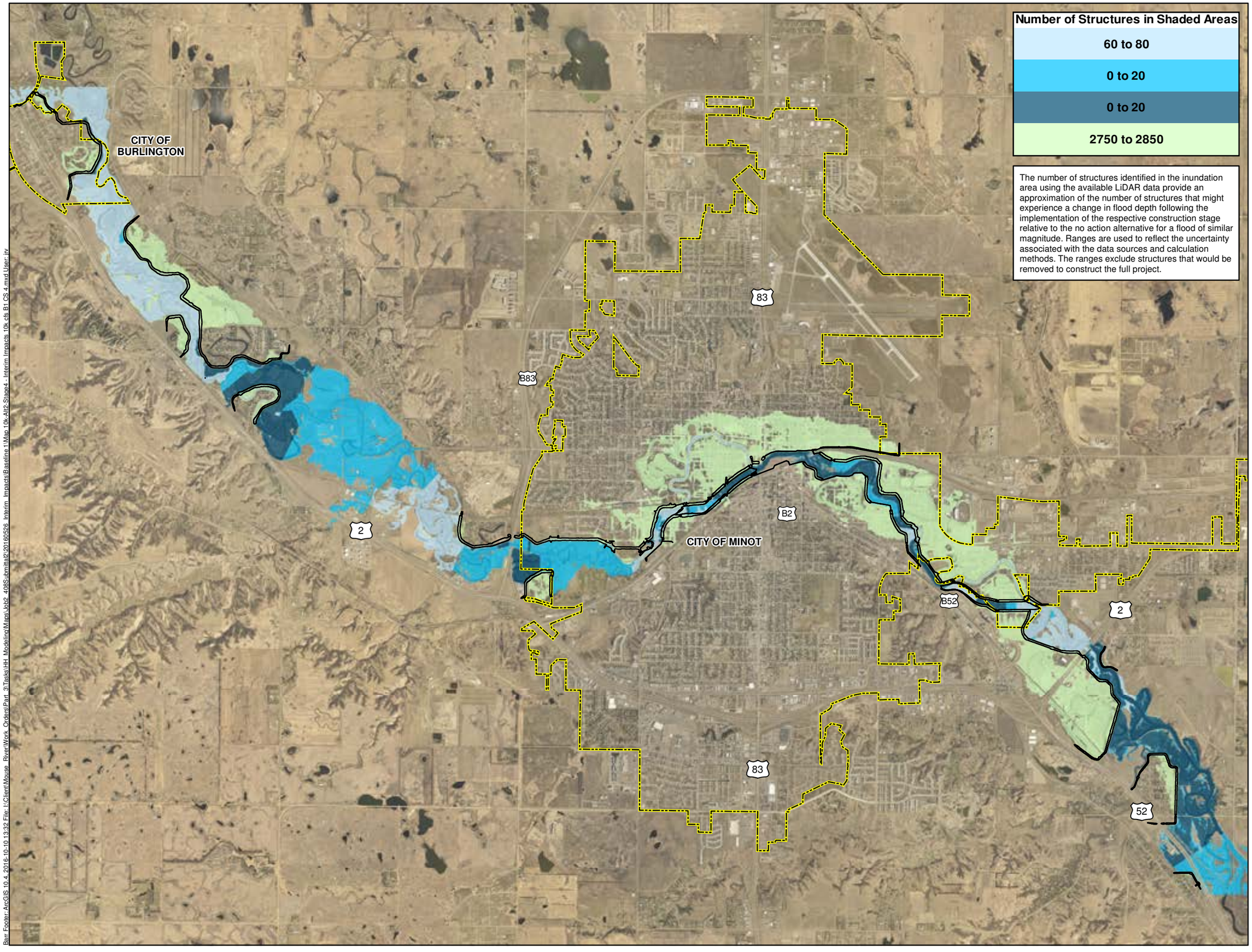

Number of Structures in Shaded Areas
60 to 80
0 to 20
0 to 20
2750 to 2850

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 10k-Alt2-Stage4

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

10,000 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

4

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

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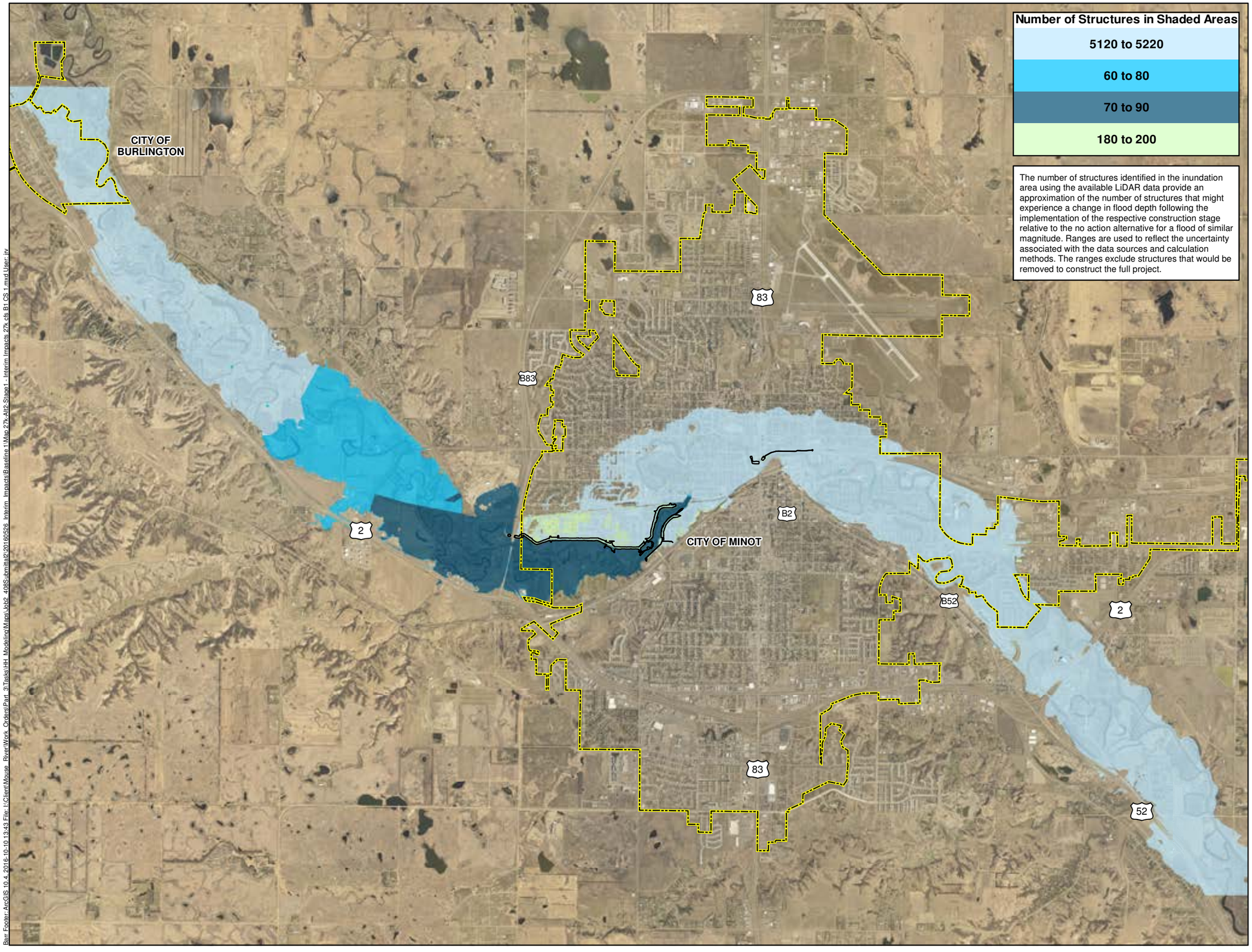

Number of Structures in Shaded Areas
5120 to 5220
60 to 80
70 to 90
180 to 200

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
- Flood Elevation Increase Between 0.1 Feet and 0.5 Feet
- Flood Elevation Increase Greater Than 0.5 Feet
- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 27k-Alt2-Stage1

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

27,400 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

1

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

CITY OF BURLINGTON

CITY OF MINOT

2

83

B83

B2

B52

52

Number of Structures in Shaded Areas
4690 to 4790
160 to 180
50 to 70
520 to 540

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

- Flood Elevation Change Less Than +0.1 Feet
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- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 27k-Alt2-Stage1.5

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

27,400 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

1.5

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

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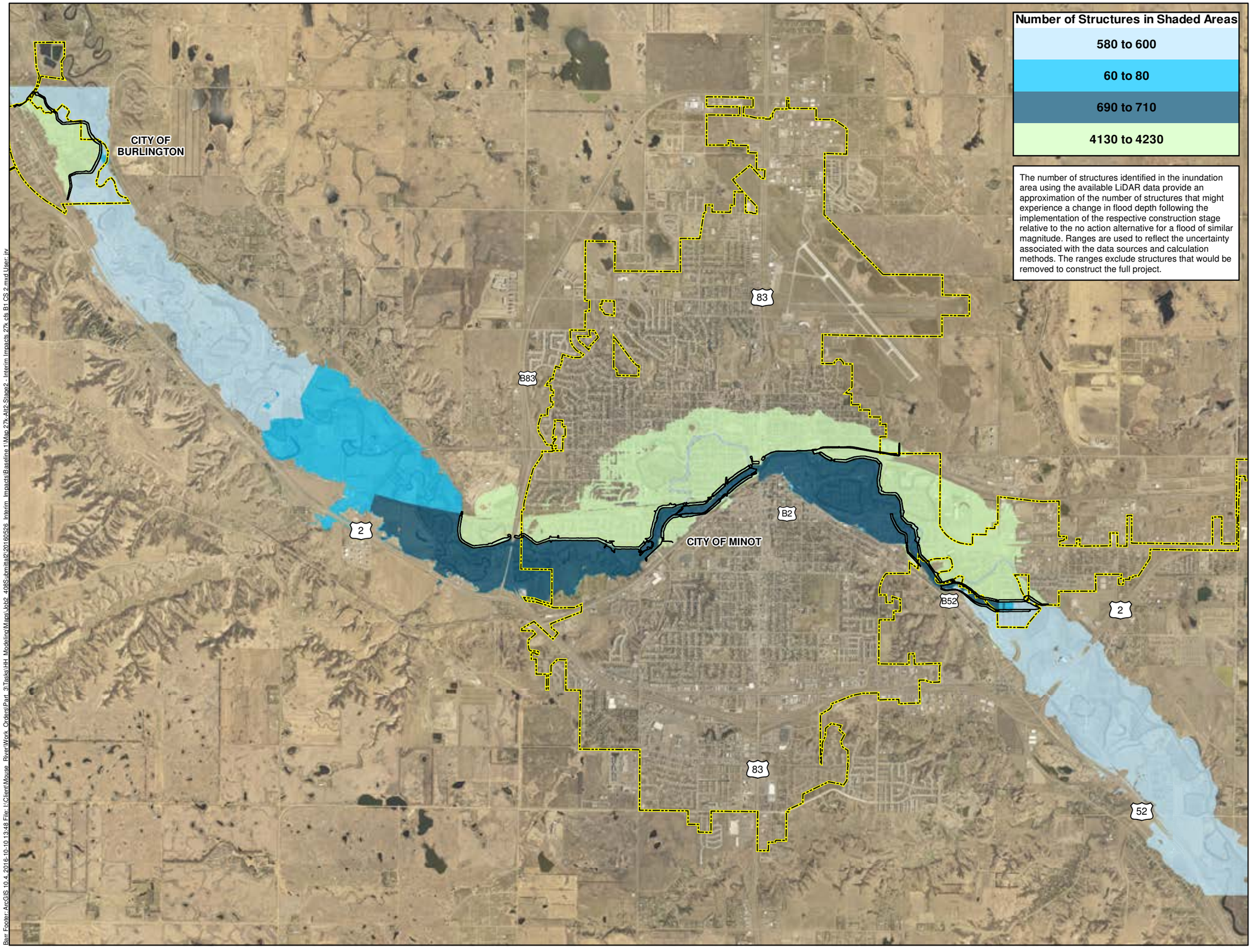

Number of Structures in Shaded Areas
580 to 600
60 to 80
690 to 710
4130 to 4230

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

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- Area No Longer Flooded
- Project Floodwalls and Levees
- Municipality

This map shows areas that could experience a change in flood depths. Flood elevation changes were calculated by subtracting the proposed flood elevation after a given construction stage from the associated no action alternative flood elevation. In newly inundated areas, the flood elevation changes are based on the depth of flooding above existing ground.

N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 27k-Alt2-Stage2

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

27,400 CFS

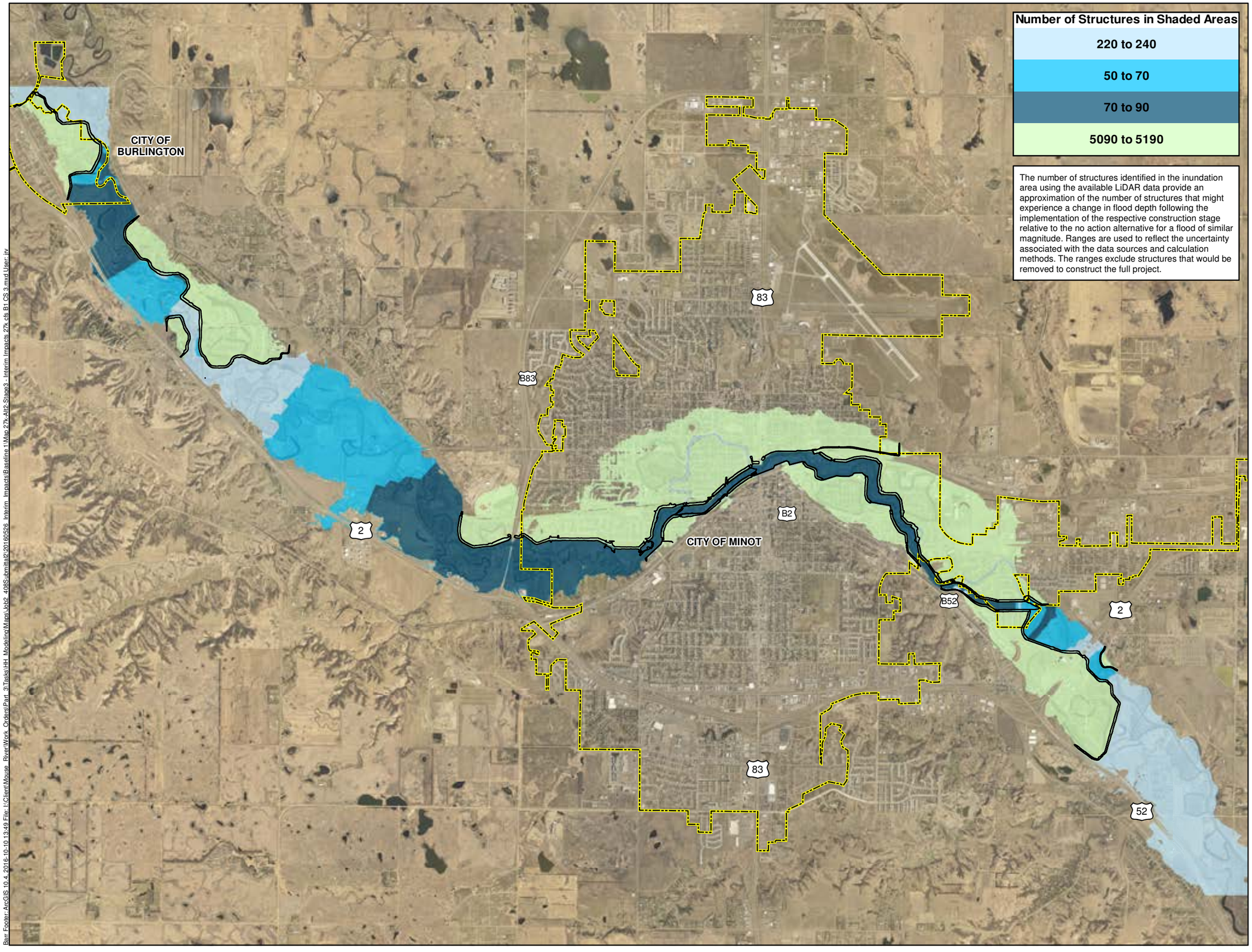
NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

2

Mouse River Enhanced Flood Protection Project
Minot, North Dakota



Number of Structures in Shaded Areas
220 to 240
50 to 70
70 to 90
5090 to 5190

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

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N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 27k-Alt2-Stage3

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

27,400 CFS

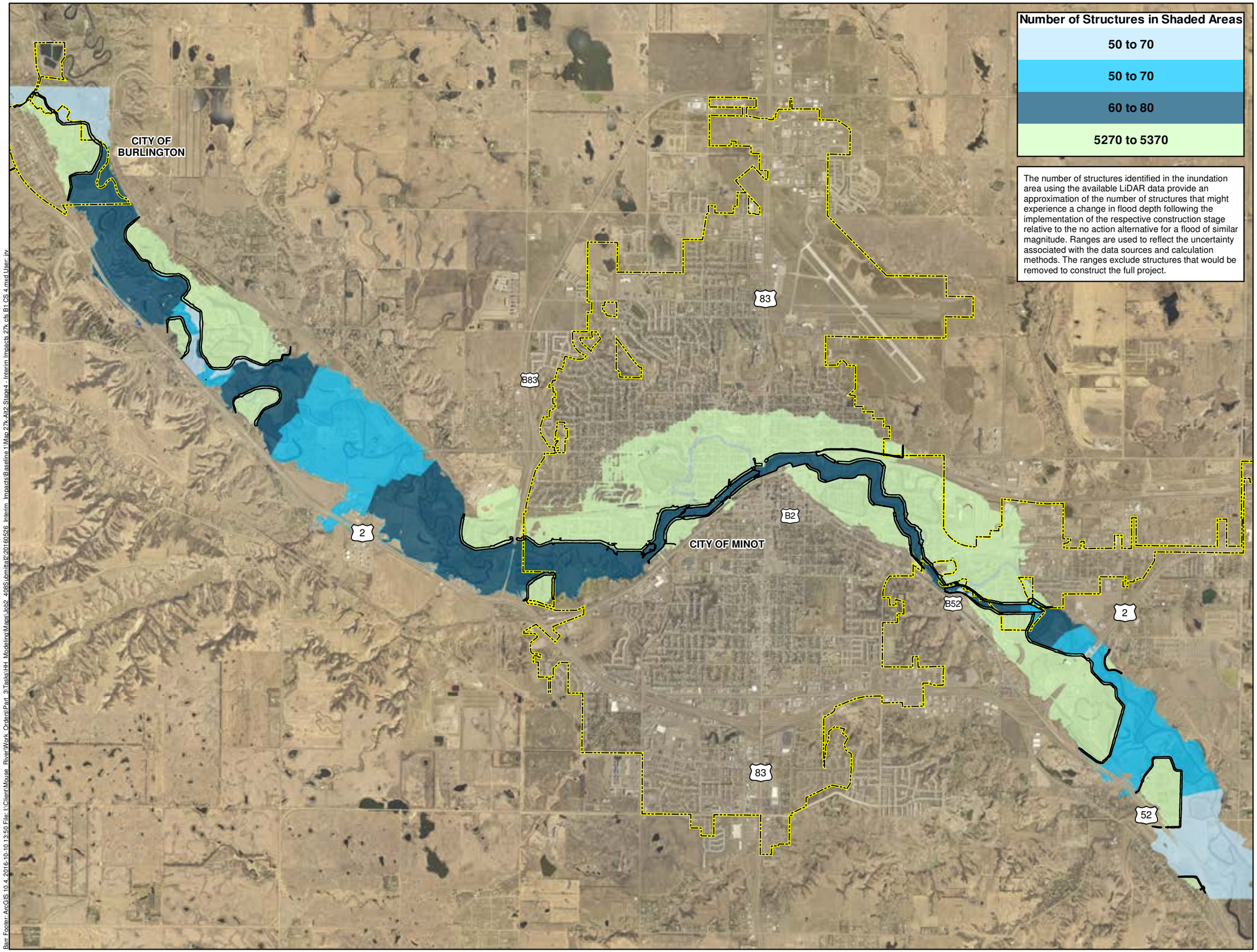
NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

3

Mouse River Enhanced Flood Protection Project
Minot, North Dakota



Number of Structures in Shaded Areas
50 to 70
50 to 70
60 to 80
5270 to 5370

The number of structures identified in the inundation area using the available LiDAR data provide an approximation of the number of structures that might experience a change in flood depth following the implementation of the respective construction stage relative to the no action alternative for a flood of similar magnitude. Ranges are used to reflect the uncertainty associated with the data sources and calculation methods. The ranges exclude structures that would be removed to construct the full project.

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- Municipality

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N

0 2,000 4,000 8,000

Feet

Imagery Source: Ward County, 2015

Map 27k-Alt2-Stage4

INTERIM IMPACTS OF PREFERRED ACTION COMPARED TO NO ACTION ALTERNATIVE: INUNDATION AREA AND DEPTH

FLOOD EVENT

27,400 CFS

NO ACTION ALTERNATIVE

2

CONSTRUCTION STAGE

4

Mouse River Enhanced Flood Protection Project
Minot, North Dakota

Appendix C

Wetlands, Waters, and Biological Inventory Report

WETLANDS, WATERS, and BIOLOGICAL INVENTORY REPORT

Mouse River Enhanced Flood Protection Project

Prepared for:

The Souris River Joint Water Resources Board

Mark D. Aanenson, CWD Certification No. 1001

Donna Jacob, PhD

October 13, 2015

HoustonEngineering Inc.

CONTENTS

ATTACHMENTS

APPENDICES – CONSTRUCTION PHASES

1 GENERAL INTRODUCTION

1.1 PURPOSE OF THIS REPORT

The 2011 flood of the Mouse River overwhelmed most flood protection efforts and caused extensive damage to public infrastructures as well as private property. The community and local governments called for a plan to guide the recovery efforts and identify solutions to better protect the Mouse River community from similar future events. The Souris River Joint Board (SRJB) subsequently requested a project plan be developed for future enhanced flood protection. A preliminary engineer's report (PER) was prepared by Barr Engineering in 2012, (Barr Engineering Mouse River Enhanced Flood Protection Plan Preliminary Engineering Report, February 29, 2012). The PER primary objective was to develop a preliminary plan that can be used as a guiding document to help reduce the risk of damages from river flows comparable to those seen during the June 2011 flood. The study scope covered the area of the Mouse River Valley from Burlington to Velva and Mouse River Park. The SRJB has initiated the implementation of portions of the PER within the area from Burlington, downstream through Minot. Because the project is within a previously authorized federal flood control project and includes federal actions, it is subject to review under the National Environmental Policy Act (NEPA) and the features that are proposed require various regulatory approvals. A programmatic Environmental Impact Statement is being developed for this segment of the PER.

Houston Engineering Inc. has been contracted by the Joint Souris River Water Resources Board to conduct wetland delineations and other environmental assessments for purposes of environmental permitting and environmental review. In order to plan the strategy for fieldwork and permitting, HEI consulted with various agencies during several meetings between October 2014 and May 2015. These agencies include USACE, North Dakota State Historical Preservation Office, United States Fish and Wildlife Service, and North Dakota State Water Commission. Consultation with these agencies is ongoing, and discussions with additional agencies will be initiated as appropriate (National Resources Conservation Service, ND department of Health, City of Minot, City of Burlington, and Ward County).

This report describes the methods and results of four overall tasks: 1) to inventory and delineate wetlands, 2) to delineate the boundary of the ordinary high water mark of the Mouse River and associated features, 3) to inventory and characterize a number of biological resources within the project corridor, and 4) to evaluate the habitats and features of river channel that would be cut off through channel diversions. Information on biological resources included a survey of bird populations at bridge habitats, an inventory of raptor nesting sites, and a tree population inventory at impacted sites.

1.2 ORGANIZATION OF THIS REPORT

The PER identified several different project features throughout the corridor including stormwater ponding sites, earthen levees, channel diversions, floodwalls, and sites targeted for overbank excavation. The footprints and characteristics of these planned features were used to guide and target the fieldwork activities. In addition, three phases of work are currently being designed and prepared for implementation following conclusion of the NEPA process and upon regulatory approvals anticipated in 2016. These phases are identified as the 4th Ave Flood walls, Forest Road, and Napa Valley.

Observations and data were collected for four major categories of information: wetland delineation (Section 3.2), Other Waters inventory (for overbank excavation sites, Section 3.3), descriptions of potential channel cut-off areas (Section 3.4), and biological resources (Section 3.5). After general information is given below regarding the sites and methods, each category is described in more detail (methods and results), followed by attachments containing data collected in the field. At the end of the report, the three phases of work are given their own pull-out section containing results specific for each phase collated from the overall project corridor results. This is intended to facilitate the permitting and construction efforts for maximum efficiency.

