

**Glacier Ridge Wind Farm
Glacier Ridge Wind Farm, LLC
Barnes County, North Dakota**

Wetlands and Other Waters Evaluation Report



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ACRONYMS/ABBREVIATIONS

| Acronyms/Abbreviations | Definition |
|------------------------|---|
| AJD | Approved Jurisdictional Determination |
| BWSR | Board of Water and Soil Resources |
| CWA | Clean Water Act |
| EPA | Environmental Protection Agency |
| FmHA | Farmers Home Administration |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HUC | Hydrologic unit code |
| MW | Megawatt |
| NHD | National Hydrography Dataset |
| NOAA | National Oceanic and Atmospheric Administration |
| NRCS | Natural Resource Conservation Service |
| NRPW | Non-relatively permanent water |
| NWI | National Wetlands Inventory |
| NWP | Nationwide Permit |
| O&M | Operations and maintenance |
| OHWM | Ordinary high water mark |
| PCN | Pre-construction notification |
| PJD | Preliminary Jurisdictional Determination |
| PLS | Public Land Survey System |
| RPW | Relatively permanent water |
| SSURGO | Soil Survey Geographic (database) |
| TNW | Traditional navigable water |
| USACE | United States Army Corps of Engineers |
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| WoUS | Waters of the United States |

1.0 INTRODUCTION

Glacier Ridge Wind Farm, LLC (Glacier Ridge), a subsidiary of Renewable Energy Systems Americas, Inc. (RES Americas) contracted with Tetra Tech, Inc., (Tetra Tech) to conduct a wetlands and other waters evaluation survey of its proposed Glacier Ridge Wind Farm (Project), located in Barnes County, North Dakota (**Figure 1**). The proposed Project will have a nameplate capacity of approximately 300 megawatts (MW), consisting of up to 87 Vestas 3.45 MW wind turbines.

This report describes the results of the surveys for wetlands and other waters performed for the proposed Project. The report includes a description of the Project Area and Survey Corridor, methods used to identify and evaluate wetlands and other waters, agency consultation, survey results and conclusions, and references used to support the conclusions. Appendices include figures illustrating the Project and survey results, site photographs, and Wetland Determination Data Forms.

1.1 PROJECT DESCRIPTION AND SURVEY CORRIDOR

The Project Area is the location where Project facilities may be located and includes approximately 53.8 square-miles (34,450 acres) of land under option or easement by Glacier Ridge. The Project Area is located approximately five miles northeast of Valley City in Barnes County, North Dakota as shown on **Figure 1**. The Project Area encompasses all or portions of 68 sections of land in 7 townships (**Table 1**) consisting primarily of privately owned agricultural cropland.

Table 1: Public Land Survey (PLS) Description of the Project Area

| County | Township Name | Township | Range | Section(s) |
|--------|---------------|----------|-------|--------------------------|
| Barnes | Alta | 140N | 57W | 2-5, 9-11 |
| | Weimer | 141N | 56W | 6, 7, 17-20, 30 |
| | Noltimier | 141N | 57W | 1, 2, 9-16, 21-28, 34-36 |
| | Minnie Lake | 142N | 56W | 6, 7, 18, 19, 30, 31 |
| | Grand Prairie | 142N | 57W | 1-3, 12-15, 22-27, 34-36 |
| | Ellsbury | 143N | 56W | 18, 19, 30 |
| | Baldwin | 143N | 57W | 14, 23-26, 34-36 |

The Survey Corridor is defined as the area within the Project Area specifically evaluated for wetlands and other waters as part of this survey. Geographic Information System (GIS) shapefiles for the Project facilities included as part of this survey were provided by Glacier Ridge and were used to establish the Survey Corridor as follows:

- A 500-foot diameter area centered on the turbine locations in the June 29, 2016 layout, including 87 primary turbine locations and 12 alternate turbine locations;
- A 200-foot wide corridor centered on the approximately 42 miles of service roads in the June 29, 2016 layout;
- A 100-foot wide corridor centered on the approximately 75 miles of electrical collection lines in the June 29, 2016 layout;
- An approximately 5 acre area for the operations and maintenance (O&M) facility and electrical substation location in the July 6, 2016 layout; and

- A 400-foot diameter area centered on the temporary meteorological tower location in the July 1, 2016 layout.

1.2 PHYSICAL SETTING, CLIMATE AND HYDROLOGY

The Project Area is located within the Level IV Drift Plains Ecoregion (Bryce et. al. 1996). The topography of the ecoregion is the result of the retreating Wisconsinan glaciers, which left a subtly undulating topography and a thick layer of glacial till. There are numerous temporary and seasonal wetlands in this ecoregion, with fewer semi-permanent wetlands present than in surrounding areas. The majority of this region is cultivated with wetlands being drained or simply tilled and planted (Bryce et. al. 1996).

The climate of the region is continental and is usually quite warm in the summer (the average daily maximum temperature in the summer is 80 degrees Fahrenheit) with frequent spells of hot weather and occasional cool days. It is cold in winter when arctic air frequently surges over the area (the average daily minimum temperature in the winter is 0 degrees Fahrenheit) (USDA NRCS 1990). The average annual total precipitation in Barnes County is about 18 inches. Of this, about 14 inches, or more than 75 percent, usually falls in April through September (USDA NRCS 1990).

The majority of the Project Area is located in the Maple River watershed basin (8-digit hydrologic unit code [HUC8]: 09020205). These portions of the Project Area are drained by numerous unnamed intermittent tributaries that flow to the east and southeast to the Maple River. The Maple River drains southeast and then northeast to the Sheyenne River, and ultimately, to the Red River of the North. A small portion of the southwestern part of the Project Area is located within the Lower Sheyenne watershed basin (HUC8: 09020204). This area is drained by unnamed intermittent tributaries that flow to the west and southwest to the Sheyenne River. The Sheyenne River also flows southeast and then northeast to the Red River of the North.

1.3 REGULATORY FRAMEWORK

Tetra Tech reviewed regulations pertaining to water resources in the Project Area and assessed the extent to which wetlands and other waters in the area may be regulated by Federal and State agencies. Applicable agencies and regulations are summarized below.

1.3.1 U.S. Army Corps of Engineers (USACE)

All discharges of dredged or fill material into waters of the United States (WoUS) that result in permanent or temporary losses of WoUS are regulated by the USACE under Section 404 of the Clean Water Act (CWA). The USACE regulates projects in navigable waters under Section 10 of the Rivers and Harbors Act.

Under USACE and U.S. Environmental Protection Agency (EPA) regulations, wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” In non-tidal waters, the lateral extent of USACE jurisdiction is determined by the ordinary high water mark (OHWM), which is defined as the “line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas” (33 Code of Federal Regulations [CFR] 328[e]).

1.3.1.1 Waters of the United States and Jurisdictional Determinations

The extent of the USACE regulatory jurisdiction over WoUS as defined in the CWA was further refined by the USACE and EPA in a final rule defining the scope of waters protected under the CWA published in the Federal Register on June 29, 2015, which was to become effective as of August 28, 2015 (80 FR 37104, June 29, 2015). However, the state of North Dakota is currently involved in litigation concerning the new CWA rule. In lieu of the decision on the new rule, as it may be resolved in North Dakota, the USACE will default to the preexisting definition for “waters of the United States” under Section 404 of the CWA (33 CFR 328.3[a]) as further refined in a 2008 memorandum issued jointly by the EPA and USACE (EPA and USACE 2008). A comparison of the scope of WoUS definitions in the old rule and new rule are summarized in **Table 2** and a summary of the preexisting definition for WoUS as used for determining jurisdiction in this report follows below:

The USACE will assert jurisdiction over the following waters:

- Traditional navigable waters (TNWs);
- Wetlands adjacent¹ to TNWs;
- Non-navigable tributaries of TNWs that are relatively permanent (RPWs); and
- Wetlands that directly abut² RPWs.

The USACE may assert jurisdiction over other certain types of waters based on a fact-specific analysis as to whether they have a significant nexus with a TNW. These types of waters include:

- Non-navigable tributaries that are non-relatively permanent (NRPW);
- Wetlands adjacent to NRPWs; and,
- Wetlands adjacent to, but not directly abutting, an RPW.

The USACE generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g. gullies, small washes characterized by low volume, infrequent or short duration of flow); and,
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE will apply the significant nexus standards as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream traditional navigable waters; and,
- Significant nexus includes consideration of hydrologic and ecological factors.

The USACE is the only entity that determines whether federal jurisdiction extends to specific wetlands or waters. The USACE does this by issuing Preliminary Jurisdictional Determinations (PJDs) and Approved Jurisdictional Determinations (AJDs). PJDs are non-binding written indications from the USACE that waters, including wetlands, identified on a parcel may be WoUS. If jurisdiction is unclear, PJDs will often treat all waters and wetlands as if they

¹ The term “adjacent” is defined as “bordering, contiguous, or neighboring,” and includes wetlands separated from a tributary by barriers such as natural river berms, man-made dikes, beach dunes and similar features.

² A continuous surface connection to the tributary must be present, the wetland may not be separated from the tributary by uplands, a berm, dike, or similar features.

are jurisdictional waters. AJDs are official USACE determination that jurisdictional WoUS are either present or absent on specific sites. AJDs are generally reliable for five years and may be appealed through the USACE administrative appeal process.

Given the USACE's sole authority to make Jurisdictional Determinations, suggestions of jurisdiction or the lack of jurisdiction regarding wetlands and other waters in this report are preliminary and based on Tetra Tech's interpretation of the guidance described above, desktop review of mapping, and evidence observed in the field.

Table 2: Comparison of Old Rule and New Rule for Defining WoUS and Determining Jurisdiction

| Subject | Old Rule | New Rule (Under Injunction) |
|--|--|---|
| Navigable Waters | Jurisdictional | Jurisdictional |
| Interstate Waters | Jurisdictional | Jurisdictional |
| Territorial Seas | Jurisdictional | Jurisdictional |
| Impoundments | Jurisdictional | Jurisdictional |
| Tributaries to Traditional Navigable Waters | Did not define tributary. | Jurisdictional Defined tributary for the first time as water features with bed, banks and OHWM, and flow downstream to a TNW, interstate water or the territorial sea. |
| Adjacent Wetlands/Water | Included wetlands adjacent to traditional navigable waters and directly abutting RPWs. Wetlands adjacent RPWs and NRPS were subject to a significant nexus evaluation to determine jurisdiction. | Includes waters adjacent to, or neighboring, jurisdictional waters including: waters within 1,500 feet of a TNW, waters within 100 feet of a tributary, and waters within the 100-year floodplain and within 1,500 feet of a TNW or tributary. |
| Isolated or "Other" Waters | Included all other waters the use, degradation or destruction of which could affect interstate or foreign commerce. | Includes specific waters that are similarly situated: prairie potholes, Carolina and Delmarva bays, pocosins, western vernal pools in California, and Texas coastal prairie wetlands when they have a significant nexus. Includes waters with a significant nexus within the 100-year floodplain greater than 1,500 feet from a TNW as well as waters with a significant nexus within 4,000 feet of a TNW or tributary. |
| Exclusions to the definition of "Waters of the US" | Excluded waste treatment systems and prior converted cropland. | Categorically excludes those in old rule and adds two types of ditches, groundwater, gullies, rills, non-wetland swales, constructed components for Municipal Separate Storm Water Sewer System (MS4s) and water delivery/reuse, and erosional features. |

1.3.1.2 Section 404 Permits

The USACE determines the type of permit, if any, that may be required under the CWA for projects that affect WoUS. The USACE authorizes certain relatively minor activities in WoUS under Nationwide Permits (NWP). NWPs that may apply to the Project include NWP 12 for Utility Line Activities, NWP 14 for Linear Transportation Projects, and NWP 51 for Land-Based Renewable Energy Generation Facilities. The USACE may permit wetland impacts associated with wind energy collection line systems or access roads under NWP 12 or NWP 14 rather than NWP 51, especially if the particular wind project has no wetland impacts associated with turbine pads.

NWPs 12, 14, and 51 are written to authorize activities that impact up to 0.5 acre of non-tidal WoUS, including the loss of no more than 300 linear feet of stream bed. An Individual Permit is required from the USACE for projects impacting greater than 0.5 acre of wetland. Pre-construction notification (PCN) to the USACE is required under NWP 51 regardless of the area of wetland impact. Under NWPs 12 and 14, a PCN to the USACE is required if the proposed activity will permanently impact more than 0.1 acre of jurisdictional wetland, and a PCN may be required for impacts less than 0.1 acre under NWP 12 and NWP 14 if certain other criteria are met. Compensatory wetland mitigation is required for all activities that impact more than 0.1 acre of wetland, and the USACE determines the need for compensatory mitigation on a case-by-case basis. To comply with authorization from the USACE under NWPs, prospective permittees must comply with the general conditions identified within the relevant NWP (USACE 2012).

Impacts for linear projects, such as utilities and roads, are typically assessed at each crossing and are not cumulative across a project. However, individual channels of a braided stream, individual arms of a large irregular wetland or lake, a stream and its adjacent wetlands, etc. are not separate waterbodies and such crossings cannot be considered separately.

1.3.2 U.S. Fish and Wildlife Service (USFWS)

The USFWS Valley City Wetland Management District manages wetland, grassland and Farmers Home Administration (FmHA) conservation easements on private lands in Cass, Traill, Barnes, Griggs, and Steele counties in east-central North Dakota. The easements afford permanent protection to wetland basins and grasslands that provide important seasonal habitat to waterfowl, shorebird and grassland nesting species during the spring migration and nesting seasons.

Wetland and FmHA easements do not allow the burning, leveling, filling, and/or draining of protected wetland basins without a permit from the USFWS. However, landowners are permitted to till and farm these areas when they are not wet. No permanent impacts to these basins are allowed from wind farm construction activities. Temporary impacts may be permitted, but the original elevation contours must be restored when construction is complete.

There are approximately 5,366 acres (16% of the Project Area) of USFWS easement lands located within the Project Area, which are depicted on **Figure 1**.

1.3.3 North Dakota State Water Commission

The North Dakota State Water Commission—Office of the State Engineer (Commission) is the regulatory body that permits actions in wetlands in the state of North Dakota. The Commission issues three types of permits: a Drain Permit, a Wetland Restoration Permit, and a Wetland Creation Permit. The state does not have a permit requirement for fill placed in a wetland.

A Drain Permit is issued for projects that drain ponds, sloughs, lakes, wetlands, or any similar series that has a watershed greater than 80 acres. A Wetland Restoration Permit is required for projects that restore wetlands less than the size of the original wetland. A Wetland Creation Permit is required for projects creating wetlands capable of storing more than 25 acre-feet of water.

The proposed Project does not meet the criteria for any of these three permits. Therefore, no state permit for wetlands is anticipated to be required for the proposed Project.

2.0 METHODS

Tetra Tech used a tiered approach to evaluate potential wetlands and other waters within the Project Area and Survey Corridor. Utilizing this approach, general wetland features were first identified during a desktop data review. The desktop data was used to guide Glacier Wind in Project facility siting prior to the field survey, and was also utilized during a facility micrositing field visit with RES Americas engineers to further avoid and reduce impacts to wetlands and other waters. The micrositing visit was followed by a wetlands and other waters evaluation field survey that included identification of jurisdictional and non-jurisdictional wetlands and non-wetland waters within the Survey Corridor based on the preliminary Project layout.

2.1 DESKTOP DATA REVIEW

Prior to and during the wetlands and other waters evaluation survey, available information was reviewed to identify areas that may exhibit wetland and other surface water characteristics. These data layers were evaluated as a whole to make probable wetland and other waters determinations. This included review of the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD), the USFWS National Wetlands Inventory (NWI), the Soil Survey Geographic (SSURGO) database, and aerial photographs.

2.1.1 Desktop Wetland Mapping

Recent aerial photography was reviewed in combination with the NHD, NWI, SSURGO soils and climate data to identify potential wetland areas within the Project Area. Aerial photographs were reviewed for photo signatures that may indicate the presence of a wetland including:

- Crop stress – differences in vigor of planted crops often seen as a pale green or yellow color
- Drowned out – cropped areas that appear to have been planted, but all or part of the crop has been drowned out
- Not cropped – visual evidence that an area with natural vegetative cover was planted around
- Standing water – visible surface water
- Altered pattern – detectable differences in vegetation or cropping patterns resulting from delayed planting dates or other alterations to standard farming practices
- Wetland signature – changes in vegetation color and/or texture in non-cropped areas

The locations of potential wetland basins within the Project Area were digitized using ArcGIS mapping software. Potential wetland area boundaries were mapped conservatively for use by Glacier Ridge during initial Project facility siting in order to avoid and minimize potential wetland impacts. Those potential wetland areas located within the Survey Corridor were field checked during the wetlands and other waters field survey.

2.2 MICROSITING

The purpose of micrositing is to view the preliminary proposed locations of Project facilities and make adjustments as necessary to meet regulatory and set-back requirements and constructability criteria. Aerial photographs, NHD, and NWI data were utilized, along with limited field observations, to determine if wetlands or other waters are located within the vicinity of proposed Project facilities. Subsequently, recommendations were made in the field to modify the proposed layout for impact avoidance.

2.3 WETLANDS AND OTHER WATERS EVALUATION SURVEY

The purpose of the wetlands and other waters evaluation survey was to identify the presence and location of wetlands and other surface waters within the Survey Corridor and determine which, if any, may be subject to USACE jurisdiction. All areas of the Survey Corridor were investigated on foot to identify potential wetlands and other waters.

2.3.1 Antecedent Precipitation Review

Antecedent precipitation conditions were evaluated using the “30-Day Rolling Total” method described in technical guidance issued by the Minnesota Board of Soil and Water Resources (BWSR 2015). The Minnesota methodology was used as comparable methods have not been established for North Dakota, and the states have similar wetland landscapes. This method involves summing the prior 30-day precipitation totals for each day and plotting this “rolling total” on a daily basis. Precipitation data for a three month period prior to the field surveys was obtained from the National Oceanic and Atmospheric Administration (NOAA) for the climatological station nearest the Project Area. A plot of the normal precipitation range was overlaid on the daily plot in order to evaluate whether antecedent precipitation was greater or less than normal throughout a month. The “normal precipitation range” was considered to be between the 30% chance of precipitation “less than” and “greater than” values from the USDA NRCS Wetlands (WETS) Climate Table for the climatological station.

2.3.2 Field Survey

The wetland survey was conducted in general conformance with the Level 2 onsite routine wetland determination method described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987). However, due to the large number of probable non-jurisdictional wetlands within the Project Area and Glacier Ridge’s commitment to minimize wetland impacts, only a small subset of surveyed wetlands were fully delineated in accordance with the three-parameter approach outlined in the Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region, Version 2.0 (USACE 2010). When a potential wetland was encountered in the Survey Corridor³, sufficient information was collected to make a preliminary USACE jurisdictional determination based on the guidance provided by EPA and USACE (2008) summarized in Section 1.3.1.1 of this report.

Potential wetlands preliminarily determined to be USACE jurisdictional based on the available information, and that may be permanently impacted by the Project, were fully delineated. At each of these potential wetlands, Tetra Tech established a transect in a representative transition zone of the potential wetland nearest the location of potential impacts that would result from development of the Project. Each transect consisted of at least one sample point in potential wetland, and if that point met wetland delineation criteria, at least one sample point in non-wetland. Soils, vegetation, and hydrology data were recorded on Wetland Determination Data Forms. Plant species dominance at sample points was based on the percent cover visually estimated within a 5-foot radius of the sample point for the herbaceous layer, a 15-foot radius for the shrub layer, and a 30-foot radius for tree and vine layers. Wetland indicator status for all plant species followed the USACE 2016 National Wetland Plant List (Lichvar et al 2016). Tetra Tech photographed each sample point location and each delineated wetland. Wetlands were classified according to Circular 39 (Shaw and Fredine 1956) and Cowardin (Cowardin et. al. 1979) methods.

³ Includes potential wetland areas and other waters identified during the desktop data review including those in the NWI, NHD and digitized from aerial photographs (see Section 2.1.1), as well as potential wetlands and other waters observed in the field.

Potential wetland features determined to be non-jurisdictional and those determined to be jurisdictional without anticipated permanent impacts were investigated based on the minimum amount of information deemed necessary in the professional judgement of the wetland specialist conducting the survey to determine if a wetland, as defined by the USACE, was present and, if so, to establish a boundary. Minimum information generally included visual observations of hydrology, topography and vegetation. If needed, soils were also observed. If, based on observations made at the time of the field visit, a potential wetland did not meet all three wetland delineation criteria (hydrophobic vegetation, hydric soils and hydrology) it was determined to be non-wetland. Observations for potential wetland areas were generally made at the lowest elevation within the Survey Corridor where the likelihood of meeting wetland delineation criteria was greatest. Observations were recorded in a field notebook that is on record at the Tetra Tech office in Bloomington, Minnesota. Tetra Tech photographed observation point locations, surveyed wetlands, and investigated non-wetland areas. Wetlands were classified according to Circular 39 (Shaw and Fredine 1956) and Cowardin (Cowardin et. al. 1979) methods.

Boundaries for non-wetland waters (i.e., ponds and streams) were established based on observations of the OHWM as defined by the USACE (see Section 1.3.1). Wetland and other waters boundaries were generally only established within the Survey Corridor. Wetlands and other waters boundaries that extended beyond the Survey Corridor were mapped at the discretion of the surveyor based on the feature size, perceived usefulness to Glacier Ridge in future Project facility layout modifications, and property access. Wetland and other waters boundaries were mapped using hand-held Geographic Positioning System (GPS) technology (see Section 2.3.2 below) and were not flagged at the time of the field survey.

2.3.3 Digital Capture of Data

A GIS specialist designed a geodatabase specifically for the Project that was used to capture wetland and other waters feature location data in the field using Trimble GPS technology, as well as to manage and display features for quality control and electronic deliverables. The geodatabase was loaded on a Trimble GeoXT handheld GPS unit, which has an accuracy of one meter or less, and ran both ESRI's ArcPad 10 and Trimble GPS Correct software packages. The geodatabase contains three types of feature classes for data capture: wetland points, wetland lines, and wetland polygons. Additional attribute data collected in the field included:

- Date feature was collected;
- Wetland specialist who evaluated and collected the feature;
- Feature type:
 - Circular 39: seasonally flooded wetland (Type 1), wet meadow wetland (Type 2), shallow marsh wetland (Type 3), deep marsh (Type 4), shallow open water (Type 5)
 - Cowardin: PEMA, PEMAf, PEMB, PEMC, PABH, R4SB, etc. (see **Appendix E** for key to Cowardin codes)
 - Other waters: pond, NRPW, RPW
- Whether the entire boundary was mapped;
- Jurisdictional status;
- Whether the wetland was fully delineated; and
- Average width and depth of linear stream features.

After the field data were post-processed, the wetland specialists who captured the field data conducted a quality control review of the geodatabase to ensure the features collected correspond with field observations and attribute data entered was accurate.

3.0 RESULTS

3.1 DESKTOP DATA REVIEW

The following sections describe the data sources reviewed prior to conducting Project micro-siting and utilized during the wetlands and other waters evaluation survey. These data sources include NHD, NWI, SSURGO, climate data, and aerial photographs.

3.1.1 National Hydrography Dataset (NHD)

NHD data for the Project Area was obtained from the USGS (USGS 2016). The NHD depicts numerous unnamed streams within the Project Area. All of the stream flow generally to the east toward the Maple River and, ultimately, to the Red River of the North, which is a TNW. Perennial, intermittent, and ephemeral streams and drainages identified within the Survey Corridor were investigated during the wetlands and other waters evaluation survey. The NHD data are presented on **Figure 2**.

3.1.2 National Wetlands Inventory (NWI)

NWI data for the Project Area was obtained from the USFWS (USFWS 2015). The NWI data indicated the presence of 126 freshwater emergent wetlands (PEMA, PEMC and PEMF), 4 freshwater forested/shrub wetlands (PFOA and PFO/EMC), and 2 freshwater ponds (PABFx) mapped within the Survey Corridor. NWI wetlands identified within the vicinity of the Survey Corridor were investigated during the wetlands and other waters evaluation survey. The NWI data are presented on **Figure 2**.

3.1.3 SSURGO Soils

Soils data for Barnes County were obtained from the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) (USDA NRCS 2016b). This information was used to study the distribution of hydric soils within the Project Area and Survey Corridor.

Soil, as it relates to wetland delineations, must be classified as a hydric soil for the area to qualify as a wetland in accordance with the 1987 Manual (Environmental Laboratory 1987) and the Regional Supplement (USACE 2010). Hydric soils are defined as soils that are formed under conditions of saturation, flooding, or ponding that occurs long enough during the growing season to develop anaerobic conditions. In the SSURGO dataset, soils may be classified using the following categories:

- Non-hydric – all series components rated as non-hydric
- Predominantly non-hydric – minority of soil components that are considered hydric accounting for 1 to 33% of the series
- Partially hydric – a mix of hydric and non-hydric soil components with hydric components accounting for 34 to 66% of the series
- Predominantly hydric – majority of soil components that are considered hydric accounting for 67 to 99% of the series
- Hydric – all series components rated as hydric

Table 3: Soil Series in the Survey Corridor

| Symbol | Soil Series | Percent Hydric | Hydric Component Landform | Percent of Survey Corridor Area |
|----------------|-------------------------------------|----------------|---------------------------------------|---------------------------------|
| G167B | Balaton-Wyard loams | 14 | Depressions, Ground moraines | 3.54 |
| G144B | Barnes-Buse loams | 8 | Depressions | 23.46 |
| G143C G143D | Barnes-Buse-Langhei loams | 6 | Depressions | 7.54 |
| G680B G680C | Barnes-Sioux complex | 0 | na | 5.31 |
| G143A G143B | Barnes-Svea loams | 6 | Depressions | 26.42 |
| G143F | Buse-Barnes loams | 6 | Depressions | 0.08 |
| G680F | Buse-Sioux complex | 0 | na | 0.66 |
| G250A | Divide loam | 14 | Depressions | 0.10 |
| G100A | Hamerly-Tonka complex | 40 | Depressions, Ground moraines | 16.75 |
| G101A | Hamerly-Wyard loams | 12 | Depressions, Ground moraines | 3.61 |
| G782B | Kranzburg-Lismore silty clay loams | 3 | Depressions | 3.43 |
| G732C | Lanona-Buse complex | 1 | Depressions | 0.32 |
| G782A | Lismore-Kranzburg silty clay loams | 3 | Depressions | 0.70 |
| G521A | Lowe loam | 94 | Flood plains, Depressions | 0.16 |
| G523A | Lowe-Fluvaquents, channeled complex | 93 | Flood plains, Depressions | 1.58 |
| G3A | Parnell silty clay loam | 94 | Depressions, Ground moraines, Marshes | 0.40 |
| G275A | Renshaw loam | 0 | na | 0.01 |
| G276B | Renshaw-Sioux complex | 3 | Depressions | 0.06 |
| G123A | Svea-Cavour loams | 4 | Depressions | 0.31 |
| G732B | Swenoda-Barnes complex | 2 | Depressions | 2.19 |
| G2A | Tonka silt loam | 89 | Depressions, Ground moraines | 0.07 |
| G6A | Vallers loam | 83 | Ground moraines, Depressions | 0.01 |
| G118A | Vallers loam, saline | 79 | Ground moraines, Depressions | 2.95 |
| G12A | Vallers, saline-Parnell complex | 86 | Ground moraines, Depressions, Marshes | 0.34 |

According to reviewed data, there are 24 soil series represented within the Survey Corridor. The majority of the Survey Corridor area is composed of soils that are classified as predominantly non-hydric (72%) or partially hydric (17%). The remainder of the soils in the Survey Corridor are classified as not hydric (6%) or predominantly hydric (5%). There are no hydric soils mapped within the Survey Corridor. These hydric soils determinations are taken from the National List of Hydric Soils (USDA-NRCS 2015). The type and extent of soils found in the Survey Corridor are summarized in **Table 3**, and the distribution of hydric soils within the Project Area is depicted on **Figure 3**.

3.1.4 Aerial Photography

Aerial photography for the Project Area in combination with antecedent precipitation data from NOAA (Menne et al. 2012) was reviewed to identify potential wetland areas. Reviewed aerial photographs included an image from fall 2015 (NAIP 2015) and summer 2011 (Bing 2011). Antecedent precipitation conditions for the reviewed aerial photographs were evaluated using the “Three Prior Month” method described in technical guidance issued by the Minnesota Board of Soil and Water Resources (BWSR 2015). The antecedent precipitation review showed the 2011 photograph was taken during a period with wet antecedent precipitation, and the 2015 photograph was taken during a period with normal antecedent precipitation (**Table 4**) (USDA NRCS 2016a).

Table 4: Antecedent Precipitation for Recent Aerial Photographs

| Precipitation Data for Project Area: | | | |
|--|--|---|---|
| Station Name: CASSELTON AGRONOMY FARM, ND US GHCND:USC00321408 | | Photo Date: July 7, 2011 | |
| Score using 1971-2000 normal period | | | |
| (values are in inches) | first prior month: June 2011 | second prior month: May 2011 | third prior month: April 2011 |
| Precipitation total for this location: | 5.63 | 3.86 | 2.18 |
| there is a 25% chance this location will have less than: | 2.48 | 1.80 | 0.69 |
| there is a 25% chance this location will have more than: | 4.29 | 3.19 | 1.77 |
| type of month: dry normal wet | Wet | wet | wet |
| monthly score | 3 * 3 = 9 | 2 * 3 = 6 | 1 * 3 = 3 |
| multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet) | 18 (Wet) | | |
| Precipitation Data for Project Area: | | | |
| Station Name: CASSELTON AGRONOMY FARM, ND US GHCND:USC00321408 | | Photo Date: September 26, 2015 | |
| Score using 1981-2010 normal period | | | |
| (values are in inches) | first prior month: August 2015 | second prior month: July 2015 | third prior month: June 2015 |
| Precipitation total for this location: | 2.90 | 3.60 | 4.07 |
| there is a 25% chance this location will have less than: | 1.78 | 1.83 | 2.48 |
| there is a 25% chance this location will have more than: | 3.22 | 3.94 | 4.29 |
| type of month: dry normal wet | Normal | normal | normal |
| monthly score | 3 * 2 = 6 | 2 * 2 = 4 | 1 * 2 = 2 |
| multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet) | 12 (Normal) | | |

The review of recent aerial photography indicated the presence of 460 potential wetland areas within the Survey Corridor. Potential wetland areas identified during the desktop review of recent aerial photography in the vicinity of the Survey Corridor were investigated during the wetlands and other waters evaluation survey. The identified potential wetland areas and the 2015 aerial photograph are presented on **Figure 4**.

3.2 MICROSITING

A Tetra Tech wetland specialist met with representatives of Glacier Ridge on June 21, 2016 to review select preliminary proposed Project facilities' locations targeted for construction in 2016. The previously reviewed data including potential wetland areas identified from aerial photographs, NHD and NWI were utilized in addition to limited field observations to determine if wetlands or other waters were located within the vicinity of proposed Project facilities and recommendations were made in the field to modify the proposed Project facilities to avoid impacts to wetland and waters features.

3.3 WETLANDS AND OTHER WATERS EVALUATION SURVEY

The wetlands and other waters evaluation survey was conducted for the majority of the Survey Corridor from June 21-30, 2016. Some property within the Survey Corridor was not accessible at the time of the June survey. These areas were surveyed from August 1-3, 2016 in addition to the locations of Project facilities modified following micro-siting. The following sections describe the results of the wetlands and other waters evaluation survey including an antecedent precipitation analysis, summary of mapped wetlands and other waters and field observations, probable USACE jurisdictional determinations, and an impact analysis.

3.3.1 Antecedent Precipitation

Precipitation data was obtained from NOAA (Menne, et. al. 2012) for two climatological stations near the Project Area: Valley City 2.0 NW (station ID GHCND:US1NDBR0002) and Casselton Agronomy Farm (station ID GHCND:USC00321408). The Valley City station is located approximately 12 miles southwest of the center of the Project Area and is the closest station to the Project Area with relatively consistent, recent precipitation data. However, there are 16 missing observations from the March 1 to July 31 period (10% of days during this period), and the reported rainfall amounts appear to generally be higher than those reported by other nearby stations. Due to the potentially imprecise data reported by this station, precipitation data from the Casselton station located approximately 30 miles southeast of the center of the Project Area was also reviewed. The Casselton dataset has 11 missing observations from July, but the data for March, April, May and June are complete. **Chart 1** and **Chart 2** show the results of the 30-Day Rolling Total analysis for the Valley City and Casselton stations.

A review of the precipitation data from the Valley City station shows generally normal precipitation levels in March, April, and most of May. There was a large rain event (2.3 inches) reported on May 23. After this point, precipitation levels are much wetter than normal with several additional large rain events reported in June and July. Notably, these include 2.35 inches of rain reported on June 15, 1.47 inches on July 7, and 1.42 inches on July 27 (**Chart 1**).

A review of the precipitation data from the Casselton station shows a similar pattern of precipitation as the Valley City station, but with lower rainfall totals. The Casselton station shows slightly lower than normal precipitation levels in March, with normal precipitation levels in most of April. By late April, precipitation levels are wetter than normal, largely due to a significant rain event on April 25 when 1.26 inches of rain were recorded. Precipitation levels remain wetter than normal until mid-May, when they return to the normal range. From mid-May through the end of July, precipitation levels fluctuate between the wet end of the normal range and drier than normal levels. Notable rain events include 1.74 inches recorded on May 31, and a total of 2.87 inches recorded from July 10 through July 12 (**Chart 2**).

Chart 1: Valley City 2.0 NW Station Precipitation March 1, 2016 – July 31, 2016

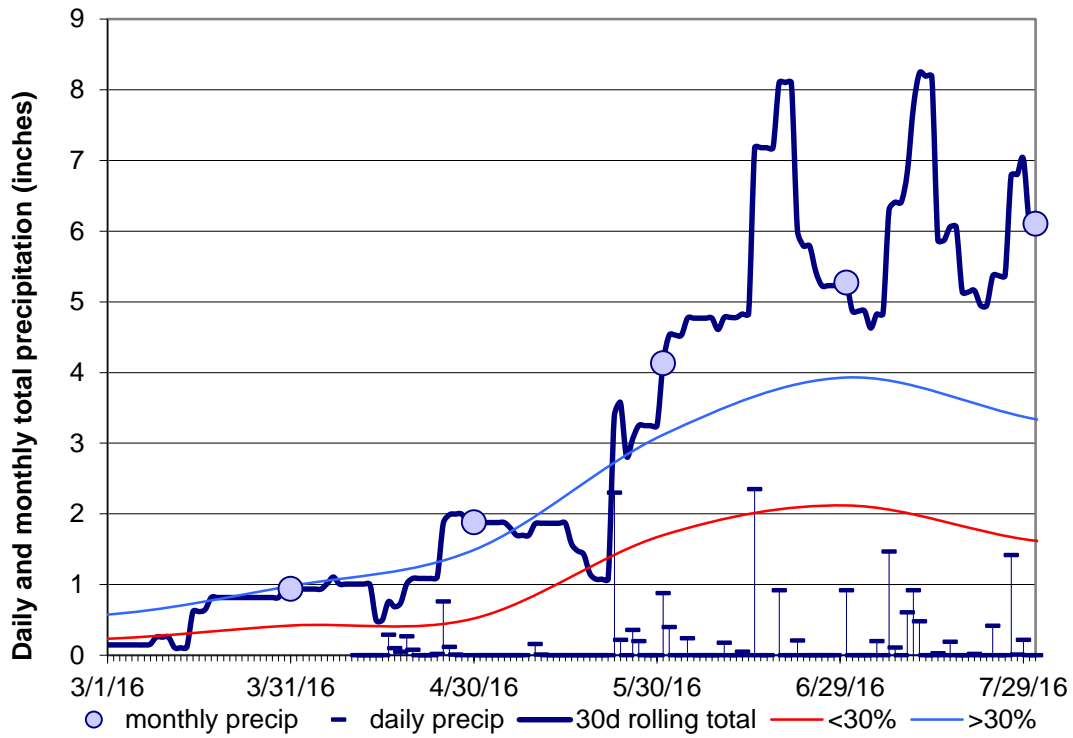
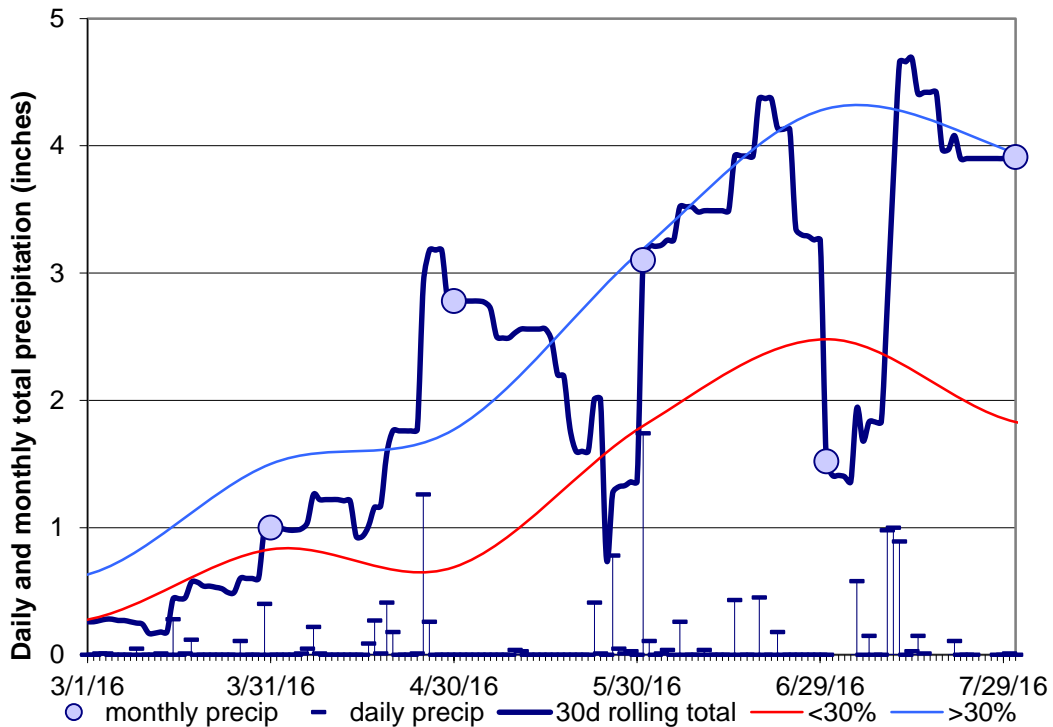


Chart 2: Casselton Agronomy Farm Station Precipitation March 1, 2016 – July 31, 2016



Observations made during the June field survey suggested hydrologic conditions were normal to dry. These observations are generally more consistent with the Casselton precipitation data showing higher precipitation in late May and drying conditions in late June when the field survey was conducted. Hydrologic conditions observed during the August field survey were wetter than in June, which is also consistent with the Casselton data showing a significant rain event in mid-July approximately three weeks prior to the August field survey.

3.3.2 Wetlands and Other Waters

During the wetlands and other waters evaluation survey, Tetra Tech identified 466 wetlands, 5 NRPWs and 1 RPW. Of these, 34 wetlands were delineated. Additionally, wetland delineation sample points were placed at five potential wetland areas that did not meet wetland delineation criteria. Wetland determination data forms for delineated wetlands and non-wetland points are presented in **Appendix B**.

All of the 460 potential wetland areas identified during the desktop data review (see Section 3.1.4) in the Survey Corridor were reviewed during the field survey, as well as 26 additional potential wetland areas located just outside the Survey Corridor. Of the 486 total potential wetland areas observed during the field survey, 398 were confirmed to be present in the field and were mapped, and 88 were determined to be non-wetlands based on the observations made at the time of the field survey. Some potential wetland areas were mapped as multiple wetlands or other water features, while others were combined into a single wetland, so the 398 field confirmed potential wetland areas were mapped as 408 wetland or other water features. Additionally, 58 wetlands were mapped during the field survey that were either not identified in the desktop potential wetlands dataset (44 wetlands) or were located outside the area initially assess during the desktop review (14 wetlands). The majority of these were relatively small (less than 0.5 acres). All of the surveyed wetlands and other waters are listed in **Appendix C** and are depicted on **Figure 4**.

Wetlands and other waters were classified using the USFWS Circular 39 (Shaw and Fredine 1971) and Cowardin (Cowardin et. al. 1979) classification systems. Circular 39 classifications were selected based on the “wettest” dominant component of the wetland, and many of the shallow marsh, deep marsh, and shallow open water wetlands include bands of drier classes of wetlands on their edges. When appropriate, multiple Cowardin classes were assigned to a wetland complex consisting of more than one class of wetland (e.g. PEMC/PEMA for a shallow marsh wetland with a border of seasonally flooded wetland). **Table 5** provides a summary of the wetland and water types that were observed during the survey, and representative photographs of each wetland type are presented in **Appendix D**. A key for the Cowardin classification system is presented in **Appendix E**.

General observations of vegetation, soils, and hydrology conditions recorded during the field survey are summarized below.

3.3.2.1 Vegetation

Wetlands observed within the Survey Corridor were typically vegetated with a variety of wetland plants typical of the central North Dakota ecotone. Many of the seasonally flooded and wet meadow wetlands were observed to be cultivated and were either barren or vegetated with crops (soybeans, corn, wheat, sunflowers, canola, or alfalfa). Natural and weedy vegetation commonly observed in cultivated and non-cultivated seasonally flooded and wet meadow wetlands included grasses (fox-tail barley [*Hordeum jubatum*], large barnyard grass [*Echinochloa crus-galli*], reed canary grass [*Phalaris arundinacea*], freshwater cord grass [*Spartina pectinata*], and field meadow-foxtail [*Alopecurus pratensis*]), sedges (*Carex sp.*), horsetails (*Equisetum sp.*), and various forbs including rough cocklebur (*Xanthium strumarium*), stinging nettle (*Urtica dioica*), and prickly lettuce (*Lactuca serriola*). Shallow and deep marsh wetlands were often dominated by cattails (*Typha sp.*). Other species observed in shallow and deep marsh

wetlands included: American water-plantain (*Alisma subcordatum*), sedges (*Carex sp.*), spike-rushes (*Eleocharis sp.*), smartweeds (*Persicaria sp.*), curly dock (*Rumex crispus*), willows (*Salix sp.*), dark-green bulrush (*Scirpus atrovirens*), and soft-stem club-rush (*Schoenoplectus tabernaemontani*). Deep-water portions of deep marsh and shallow open water wetlands were not observed during the survey for indications of non-emergent (submerged or floating) vegetation.

3.3.2.2 Soils

Soils observed within the Survey Corridor were typically loamy with textures ranging from loam to silty clay loam to clay loam. A few areas, particularly near drainageways, had more sandy soils with sandy loam or sandy clay textures. A very thick (20 to 40 or more inches), black (10YR 2/1) A horizon typical of prairies soils was observed in most locations in the Survey Corridor. As a result, the thick dark surface (A12) hydric soil indicator was the most often documented indicator at wetland sample plots.