1.2.1 ENTIRE PROJECT CORRIDOR

The general project corridor follows the Mouse River's 100-year floodplain outline, excluding the areas that would be protected under the proposed flood protection plan, e.g. levees and floodwalls. The corridor extends from just west of Burlington to southeast of Minot (approximately 14.5 miles total length, **Attachment 1 Project Location Map**). The western boundary crosses the Des Lacs River 0.9 miles from the confluence of with the Mouse River (western fork, 0.3 miles wide), and crosses the Mouse River 0.9 miles north of the confluence (northern fork, 0.6 miles wide, lengths reflect geodesic distance). The corridor then follows the Mouse River, excluding Burlington, the width fluctuating between 435 feet and 0.9 miles, mostly enclosed by ND Highway 2 and County Road 15 W, to the intersection of ND Highway 83 Bypass S (total distance approximately 6.3 miles). The land use in this segment is rural, with some residential developments, farmsteads, pastures, tilled land, small industrial parks, and riparian forested areas. From here, the corridor narrows (range 300-1700 feet) to pass through heavily residential areas and downtown Minot to ND Highway 2 E (total distance approximately 5.9 miles). This segment is predominantly residential and industrial, with only a small area of riparian forest and agricultural land at the eastern end. From there the corridor ends at approximately 0.3 miles beyond 37th Ave SE (total distance approximately 0.2 miles). This segments includes a primarily rural area with agricultural land and riparian forest (width varies between 0.1 and 0.6 miles).

The project corridor includes several existing flood risk reduction modifications in the basin, including dams and flood water storage areas, channel modifications, levees, and pump stations. The new flood protection project will develop enhanced flood protection strategies, including channel modifications, levees, pump stations, and ponding areas. Other areas of specific interest include meanders of the main channel that may be cut off by construction of levees (the King's Court development and near 18th St SE), and a potential ponding site with trees located near 2nd Ave SW.

1.2.2 CONSTRUCTION PHASES

These are three areas (phases) that are targeted for construction begin in 2016. Phase 1 is the project reach near 4th Avenue (4th Ave Floodwalls). Phase 2 is the project reach between 16th Street SW and the Highway 83 Bypass (Napa Valley). Phase 3 is the project reach between the Moose Lodge and 16th Street SW (Forest Road). The proposed construction in each phase is as follows: Phase 1 consists of floodwalls and levees; Phase 2 consists of levees and floodwalls; and Phase 3 consists of levees, floodwalls, and overbank excavation.

2 GENERAL DESCRIPTION OF THE PROJECT SITE

The study area for the Mouse River Enhanced Flood Protection project is located in north central North Dakota within the Mouse River Valley (**Attachment 1 Project Location Map**). The project area occurs along the floodplain of the Souris River and its tributary the Des Lacs River. These areas occur in the Northern Black Prairie Ecological Region (Bryce et.al. 1996). The streams are well entrenched in the project area. At the end of the Pleistocene, they flowed east into glacial Lake Souris (Lemke 1960). Major soils occurring on the floodplain include Ludden, Velva, and Harriet. Theses soils consist of alluvial deposits of clay, silt, and sand. The major surrounding upland soils are Barnes, Buse, and Daren (Soil Survey Staff, 2015). Slumps and landslides are commonly found on the uplands. Many of the area's surface features and natural drainage systems have been altered by anthropogenic processes. This has impacted the soils morphology and hydrology.

This region is characterized by the presence of temporary and seasonal wetlands in addition to riparian wetlands. Many of these wetlands formed as a result of the meandering and flooding of the Mouse River channel and tributaries in the relatively flat landscape, forming numerous depressions, oxbows, and other fluvial features. Several types of wetlands could be affected by project construction, including palustrine forested emergent wetlands, palustrine emergent aquatic bed wetlands, and riverine lower perennial unconsolidated bottom wetlands.

3 METHODS AND RESULTS

3.1 GENERAL METHODS

Science staff from Houston Engineering (Mark D. Aanenson and Donna Jacob) made several visits to the project area (May 18-22, June 22-25, and July 23rd, 2015) for field reconnaissance and data collection. Mike Ulmer of Prairie Soil Consulting LLC accompanied when soil sampling was required.

3.2 WETLAND DELINEATION

This section gives methods and results for data collected over the entire project corridor. For the purpose of optimizing quality results with efficiency of time and cost for this project, the wetland delineation strategy is divided into four parts: A) offsite review of the entire project area (Burlington to Minot), B) detailed wetland delineation of wetlands within the three phases currently scheduled for construction, C) field verification of wetlands within sites planned for structural features (road improvements, levees, floodwalls, etc.) within the remaining project area, and D) wetland delineation and elevation assessment at targeted ponding areas. Each of these parts is described in more detail below.

3.2.1 PART A: OFFSITE REVIEW

3.2.1.1 METHODS

Following guidance from USACE Wetland Delineation Manual (1987), the offsite wetland review consisted of examination of the National Wetland Inventory (NWI, US Fish and Wildlife Service), aerial photography (2010, 2014), NRCS Hydric Soil Ratings (USDA-NRCS), topographic maps, and lidar elevation imagery. Layers for photography, lidar, and NWI were viewed using ArcMap (ArcGIS 10.2.2 and 10.3 ©ESRI) and other layers were added including

boundaries (project corridor, construction phases) proposed construction features (pump stations, floodwalls, levees, high flow diversions, interior ponding areas, and overbank excavation areas).

3.2.1.2 RESULTS

This offsite study identified 117 potential wetland sites (304 total acres) throughout the project corridor (**Attachment 2 Wetlands in Project Corridor**). Most of these features, such as oxbows, resulted from the meandering of the Mouse River in the relatively flat landscape. Some of these wetland areas correspond to the NWI listed wetlands, described below. Regarding the rivers and streams in the corridor, only the Mouse River is listed in NWI. In Burlington the Des Lacs River is the main tributary to the Mouse River. Closer to Minot several smaller tributaries drain into the Mouse River, most of which are unnamed, but the named ones are the Gassman Coulee, the South Branch Coulee, First Larson Coulee, Second Larson Coulee, and Livingston Creek.

The majority of the wetlands identified in the offsite study were not investigated further, but noted in the event of adjusted or additional planned construction activities. Of the total potential wetland sites, eight were located within the targeted construction phase areas (see details in Section 3.2.2 below), and 31 were located at sites of other planned construction (e.g. levees; see details in Section 3.2.3 below). These 39 wetlands were investigated further, either with detailed wetland delineation or field verification.

National Wetland Inventory: Many listed wetlands occur within the project corridor (**Attachment 4 National Wetland Inventory Maps**). The Mouse River is listed as a lower perennial river with an unconsolidated bottom (R2UBH). The most prevalent wetland types within the corridor are palustrine emergent wetlands, either temporarily flooded (PEMA), semi-permanently flooded (PEMF), or seasonally flooded (PEMC), and some of which are partially drained or ditched (PEMCd). Other types of wetlands common in the corridor are and the palustrine aquatic bed type, some semi-permanently flooded (PABF), including diked or impounded (PABFh), excavated (PABFx) or intermittently exposed and excavated (PABGx). Other wetland types include palustrine emergent aquatic bed semi-permanently flooded (PEM/ABF), palustrine forested temporarily flooded (PFOA), and palustrine forested emergent temporarily flooded (PFO/EMA) (codes referencing Cowardin et al. 1979).

Soils: Fine-textured Ludden soils occur in oxbows, depressions, and abandoned meanders. Harriet soils, also fine-textured, are strongly saline and occur on floodplains adjacent to depressions (**Attachment 5 Soil Hydric Rating Maps**). These two soil types are poorly or very poorly drained and are considered hydric soils. Moderately-coarse textured Velva soils, occurring on floodplains, natural levees, and splays in the area, are moderately-well or well drained.

3.2.2 PART B: DELINEATION AT THREE CONSTRUCTION PHASES

3.2.2.1 METHODS

Paired sample point delineation procedures were conducted within the three phases that are the focus of upcoming flood protection construction (4th Ave NE Floodwalls, Forest Road, and Napa Valley). The field wetland delineation (Level 2 delineation) was conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual and the Great Plains Region (Version 2.0) Regional Supplement. Wetland boundaries within the study area were determined by completing USACE Wetland Determination Data Forms for paired test hole points and by observing

vegetation and hydrology in the area. Each test hole point was documented with site photography and GIS positioning using professional Trimble Geo 7x GPS instruments. Personnel conducting these delineations included North Dakota Registered Professional Soil Classifiers.

3.2.2.2 GENERAL RESULTS

The only construction phase which contains wetlands is the Napa Valley area. There are seven here, plus one constructed holding pond (**Table 1**) (**Attachment 2 Wetlands in Project Corridor**, **Attachment 6 – Wetland Delineation Data Forms**, **Attachment 7 – Wetland Site Photographs**). The other two construction phases, the 4th Ave NE Floodwalls and Forest Road areas are more urban than Napa Valley, and contain no wetlands. The predominant soil types within the three construction phases include Velva loams with a hydric rating of 45, and urban land soils with ratings ranging from 3 to 19. Within the construction phase boundaries, there are no tributaries to the Mouse River. Only the Forest Road area includes zones of potential overbank excavation. Information for these transects is located in Section 3.3: Other Waters Inventory.

3.2.3 PART C: FIELD VERIFICATION AT OTHER CONSTRUCTION SITES

3.2.3.1 METHODS

Other construction activities are planned outside the three phases described above, including levees, floodwalls, and road improvements (the potential ponding areas are described in Section 3.2.4). Where these proposed construction sites overlap with wetlands detected during the offsite review, we verified the presence of these wetlands in the field. This verification was done by direct observation of the presence of wetland vegetation and hydrology. This assessment provides information necessary to develop an appropriate approach at the time of these future construction activities.

3.2.3.2 RESULTS

There are 31 wetlands (99.3 acres) that intersect with proposed construction activities (**Attachment 2 Wetlands in Project Corridor)**. These include basins and oxbows that may be impacted with the construction of floodwalls and levees.

3.2.4 PART D: DELINEATION AT PONDING SITES

3.2.4.1 METHODS

Due to the potential for indirect wetland impacts following construction of flood protection structures, sites where ponding may occur (i.e. oxbows, depressions, etc.) also require delineation and assessment of the Ordinary High Water Mark elevation. Because these sites may be used for storage of water during flooding events, the wetland vegetation may be adversely affected by increased water levels and lengthy inundation. The field wetland delineation for these sites was done as in Part B, with test hole points and data forms. The delineation points (OHWM) were also marked with survey lath for subsequent elevation determination.

3.2.4.2 RESULTS

There are 16 areas which are designated as potential ponding sites (110.0 acres). These are sites that are oxbows or cut-off meanders of the river, and which currently hold water and support wetland vegetation (**Attachment 2 Wetlands in Project Corridor**). These sites and the wetland classification are listed in Table 1. Data forms for each

site are located in **Attachment 6 Wetland Delineation Data Forms** and photographs are in **Attachment 8 Ponding Site Photographs**. Another potential ponding site is the site near 2nd Ave SW with planted trees. Because there are no wetlands present there, a delineation was not performed.

Table 1: Ponding sites or wetland sites within the project corridor.

Site number	NWI listed	Cowardin classification	General Description of the Wetland Site	Area of wetland) or ponding site (acres)
1*	no	PEMC	Ponding site	2.48
2	yes	PEMC	Ponding site	6.31
3	yes	PEMC	Ponding site	5.49
4	yes	PEMC	Ponding site	2.80
5	yes	PEMC	Ponding site	2.04
6	yes	PEMC	Ponding site	10.45
7	yes	PABF	Ponding site	10.44
8	yes	PEMA	Riparian Wetland	0.23
9**	no	PEMC	Riparian Wetland	0.03
10**	yes	PEMC	Riparian Wetland	0.34
11	no	PFOA	Riparian Wetland	0.10
12**	no	PFO/EMA	Riparian Wetland	1.46
13	no	PEM/FOA	Riparian Wetland	0.83
14	no	PEMA	Ponding site	1.02
15	yes	R2UBH/PEMC	Riparian Wetland	0.47
16**	yes	PFO/EMA	Riparian Wetland	0.50
17**	no	PEMC	Riparian Wetland	0.10
18**	no	PEMA	Riparian Wetland	0.19
19**	no	PEMF	Riparian Wetland	0.31
20	no	PEMC	Ponding site	24.14
21	no	PEM/FOA	Ponding site	1.68
22	no	PEMA	Channel diversion flow area	2.72
23	yes	PABF	Ponding site	4.69
24	yes	PABF	Ponding site	5.43
25	no	PEMC	Ponding site	2.38
26	yes	PEMC	Ponding site	8.23
27	yes	PABF, PABGx, PEMF	Ponding site	15.84
28	yes	PEMA, PEMC	Ponding site	6.61

** Associated with Des Lacs River, all other sites are Mouse River*
*** Within or adjacent to the boundary of the Napa Valley Construction Phase*

3.3 OTHER WATERS INVENTORY

3.3.1.1 METHODS

Other waters within the project are anticipated to be limited to the Mouse River Channel and its associated fluvial features. These features could include river oxbows directly connecting, or with a limited connection, to the active river channel. The jurisdictional boundary of the Mouse River Channel and any other waters relative to the USACE

Clean Water Act was determined at a number of transects throughout the entire project following Ordinary High Water Mark (OHW) guidance from USACE (2005). This consists of determining the elevation at which the vegetation changes from a predominantly wetland community to an upland community as well as the presence of drift lines and the locations of water marks (stains) on the banks, rocks, or concrete headwalls. Several transects were selected in each area planned for overbank excavations. The locations of transects, photographs, and the OHW data points were georeferenced with a Trimble GPS unit. The OHW points were marked with survey lath for subsequent elevation survey work.

The OHW points were then compared to water surface profiles generated from the hydraulic model as well as lidar information and recent aerial photography. The predicted elevation for the two year flood model (Barr Engineering) was exported and compared to the OHW survey values with a margin of reasonable fluctuation accounting for different flows above and below the two year flood event (Plus 500 cfs and Minus 500 cfs). Because low head dams raise the normal water elevation, the OHW offset was calculated for each reach above a dam and those cross-sections were adjusted from the two year Plus 500 cfs values. The updated cross-section values were mapped and the delineation line compared to various years of imagery (Ward Co 2010 High resolution, 2014 Ackerman High resolution). The lines were adjusted to fit emergent vegetation present in the images.

3.3.1.2 RESULTS

The OHW line was delineated throughout the project corridor, including the seven stretches of the Mouse River banks that have been designated as areas of potential overbank excavation activity **(Attachment 2 Wetlands in Project Corridor)**. Data were collected for a total of 15 transects, and the OHW elevation line determined throughout the project area, (**Attachment 3 Ordinary High Water Mark maps**). The data forms for the OHW determinations are in **Attachment 9 OWH Data Forms** and photographs are located in **Attachment 10 OHW Site Photographs**.

3.4 POTENTIAL CHANNEL CUT-OFF AREA DESCRIPTIONS

3.4.1.1 METHODS

There are two areas of focus where the main channel of the Mouse River may be cut off following construction of levees; the King's Court development west of Minot and the meander located near 18th St SE near the center of the city. These two stretches of the river were observed and a general description of their ecological condition follows.

3.4.1.2 RESULTS

King's Court: The interior bank of the meander, near the houses, consists of a low levee sloping down to the river (Channel cut-off sites 1 and 2, **Attachment 2 Wetlands in Project Corridor**). The bank is composed of riprap and large rocks, channelized, with no natural habitat such as overbanks or mud (Figure 1). The vegetation is composed of predominantly non-native wetland plants and dryland plants growing among the rocks. Saplings of *Fraxinus pennsylvanica* (Green ash) that have germinated have been sprayed with herbicide. The e opposite side of the river appears to have some natural habitat, including mud banks with some natural vegetation and mature trees, but the erosional banks have also been reinforced with riprap.

Meander near 18th St SE: Both sides of the river have been channelized with levees and riprap (Channel cut-off sites 3 and 4, **Attachment 2 Wetlands in Project Corridor**). The interior bank of the meander has developed a mud bank in the depositional area, and there is some natural habitat with both native and non-native vegetation including grasses and some large trees (Figure 1). The outer bank has more riprap exposed, and there is some natural vegetation with grasses, forbs, and trees in a range of sizes.

Site 1 – west side facing southwest

Site 1 – west side facing north

Site 2 – east side facing east

Site 2 – east side facing south

Site 3 – northeast side looking south

Site 4 – northeast side looking west

Figure 1: Photographs of the potential channel cut-off sites, a-d) King's Cross and e-f) 18th St SE.

3.5 BIOLOGICAL RESOURCES

"Critical habitat" as designated by the USFWS are areas for a federally- listed species, and is a defined, finite area or set of areas. Alternatively, "potential habitat" for a federally-listed species includes both USFWS-designated critical habitat and natural conditions that might also be utilized by the species. The USFWS identifies the Mouse River as potential habitat for endangered or threatened species birds, including the Piping Plover (approximately 30 miles west of Minot). There is no designated critical habitat in the area identified as the 2011 inundation zone. Although geospatial analysis showed no documented records of listed species in the area, consultation with the USFWS is necessary to develop plans that minimize potential impacts to biota.

3.5.1 BRIDGE BIRD HABITAT INVENTORY

3.5.1.1 METHODS

Barn swallows (*Hirundo rustica*) and cliff swallows (*Petrochelidon pyrrhonota*), as well as rock pigeons (*Columba livia*), are known to roost opportunistically under bridges and hydraulic structures. Field reconnaissance included visual inspection of all road crossings within the project corridor, and data recorded included nesting use, species present, and estimated nest numbers. Each bridge was photographed and geo-located. Bird species were identified based on their behavior, physical features, and the nest characteristics. Birds flying in the vicinity of bridges were monitored for species identification. Where nests were present, intact nests were counted even if birds not visible. Pigeons roosting were noted, but nests may not have always been visible.

3.5.1.2 RESULTS

Twenty nine bridges were identified and surveyed within the project corridor (**Attachment 2 Wetlands in Project Corridor)**. Of these, twelve hosted no birds or nests, eight were habitat for pigeons, and twelve hosted nests for cliff swallows (**Attachment 11 Bridge Bird Habitat Photographs**). No barn swallows were observed. Of the habitat sites for cliff swallows, the estimated number of nests ranged from 60 to 500, with the greatest number of nests at the Site 29 bridge, located in the furthest eastern part of the project corridor (Table 3).

Table 3: Bridge sites within the project corridor with associated bird species and nest estimates.

Bridge site number	Type	Bird species present	Nest count estimate	Bridge site number	Type	Bird species present	Nest count estimate
1	1	none	none	16	1	none	none
2	1	none	none	17	1	rock pigeons	20-40
3	1	cliff swallows	80-90	18	3	rock pigeons	unknown
4	3	none	none	19	4	none	none
5	1	cliff swallows	450	20	1	cliff swallows rock pigeons	170 unknown
6	2	cliff swallows	60	21	3	none	none
7	2	cliff swallows	60	22	1	cliff swallows rock pigeons	90 unknown
8	2	cliff swallows	60	23	1	cliff swallows	320
9	2	cliff swallows	60	24	2, 4	rock pigeons	unknown
10	1	none	none	25	1	none	none
11	1	rock pigeons	unknown	26	1	cliff swallows rock pigeons	400 unknown
12	1	rock pigeons	10	27	1	none	none
13	1	none	none	28	1	cliff swallows	390
14	4	none	none	29	1	cliff swallows	400-500
15	1	none	none				

[1] concrete vehicle bridge, [2] utility vehicle bridge, [3] Railway bridge, [4] footbridge

3.5.2 RAPTOR NEST INVENTORY

3.5.2.1 METHODS

The goal of field reconnaissance was to identify and document raptor nests (primarily bald eagles) within the corridor. Bald eagles prefer large rivers and lakes bordered with mature stands or old-growth trees such as cottonwood. Breeding habitat often includes some type of edge and relatively open canopy. The large nests are usually built within the top quarter of tall, living trees. Nests are relatively close to water, typically less than two kilometers. Field staff visually inspected, using binoculars, the project corridor for suitable habitats, suitable roost trees, and presence of nest structures and birds at each wetland, other waters, bridge, and recreational site.

3.5.2.2 RESULTS

No raptor nests were observed. However, optimum nest sighting is during the period when deciduous trees have shed their leaves. Because fieldwork described in this report occurred during May and June, it is possible nests may have been obscured by the presence of foliage. Also, observations were made from the ground at the various data sites, meaning several areas did not receive thorough assessment, including the following: the area furthest east in the corridor beyond 87th St NW in Burlington, the area north of Burlington north of the river, the area between OHW Site 2 and wetland Site 3, the area between King's Court development and OHW Site 6, and between OHW Site 15 and Bridge 29 **(Attachment 2 Wetlands in Project Corridor**). Additional raptor nest inventory may be necessary outside the growing season and over a larger area. Within the construction phases, which were inspected more thoroughly and are located in areas of greater human activity, no raptor nests were observed.

3.5.3 TREE POPULATION INVENTORY

3.5.3.1 METHODS

Because the North Dakota Game and Fish Department, in association with the USACE permitting process, has indicated the importance of tree populations in the state and has used a tree replacement metric for past projects, we anticipated the need for an initial estimate of trees in the project areas. From the construction plans and aerial photographs, sites at which trees will be impacted were selected. At the two sites where natural communities are located, naturally occurring tree communities are defined here as those that show a random distribution (not planted by humans) with accompanying understory vegetation (shrubs and forbs) which are not controlled by spraying or mowing. Tree species and frequency were surveyed within quadrats (30 ft. radius unless otherwise specified, trees defined as 3 inch diameter at breast height) to determine the population of trees in the area. With this information, the surface area of proposed construction (with a buffer of 50', including levees, floodwalls, and channel diversion areas) or overbank excavation was determined, and the number of trees affected was extrapolated. These results give an estimate of the number and species of trees potentially impacted by the construction in the corridor. At a third site it was observed ornamental trees had been planted, resulting in an artificial distribution. The typical survey quadrat technique is not appropriate here and a thorough tree inventory will be required at a later date if necessary.

3.5.3.2 RESULTS

2nd Ave SW Tree area – area of proposed pond for water retention: This area is a small, triangular plot (5.4 acres, Tree site 1, **Attachment 2 Wetlands in Project Corridor**) containing planted trees of a large variety of species, including ornamental and fruit trees (Figure 2). Some of the species found here include *Acer ginnala* (Amur maple), *Acer negundo* (Box elder), *Elaeagnus angustifolia* (Russian olive), *Fraxinus pennsylvanica* (Green ash), *Malis pumila* (apple), Pine species (several), *Populus tremuloides* (Quaking aspen), *Prunus* species (plum), *Quercus macrocarpa* (Burr oak), *Salix* species (willows), and *Tilia americana* (American basswood). If this area is to be impacted by construction activities, we recommended that a more complete tree inventory be conducted.

Naturally occurring stands of trees: Naturally occurring trees in North Dakota are limited typically to a small group of species. At the first natural sampling site (Tree site 2, **Attachment 2 Wetlands in Project Corridor,** Figure 2), the quadrat contained twelve *F. pennsylvanica* individuals and three *A. negundo*. Other species observed nearby were one *Q. macrocarpa* and many *Populus deltoides* (Cottonwood) saplings. The second site (Tree site 3) (75' radius) contained six *A. negundo* individuals, four *F. pennsylvanica,* one *Q. macrocarpa,* and one *Prunus virginiana* (Choke cherry). This results in a mean number of individuals per acre as follows: 97.5 *F. pennsylvanica*, 30.5 *A. negundo*, 1.25 *Q. macrocarpa*, and 1.25 *P. virginiana*. These estimates may be somewhat overestimated at locations of floodwalls, levees, and channel diversion areas because these construction activities are located in more built up areas and less frequently in natural stands of trees.

The estimated area of overbank excavation in the project corridor is approximately 41.4 acres. The total estimated area for other construction activities is approximately 69.7 acres. Table 4 shows the areas of potential tree impact and the estimated numbers of trees affected.

Table 4: Areas of potential natural tree impacts, location, and description.

Location of proposed construction area with trees	**Estimated area of construction impact (acres)**	**Estimated impact (number of individuals)**			
		Fraxinus pennsylvanica (Green ash)	*Acer negundo (Box elder)*	*Quercus macrocarpa (Burr oak)*	*Prunus virginiana (Choke cherry)*
Overbank excavation areas	41.4	4,040	1,270	52	52
Other construction areas including levees, floodwalls, and channel diversion areas (including 50 ft. buffer)	69.7	6,800	213	87	87
Sum estimated acres	111	10,840	1,483	139	139
	Total number of trees	12,600			

Tree Site 1, 2nd Ave SW, potential ponding area

Tree Site 2, near OHW 7

Tree Site 3, near OHW 14

Trees near OHW 1

Trees potentially impacted by King's Cross levee

Trees in potential ponding areas (Site 25w)

Figure 2: Photographs of tree sites and examples of impacts

4 REFERENCES

Bryce, S.A., Omernik, J.M., Pater, D.A., Ulmer, M., Schaar, J., Freeouf, J., Johnson, R., Kuck, P., and Azevedo, S.H., 1996, Ecoregions of North Dakota and South Dakota, (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service. http://www.fws.gov/wetlands/_documents/gNSDI/ClassificationWetlandsDeepwaterHabitatsUS.pdf

Lichvar, R.W. 2014. The National Wetland Plant List. 2014. Wetland Ratings. Available on line at: http://wetland_plants.usace.army.mil/

Lemke, Richard W. Geology of the Souris River Area North Dakota. 1960. Geo Survey Prof. Paper 325.

Schoeneberger, P.J., Wysocki, D.A., Benham, E.C. and Broderson, W.E. 2002. Field Book for describing and sampling soils. Ver. 2.0. NRCS-USDA.

U.S. Army Corps of Engineers, March 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0). http://www.usace.army.mil/missions/civilworks/regulatoryprogramandpermits/reg_supp.aspx

U.S. Army Corps of Engineers. 1987. US Army Corps of Engineers Wetlands Delineation Manual. Available on line at: http://www.wetlands.com/regs/tlpge02e.htm

U.S. Army Corps of Engineers. 2012. North American Digital Flora, National Wetlands Plant List. Available on line at: http://rsgisias.crrel.usace.army.mil/NWPL/ (Accessed June 2015)

U.S. Army Corps of Engineers. 2005. Ordinary High Water Mark (OHWM) Appendix H, RGL 05-05. Available on line at: http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/app_h_rgl05-05.pdf (Accessed June 2015)

U.S. Department of Agriculture – Natural Resource Conservation Service. Soil Survey of Ward County, North Dakota. http://websoilsurvey.nrcs.usda.gov/app/ (Accessed July 2015)

U.S. Department of Agriculture – Natural Resource Conservation Service. 2010. Field Indicators of Hydric Soils in the United States A Guide for Identifying and Delineating Hydric Soils, Version 7.0. ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric_Soils/FieldIndicators_v7.pdf

U.S. Department of Agriculture – Natural Resource Conservation Service. Plants Database. http://plants.usda.gov/ (Accessed June 2015)

U.S. Department of Agriculture – Natural Resource Conservation Service. Soil Survey Staff. 1982. Soil Survey Manual. 430-V, Issue 2. Washington, DC., U.S. Govt. Printing Office.

U.S. Department of Agriculture – Natural Resource Conservation Service. Soil Survey Staff. 2006. Keys to Soil Taxonomy, 10th Addition.

U.S. Fish and Wildlife Service. National Wetlands Inventory. http://www.fws.gov/wetlands/Data/Mapper.html (Accessed June 2015)

U.S. Geological Survey. USGS Topographic Map. http://viewer.nationalmap.gov/viewer/ (Accessed July 2015

ATTACHMENT 1

PROJECT LOCATION MAP

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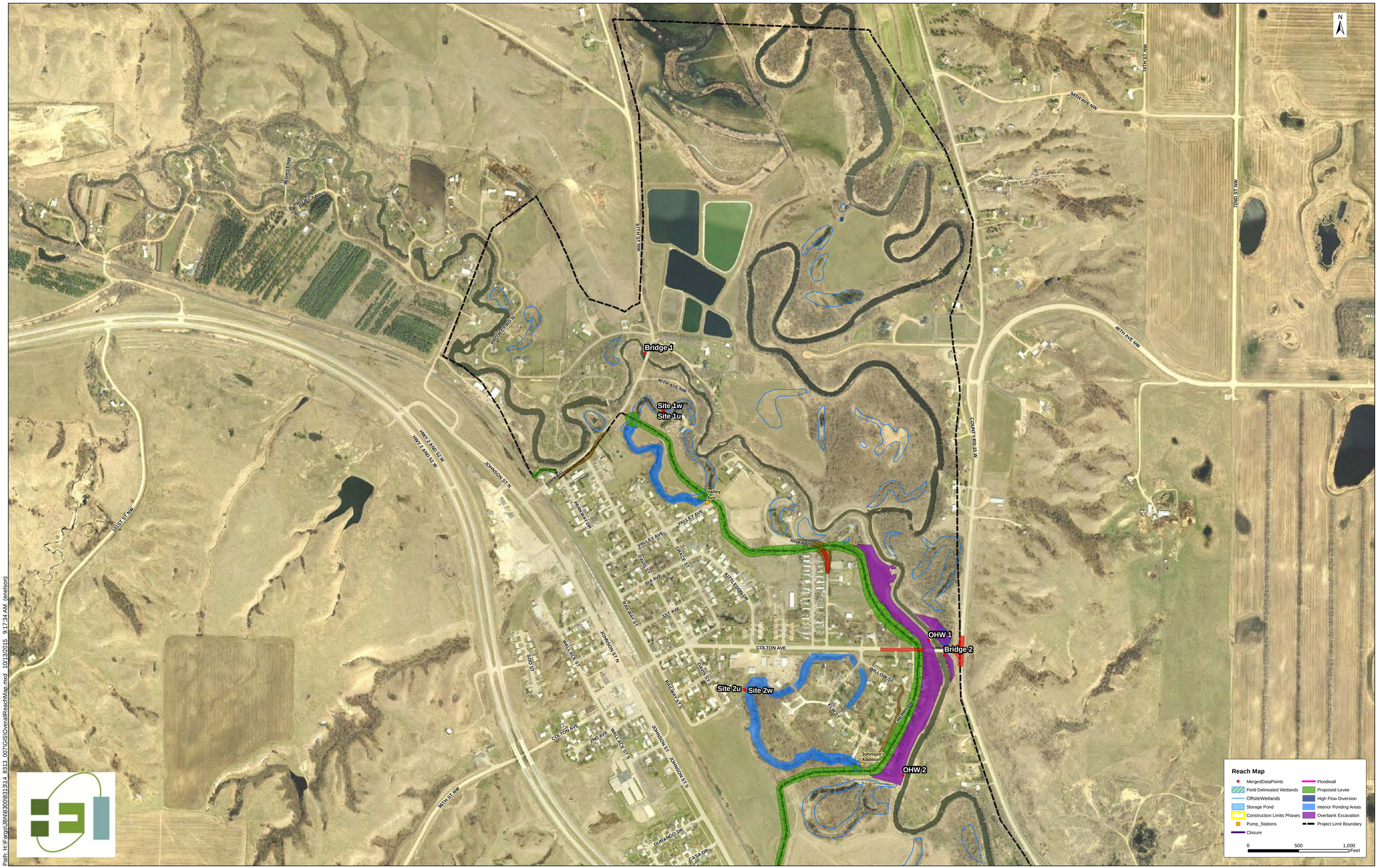
ATTACHMENT 2

WETLANDS IN PROJECT CORRIDOR



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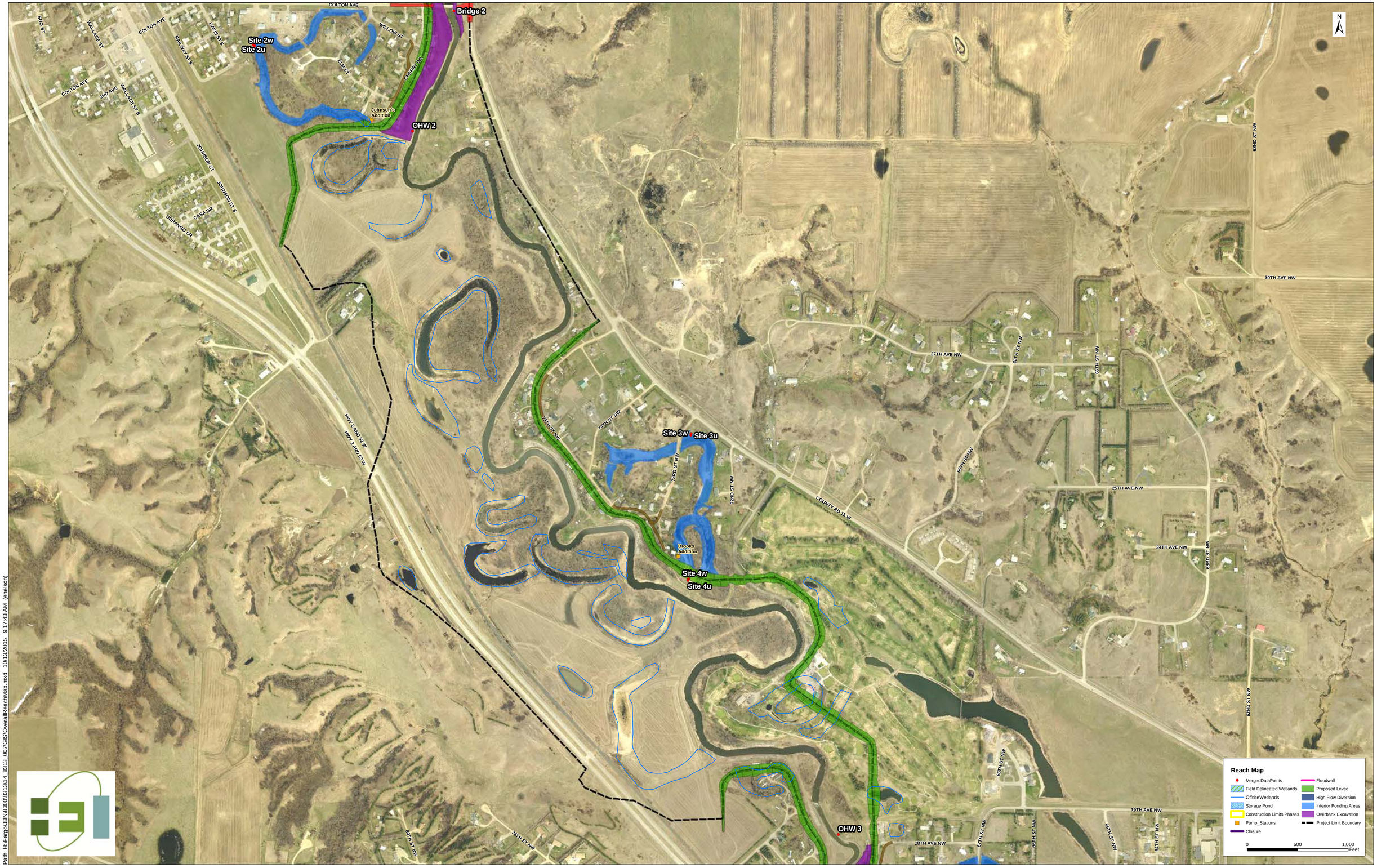

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Site 4w
Site 4u
OHW 3
Site 5w
Site 5u
Talbotts Nursery
Site 6w
Site 6u
OHW 5
OHW 4
Channel Site 1
Channel Site 2
Bridge 3
King's Court
Country Club Acres
Kings Court
63RD ST NW
62ND ST NW
56TH ST NW
19TH AVE NW
COUNTY RD 15 W
ROLLING HILLS DR
66TH ST NW
67TH ST NW
65TH ST NW
64TH ST NW
57TH ST NW
18TH AVE NW
17TH AVE NW
16TH AVE NW
68TH ST NW
76TH ST NW
22ND ST NW
HWY 2 AND 52 W
69TH ST NW
14TH AVE NW
50TH ST NW
10TH AVE NW
48TH ST NW
9TH AVE NW
8TH AVE NW
7TH AVE NW
54TH ST NW
5TH AVE SW
4TH AVE NW
N

Reach Map

- MergedDataPoints
- Field Delineated Wetlands
- OffsiteWetlands
- Storage Pond
- Construction Limits Phases
- Pump_Stations
- Closure
- Floodwall
- Proposed Levee
- High Flow Diversion
- Interior Ponding Areas
- Overbank Excavation
- Project Limit Boundary

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OHW 4

Channel Site 1

Channel Site 2

Kings Court

King's Court

Bridge 3

Bridge 4

Site 9u

Site 9w

Terrace to Valley

9TH AVE NW

7TH AVE NW

5TH AVE NW

65TH ST NW

COUNTY RD 15 W

10TH AVE NW

48TH ST NW

HIGHVIEW AVE NW

HILLTOP ST NW

HARMONY CT

HARMONY ST NW

HOMESTEAD RD NW

4TH AVE NW

45T ST NW

54TH ST NW

5TH AVE SW

62ND ST SW

HWY 2 AND 52 W

NOEL AVE

FRONTAGE RD

COUNTY RD 17

COUNTY RD 12 W

14TH AVE SW

34TH ST SW

7TH AVE SW

36TH ST SW

37TH ST SW

HWY 82 & 9

N

Reach Map

- MergedDataPoints
- Field Delineated Wetlands
- OffsiteWetlands
- Storage Pond
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- Floodwall
- Proposed Levee
- High Flow Diversion
- Interior Ponding Areas
- Overbank Excavation
- Project Limit Boundary

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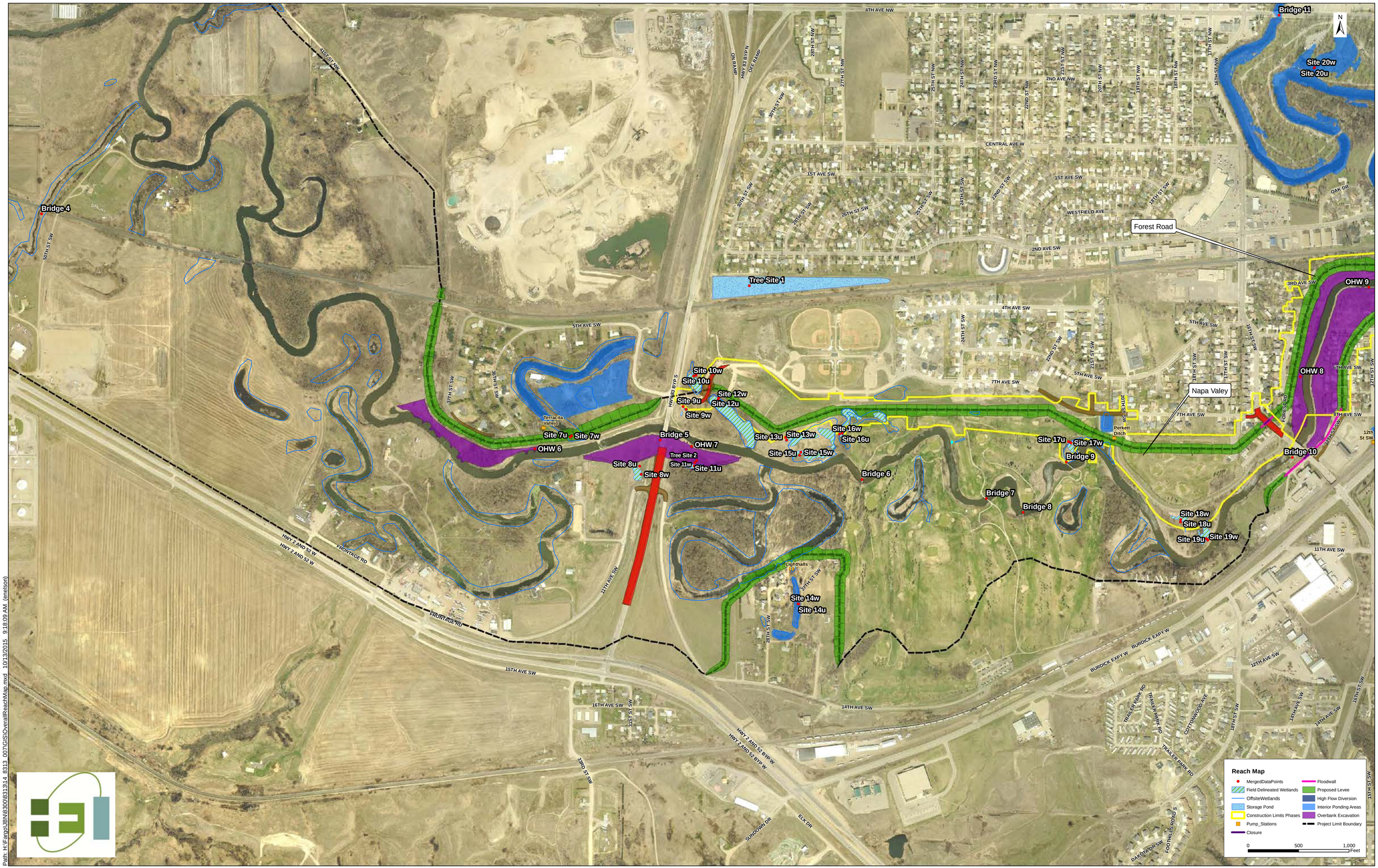

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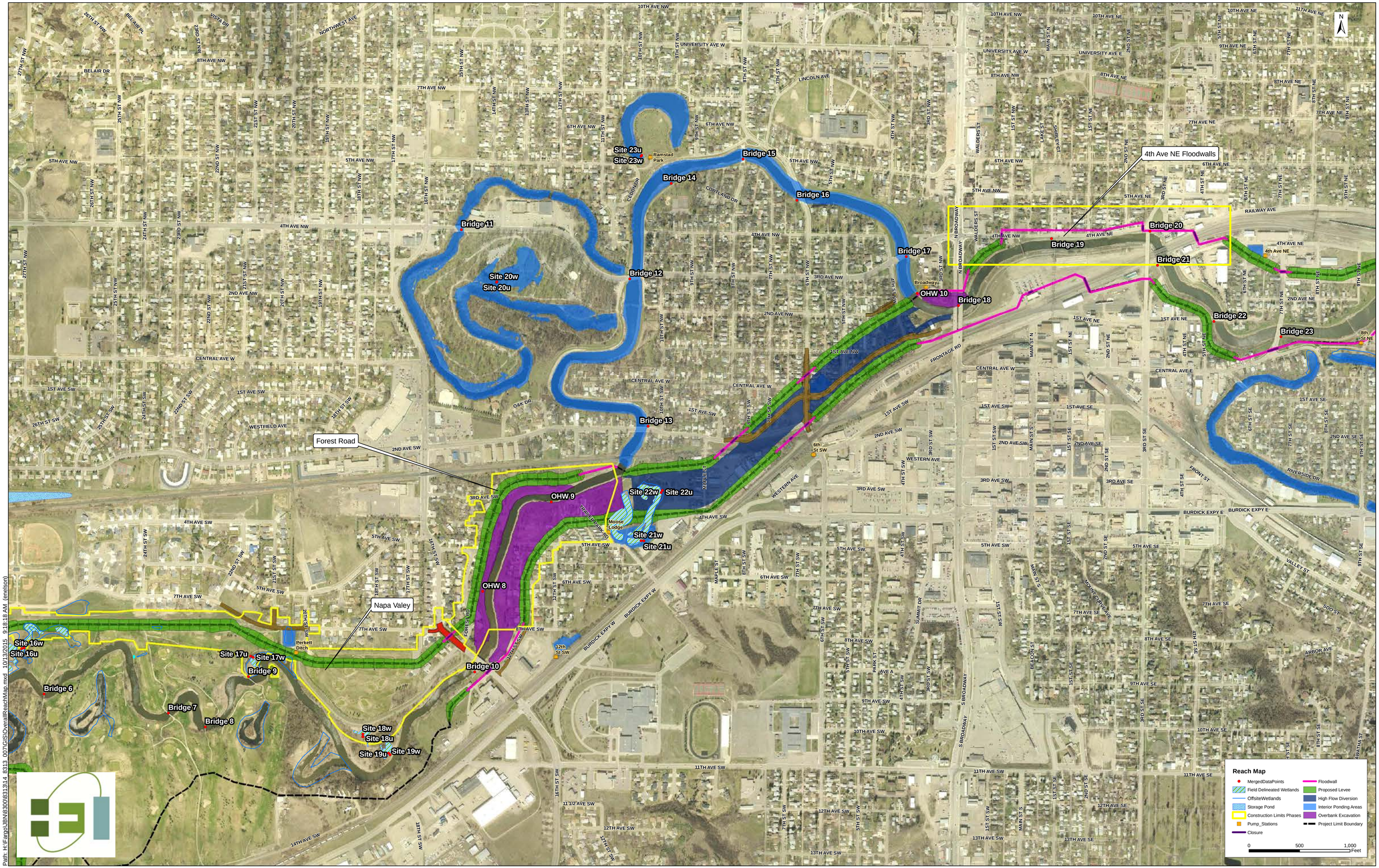

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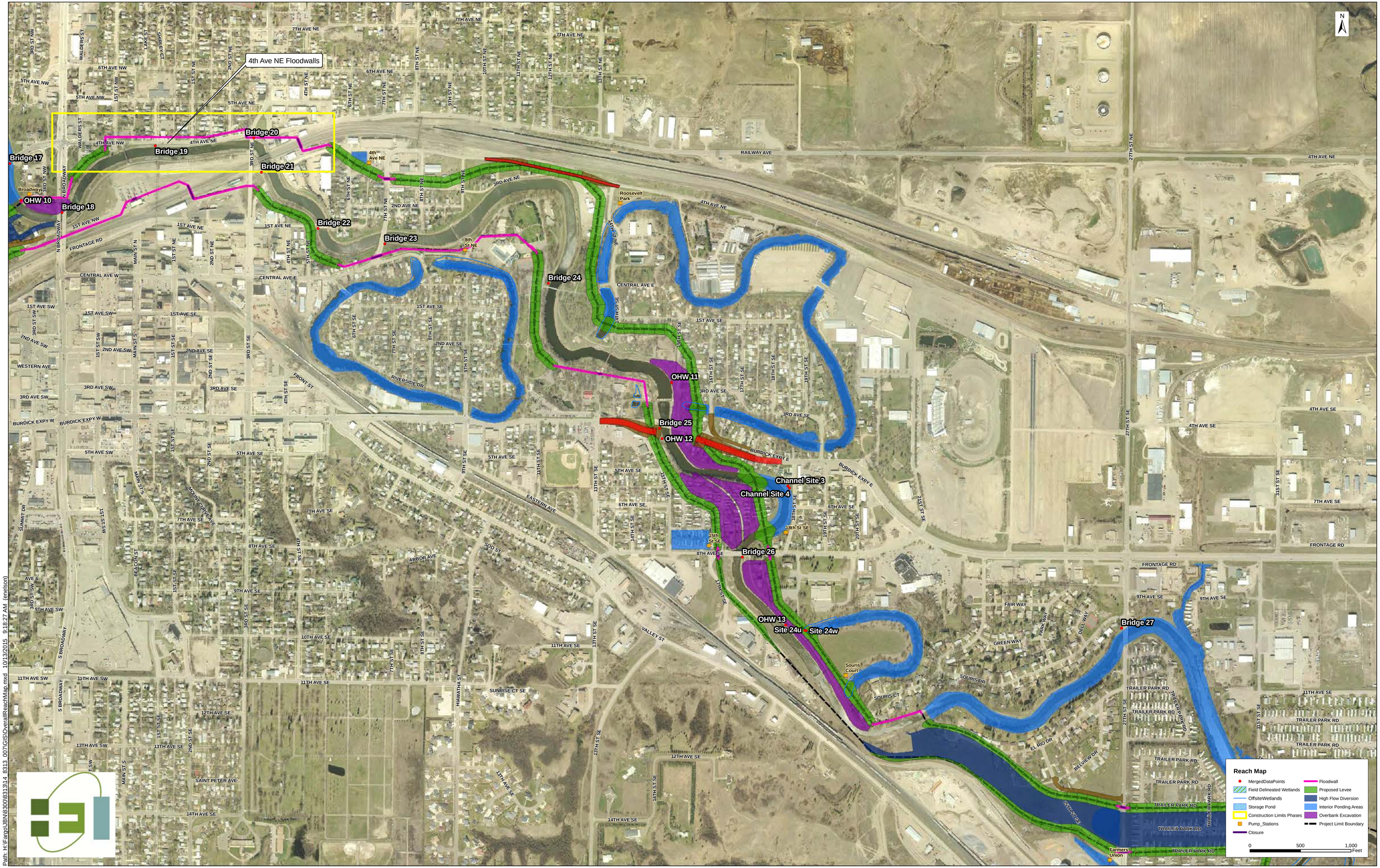

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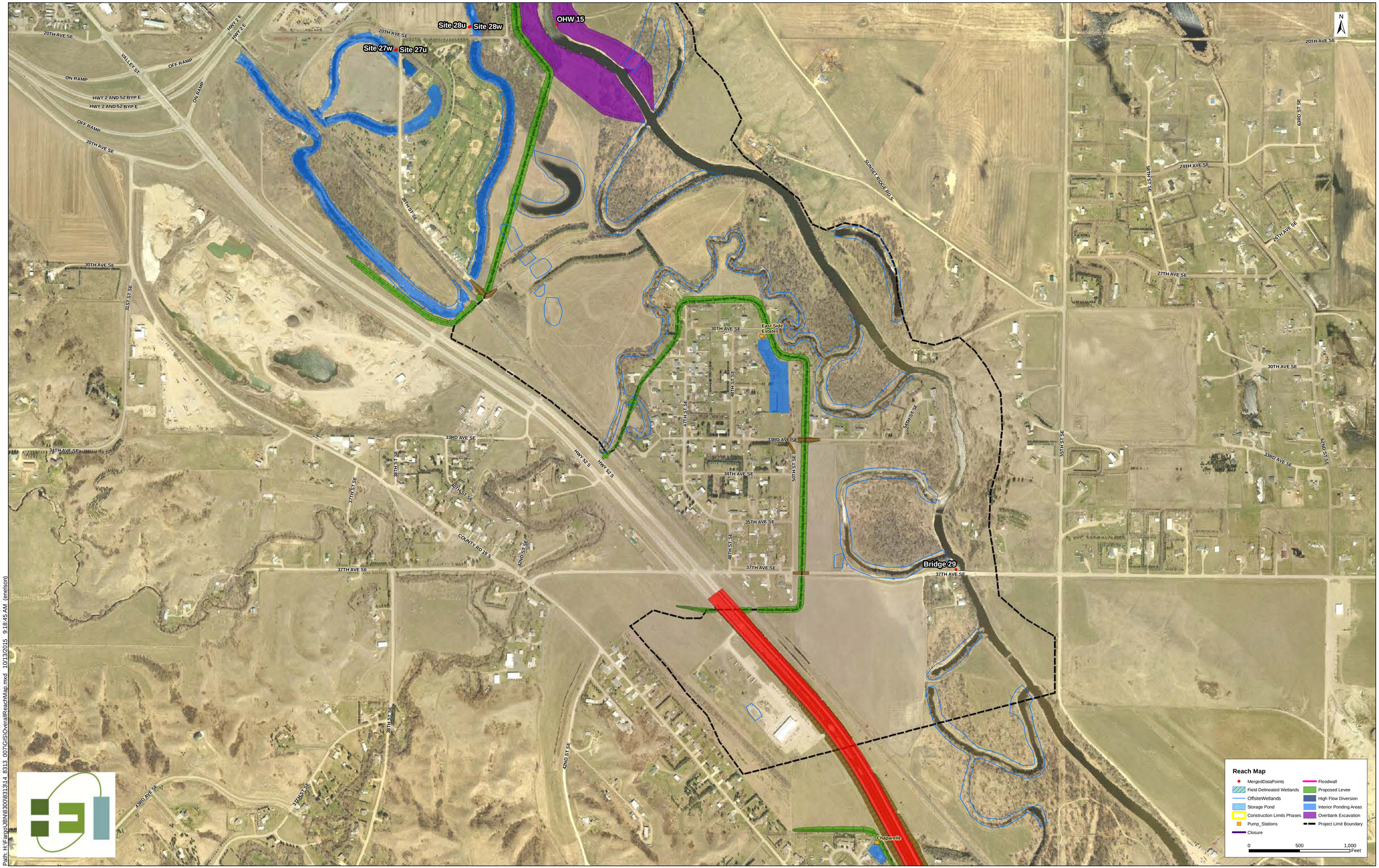