Table 5: Wetland and Other Water Types Observed in the Survey Corridor

| Number Surveyed | Circular 39 | Cowardin | Description |
|-----------------|--|----------------|--|
| 353 | Type 1 Seasonally Flooded Basins or Flats | PEMA, PEMAf | These wetlands may be inundated or saturated for variable periods, but are usually well drained during much of the growing season. Vegetation is variable. |
| 13 | Type 2 Fresh Wet Meadows | PEMB, PEMBf | These wetlands are typically not inundated, but soils remain saturated within a few inches of the surface during most of the growing season. Vegetation typically includes grasses, sedges, rushes and various broad-leaved plants. |
| 91 | Type 3 Shallow Fresh Marshes | PEMC, PEMCd | These wetlands typically have soils that remain saturated during the growing season and are commonly inundated with up to six inches of water. Vegetation typically includes grasses, bulrushes, spikerushes and various marsh plants including cattails, arrowheads and smartweeds. |
| 4 | Type 4 Deep Fresh Marshes | PEMF, PABF | These wetlands are typically inundated with six inches to three feet or more of water during the growing season. Vegetation typically includes cattails, reeds, bulrushes, spikerushes and wild rice as well as pondweeds, coontail, watermilfoils, duckweeds, and waterlilies in deeper water. |
| 5 | Type 5 Open Water | PEMH, PABH | Includes shallow ponds and reservoirs with less than 10 feet of water and a border of emergent vegetation. Vegetation (typically in areas with water depth less than 6 feet) may include: pondweeds, naiads, wildcelery, coontail, watremilfoils, muskgrasses, waterlilies, and spaderdocks. |
| 5 | N/A | R4USC | Streams with intermittent flow that generally contain flowing water for only part of the year. When water is not flowing, it may remain in isolated pools or surface water may be absent. The streambed varies in substrate and form depending on the gradient of the channel, velocity of water, and sediment load. |
| 1 | N/A | R2UBH | Streams with low gradient and flow velocity, but water generally flows year-round. The substrate typically consists of sand and mud. |

3.3.2.3 Hydrology

The drainage system in the Project Area is poorly developed with relatively few drainage swales or streams, and numerous isolated wetlands. Several linear drainageways were observed in the Survey Corridor that lacked bed and/or bank characteristics that precluded them from being considered streams, but met the criteria to be considered wetlands. Many of the drainageways and streams observed in the Survey Corridor appeared to have been modified by straightening or channelizing, and some swales appeared to have been developed between wetlands to facilitate drainage and benefit agricultural use of the land. The five NRPWs and one NRPS identified in the Survey Corridor appear to flow toward the Maple River, and ultimately, to the Red River of the North, the closest TNW to the Project Area.

Approximately half of the wetlands and other waters surveyed were inundated or saturated at the surface at the time of the field survey. The remaining wetlands, primarily seasonally flooded PEMAf types, did not exhibit any of the primary wetland hydrology indicators. Hydrology criteria for these wetlands were established based on observations of secondary wetland hydrology indicators. The secondary indicators observed most often were surface soil cracks (B6), sparsely vegetated concave surface (B8), drainage patterns (B10), and geomorphic position (D2).

3.3.3 USACE Jurisdiction

Each of the wetlands and other waters features identified during the wetlands and other waters evaluation survey was reviewed for potential USACE jurisdiction in accordance with USACE and USEPA guidance as described in Section 1.3.1.1 of this report, and a preliminary jurisdictional determination was recommended for each. Of the 472 wetlands and other waters identified during the survey, 74 were determined to potentially have a hydrologic connection to the Red River of the North (68 wetlands, 5 NRPWs, and 1 RPW) and meet the criteria to be considered WoUS under the currently effective regulations. These wetlands and waters would, therefore, likely be subject to USACE regulatory jurisdiction. The remaining 398 wetlands appeared to be isolated waters that would not likely be subject to USACE regulatory jurisdiction under the currently effective regulations. If, however, the new CWA rule as previously proposed were implemented, these prairie pothole wetlands could be subject to a significant nexus evaluation to determine if they are WoUS. Only the USACE can make the final determination on the jurisdiction of wetlands and other waters.

4.0 IMPACT ANALYSIS

An analysis of potential wetlands and other waters that may be impacted by the Project was conducted based on the results of the wetlands and other waters evaluation survey and current Project facilities layout. Many of the estimated impacts may be reduced or eliminated by Glacier Ridge with future modifications to the Project facilities layouts. The following sections include a description of the assumed permanent and temporary impact areas, results of the impact analysis for the Project, and regulatory implications.

4.1 IMPACT AREAS

For the purposes of this assessment, permanent impacts resulting from the Project are considered to be the Project footprint during operation. Project infrastructure that could exert permanent impacts includes turbines, access roads, collection system junction boxes, the substation and the O&M building. Temporary impacts would occur during construction to accommodate equipment and temporary laydown activities beyond the built Project infrastructure. **Table 6** outlines the estimated permanent and temporary impact areas anticipated for Project infrastructure.

Table 6: Proposed Project Facility Impact Assumptions

| Proposed Project Component | Construction Disturbance | Temporary Construction Disturbance to be Reclaimed | Permanent Disturbance (Operation) |
|----------------------------|--------------------------------------|--|--------------------------------------|
| Wind Turbines | 4.5 acres per turbine | 4.3 acres per turbine | 0.2 acre per turbine |
| Access Roads | 68 feet wide per linear foot of road | 48 feet wide per linear foot of road | 20 feet wide per linear foot of road |
| Collection Lines | 40 feet wide per linear foot | 40 feet wide per linear foot minus 12 x 8 feet for each junction box | 12 x 8 feet for each junction box |
| Meteorological Towers | 1.25 acres per tower | 1.25 acres per tower | 5 square feet per permanent tower |
| Substation | 5 acres | 3 acres | 2 acres |
| O&M building | 3 acres | 1 acre | 2 acres |

4.2 ESTIMATED IMPACTS TO WETLANDS AND OTHER WATERS

The analysis of impacts revealed that 320 wetlands and other waters may be impacted by the Project. Of these, the majority are non-jurisdictional. Glacier Ridge is committed to avoiding all impacts to wetlands on USFWS wetland easements, as well as reducing or eliminating impacts to USACE jurisdictional wetlands and other WoUS. Impact avoidance and minimization will be achieved by modifications to Project facility layouts and implementation of avoidance measures during construction. Permanent and temporary impacts to non-jurisdictional wetlands may also be reduced as practicable. **Table 7** includes a summary of estimated impacts, and a detailed listing of estimated impacts can be found in **Appendix F**.

Table 7: Wetlands and Other Waters Impacts Summary

| Impact Type | Wetlands and Other Waters Impacted | | | |
|-------------|------------------------------------|-----------------|--------------------|--------|
| | USACE Jurisdictional | USFWS Easement* | Non-Jurisdictional | Total† |
| Permanent‡ | 13 | 9 | 59 | 80 |
| Temporary | 65 | 30 | 231 | 319 |

* Glacier Ridge is committed to avoiding all impacts to wetlands on USFWS wetland easements

† Total may be less than sum of jurisdictional counts as some wetlands fall under the jurisdiction of the both USACE and USFWS

‡ Most permanently impacted wetlands and other waters will also be subject to temporary impacts

5.0 USFWS CONSULTATION

Tetra Tech has initiated consultation with the USFWS Valley City Wetland Management District regarding wetland basins on USFWS easement tracts within the Project Area. Mr. Kurt Tompkins, District Manager, has been identified as the primary point of contact for the consultation.

Tetra Tech contacted Mr. Tompkins prior to the wetlands and other waters evaluation field survey to discuss the proposed methodology and confirm it would adequately capture wetland basins on USFWS easement tracts. Mr. Thompson confirmed that the proposed methodology would be adequate. Tetra Tech also invited Mr. Tompkins to visit the Project Area during the field survey to provide additional on-site guidance regarding wetland basins on USFWS easement tracts; however, Mr. Tompkins indicated that he would not need to visit the Project Area at this time and would review Tetra Tech's survey results upon completion of the field effort. As requested, Tetra Tech has provided Mr. Tompkins with GIS shapefiles of the 46 wetlands identified on USFWS easement tracts to review and confirm that all wetland basins within the Survey Corridor on easement tracts had been identified, and that all of the surveyed wetland boundaries were accurate. As of the date of this report, Tetra Tech is waiting to receive the requested feedback from the USFWS.

6.0 CONCLUSIONS AND RECOMENDATIONS

Tetra Tech completed a wetlands and other waters evaluation survey for the proposed Glacier Ridge Wind Farm located in Barnes County, North Dakota. A total of 466 wetlands, 5 NRPWs and 1 RPW were identified during the survey. Of these, 68 wetlands, 5 NRPWs, and 1 RPW were preliminarily determined to fall under the jurisdiction of the USACE, and 46 wetlands were identified on USFWS easement tracts.

An estimated 240 wetlands and other waters may be temporarily impacted by the Project as currently proposed, and permanent and temporary impacts may occur for an additional 79 wetlands and other waters. Permanent impacts only may occur for one wetland. Permanent impacts to 13 USACE jurisdictional wetlands and other WoUS (SJ112, SK064, WJ189, WJ128, WJ205, WJ324, WJ325, WK036, WK058, WK060, WK123, WK138, and WK142) and 9 wetlands on USFWS easement tracts (WJ069, WJ071, WJ072, WJ106, WJ128, WJ177, WJ284, and WJ326) are currently estimated. With the exception of WJ128, all estimated permanent impacts to USACE jurisdictional wetlands and other WoUS are less than 0.1 acre.

Glacier Ridge has committed to avoiding and minimizing impacts to potential USACE jurisdictional wetlands and other WoUS, as practicable, and avoiding all impacts to wetlands on USFWS wetland easements. Avoidance and minimization will be achieved in modifications to Project facility layouts, reduction in the construction footprint in certain areas, and horizontal drilling of electrical collection lines, where appropriate and feasible, as reflected in the final layout maps provided to the North Dakota Public Service Commission on August 12, 2016.

The recommended USACE jurisdictional determinations presented in this report are preliminary, only the USACE can make the final determination of jurisdiction for wetlands and other waters. Therefore, Tetra Tech recommends obtaining an AJD from the USACE for any wetlands that will be permanently or temporarily impacted by the Project. The USACE will also determine the type of permit, if any, that is required. Glacier Ridge intends to limit impacts to USACE jurisdictional WoUS to those that would be approved under NWP 12 or NWP 14 and fall under the 0.1 acre per-crossing impact that would not require completion of a PCN.

7.0 REFERENCES

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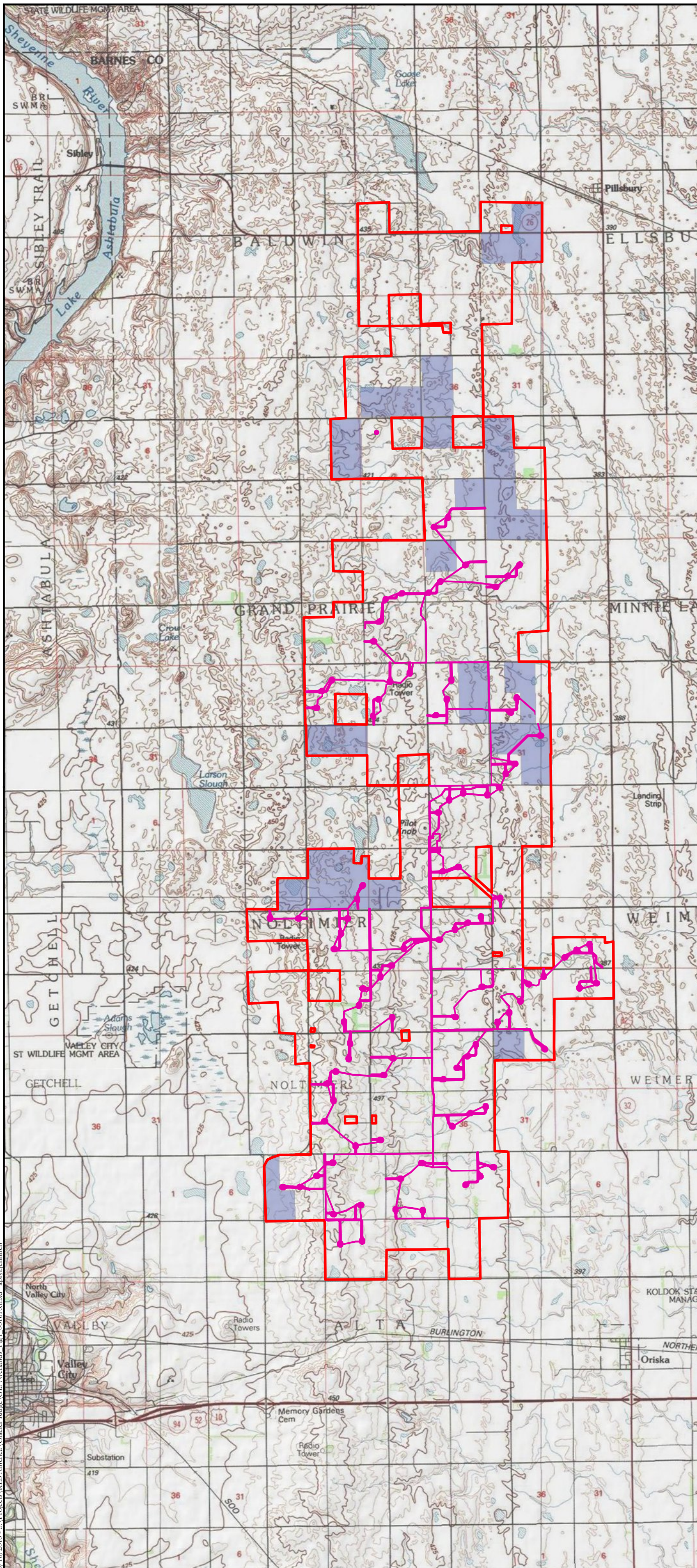
APPENDIX A – FIGURES

Figure 1 – Project Location

Figure 2 – NHD and NWI

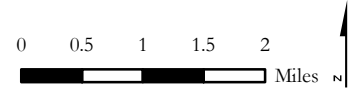
Figure 3 – SSURGO Soils

Figure 4 – Wetlands and Other Waters Survey Results

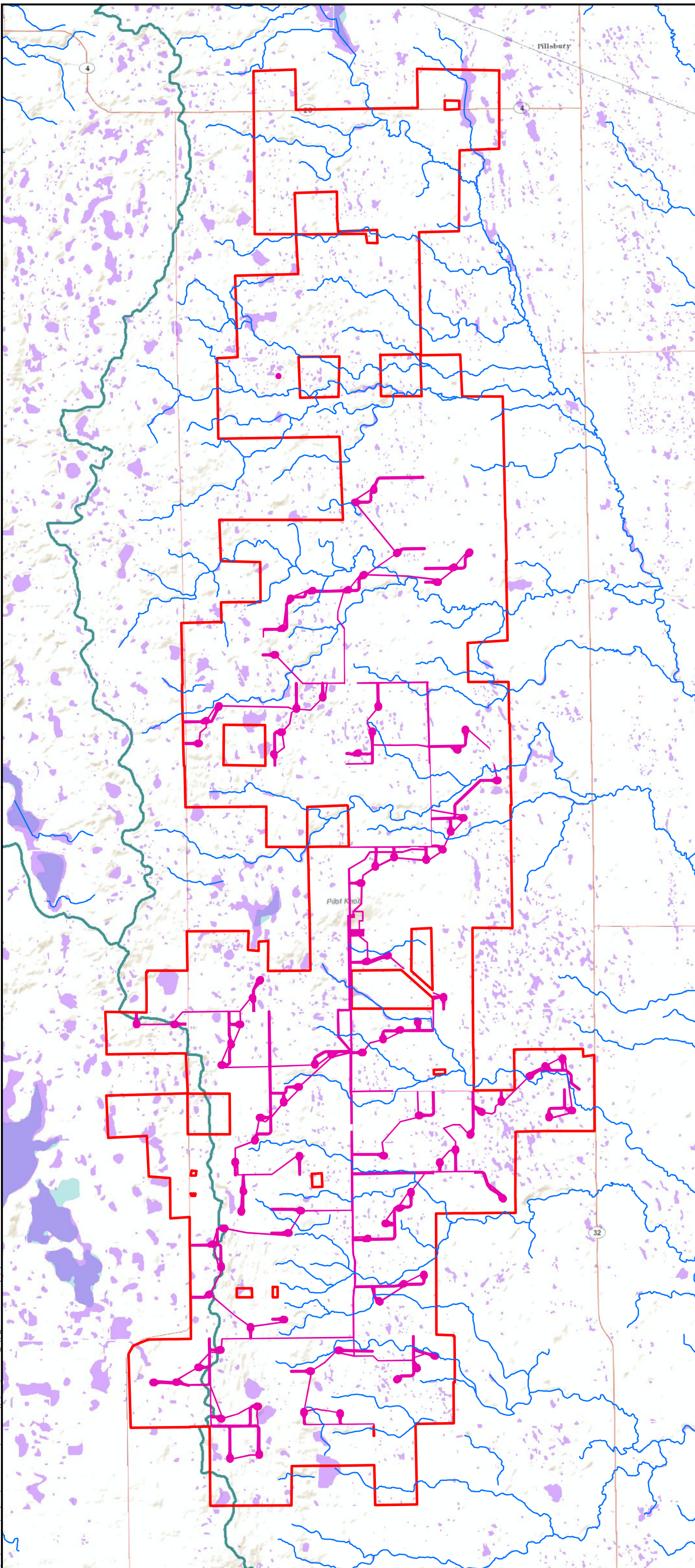


Glacier Ridge Wind Farm Barnes County, North Dakota






- █ Survey Corridor
- Project Area
- USFWS Easement



**Wetlands and
Other Waters Survey**
Figure 1 - Project Location



**Glacier Ridge Wind Farm
Barnes County, North Dakota**

-  NHD
-  Watershed Boundary
-  NWI Wetland
-  Survey Corridor
-  Project Area

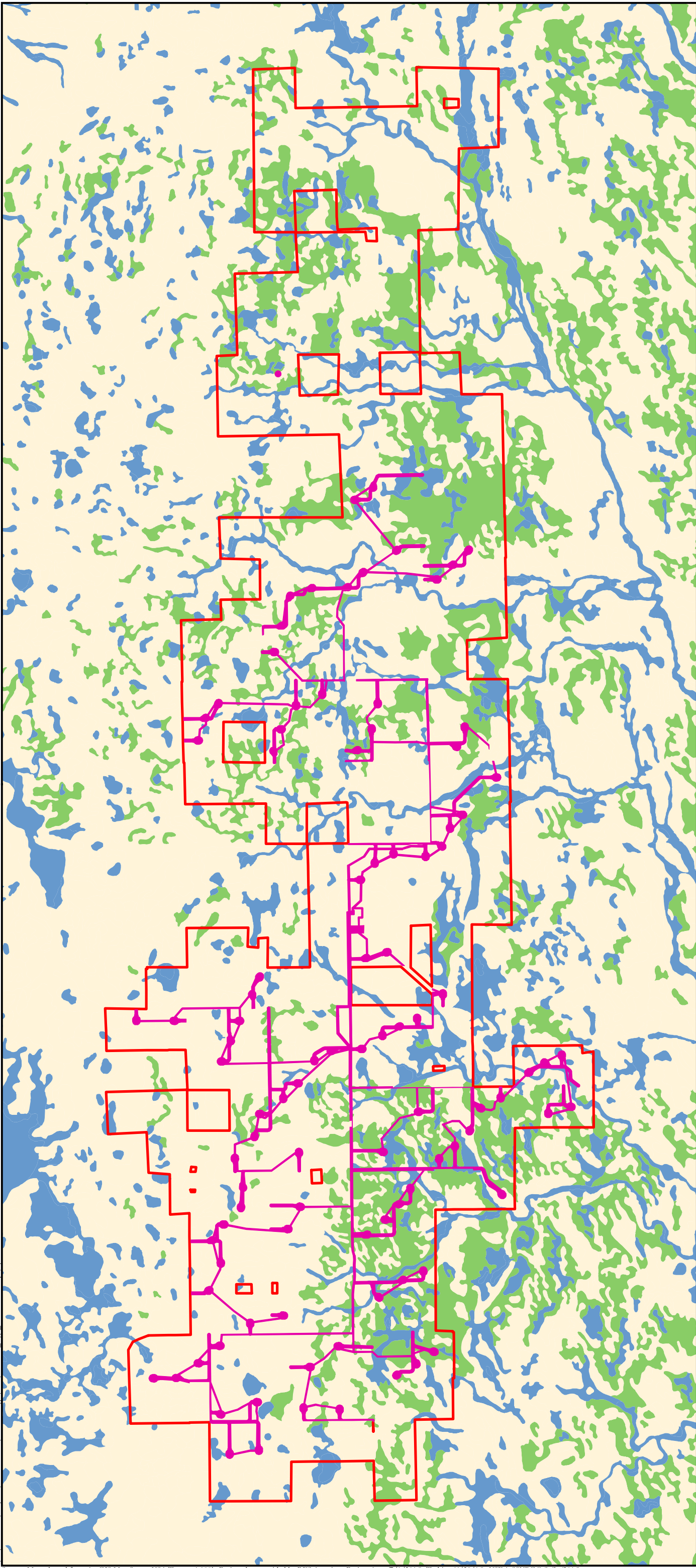


**Wetlands and
Other Waters Survey
Figure 2 - NHD and NWI**

8/18/2016 - SA\Projects\RES America\Glacier Ridge\GIS\Wetlands - Fig2_081816.mxd apr1611mich

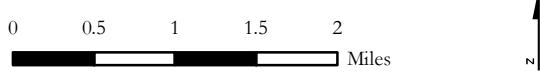
Source: Map adapted from ArcGIS Map Server Basemap, Project data provided by RES America - Project Area (7/1/2016), USGS (NHD), and USFWS (NWI).





**Glacier Ridge Wind Farm
Barnes County, North Dakota**

- Survey Corridor
- Project Area
- Non-hydric & Predominantly Non-hydric
- Partially Hydric
- Predominantly Hydric



**Wetlands and
Other Waters Survey
Figure 3 - SSURGO Soils**



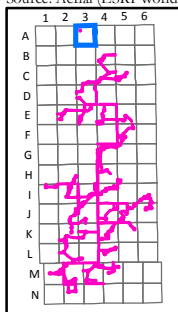
8/18/2016 - SA\Projects\RES America\Glacier Ridge\GIS\Wetlands_Fig3_081016.mxd apr16mmich

Source: Map adapted from ArcGIS Map Server USA Topos - 1:100k; Project data provided by RES America - Project Area (7/1/2016), Turbine (6/29/16); USDA SSURGO Soils (2016).

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults\MB_080916.mxd aprvlliemrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas(Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

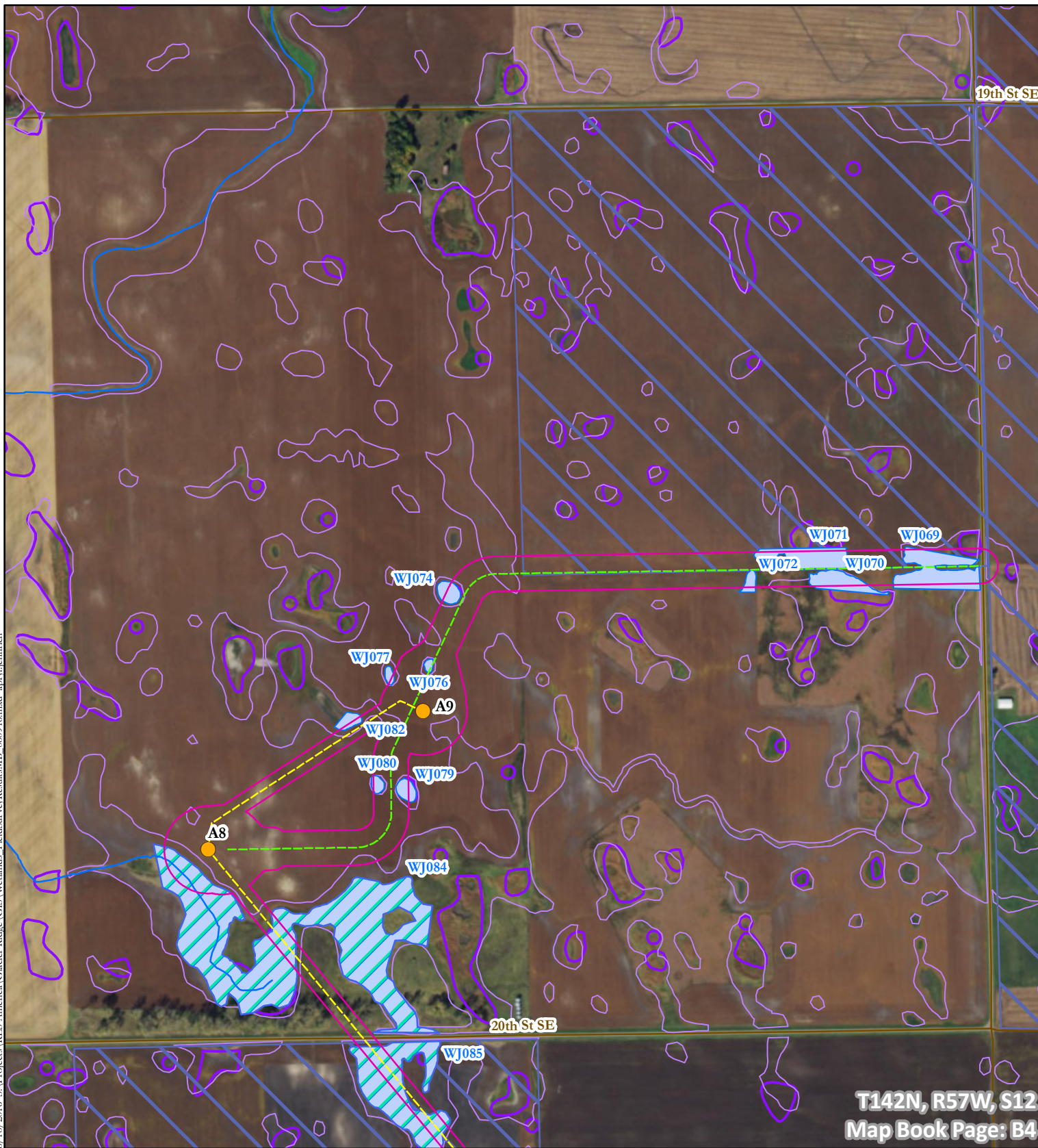
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

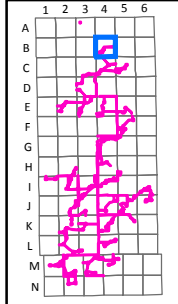


8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults.MB_080916.mxd aprvl.jennrich



T142N, R57W, S12
Map Book Page: B4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas(Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

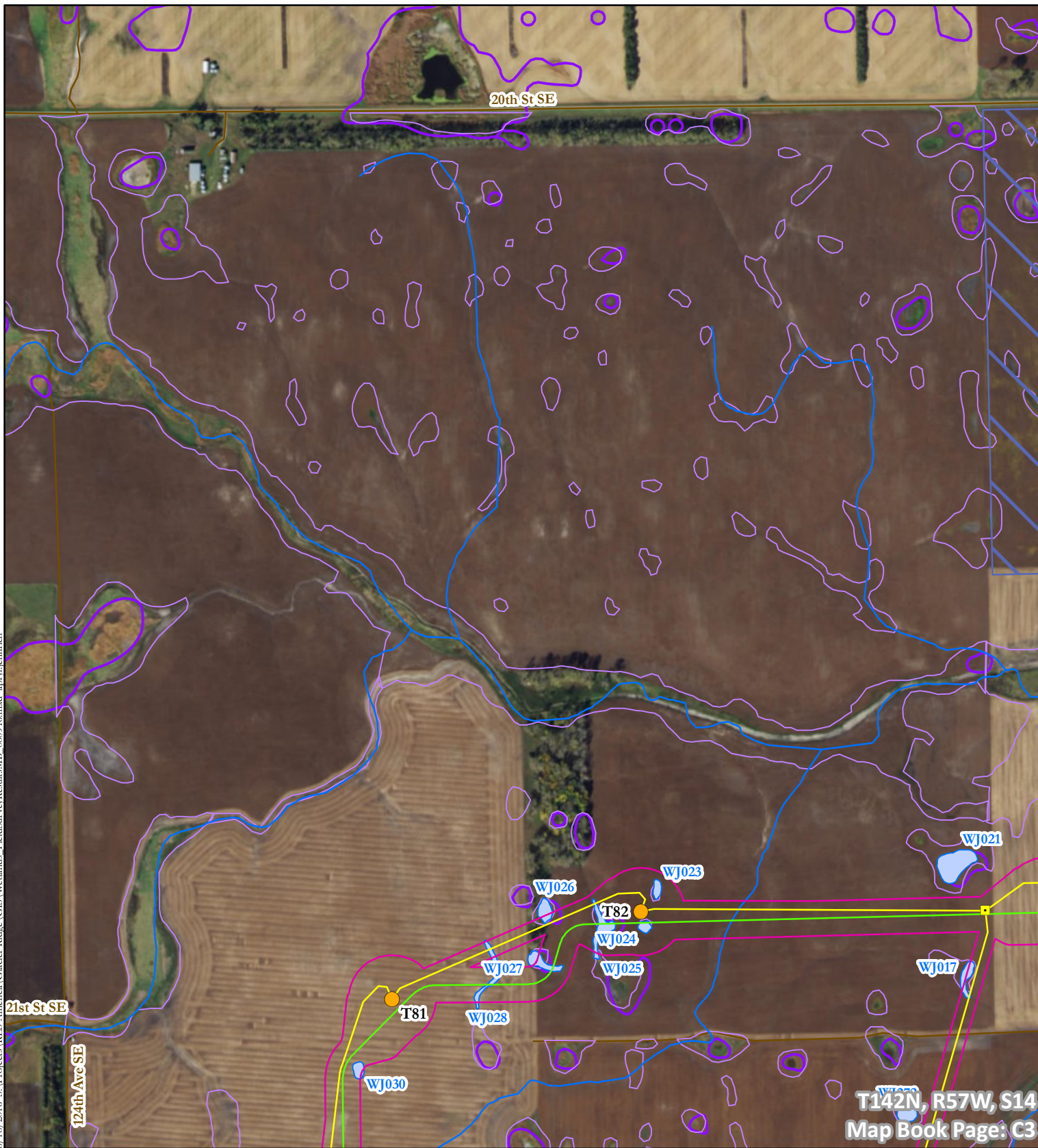
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



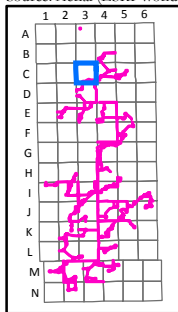
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 S:\Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults\MB_080916.mxd aprvl.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

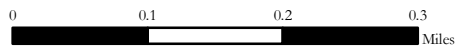
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

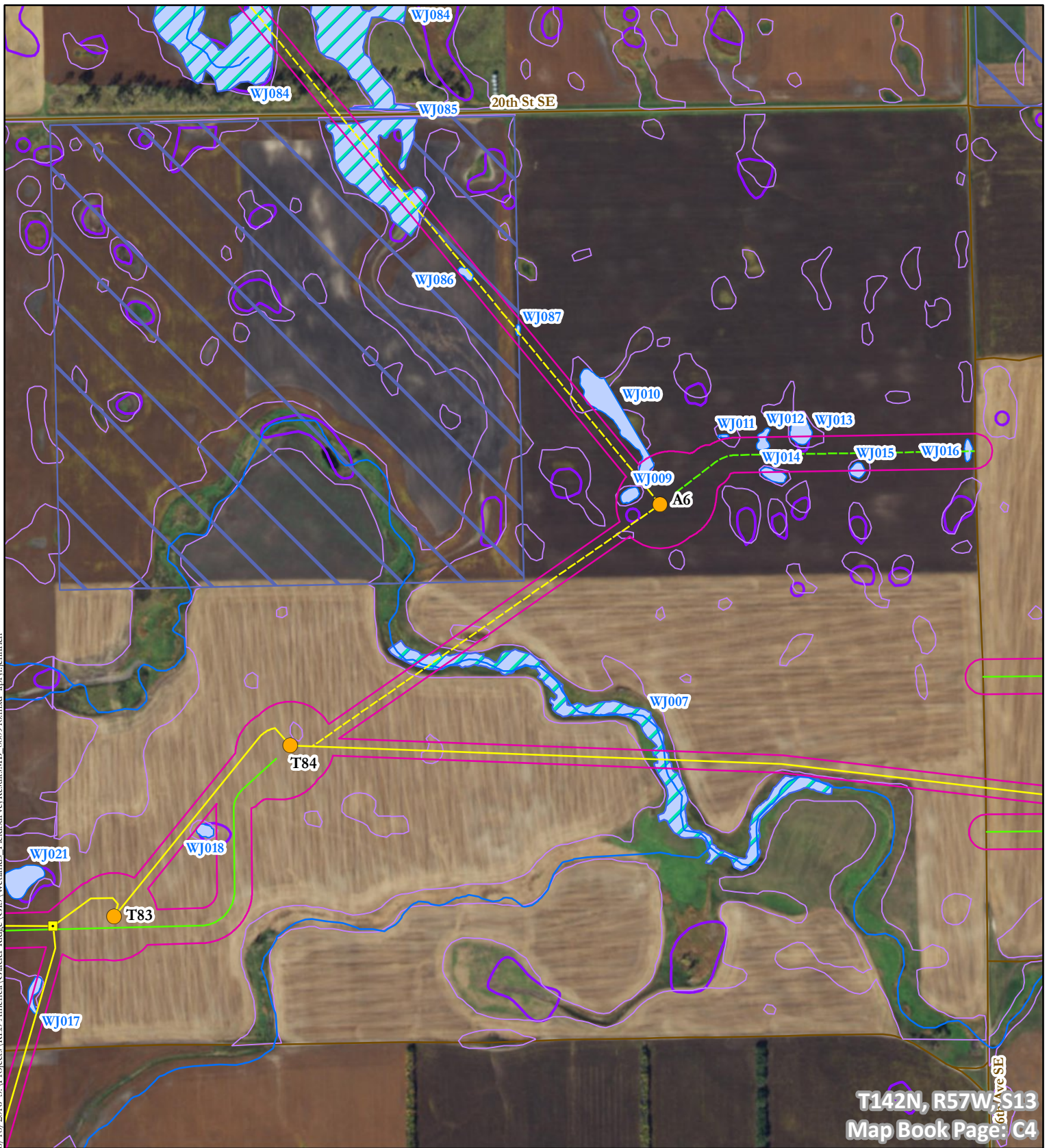
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



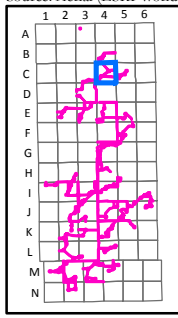
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 5:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults.MB_080916.mxd aprvil.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

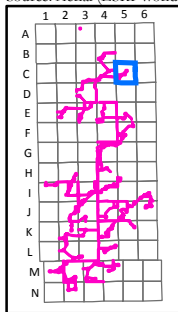
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 S:\Projects\RES America\Glacier Ridge\GIS\Wetlands_FieldSurveyResults\MB_080916.mxd aprvl.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

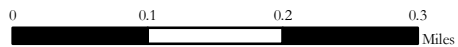
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

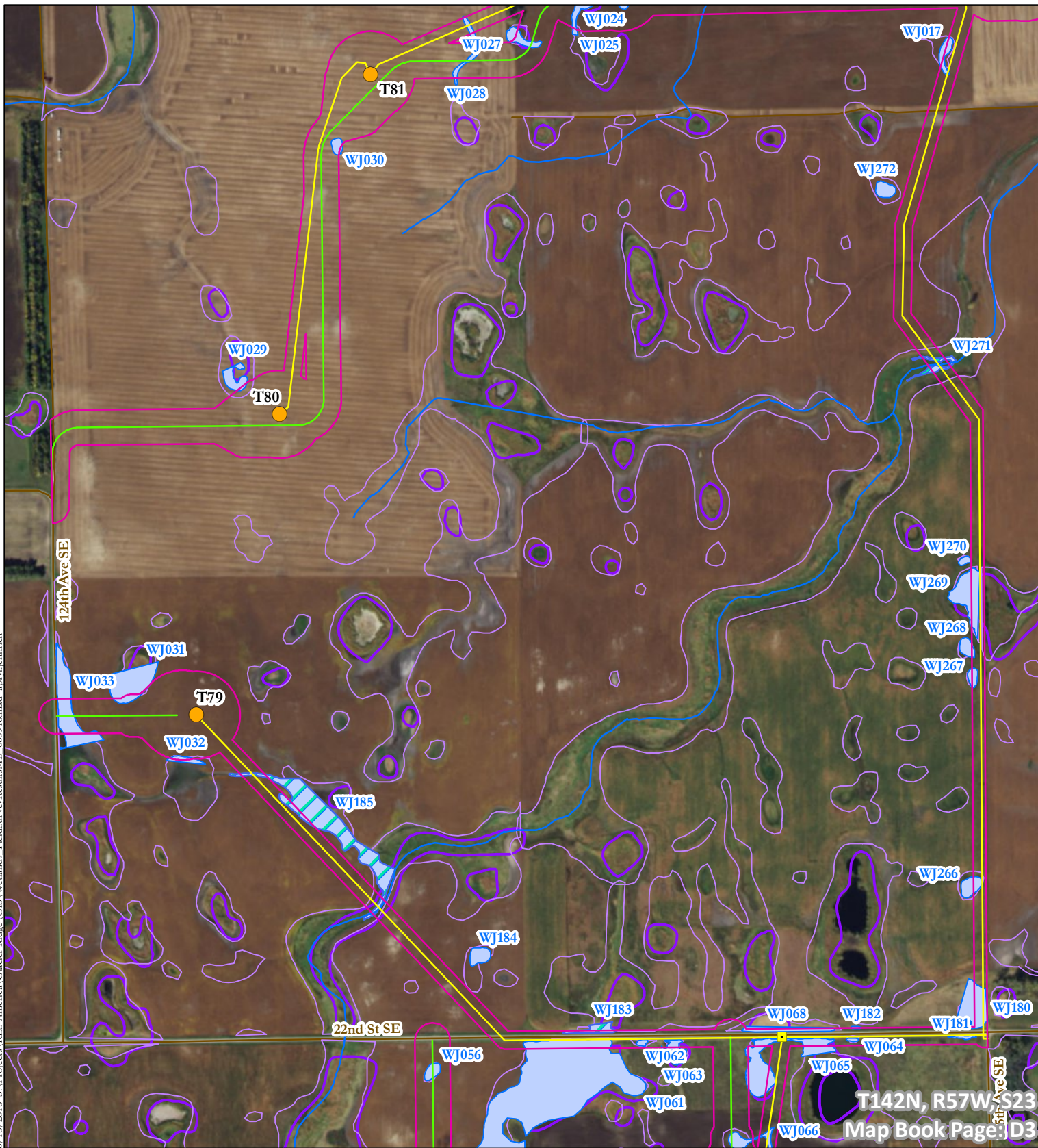
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



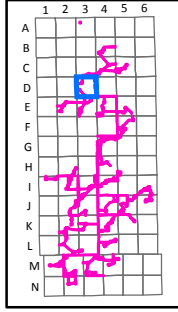
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 S:\Projects\RES America\Glacier Ridge\GIS\Wetlands_FieldSurveyResults.MB_080916.mxd aprvl.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



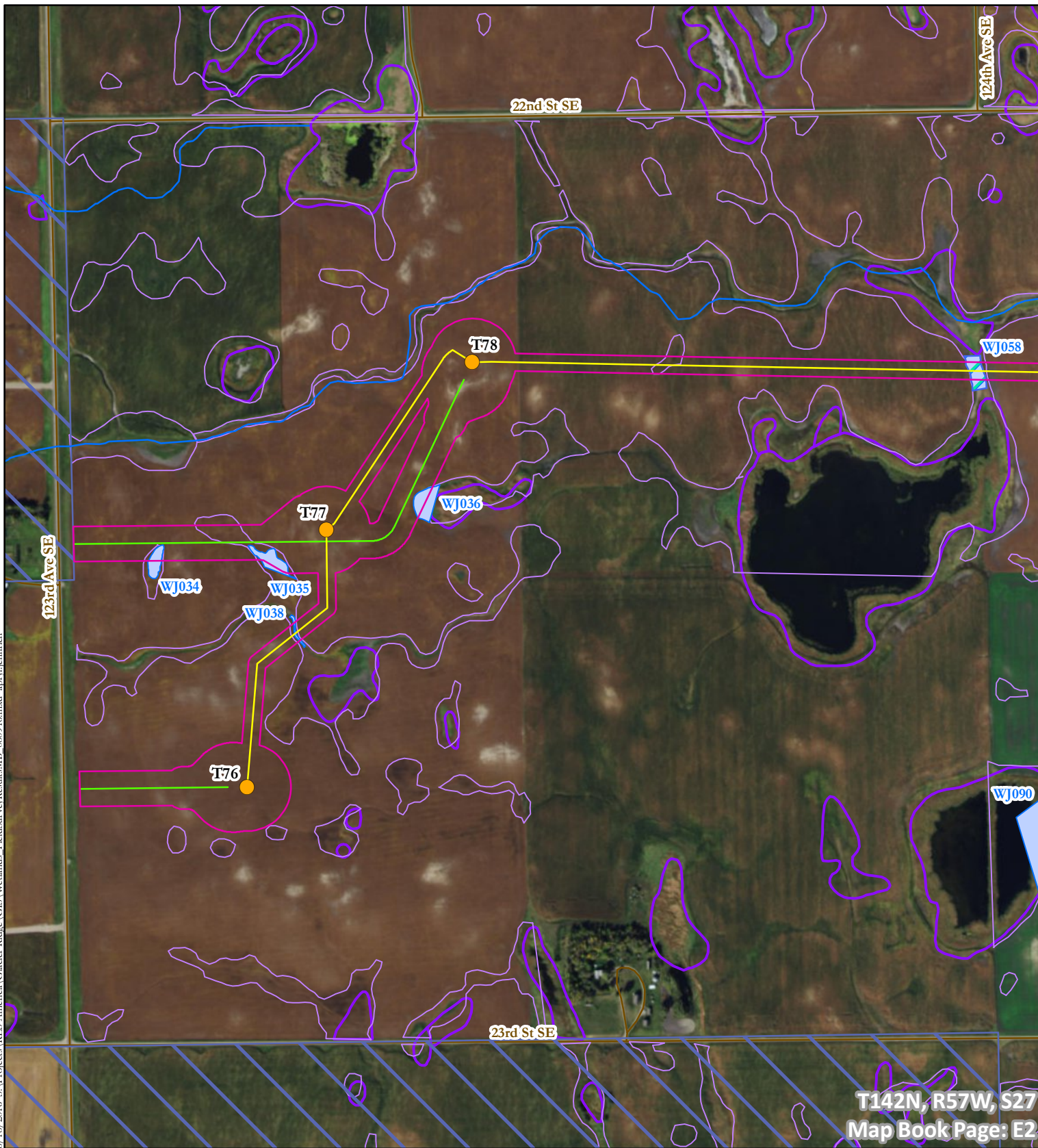
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.5 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