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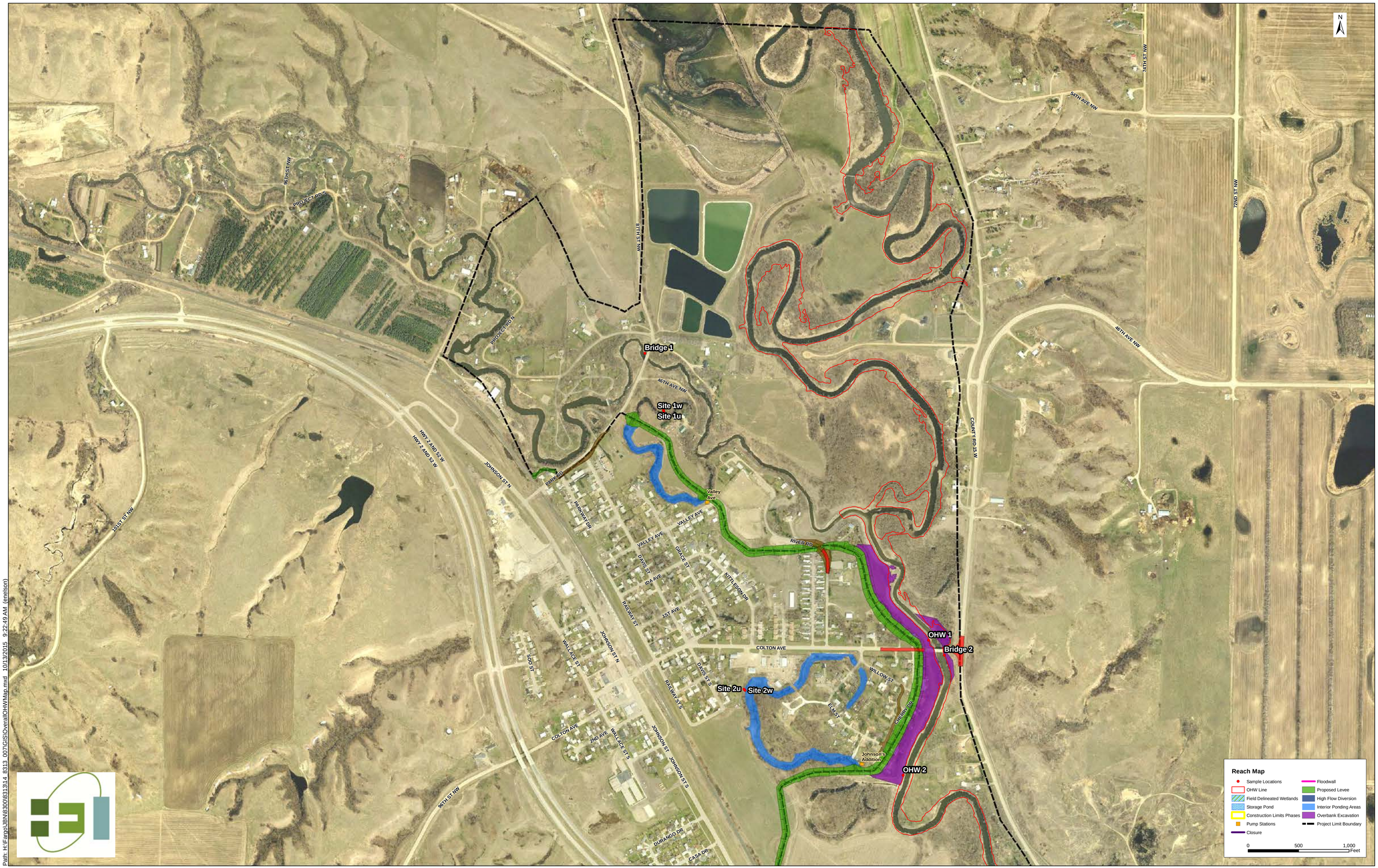
ATTACHMENT 3

ORDINARY HIGH WATER MARK MAPS



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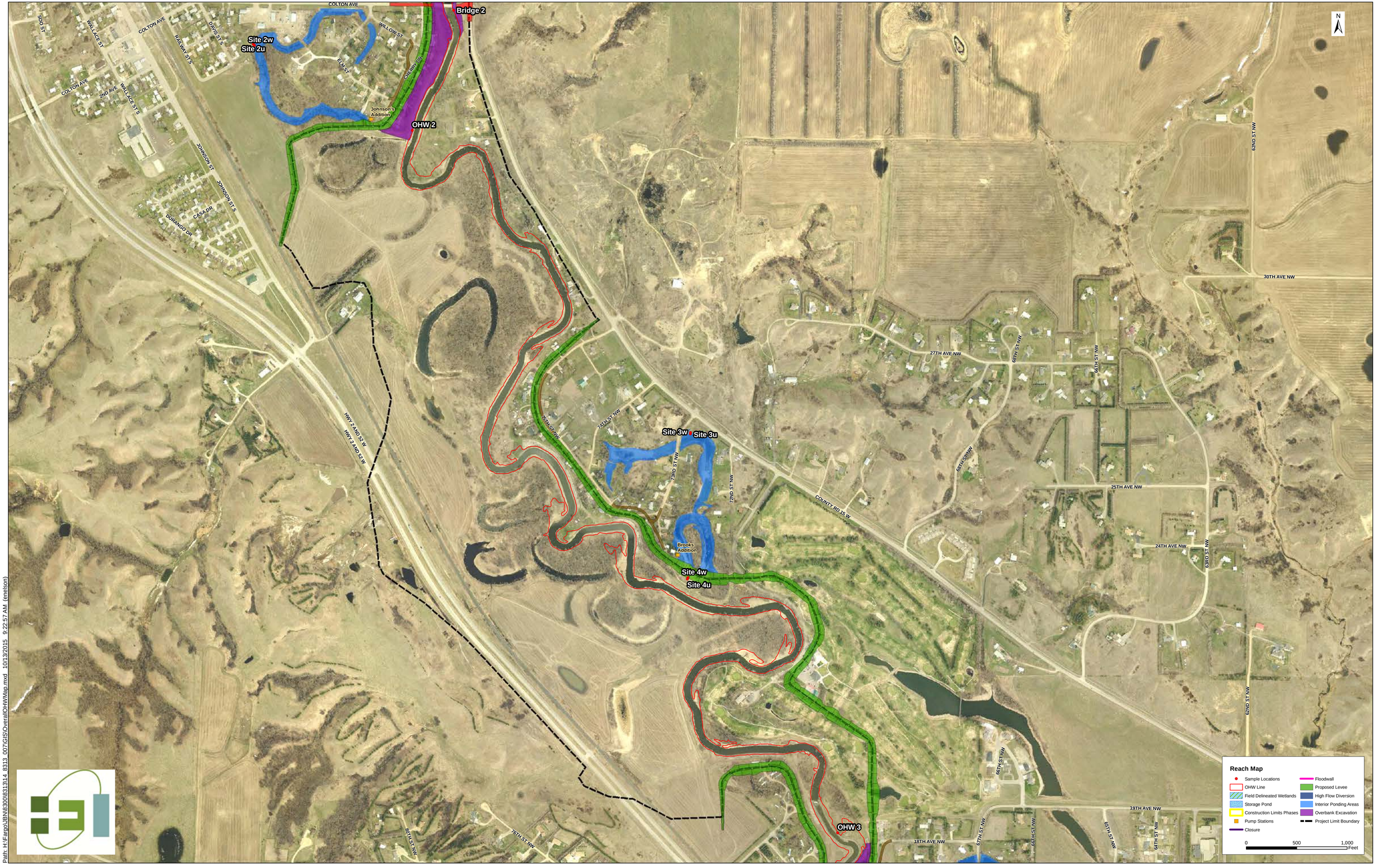

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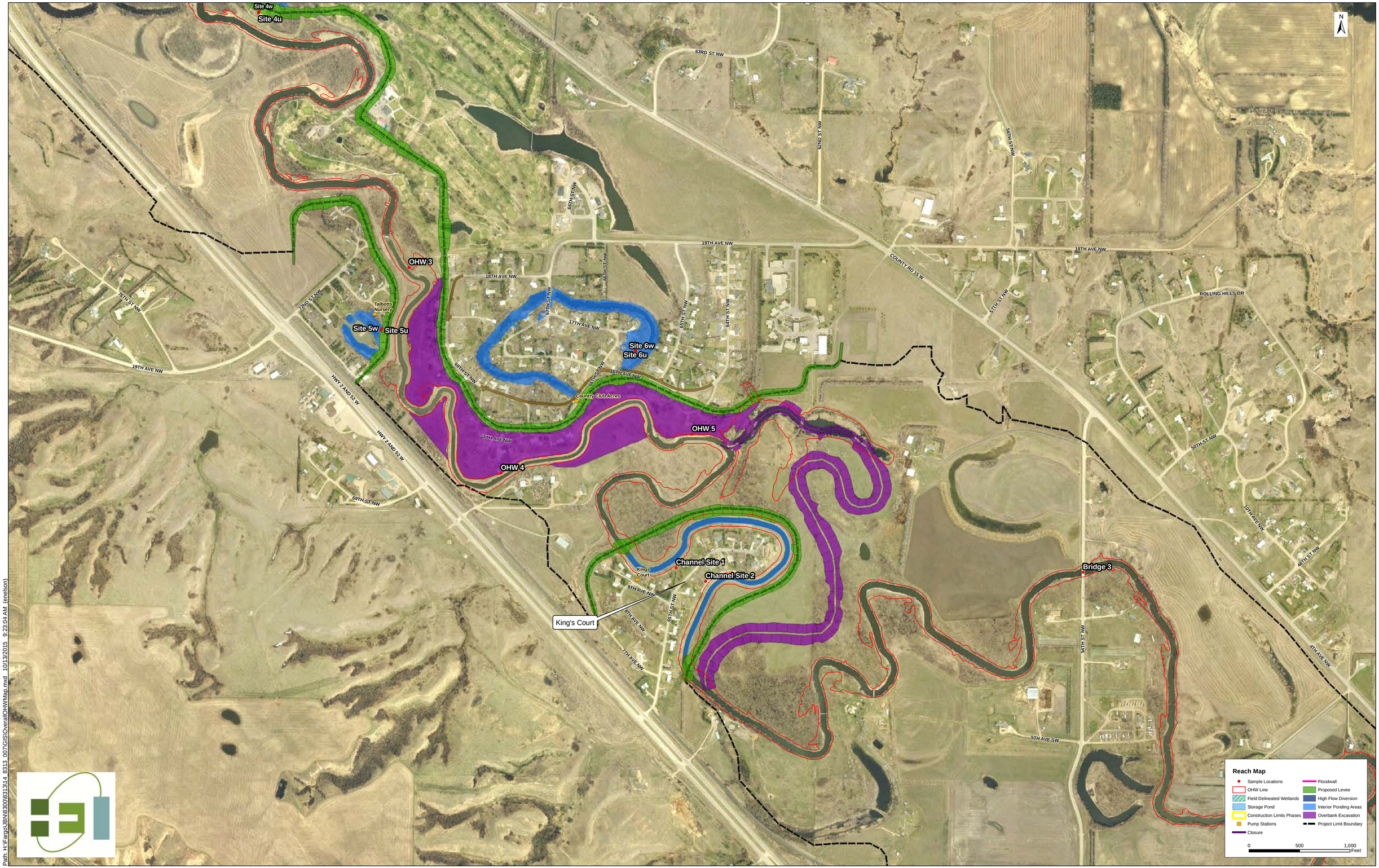

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OHW 4

Channel Site 1

Channel Site 2

Bridge 3

Bridge 4

King's Court

Kings Court

9TH AVE NW

7TH AVE NW

65TH ST NW

54TH ST NW

48TH ST NW

COUNTY RD 15 W

10TH AVE NW

HIGHVIEW AVE NW

HILLTOP ST NW

HARMONY CT

HARMONY ST NW

HOMESTEAD RD NW

4TH AVE NW

45T ST NW

5TH AVE SW

7TH AVE SW

54TH ST SW

62ND ST SW

HWY 2 AND 52 W

NOEL AVE

FRONTAGE RD

COUNTY RD 12 W

14TH AVE SW

37TH ST SW

36TH ST SW

HWY 82 & 9 S

Site 9u

Site 9w

Terracita Village

N

Reach Map

- Sample Locations
- OHW Line
- Field Delineated Wetlands
- Storage Pond
- Construction Limits Phases
- Pump Stations
- Closure
- Floodwall
- Proposed Levee
- High Flow Diversion
- Interior Ponding Areas
- Overbank Excavation
- Project Limit Boundary

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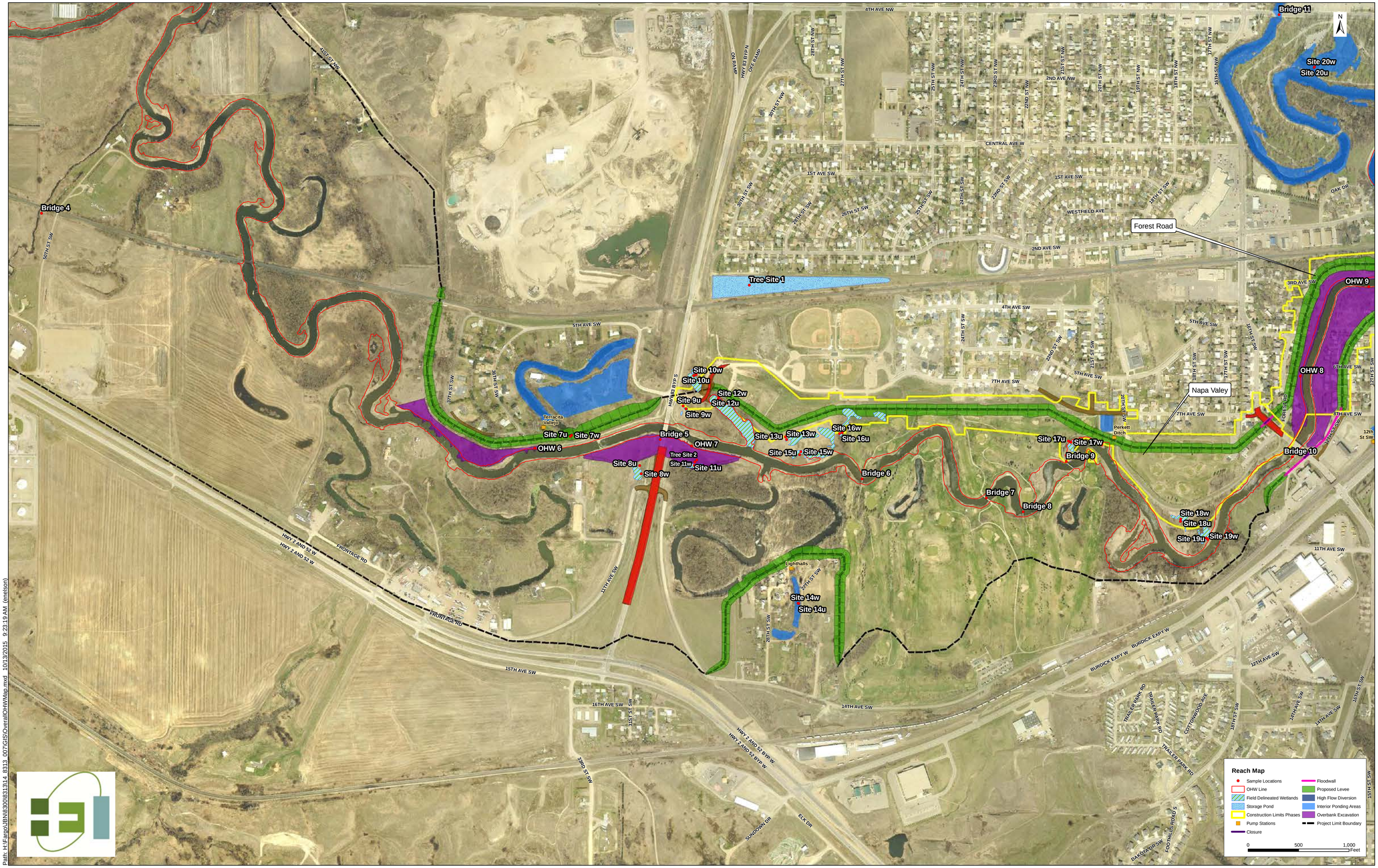

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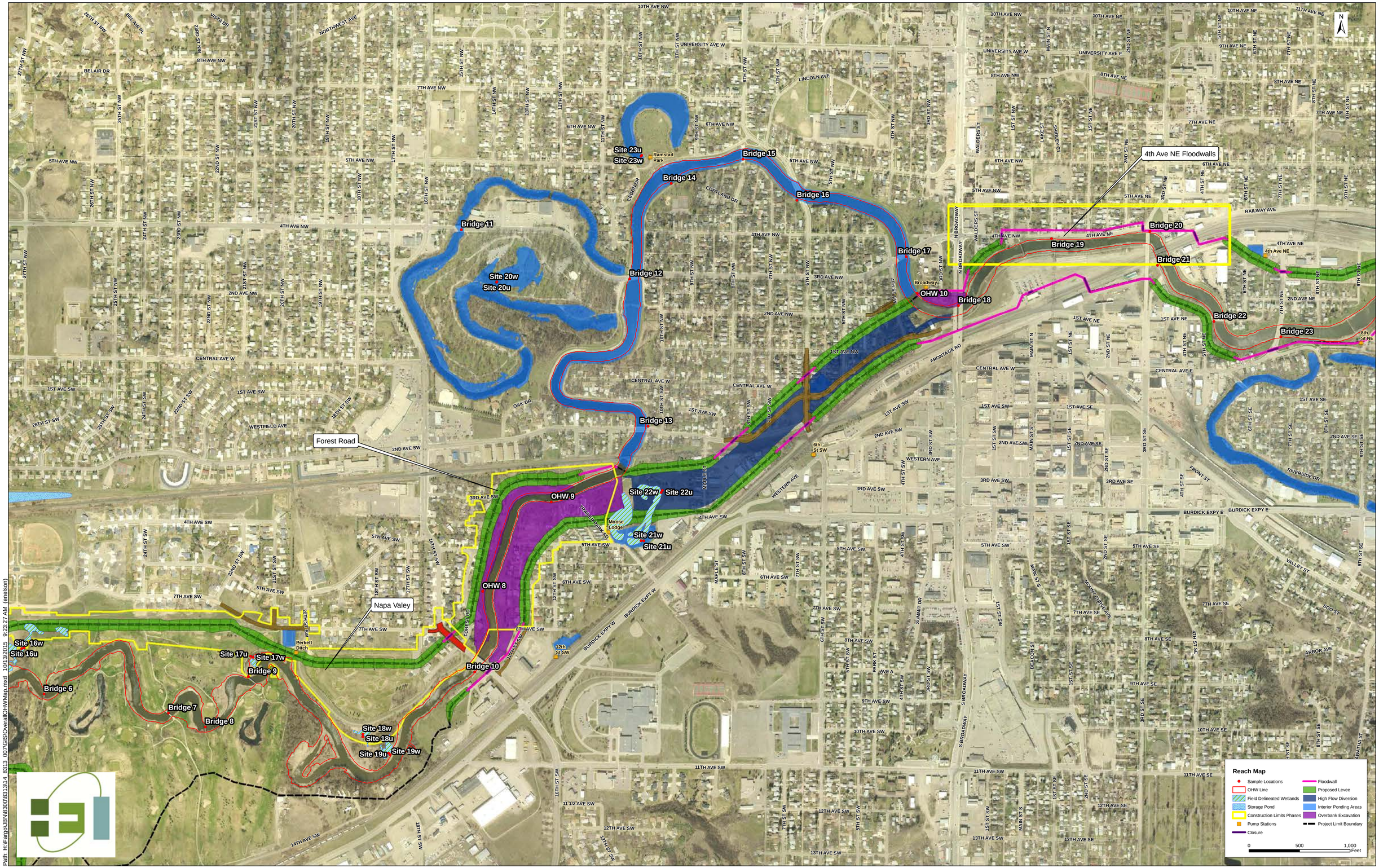

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4th Ave NE Floodwalls

Bridge 17
Bridge 18
Bridge 19
Bridge 20
Bridge 21
Bridge 22
Bridge 23
Bridge 24
Bridge 25
Bridge 26
Bridge 27

OHW 10
OHW 11
OHW 12
OHW 13

Channel Site 3
Channel Site 4

Site 24u
Site 24w

Roosevelt Park
Souris Court
Farmers Union

Reach Map

- Sample Locations
- OHW Line
- Field Delineated Wetlands
- Storage Pond
- Construction Limits Phases
- Pump Stations
- Closure
- Floodwall
- Proposed Levee
- High Flow Diversion
- Interior Ponding Areas
- Overbank Excavation
- Project Limit Boundary

0 500 1,000 Feet

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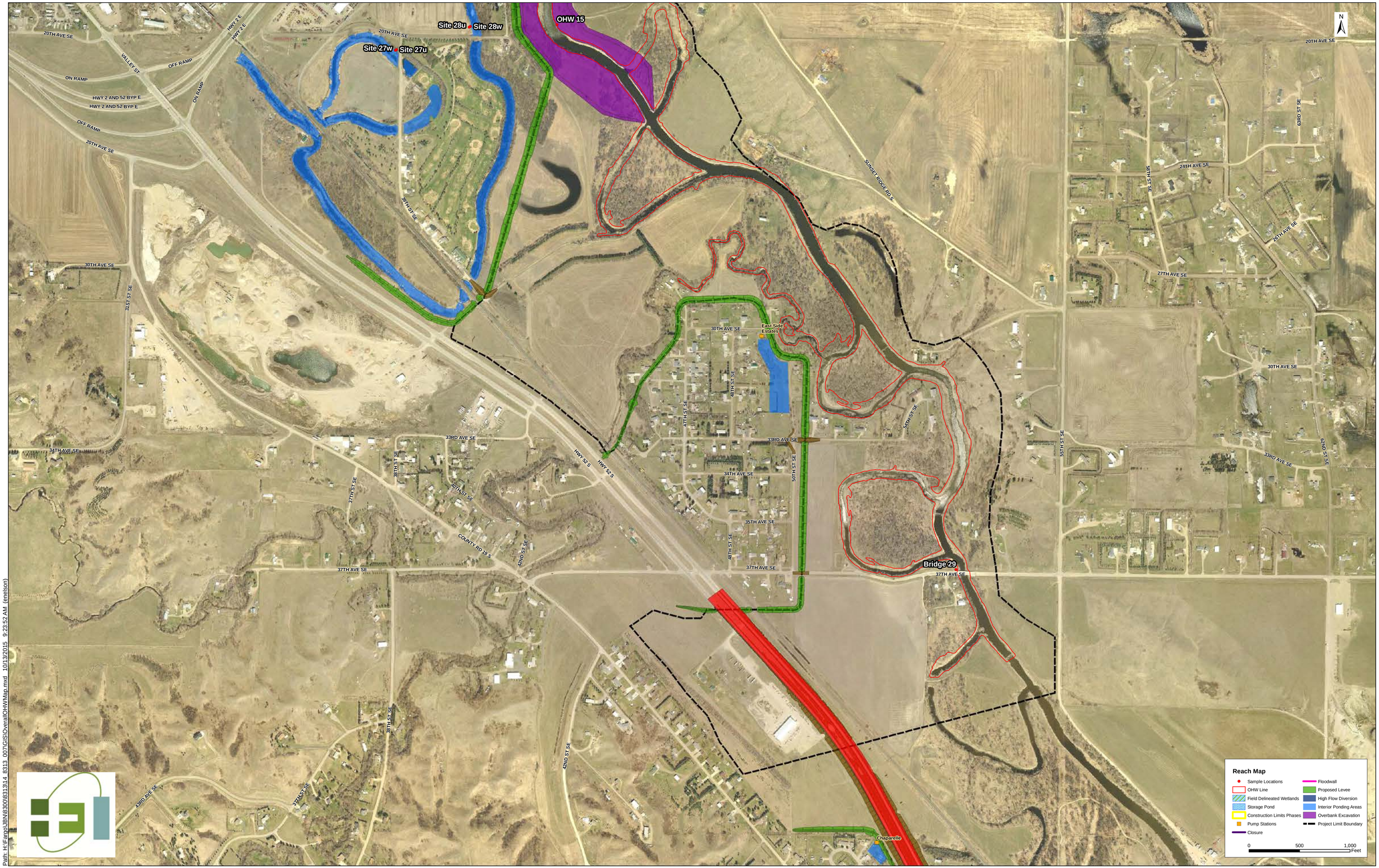

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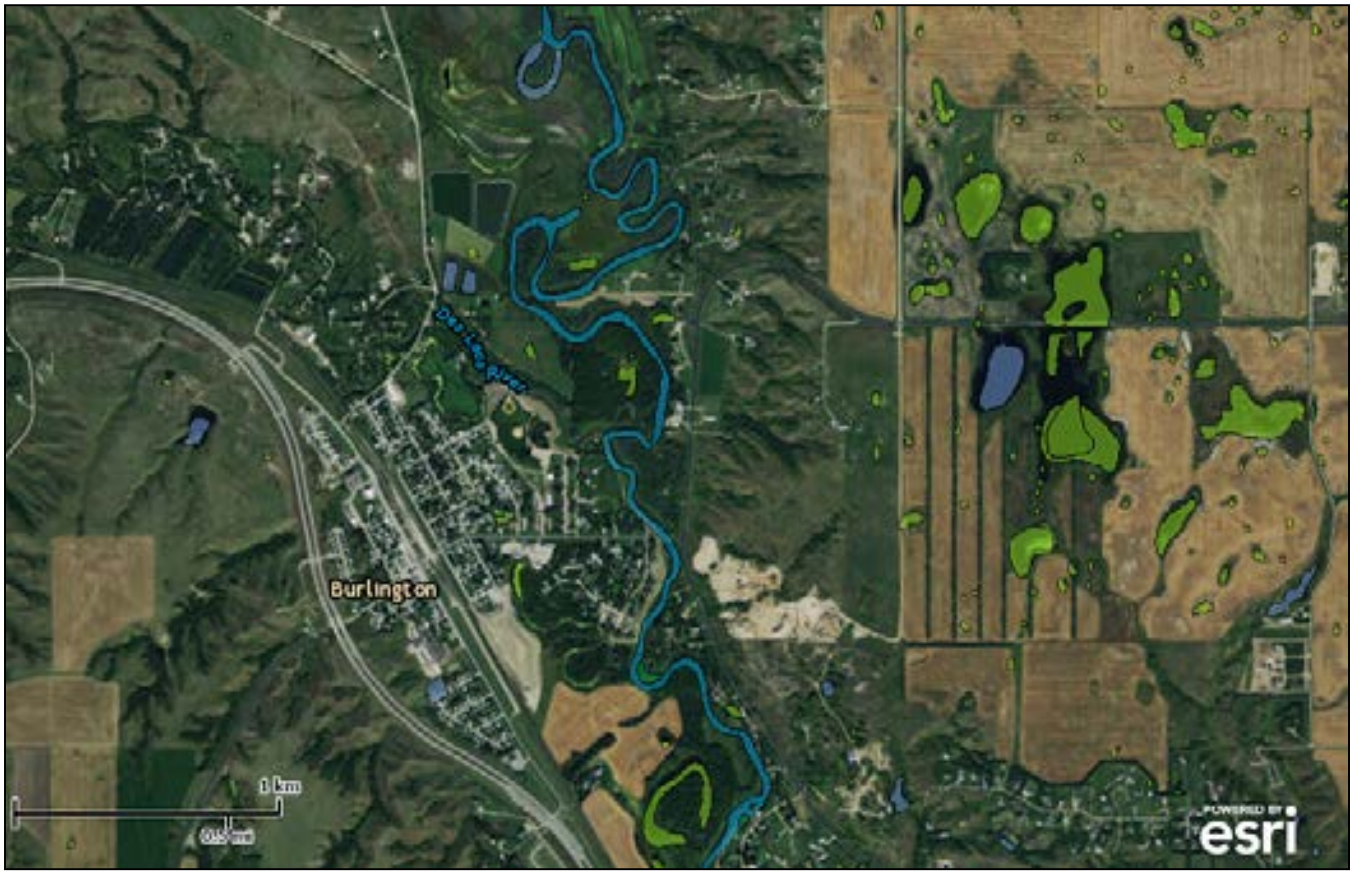
ATTACHMENT 4

NATIONAL WETLAND INVENTORY MAPS

U.S. Fish and Wildlife Service
National Wetlands Inventory

NWI Mouse a

Jul 22, 2015



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

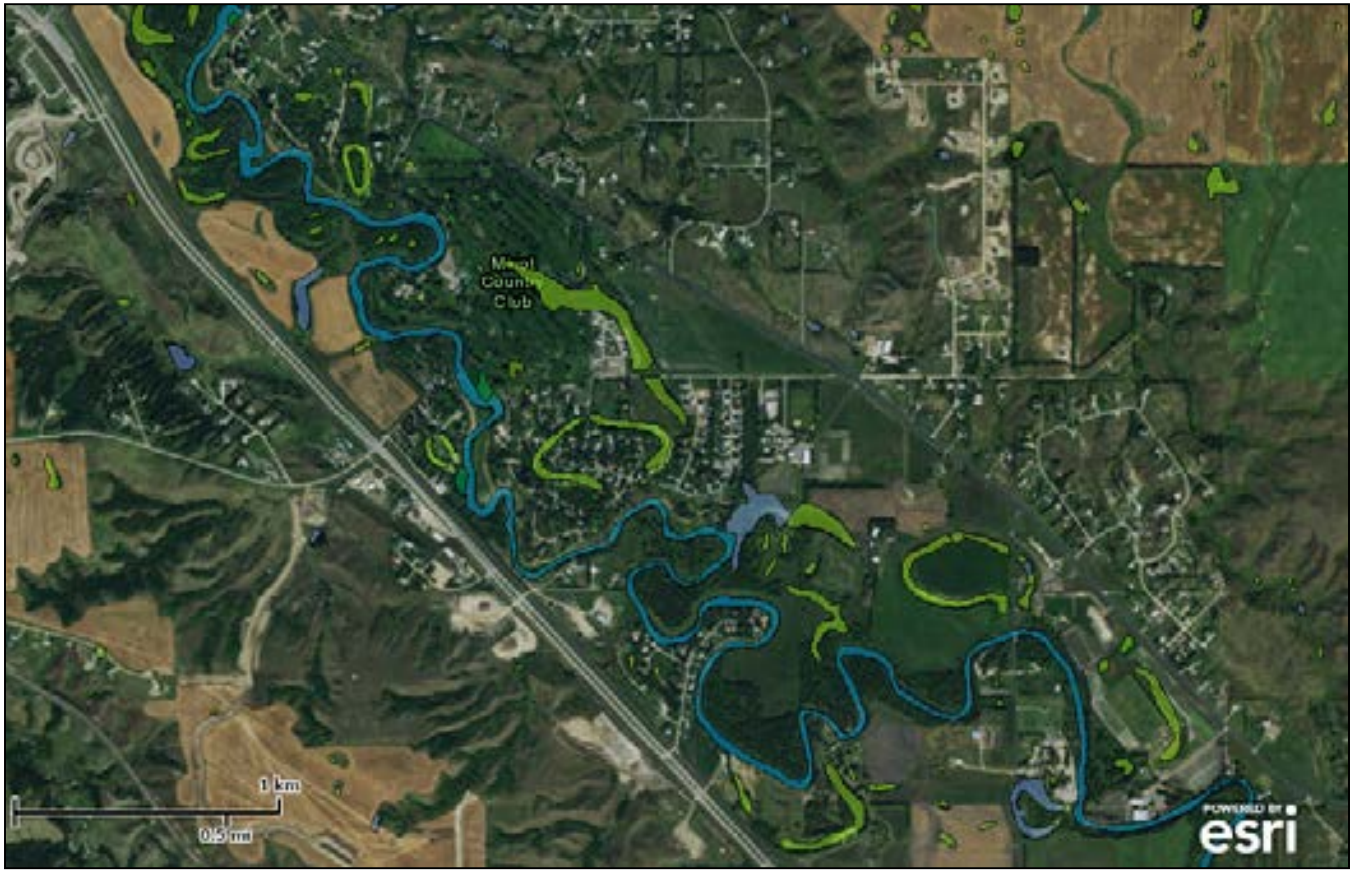
User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

NWI Mouse b

Jul 22, 2015



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

NWI Mouse c

Jul 22, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

NWI Mouse d

Jul 22, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

NWI Mouse e

Jul 22, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

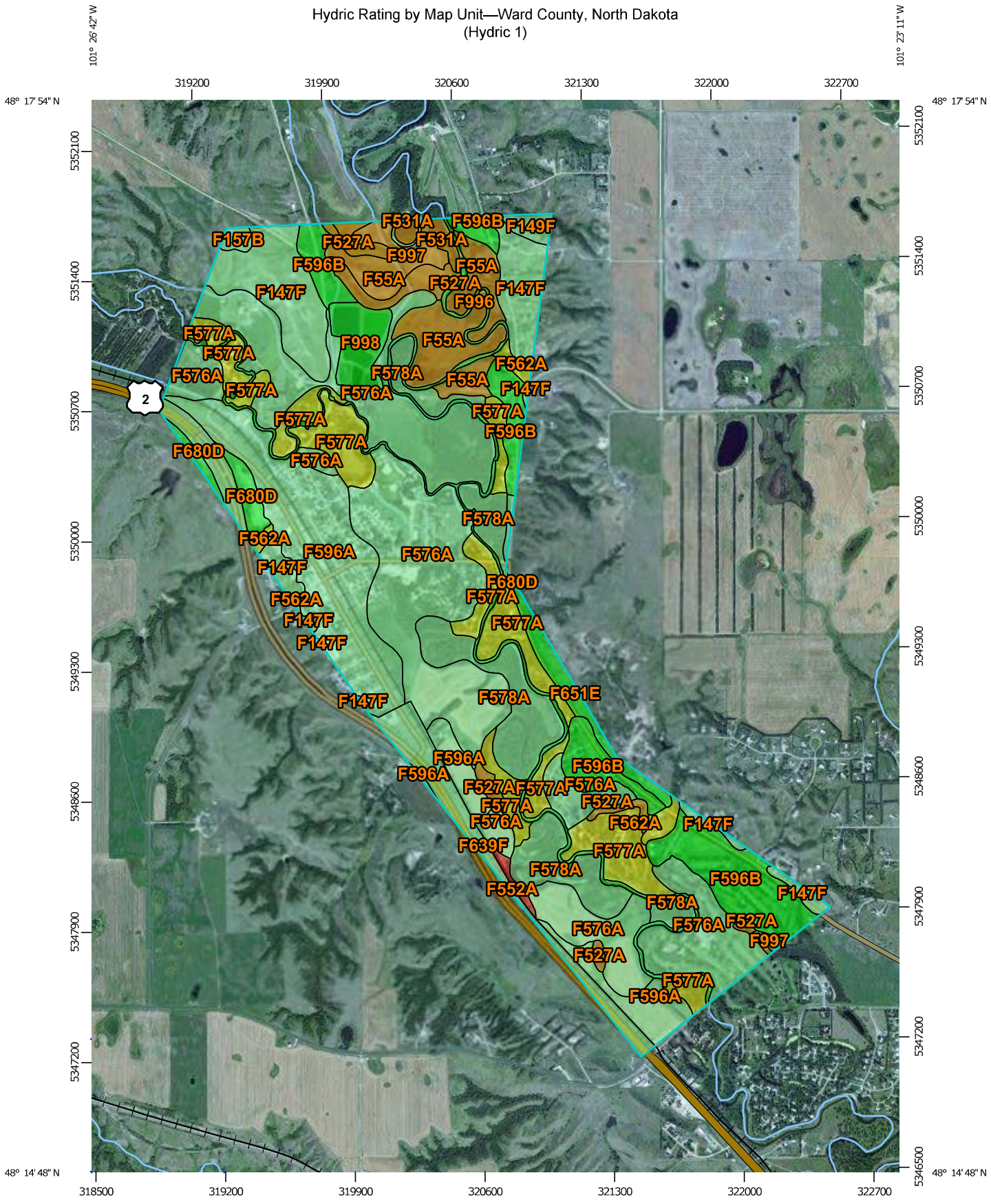
- Digital Data

User Remarks:

ATTACHMENT 5

SOIL HYDRIC RATING MAPS

Hydric Rating by Map Unit—Ward County, North Dakota
(Hydric 1)

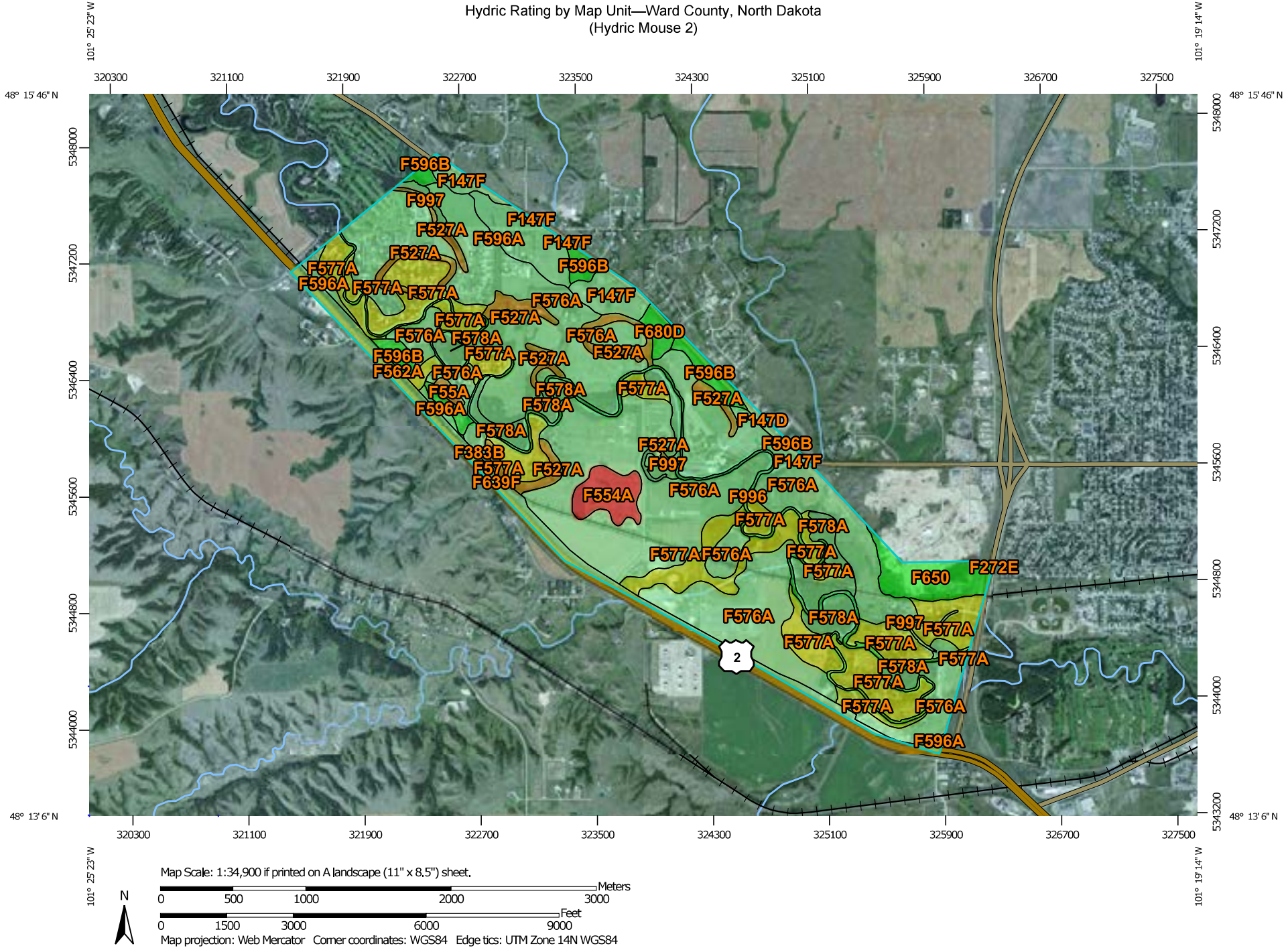


Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F55A	Ludden silty clay, 0 to 1 percent slopes, frequently flooded	94	100.7	6.4%
F147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	3	123.3	7.9%
F149F	Buse-Barnes-La Prairie, wooded, occasionally flooded loams, 6 to 35 percent slopes	3	7.6	0.5%
F157B	Barnes loam, 3 to 6 percent slopes	2	4.7	0.3%
F527A	Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded	98	37.9	2.4%
F531A	Ludden, wooded-Fluvaquents, channneled complex, 0 to 2 percent slopes, frequently flooded	98	10.5	0.7%
F552A	Harriet loam, strongly saline, 0 to 1 percent slopes, occasionally flooded	100	4.4	0.3%
F562A	La Prairie-Fluvaquents, channeled complex, 0 to 2 percent slopes, frequently flooded	45	13.7	0.9%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	7	453.2	28.9%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	45	168.2	10.7%
F578A	Velva fine sandy loam, moist, wooded, 0 to 2 percent slopes, frequently flooded	20	131.1	8.4%
F596A	Darnen loam, 0 to 2 percent slopes	3	198.0	12.6%
F596B	Darnen loam, 2 to 6 percent slopes	0	129.6	8.3%

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	19	65.0	4.1%
F651E	Udarents loamy, abandoned gravel pits, 0 to 25 percent slopes	0	23.1	1.5%
F680D	Barnes-Sioux complex, 6 to 15 percent slopes	0	17.3	1.1%
F996	Water	0	49.5	3.2%
F997	Water, intermittent	20	3.6	0.2%
F998	Water, miscellaneous	0	28.4	1.8%
Totals for Area of Interest			**1,569.9**	**100.0%**

Hydric Rating by Map Unit—Ward County, North Dakota
(Hydric Mouse 2)

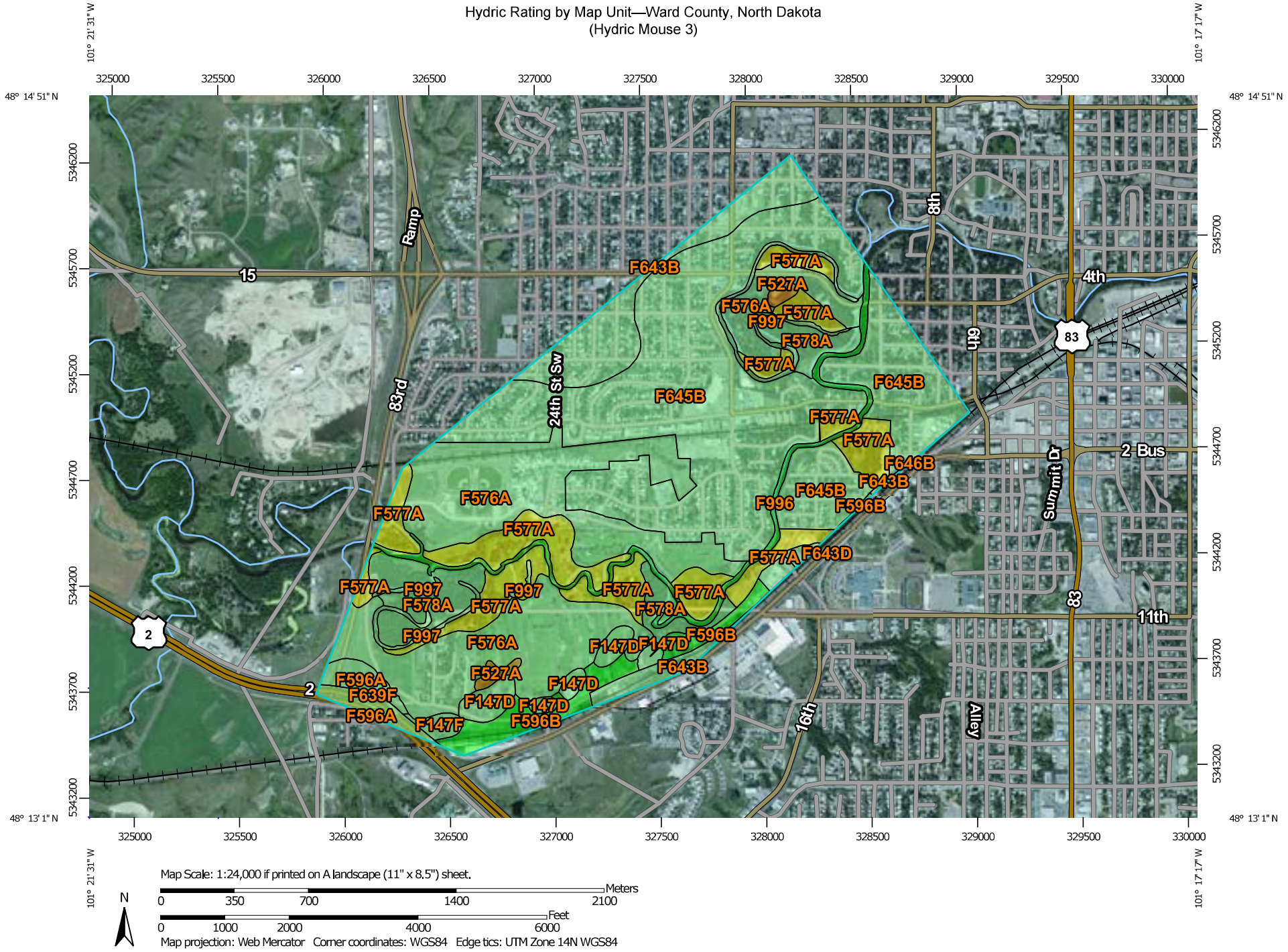


Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F55A	Ludden silty clay, 0 to 1 percent slopes, frequently flooded	94	4.7	0.3%
F147D	Buse-Barnes-Darnen loams, 6 to 15 percent slopes	2	5.1	0.3%
F147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	3	43.0	2.3%
F272E	Sioux-Arvilla-Renshaw complex, 9 to 25 percent slopes	0	0.2	0.0%
F383B	Maddock-Hecla fine sandy loams, 0 to 6 percent slopes	3	7.4	0.4%
F527A	Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded	98	75.7	4.1%
F554A	Harriet loam, 0 to 1 percent slopes, occasionally flooded	100	34.0	1.8%
F562A	La Prairie-Fluvaquents, channeled complex, 0 to 2 percent slopes, frequently flooded	45	5.7	0.3%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	7	925.4	49.6%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	45	328.8	17.6%
F578A	Velva fine sandy loam, moist, wooded, 0 to 2 percent slopes, frequently flooded	20	111.9	6.0%
F596A	Darnen loam, 0 to 2 percent slopes	3	61.4	3.3%
F596B	Darnen loam, 2 to 6 percent slopes	0	44.0	2.4%
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	19	77.2	4.1%

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F650	Pits, gravel and sand	0	50.7	2.7%
F680D	Barnes-Sioux complex, 6 to 15 percent slopes	0	20.5	1.1%
F996	Water	0	60.8	3.3%
F997	Water, intermittent	20	10.4	0.6%
Totals for Area of Interest			**1,867.1**	**100.0%**