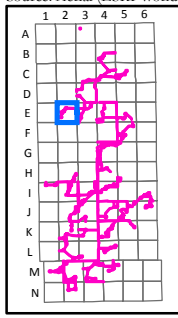


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T142N, R57W, S27
Map Book Page: E2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



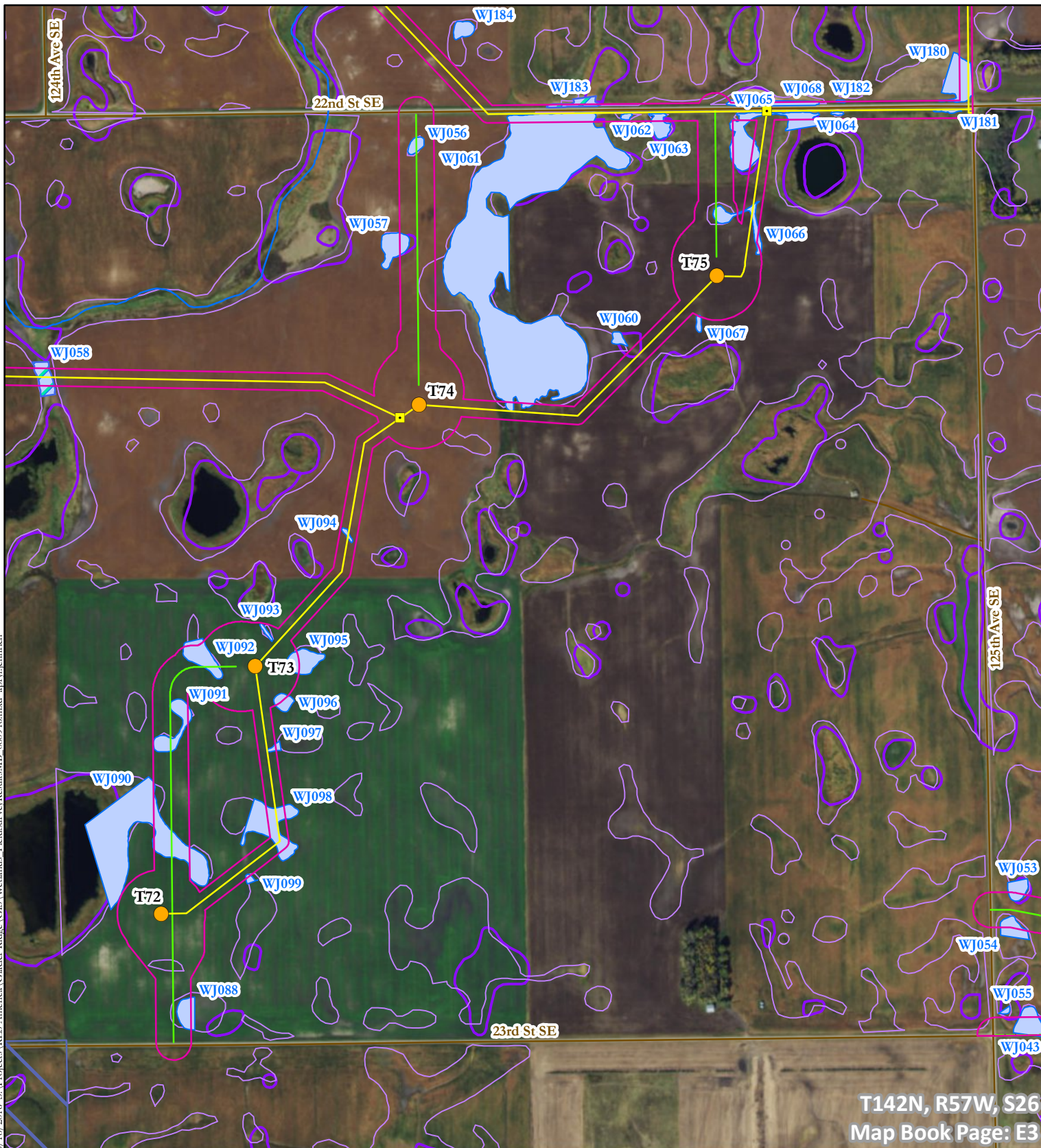
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

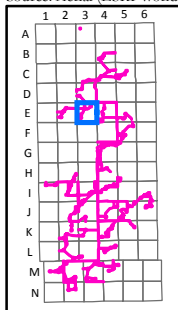


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T142N, R57W, S26
Map Book Page: E3

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



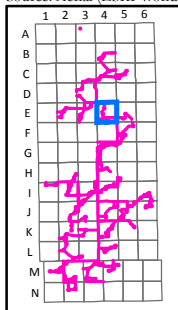
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

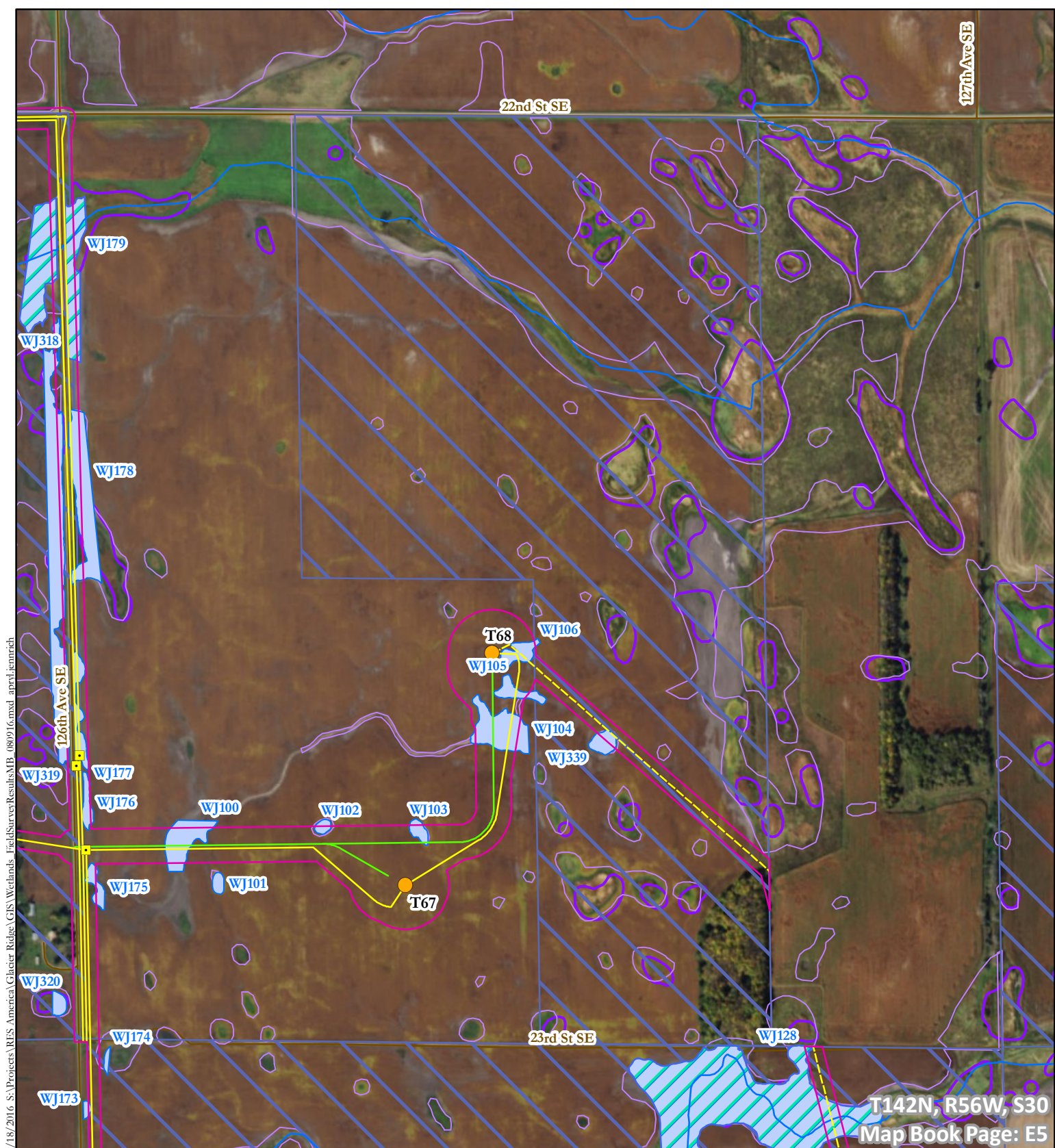
Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

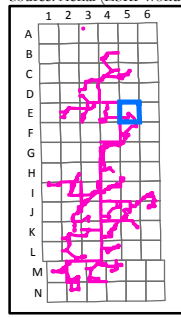




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T142N, R56W, S30
Map Book Page: E5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas(Tetra Tech).



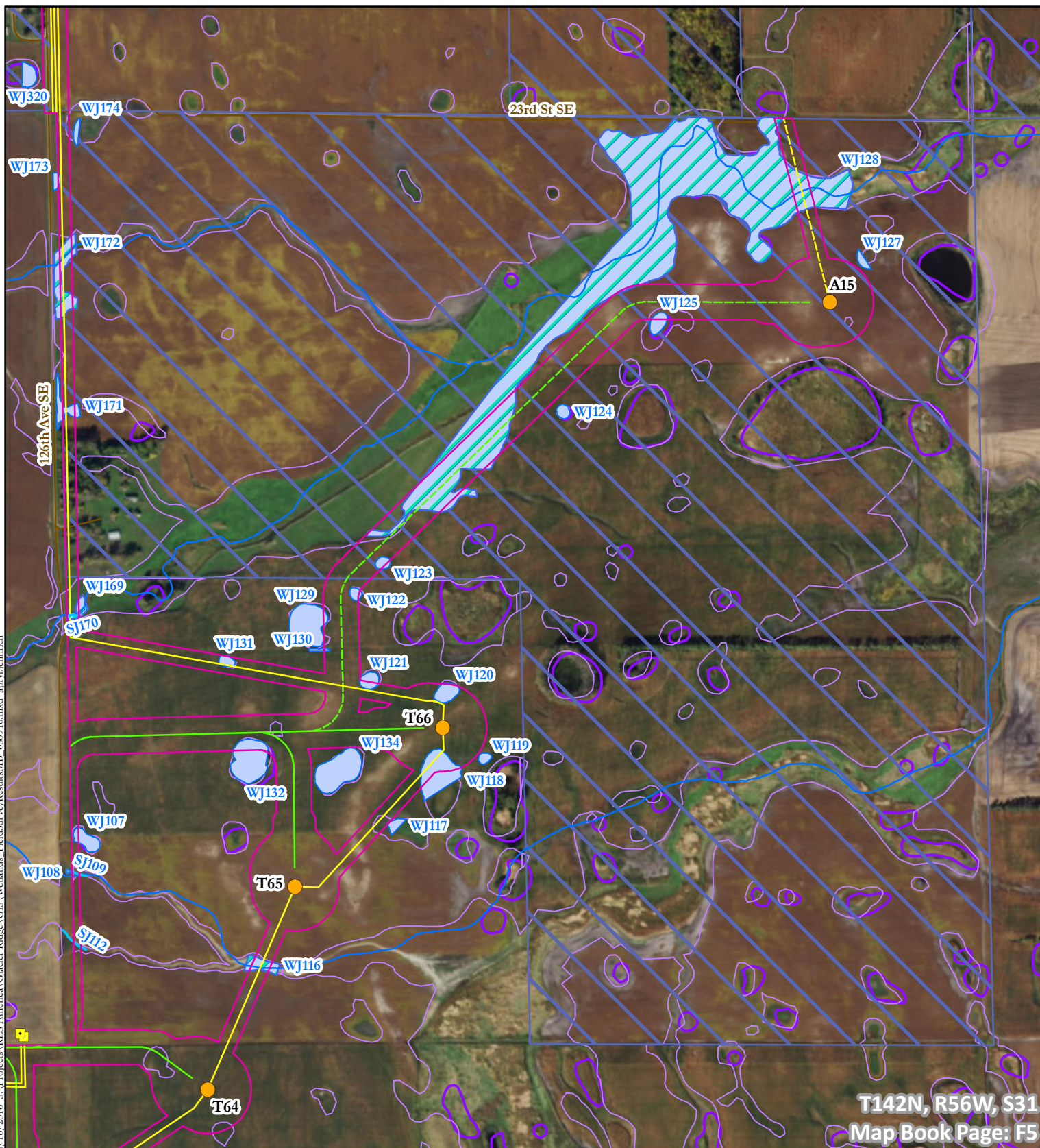
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

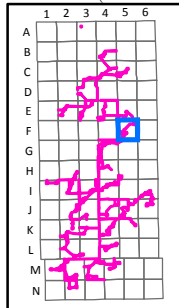
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

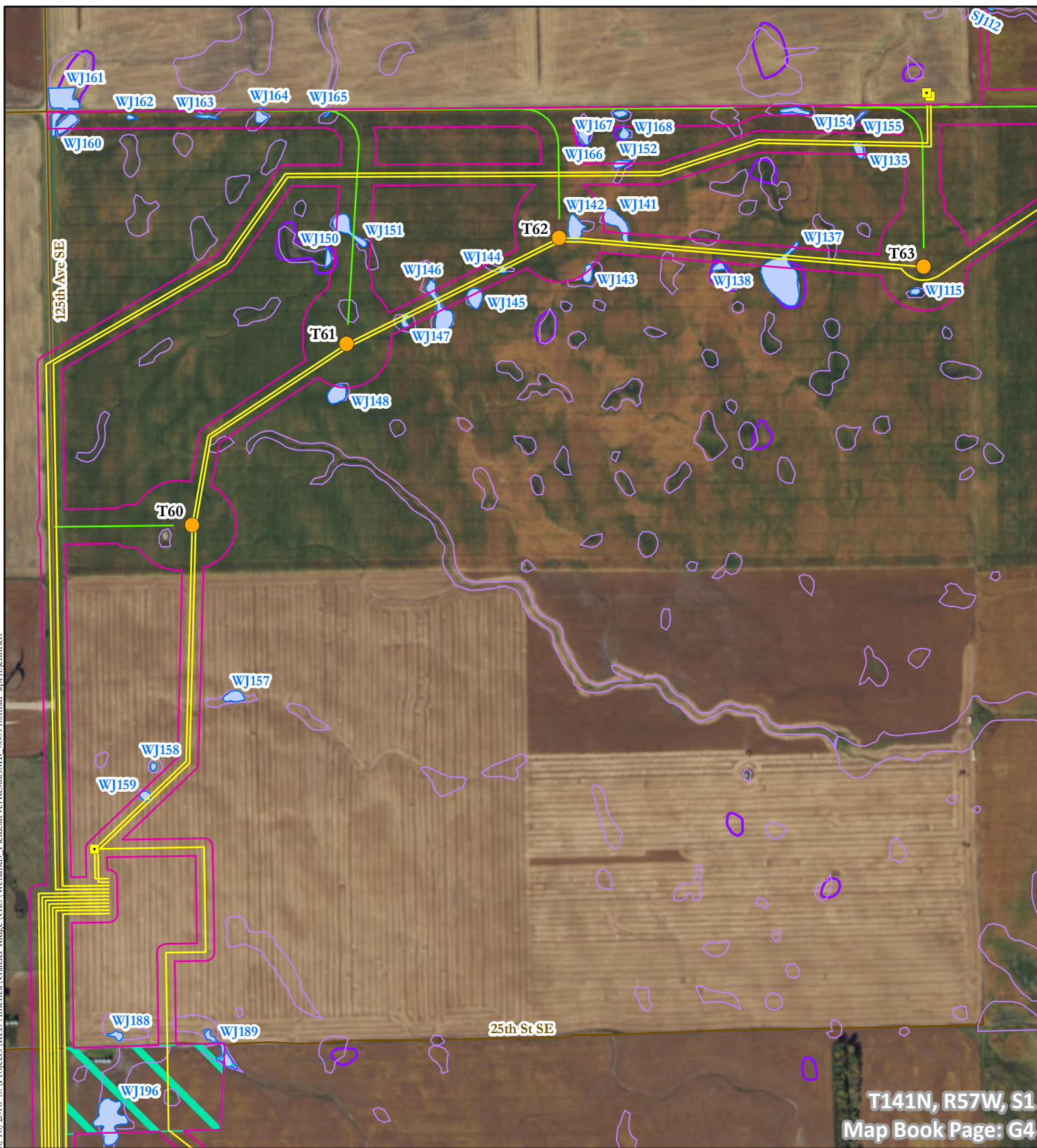
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

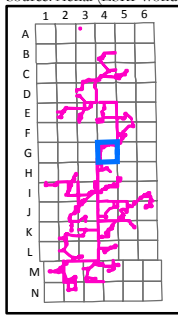


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T141N, R57W, S1
Map Book Page: G4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



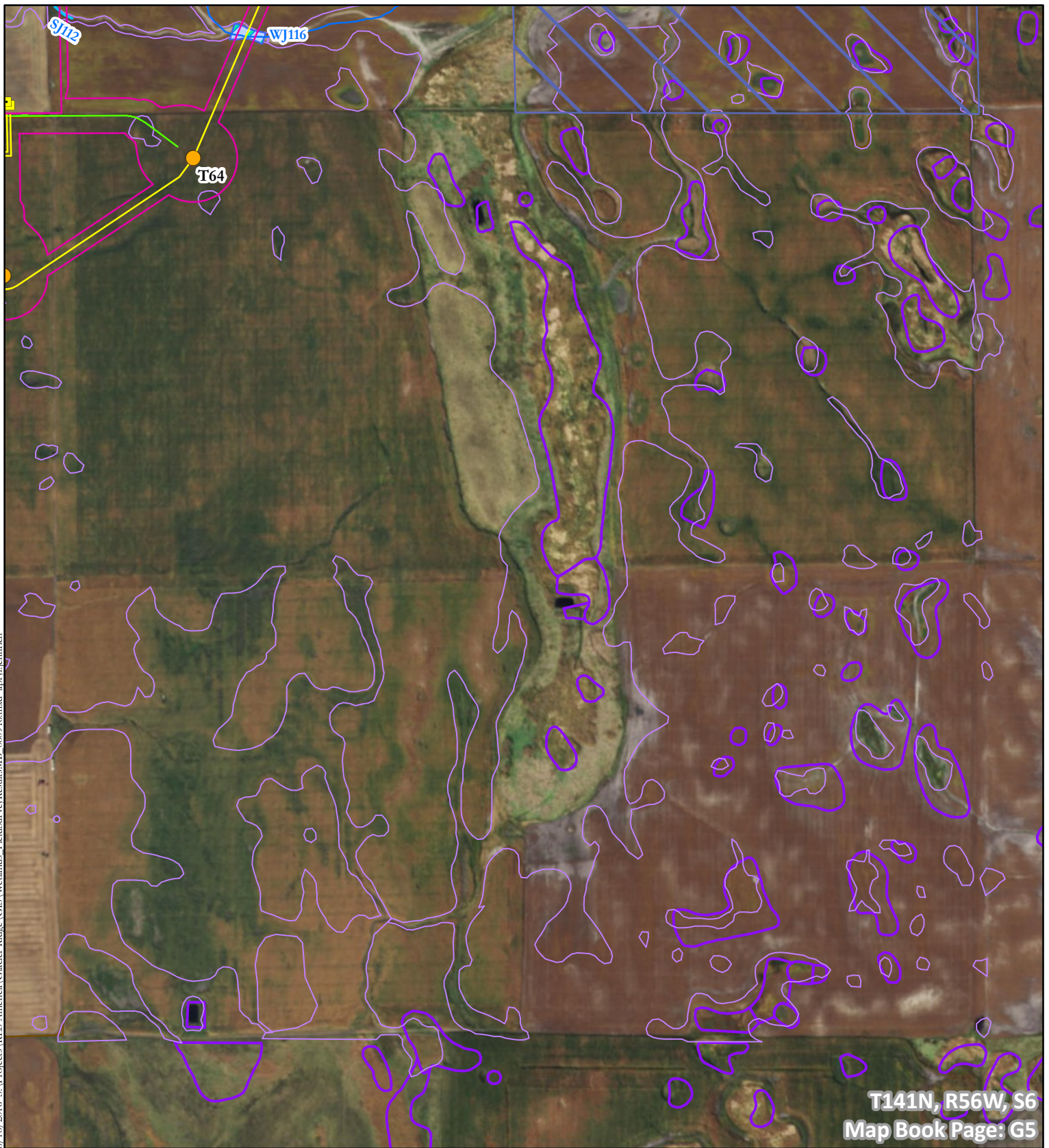
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

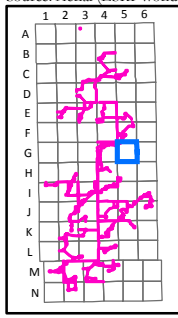


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T141N, R56W, S6
Map Book Page: G5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas(Tetra Tech).



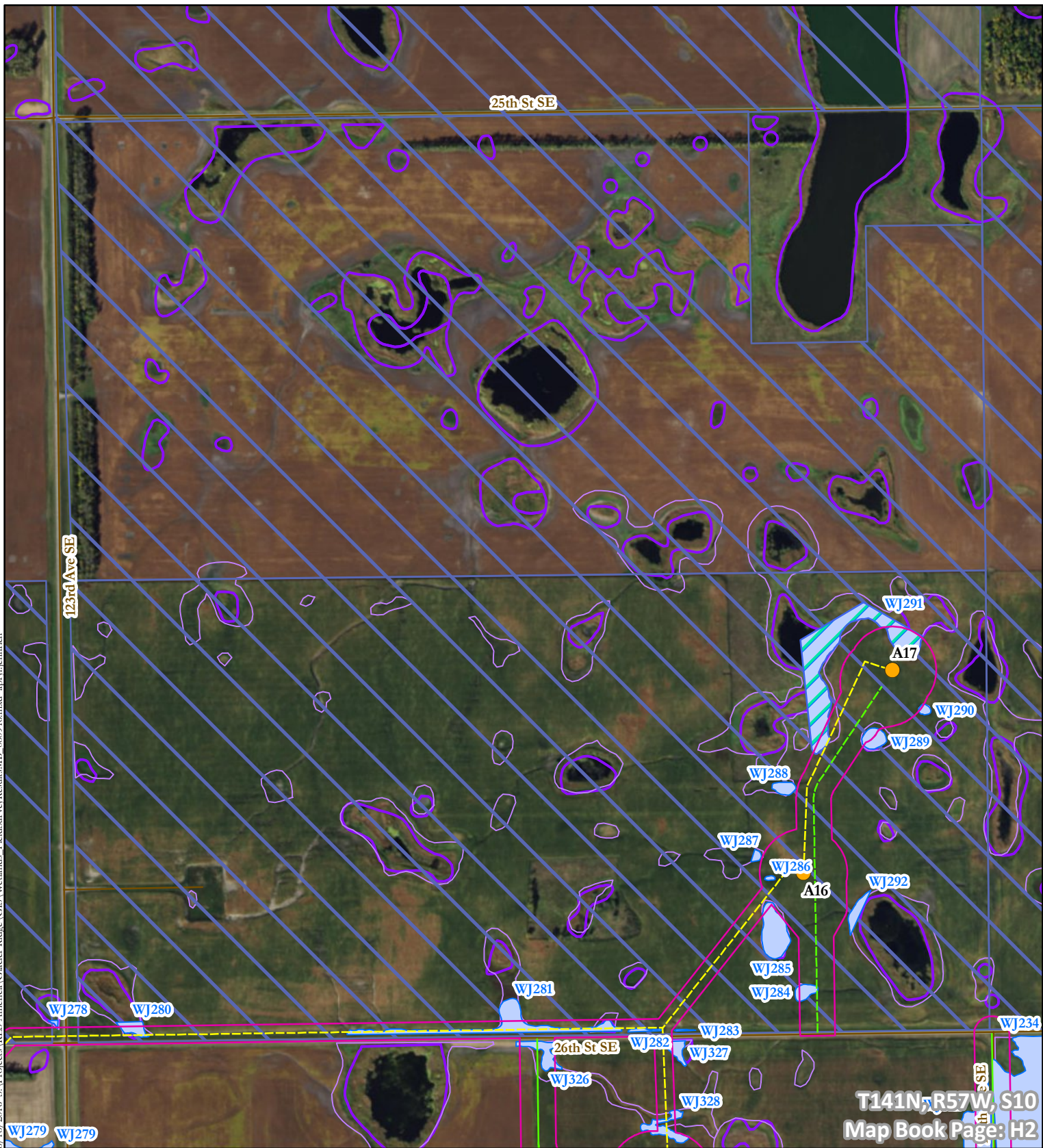
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

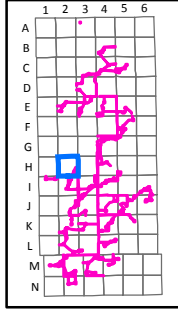


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T141N, R57W, S10
Map Book Page: H2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



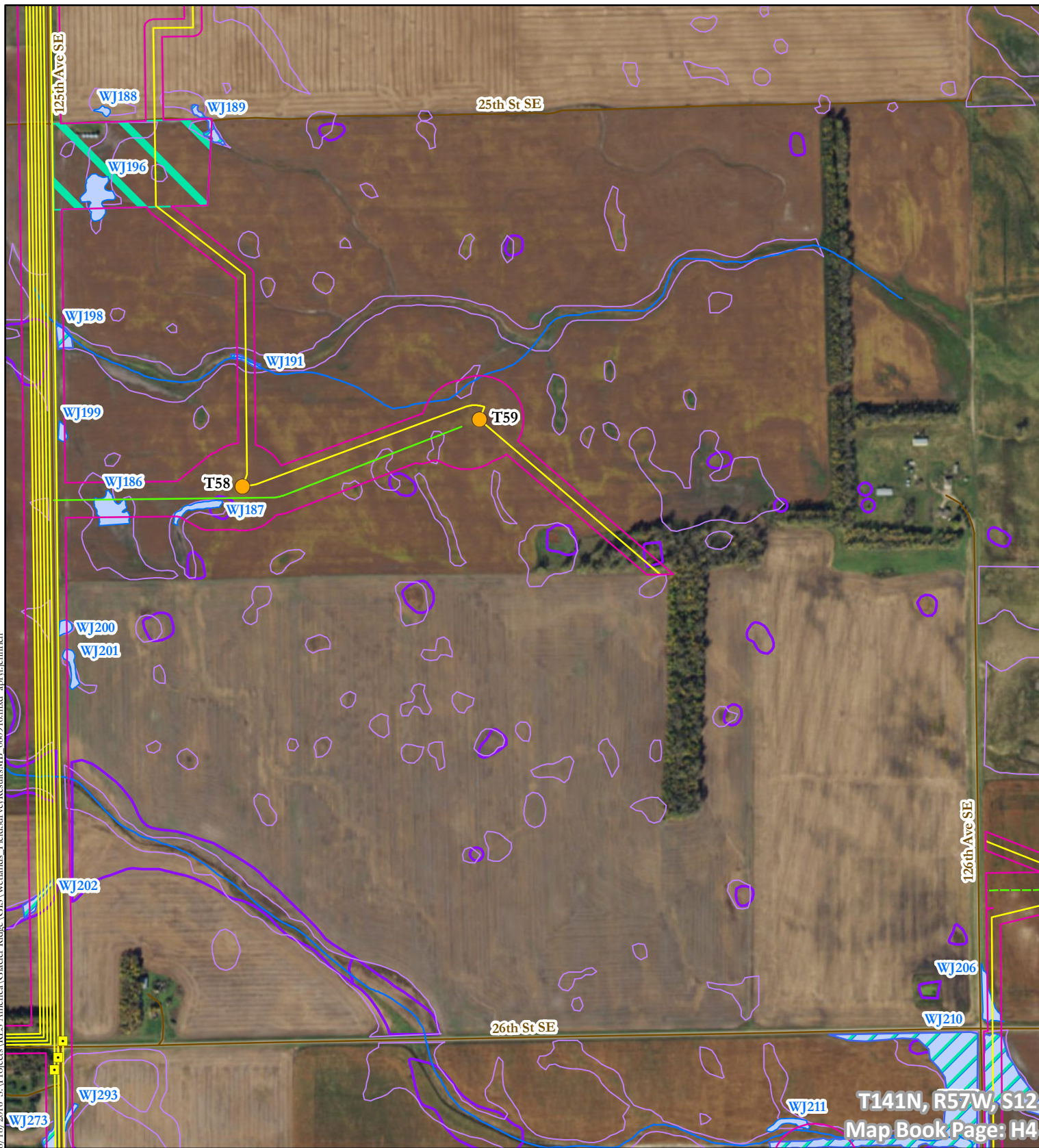
| Survey Data | Desktop Data | Facilities |
|----------------------|------------------------|-----------------|
| Stream Feature | NHD | Jbox |
| Non-Jurisdictional | NWI Wetland | Turbine |
| USACE Jurisdictional | Potential Wetland Area | Collection |
| Survey Corridor | USFWS Easement | Collection Alt |
| | Public Road | Access Road |
| | | Access Road Alt |
| | | O&M/Substation |

0 0.1 0.2 0.3 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

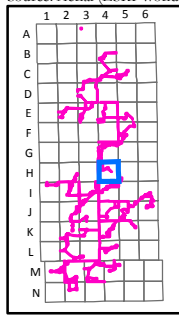


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T141N, R57W, S12
Map Book Page: H4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



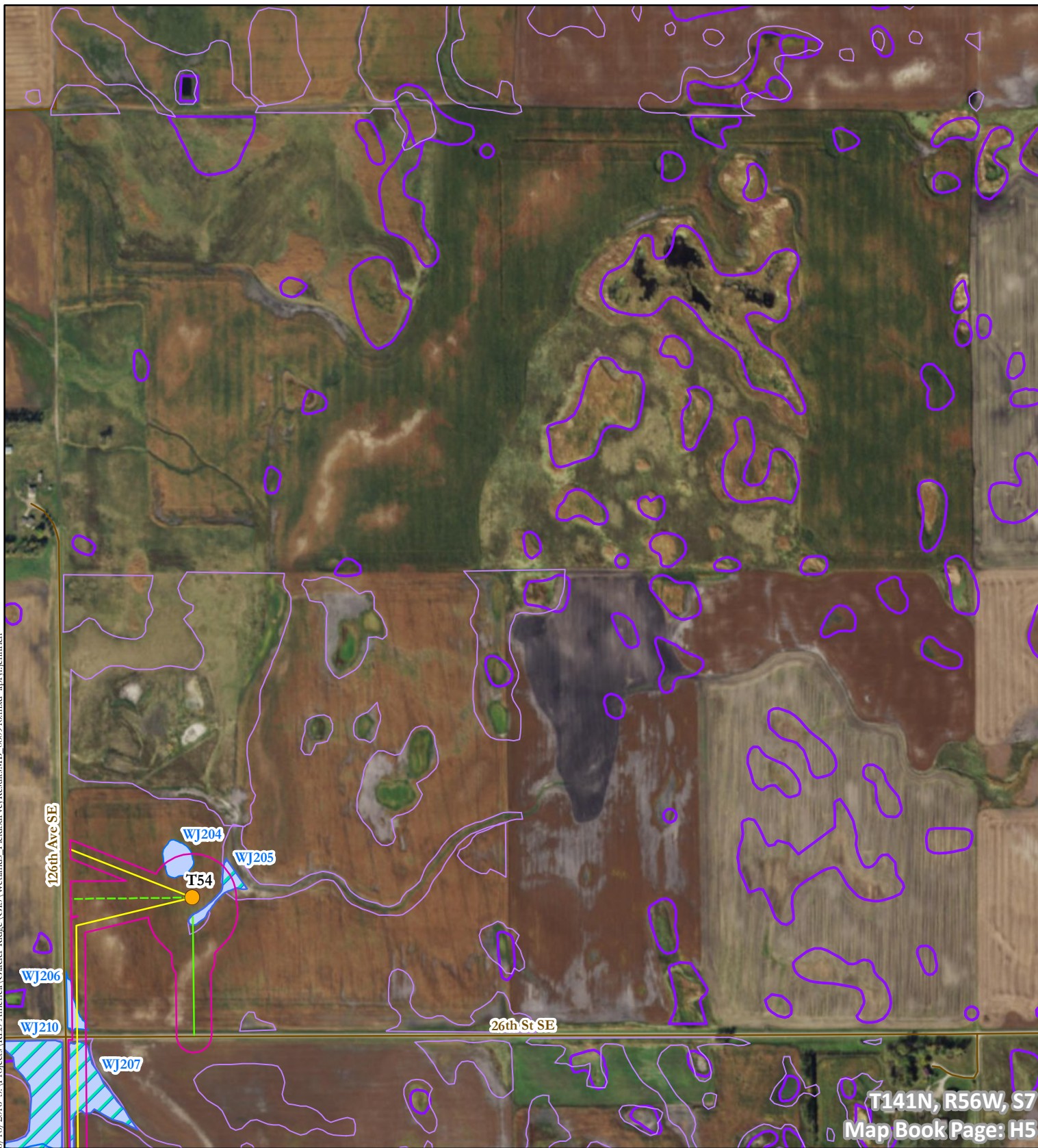
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

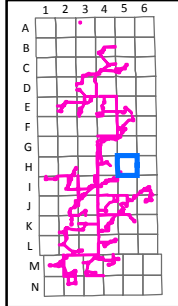


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T141N, R56W, S7
Map Book Page: H5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

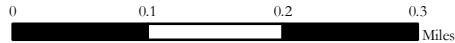
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



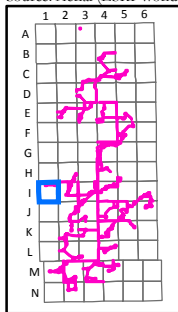
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults\MB_080916.mxd aprvl.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

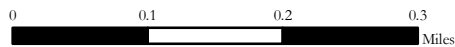
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

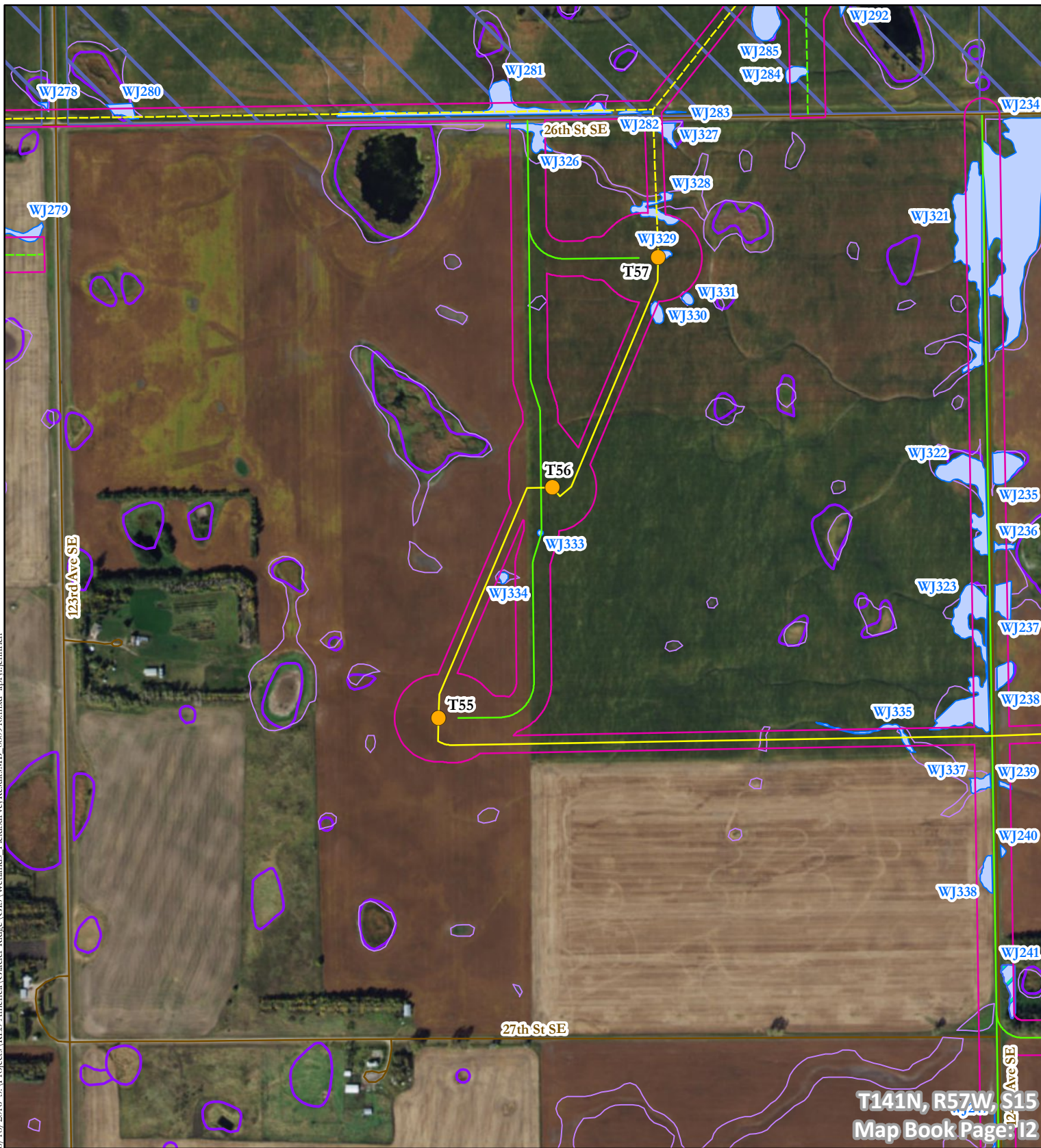
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

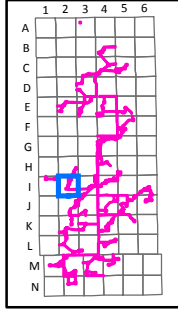


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T141N, R57W, S15
Map Book Page: 12

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



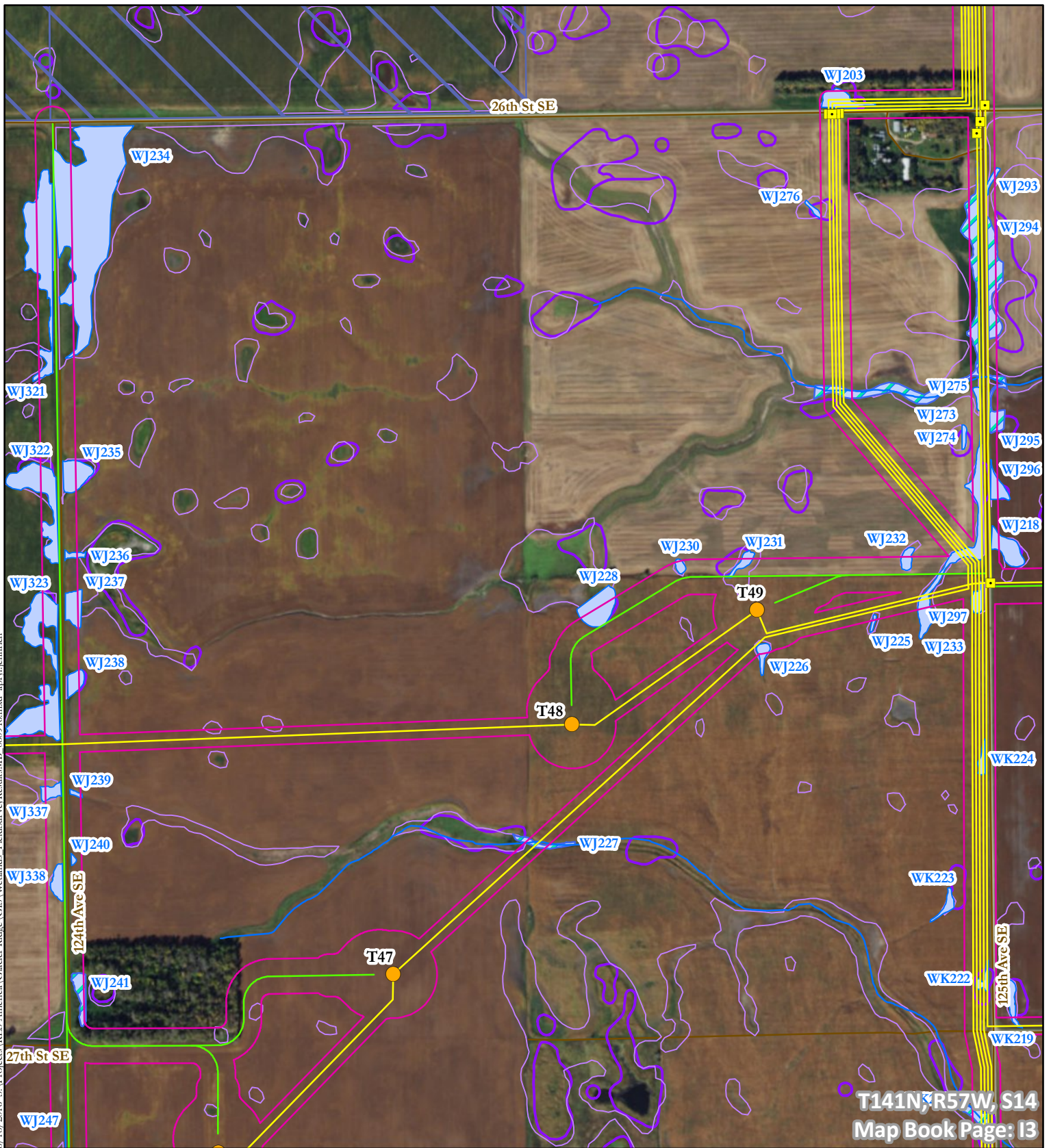
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

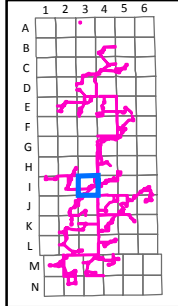
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 S:\Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults\MB_080916.mxd aprvl.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

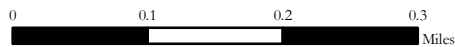
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

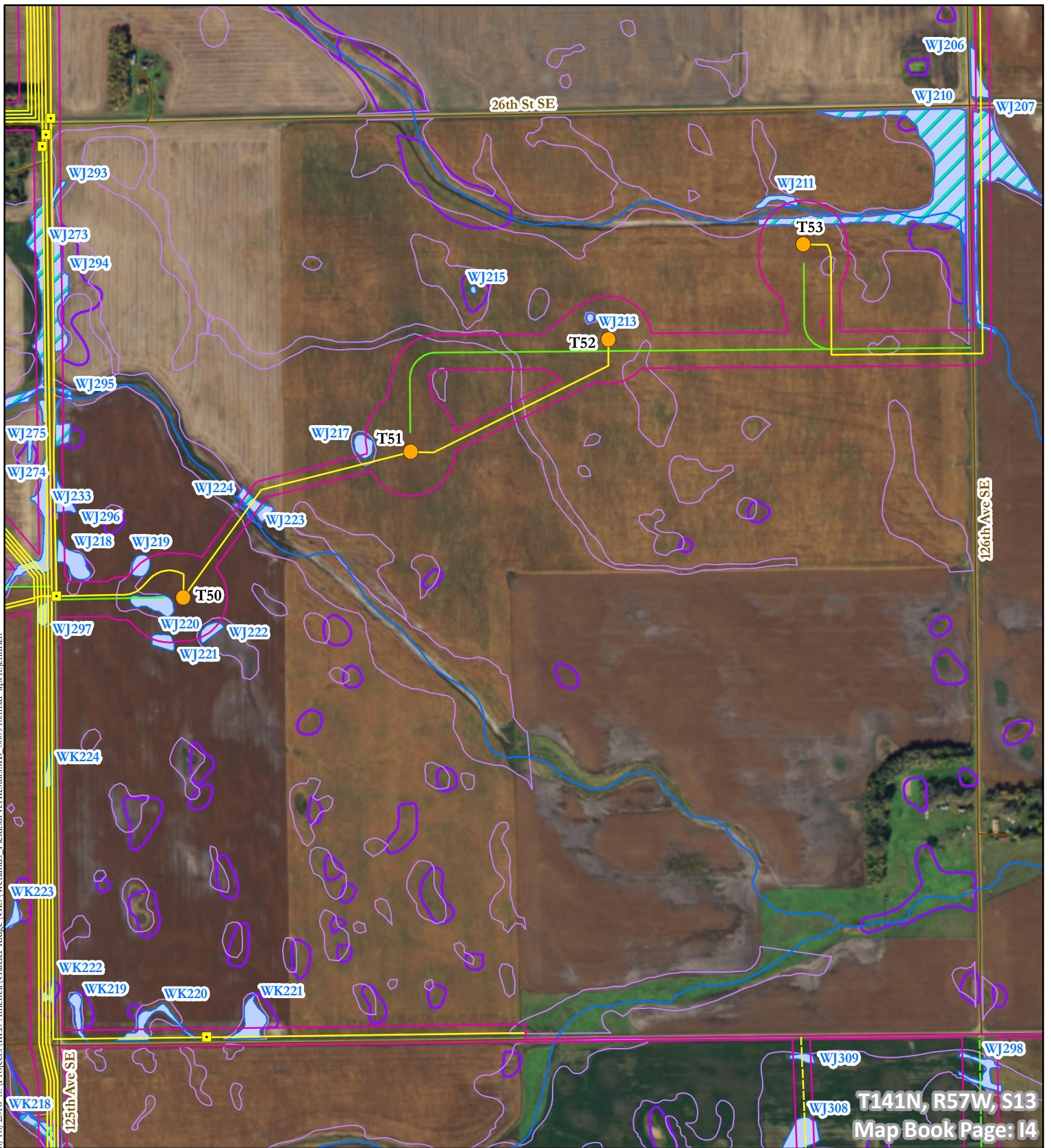
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



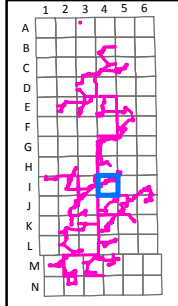
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 S:\Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults\MB_080916.mxd aprvl.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas(Tetra Tech).



Survey Data

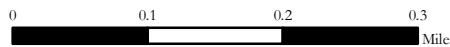
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

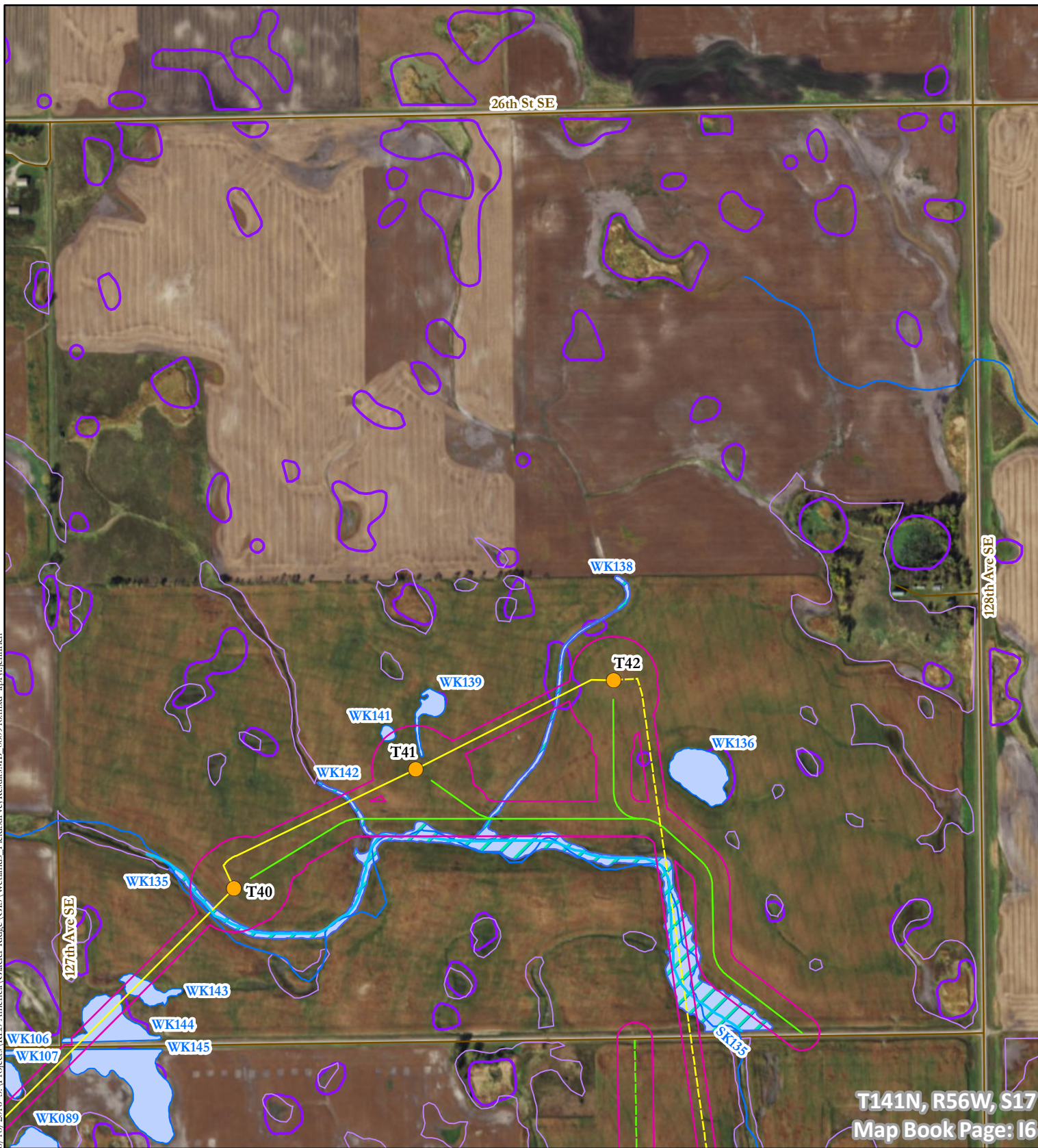
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

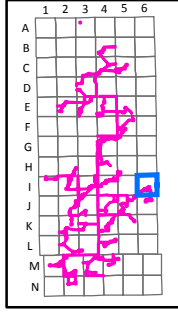


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T141N, R56W, S17
Map Book Page: I6

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



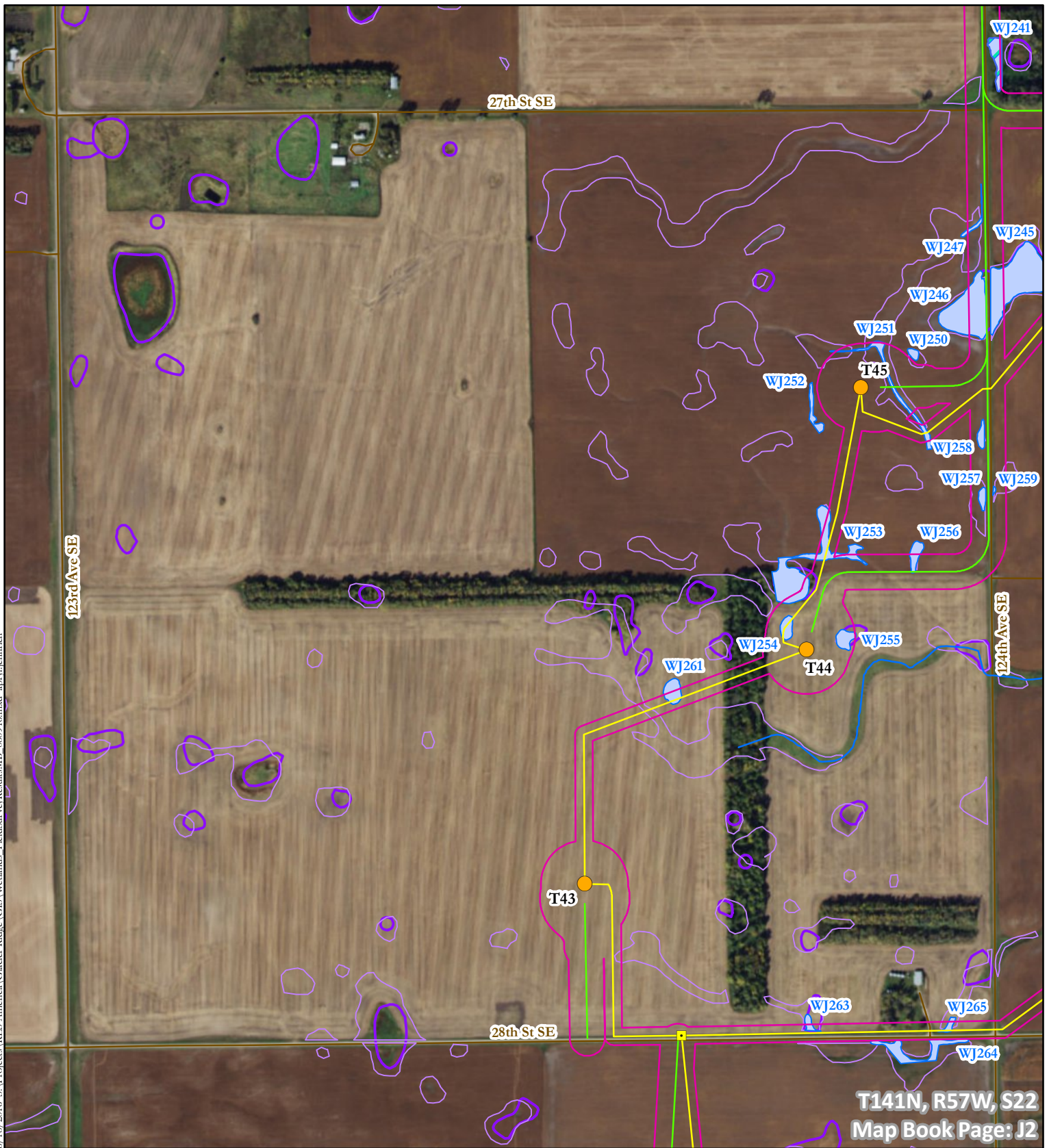
| Survey Data | Desktop Data | Facilities |
|----------------------|------------------------|-----------------|
| Stream Feature | NHD | Jbox |
| Non-Jurisdictional | NWI Wetland | Turbine |
| USACE Jurisdictional | Potential Wetland Area | Collection |
| Survey Corridor | USFWS Easement | Collection Alt |
| | Public Road | Access Road |
| | | Access Road Alt |
| | | O&M/Substation |

0 0.1 0.2 0.3 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

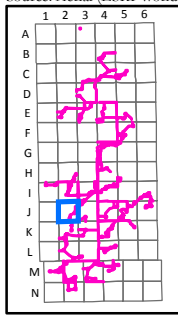


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T141N, R57W, S22
Map Book Page: J2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



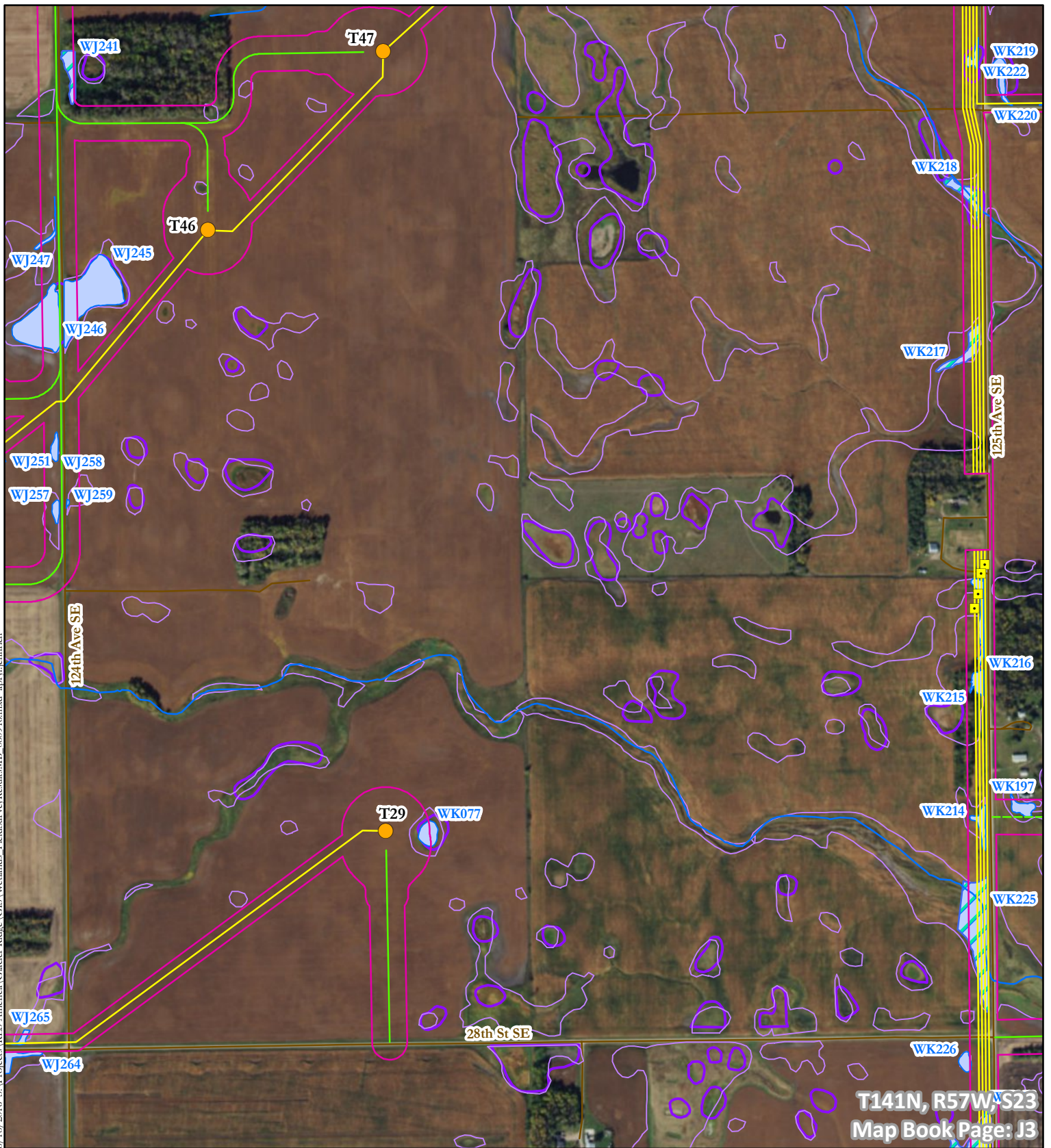
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

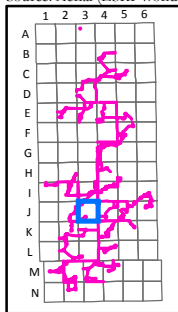
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

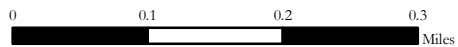
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

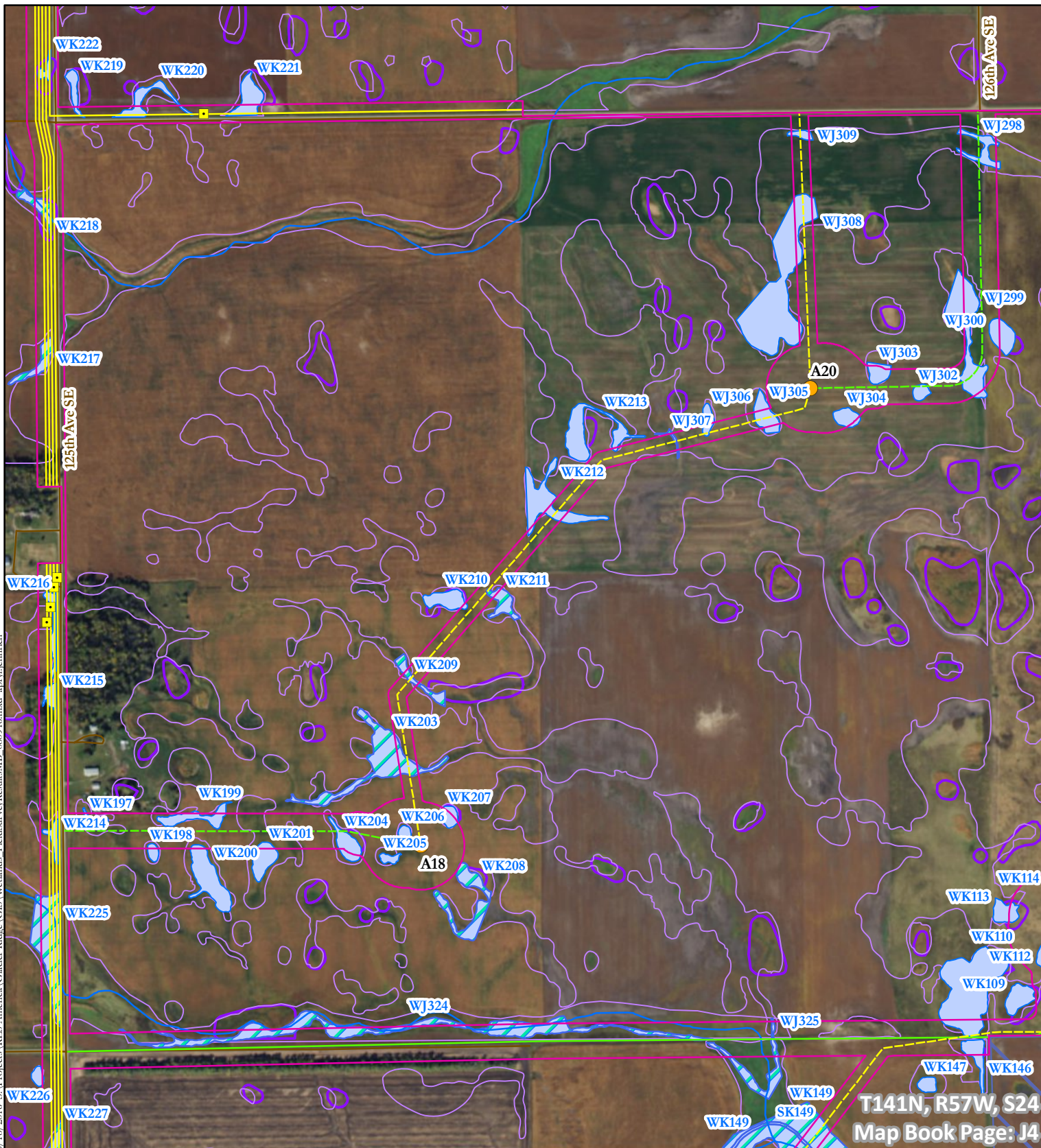
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



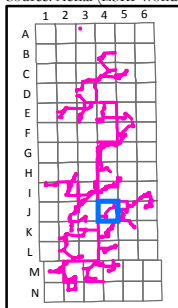
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

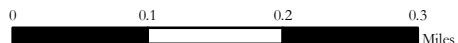
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

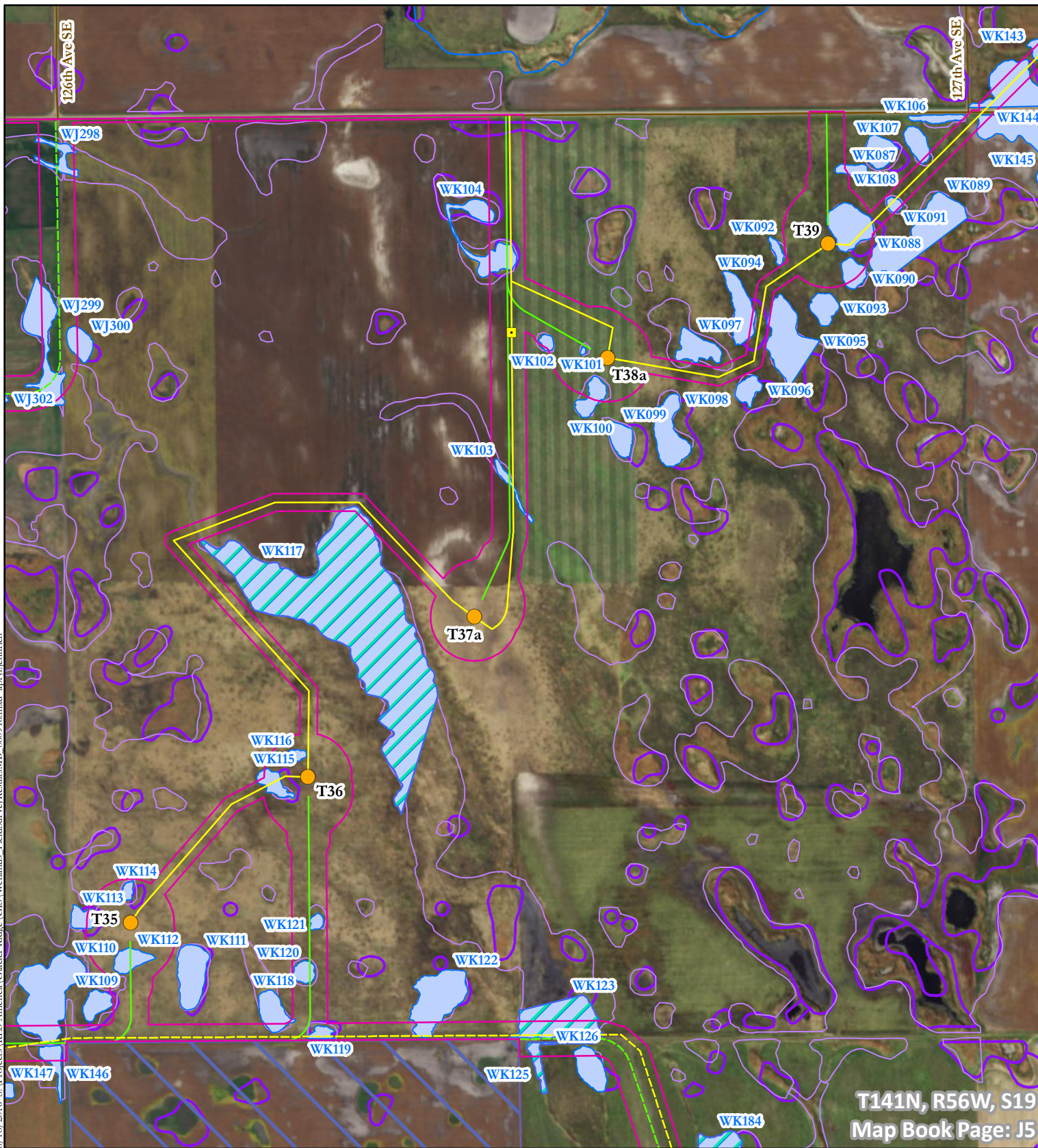
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



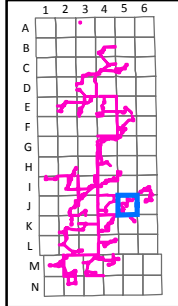
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

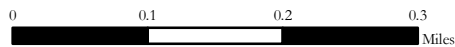
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

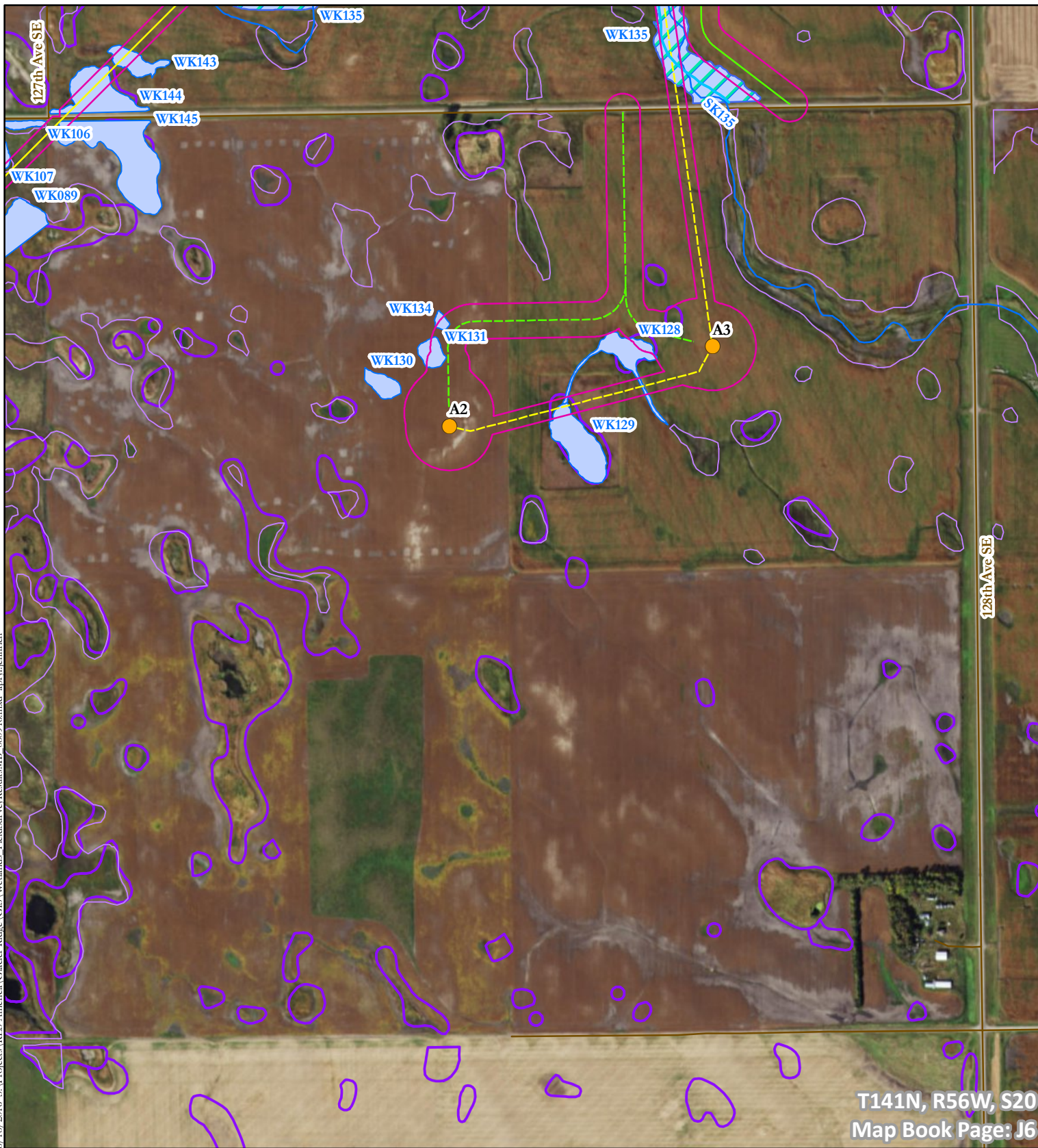
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



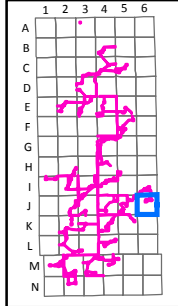
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

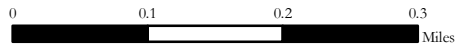
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

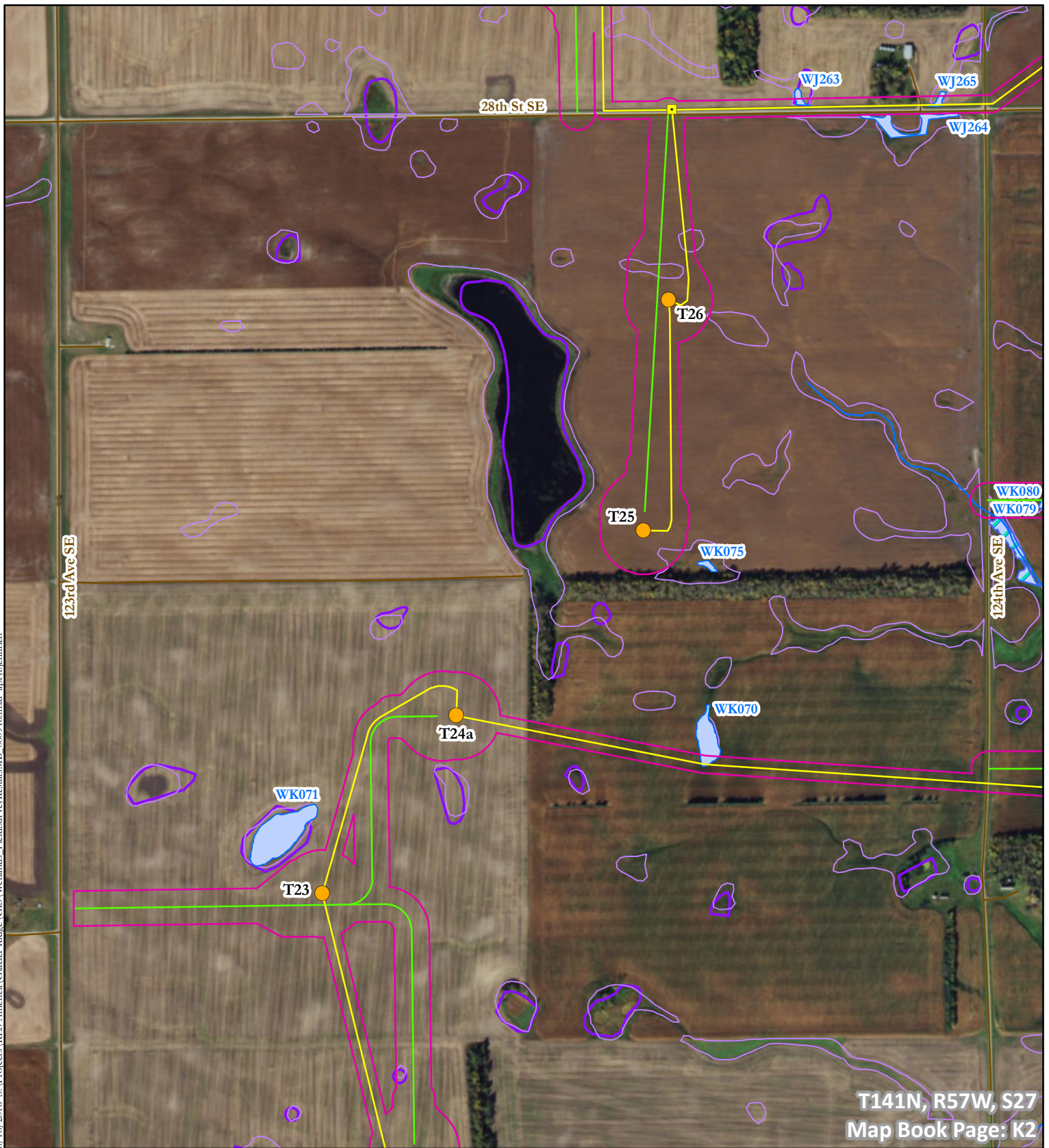
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

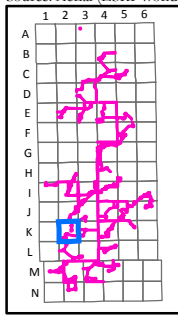


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T141N, R57W, S27
Map Book Page: K2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



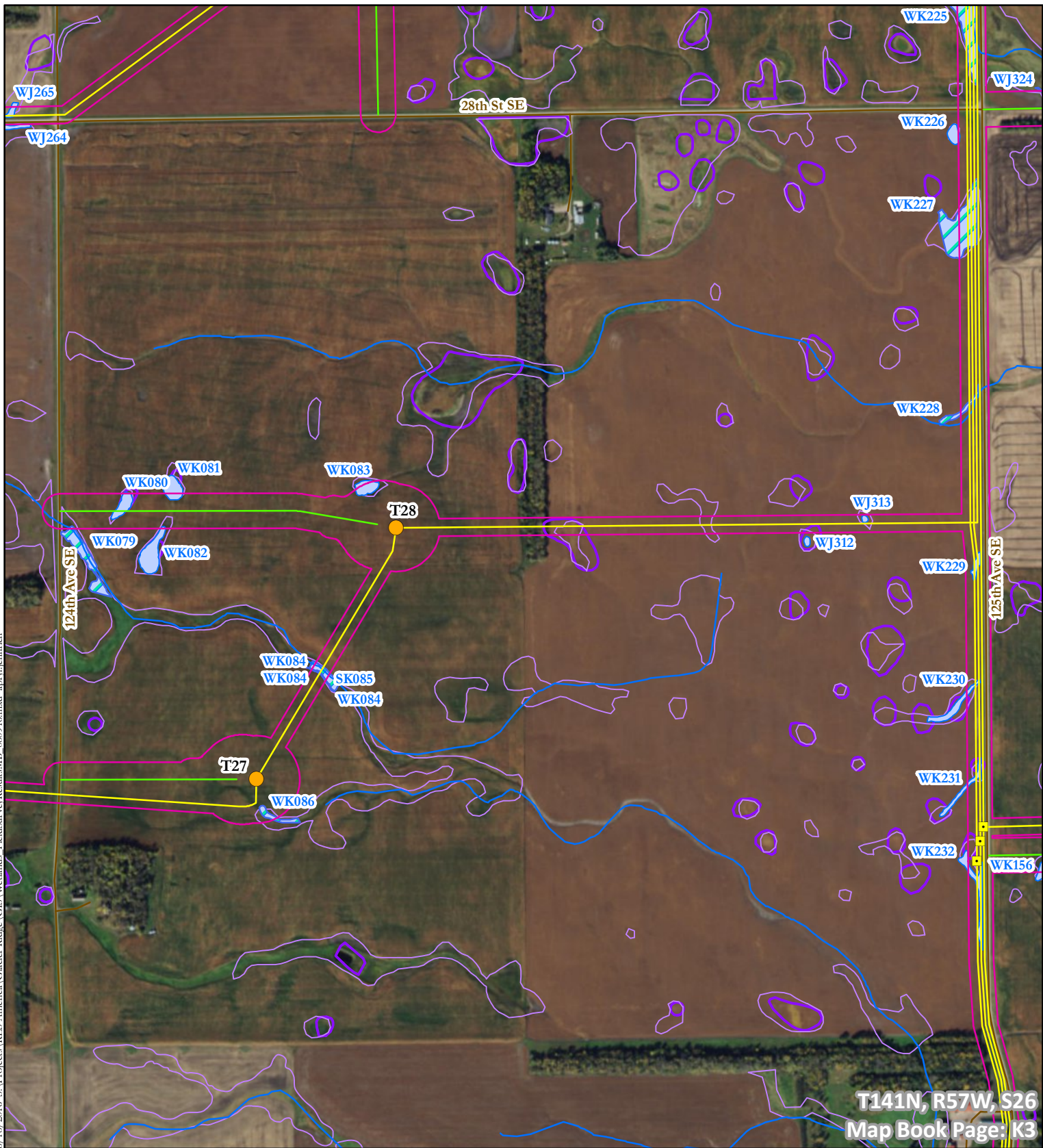
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

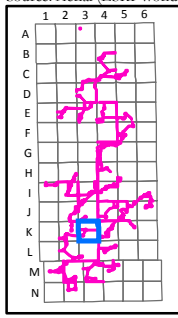
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



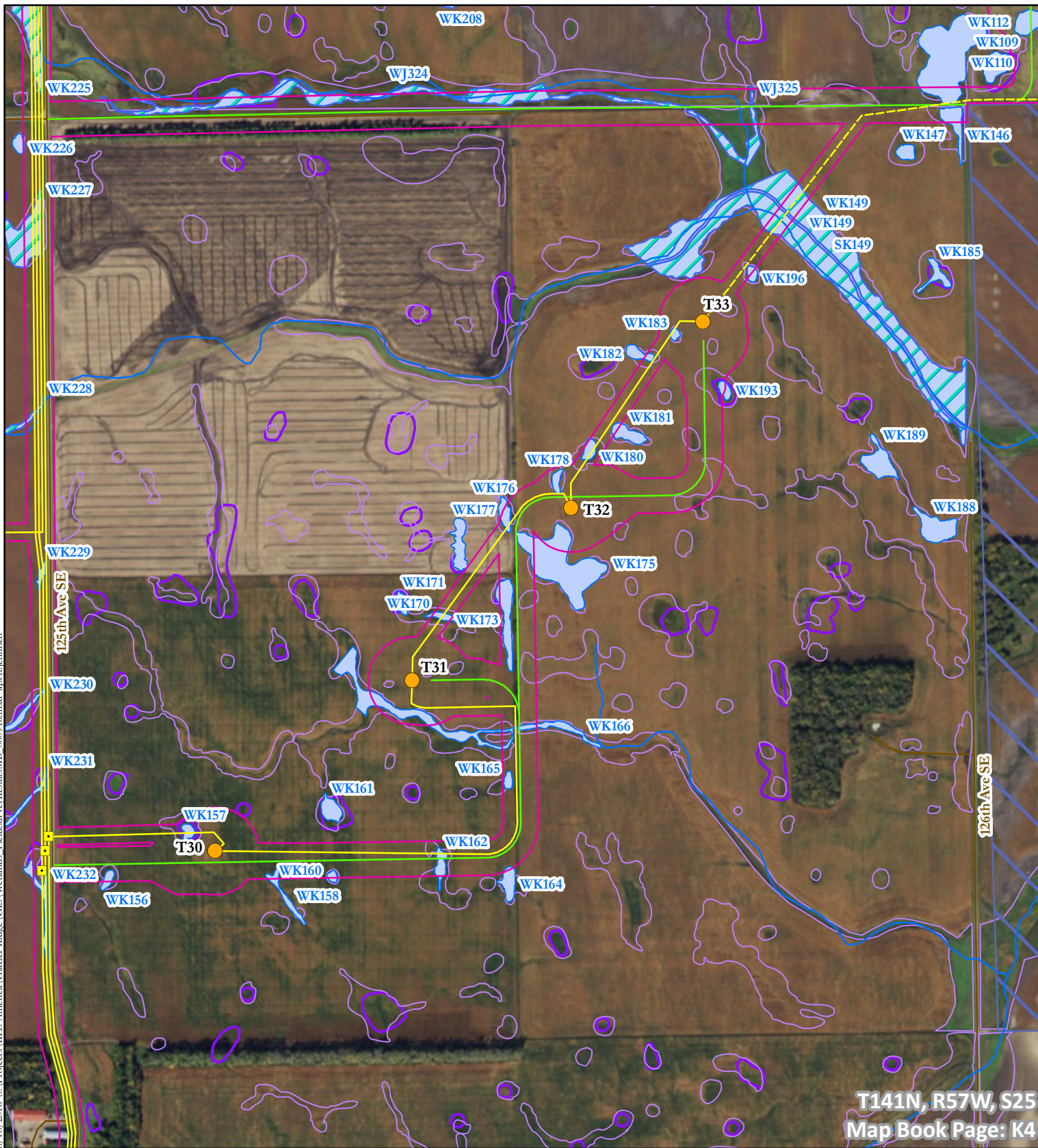
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

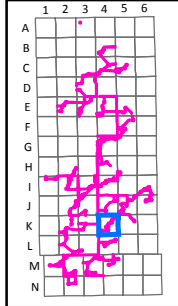
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

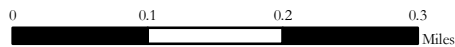
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

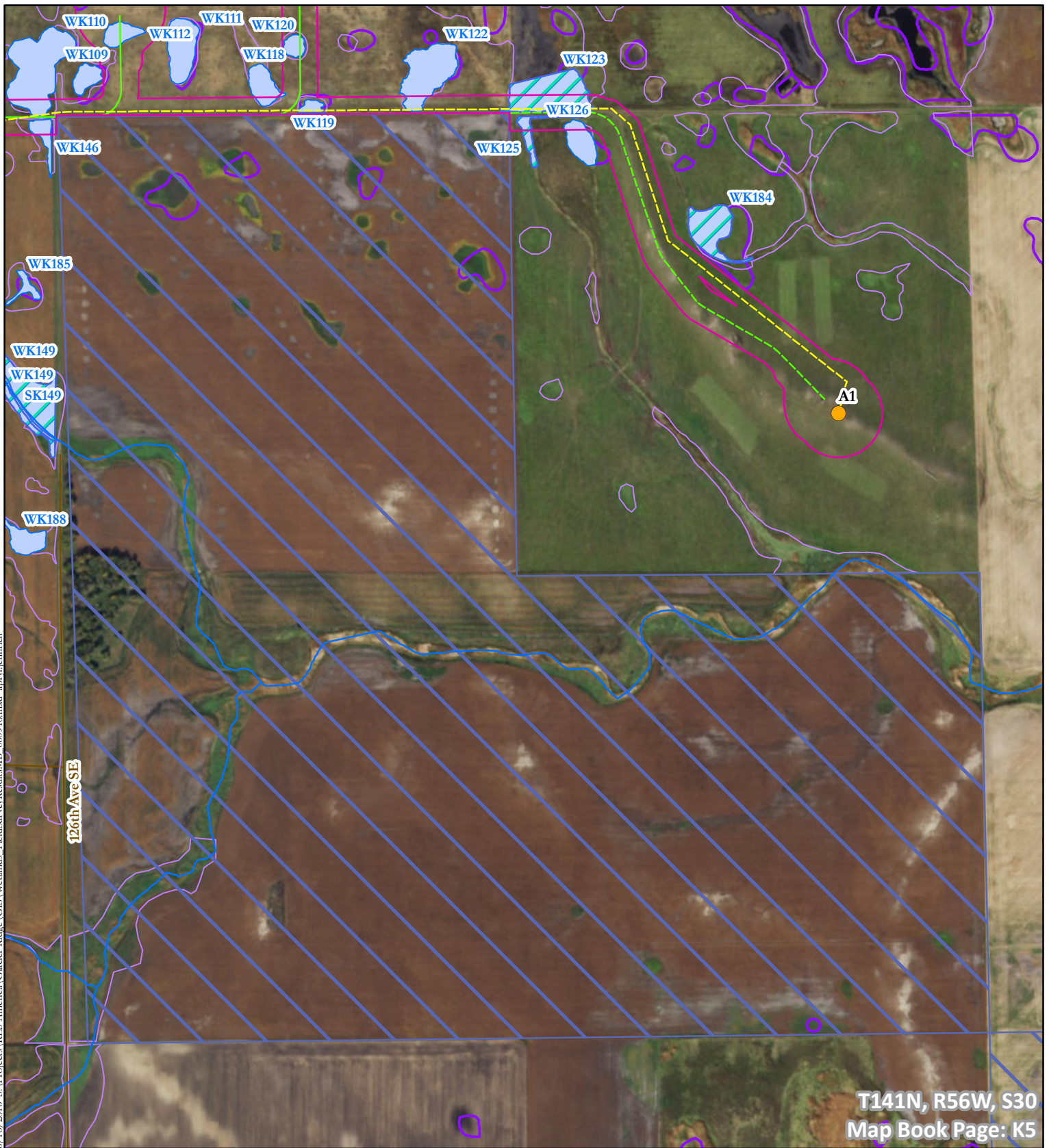
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

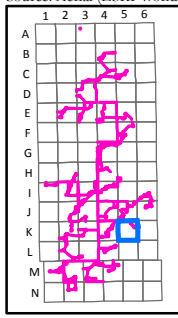


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T141N, R56W, S30
Map Book Page: K5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



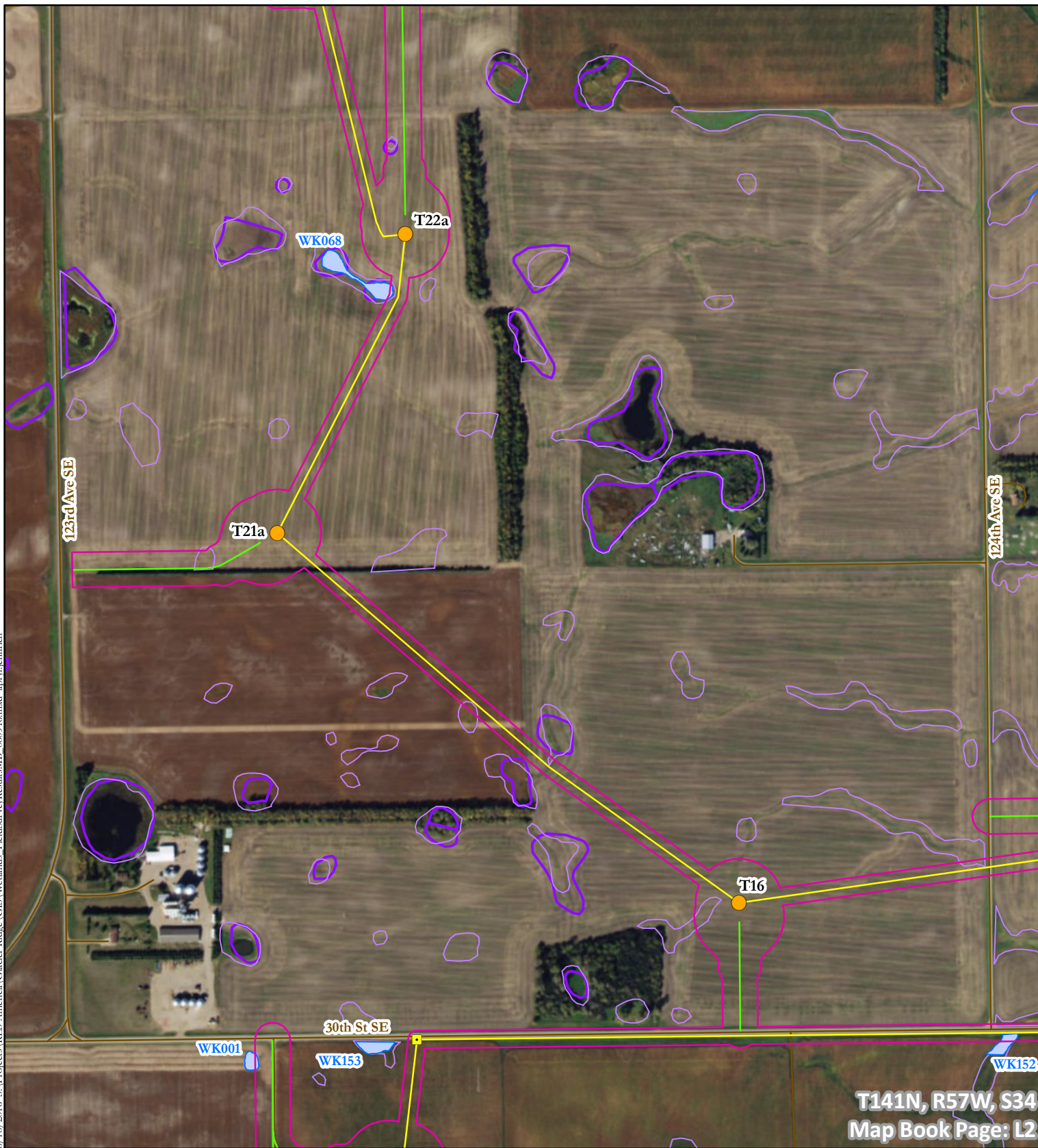
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

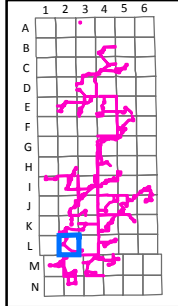
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas(Tetra Tech).