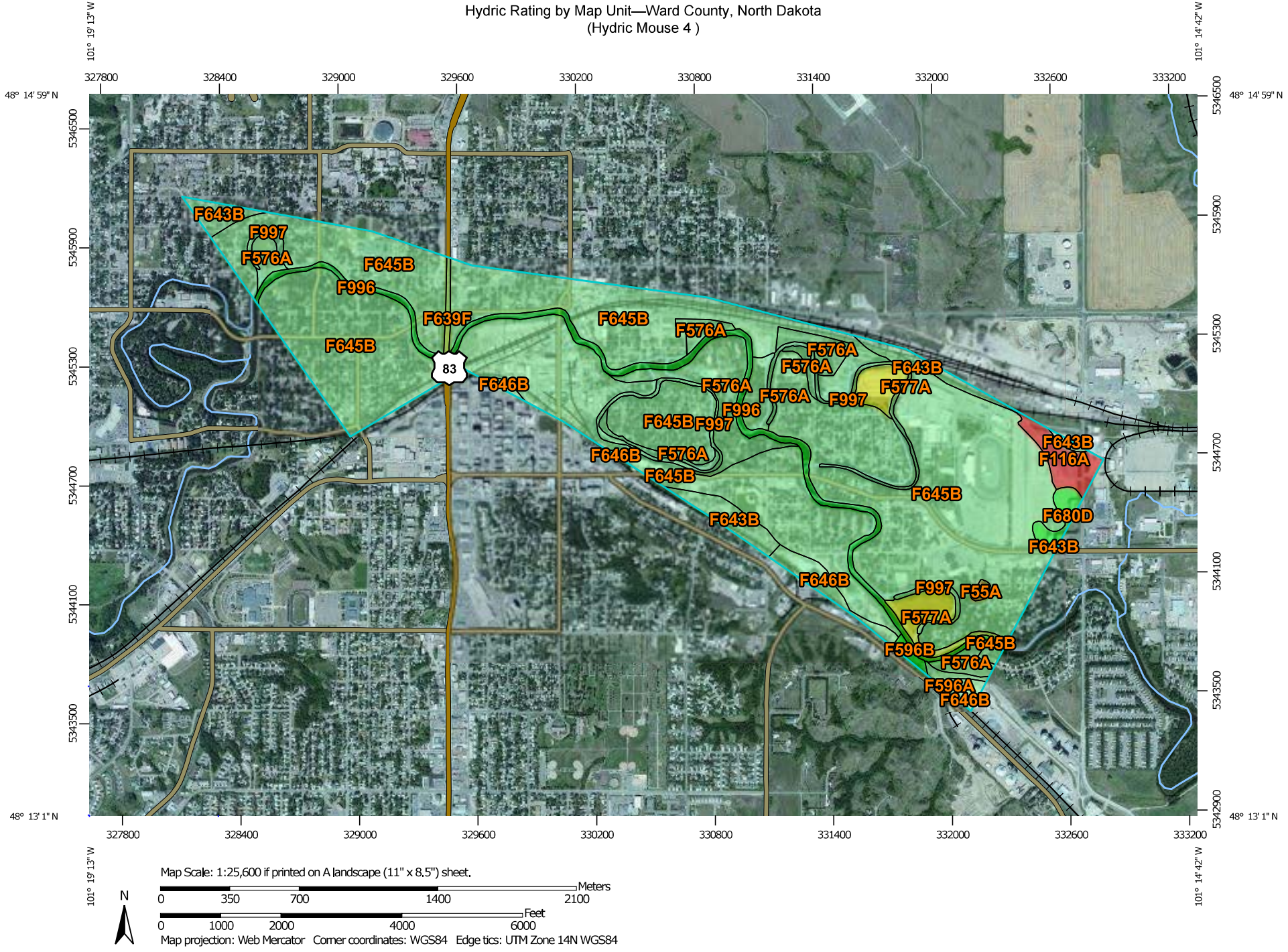
Hydric Rating by Map Unit—Ward County, North Dakota
(Hydric Mouse 3)



Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F147D	Buse-Barnes-Darnen loams, 6 to 15 percent slopes	2	22.5	2.1%
F147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	3	5.2	0.5%
F527A	Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded	98	6.2	0.6%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	7	267.8	24.5%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	45	133.2	12.2%
F578A	Velva fine sandy loam, moist, wooded, 0 to 2 percent slopes, frequently flooded	20	63.8	5.8%
F596A	Darnen loam, 0 to 2 percent slopes	3	10.7	1.0%
F596B	Darnen loam, 2 to 6 percent slopes	0	35.5	3.2%
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	19	10.7	1.0%
F643B	Urban land-Udorthents loamy complex, 0 to 6 percent slopes	3	75.2	6.9%
F643D	Urban land-Udorthents loamy complex, 6 to 15 percent slopes	3	2.3	0.2%
F645B	Urban land-Udifluvents loamy complex, 0 to 6 percent slopes	3	413.5	37.8%
F646B	Urban land, 0 to 6 percent slopes	3	0.0	0.0%
F996	Water	0	28.0	2.6%
F997	Water, intermittent	20	17.9	1.6%
Totals for Area of Interest			**1,092.7**	**100.0%**

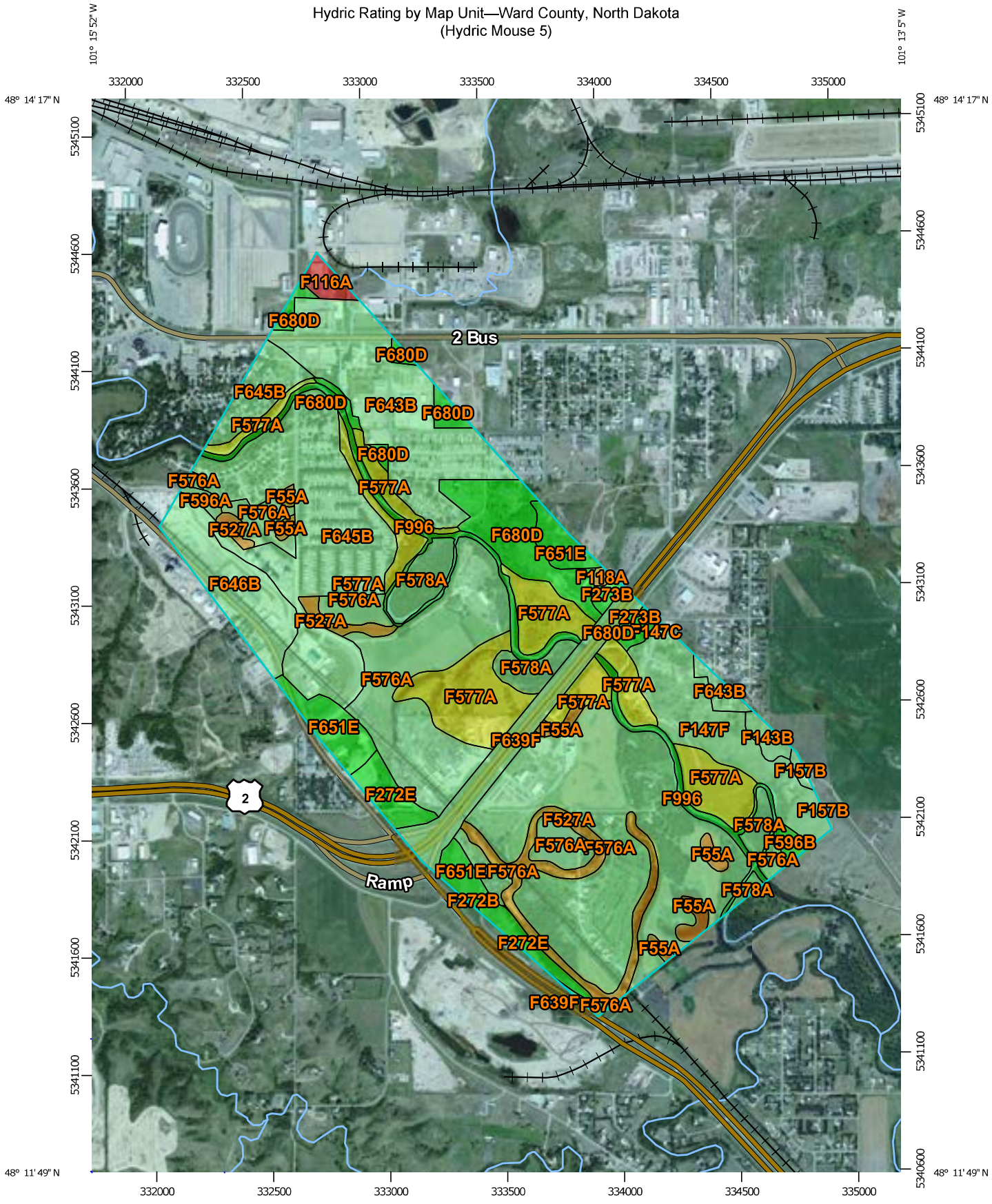
Hydric Rating by Map Unit—Ward County, North Dakota
(Hydric Mouse 4)



Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F55A	Ludden silty clay, 0 to 1 percent slopes, frequently flooded	94	1.8	0.2%
F116A	Easby clay loam, 0 to 1 percent slopes	100	16.1	1.5%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	7	84.3	7.9%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	45	27.9	2.6%
F596A	Darnen loam, 0 to 2 percent slopes	3	3.0	0.3%
F596B	Darnen loam, 2 to 6 percent slopes	0	2.8	0.3%
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	19	3.8	0.4%
F643B	Urban land-Udorthents loamy complex, 0 to 6 percent slopes	3	35.0	3.3%
F645B	Urban land-Udifluvents loamy complex, 0 to 6 percent slopes	3	797.3	74.9%
F646B	Urban land, 0 to 6 percent slopes	3	20.1	1.9%
F680D	Barnes-Sioux complex, 6 to 15 percent slopes	0	7.5	0.7%
F996	Water	0	40.0	3.8%
F997	Water, intermittent	20	24.4	2.3%
Totals for Area of Interest			**1,063.9**	**100.0%**

Hydric Rating by Map Unit—Ward County, North Dakota
(Hydric Mouse 5)



Map Scale: 1:22,300 if printed on A portrait (8.5" x 11") sheet.

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Meters: 0 300 600 1200 1800

Feet: 0 1000 2000 4000 6000

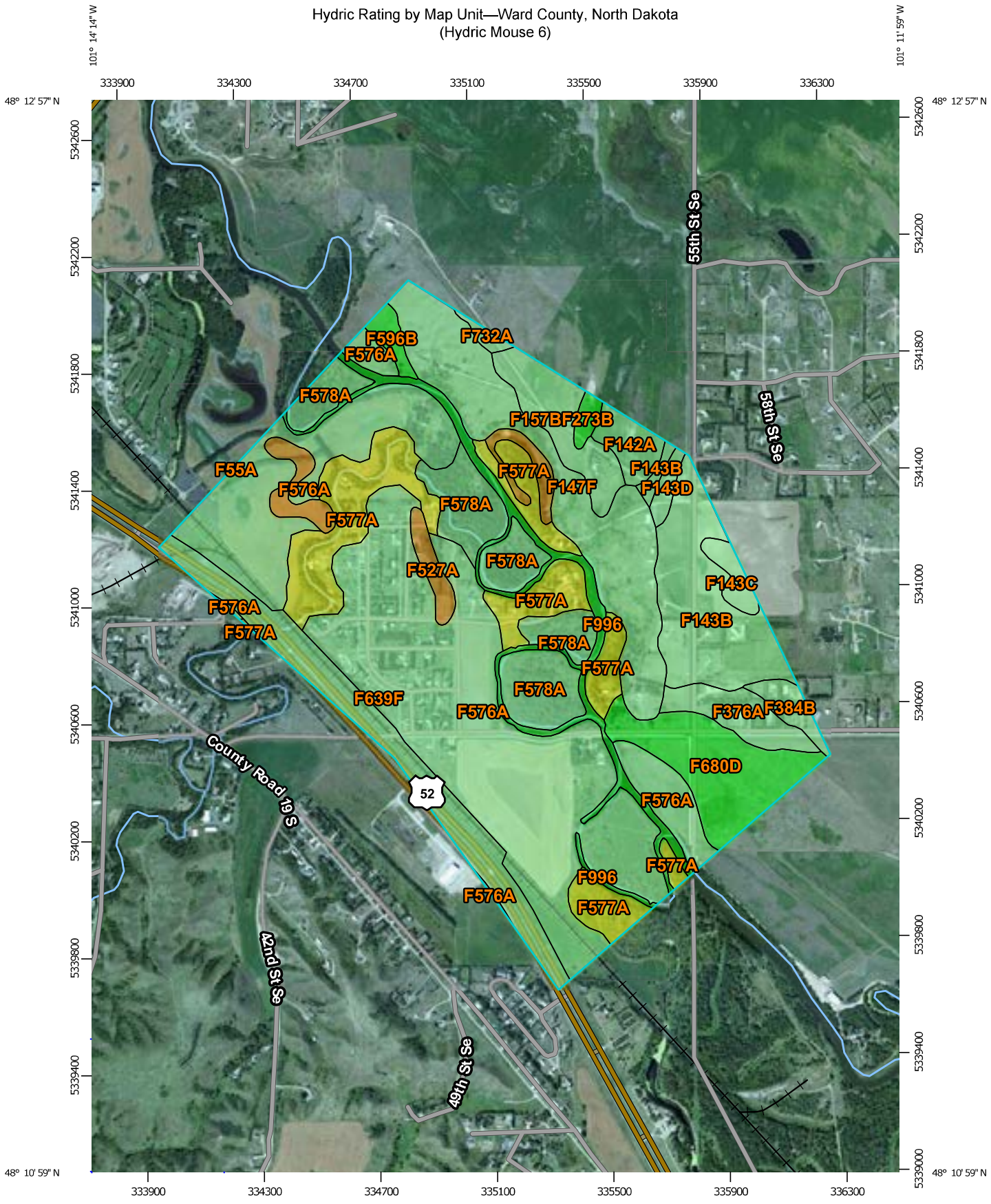
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F55A	Ludden silty clay, 0 to 1 percent slopes, frequently flooded	94	13.4	1.3%
F116A	Easby clay loam, 0 to 1 percent slopes	100	6.1	0.6%
F118A	Vallers loam, saline, 0 to 1 percent slopes	79	1.3	0.1%
F143B	Barnes-Svea loams, 3 to 6 percent slopes	6	5.2	0.5%
F147C	Buse-Barnes-Darnen loams, 3 to 9 percent slopes	2	0.6	0.1%
F147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	3	55.1	5.3%
F157B	Barnes loam, 3 to 6 percent slopes	2	1.8	0.2%
F272B	Arvilla-Sioux complex, 2 to 6 percent slopes	0	0.6	0.1%
F272E	Sioux-Arvilla-Renshaw complex, 9 to 25 percent slopes	0	21.4	2.1%
F273B	Sioux-Arvilla complex, 2 to 6 percent slopes	0	3.9	0.4%
F527A	Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded	98	35.7	3.4%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	7	310.6	29.9%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	45	112.5	10.8%
F578A	Velva fine sandy loam, moist, wooded, 0 to 2 percent slopes, frequently flooded	20	32.3	3.1%
F596A	Darnen loam, 0 to 2 percent slopes	3	2.7	0.3%
F596B	Darnen loam, 2 to 6 percent slopes	0	3.5	0.3%

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	19	36.5	3.5%
F643B	Urban land-Udorthents loamy complex, 0 to 6 percent slopes	3	97.4	9.4%
F645B	Urban land-Udifluvents loamy complex, 0 to 6 percent slopes	3	140.0	13.5%
F646B	Urban land, 0 to 6 percent slopes	3	42.2	4.1%
F651E	Udarents loamy, abandoned gravel pits, 0 to 25 percent slopes	0	33.2	3.2%
F680D	Barnes-Sioux complex, 6 to 15 percent slopes	0	51.4	4.9%
F996	Water	0	30.4	2.9%
Totals for Area of Interest			**1,037.9**	**100.0%**

Hydric Rating by Map Unit—Ward County, North Dakota
(Hydric Mouse 6)



Map Scale: 1:17,900 if printed on A portrait (8.5" x 11") sheet.

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0 500 1000 2000 3000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F55A	Ludden silty clay, 0 to 1 percent slopes, frequently flooded	94	7.8	1.1%
F142A	Svea loam, 0 to 3 percent slopes	4	9.3	1.3%
F143B	Barnes-Svea loams, 3 to 6 percent slopes	6	49.7	7.0%
F143C	Barnes-Buse-Langhei loams, 6 to 9 percent slopes	6	5.5	0.8%
F143D	Barnes-Buse-Langhei loams, 9 to 15 percent slopes	6	3.5	0.5%
F147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	3	72.1	10.2%
F157B	Barnes loam, 3 to 6 percent slopes	2	21.7	3.1%
F273B	Sioux-Arvilla complex, 2 to 6 percent slopes	0	2.9	0.4%
F376A	Embden fine sandy loam, 0 to 2 percent slopes	3	14.9	2.1%
F384B	Maddock-Hecla loamy fine sands, 0 to 6 percent slopes	3	6.5	0.9%
F527A	Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded	98	12.0	1.7%
F576A	Velva loam, moist, 0 to 2 percent slopes, occasionally flooded	7	253.2	35.9%
F577A	Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded	45	73.5	10.4%
F578A	Velva fine sandy loam, moist, wooded, 0 to 2 percent slopes, frequently flooded	20	57.7	8.2%
F596B	Darnen loam, 2 to 6 percent slopes	0	4.4	0.6%

Hydric Rating by Map Unit— Summary by Map Unit — Ward County, North Dakota (ND101)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
F639F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	19	45.3	6.4%
F680D	Barnes-Sioux complex, 6 to 15 percent slopes	0	38.5	5.5%
F732A	Swenoda-Barnes fine sandy loams, 0 to 3 percent slopes	2	2.1	0.3%
F996	Water	0	25.4	3.6%
Totals for Area of Interest			**706.1**	**100.0%**

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ward County, North Dakota
Survey Area Data: Version 14, Sep 23, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 17, 2010—Jun 23, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

ATTACHMENT 6

WETLAND DELINEATION DATA FORMS

Table: data form numbers and corresponding map numbers

Map Site number	Data form number
1	15
2	16
3	17
4	18
5	20
6	19
7	21
8	10
9	9
10	1
11	11
12	2
13	3
14	22
15	4
16	5
17	6
18	7
19	8
20	23
21	12
22	13
23	14
24	24
25	25
26	26
27	27
28	28

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 1u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Plane Slope (%): 2

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Bromus inermis**	50	x	UPL
2. **Poa pratensis**	20	x	FACU
3. **Agropyron cristatum**	20	_____	NL UPL
4. **Oenothera biennis**	10	_____	FACU
5. **Artemisia vulgaris**	10	_____	UPL
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	110	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **0** (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **0** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	_____
FACW species	**0**	x2 =	_____
FAC species	**0**	x3 =	_____
FACU species	**1**	x4 =	_____
UPL species	**1**	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

possible constructed pothole, material perhaps used for road building

SOIL

Sampling Point: 1u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					Loam	A
4-12	2.5Y 4/3	80	10YR 5/6	20	C	M	SL/CL	C stratified

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Aquic Ustifluvents

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Floodplain adjacent to oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 1w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	

Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Fraxinus pennsylvanica**	20	x	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	20	= Total Cover	

Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	100	x	FACW
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	

Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 1w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]		
0-5	10YR 3/2	100					Loam	A
5-12	2.5Y 4/2	90	10YR 5/6	10	C	M	CL/SL	C stratified

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Fringe of oxbow. Hydrology has been manipulated by road system. Water in bottom of oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 2u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment into oxbow Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Fraxinus pennsylvanica**	**50**	**x**	**FAC**
2. **Acer negundo**	50	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Lonicera dioica**	5	x	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	5	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Bromus inermis**	20	x	UPL
2. **Poa pratensis**	20	x	FACU
3. **Poa compressa**	20	x	FACU
4. **Urtica dioica**	10	_____	FAC
5. **Thalictrum venulosum**	10	_____	FAC
6. **Arctium minus**	5	_____	FACU
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	85	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **15**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **33** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**120**	x3 =	**360**
FACU species	**50**	x4 =	**200**
UPL species	**20**	x5 =	**100**
Column Totals:	**190** (A)		**660** (B)

Prevalence Index = B/A = **3.5**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 2u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	100					Loam	A1
10-15	10YR 2/2	100					Loam	A2
15-21	10YR 3/2	100					L/CL	AC stratified

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Haplustoll. La Prairie like soil. Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Escarpment into oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 2w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Fraxinus pennsylvanica**	**100**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Carex aquatilis**	80	x	OBL
2. **Phalaris arundinacea**	20	_____	FACW
3. **Thalictrum venulosum**	5	_____	FAC
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	105	= Total Cover	
Woody Vine Stratum (Plot Size: **30'**)			
1. **Echinocystis lobata**	**5**	**x**	**FAC**
2. _____	_____	_____	_____
	5	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 2w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	95	10YR 5/6	5	C	M	Loam	A
4-12	2.5Y 3/2	80	7.5YR 5/6	20	C	M	SL	AC

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Mollic Fluvaquent. Very poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Fringe of oxbow. Hydrology has been manipulated by road system. Water in bottom of oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 3u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Levee on floodplain Local relief (concave, convex, none): Plane Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Populus deltoides**	5	x	FAC
2. **Salix interior**	5	x	FACW
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	10	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Cirsium arvense**	10	x	FACU
2. **Artemisia vulgaris**	10	x	UPL
3. **Equisetum hyemale**	5	x	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	45	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **50**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **60** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

sandy soils, lots of open groung

SOIL

Sampling Point: 3u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 5/3	95	2.5Y 5/4	5	C	M	Fine Sand	A
12-16	2.5Y 3/2	95	2.5Y 5/4	5	C	M	LS	AC

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Aquic Ustifluvent. Banks like. Moderately well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sandy levee adjacent to depression (old meander) on floodplain. Site was flooded in 2011.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 3w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Depression on floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Populus deltoides**	50	x	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	50	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Calamagrostis canadensis**	50	x	FACW
2. **Phalaris arundinacea**	50	x	FACW
3. **Cirsium arvense**	10	_____	FACU
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	110	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 3w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	90	10YR 5/6	10	C	M	SL	A
3-11	2.5Y 4/2	85	7.5YR 5/6	15	C	M	LFS	C
11-16	2.5Y 3/2	95	10YR 5/6	5	C	M	CL	Ab

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression on floodplain. Old meander scar.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 4u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Levee on floodplain Local relief (concave, convex, none): Plane Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Artemisia vulgaris**	5	x	UPL
2. **Solidago gigantea**	5	x	FAC
3. **Cirsium arvense**	5	x	FACU
4. **Euphorbia esula**	5	x	N1 UPL
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	20	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **80**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **25** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**5**	x3 =	**15**
FACU species	**5**	x4 =	**20**
UPL species	**10**	x5 =	**50**
Column Totals:	**20** (A)		**85** (B)

Prevalence Index = B/A = **4.25**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 4u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 4/2	100					Fine Sand	A
12-16	2.5Y 3/2	100					FSL	AC

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Typic Ustifluvent. Banks. Moderately well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sandy levee adjacent to depression (old meander) on floodplain. Site was flooded in 2011. Levees are irregular shaped and are adjacent to the depressions. Area probably reshaped during flooding in 2011..

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 4w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Depression on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	5	x	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	5	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	50	x	FACW
2. **Poa pratensis**	40	x	FACU
3. **Cirsium arvense**	5	_____	FACU
4. **Sonchus arvensis**	10	_____	FAC
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	110	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **66** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 4w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	95	10YR 5/6	5	C	M	FSL	A
4-12	2.5Y 4/2	85	7.5YR 5/6	15	C	M	LFS	C

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 6

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression on floodplain. Old meander scar. Oxidized rhizospheres and saturation in places.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 5u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Levee on floodplain Local relief (concave, convex, none): Plane Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Ulmus americana**	**20**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	20	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Fraxinus pennsylvanica**	5	x	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	5	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Poa pratensis**	80	x	FACU
2. **Sonchus arvensis**	5	_____	FAC
3. **Urtica dioica**	5	_____	FAC
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	90	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 5u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 4/3	95	2.5Y 5/4	5	C	M	Fine Sand	A
12-18	2.5Y 3/2	95	2.5Y 5/4	5	C	M	Loam	AC

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Aquic Ustifluvent. Banks like. Moderately well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sandy levee adjacent to depression (old meander) on floodplain. Site was flooded in 2011. Levees are irregular shaped and are adjacent to the depressions. Area probably reshaped during flooding in 2011..

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 5w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Abandoned oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**50**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	50	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Fraxinus pennsylvanica**	60	x	FAC
2. **Ulmus americana**	5	_____	FAC
3. **Cornus alba**	5	_____	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	70	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Artemisia vulgaris**	15	x	UPL
2. **Taraxacum officinale**	5	x	FACU
3. **Arctium minus**	5	_____	FACU
4. **Potentila norvegica**	5	_____	FAC
5. **Poa pratensis**	5	_____	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	35	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **60**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **50** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**5**	x2 =	**10**
FAC species	**120**	x3 =	**360**
FACU species	**15**	x4 =	**60**
UPL species	**15**	x5 =	**75**
Column Totals:	**155** (A)		**505** (B)

Prevalence Index = B/A = **3.3**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 5w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	2.5Y 4/2	80	7.5YR 5/6	20	C	M/PL	FSL	A1
10-18	10YR 3/2	90	10YR 5/6	10	C	M	Loam	A 2

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 6

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression on floodplain. Abandoned oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 6u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Levee on floodplain Local relief (concave, convex, none): Plane Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: _____)			
1. **Phalaris arundinacea**	40	x	FACW
2. **Cirsium arvense**	20	x	FACU
3. **Urtica dioica**	20	x	FAC
4. **Xanthium strumarium**	10	_____	FAC
5. **Artemisia vulgaris**	10	_____	UPL
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **66** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 6u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	2.5Y 4/3	70					SL/Loam	AC stratified
	10YR 3/2	30						

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Typic Ustifluvent. Banks. Moderately well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Levee adjacent to river on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 6w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Bank of stream on floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Fraxinus pennsylvanica**	**10**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	10	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	40	x	FACW
2. **Urtica dioica**	5	_____	FAC
3. **Taraxacum officinale**	5	_____	FACU
4. **Mentha arvensis**	5	_____	FACW
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	70	= Total Cover	
Woody Vine Stratum (Plot Size: **15'**)			
1. **Echinocystis lobata**	**5**	**x**	**FAC**
2. _____	_____	_____	_____
	5	= Total Cover	

% Bare Ground in Herb Stratum **30**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 6w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 3/2	95	10YR 5/6	5	C	M	Loam	A
2-8	2.5Y 4/2	90	7.5YR 5/6	10	C	M/PL	Loam	C1
8-16	2.5Y 4/2	80	7.5YR 5/6	20	C	M	SL	C2

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Bank of stream on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 7u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Rise on floodplain Local relief (concave, convex, none): Plane Slope (%): 2

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Lonicera dioica**	100	x	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	100	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	80	x	FACW
2. **Poa pratensis**	20	_____	FACU
3. **Calamagrostis canadensis**	10	_____	FACW
4. **Euphorbia esula**	5	_____	N1 UPL
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	115	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**2**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**90**	x2 =	**180**
FAC species	**0**	x3 =	**0**
FACU species	**120**	x4 =	**480**
UPL species	**5**	x5 =	**25**
Column Totals:	**215** (A)		**685** (B)

Prevalence Index = B/A = **3.2**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 7u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					Clay Loam	A1
12-24	10YR 2/2	100					Clay Loam	A2

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Haplustoll. La Prairie soils. Moderately well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Rise on floodplain adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 7w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Shallow depression on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	100	x	FACW
2. **Euphorbia esula**	5		N1 UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 7w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					Loam	A
5-15	2.5Y 4/2	80	7.5YR 5/6	20	C	M/PL	Clay Loam	C

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 8u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Rise on floodplain Local relief (concave, convex, none): Plane Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Artemisia vulgaris**	40	x	UPL
2. **Phalaris arundinacea**	40	x	FACW
3. **Poa pratensis**	10	_____	FACU
4. **Tanacetum vulgare**	10	_____	FACU
5. **Cirsium arvense**	5	_____	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	95	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**2**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**40**	x2 =	**80**
FAC species	**0**	x3 =	**0**
FACU species	**25**	x4 =	**100**
UPL species	**40**	x5 =	**200**
Column Totals:	**105** (A)		**380** (B)

Prevalence Index = B/A = **3.6**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 8u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5Y 3/2	100					SL	A
3-14	2.5Y 4/3	90	2.5Y 5/4	10	C	M	LS	C

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Aquic Ustifluvent. Somewhat poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Rise on floodplain adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 8w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 22, T155N, R83W

Landform (hillslope, terrace, etc.): Depression on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**10**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	10	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	90	x	FACW
2. **Calamagrostis canadensis**	10	_____	FACW
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 8w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/2	90	7.5YR 5/6	10	C	M/PL	Loam	A
5-15	2.5Y 4/2	80	7.5YR 5/6	20	C	M	SL	C

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):	
Water Table Present?	Yes	☒	No	☐	Depth (inches):	5
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	5

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 9u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Rise on floodplain Local relief (concave, convex, none): Plane Slope (%): 2

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Fraxinus pennsylvanica**	**80**	**x**	**FAC**
2. _____			
3. _____			
4. _____			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Bromus inermis**	80	x	UPL
2. **Cirsium arvense**	20		FACU
3. **Artemisia vulgaris**	10		UPL
4. **Sonchus arvensis**	5		FAC
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
	115	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____			
2. _____			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **50** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**85**	x3 =	**255**
FACU species	**20**	x4 =	**80**
UPL species	**90**	x5 =	**450**
Column Totals:	**195** (A)		**785** (B)

Prevalence Index = B/A = **4.0**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 9u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					Loam	A
7-12	2.5Y 3/2	100					SL	Bw
12-18	10YR 2/2	90	10YR 5/6	10	C	M	Loam	Ab

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Haplustoll. Straw like-soils. Somewhat poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Rise on floodplain adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection | City/County: Ward | Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. | State: ND | Sampling Point: 9w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer | Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Depression on floodplain | Local relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): F | Lat: _____ | Long: _____ | Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded | NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**20**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	20	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	65	x	FACW
2. **Sonchus arvensis**	10	_____	FAC
3. **Calamagrostis canadensis**	10	_____	FACW
4. **Poa pratensis**	10	_____	FACU
5. **Cirsium arvense**	5	_____	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 9w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/2	85	10YR 5/6	15	C	M/PL	SL	A
4-16	10YR 2/2	95	10YR 5/6	5	C	M	Clay Loam	AC

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):	
Water Table Present?	Yes	☒	No	☐	Depth (inches):	Surface
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	Surface

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 10u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Rise on floodplain Local relief (concave, convex, none): Plane Slope (%): 2

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Elymus repens**	50	x	FACU
2. **Poa pratensis**	40	x	FACU
3. **Panicum virgatum**	5		FAC
4. **Euphorbia esula**	5		N1 UPL
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 10u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/2	100					Clay Loam	A
5-15	10YR 3/2	100					Clay Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Haplustoll. La Prairie ike-soils. Somewhat poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Rise on floodplain adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 10w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Depression on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Hordeum jubatum**	40	x	FACW
2. **Typha sp.**	40	x	OBL
3.			
4. **Oenothera biennis**	5		FACU
5. **Poa pratensis**	5		FACU
6. **Rumex crispus**	5		FAC
7.			
8.			
9.			
10.			
	95	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 10w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	2.5Y 4/2	55	7.5YR 5/6	15	C	M/PL	L/SL	A stratified
	10YR 2/2	25	10YR 5/6	5	C	M		

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	6
Water Table Present?	Yes	☒	No	☐	Depth (inches):	Surface
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	Surface

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 11u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**60**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	60	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	30	x	FACW
2. **Bromus inermis**	30	x	UPL
3. **Poa pratensis**	15	_____	FACU
4. **Cirsium arvense**	5	_____	FACU
5. **Carex gracillima**	5	_____	FACW
6. **Urtica dioica**	5	_____	FAC
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	95	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **66** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 11u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 4/3	100					Fine Sand	A

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Typic Ustifluvent. Banks soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Escarpment adjacent to channel of oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 11w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**10**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	10	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	95	x	FACW
2. **Urtica dioica**	10	_____	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	105	= Total Cover	
Woody Vine Stratum (Plot Size: **15'**)			
1. **Echinocystis lobata**	**5**	**x**	**FAC**
2. _____	_____	_____	_____
	5	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 11w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 4/2	80	7.5YR 5/6	20	C	M/PL	LS	A
8-16	2.5Y 3/2	70	7.5YR 5/6	30	C	M	Loam	Ab

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):	
Water Table Present?	Yes	☒	No	☐	Depth (inches):	Surface
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	Surface

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Oxbow on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 12u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 23, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Ulmus americana**	**40**	**x**	**FAC**
2. **Fraxinus pennsylvanica**	40	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	80	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	20	x	FAC
2. **Ulmus americana**	5	_____	FAC
3. **Lonicera dioica**	10	x	FACU
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	35	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	10	x	FACW
2. **Urtica dioica**	10	x	FAC
3. **Sonchus arvensis**	10	x	FAC
4. **Cirsium arvense**	10	x	FACU
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	40	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **60**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **6** (A)

Total Number of Dominant Species Across All Strata: **8** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **0.75** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 12u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 2/1	100					Loam	A
14-22	10YR 2/2	100					Loam	A2
22+	10YR 4/3	95	2.5Y 5/4	5	C	M	Clay Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. La Prairie soil. Moderately well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on escarpment above the seep area.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 12w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 23, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment sideslope (seep) Local relief (concave, convex, none): Concave Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**20**	**x**	**FAC**
2. **Salix amygdaloides**	20	x	FACW
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	40	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	10	x	FAC
2. **Cornus alba**	5	x	FACW
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	15	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	60	x	FACW
2. **Epilobium leptophyllum**	20	_____	OBL
3. **Carex retrosa**	20	_____	OBL
4. **Rumex crispus**	10	_____	FAC
5. **Cirsium arvense**	5	_____	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	115	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **5** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 12w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	95	10YR 5/6	5	C	M	Loam	A
8-16	2.5Y 3/2	95	10YR 5/6	5	C	M	Clay Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The area is a seep on the sideslope of an escarpment leading into an oxbow on the floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 13u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 23, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Fraxinus pennsylvanica**	**100**	**x**	**FAC**
2. _____			
3. _____			
4. _____			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Poa pratensis**	70	x	FACU
2. **Taraxacum officinale**	20	x	FACU
3. **Cirsium arvense**	10	_____	FACU
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____			
2. _____			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **33** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**100**	x3 =	**300**
FACU species	**100**	x4 =	**400**
UPL species	**0**	x5 =	**0**
Column Totals:	**200** (A)		**700** (B)

Prevalence Index = B/A = **3.5**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 13u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loam	A
3-15	2.5Y 5/3	95	2.5Y 5/4	5	C	M	Clay Loam	C

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Aquic Udifluvent. Somewhat poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 13w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 23, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	60	x	FACW
2. **Typha latifolia**	40	x	OBL
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 13w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	95	10YR 5/6	5	C	M	Loam	A
6-14	2.5Y 4/2	60	10YR 5/6	20	C	M	Clay Loam	C
	2.5Y 4/3	20						

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Very Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	24
Water Table Present?	Yes	☒	No	☐	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 14u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 14, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 15

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F576A Velva loam, moist, 0 to 2 percent slopes, occasionally flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☒	No	☐
Hydric Soil Present?	Yes	☐	No	☒
Wetland Hydrology Present?	Yes	☐	No	☒

Is the Sampling Area within a Wetland? Yes ☐ No ☒

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	70	x	FACW
2. **Euphorbia esula**	10		N1 UPL
3. **Carex aquatilis**	10		OBL
4. **Artemisia vulgaris**	5		UPL
5. **Cirsium arvense**	5		FACU
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 14u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/2	100					Loam	A
5-15	10YR 3/2	100					Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Pachic Hapludoll. Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/19/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 14w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 14, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F576A Velva loam, moist, 0 to 2 percent slopes, occasionally flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	90	x	FACW
2. **Rumex crispus**	10	_____	FAC
3. **Carex aquatilis**	10	_____	OBL
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	110	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 14w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Loam	A
4-12	2.5Y 4/2	95	2.5Y 5/4	5	C	M	Loam	C

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☒ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	>72
Water Table Present?	Yes	☒	No	☐	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site adjacent to oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 15u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 2, T155N, R84W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 9

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	30	x	FACW
2. **Thalictrum venulosum**	10	x	FAC
3. **Taraxacum officinale**	5	_____	FACU
4. **Cirsium arvense**	5	_____	FACU
5. **Arctium minus**	5	_____	FACU
6. **Sonchus arvensis**	5	_____	FAC
7. **Euphorbia esula**	5	_____	N1 UPL
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	65	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **35**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **122** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 15u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 2/1	100					Loam	A
9-16	10YR 3/2	100					SL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Pachic Hapludoll. Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 15w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 2, T155N, R84W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	60	x	FACW
2. **Carex aquatilis**	20	x	OBL
3. **Equisetum arvense**	10	_____	FAC
4. **Euphorbia esula**	5	_____	N1 UPL
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	95	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 15w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Loam	A
6-12	2.5Y 4/2	90	10YR 5/6	10	C	M	Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	>48
Water Table Present?	Yes	☒	No	☐	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site adjacent to oxbow on floodplain (bank of oxbow). Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection | City/County: Ward | Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. | State: ND | Sampling Point: 16u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer | Section, Township, Range: Sec. 1, T155N, R84W

Landform (hillslope, terrace, etc.): Escarpment on floodplain | Local relief (concave, convex, none): Plane | Slope (%): 6

Subregion (LRR): F | Lat: _____ | Long: _____ | Datum: NAD 83

Soil Map Unit Name: F576A—Velva loam, moist, 0 to 2 percent slopes, occasionally flooded | NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**50**	**X**	**FAC**
2. _____			
3. _____			
4. _____			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	30	X	FAC
2. **Rosa arkansana**	5		FACU
3. _____			
4. _____			
5. _____			
	30	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Urtica dioica**	25	X	FAC
2. **Poa pratensis**	20	X	FACU
3. **Taraxacum officinale**	5		FACU
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
	50	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____			
2. _____			
		= Total Cover	

% Bare Ground in Herb Stratum **50**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **75** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**105**	x3 =	**315**
FACU species	**25**	x4 =	**100**
UPL species	**0**	x5 =	**0**
Column Totals:	**130** (A)		**415** (B)

Prevalence Index = B/A = **3.2**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 16u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	100					Loam	A
16-32	10YR 2/2	100					Loam	AB
32+	10YR 3/2	100					Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. La Prairie Soils. Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection | City/County: Ward | Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. | State: ND | Sampling Point: 16w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer | Section, Township, Range: Sec. 1, T155N, R84W

Landform (hillslope, terrace, etc.): Oxbow on floodplain | Local relief (concave, convex, none): Concave | Slope (%): ≤1

Subregion (LRR): F | Lat: _____ | Long: _____ | Datum: NAD 83

Soil Map Unit Name: F576A Velva loam, moist, 0 to 2 percent slopes, occasionally flooded | NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**100**	**x**	**FAC**
2.			
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	5	x	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot Size: **2' x 10'**)			
1. **Phalaris arundinacea**	75	x	FACW
2. **Urtica dioica**	20		FAC
3. **Taraxacum officinale**	5		FACU
4. **Poa pratensis**	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	105	= Total Cover	
Woody Vine Stratum (Plot Size: **15'**)			
1. **Echinocystis lobata**	**5**	**x**	**FAC**
2.			
	5	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **25** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**75**	x2 =	**150**
FAC species	**130**	x3 =	**390**
FACU species	**10**	x4 =	**40**
UPL species	**0**	x5 =	**0**
Column Totals:	**215** (A)		**580** (B)

Prevalence Index = B/A = **2.7**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

X 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☐

Remarks:

SOIL

Sampling Point: 16w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	95	7.5YR 5/6	5	C	M	Loam	A
7-14	5Y 3/1	98	2.5Y 5/4	2	C	M	SiCL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Very Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	>12
Water Table Present?	Yes	☒	No	☐	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site adjacent to oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 17u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 12, T155N, R84W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F527A Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Rosa arkansana**	5	x	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	5	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Poa pratensis**	70	x	FACU
2. **Galium boreale**	25	x	FACU
3. **Anemone canadensis**	5	_____	FACW
4. **Cirsium arvense**	5	_____	FACU
5. **R**	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	105	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **0** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **0** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**0**	x3 =	**0**
FACU species	**100**	x4 =	**400**
UPL species	**0**	x5 =	**0**
Column Totals:	**100** (A)		**400** (B)

Prevalence Index = B/A = **4**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 17u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	100					SiCL	A
16-28	2.5Y 3/2	100					SiCL	Bw
28+	2.5Y 4/3	100					SiCL	Bk

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. La Delle Soils. Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 17w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 12, T155N, R84W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F527A Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Glycyrrhiza lepidota**	5	x	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	5	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Poa pratensis**	70	x	FACU
2. **Carex aquatilis**	20	_____	OBL
3. **Mentha arvensis**	10	_____	FACW
4. **Typha sp.**	5	_____	OBL
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	105	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **0** (A)

Total Number of Dominant Species Across All Strata: **2** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **0** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**25**	x1 =	_____
FACW species	**10**	x2 =	_____
FAC species	**0**	x3 =	_____
FACU species	**75**	x4 =	_____
UPL species	**0**	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = **3.1**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 17w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	95	10YR 5/6	5	C	M	SiCL	A
7-14	5Y 3/1	90	7.5Y 5/6	10	C	M	SiCL	Bt

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Ludden soils. Very Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	>12
Water Table Present?	Yes	☒	No	☐	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site in oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 18u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 12, T155N, R84W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Bromus inermis**	95	x	UPL
2. **Taraxacum officinale**	5	_____	FACU
3. **Artemisia vulgaris**	5	_____	UPL
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	105	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 18u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 2/1	100					Loam	A
9-24	10YR 3/2	100					Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. La Prairie Soils. Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on channel escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 18w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 12, T155N, R84W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	100	x	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 18w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 2/1	100					Loam	A
13-20	2.5Y 4/2	85	7.5Y 5/6	20	C	M	SiCL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Ludden soils. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 19u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 18, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 9

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Lonicera dioica**	20	x	FACU
2. **Rosa arkansana**	20	x	FACU
3. **Ulmus americana**	5	_____	FAC
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	45	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Galium triflorum**	50	x	FACU
2. **Poa pratensis**	20	x	FACU
3. **Carex aquatilis**	20	x	OBL
4. **Sonchus arvensis**	10	_____	FAC
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **20** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**20**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**15**	x3 =	**105**
FACU species	**110**	x4 =	**440**
UPL species	**0**	x5 =	**0**
Column Totals:	**46** (A)		**109** (B)

Prevalence Index = B/A = **2.4**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 19u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					Loam	A
6-15+	10YR 3/2	99	10YR 5/6				Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. La Prairie Soils. Moderately Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on channel escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 19w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 18, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Lonicera dioica**	10	x	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	10	= Total Cover	
Herb Stratum (Plot Size: **10 x 20'**)			
1. **Carex aquatilis**	80	x	OBL
2. **Poa pratensis**	25	x	FACU
3. **Equisetum arvense**	5	_____	FAC
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	110	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **33** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**80**	x1 =	**80**
FACW species	**0**	x2 =	**0**
FAC species	**5**	x3 =	**15**
FACU species	**35**	x4 =	**140**
UPL species	**0**	x5 =	**0**
Column Totals:	**120** (A)		**235** (B)

Prevalence Index = B/A = **2**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

x 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 19w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					SiCL	A
8-16	2.5Y 4/2	90	7.5YR 4/4	10	C	M	SiCL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Ludden soils. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):	
Water Table Present?	Yes	☒	No	☐	Depth (inches):	8
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	8

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 20u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 18, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 4

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**10**	**x**	**FAC**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	10	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Poa pratensis**	50	x	FACU
2. **Taraxacum officinale**	15	_____	FACU
3. **Achillea millefolium**	15	_____	FACU
4. **Cirsium arvense**	10	_____	FACU
5. **Plantago major**	10	_____	FAC
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**2**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**50**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**20**	x3 =	**60**
FACU species	**90**	x4 =	**360**
UPL species	**0**	x5 =	**0**
Column Totals:	**110** (A)		**420** (B)

Prevalence Index = B/A = **3.8**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 20u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					Loam	A
5-15+	10YR 3/2	50	10YR 5/6	10	C	M	Loam	Bw mixed
	2.5Y 4/3	40						

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Aquic Hapludoll. Somewhat poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on channel escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 20w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 18, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **4 x 10'**)			
1. **Calamagrostis canadensis**	50	x	FACW
2. **Phalaris arundinacea**	30	x	FACW
3. **Melilotus officinalis**	10		FACU
4. **Poa pratensis**	10		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 20w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					Loam	A
2-12	2.5Y 4/2	85	7.5YR 4/4	15	C	M	Loam	C

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	>12
Water Table Present?	Yes	☒	No	☐	Depth (inches):	4
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	4

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection | City/County: Ward | Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. | State: ND | Sampling Point: 21u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer | Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain | Local relief (concave, convex, none): Plane | Slope (%): 9

Subregion (LRR): F | Lat: _____ | Long: _____ | Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded | NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**100**	**x**	**FAC**
2. **Fraxinus pennsylvanica**	100	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	200	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	20	x	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	20	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Bromus inermis**	50	x	UPL
2. **Poa pratensis**	20	x	FACU
3. **Nepeta cataria**	10	_____	FACU
4. **Taraxacum officinale**	5	_____	FACU
5. **Elymus repens**	5	_____	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	90	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **10**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **60** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 21u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					SL	A
6-15	2.5Y 4/3	100					SL/LS	Bw stratified

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Typic Udifluvent. Banks like soil. Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on channel escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection | City/County: Ward | Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. | State: ND | Sampling Point: 21w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer | Section, Township, Range: Sec. 21, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain | Local relief (concave, convex, none): Concave | Slope (%): 3

Subregion (LRR): F | Lat: _____ | Long: _____ | Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded | NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**100**	**x**	**FAC**
2. **Fraxinus pennsylvanica**	100	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	200	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Ulmus americana**	5	x	FAC
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	5	= Total Cover	
Herb Stratum (Plot Size: **3 x 5'**)			
1. **Phalaris arundinacea**	40	x	FACW
2. **Carex aquatilis**	40	x	OBL
3. **Calamagrostis canadensis**	20	x	FACW
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **6** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 21w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	95	7.5YR 4/4	5	C	M	Loam	A
6-15	2.5Y 4/2	85	7.5YR 5/6	15	C	M	SL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	>12
Water Table Present?	Yes	☒	No	☐	Depth (inches):	4
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	4

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 22u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 27, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 9

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F576A Velva loam, moist, 0 to 2 percent slopes, occasionally flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**100**	**x**	**FAC**
2. **Ulmus americana**	10	_____	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	110	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Lonicera dioica**	10	x	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	10	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Bromus inermis**	30	x	UPL
2. **Taraxacum officinale**	10	x	FACU
3. **Galium triflorum**	10	x	FACU
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	50	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **50**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **20** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**110**	x3 =	**330**
FACU species	**30**	x4 =	**120**
UPL species	**30**	x5 =	**150**
Column Totals:	**170** (A)		**600** (B)

Prevalence Index = B/A = **3.5**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 22u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 2/1	100					SiCL	A
14-20+	10YR 3/2	100					SiCL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. Ladell. Moderately Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on channel escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 22w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 27, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F576A Velva loam, moist, 0 to 2 percent slopes, occasionally flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**50**	**x**	**FAC**
2. **Ulmus americana**	50	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	50	x	FAC
2. **Ulmus americana**	50	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	100	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Carex normalis**	80	x	OBL
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	80	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **20**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **5** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 22w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	90	7.5YR 5/6	10	C	M	SiCL	A
8-16	2.5Y 3/2	60	7.5YR 5/6	20	C	M	SiCL	Bw mixed
	2.5Y 4/2	20						

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes ☐	No ☐	Depth (inches):		
Water Table Present?	Yes ☐	No ☐	Depth (inches):	8	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):	8	

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 23u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 23, T155N, R83W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**50**	**x**	**FAC**
2. **Fraxinus pennsylvanica**	50	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	15	x	FAC
2. **Rhamnus cathartica**	5	_____	FACU
3. **Rosa arkansana**	5	_____	FACU
4. **Viburnum opulus**	5	_____	FAC
5. _____	_____	_____	_____
	30	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Maianthemum stellatum**	10	x	FACU
2. **Anemone canadensis**	5	_____	FACW
3. **Mentha arvensis**	10	x	FACW
4. **Arctium minus**	5	_____	FACU
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	30	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **50**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **40** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**10**	x2 =	**20**
FAC species	**120**	x3 =	**150**
FACU species	**25**	x4 =	**100**
UPL species	**0**	x5 =	**0**
Column Totals:	**185** (A)		**570** (B)

Prevalence Index = B/A = **3.1**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 23u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					SiCL	A
6-16	2.5Y 3/2	99	10YR 5/6	1	C	M	Loam	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. La Prairie. Moderately Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on channel escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 23w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 23, T155N, R83W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**50**	**x**	**FAC**
2. **Fraxinus pennsylvanica**	50	x	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Ulmus americana**	10	x	FAC
2. **Cornus alba**	5	x	FACW
3. **Acer negundo**	5	x	FAC
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	20	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Carduus nutans**	5	x	FACU
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	15	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum **85**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 23w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	95	10YR 5/6	5	C	M	SiCL	A
5-15	2.5Y 3/2	90	2.5Y 5/6	10	C	M	SiCL	Bw mixed

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes ☐	No ☐	Depth (inches):		
Water Table Present?	Yes ☒	No ☐	Depth (inches):	5	
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):	5	

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 24u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 19, T155N, R82W

Landform (hillslope, terrace, etc.): Escarpment on floodplain Local relief (concave, convex, none): Plane Slope (%): 6

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F645B Urban land-Udifluvents loamy complex, 0 to 6 percent slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer negundo**	**30**	**x**	**FAC**
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Fraxinus pennsylvanica**	5	x	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	60	x	FACW
2. **Poa pratensis**	20	x	FACU
3. **Sonchus arvensis**	5		FAC
4. **Cirsium arvense**	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	90	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum **5**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 24u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					Loam	A
4-15	10YR 3/2	100					SL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Pachic Hapludoll. Moderately Well drained. Slump area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on channel escarpment above the oxbow.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 24w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 19, T155N, R82W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F645B Urban land-Udifluvents loamy complex, 0 to 6 percent slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Acer negundo**	5	x	FAC
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	40	x	FACW
2. **Poa pratensis**	15		FACU
3. **Carex aquatilis**	10		OBL
4. **Cirsium arvense**	5		FACU
5. **Anemone canadensis**	5		FACW
6. **Mentha arvensis**	5		FACW
7.			
8.			
9.			
10.			
	80	= Total Cover	
Woody Vine Stratum (Plot Size: **15'**)			
1. **Echinocystis lobata**	**5**	**x**	**FAC**
2.			
	5	= Total Cover	

% Bare Ground in Herb Stratum **15**

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)

Total Number of Dominant Species Across All Strata: **3** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **100** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 24w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	95	10YR 5/6	5	C	M	Loam	A
5-15	2.5Y 4/2	90	10YR 5/6	10	C	M	L/SL	Bw stratified

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☐	Depth (inches):
Water Table Present?	Yes	☒	No	☐	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 4

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 25u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 29, T155N, R82W

Landform (hillslope, terrace, etc.): Rise on floodplain Local relief (concave, convex, none): Plane Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F527A Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Elymus repens**	70	x	FACU
2. **Euphorbia esula**	30	x	N1 UPL
3. **Taraxacum officinale**	5		FACU
4. **Bromus inermis**	5		UPL
5.			
6.			
7.			
8.			
9.			
10.			
	110	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 25u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					SL	A
6-20	10YR 3/2	99	10YR 5/6	1	C	M	SL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Aquic Hapludoll. Moderately Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on rise on floodplain adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 25w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 29, T155N, R82W