Survey Data

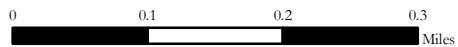
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



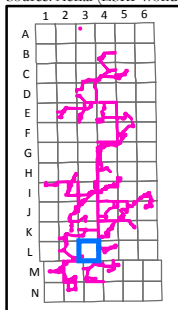
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

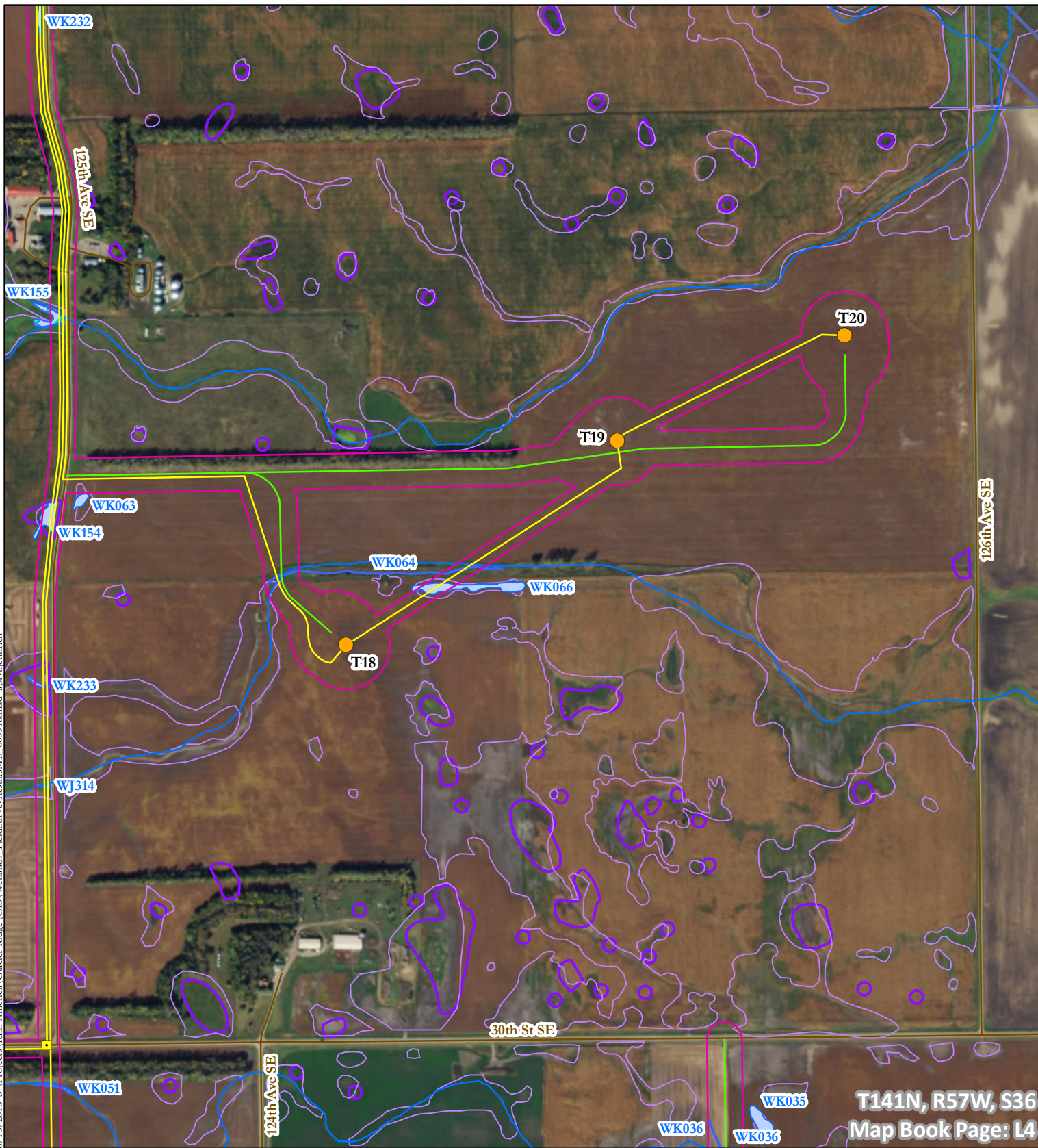
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



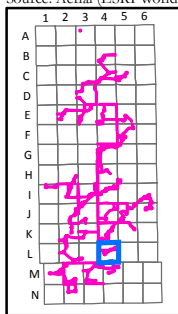
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults\MB_080916.mxd aprvll jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

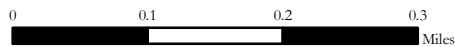
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

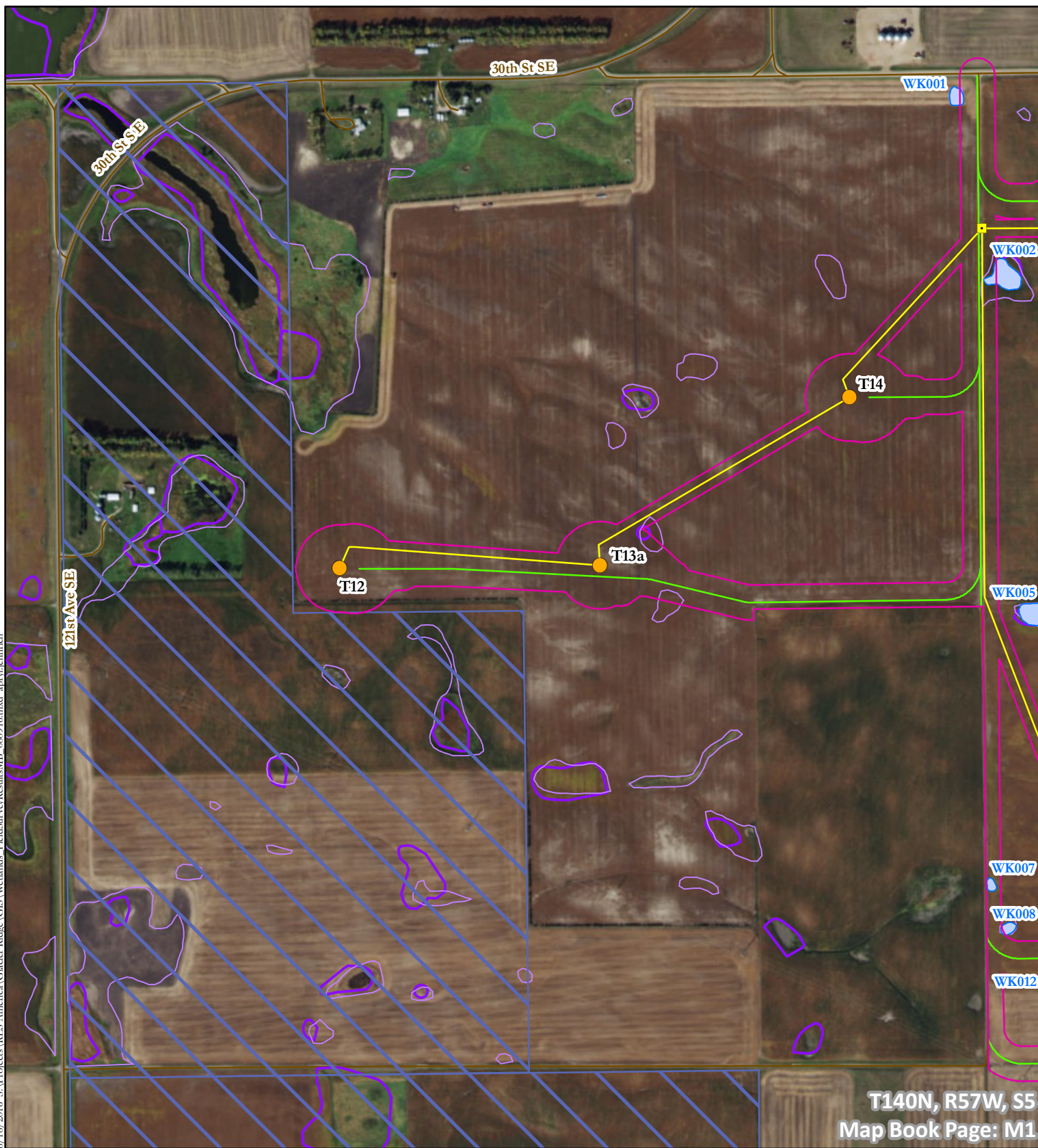
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



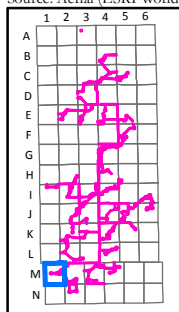
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



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Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

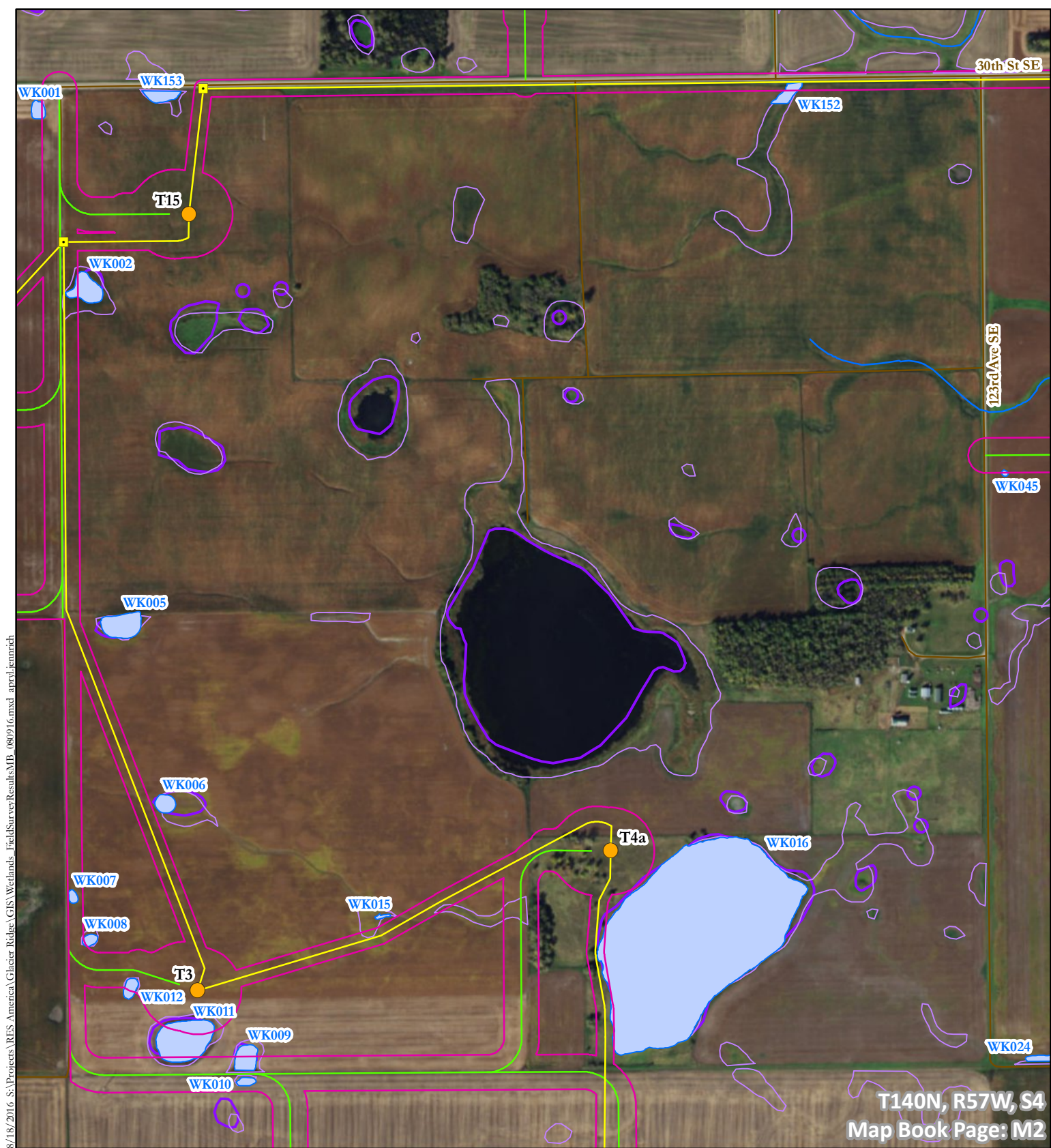
Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

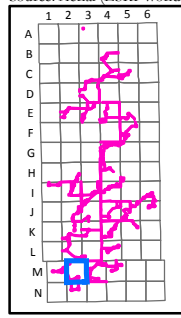




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T140N, R57W, S4
Map Book Page: M2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



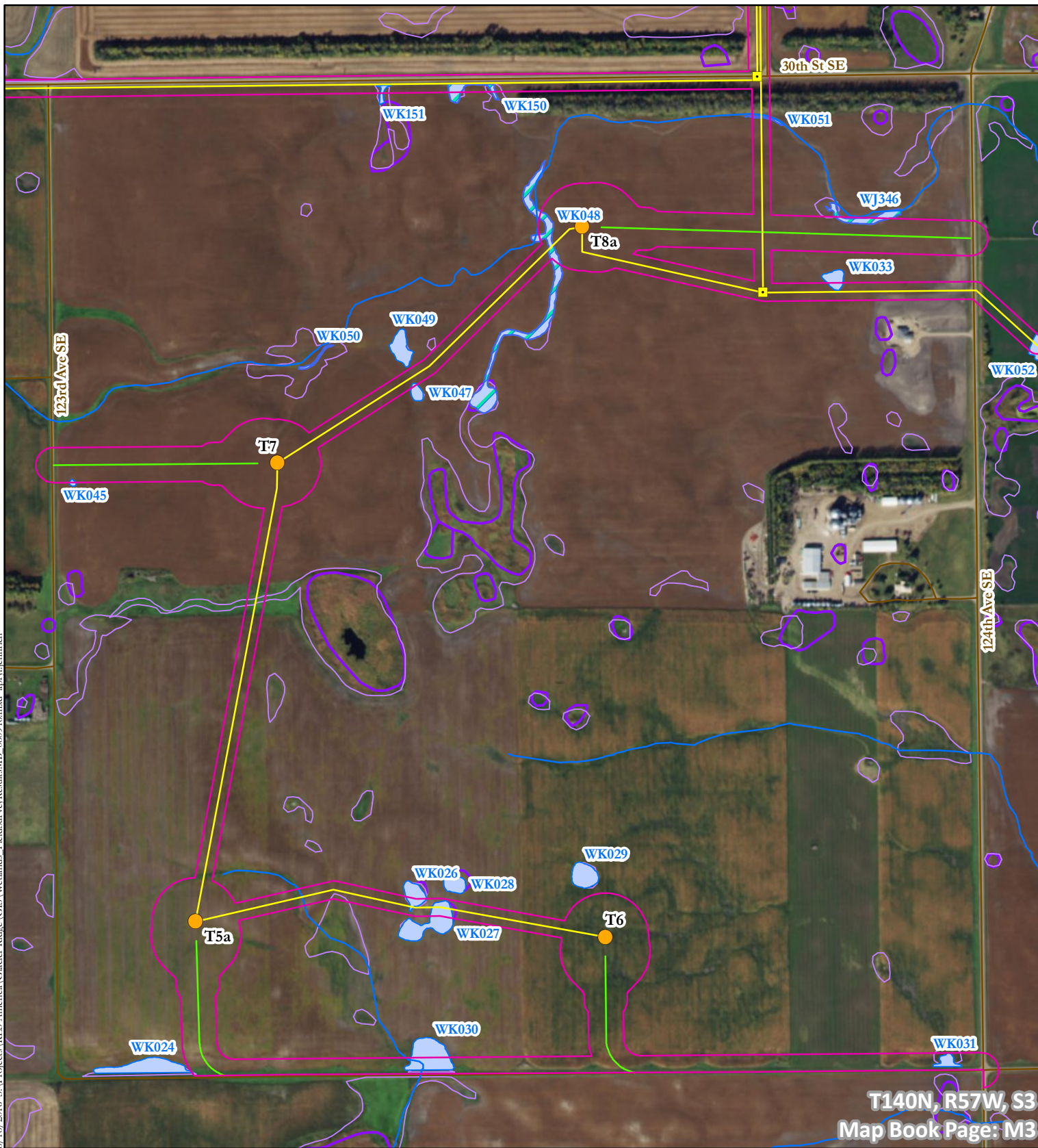
| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

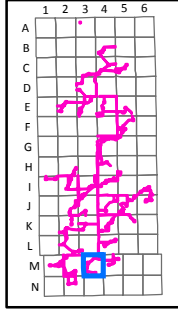


8/18/2016 5:10 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults.MB_080916.mxd aprvl.jennrich



T140N, R57W, S3
Map Book Page: M3

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



| Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|------------------------|------------|-----------------|
| | Stream Feature | | NHD | | Jbox |
| | Non-Jurisdictional | | NWI Wetland | | Turbine |
| | USACE Jurisdictional | | Potential Wetland Area | | Collection |
| | Survey Corridor | | USFWS Easement | | Collection Alt |
| | | | Public Road | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |

0 0.1 0.2 0.3 Miles

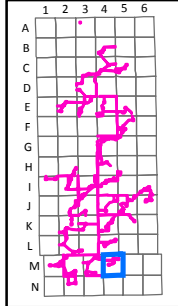
**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



8/18/2016 5: Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults\MB_080916.mxd aprvl.jennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas (Tetra Tech).



Survey Data

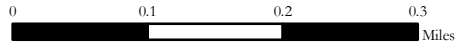
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

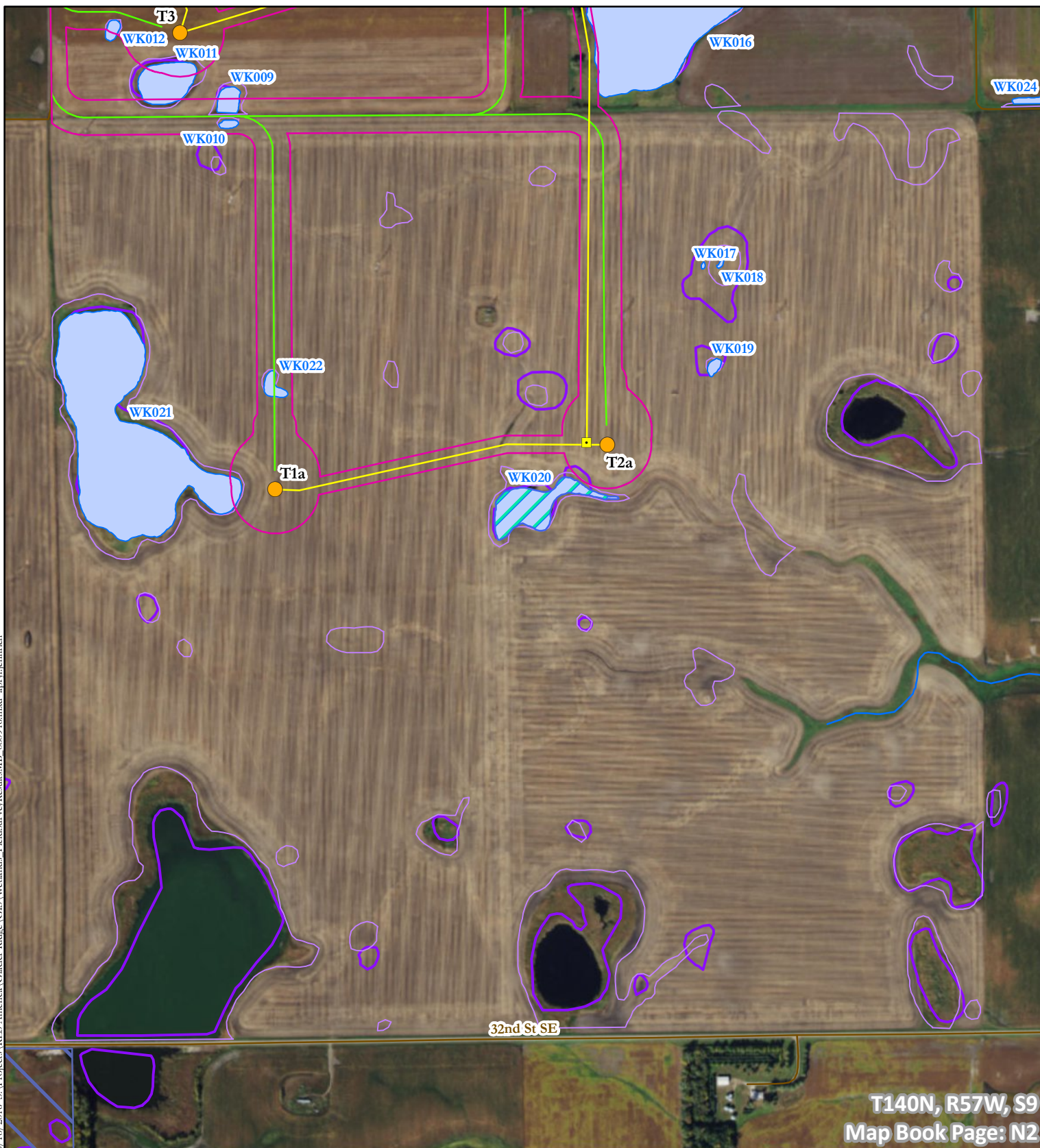
- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**

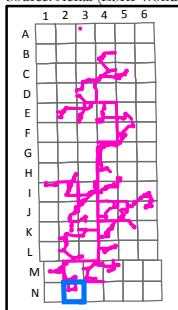


8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - FieldSurveyResults.MB_080916.mxd aprvl.jennrich



T140N, R57W, S9
Map Book Page: N2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands and Potential Wetland Areas(Tetra Tech).



Survey Data

- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- Potential Wetland Area
- USFWS Easement
- Public Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



**Figure 4 - Wetlands and Other Waters Survey Results
Glacier Ridge Wind, LLC
Barnes County, North Dakota**



APPENDIX B – WETLAND DETERMINATION DATA FORMS

WJ007

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/21/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ007A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S13 T142N R57W
 Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 06' 48.92" Long: -97° 50' 13.12" Datum: NAD 83
 Soil Map Unit Name: Lowe-Fluvaquents, channeled complex vWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | |
|--|---|
| Hydrophytic vegetation present? <u>Y</u> Hydric soil present? <u>Y</u> Indicators of wetland hydrology present? <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Remarks: <p align="center">Photo 0035 - A (W), Photo 0036 - B (N), Photo 0037 - Overview (S)</p> | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|--|------------------|------------------|------------------|---|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| Sapling/Shrub stratum | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>8</u> x 1 = <u>8</u> FACW species <u>60</u> x 2 = <u>120</u> FAC species <u>15</u> x 3 = <u>45</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>83</u> (A) <u>173</u> (B) Prevalence Index = B/A = <u>2.08</u> |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| Herb stratum | | | | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 <u>Phalaris arundinacea</u> | <u>60</u> | <u>Y</u> | <u>FACW</u> | |
| 2 <u>Urtica dioica</u> | <u>15</u> | <u>N</u> | <u>FAC</u> | |
| 3 <u>Typha angustifolia</u> | <u>8</u> | <u>N</u> | <u>OBL</u> | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 6 _____ | _____ | _____ | _____ | |
| 7 _____ | _____ | _____ | _____ | |
| 8 _____ | _____ | _____ | _____ | |
| 9 _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | |
| <u>83</u> = Total Cover | | | | |
| Woody vine stratum | | | | Hydrophytic vegetation present? <u>Y</u> |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>20</u> | | | | |

Remarks:

SOIL

Sampling Point: WJ007A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-24 | 10YR 2/1 | 100 | | | | | Muck | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

| | | | |
|--|--|--|--|
| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
| <input checked="" type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| | (MLRA 72 & 73 of LRR H) | *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic | |

| | |
|---|--------------------------------------|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u>Y</u> |
| Remarks: _____ | |

HYDROLOGY

| | |
|--|---|
| Wetland Hydrology Indicators: | |
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| | <input type="checkbox"/> Drainage Patterns (B10) |
| | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| | <input type="checkbox"/> Crayfish Burrows (C8) |
| | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| | <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |
| | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |

| | | |
|---|--|--|
| Field Observations: | | Indicators of wetland hydrology present? <u>Y</u> |
| Surface water present? Yes <u> </u> No <u> X </u> Depth (inches): _____ | | |
| Water table present? Yes <u> X </u> No <u> </u> Depth (inches): <u> 6 </u> | | |
| Saturation present? Yes <u> X </u> No <u> </u> Depth (inches): <u> 2 </u> | | |
| (includes capillary fringe) | | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/21/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ007B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S13 T142N R57W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 4
 Subregion (LRR): F Lat: 47° 06' 48.97" Long: -97° 50' 13.11" Datum: NAD 83
 Soil Map Unit Name: Lowe-Fluvaquents, channeled complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 0035 - A (W), Photo 0036 - B (N), Photo 0037 - Overview (S)

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | | |
|---|-----------------------|------------------|------------------|------------------|---|--|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>15</u> x 3 = <u>45</u> | | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | | |
| | | <u>0</u> | = Total Cover | | UPL species <u>80</u> x 5 = <u>400</u> | | |
| | | <u>0</u> | = Total Cover | | Column totals <u>95</u> (A) <u>445</u> (B) | | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>4.68</u> | | |
| 1 | <u>Bromus inermis</u> | <u>80</u> | <u>Y</u> | <u>UPL</u> | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | | |
| 2 | <u>Urtica dioica</u> | <u>15</u> | <u>N</u> | <u>FAC</u> | | | |
| 3 | _____ | _____ | _____ | _____ | | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| 5 | _____ | _____ | _____ | _____ | | | |
| 6 | _____ | _____ | _____ | _____ | | | |
| 7 | _____ | _____ | _____ | _____ | | | |
| 8 | _____ | _____ | _____ | _____ | | | |
| 9 | _____ | _____ | _____ | _____ | | | |
| 10 | _____ | _____ | _____ | _____ | | | |
| | | <u>95</u> | = Total Cover | | | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u>N</u> | | |
| 1 | _____ | _____ | _____ | _____ | | | |
| 2 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>5</u> | | | | | | | |

Remarks:

SOIL

Sampling Point: WJ007B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-26 | 10YR 2/1 | 100 | | | | | Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|--|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input checked="" type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: Large Rock
 Depth (inches): _____

Hydric soil present? Y

Remarks:

Hit restrictive feature at 26" could not confirm A12, A12 assumed

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes X No _____ Depth (inches): 26
 Saturation present? Yes X No _____ Depth (inches): 15
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

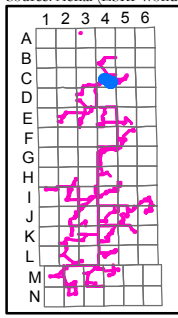
Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvlgennrich



T142N, R57W, S13
Map Book Page(s): C4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

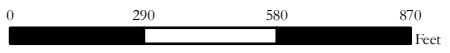
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- ▣ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WJ007
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



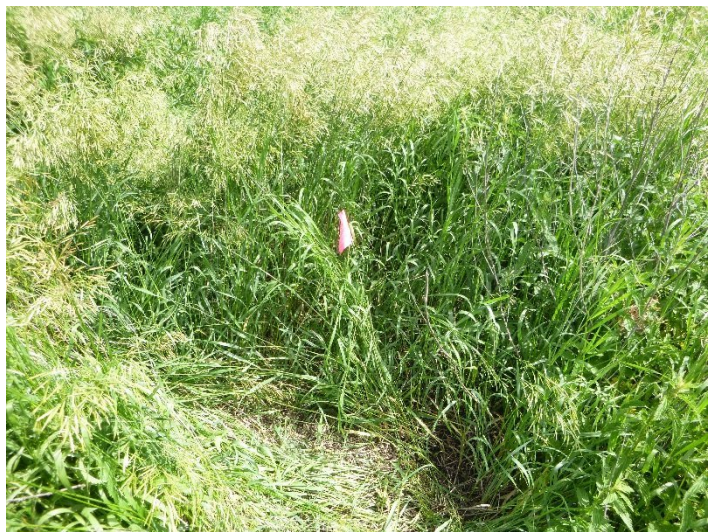
Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ007 overview looking to the south.



Wetland sample point WJ007A



Non-wetland sample point WJ007B

WJ050

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/22/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ050A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S25 T142N R57W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 05' 16.78" Long: -97° 50' 51.86" Datum: NAD 83
 Soil Map Unit Name: Hamerly-Tonka complex IWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Photo 0086 - A, Photo 0087 - B, Photo 0084 - Overview (N), Photo 0085 - Overview (E)

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|-------------------------------|------------------|------------------|------------------|--|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 | _____ | | | | Total % Cover of: | |
| 2 | _____ | | | | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 | _____ | | | | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 | _____ | | | | FAC species <u>3</u> x 3 = <u>9</u> | |
| 5 | _____ | | | | FACU species <u>0</u> x 4 = <u>0</u> | |
| | | <u>0</u> | = Total Cover | | UPL species <u>1</u> x 5 = <u>5</u> | |
| | | | | | Column totals <u>4</u> (A) <u>14</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>3.50</u> | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 | <u>Echinochloa crus-galli</u> | <u>3</u> | <u>Y</u> | <u>FAC</u> | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 2 | <u>Glycine max</u> | <u>1</u> | <u>N</u> | <u>UPL</u> | <input checked="" type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| 3 | _____ | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 4 | _____ | | | | Hydrophytic vegetation present? <u>Y</u> | |
| 5 | _____ | | | | | |
| 6 | _____ | | | | | |
| 7 | _____ | | | | | |
| 8 | _____ | | | | | |
| 9 | _____ | | | | | |
| 10 | _____ | | | | | |
| | | <u>4</u> | = Total Cover | | | |
| Woody vine stratum | (Plot size: _____) | | | | | |
| 1 | _____ | | | | | |
| 2 | _____ | | | | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>20</u> | | | | | | |

Remarks:
 Heavily disturbed vegetation, mostly unvegetated.

SOIL

Sampling Point: WJ050A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-6 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 6-16 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 16-30 | 10YR 4/2 | 90 | 2.5Y 5/6 | 10 | C | PL | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/22/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ050B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S25 T142N R57W
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 1
 Subregion (LRR): F Lat: 47° 05' 16.63" Long: -97° 50' 51.90" Datum: NAD 83
 Soil Map Unit Name: Hamerly-Tonka complex IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 0086 - A, Photo 0087 - B, Photo 0084 - Overview (N), Photo 0085 - Overview (E)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|--|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>2</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>70</u> x 3 = <u>210</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| <u>0</u> = Total Cover | | | UPL species <u>20</u> x 5 = <u>100</u> | | |
| | | | Column totals <u>90</u> (A) <u>310</u> (B) | | |
| | | | Prevalence Index = B/A = <u>3.44</u> | | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Echinochloa crus-galli</u> | <u>70</u> | <u>Y</u> | <u>FAC</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 <u>Glycine max</u> | <u>20</u> | <u>Y</u> | <u>UPL</u> | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>90</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>10</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ050B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-14 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 14-19 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 19-34 | 10YR 8/1 | 100 | | | | | Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

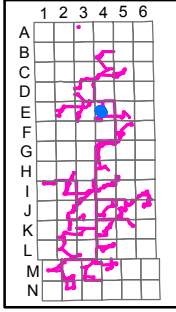
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands_Delineated\WetlandsMB_080916.mxd aprvlljennrich



T142N, R57W, S25
Map Book Page(s): E4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

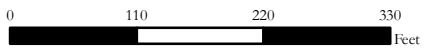
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- ▣ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WJ050
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ050 overview looking to the north.



Wetland sample point WJ050A



Non-wetland sample point WJ050B

WJ058

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/23/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ058A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S26 T142N R57W
 Landform (hillslope, terrace, etc.): Drainage swale Local relief (concave, convex, none): None Slope (%): 2
 Subregion (LRR): F Lat: 47° 05' 27.88" Long: -97° 52' 31.02" Datum: NAD 83
 Soil Map Unit Name: Lowe-Fluvaquents complex vWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|---|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photo 0097 - A, Photo 0098 - B, Photo 0099 - Overview (S), Photo 0100 - Overview (NW) | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--------------------------------------|-----------------------------|------------------|------------------|------------------|--|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 2 | _____ | _____ | _____ | _____ | FACW species <u>70</u> x 2 = <u>140</u> | |
| 3 | _____ | _____ | _____ | _____ | FAC species <u>10</u> x 3 = <u>30</u> | |
| 4 | _____ | _____ | _____ | _____ | FACU species <u>20</u> x 4 = <u>80</u> | |
| 5 | _____ | _____ | _____ | _____ | UPL species <u>0</u> x 5 = <u>0</u> | |
| | | <u>0</u> | = Total Cover | | Column totals <u>100</u> (A) <u>250</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>2.50</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) | |
| 1 | <u>Phalaris arundinacea</u> | <u>70</u> | <u>Y</u> | <u>FACW</u> | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic Hydrophytic vegetation present? <u>Y</u> | |
| 2 | <u>Thlaspi arvense</u> | <u>10</u> | <u>N</u> | <u>FACU</u> | | |
| 3 | <u>Lactuca serriola</u> | <u>10</u> | <u>N</u> | <u>FAC</u> | | |
| 4 | <u>Fallopia convolvulus</u> | <u>10</u> | <u>N</u> | <u>FACU</u> | | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>100</u> | = Total Cover | | | |
| Woody vine stratum | | | | | | |
| (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | | |

Remarks:

SOIL

Sampling Point: WJ058A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-30 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 30-38 | 10YR 3/1 | 100 | | | | | Si Cl | |
| 38-41 | 10YR 5/1 | 65 | 10YR 8/1 | 35 | D | PL | Si Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes No _____ Depth (inches): 21"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/23/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ058B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S26 T142N R57W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 05' 27.94" Long: -97° 52' 30.78" Datum: NAD 83
 Soil Map Unit Name: Lowe-Fluvaquents, channeled complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 0097 - A, Photo 0098 - B, Photo 0099 - Overview (S), Photo 0100 - Overview (NW), Corn field

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 6 _____ | _____ | _____ | _____ | UPL species <u>50</u> x 5 = <u>250</u> | |
| 7 _____ | _____ | _____ | _____ | Column totals <u>50</u> (A) <u>250</u> (B) | |
| 8 _____ | _____ | _____ | _____ | Prevalence Index = B/A = <u>5.00</u> | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>50</u> = Total Cover | | | | | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Zea Mays</u> | <u>50</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>50</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>50</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ058B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-22 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 22-30 | 10YR 2/1 | 94 | 10YR 7/1 | 6 | D | PL | Si Cl | |
| 30-34 | 10YR 3/1 | 100 | | | | | Si Cl | |
| 34-38 | 10YR 4/1 | 100 | | | | | Si Cl | |
| 38-41 | 10YR 7/2 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

| | | | |
|--|--|--|--|
| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | | |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

| | |
|---|--|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u> N </u> |
| Remarks: _____ | |

HYDROLOGY

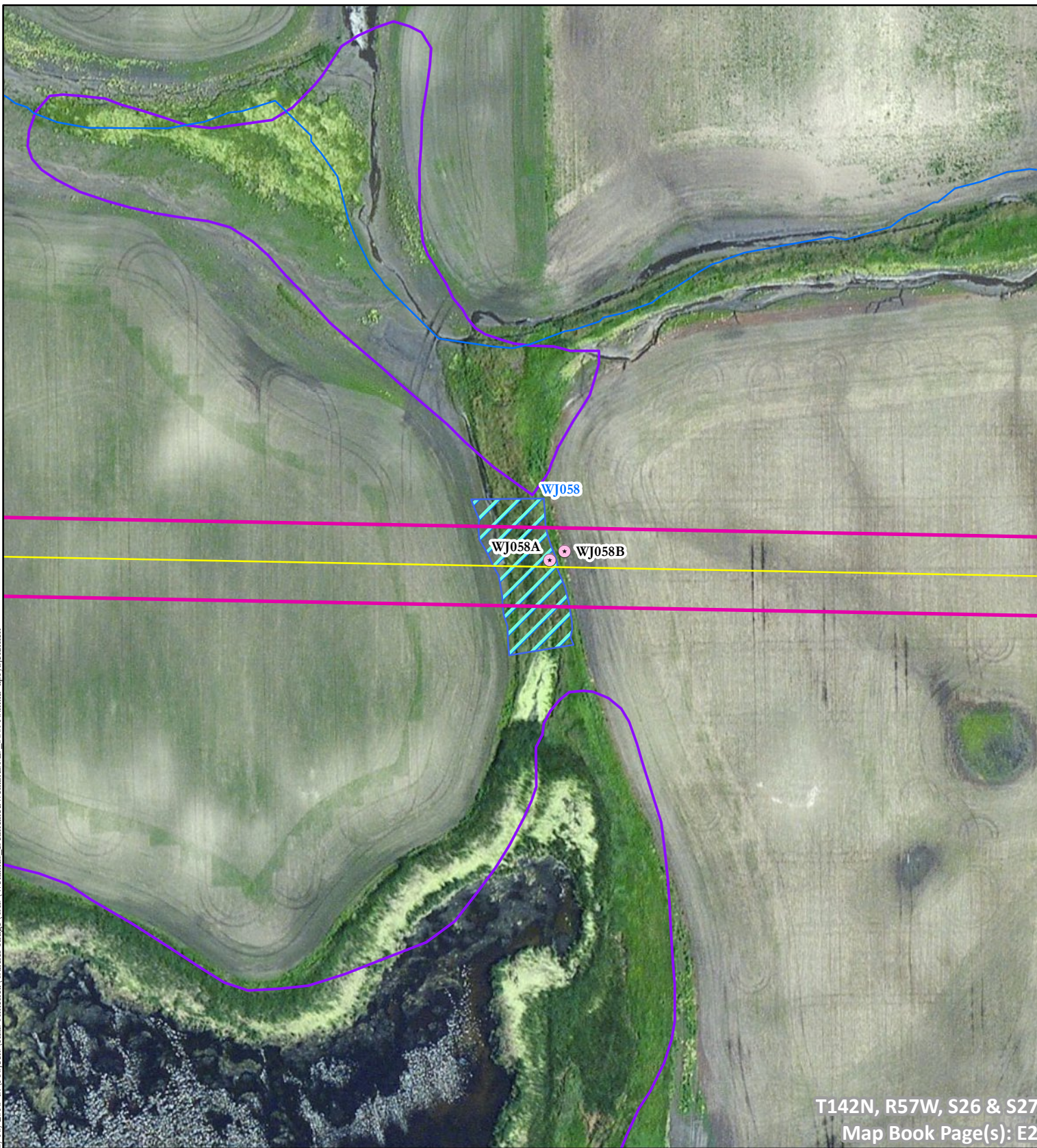
| | |
|---|---|
| Wetland Hydrology Indicators: | |
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |
| <input type="checkbox"/> Salt Crust (B11) | |
| <input type="checkbox"/> Aquatic Invertebrates (B13) | |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | |
| <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | |
| <input type="checkbox"/> Presence of Reduced Iron (C4) | |
| <input type="checkbox"/> Thin Muck Surface (C7) | |
| <input type="checkbox"/> Other (Explain in Remarks) | |

| | |
|--|--|
| Field Observations: | |
| Surface water present? Yes _____ No <u> X </u> Depth (inches): _____ | Indicators of wetland hydrology present? <u> N </u> |
| Water table present? Yes _____ No <u> X </u> Depth (inches): _____ | |
| Saturation present? Yes _____ No <u> X </u> Depth (inches): _____ (includes capillary fringe) | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

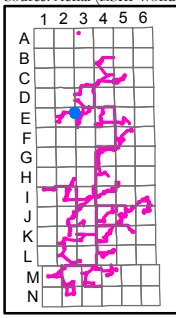
Remarks: _____

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T142N, R57W, S26 & S27
Map Book Page(s): E2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

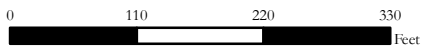
- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ058
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Wetland WJ058 overview looking to the northwest.



Wetland sample point WJ058A



Non-wetland sample point WJ058B

WJ084

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/23/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ084A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S12 T142N R57W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 2
 Subregion (LRR): F Lat: 47° 07' 36.98" Long: -97° 51' 05.61" Datum: NAD 83
 Soil Map Unit Name: Hamerly-Tonka complex IWI Classification: PEMC / PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |

Remarks:
 Photo 0131 - A, Photo 0132 - B, Photo 0133 - Overview (SE), Photo 0134 - Overview (SW), soybean field

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|--|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>1</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>2</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>50.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>5</u> x 2 = <u>10</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>20</u> x 5 = <u>100</u> |
| | | | | Column totals | <u>25</u> (A) <u>110</u> (B) |
| | | | | Prevalence Index = B/A = | <u>4.40</u> |
| <u>Herb stratum</u> (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>20</u> | <u>Y</u> | <u>UPL</u> | _____ | Rapid test for hydrophytic vegetation |
| 2 <u>Hordeum jubatum</u> | <u>5</u> | <u>Y</u> | <u>FACW</u> | _____ | Dominance test is >50% |
| 3 _____ | _____ | _____ | _____ | _____ | Prevalence index is ≤3.0* |
| 4 _____ | _____ | _____ | _____ | _____ | Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) |
| 5 _____ | _____ | _____ | _____ | _____ | <u>X</u> Problematic hydrophytic vegetation* (explain) |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>25</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | Hydrophytic vegetation present? | |
| 1 _____ | _____ | _____ | _____ | <u>Y</u> | |
| 2 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: | <u>75</u> | | | | |

Remarks:
 Beans are stressed, very disturbed

SOIL

Sampling Point: WJ084A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-4 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 4-16 | 10YR 2/1 | 98 | 10YR 3/4 | 2 | C | PL | Si Cl Lo | |
| 16-23 | 5Y 5/1 | 100 | | | | | Si Cl | |
| 23-28 | 10YR 4/1 | 100 | | | | | Si Cl | |
| 28-36 | 2.5Y 7/1 | 100 | | | | | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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): 21
 Saturation present? Yes No Depth (inches): 2
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/23/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ084B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S12 T142N R57W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR): F Lat: 47° 07' 37.13" Long: -97° 51' 05.58" Datum: NAD 83
 Soil Map Unit Name: Hamerly-Tonka complex IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |

Remarks:
 Photo 0131 - A, Photo 0132 - B, Photo 0133 - Overview (SE), Photo 0134 - Overview (SW), soybean field

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|------------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>1</u> x 2 = <u>2</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>20</u> x 5 = <u>100</u> |
| | | | | Column totals | <u>21</u> (A) <u>102</u> (B) |
| | | | | Prevalence Index = B/A = | <u>4.86</u> |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>20</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 <u>Hordeum jubatum</u> | <u>1</u> | <u>N</u> | <u>FACW</u> | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>21</u> | = Total Cover | | Hydrophytic vegetation present? | |
| | | | | <u>N</u> | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>80</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ084B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-6 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 6-14 | 10YR 2/1 | 99 | 10YR 3/4 | 1 | C | PL | Si Cl Lo | |
| 14-20 | 10YR 3/1 | 100 | | | | | Si Cl | |
| 20-29 | 10YR 5/1 | 100 | | | | | Si Cl | |
| 29-40 | 2.5Y 5/2 | 94 | 2.5Y 5/6 | 6 | C | PL | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

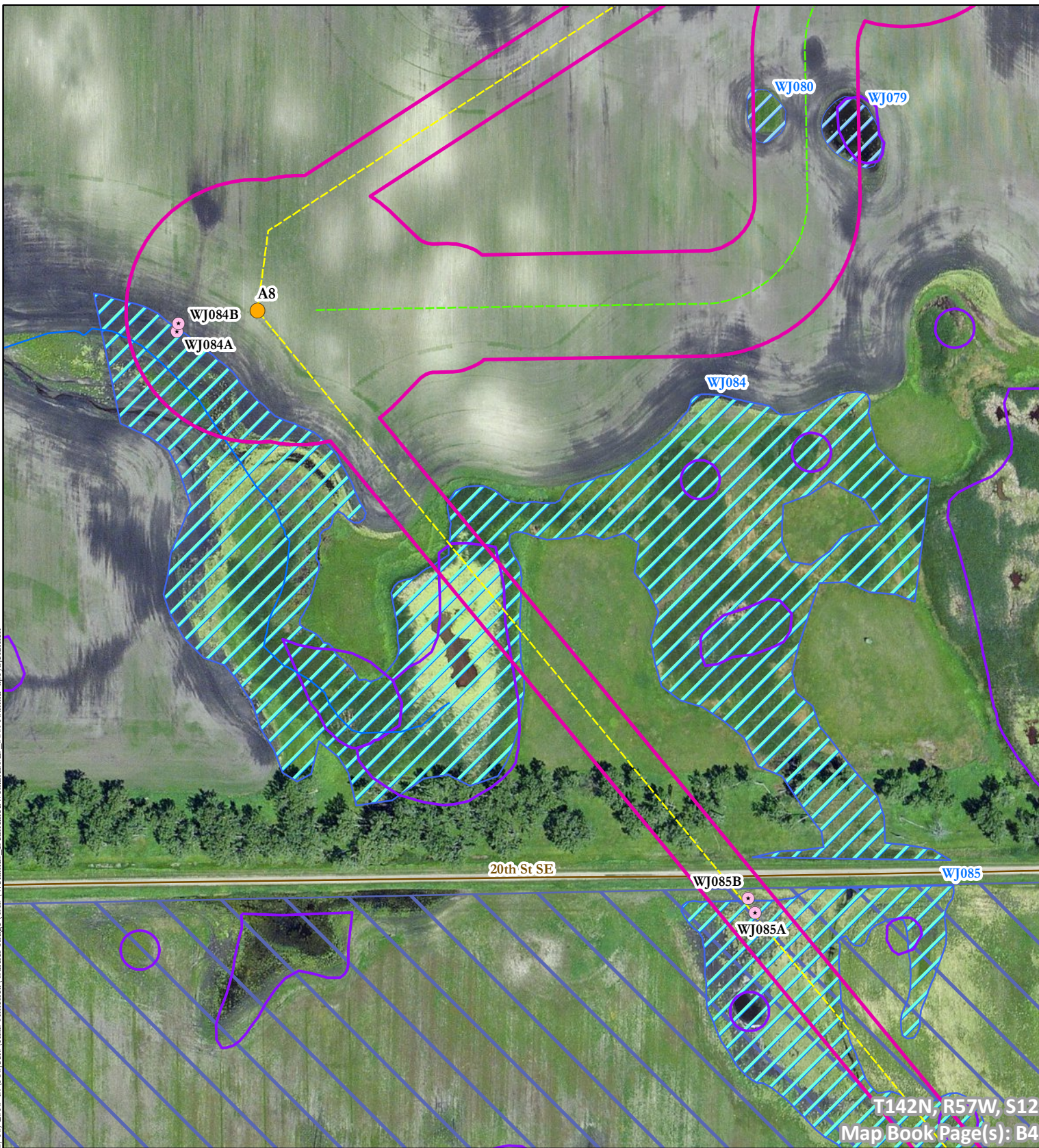
Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): 21
 Saturation present? Yes No Depth (inches): 20
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

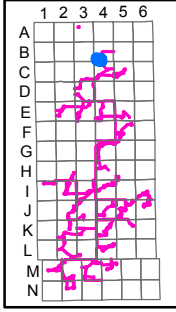
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvlgjennrich



T142N, R57W, S12
Map Book Page(s): B4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

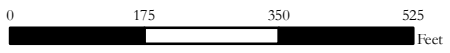
- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ084
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ084 overview looking to the southwest.



Wetland sample point WJ084A



Non-wetland sample point WJ084B

WJ085

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ085A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S13 T142N R57W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 07' 25.91" Long: -97° 50' 49.96" Datum: NAD 83
 Soil Map Unit Name: Balton-Wyard loams vWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Photo 0135 - A, Photo 0136 - B, Photo 0137 - Overview (E), Photo 0138 - Overview (S), Photo 0139 - NHD

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 0 = Total Cover | | | | UPL species <u>5</u> x 5 = <u>25</u> | |
| | | | | Column totals <u>5</u> (A) <u>25</u> (B) | |
| | | | | Prevalence Index = B/A = <u>5.00</u> | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Zea Mays</u> | <u>5</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| 5 = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>Y</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>95</u> | | | | | |

Remarks:
 Ag field planted with corn.

SOIL

Sampling Point: WJ085A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-5 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 5-15 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 15-26 | 10YR 5/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ085B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S13 T142N R57W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 0
 Subregion (LRR): F Lat: 47° 07' 26.19" Long: -97° 50' 50.13" Datum: NAD 83
 Soil Map Unit Name: Balton-Wyard loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>N</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |

Remarks:
 Photo 0135 - A, Photo 0136 - B, Photo 0137 - Overview (E), Photo 0138 - Overview (S), Photo 0139 - NHD

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|--|------------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>20</u> x 5 = <u>100</u> |
| | | | | Column totals | <u>20</u> (A) <u>100</u> (B) |
| | | | | Prevalence Index = B/A = | <u>5.00</u> |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Zea Mays</u> | <u>20</u> | <u>Y</u> | <u>UPL</u> | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| 2 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 3 _____ | _____ | _____ | _____ | Hydrophytic vegetation present? | |
| 4 _____ | _____ | _____ | _____ | <u>N</u> | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>20</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>80</u> | | | | | |

Remarks:
 Corn is not stressed

SOIL

Sampling Point: WJ085B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-18 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 18-22 | 10YR 4/1 | 100 | | | | | Si Cl | |
| 22-26 | 10YR 5/1 | 100 | | | | | Si Cl | |
| 22-29 | 10YR 6/2 | 100 | | | | | Si Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

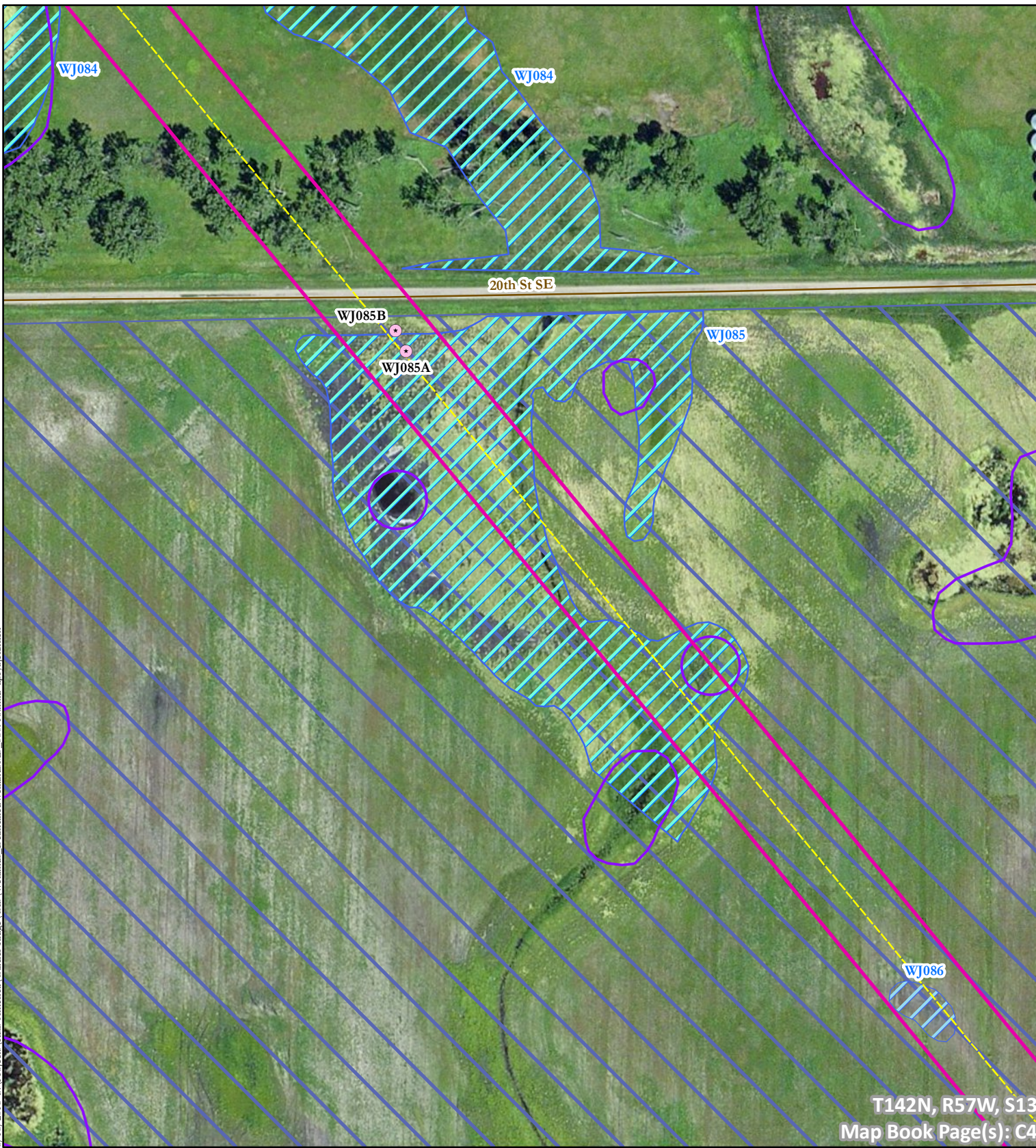
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

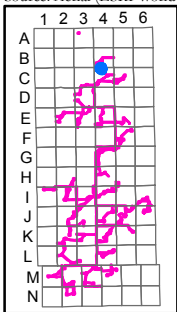
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

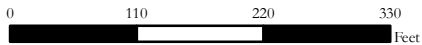
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- - - Collection Alt
- Access Road
- - - Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ085
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ085 overview looking to the south.



Wetland sample point WJ085A



Non-wetland sample point WJ085B

WJ108

Seasonally Flooded Wetland

& SJ109

Non-Relatively Permanent Water

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ108A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): F Lat: 47° 04' 07.17" Long: -97° 49' 56.93" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: PEMA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil X, or hydrology X significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u> Y </u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Newly installed culvert along a drainage swale; Photo 162-A, Photo 163-B, Photo 164-Overview E

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: <u> </u>) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|--|-----------------------------|
| 1 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Number of Dominant Species that are OBL, FACW, or FAC: | <u>1</u> (A) |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>100.00%</u> (A/B) |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index Worksheet | |
| 1 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Total % Cover of: | |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | OBL species <u>0</u> x 1 = | <u>0</u> |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | FACW species <u>0</u> x 2 = | <u>0</u> |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | FAC species <u>10</u> x 3 = | <u>30</u> |
| 5 <u> </u> | <u> </u> | <u> </u> | <u> </u> | FACU species <u>0</u> x 4 = | <u>0</u> |
| <u>0</u> = Total Cover | | | | UPL species <u>0</u> x 5 = | <u>0</u> |
| <u>Herb stratum</u> (Plot size: <u> </u>) | | | | Column totals | <u>10</u> (A) <u>30</u> (B) |
| 1 <u>Xanthium strumarium</u> | 10 | Y | FAC | Prevalence Index = B/A = | <u>3.00</u> |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 5 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 6 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 7 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 8 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 9 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 10 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| <u>10</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: <u> </u>) | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> Rapid test for hydrophytic vegetation | |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u>X</u> Dominance test is >50% | |
| <u>0</u> = Total Cover | | | | <u>X</u> Prevalence index is ≤3.0* | |
| % Bare Ground in Herb Stratum: <u>80</u> | | | | <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| | | | | <u> </u> Problematic hydrophytic vegetation* (explain) | |
| | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| | | | | Hydrophytic vegetation present? | <u>Y</u> |

Remarks:

SOIL

Sampling Point: WJ108A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|-------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-19 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 19-28 | 10YR 2/1 | 98 | 10YR 3/6 | 2 | C | PL | Si Cl | |
| 28-29 | 10YR 3/1 | 92 | 10YR 3/6 | 8 | C | PL | Si Cl | |
| 29-30 | 10YR 4/2 | 85 | 10YR 3/6 | 15 | C | PL | Si Cl | |
| 30-38 | 10YR 6/2 | 0 | 10YR 5/6 | 10 | C | PL | Cl Lo | |
| 38-39 | 10YR 6/2 | 90 | 10YR 5/6 | 10 | C | PL | Sa Cl | tiny gravel |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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): 19
 Saturation present? Yes No Depth (inches): 19
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ108B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 04' 07.26" Long: -97° 49' 56.84" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: PEMA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil X, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 0162 - A, Photo 0163 - B, Photo 0164 - Overview (E), newly installed culvert along a drainage swale

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 6 _____ | _____ | _____ | _____ | UPL species <u>95</u> x 5 = <u>475</u> | |
| 7 _____ | _____ | _____ | _____ | Column totals <u>95</u> (A) <u>475</u> (B) | |
| 8 _____ | _____ | _____ | _____ | Prevalence Index = B/A = <u>5.00</u> | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>95</u> = Total Cover | | | | | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Bromus inermis</u> | <u>95</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>95</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>0</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ108B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|-------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-9 | 2.5Y 3/2 | 100 | | | | | Si Lo | |
| 9-18 | 10YR 2/1 | 100 | | | | | Si Lo | Sand lenses |
| 18-25 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 25-30 | 2.5Y 6/1 | 92 | 2.5Y 5/4 | 8 | C | PL | Si Cl | |
| 30-39 | 2.5Y 6/2 | 100 | | | | | Si Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

Top 9 inches of sand appeared to be recently washed in due to proximity to culvert

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

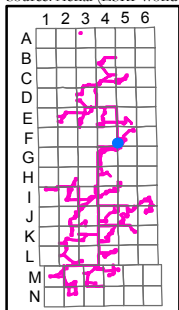
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T142N, R57W, S36 & T142N, R56W, S31
Map Book Page(s): F4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ▭ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ108
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ108 and SJ109 overview looking to the east.



Wetland sample point WJ108A



Non-wetland sample point WJ108B

WJ110

Non-Wetland Delineation Point

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ110A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): Drainage swale Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 04' 08.31" Long: -97° 49' 57.17" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |
| Remarks: <p align="center">Modified drainage</p> | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|---|------------------|------------------|------------------|--|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>5</u> x 5 = <u>25</u> Column totals <u>5</u> (A) <u>25</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| Sapling/Shrub stratum (Plot size: _____) | | | | |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| Herb stratum (Plot size: _____) | | | | |
| 1 <u>Glycine max</u> | <u>5</u> | <u>Y</u> | <u>UPL</u> | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 6 _____ | _____ | _____ | _____ | |
| 7 _____ | _____ | _____ | _____ | |
| 8 _____ | _____ | _____ | _____ | |
| 9 _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | |
| <u>5</u> = Total Cover | | | | |
| Woody vine stratum (Plot size: _____) | | | | |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>95</u> | | | | |
| Hydrophytic vegetation present? <u>N</u> | | | | |

Remarks:

SOIL

Sampling Point: WJ110A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-1 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 1-9 | 10YR 3/3 | 100 | | | | | Si Cl | |
| 9-17 | 10YR 3/4 | 100 | | | | | Sa Cl | |
| 17-23 | 2.5Y 5/3 | 99 | 10YR 5/6 | 1 | C | PL | Sa Cl | gravel |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|---|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 17"
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

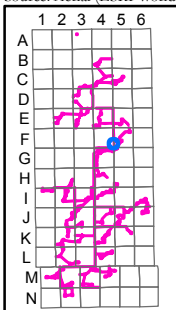
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Final\Delimited\Wetlands\MB_080916.mxd aprtj@emrich



T142N, R57W, S36
Map Book Page(s): F4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ110A
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Non-wetland sample point WJ110A and overview looking to the west.

WJ111

Non-Wetland Delineation Point

& SJ112

Non-Relatively Permanent Water

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ111A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R57W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): 2
 Subregion (LRR): F Lat: 47° 04' 03.58" Long: -97° 49' 57.21" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams, 3-6% slope vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u> N </u> |
| Hydric soil present? | <u>N</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Photo 167 - A (W), modified drainage appears to have been established for some time

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|-----------------------|----------------------------------|-------------------------|--|--------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u> 1 </u> | <u> (A) </u> |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u> 1 </u> | <u> (B) </u> |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u> 100.00% </u> | <u> (A/B) </u> |
| 4 _____ | _____ | _____ | _____ | | |
| | <u> 0 </u> | <u> = Total Cover </u> | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u> 0 </u> x 1 = <u> 0 </u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u> 50 </u> x 2 = <u> 100 </u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u> 0 </u> x 3 = <u> 0 </u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u> 0 </u> x 4 = <u> 0 </u> | |
| | <u> 0 </u> | <u> = Total Cover </u> | | UPL species <u> 0 </u> x 5 = <u> 0 </u> | |
| <u>Herb stratum</u> (Plot size: _____) | | | | Column totals <u> 50 </u> (A) <u> 100 </u> (B) | |
| 1 <u>Hordeum jubatum</u> | <u> 50 </u> | <u> Y </u> | <u> FACW </u> | Prevalence Index = B/A = <u> 2.00 </u> | |
| 2 _____ | _____ | _____ | _____ | | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u> 50 </u> | <u> = Total Cover </u> | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| | <u> 0 </u> | <u> = Total Cover </u> | | | |
| % Bare Ground in Herb Stratum: <u> 50 </u> | | | | Hydrophytic vegetation present? <u> Y </u> | |

Remarks:

SOIL

Sampling Point: WJ111A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-4 | 10YR 3/2 | 100 | | | | | Sand | |
| 4-10 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 10-16 | 10YR 2/2 | 100 | | | | | Sa Lo | |
| 16-17 | 2.5Y 6/2 | 65 | 2.5Y 5/6 | 35 | C | PL | Cl Lo | |
| 17-27 | 2.5Y 6/2 | 60 | 2.5Y 5/6 | 20 | C | PL | Cl Lo | |
| | | | 2.5Y 7/1 | 20 | D | M | | |
| 27-30 | 2.5Y 7/1 | 75 | 2.5Y 5/6 | 25 | C | PL | Cl Lo | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 4"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

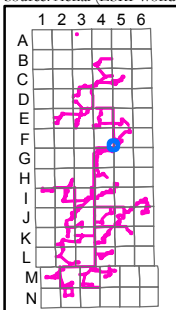
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Filled\Delimited\Wetlands_MB_08/09/16.mxd aprtjennrich



T142N, R57W, S36
Map Book Page(s): F4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ111A
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Non-wetland sample point WJ111A, NRPW SJ112, and overview looking to the west.

WJ116

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/25/2016
 Applicant/Owner: RES America State: ND Sampling Point: WJ116A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 04' 01.52" Long: -97° 49' 41.08" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |

Remarks:
 Photo 172 - A, Photo 173 - B, Photo 174 - Overview (NW), Photo 175 - Overview (SE), soybean field

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|---------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| 0 = Total Cover | | | | UPL species | <u>1</u> x 5 = <u>5</u> |
| | | | | Column totals | <u>1</u> (A) <u>5</u> (B) |
| | | | | Prevalence Index = B/A = | <u>5.00</u> |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>1</u> | <u>Y</u> | <u>UPL</u> | <input type="checkbox"/> Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | <input type="checkbox"/> Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | <input type="checkbox"/> Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | <input checked="" type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| 1 = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? | |
| 1 _____ | _____ | _____ | _____ | <u>Y</u> | |
| 2 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | |

Remarks:
 Beans are very stressed / absent

SOIL

Sampling Point: WJ116A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-13 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 13-17 | 10YR 5/1 | 100 | | | | | Cl | |
| 17-20 | 10YR 6/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input checked="" type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes No _____ Depth (inches): 11"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Floodplain of a small drainage swale

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/25/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ116B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 04' 01.23" Long: -97° 49' 41.17" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 172 - A, Photo 173 - B, Photo 174 - Overview (NW), Photo 175 - Overview (SE), soybean field

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| | <u>0</u> | = Total Cover | | UPL species <u>10</u> x 5 = <u>50</u> | |
| | | | | Column totals <u>10</u> (A) <u>50</u> (B) | |
| | | | | Prevalence Index = B/A = <u>5.00</u> | |
| <u>Herb stratum</u> (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>10</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>N</u> | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>10</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>90</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ116B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|-------------------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-18 | 10YR 2/1 | 100 | | | | | Cl Lo | Thin sand surface layer |
| 18-33 | 10YR 3/1 | 100 | | | | | Cl | |
| 33-37 | 10YR 3/1 | 100 | | | | | Sa Cl | |
| 37-42 | 2.5Y 5/2 | 100 | | | | | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

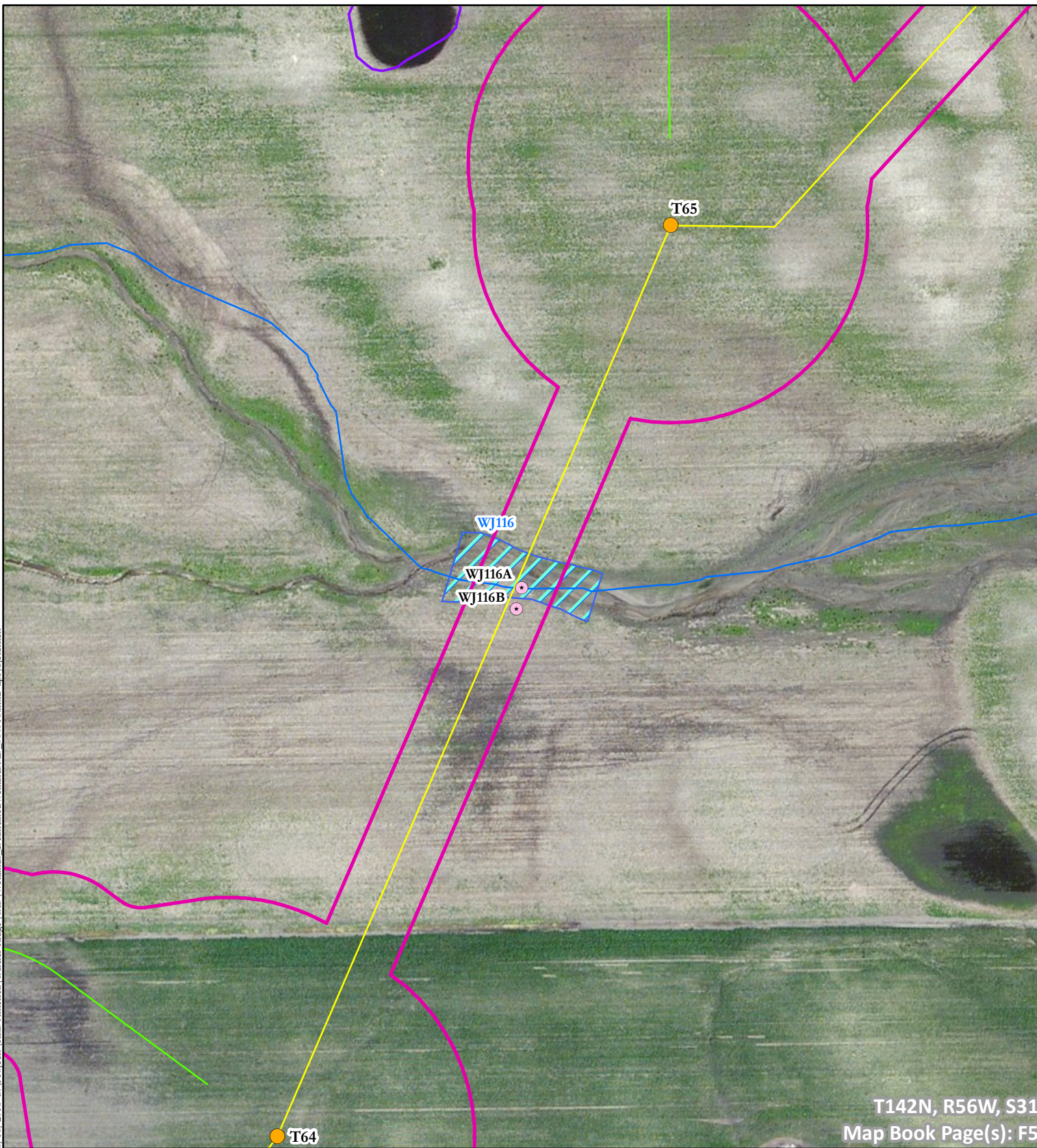
Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): 38"
 Saturation present? Yes No Depth (inches): 13"
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

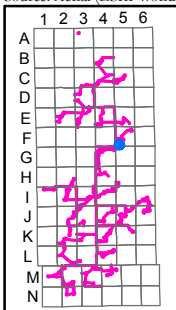
Remarks:

8/18/2016 8:18 AM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T142N, R56W, S31
Map Book Page(s): F5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ116
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ116 overview looking to the northwest.



Wetland sample point WJ116A



Non-wetland sample point WJ116B

WJ128

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/25/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ128A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 2
 Subregion (LRR): F Lat: 47° 04' 43.72" Long: -97° 48' 55.46" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Photo 186 - A, Photo 187 - B, Photo 188 - Overview (NE), Photo 189 - Overview (NW)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|--|-----------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>10</u> x 5 = <u>50</u> |
| <u>Herb stratum</u> (Plot size: _____) | | | | Column totals | <u>10</u> (A) <u>50</u> (B) |
| 1 <u>Glycine max</u> | <u>10</u> | <u>Y</u> | <u>UPL</u> | Prevalence Index = B/A = | <u>5.00</u> |
| 2 _____ | _____ | _____ | _____ | | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>10</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 _____ | _____ | _____ | _____ | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 2 _____ | _____ | _____ | _____ | <input checked="" type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| | <u>0</u> | = Total Cover | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| % Bare Ground in Herb Stratum: <u>90</u> | | | | Hydrophytic vegetation present? | <u>Y</u> |

Remarks: Planted with beans

SOIL

Sampling Point: WJ128A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-6 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 6-13 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 13-17 | 10YR 3/1 | 100 | | | | | Si Cl Lo | |
| 17-29 | 2.5Y 6/2 | 100 | | | | | Si Cl | |
| 29-37 | 2.5Y 6/3 | 100 | | | | | Si Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input checked="" type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes No _____ Depth (inches): 17"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/25/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ128B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 4
 Subregion (LRR): F Lat: 47° 04' 43.62" Long: -97° 48' 55.41" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 186 - A, Photo 187 - B, Photo 188 - Overview (NE), Photo 189 - Overview (NW)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 6 _____ | _____ | _____ | _____ | UPL species <u>50</u> x 5 = <u>250</u> | |
| 7 _____ | _____ | _____ | _____ | Column totals <u>50</u> (A) <u>250</u> (B) | |
| 8 _____ | _____ | _____ | _____ | Prevalence Index = B/A = <u>5.00</u> | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>50</u> = Total Cover | | | | | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>50</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>50</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>50</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ128B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-13 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 13-16 | 10YR 3/1 | 100 | | | | | Si Cl | |
| 16-17 | 10YR 4/1 | 100 | | | | | Si Cl | |
| 17-19 | 10YR 5/1 | 100 | | | | | Si Cl | |
| 19-23 | 2.5Y 6/2 | 100 | | | | | Si Cl | |
| 23-25 | 2.5Y 6/3 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

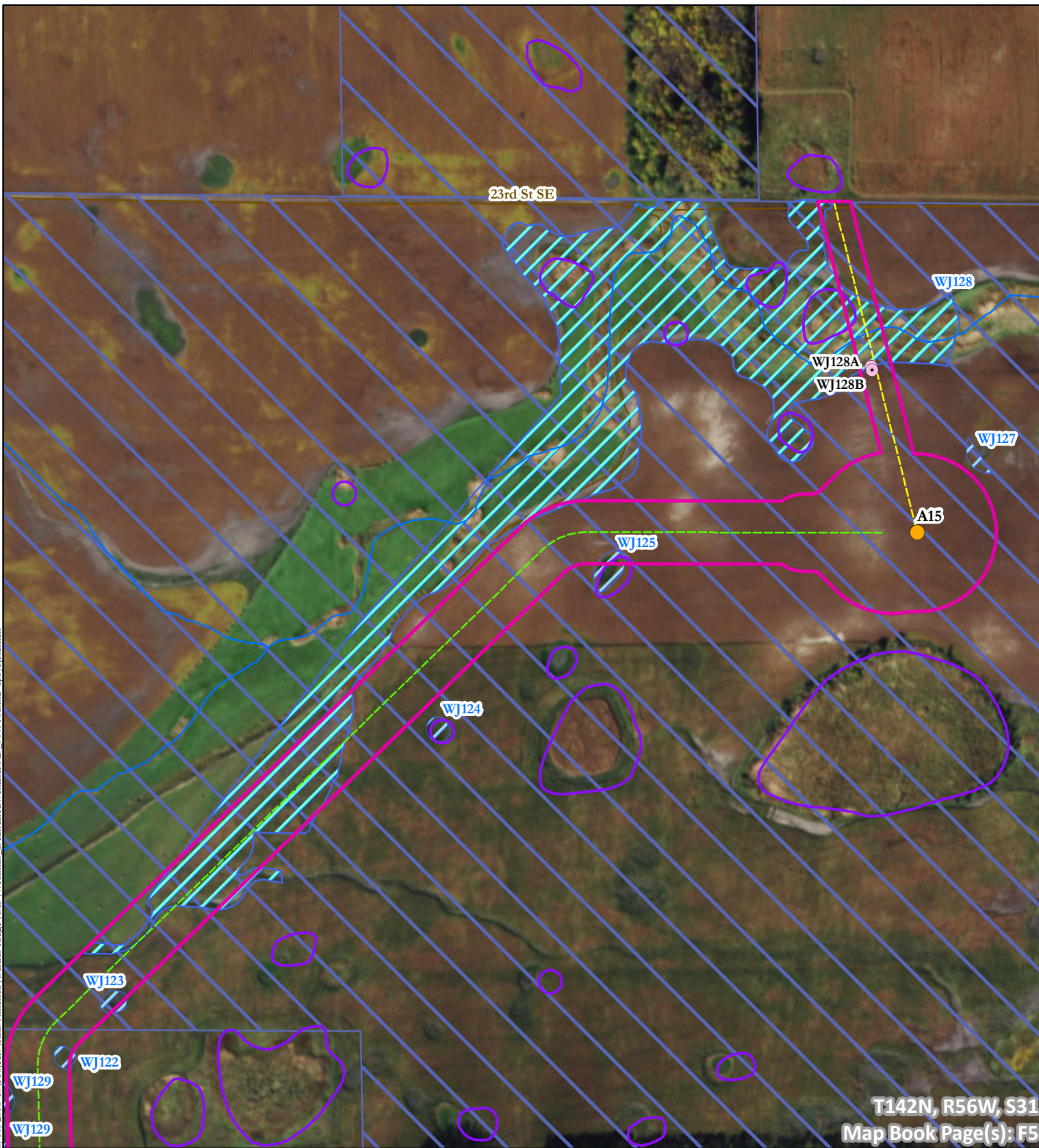
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 23"
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

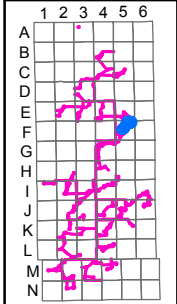
Remarks:

8/18/2016 8:18 AM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_081016.mxd aprvlgjennrich



T142N, R56W, S31
Map Book Page(s): F5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

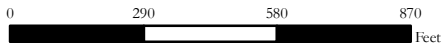
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ128
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ128 overview looking to the northeast.



Wetland sample point WJ128A



Non-wetland sample point WJ128B

WJ155

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/25/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ155A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S1 T141N R57W
 Landform (hillslope, terrace, etc.): drainage swale Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR): F Lat: 47° 03' 56.91" Long: -97° 50' 06.39" Datum: NAD 83
 Soil Map Unit Name: Balaton-Wyard loams vWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | |

Remarks:
 Photo 215 - A, Photo 216 - B, Photo 217 - Overview (SW), Photo 218 - Overview (NE)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------------|------------------|------------------|---|--|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>0</u> (B) | |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> = Total Cover | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | | | | Total % Cover of: | |
| 2 _____ | | | | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | | | | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | | | | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | | | | FACU species <u>0</u> x 4 = <u>0</u> | |
| | <u>0</u> = Total Cover | | | UPL species <u>0</u> x 5 = <u>0</u> | |
| <u>Herb stratum</u> (Plot size: _____) | | | | Column totals <u>0</u> (A) <u>0</u> (B) | |
| 1 _____ | | | | Prevalence Index = B/A = _____ | |
| 2 _____ | | | | Hydrophytic Vegetation Indicators: | |
| 3 _____ | | | | ____ Rapid test for hydrophytic vegetation | |
| 4 _____ | | | | ____ Dominance test is >50% | |
| 5 _____ | | | | ____ Prevalence index is ≤3.0* | |
| 6 _____ | | | | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 7 _____ | | | | ____ <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 8 _____ | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 9 _____ | | | | Hydrophytic vegetation present? <u>Y</u> | |
| 10 _____ | | | | | |
| | <u>0</u> = Total Cover | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | | |
| 1 _____ | | | | | |
| 2 _____ | | | | | |
| | <u>0</u> = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>100</u> | | | | | |

Remarks:
 Unvegetated

SOIL

Sampling Point: WJ155A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|---------------------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-4 | 10YR 2/1 | 100 | | | | | Si Cl | Sand on top, trace gravel |
| 4-6 | 10YR 2/1 | 93 | 2.5Y 5/2 | 5 | D | M | Si Cl | |
| | | | 10YR 5/6 | 2 | C | PL | | |
| 6-10 | 10YR 2/1 | 90 | 10YR 5/6 | 10 | C | PL | Sa Cl | sand lense at 9" |
| 10-14 | 10YR 2/1 | 100 | | | | | Si Lo | sand lenses |
| 14-22 | 10YR 4/2 | 99 | 10YR 5/6 | 1 | C | PL | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

Thin sand deposit on surface, sand lenses at 9", saturated sand lesnes at 11"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes No _____ Depth (inches): 11"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/25/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ155B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S1 T141N R57W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 2
 Subregion (LRR): F Lat: 47° 03' 56.80" Long: -97° 50' 06.25" Datum: NAD 83
 Soil Map Unit Name: Balaton-Wyard loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 215 - A, Photo 216 - B, Photo 217 - Overview (SW), Photo 218 - Overview (NE)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|--|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| _____ | _____ | _____ | _____ | UPL species <u>10</u> x 5 = <u>50</u> | |
| <u>0</u> = Total Cover | | | | Column totals <u>10</u> (A) <u>50</u> (B) | |
| | | | | Prevalence Index = B/A = <u>5.00</u> | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>10</u> | <u>Y</u> | <u>UPL</u> | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| 2 _____ | _____ | _____ | _____ | | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>10</u> = Total Cover | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>90</u> | | | | | |

Remarks:
 Unvegetated

SOIL

Sampling Point: WJ155B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-11 | 10YR 2/1 | 99 | 10YR 5/6 | 1 | C | PL | Si Cl | |
| 11-22 | 10YR 4/3 | 99 | 10YR 5/6 | 1 | C | PL | Cl | |
| 22-23 | 2.5Y 5/3 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

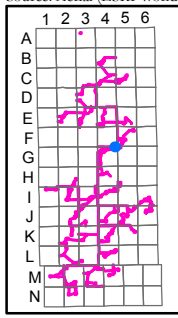
Remarks:

8/18/2016 8:18 AM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich

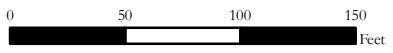


T141N, R57W, S1
Map Book Page(s): G4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



- | Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|----------------|------------|-----------------|
| | Sample Point | | NHD | | Jbox |
| | Stream Feature | | NWI Wetland | | Turbine |
| | Non-Jurisdictional | | USFWS Easement | | Collection |
| | USACE Jurisdictional | | Road | | Collection Alt |
| | Survey Corridor | | | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |



Wetland ID: WJ155
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ155 overview looking to the southwest.