Landform (hillslope, terrace, etc.): Abandoned channel on floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F527A Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Spartina pectinata**	80	x	FACW
2. **Phalaris arundinacea**	20	x	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 25w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					SL	A
6-14	2.5Y 4/2	85	10YR 5/6	15	C	M	SL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	<6
Water Table Present?	Yes	☒	No	☐	Depth (inches):	4
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	4

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Abandoned channel. Area might have been manipulated.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 26u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 29, T155N, R82W

Landform (hillslope, terrace, etc.): Rise on floodplain Local relief (concave, convex, none): Plane Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Quercus macrocarpa**	**100**	**x**	**FACU**
2. _____			
3. _____			
4. _____			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
		= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	50	x	FACW
2. **Poa pratensis**	50	x	FACU
3. **Artemisia vulgaris**	10		UPL
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
	110	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____			
2. _____			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**33**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**50**	x2 =	**100**
FAC species	**0**	x3 =	**0**
FACU species	**150**	x4 =	**600**
UPL species	**10**	x5 =	**50**
Column Totals:	**210** (A)		**750** (B)

Prevalence Index = B/A = **3.6**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 26u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/2	100					SiCL	A
8-16	2.5Y 3/2	100					SiCL	Bw

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Hapludoll. Moderately Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on rise on floodplain adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 26w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 29, T155N, R82W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F577A Velva, moist-Fluvaquents, channeled fine sandy loams, 0 to 2 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Quercus macrocarpa**	**30**	**x**	**FACU**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	30	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Alopecurus arundinaceus**	25	x	FACW
2. **Phalaris arundinacea**	25	x	FACW
3. **Calamagrostis canadensis**	25	x	FACW
4. **Rumex crispus**	25	x	FAC
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **4** (A)

Total Number of Dominant Species Across All Strata: **5** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **80** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 26w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	95	10YR 5/6	5	C	M/PL	SiCL	A
4-14	2.5Y 4/2	60	10YR 5/6	10	C	M	SiCL	Bw stratified
	2.5Y 3/2	30						

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☒ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☐	Depth (inches):	
Water Table Present?	Yes	☒	No	☐	Depth (inches):	6
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	6

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site is on bank of oxbow on floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 27u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 32, T155N, R82W

Landform (hillslope, terrace, etc.): Rise on floodplain Local relief (concave, convex, none): Plane Slope (%): 1

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F527A Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: **15'**)			
1. **Salix interior**	10	x	FACW
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. **40**	_____	_____	_____
5. _____	_____	_____	_____
	10	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Poa pratensis**	80	x	FACU
2. **Taraxacum officinale**	20	_____	FACU
3. **Phalaris arundinacea**	5	_____	FACW
4. **Taraxacum officinale**	5	_____	FACU
5. **Anemone canadensis**	5	_____	FACW
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	115	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)

Total Number of Dominant Species Across All Strata: **0** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **50** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**20**	x2 =	**42**
FAC species	**0**	x3 =	**0**
FACU species	**105**	x4 =	**420**
UPL species	**0**	x5 =	**0**
Column Totals:	**125** (A)		**460** (B)

Prevalence Index = B/A = **3.7**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 27u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					SiCL	A
6-15	2.5Y 3/2	100					SiCL	Bw Stratified

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Mollic Udifluvent. Moderately Well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on rise on floodplain (Levee) adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 27w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 32, T155N, R82W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F527A Ludden silty clay, very poorly drained, 0 to 1 percent slopes, frequently flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐	**Is the Sampling Area within a Wetland?**	**Yes ☒ No ☐**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: **30'**)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Salix amygdaloides**	**30**	**x**	**FACW**
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	30	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5 x5'**)			
1. **Phalaris arundinacea**	50	x	FACW
2. **Hordeum jubatum**	20	x	FACW
3. **Typha sp.**	10	_____	OBL
4. **Sonchus arvensis**	10	_____	FAC
5. **Taraxacum officinale**	10	_____	FACU
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 27w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	2.5Y 3/2	100					SiCL	A
5-15	2.5Y 4/2	70	10YR 5/6	10	C	M	SiCL	Bw stratified
	2.5Y 3/2	20						

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Typic Fluvaquent. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☐	Depth (inches):
Water Table Present?	Yes	☒	No	☐	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 4

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site is on bank of oxbow on floodplain. Water in channel.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection | City/County: Ward | Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. | State: ND | Sampling Point: 28u

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer | Section, Township, Range: Sec. 29, T155N, R82W

Landform (hillslope, terrace, etc.): Rise on floodplain | Local relief (concave, convex, none): Plane | Slope (%): 1

Subregion (LRR): F | Lat: _____ | Long: _____ | Datum: NAD 83

Soil Map Unit Name: F576A Velva loam, moist, 0 to 2 percent slopes, occasionally flooded | NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Poa pratensis**	70	x	FACU
2. **Phalaris arundinacea**	20	_____	FACW
3. **Bromus inermis**	10	_____	UPL
4. **Taraxacum officinale**	5	_____	FACU
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	105	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **0** (A)

Total Number of Dominant Species Across All Strata: **1** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **0** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**20**	x2 =	**40**
FAC species	**0**	x3 =	**0**
FACU species	**75**	x4 =	**300**
UPL species	**10**	x5 =	**50**
Column Totals:	**105** (A)		**390** (B)

Prevalence Index = B/A = **3.7**

Hydrophytic Vegetation Indicators:

_____ 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: 28u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 2/1	100					SiCL	A
13-20	10YR 2/2	95	7.5YR 5/6	5	C	M	SiCL	A2

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☐ No ☒

Remarks:

Cumulic Udifluvent. Somewhat poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):
Water Table Present?	Yes	☐	No	☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site on rise on floodplain (Levee) adjacent to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project Site: Minot Flood Protection City/County: Ward Sampling Date: 5/20/15

Applicant/Owner: Houston Engineering, Inc. State: ND Sampling Point: 28w

Investigator(s): Mark Aanenson, Donna Jacob, and Mike Ulmer Section, Township, Range: Sec. 29, T155N, R82W

Landform (hillslope, terrace, etc.): Oxbow on floodplain Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): F Lat: _____ Long: _____ Datum: NAD 83

Soil Map Unit Name: F576A Velva loam, moist, 0 to 2 percent slopes, occasionally flooded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☒	No	☐
Hydric Soil Present?	Yes	☒	No	☐
Wetland Hydrology Present?	Yes	☒	No	☐

Is the Sampling Area within a Wetland? Yes ☒ No ☐

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
	_____	= Total Cover	
Herb Stratum (Plot Size: **5'**)			
1. **Phalaris arundinacea**	90	x	FACW
2. **Urtica dioica**	5	_____	FAC
3. **Typha sp.**	5	_____	OBL
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
	100	= Total Cover	
Woody Vine Stratum (Plot Size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

x 1 – Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is >50%

_____ 3 – Prevalence Index is ≤3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: 28w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					SiCL	A
5-20	10YR 2/1	90	7.5YR 5/6	10	C	M	SiCL	A2

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 CM Mucky Peat or Peat (S2)(**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

Cumulic Endoaquoll. Poorly drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres along Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes	☐	No	☐	Depth (inches):
Water Table Present?	Yes	☒	No	☐	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 6

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site is on bank of oxbow on floodplain. Water in channel.

ATTACHMENT 7

WETLAND SITE PHOTOGRAPHS

Attachment 7: Wetland Site Photographs

Site 8w

Site 9w

Site 11w

Site 12w

Site 13w

Site 16w

Attachment 7: Wetland Site Photographs

Site 17w

Site 18w

ATTACHMENT 8

PONDING SITE PHOTOGRAPHS

Attachment 8: Potential Ponding Site Photographs

Site 1w

Site 2w

Site 3w

Site 4w

Site 5w

Site 6w

Attachment 8: Potential Ponding Site Photographs

Site 7w

Site 14w

Site 18w

Site 19w

Site 20w

Site 21w

Attachment 8: Potential Ponding Site Photographs

Site 22w – Channel flow diversion area

Site 23w

Site 24w

Site 25w

Site 26w

ATTACHMENT 9

ORDINARY HIGH WATER MARK DATA FORMS

Table: original field site numbers and corresponding map site numbers

OWH site number	OHW original field site number
1	29
2	30
3	31
4	32
5	33
6	34
7	35
8	36
9	37
10	38
11	41
12	42
13	39
14	40
15	43

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				Sample Point: 29	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural		Artificial		Manipulated	
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)			Intermittent (Flows <3 months)		
	Seasonal (Continuous flow ≥ 3 months)			Ephemeral (Flows only in response to rainfall)		
Stream Width (ft)	50-60		Stream Depth (ft):	?		
OHWM Indicator	Natural Line Impress on bank		Sediment Sorting		Shelving	
	Litter disturbed or washed away		Changes in character of soil		Scour	
	Destruction of terrestrial vegetation		Deposition		Presence of litter or debris	
	Multiple observed flow events		Wracking		Bed and bank	
	Vegetation matted down, bent or absent		Water staining		Change in plant community	
Vegetation Above OHW:	*Medicago sativa, Euphorbia esula, Taraxacum officinale, Phalaris arundinacea*					
Vegetation Below OHW:	*Elymus repens, Phalaris arundinacea*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:		Other (explain):			

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				Sample Point: **30**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:		
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	29	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Fraxinus pennsylvanica, Taraxacum officinale, Euphorbia esula, Artemisia vulgaris, Medicago sativa*					
Vegetation Below OHW:	*Phalaris arundinacea, Fraxinus pennsylvanica, Elymus repens, Plantago major, Rumex crispus, Carex sp.*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 31**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:		
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	66	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Solidago gigantean, Epilobium leptophyllum*					
Vegetation Below OHW:	*Phalaris arundinacea, Populus deltoides, Plantago major, Typha sp., bulrush, crowfoot,*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 32**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:		
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	60 ?	Stream Depth (ft):				
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Xanthium strumarium, Euphorbia esula, Apocynum cannabinum, Acer negundo, Fraxinus pennsylvanica, Ulmus Americana, Artemisia vulgaris*					
Vegetation Below OHW:	*Phalaris arundinacea, Xanthium strumarium, Epilobium leptophyllum*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 33**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	50-60	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Rumex crispus, Medicago sativa, Artemisia vulgaris, Euphorbia esula, Cirsium arvense, Elymus repens*					
Vegetation Below OHW:	*Phalaris arundinacea, Populus deltoides, Carex sp., Euphorbia esula, Elymus repens*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 34**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:		
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	100	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Euphorbia esula, Panicum virgatum, Artemisia vulgaris*					
Vegetation Below OHW:	*Phalaris arundinacea, Carex sp.*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 35**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes*	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	150	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Populus deltoides, Oenothera biennis, Euphorbia esula, Taraxacum officinale, Artemisia vulgaris*					
Vegetation Below OHW:	*Equisetum arvense, Fraxinus pennsylvanica, Poa pratensis, Salix interior, Carex sp.*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

*Bank surface was damp up to OHWM, hot dry day, oxidized runnels into H2O

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 36**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	100	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Euphorbia esula, Artemisia vulgaris, Taraxacum officinale, Cirsium arvense, Elymus repens*					
Vegetation Below OHW:	*Phalaris arundinacea, Carex sp.*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 37**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	60	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Artemisia vulgaris, Medicago sativa, Cirsium arvense, Taraxacum officinale, Acer negundo, Poa pratensis*					
Vegetation Below OHW:	*Phalaris arundinacea, Carex sp.*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 38**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	60	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Artemisia vulgaris, Oenothera biennis, Taraxacum officinale, Carex sp., Mentha arvensis, strawberry, bindweed*					
Vegetation Below OHW:	*Carex sp., Populus deltoides*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 39**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	120	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Oenothera biennis, Artemisia vulgaris, Cirsium arvense,*					
Vegetation Below OHW:	*Phalaris arundinacea, Potentilla norvegica, Eleocharis palustris, Oenothera biennis, Persicaria sp., Typha sp.*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 5/21/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 40**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	100	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Equisetum arvense, Medicago sativa, Artemisia vulgaris, Taraxacum officinale, Bromus inermis, Sonchus arvensis*					
Vegetation Below OHW:	*Phalaris arundinacea,*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 6/24/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 41**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:	?	
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	120-150	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Phalaris arundinacea, Euphorbia esula, Cirsium arvense, Artemisia vulgaris, Apocynum cannabinum, Lactuca seriola*					
Vegetation Below OHW:	*Phalaris arundinacea, Cirsium arvense, Apocynum cannabinum, Carex sp.*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 6/24/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 42**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:		
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	80	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Acer negundo, Artemisia vulgaris, Ulmus Americana, Fraxinus pennsylvanica, Melilotus officinalis*					
Vegetation Below OHW:	*Phalaris arundinacea, Carex sp. Xanthium strumarium, Schoenoplectus tabernaemontani, Beckmannia syzigachne*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

Other Waters Information Form

Date: 6/24/2015	Project: Mouse River Enhanced Flood Protection				**Sample Point: 43**	
State-County: Ward County, ND	Investigators: Mark Aanenson, Donna Jacob					
Waterbody Type:	Lake	Pond	Borrow Pit	River	Stream	Other
Waterbody Name:	Mouse River					
River or Stream						
Stream is:	Natural	Artificial	Manipulated			
Subsurface Flow:	Yes	No	Unknown	Channel Height (ft) OHW to bottom:		
Flow Type:	Perennial (Flows year round)	Intermittent (Flows <3 months)				
	Seasonal (Continuous flow ≥ 3 months)	Ephemeral (Flows only in response to rainfall)				
Stream Width (ft)	100	Stream Depth (ft):	?			
OHWM Indicator	Natural Line Impress on bank	Sediment Sorting	Shelving			
	Litter disturbed or washed away	Changes in character of soil	Scour			
	Destruction of terrestrial vegetation	Deposition	Presence of litter or debris			
	Multiple observed flow events	Wracking	Bed and bank			
	Vegetation matted down, bent or absent	Water staining	Change in plant community			
Vegetation Above OHW:	*Artemisia vulgaris, Asclepias syriaca, Oenothera biennis, Euphorbia esula, Melilottus officinalis*					
Vegetation Below OHW:	*Carex sp. Phalaris arundinacea, Agropyron cristatum, Salix exigua*					
Stream Substrate:	Silts	Cobbles	Bedrock	Gravel	Concrete	
	Muck	Vegetation	Sands	Other - Explain:		
Aquatic Habitats:	Sand Bar	Gravel Bar	Mud Bar	Fringing Wetlands	Undercut Banks	Gravel Riffles
	Deep Pools	Bank root systems	Overhanging trees/shrubs	In-stream emergent plants	In-stream submerged plants	
Lakes and other Deepwater Habitat						
Shoreline Type:	Silts	Cobbles	Bedrock	Concrete	Muck	
	Vegetation:	Other (explain):				

ATTACHMENT 10

OHW SITE PHOTOGRAPHS

Attachment 10: OHW Delineation Site Photographs

OHW Site 1

OHW Site 2

OHW Site 3

OHW Site 4

OHW Site 5

OHW Site 6

Attachment 10: OHW Delineation Site Photographs

OHW Site 7

OHW Site 8

OHW Site 9

OHW Site 10

OHW Site 11

OHW Site 12

Attachment 10: OHW Delineation Site Photographs

OHW Site 13

OHW Site 14

OHW Site 15

ATTACHMENT 11

BIRD BRIDGE HABITAT PHOTOGRAPHS

Attachment 11: Bridge Bird Survey Site Photographs

Site 1

Site 2

Site 4

Site 5

Site 9

Site 10

Attachment 11: Bridge Bird Survey Site Photographs

Site 11

Site 12

Site 17

Site 19

Site 20

Site 21

Attachment 11: Bridge Bird Survey Site Photographs

Site 22

Site 23

Site 24

Site 25

Site 26

Site 27

Attachment 11: Bridge Bird Survey Site Photographs

Site 28

Site 29

PHASE 1 – 4TH AVE NE FLOODWALLS

See **4th Ave NE Construction Phase Map**

Construction activity: levees and floodwalls

WETLAND DELINEATION

There are no wetlands located within this construction phase.

OTHER WATERS INVENTORY

There is no planned overbank excavation in this construction phase.

BIOLOGICAL RESOURCES: BRIDGE BIRD HABITAT INVENTORY

Three bridges crossing the main river channel are located within this area (Table 1). Only one, the 3rd St SE bridge, showed evidence of the presence of birds (Figure 1). Rock pigeons were identified, but nests were not visible or not present. Cliff swallows were seen flying and nesting, with a total nest count estimated at 170.

Table 1: Bridge sites within the 4th AVE NE Floodwalls Construction Phase with associated bird species and nest estimates.

Bridge site number	Location/description (over main river channel unless otherwise specified)	Bird species present	Nest count estimate
19	Old wooden footbridge	none	none
20	Concrete vehicle bridge, 3rd St SE	cliff swallows rock pigeons	170 unknown
21	Railway bridge	none	none

Bridge 19

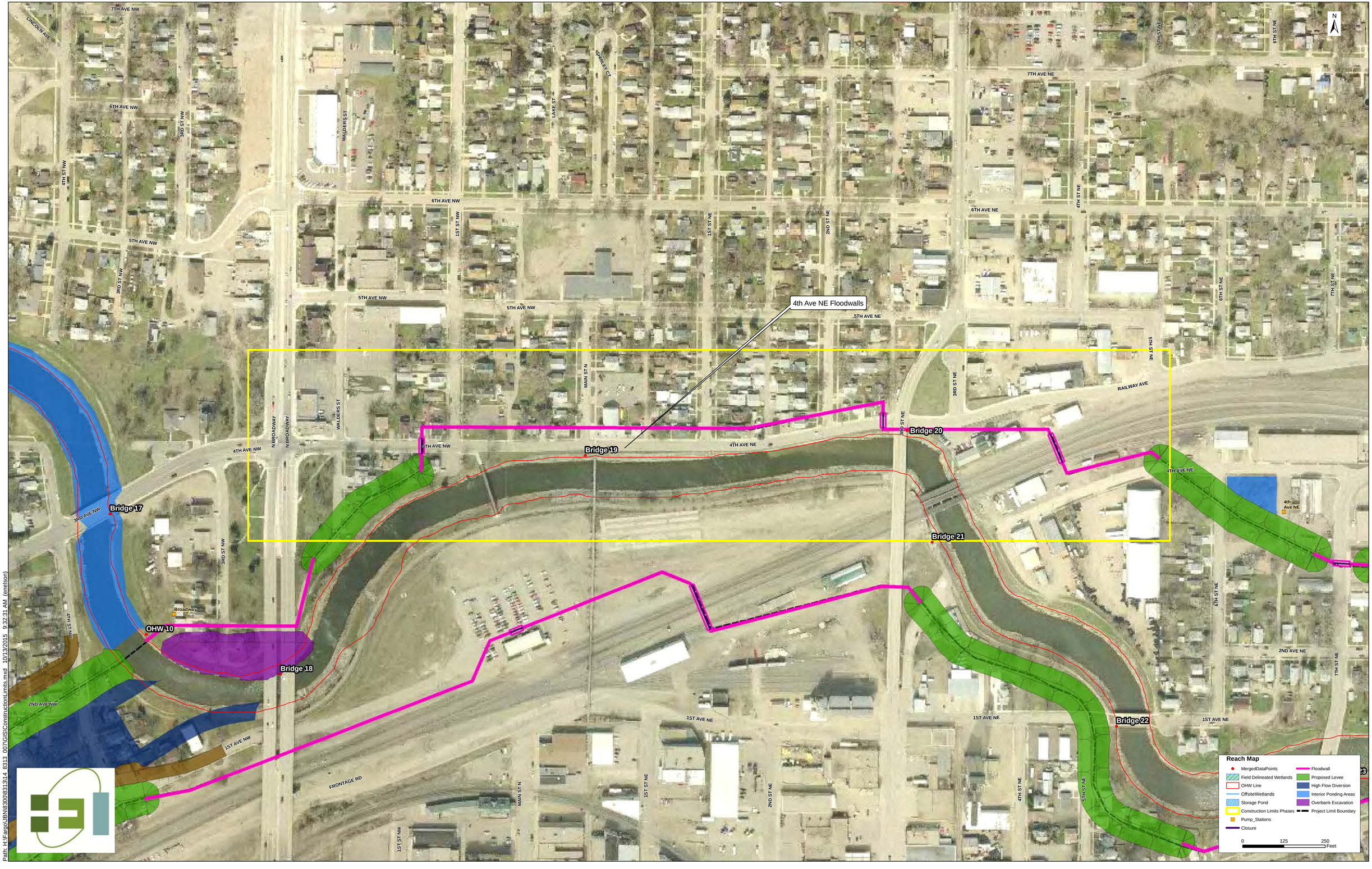
Bridge 20

Bridge 21

Figure 1: bridges within construction Phase 1 – 4th Ave NE

BIOLOGICAL RESOURCES: TREE POPULATION INVENTORY

A small area of trees may be impacted by construction of a levee.



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PHASE 2 – NAPA VALLEY

See **Napa Valley Construction Phase Map**

Construction activity: levees and floodwalls

WETLAND DELINEATION

There are seven wetlands located within or bordering on this construction phase (Table 1, Figure 1). The artificial wetland within this area is the constructed holding pond at the Perkett Ditch pump station (not delineated in this report because it is clearly constructed), listed by NWI as PABFx. Some of the wetlands extend beyond the boundaries of the construction area.

Table 1: Natural wetlands identified within or adjacent to the Napa Valley Construction Phase

Site number	NWI listed	Cowardin classification	Total wetland area (acres)
9	no	PEMC	0.021
10	yes	PEMC	0.34
12	no	PFO/EMA	1.46
16	yes	PFO/EMA	0.16
17	no	PEMC	0.1
18	no	PEMA	0.19
19	no	PEMF	0.32
		Total acres	2.591

Site 9w

Site 12w

Site 16w

Site 17w

Site 18w

Figure 1: Examples of natural wetlands identified within or adjacent to the Napa Valley Construction Phase

Soils: The predomiant soils here are a) Velva, moist-Fluvaquents, channeled find sandy loams, 0-2% slopes, frequently flooded (hydric rating 7); b) Velva loam, moist 0-2% slopes, occasionally flooded (hydric rating 45); and c) Urban land-Udifluvents loamy complex, 6-15% slopes (hydric rating 3).

Plants: The dominant vegetation for wetlands in this construction phase includes *Phalaris arundinacea* (Reed canary grass), *Carex aquatilis* (Aquatic sedge), *Acer negundo* (Box elder), and *Fraxinus pennsylvanica* (Green ash). The dominant upland vegetation is composed mainly of *Bromus inermis* (Smooth brome grass), *Poa pratensis* (Kentucky blue grass), F. *pennsylvanica*, *Ulmus americana* (American elm), and *Artemisia vulgaris* (Wormwood sage).

OTHER WATERS INVENTORY

There is no planned overbank excavation in this construction phase.

BIOLOGICAL RESOURCES: BRIDGE BIRD HABITAT INVENTORY

There are no bridges located within this construction phase.

BIOLOGICAL RESOURCES: TREE POPULATION INVENTORY

Trees will be impacted by the construction of the levee within this construction phase.

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PHASE 3 – FOREST ROAD

See **Forest Road Construction Phase Map**

Construction activity: levees, floodwalls, overbank excavation

WETLAND DELINEATION

There are no wetlands located within this construction phase.

OTHER WATERS INVENTORY

Within the Forest Road Construction Phase, the entire stretch of the river banks are sites of potential overbank excavation. The elevation of the wetland boundary (ordinary high water mark) was determined at two sites (OHW sites 8 and 9) where these banks were predominantly grasses (Figure 1). The following species were present in the plant community above the ordinary high water mark(OHW) include *Phalaris arundinacea, Artemisia vulgaris, Medicago sativa, Cirsium arvense, Taraxacum officinale, Elymus repens, Euphorbia esula, Acer negundo, Poa pratensis*, while below the OHW there are *P. arundinacea, and Carex species* (**Attachment 9 – OHW data forms**).

OHW Site 8

OHW Site 9

Figure 1: Overbank excavation sites within construction Phase 2 – Forest Road

BIOLOGICAL RESOURCES: BRIDGE BIRD HABITAT INVENTORY

There are no bridges located within this construction phase.

BIOLOGICAL RESOURCES: TREE POPULATION INVENTORY

Trees will be impacted by the construction of the levee and the overbank excavation within this construction phase.

Forest Road

OHW 9

OHW 8

Site 22u

Site 22w

Site 21w

Site 21u

Bridge 10

Napa Valley

Moose Lodge

12th St SW

2ND AVE SW

3RD AVE SW

4TH AVE SW

5TH AVE SW

6TH AVE SW

7TH AVE SW

8TH AVE SW

MS 15 HWY

12TH ST SW

15TH ST SW

16TH ST SW

17TH ST SW

18TH ST SW

19TH ST SW

MAPLE ST

TRAILER PARK RD

FOREST RD

BURDICK EXPY W

14TH ST SW

N

Reach Map

- MergedDataPoints
- Field Delineated Wetlands
- OHW Line
- OffsiteWetlands
- Storage Pond
- Construction Limits Phases
- Pump_Stations
- Closure
- Floodwall
- Proposed Levee
- High Flow Diversion
- Interior Ponding Areas
- Overbank Excavation
- Project Limit Boundary

0 125 250 Feet

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