Wetland sample point WJ155A



Non-wetland sample point WJ155B

WJ169

Shallow Marsh Wetland

& SJ170

Relatively Permanent Water

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ169A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): F Lat: 47° 04' 21.33" Long: -97° 49' 56.37" Datum: NAD 83
 Soil Map Unit Name: Lowe-Fluvaquents vWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Photo 232 - A, Photo 233 - B, Photo 234 - Overview (E), Photo 235 - Overview (W), Adjacent to SJ170

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>5</u> x 1 = <u>5</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>95</u> x 2 = <u>190</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 6 _____ | _____ | _____ | _____ | UPL species <u>0</u> x 5 = <u>0</u> | |
| 7 _____ | _____ | _____ | _____ | Column totals <u>100</u> (A) <u>195</u> (B) | |
| 8 _____ | _____ | _____ | _____ | Prevalence Index = B/A = <u>1.95</u> | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Phalaris arundinacea</u> | <u>95</u> | <u>Y</u> | <u>FACW</u> | <input checked="" type="checkbox"/> Rapid test for hydrophytic vegetation | |
| 2 <u>Typha angustifolia</u> | <u>5</u> | <u>N</u> | <u>OBL</u> | <input checked="" type="checkbox"/> Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | <input checked="" type="checkbox"/> Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| 100 = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>Y</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>0</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ169A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|------------|-----------------------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-10 | 10YR 2/1 | 100 | | | | | Loamy muck | faint H ₂ S odor |
| 10-20 | 10YR 2/1 | 100 | | | | | Mucky clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): 9"
 Saturation present? Yes No Depth (inches): 2"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ169B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 2
 Subregion (LRR): F Lat: 47° 04' 21.22" Long: -97° 49' 56.46" Datum: NAD 83
 Soil Map Unit Name: Lowe-Fluvaquents vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:
 Photo 232 - A, Photo 233 - B, Photo 234 - Overview (E), Photo 235 - Overview (W), Adjacent to SJ170

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 6 _____ | _____ | _____ | _____ | UPL species <u>100</u> x 5 = <u>500</u> | |
| 7 _____ | _____ | _____ | _____ | Column totals <u>100</u> (A) <u>500</u> (B) | |
| 8 _____ | _____ | _____ | _____ | Prevalence Index = B/A = <u>5.00</u> | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>100</u> = Total Cover | | | | | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Bromus inermis</u> | <u>100</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>100</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>0</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ169B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|--------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-8 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 8-19 | 2.5Y 5/3 | 95 | 7.5YR 4/6 | 5 | C | PL | Cl Lo | small gravel |
| 19-20 | 2.5Y 5/3 | 86 | 2.5Y 6/1 | 8 | D | PL | Sa Cl | |
| | | | 7.5YR 4/6 | 6 | C | PL | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|---|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

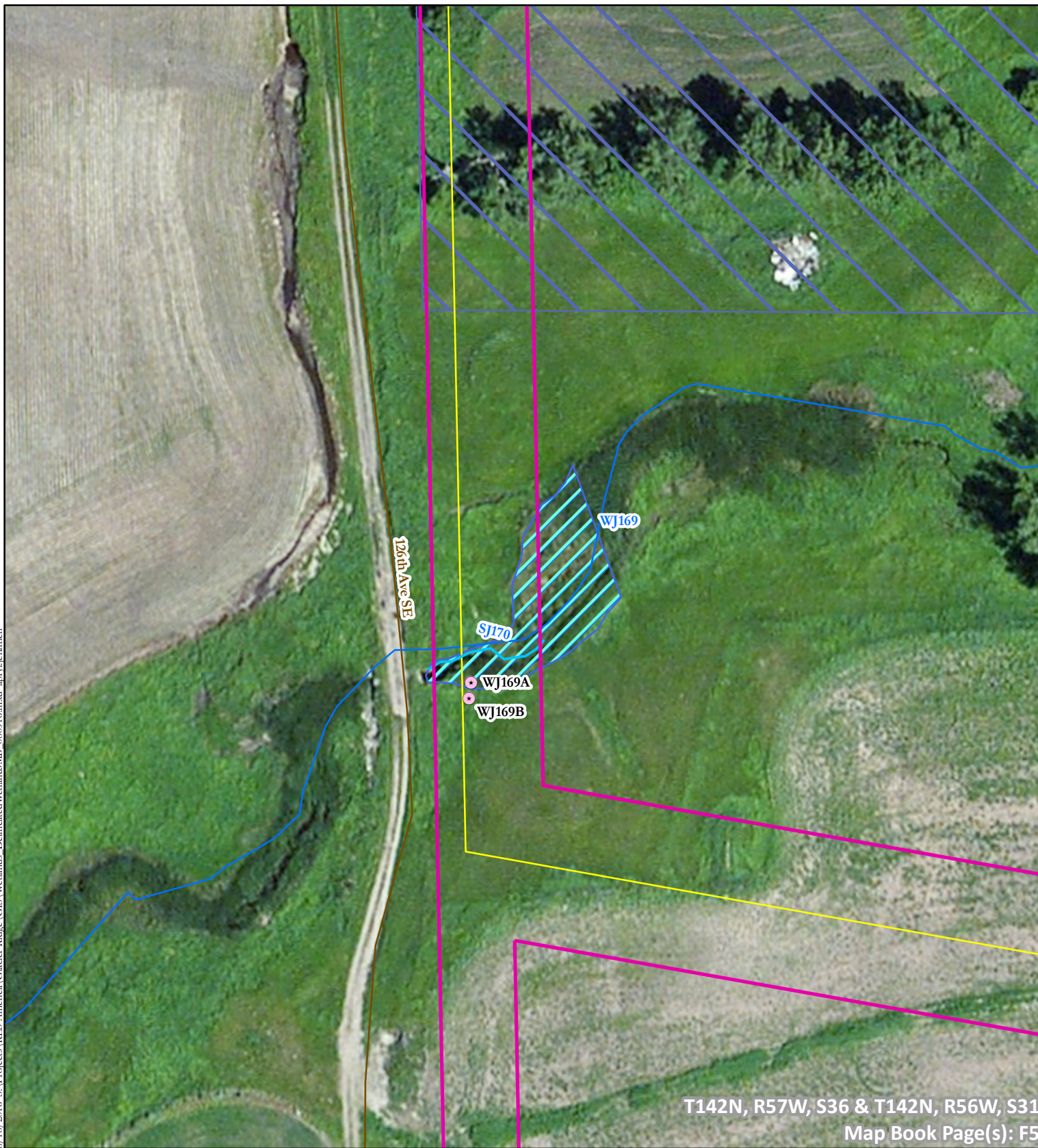
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

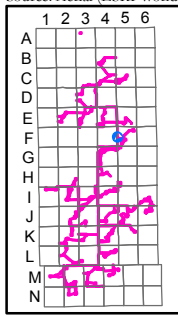
Remarks:

8/18/2016 8:11 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T142N, R57W, S36 & T142N, R56W, S31
Map Book Page(s): F5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

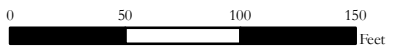
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ169
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ169 and RPW SJ170 overview looking to the east.



Wetland sample point WJ169A



Non-wetland sample point WJ169B

WJ172

Wet Meadow Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ172A
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR): F Lat: 47° 04' 42.04" Long: -97° 49' 56.84" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: PEMB

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photo 237 - A, Photo 238 - B, Photo 239 - Overview | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | | |
|--|-----------------------------|------------------|------------------|------------------|---|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) | | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>3</u> (B) | | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>15</u> x 1 = <u>15</u> | | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>25</u> x 2 = <u>50</u> | | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>5</u> x 4 = <u>20</u> | | |
| | | <u>0</u> | = Total Cover | | UPL species <u>0</u> x 5 = <u>0</u> | | |
| | | <u>45</u> | = Total Cover | | Column totals <u>45</u> (A) <u>85</u> (B) | | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>1.89</u> | | |
| 1 | <u>Typha angustifolia</u> | <u>15</u> | <u>Y</u> | <u>OBL</u> | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | | |
| 2 | <u>Alopecurus pratensis</u> | <u>15</u> | <u>Y</u> | <u>FACW</u> | | | |
| 3 | <u>Phalaris arundinacea</u> | <u>10</u> | <u>Y</u> | <u>FACW</u> | | | |
| 4 | <u>Elymus repens</u> | <u>5</u> | <u>N</u> | <u>FACU</u> | | | |
| 5 | _____ | _____ | _____ | _____ | | | |
| 6 | _____ | _____ | _____ | _____ | | | |
| 7 | _____ | _____ | _____ | _____ | | | |
| 8 | _____ | _____ | _____ | _____ | | | |
| 9 | _____ | _____ | _____ | _____ | | | |
| 10 | _____ | _____ | _____ | _____ | | | |
| | | <u>45</u> | = Total Cover | | | | |
| Woody vine stratum | (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | | |
| 2 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>50</u> | | | | | | Hydrophytic vegetation present? <u>Y</u> | |

Remarks:

SOIL

Sampling Point: WJ172A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|------------|---------------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-6 | 10YR 2/1 | 100 | | | | | Loamy muck | |
| 6-7 | 10YR 2/1 | 100 | | | | | Mucky Cl | less organic matter |
| 7-8 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 8-10 | 10YR 3/2 | 90 | 10YR 3/6 | 10 | C | PL | Sa | |
| 10-17 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 17-20 | 10YR 2/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input checked="" type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

sand deposit on surface

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes No _____ Depth (inches): surface
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ172B
 Investigator(s): Apryl Jennrich / Karl Bear Section, Township, Range: S31 T142N R56W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR): F Lat: 47° 04' 42.16" Long: -97° 49' 56.95" Datum: NAD 83
 Soil Map Unit Name: Barnes-Svea loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photo 237 - A, Photo 238 - B, Photo 239 - Overview | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------------|------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>2</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>1</u> x 3 = <u>3</u> | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>41</u> x 4 = <u>164</u> | |
| | | <u>0</u> | = Total Cover | | UPL species <u>50</u> x 5 = <u>250</u> | |
| | | <u>92</u> | = Total Cover | | Column totals <u>92</u> (A) <u>417</u> (B) | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>4.53</u> | |
| 1 | <u>Bromus inermis</u> | <u>50</u> | <u>Y</u> | <u>UPL</u> | Hydrophytic Vegetation Indicators: ___ Rapid test for hydrophytic vegetation ___ Dominance test is >50% ___ Prevalence index is ≤3.0* ___ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ___ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 2 | <u>Poa compressa</u> | <u>30</u> | <u>Y</u> | <u>FACU</u> | | |
| 3 | <u>Poa pratensis</u> | <u>10</u> | <u>N</u> | <u>FACU</u> | | |
| 4 | <u>Cirsium arvense</u> | <u>1</u> | <u>N</u> | <u>FACU</u> | | |
| 5 | <u>Rumex crispus</u> | <u>1</u> | <u>N</u> | <u>FAC</u> | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>92</u> | = Total Cover | | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u>N</u> | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>2</u> | | | | | | |

Remarks:

SOIL

Sampling Point: WJ172B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-1 | 10YR 2/1 | 100 | | | | | Mucky Lo | |
| 1-10 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 10-14 | 10YR 2/1 | 99 | 10YR 6/1 | 1 | D | PL | Si Cl | |
| 14-17 | 10YR 3/1 | 99 | 7.5YR 3/4 | 1 | C | PL | Si Cl | |
| 17-20 | 10YR 3/1 | 100 | | | | | Cl | |
| 20-22 | 2.5Y 6/1 | 100 | | | | | Cl | |
| 22-24 | 2.5Y 7/1 | 100 | | | | | Cl | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: large rock
 Depth (inches): 24"

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

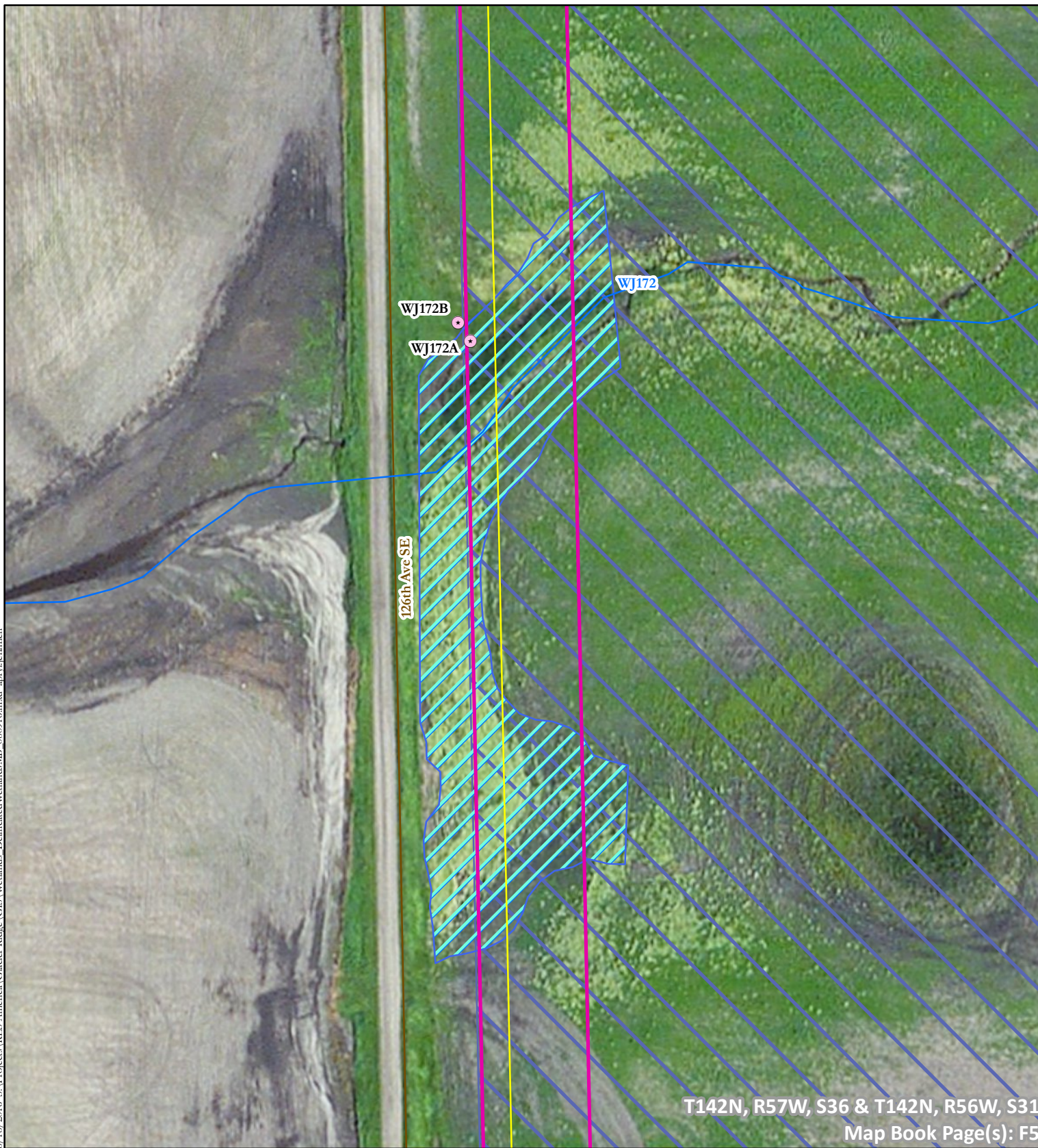
Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): _____
 Saturation present? Yes No Depth (inches): 4"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

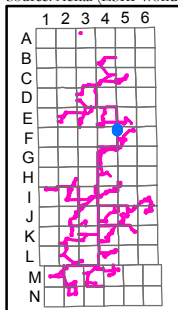
Remarks:

8/18/2016 8:11:05 AM \\Projects\RES America\Glacier Ridge\GIS\Wetlands_Delineated\WetlandsMB_080916.mxd aprvljennrich



T142N, R57W, S36 & T142N, R56W, S31
Map Book Page(s): F5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ172
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ172 overview looking to the east.



Wetland sample point WJ172A



Non-wetland sample point WJ172B

WJ179

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ179A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S30 T142N R56W
 Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): Concave Slope (%): 3
 Subregion (LRR): F Lat: 47° 05' 36.96" Long: -97° 49' 57.72" Datum: NAD83
 Soil Map Unit Name: Vallers Loam, Saline IWI Classification: PEMC/PEMA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|---|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photos 247-A, 248-B, 249-overview E | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--------------------------------------|---------------------------|------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>10</u> x 1 = <u>10</u> | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>60</u> x 2 = <u>120</u> | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>5</u> x 4 = <u>20</u> | |
| | | <u>0</u> | = Total Cover | | UPL species <u>0</u> x 5 = <u>0</u> | |
| | | <u>75</u> | = Total Cover | | Column totals <u>75</u> (A) <u>150</u> (B) | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>2.00</u> | |
| 1 | <u>Spartina pectinata</u> | <u>60</u> | <u>Y</u> | <u>FACW</u> | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 2 | <u>Typha angustifolia</u> | <u>10</u> | <u>N</u> | <u>OBL</u> | | |
| 3 | <u>Poa pratensis</u> | <u>5</u> | <u>N</u> | <u>FACU</u> | | |
| 4 | _____ | _____ | _____ | _____ | | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>75</u> | = Total Cover | | | |
| Woody vine stratum | (Plot size: _____) | | | | | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | Hydrophytic vegetation present? <u>Y</u> | |

Remarks:

SOIL

Sampling Point: WJ179A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-6 | 10YR 2/1 | 100 | | | | | Lo Muck | |
| 6-9 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 9-13 | 10YR 3/1 | 100 | | | | | Si Cl Lo | |
| 13-20 | 2.5YR 5/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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): 10
 Saturation present? Yes No Depth (inches): 0
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ179B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S30 T142N R56W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Convex Slope (%): 1
 Subregion (LRR): F Lat: 47° 05' 36.94" Long: -97° 49' 57.51" Datum: NAD83
 Soil Map Unit Name: Vallers Loam, Saline IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>N</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--------------------------------------|---------------------------|------------------|------------------|------------------|---|-------------------------------|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>1</u> (A) |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>2</u> (B) |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>50.00%</u> (A/B) |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 | _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 | _____ | _____ | _____ | _____ | FACW species | <u>25</u> x 2 = <u>50</u> |
| 4 | _____ | _____ | _____ | _____ | FAC species | <u>15</u> x 3 = <u>45</u> |
| 5 | _____ | _____ | _____ | _____ | FACU species | <u>70</u> x 4 = <u>280</u> |
| | | <u>0</u> | = Total Cover | | UPL species | <u>15</u> x 5 = <u>75</u> |
| | | <u>125</u> | = Total Cover | | Column totals | <u>125</u> (A) <u>450</u> (B) |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>3.60</u> | |
| 1 | <u>Poa compressa</u> | <u>60</u> | <u>Y</u> | <u>FACU</u> | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 2 | <u>Spartina pectinata</u> | <u>25</u> | <u>Y</u> | <u>FACW</u> | | |
| 3 | <u>Lactuca serriola</u> | <u>15</u> | <u>N</u> | <u>FAC</u> | | |
| 4 | <u>Potentilla recta</u> | <u>15</u> | <u>N</u> | <u>UPL</u> | | |
| 5 | <u>Cirsium arvense</u> | <u>10</u> | <u>N</u> | <u>FACU</u> | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>125</u> | = Total Cover | | | |
| Woody vine stratum | (Plot size: _____) | | | | | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | Hydrophytic vegetation present? <u>N</u> | |

Remarks:

SOIL

Sampling Point: WJ179B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-13 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 13-23 | 2.5Y 4/1 | 100 | | | | | Si Cl | |
| 23-27 | 2.5Y 4/1 | 100 | | | | | Cl | |
| 27-29 | 10YR 6/1 | 100 | | | | | Cl | |
| 29-35 | 10YR 6/1 | 97 | 10YR 3/4 | 3 | C | PL | Cl | |
| 35-39 | 10YR 6/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

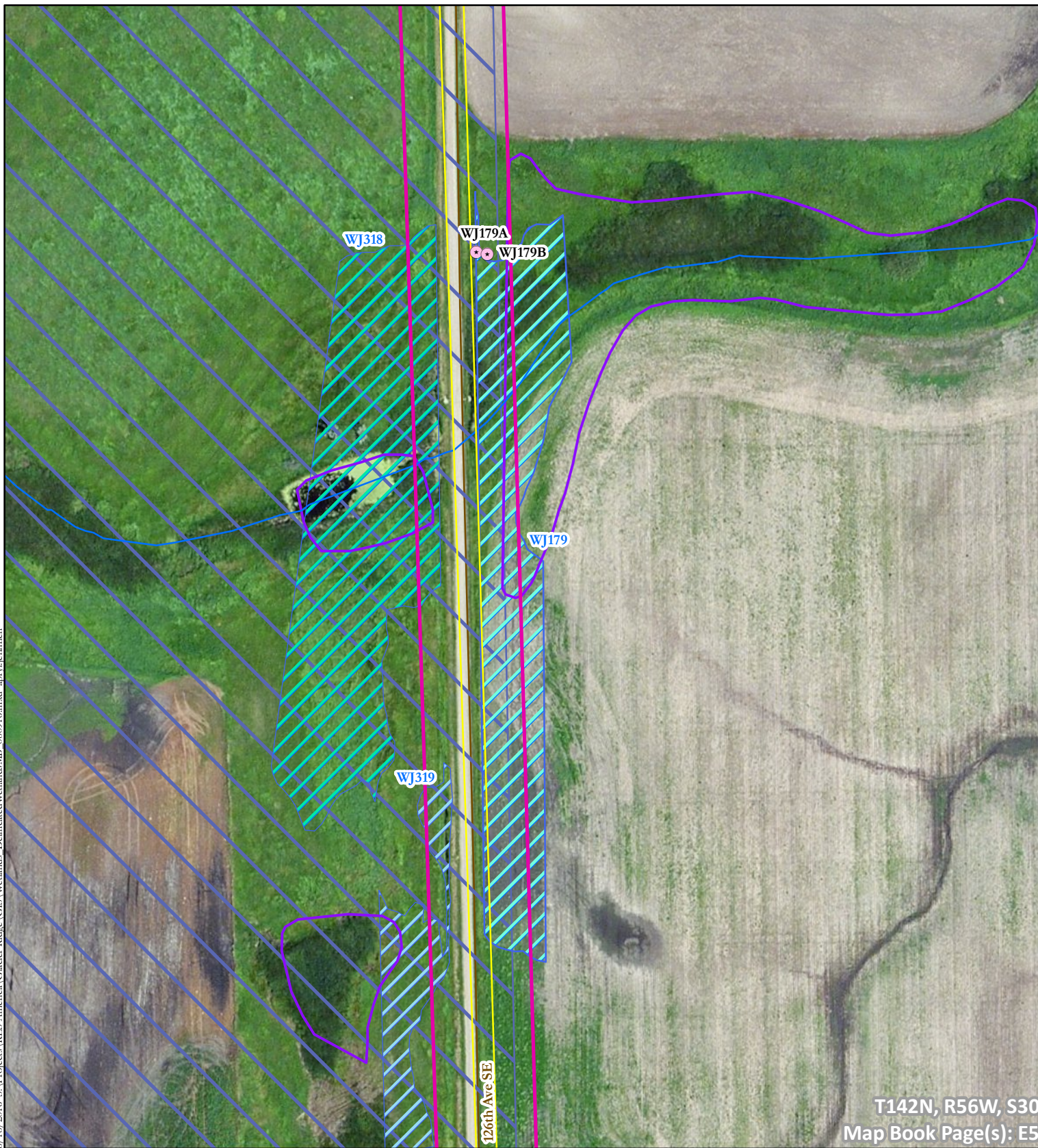
Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): 25
 Saturation present? Yes No Depth (inches): 10
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

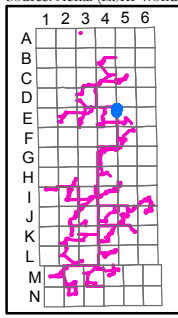
Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T142N, R56W, S30
Map Book Page(s): E5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

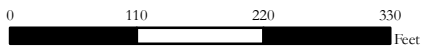
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- ▣ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WJ179
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ179 overview looking to the east.



Wetland sample point WJ179A



Non-wetland sample point WJ179B

WJ183

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ183A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S23 T142N R57W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 05' 42.80" Long: -97° 51' 45.92" Datum: NAD83
 Soil Map Unit Name: Parnell Silty Clay Loam IWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |

Remarks:

Photos 253-A, 254-B, 255-Overview (W)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>2</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>2</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>100.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>95</u> x 2 = <u>190</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>5</u> x 3 = <u>15</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>0</u> x 5 = <u>0</u> |
| <u>Herb stratum</u> (Plot size: _____) | | | | Column totals | <u>100</u> (A) <u>205</u> (B) |
| 1 <u>Phalaris arundinacea</u> | 60 | Y | FACW | Prevalence Index = B/A = | <u>2.05</u> |
| 2 <u>Spartina pectinata</u> | 30 | Y | FACW | | |
| 3 <u>Apocynum cannabinum</u> | 5 | N | FAC | | |
| 4 <u>Alopecurus pratensis</u> | 5 | N | FACW | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>100</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 _____ | _____ | _____ | _____ | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | <input checked="" type="checkbox"/> Dominance test is >50% | |
| | <u>0</u> | = Total Cover | | <input checked="" type="checkbox"/> Prevalence index is ≤3.0* | |
| % Bare Ground in Herb Stratum: _____ | | | | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| | | | | ____ Problematic hydrophytic vegetation* (explain) | |
| | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| | | | | Hydrophytic vegetation present? | <u>Y</u> |

Remarks:

SOIL

Sampling Point: WJ183A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-3 | 10YR 2/1 | 100 | | | | | Muck | |
| 3-12 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 12-20 | 10YR 2/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input checked="" type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): 10"
 Saturation present? Yes No Depth (inches): 0
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ183B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S23 T142N R57W
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 2
 Subregion (LRR): F Lat: 47° 05' 42.81" Long: -97° 51' 45.70" Datum: NAD83
 Soil Map Unit Name: Parnell Silty Clay Loam vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--------------------------------------|-----------------------------|------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>2</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>35</u> x 2 = <u>70</u> | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>17</u> x 3 = <u>51</u> | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>17</u> x 4 = <u>68</u> | |
| | | <u>0</u> | = Total Cover | | UPL species <u>25</u> x 5 = <u>125</u> | |
| | | <u>94</u> | = Total Cover | | Column totals <u>94</u> (A) <u>314</u> (B) | |
| | | <u>94</u> | = Total Cover | | Prevalence Index = B/A = <u>3.34</u> | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 | <u>Spartina pectinata</u> | <u>35</u> | <u>Y</u> | <u>FACW</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 | <u>Bromus inermis</u> | <u>25</u> | <u>Y</u> | <u>UPL</u> | ____ Dominance test is >50% | |
| 3 | <u>Apocynum cannabinum</u> | <u>15</u> | <u>N</u> | <u>FAC</u> | ____ Prevalence index is ≤3.0* | |
| 4 | <u>Glycyrrhiza lepidota</u> | <u>15</u> | <u>N</u> | <u>FACU</u> | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 | <u>Lactuca serriola</u> | <u>2</u> | <u>N</u> | <u>FAC</u> | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 | <u>Cirsium arvense</u> | <u>2</u> | <u>N</u> | <u>FACU</u> | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>94</u> | = Total Cover | | | |
| Woody vine stratum | (Plot size: _____) | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 1 | _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>N</u> | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | | |
| Remarks: | | | | | | |

SOIL

Sampling Point: WJ183B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-17 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 17-38 | 2.5Y 5/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 30
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

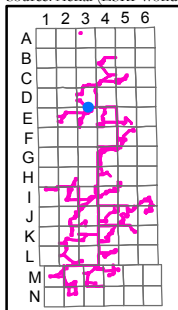
Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprviglenrich



T142N, R57W, S23
Map Book Page(s): D3

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

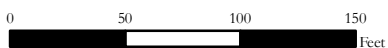
- Sample Point
- ~ Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ183
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ183 overview looking to the west.



Wetland sample point WJ183A



Non-wetland sample point WJ183B

WJ185

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 06/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ185A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S23 T142 R57W
 Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 5' 49.44" Long: -97° 52' 5.15" Datum: NAD83
 Soil Map Unit Name: Lowe - Fluvanquents, Channeled Complex vWI Classification: PEMC/PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | |
| Remarks: Photos - 257-A, 258 - B, 259 - Overview NE, 260 - Overview SW | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|--|------------------|------------------|------------------|---|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| Sapling/Shrub stratum (Plot size: _____) | | | | Prevalence Index Worksheet |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>90</u> x 2 = <u>180</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>95</u> (A) <u>200</u> (B) Prevalence Index = B/A = <u>2.11</u> |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| Herb stratum (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 <i>Phalaris arundinacea</i> | 90 | Y | FACW | |
| 2 <i>Cirsium arvense</i> | 5 | N | FACU | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 6 _____ | _____ | _____ | _____ | |
| 7 _____ | _____ | _____ | _____ | |
| 8 _____ | _____ | _____ | _____ | |
| 9 _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | |
| <u>95</u> = Total Cover | | | | |
| Woody vine stratum (Plot size: _____) | | | | Hydrophytic vegetation present? <u>Y</u> |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| % Bare Ground in Herb Stratum: _____ | | | | |

Remarks:

SOIL

Sampling Point: WJ185A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-13 | 10YR 2/1 | 100 | | | | | Si Lo | many roots |
| 13-21 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 21-25 | 10YR 2/1 | 100 | | | | | Sa Cl | |
| 25-29 | 10YR 2/1 | 50 | 2.5Y 4/1 | 45 | D | M | Sa Cl | |
| 25-29 | | | 10YR 3/4 | 5 | C | PL | | |
| 29-36 | 2.5YR 5/1 | 100 | | | | | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 13
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 06/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ185B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S23 T142 R57W
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 5' 49.35" Long: -97° 52' 5.04" Datum: NAD83
 Soil Map Unit Name: Buse - Sioux Complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |
| Remarks: | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|--|------------------|------------------|------------------|---|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>100</u> x 5 = <u>500</u> Column totals <u>100</u> (A) <u>500</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| Sapling/Shrub stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| Herb stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: ___ Rapid test for hydrophytic vegetation ___ Dominance test is >50% ___ Prevalence index is ≤3.0* ___ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ___ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 <u>Bromus inermis</u> | <u>100</u> | <u>Y</u> | <u>UPL</u> | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 6 _____ | _____ | _____ | _____ | |
| 7 _____ | _____ | _____ | _____ | |
| 8 _____ | _____ | _____ | _____ | |
| 9 _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | |
| <u>100</u> = Total Cover | | | | |
| Woody vine stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | |
| % Bare Ground in Herb Stratum: _____ | | | | |

Remarks:

SOIL

Sampling Point: WJ185B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-15 | 10YR 2/1 | 100 | | | | | Loam | |
| 15-22 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 22-29 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 29-40 | 10YR 2/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- Histisol (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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

Could not dig deep enough to confirm A12, A12 assumed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

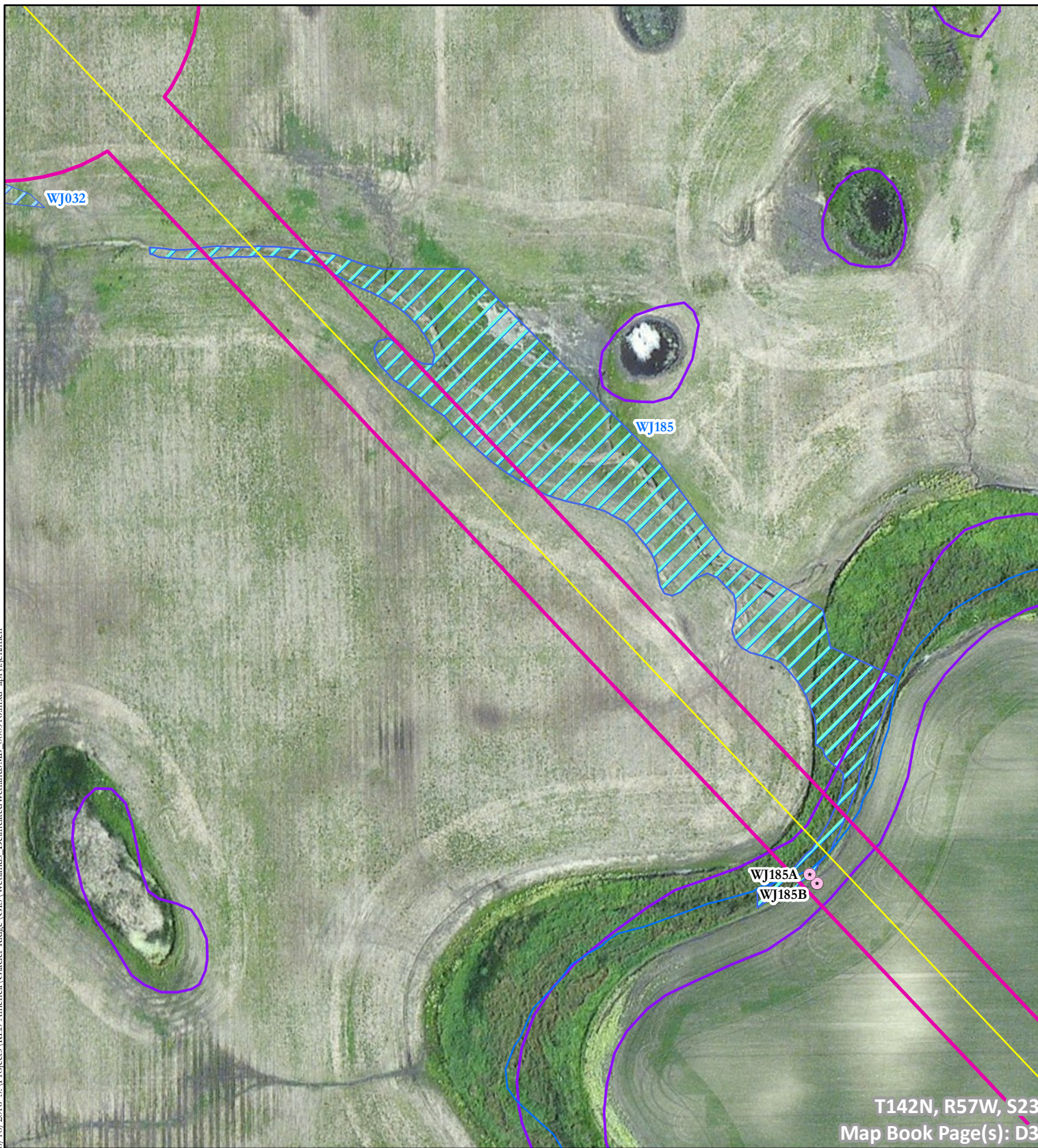
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 29
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

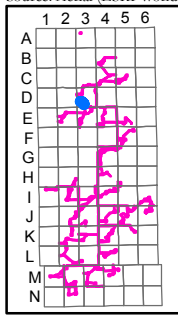
Remarks:

8/18/2016 8:11:05 AM S:\Projects\RES America\Glacier Ridge\GIS\Wetlands_Delineated\WetlandsMB_080916.mxd aprvljennrich



T142N, R57W, S23
Map Book Page(s): D3

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

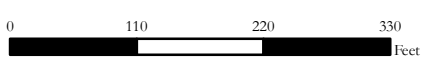
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- - - Collection Alt
- Access Road
- - - Access Road Alt
- ▨ O&M/Substation



Wetland ID: WJ185
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ185 overview looking to the northeast.



Wetland sample point WJ185A



Non-wetland sample point WJ185B

WJ189

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 06/27/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ189A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S1 T141N R57W
 Landform (hillslope, terrace, etc.): Drainage Swale Local relief (concave, convex, none): Concave Slope (%): 0
 Subregion (LRR): F Lat: 47° 03' 05.34" Long: -97° 51' 00.97" Datum: NAD83
 Soil Map Unit Name: Barnes - svea loams IWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|---|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photo - 264 - A, 265 - B, 266 - Overview (NW) | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|--------------------|------------------|------------------|------------------|--|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 2 | _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 3 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 4 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 5 | _____ | _____ | _____ | _____ | UPL species <u>15</u> x 5 = <u>75</u> | |
| | | <u>0</u> | = Total Cover | | Column totals <u>15</u> (A) <u>75</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>5.00</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 1 | <u>Zea Mays</u> | <u>15</u> | <u>Y</u> | <u>UPL</u> | <input checked="" type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| 2 | _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 3 | _____ | _____ | _____ | _____ | | |
| 4 | _____ | _____ | _____ | _____ | | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>Y</u> | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>15</u> | = Total Cover | | | |
| Woody vine stratum | | | | | | |
| (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>85</u> | | | | | | |

Remarks: Corn is very stressed and stunted

SOIL

Sampling Point: WJ189A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-25 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 25-34 | 10YR 3/1 | 100 | | | | | Cl | |
| 34-36 | 2.5Y 5/2 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: Bedrock
 Depth (inches): 36

Hydric soil present? Y

Remarks:

Very close to A12, using professional judgement based on strenght of other indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 06/27/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ189B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S1 T141N R57W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1
 Subregion (LRR): F Lat: 47° 03' 05.35" Long: -97° 51' 00.86" Datum: NAD83
 Soil Map Unit Name: Barnes - svea loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |
| Remarks: | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|---|--------------------|------------------|------------------|------------------|---|
| 1 _____ | | | | | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 _____ | | | | | |
| 3 _____ | | | | | |
| 4 _____ | | | | | |
| | | <u>0</u> | = Total Cover | | |
| Sapling/Shrub stratum (Plot size: _____) | | | | | Prevalence Index Worksheet |
| 1 _____ | | | | | |
| 2 _____ | | | | | |
| 3 _____ | | | | | |
| 4 _____ | | | | | |
| | | <u>0</u> | = Total Cover | | |
| Herb stratum (Plot size: _____) | | | | | |
| 1 <u>Zea Mays</u> | | <u>40</u> | <u>Y</u> | <u>UPL</u> | Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>40</u> x 5 = <u>200</u> Column totals <u>40</u> (A) <u>200</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| 2 _____ | | | | | |
| 3 _____ | | | | | |
| 4 _____ | | | | | |
| 5 _____ | | | | | |
| 6 _____ | | | | | |
| 7 _____ | | | | | |
| 8 _____ | | | | | |
| 9 _____ | | | | | |
| 10 _____ | | | | | |
| | | <u>40</u> | = Total Cover | | |
| Woody vine stratum (Plot size: _____) | | | | | |
| 1 _____ | | | | | |
| 2 _____ | | | | | |
| | | <u>0</u> | = Total Cover | | |
| % Bare Ground in Herb Stratum: _____ | | | | | |

Remarks:

SOIL

Sampling Point: WJ189B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-10 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 10-15 | 10YR 2/1 | 100 | | | | | Cl | |
| 15-20 | 10YR 2/1 | 90 | 2.5Y 6/2 | 10 | D | PL | Cl | |
| 20-23 | 10YR 2/1 | 60 | 2.5Y 6/2 | 40 | D | M | Cl | |
| 23-27 | 10YR 2/1 | 50 | 2.5Y 6/2 | 50 | D | M | Sa Cl | |
| 27-35 | 25Y 3/2 | 70 | 2.5Y 5/4 | 30 | C | PL | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

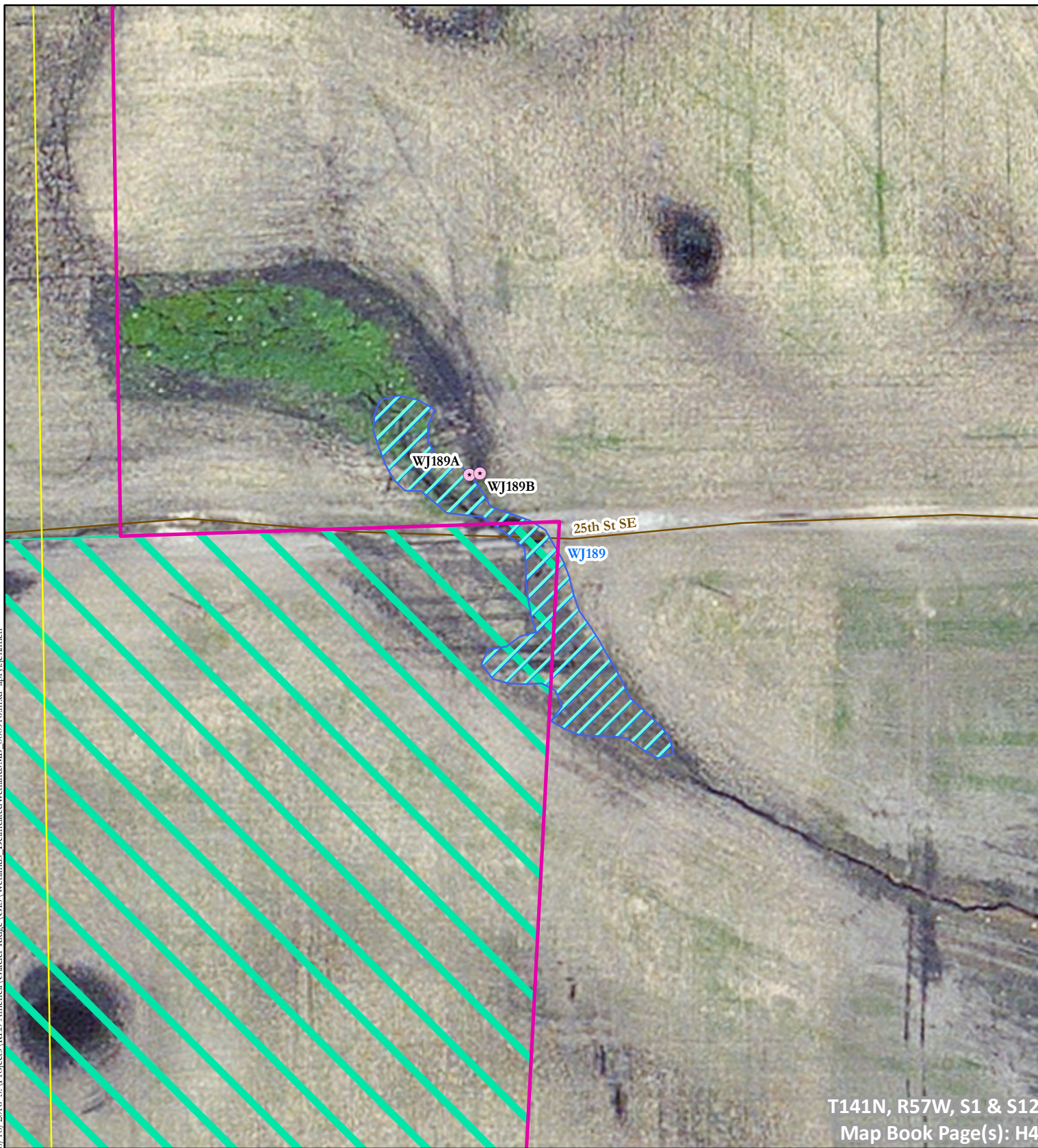
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

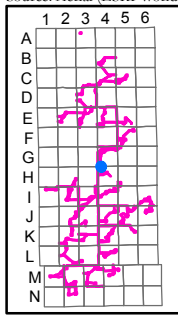
Remarks:

8/18/2016 5:10 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprljennrich



T141N, R57W, S1 & S12
Map Book Page(s): H4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

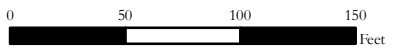
- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ189
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



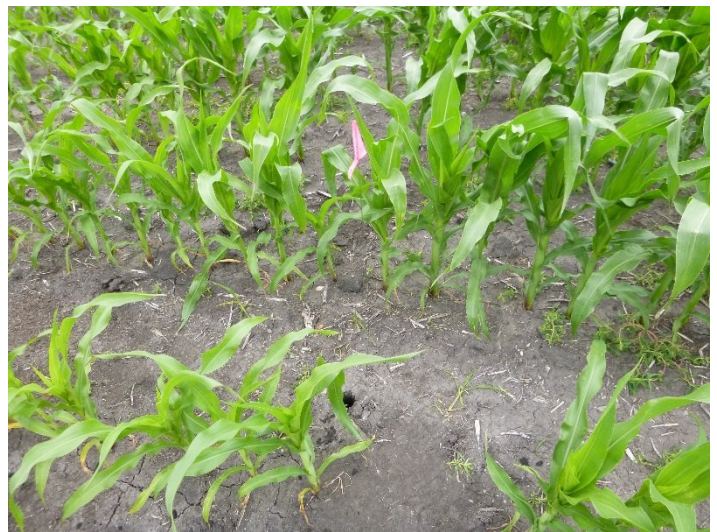
Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ189 overview looking to the northwest.



Wetland sample point WJ189A



Non-wetland sample point WJ189B

WJ195

Non-Wetland Delineation Point

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/26/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ195A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S12 T141N 57W
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 2' 49.78" Long: -97° 50' 39.23" Datum: NAD83
 Soil Map Unit Name: Barnes - Svea Loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: <p align="center">Photos: 272 - A, 273 - Overview NE</p> | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|--------------------------|------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 2 | _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 3 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 4 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 5 | _____ | _____ | _____ | _____ | UPL species <u>100</u> x 5 = <u>500</u> | |
| | | <u>0</u> | = Total Cover | | Column totals <u>100</u> (A) <u>500</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>5.00</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | ____ Rapid test for hydrophytic vegetation | |
| 1 | <u>Triticum aestivum</u> | <u>100</u> | <u>Y</u> | <u>UPL</u> | ____ Dominance test is >50% | |
| 2 | _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 3 | _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 4 | _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>100</u> | = Total Cover | | | |
| Woody vine stratum | | | | | Hydrophytic vegetation present? | |
| (Plot size: _____) | | | | | <u>N</u> | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| ____ % Bare Ground in Herb Stratum: _____ | | | | | | |

Remarks:

SOIL

Sampling Point: WJ195A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-6 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 6-9 | 10YR 2/1 | 96 | 10YR 3/6 | 4 | C | PL | Si Cl | |
| 9-17 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 17-22 | 10YR 4/2 | 95 | 10YR 3/6 | 5 | C | PL | Cl Lo | |
| 22-24 | 2.5Y 5/2 | 90 | 10YR 3/6 | 10 | C | PL | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

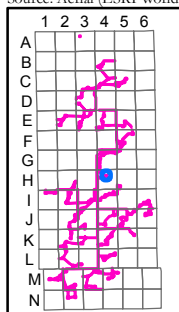
Remarks:

8/18/2016 8:11:00 AM S:\Projects\RES America\Glacier Ridge\GIS\Wetlands - Final\Delimited\WetlandsMB_080916.mxd aprtj,je,mrj



T141N, R57W, S12
Map Book Page(s): H4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ195A
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Wetland WJ195 overview looking to the northwest.



Non-wetland sample point WJ195A

WJ205

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/27/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ205A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S7 T141N R56W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0
 Subregion (LRR): F Lat: 47° 02' 22.25" Long: -97° 49' 44.65" Datum: NAD83
 Soil Map Unit Name: Hamerly-Wyard loams vWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|---|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photos: 283 - A, 284 - B, 285 - Overview (N), 286 - Overview (SE) | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|--------------------|------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 2 | _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 3 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 4 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 5 | _____ | _____ | _____ | _____ | UPL species <u>2</u> x 5 = <u>10</u> | |
| | | <u>0</u> | = Total Cover | | Column totals <u>2</u> (A) <u>10</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>5.00</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | ____ Rapid test for hydrophytic vegetation | |
| 1 | <u>Zea Mays</u> | <u>2</u> | <u>Y</u> | <u>UPL</u> | ____ Dominance test is >50% | |
| 2 | _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 3 | _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 4 | _____ | _____ | _____ | _____ | ____ <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>2</u> | = Total Cover | | | |
| Woody vine stratum | | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>Y</u> | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>98</u> | | | | | | |

Remarks:
Really stressed corn, almost all dead

SOIL

Sampling Point: WJ205A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-8 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 8-9 | 10YR 2/1 | 100 | | | | | Cl | |
| 9-19 | 2.5Y 6/2 | 100 | | | | | Cl | |
| 19-20 | 2.5Y 6/2 | 85 | 2.5Y 5/6 | 15 | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/27/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ205B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S7 T141N R56W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1
 Subregion (LRR): F Lat: 47° 02' 22.27" Long: -97° 49' 44.85" Datum: NAD83
 Soil Map Unit Name: Hamerly-Wyard loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>N</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|--------------------|------------------|------------------|------------------|---|----------------------------|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 2 | _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 3 | _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 4 | _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| 5 | _____ | _____ | _____ | _____ | UPL species | <u>5</u> x 5 = <u>25</u> |
| | | <u>0</u> | = Total Cover | | Column totals | <u>5</u> (A) <u>25</u> (B) |
| Herb stratum | | | | | Prevalence Index = B/A = <u>5.00</u> | |
| (Plot size: _____) | | | | | Hydrophytic Vegetation Indicators: | |
| 1 | <u>Zea Mays</u> | <u>5</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 | _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 | _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 | _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 | _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 | _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 | _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>N</u> | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>5</u> | = Total Cover | | | |
| Woody vine stratum | | | | | | |
| (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>95</u> | | | | | | |
| Remarks: | | | | | | |

SOIL

Sampling Point: WJ205B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|-------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-8 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 8-10 | 2.5Y 4/2 | 100 | | | | | Cl | |
| 10-16 | 2.5Y 6/2 | 100 | | | | | Sa Cl | |
| 16-20 | 2.5Y 6/2 | 70 | 2.5Y 5/6 | 30 | C | M | Sa Cl | Sandy at 20 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

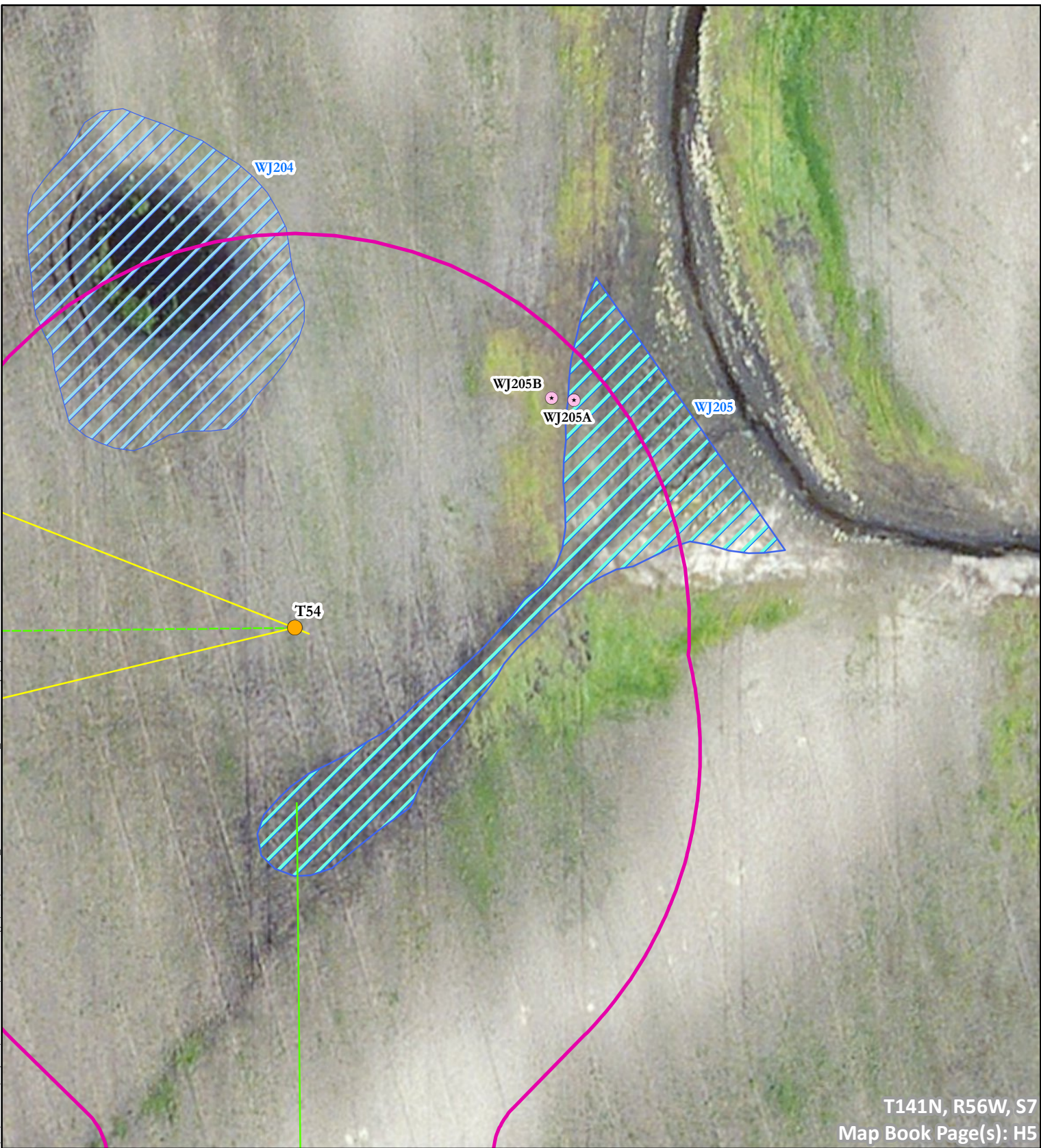
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

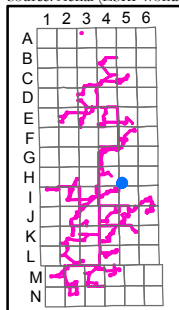
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T141N, R56W, S7
Map Book Page(s): H5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▨ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WJ205
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ205 overview looking to the southeast.



Wetland sample point WJ205A



Non-wetland sample point WJ205B

WJ210

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/27/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ210A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S13 T141N R57W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): 3
 Subregion (LRR): F Lat: 47° 2' 6.61" Long: -97° 50' 10.81" Datum: NAD83
 Soil Map Unit Name: Barnes - Svea loams IWI Classification: PEMA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? <u>Y</u> | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? <u>Y</u> | <u>Y</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | <u>Y</u> | |
| Remarks: Photos: 291-A, 292-B, 293-Overview (W), 294-Overview (E), Drainage swale/NHD line | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
|--|------------------------|------------------|------------------|------------------|--|
| 1 | _____ | _____ | _____ | _____ | Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>35</u> x 2 = <u>70</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>35</u> (A) <u>70</u> (B) Prevalence Index = B/A = <u>2.00</u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: ____ Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 | <u>Hordeum jubatum</u> | <u>35</u> | <u>Y</u> | <u>FACW</u> | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| 6 | _____ | _____ | _____ | _____ | |
| 7 | _____ | _____ | _____ | _____ | |
| 8 | _____ | _____ | _____ | _____ | |
| 9 | _____ | _____ | _____ | _____ | |
| 10 | _____ | _____ | _____ | _____ | |
| 35 = Total Cover | | | | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u>Y</u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>65</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ210A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|------------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-1 | 10YR 2/1 | 100 | | | | | Sandy muck | |
| 1-7 | 10YR 6/1 | 100 | | | | | Sa Cl | |
| 7-10 | 10YR 5/2 | 97 | 10YR 4/6 | 3 | C | PL | Sa Lo | |
| 10-17 | 10YR 7/2 | 100 | | | | | Sa Lo | |
| 17-20 | 2.5Y 6/2 | 80 | 2.5Y 6/8 | 20 | C | M | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input checked="" type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes No _____ Depth (inches): 0
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/27/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ210B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S13 T141N R57W
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0
 Subregion (LRR): F Lat: 47° 2' 6.49" Long: -97° 50' 10.81" Datum: NAD83
 Soil Map Unit Name: Barnes - Svea loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|--|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |
| Remarks: <p align="center">Field planted in beans</p> | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|---|------------------|------------------|------------------|--|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>50</u> x 5 = <u>250</u> Column totals <u>50</u> (A) <u>250</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| Sapling/Shrub stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| Herb stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
| 1 <u>Glycine max</u> | <u>50</u> | <u>Y</u> | <u>UPL</u> | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 6 _____ | _____ | _____ | _____ | |
| 7 _____ | _____ | _____ | _____ | |
| 8 _____ | _____ | _____ | _____ | |
| 9 _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | |
| 50 = Total Cover | | | | |
| Woody vine stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>50</u> | | | | |
| Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | | | | |
| Hydrophytic vegetation present? <u>N</u> | | | | |

Remarks:

SOIL

Sampling Point: WJ210B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-16 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 16-24 | 10YR 2/1 | 60 | 2.5Y 6/2 | 40 | | | Lo | |
| 24-33 | 2.5Y 6/2 | 95 | 10YR 3/6 | 5 | C | PL | Sa Lo | |
| 33-37 | 2.5Y 5/3 | 93 | 10YR 5/6 | 7 | C | PL | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

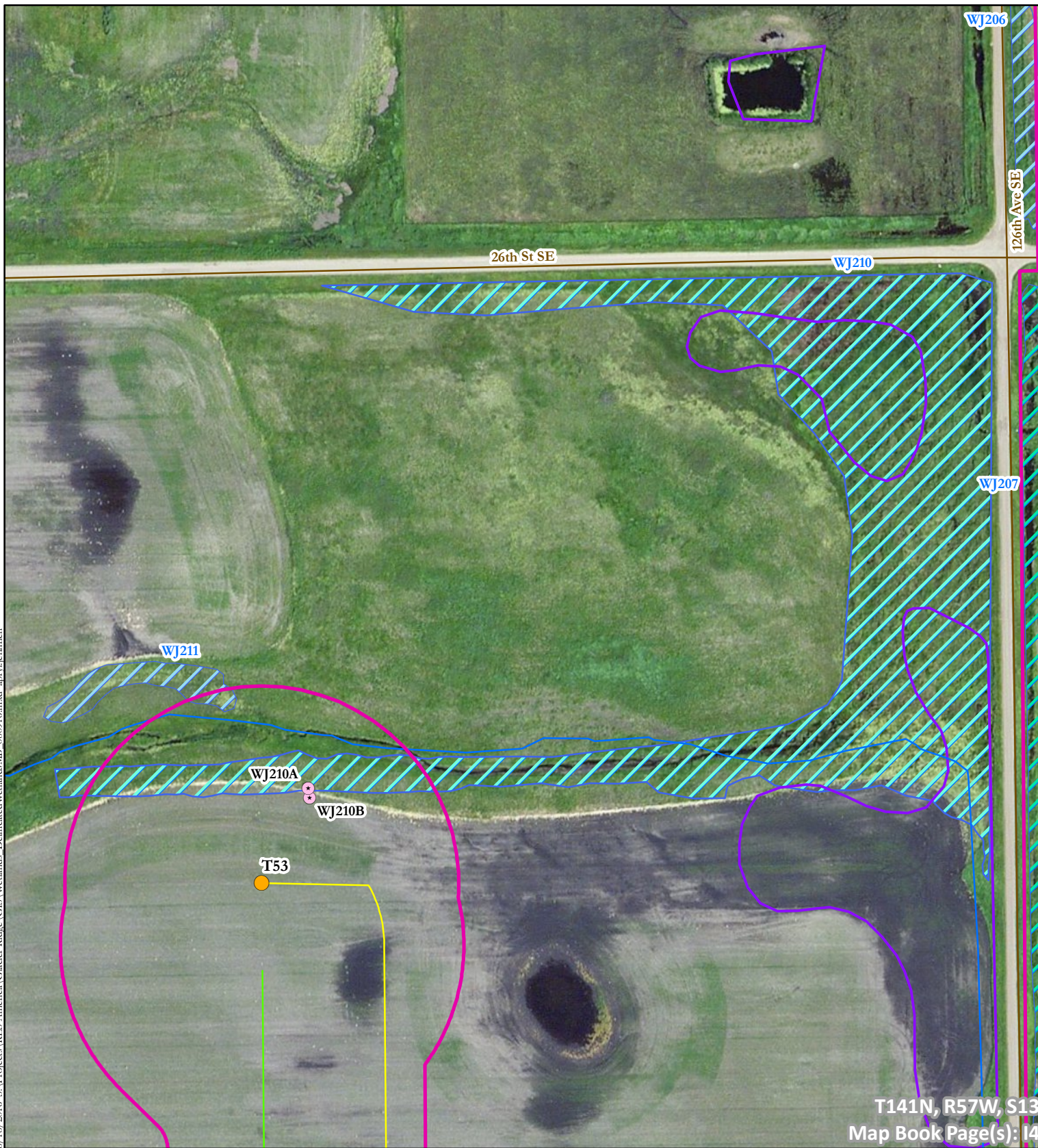
Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): 37
 Saturation present? Yes No Depth (inches): 28
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

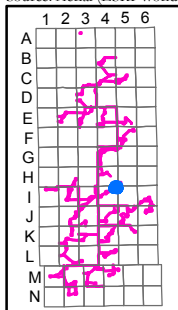
Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands_Delineated\WetlandsMB_080916.mxd aprvljennrich



T141N, R57W, S13
Map Book Page(s): 14

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ210
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ210 overview looking to the east.



Wetland sample point WJ210A



Non-wetland sample point WJ210B

WJ214

Non-Wetland Delineation Point

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/27/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ214A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S13 T141N R57W
 Landform (hillslope, terrace, etc.): Drainage swale Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 1' 59.73" Long: -97° 50' 36.92" Datum: NAD83
 Soil Map Unit Name: Barnes - Svea loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? (If no, explain in remarks)
 Are vegetation X, soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>N</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |

Remarks:

Photos: 298-A, 299-Overview (NW)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: <u> </u>) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|--|--------------------|
| 1 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index Worksheet | |
| 1 <u> </u> | | | | Total % Cover of: | |
| 2 <u> </u> | | | | OBL species <u>0</u> x 1 = | <u>0</u> |
| 3 <u> </u> | | | | FACW species <u>0</u> x 2 = | <u>0</u> |
| 4 <u> </u> | | | | FAC species <u>0</u> x 3 = | <u>0</u> |
| 5 <u> </u> | | | | FACU species <u>0</u> x 4 = | <u>0</u> |
| <u>0</u> = Total Cover | | | | UPL species <u>40</u> x 5 = | <u>200</u> |
| | | | | Column totals <u>40</u> (A) | <u>200</u> (B) |
| | | | | Prevalence Index = B/A = | <u>5.00</u> |
| <u>Herb stratum</u> (Plot size: <u> </u>) | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>40</u> | <u>Y</u> | <u>UPL</u> | <u> </u> Rapid test for hydrophytic vegetation | |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> Dominance test is >50% | |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> Prevalence index is ≤3.0* | |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> Problematic hydrophytic vegetation* (explain) | |
| 6 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 7 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 8 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 9 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| 10 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| <u>40</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: <u> </u>) | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 1 <u> </u> | | | | Hydrophytic vegetation present? | <u>N</u> |
| 2 <u> </u> | | | | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>60</u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ214A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|-------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-14 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 14-19 | 10YR 2/1 | 100 | | | | | Si Cl Lo | Sand lenses |
| 19-21 | 10YR 2/1 | 94 | 10YR 3/6 | 6 | C | PL | Si Cl Lo | |
| 21-26 | 10YR 2/1 | 98 | 10YR 3/6 | 2 | C | PL | Si Cl Lo | |
| 26-28 | 10YR 2/1 | 99 | 10YR 3/6 | 1 | C | PL | Cl | |
| 28-33 | 10YR 2/1 | 100 | | | | | Cl | |
| 33-36 | 10YR 3/3 | 100 | | | | | Sa Lo | |
| 36-38 | 10YR 4/2 | 97 | 10YR 3/6 | 3 | C | PL | Sa Cl Lo | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

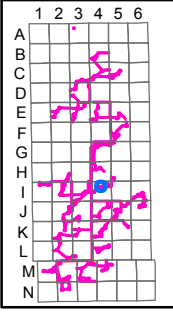
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

8/18/2016 8:11:01 AM S:\Projects\RES America\Glacier Ridge\GIS\Wetlands - Final\Delimited\Wetlands\MB_080916.mxd aprtj,jejrnich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

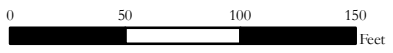
- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ214A
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Wetland WJ214 overview looking to the northwest.



Non-wetland sample point WJ214A

WJ241

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/28/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ241A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S14 T141N R57W
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 1' 24.70" Long: -97° 52' 29.85" Datum: NAD83
 Soil Map Unit Name: Hamerly-Wyard loams IWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photos: 335-A, 336-B, 337-Overview (E) | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--------------------------------------|-----------------------------|------------------|------------------|------------------|--|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>10</u> x 1 = <u>10</u> | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>90</u> x 2 = <u>180</u> | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| | | <u>0</u> | = Total Cover | | UPL species <u>0</u> x 5 = <u>0</u> | |
| | | | | | Column totals <u>100</u> (A) <u>190</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>1.90</u> | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 | <u>Phalaris arundinacea</u> | <u>90</u> | <u>Y</u> | <u>FACW</u> | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) | |
| 2 | <u>Typha angustifolia</u> | <u>10</u> | <u>N</u> | <u>OBL</u> | | |
| 3 | _____ | _____ | _____ | _____ | | |
| 4 | _____ | _____ | _____ | _____ | | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>100</u> | = Total Cover | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? | |
| 1 | _____ | _____ | _____ | _____ | <u>Y</u> | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | | |

Remarks:

SOIL

Sampling Point: WJ241A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|------------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-7 | 10YR 2/1 | 100 | | | | | Loamy muck | |
| 7-16 | 10YR 2/1 | 100 | | | | | Silty clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- Histisol (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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes No Depth (inches): 4
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/28/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ241B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S14 T141N R57W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 1' 24.47" Long: -97° 52' 29.84" Datum: NAD83
 Soil Map Unit Name: Hamerly-Wayard loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | |
| Remarks: | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | Absolute % Cover | Dominant Species | Indicator Status | |
|---|------------------|------------------|------------------|---|
| 1 _____ | _____ | _____ | _____ | Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| Sapling/Shrub stratum (Plot size: _____) | | | | |
| 1 _____ | _____ | _____ | _____ | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>100</u> x 5 = <u>500</u> Column totals <u>100</u> (A) <u>500</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| Herb stratum (Plot size: _____) | | | | |
| 1 <u>Bromus inermis</u> | 100 | Y | UPL | Hydrophytic Vegetation Indicators: ___ Rapid test for hydrophytic vegetation ___ Dominance test is >50% ___ Prevalence index is ≤3.0* ___ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ___ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 6 _____ | _____ | _____ | _____ | |
| 7 _____ | _____ | _____ | _____ | |
| 8 _____ | _____ | _____ | _____ | |
| 9 _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | |
| 100 = Total Cover | | | | |
| Woody vine stratum (Plot size: _____) | | | | |
| 1 _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>N</u> |
| 2 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| % Bare Ground in Herb Stratum: _____ | | | | |

Remarks:

SOIL

Sampling Point: WJ241B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-8 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 8-33 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 33-40 | 10YR 2/1 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

Could not determine if A12 was present. A12 assumed.

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes No Depth (inches): 0
 Water table present? Yes No Depth (inches): 11
 Saturation present? Yes No Depth (inches): 8
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

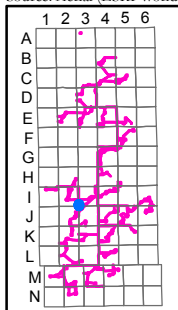
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvlgjennrich



T141N, R57W, S14
Map Book Page(s): 13

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ241
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Wetland WJ241 overview looking to the east.



Wetland sample point WJ241A



Non-wetland sample point WJ241B

WJ291

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/29/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ291A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S10 T141N R57W
 Landform (hillslope, terrace, etc.): Bottom of hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 02' 34.89" Long: -97° 52' 38.07" Datum: NAD83
 Soil Map Unit Name: Barnes-Buse-Langhei loams IWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|---|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photos: 390-A, 391-B, 392-Overview (E), 393-overview (W) | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | | |
|--|-------------------------------|------------------|------------------|------------------|--|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>1</u> x 3 = <u>3</u> | | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | | |
| | | <u>0</u> | = Total Cover | | UPL species <u>10</u> x 5 = <u>50</u> | | |
| | | <u>11</u> | = Total Cover | | Column totals <u>11</u> (A) <u>53</u> (B) | | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>4.82</u> | | |
| 1 | <u>Glycine max</u> | <u>10</u> | <u>Y</u> | <u>UPL</u> | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ <u>X</u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | | |
| 2 | <u>Echinochloa crus-galli</u> | <u>1</u> | <u>N</u> | <u>FAC</u> | | | |
| 3 | _____ | _____ | _____ | _____ | | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| 5 | _____ | _____ | _____ | _____ | | | |
| 6 | _____ | _____ | _____ | _____ | | | |
| 7 | _____ | _____ | _____ | _____ | | | |
| 8 | _____ | _____ | _____ | _____ | | | |
| 9 | _____ | _____ | _____ | _____ | | | |
| 10 | _____ | _____ | _____ | _____ | | | |
| | | <u>11</u> | = Total Cover | | | | |
| Woody vine stratum | (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | | |
| 2 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>89</u> | | | | | | Hydrophytic vegetation present? <u>Y</u> | |

Remarks:
 Stressed soybeans

SOIL

Sampling Point: WJ291A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-9 | 10YR 2/1 | 100 | | | | | Cl | |
| 9-10 | 10YR 3/1 | 100 | | | | | Cl | |
| 10-17 | 10YR 6/1 | 100 | | | | | Sa Cl | |
| 17-20 | 10YR 6/2 | 100 | | | | | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|---|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/29/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ291B
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S10 T141N R57W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2 to 3
 Subregion (LRR): F Lat: 47° 02' 34.82" Long: -97° 52' 38.26" Datum: NAD83
 Soil Map Unit Name: Barnes-Buse-Langhei loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? | <u>N</u> | |
| Indicators of wetland hydrology present? | <u>N</u> | |
| Remarks: | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|--|--|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | Total Number of Dominant Species Across all Strata: <u>1</u> (B) |
| 2 _____ | _____ | _____ | _____ | | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| Sapling/Shrub stratum | | | | Prevalence Index Worksheet | |
| 1 _____ | | | | Total % Cover of: | |
| 2 _____ | | | | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | | | | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | | | | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | | | | FACU species <u>0</u> x 4 = <u>0</u> | |
| <u>0</u> = Total Cover | | | | UPL species <u>20</u> x 5 = <u>100</u> | |
| | | | | Column totals <u>20</u> (A) <u>100</u> (B) | |
| | | | | Prevalence Index = B/A = <u>5.00</u> | |
| Herb stratum | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>20</u> | <u>Y</u> | <u>UPL</u> | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| 2 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>N</u> | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>20</u> = Total Cover | | | | | |
| Woody vine stratum | | | | | |
| 1 _____ | | | | | |
| 2 _____ | | | | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>80</u> | | | | | |
| Remarks: | | | | | |

SOIL

Sampling Point: WJ291B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-17 | 10YR 2/1 | 100 | | | | | Cl | |
| 17-23 | 10YR 3/1 | 100 | | | | | Cl | |
| 23-28 | 10YR 3/2 | 100 | | | | | Sa Cl | |
| 28-33 | 5YR 5/2 | 100 | | | | | Sa Cl | |
| 33-39 | 2.5Y 5/2 | 100 | | | | | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 38
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

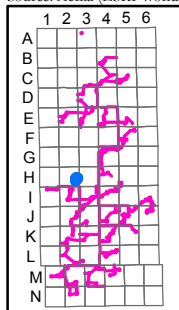
Saturated sand lenses at 38 inches

8/18/2016 8:11:05 AM S:\Projects\RES America\Glacier Ridge\GIS\Wetlands_Delineated\WetlandsMB_080916.mxd aprvljennrich



T141N, R57W, S10
Map Book Page(s): H2

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ291
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ291 overview looking to the east.



Wetland sample point WJ291A



Non-wetland sample point WJ291B

WJ301

Non-Wetland Delineation Point

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/29/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ301A
 Investigator(s): Apryl Jennrich/Karl Bear Section, Township, Range: S19 T141N R56W
 Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 1' 6.50" Long: -97° 49' 56.90" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>N</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |

Remarks:
 Photos: 409-A, 410-Overview to (ESE) ; Wetland does not extend into corridor but may be present to E/ESE

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|--|------------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>25</u> x 5 = <u>125</u> |
| | | | | Column totals | <u>25</u> (A) <u>125</u> (B) |
| | | | | Prevalence Index = B/A = | <u>5.00</u> |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>25</u> | <u>Y</u> | <u>UPL</u> | _____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | _____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | _____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | _____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>25</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? | |
| 1 _____ | _____ | _____ | _____ | <u>N</u> | |
| 2 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | |

Remarks:

SOIL

Sampling Point: WJ301A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-17 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 17-25 | 10YR 3/1 | 100 | | | | | Si Cl | |
| 25-28 | 2.5Y 4/2 | 100 | | | | | Sa Cl | |
| 28-31 | 2.5Y 4/3 | 100 | | | | | Sa Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 28
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

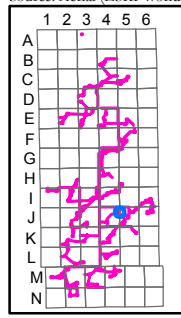
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Filled\Delimited\Wetlands_MB_080916.mxd aprtj,etmrich



T141N, R56W, S19
Map Book Page(s): J5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

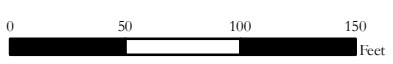
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ▭ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WJ301A
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Wetland WJ301 overview looking to the northwest.



Non-wetland sample point WJ301A

WJ324

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/2/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ324A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R57W S24
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 0
 Subregion (LRR): F Lat: 47° 0' 28.92" Long: -97° 51' 05.48" Datum: NAD83
 Soil Map Unit Name: Vallers Loam vWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photos: A-3268, B-3269, 3270-Overview WNW, 3272 Overview ENE | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------------------------|------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>2</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species <u>45</u> x 1 = <u>45</u> | |
| 2 | _____ | _____ | _____ | _____ | FACW species <u>25</u> x 2 = <u>50</u> | |
| 3 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 4 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 5 | _____ | _____ | _____ | _____ | UPL species <u>11</u> x 5 = <u>55</u> | |
| | | <u>0</u> | = Total Cover | | Column totals <u>81</u> (A) <u>150</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>1.85</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | ____ Rapid test for hydrophytic vegetation | |
| 1 | <u><i>Typha angustifolia</i></u> | <u>45</u> | <u>Y</u> | <u>OBL</u> | <input checked="" type="checkbox"/> Dominance test is >50% | |
| 2 | <u><i>Phalaris arundinacea</i></u> | <u>25</u> | <u>Y</u> | <u>FACW</u> | <input checked="" type="checkbox"/> Prevalence index is ≤3.0* | |
| 3 | <u><i>Euphorbia esula</i></u> | <u>5</u> | <u>N</u> | <u>UPL</u> | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 4 | <u><i>Bromus inermis</i></u> | <u>5</u> | <u>N</u> | <u>UPL</u> | ____ Problematic hydrophytic vegetation* (explain) | |
| 5 | <u><i>Asclepias syriaca</i></u> | <u>1</u> | <u>N</u> | <u>UPL</u> | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>81</u> | = Total Cover | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| Woody vine stratum | | | | | Hydrophytic vegetation present? | |
| (Plot size: _____) | | | | | <u>Y</u> | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| ____ % Bare Ground in Herb Stratum: _____ | | | | | | |

Remarks:

SOIL

Sampling Point: WJ324A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-9 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 9-16 | 10YR 6/2 | 50 | 10YR 5/6 | 2 | C | PL | Cl Lo | |
| | 10YR 2/1 | 48 | | | | | | |
| 16-19 | 10YR 4/2 | 98 | 10YR 5/6 | 2 | C | PL | Sa Cl | |
| 19-24 | 10YR 5/2 | 60 | 10YR 5/6 | 40 | C | PL/M | Lo Sa | |
| 24-33 | 2.5Y 6/2 | 80 | 10YR 5/6 | 20 | C | PL/M | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 20
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/2/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ324B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R57W S24
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR): F Lat: 47° 0' 28.90" Long: -97° 51' 05.37" Datum: NAD83
 Soil Map Unit Name: Vallers Loam vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If needed, explain any answers in remarks.) Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--------------------------------------|--------------------------|------------------|------------------|------------------|---|------------------------------|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>2</u> (B) |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 2 | _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 3 | _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 4 | _____ | _____ | _____ | _____ | FACU species | <u>40</u> x 4 = <u>160</u> |
| 5 | _____ | _____ | _____ | _____ | UPL species | <u>50</u> x 5 = <u>250</u> |
| | | <u>0</u> | = Total Cover | | Column totals | <u>90</u> (A) <u>410</u> (B) |
| Herb stratum | | | | | Prevalence Index = B/A = <u>4.56</u> | |
| (Plot size: _____) | | | | | | |
| 1 | <u>Bromus inermis</u> | <u>40</u> | <u>Y</u> | <u>UPL</u> | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 2 | <u>Poa compressa</u> | <u>40</u> | <u>Y</u> | <u>FACU</u> | | |
| 3 | <u>Asclepias syriaca</u> | <u>10</u> | <u>N</u> | <u>UPL</u> | | |
| 4 | _____ | _____ | _____ | _____ | | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>90</u> | = Total Cover | | | |
| Woody vine stratum | | | | | Hydrophytic vegetation present? | |
| (Plot size: _____) | | | | | <u>N</u> | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | | |

Remarks:

SOIL

Sampling Point: WJ324B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-8 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 8-14 | 10YR 2/1 | 80 | 2.5Y 5/1 | 20 | D | M | Si Cl Lo | |
| 14-18 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 18-28 | 2.5Y 5/2 | 100 | | | | | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

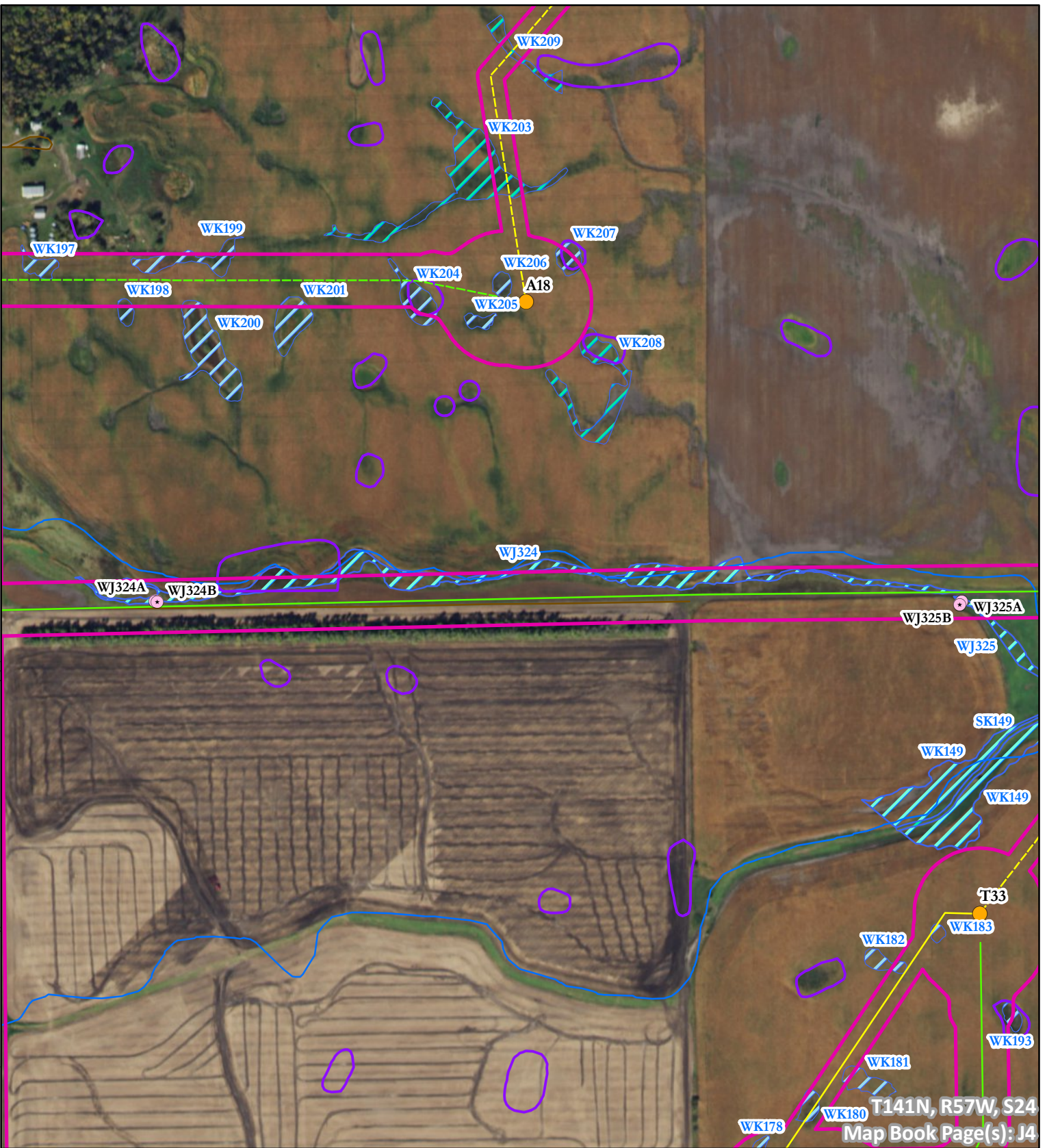
Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

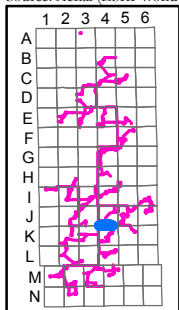
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

8/18/2016 8:15:16 AM S:\Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▨ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WJ324
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Wetland WJ324 overview looking to the west-northwest.



Wetland sample point WJ324A



Non-wetland sample point WJ324B

WJ325

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/2/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ325A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R37W S25
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 0' 28.47" Long: -97° 50' 21.17" Datum: NAD83
 Soil Map Unit Name: Vallers Loam dWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u> Y </u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Photos: A - 3272, B - 3273, Overview SE - 3274

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: <u> </u>) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|--|----------------------|
| 1 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Number of Dominant Species that are OBL, FACW, or FAC: | <u>2</u> (A) |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Total Number of Dominant Species Across all Strata: | <u>2</u> (B) |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>100.00%</u> (A/B) |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index Worksheet | |
| 1 <u> </u> | | | | Total % Cover of: | |
| 2 <u> </u> | | | | OBL species <u>0</u> x 1 = | <u>0</u> |
| 3 <u> </u> | | | | FACW species <u>55</u> x 2 = | <u>110</u> |
| 4 <u> </u> | | | | FAC species <u>35</u> x 3 = | <u>105</u> |
| 5 <u> </u> | | | | FACU species <u>0</u> x 4 = | <u>0</u> |
| | | | | UPL species <u>0</u> x 5 = | <u>0</u> |
| | <u>0</u> | = Total Cover | | Column totals <u>90</u> (A) | <u>215</u> (B) |
| <u>Herb stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index = B/A = | <u>2.39</u> |
| 1 <u>Hordeum jubatum</u> | 55 | Y | FACW | | |
| 2 <u>Echinochloa crus-galli</u> | 35 | Y | FAC | | |
| 3 <u> </u> | | | | | |
| 4 <u> </u> | | | | | |
| 5 <u> </u> | | | | | |
| 6 <u> </u> | | | | | |
| 7 <u> </u> | | | | | |
| 8 <u> </u> | | | | | |
| 9 <u> </u> | | | | | |
| 10 <u> </u> | | | | | |
| | <u>90</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: <u> </u>) | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u> </u> | | | | <u> </u> Rapid test for hydrophytic vegetation | |
| 2 <u> </u> | | | | <u>X</u> Dominance test is >50% | |
| | | | | <u>X</u> Prevalence index is ≤3.0* | |
| | | | | <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| | | | | <u> </u> Problematic hydrophytic vegetation* (explain) | |
| | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| | <u>0</u> | = Total Cover | | Hydrophytic vegetation present? | <u>Y</u> |
| % Bare Ground in Herb Stratum: <u> </u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ325A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-9 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 9-11 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 11-19 | 10YR 4/2 | 96 | 10YR 4/6 | 4 | C | PL | Sa Cl | |
| 19-21 | 10YR 5/1 | 98 | 10YR 4/6 | 2 | C | PL | Sa Cl | |
| 21-23 | 10YR 6/2 | 100 | | | | | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|---|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|---|---|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): _____
 Saturation present? Yes No Depth (inches): 20
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/2/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ325B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R37W S25
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 1
 Subregion (LRR): F Lat: 47° 0' 28.36" Long: -97° 50' 21.31" Datum: NAD83
 Soil Map Unit Name: Vallers Loam vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? (If no, explain in remarks)
 Are vegetation X, soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u> N </u> | Is the sampled area within a wetland? <u> N </u> |
| Hydric soil present? <u> Y </u> | |
| Indicators of wetland hydrology present? <u> N </u> | |
| Remarks: <p align="center">Ag field planted with beans</p> | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|--|--------------------|-------------------------------------|------------------|------------------|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u> 0 </u> (A) Total Number of Dominant Species Across all Strata: <u> 1 </u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u> 0.00% </u> (A/B) |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| | | <u> 0 </u> = Total Cover | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u> 0 </u> x 1 = <u> 0 </u> FACW species <u> 0 </u> x 2 = <u> 0 </u> FAC species <u> 0 </u> x 3 = <u> 0 </u> FACU species <u> 0 </u> x 4 = <u> 0 </u> UPL species <u> 40 </u> x 5 = <u> 200 </u> Column totals <u> 40 </u> (A) <u> 200 </u> (B) Prevalence Index = B/A = <u> 5.00 </u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| | | <u> 0 </u> = Total Cover | | | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: ___ Rapid test for hydrophytic vegetation ___ Dominance test is >50% ___ Prevalence index is ≤3.0* ___ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ___ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 | <u>Glycine max</u> | 40 | Y | UPL | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| 6 | _____ | _____ | _____ | _____ | |
| 7 | _____ | _____ | _____ | _____ | |
| 8 | _____ | _____ | _____ | _____ | |
| 9 | _____ | _____ | _____ | _____ | |
| 10 | _____ | _____ | _____ | _____ | |
| | | <u> 40 </u> = Total Cover | | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u> N </u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| | | <u> 0 </u> = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u> 50 </u> | | | | | |

Remarks:

SOIL

Sampling Point: WJ325B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-15 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 15-24 | 2.5Y 6/1 | 100 | | | | | Si Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

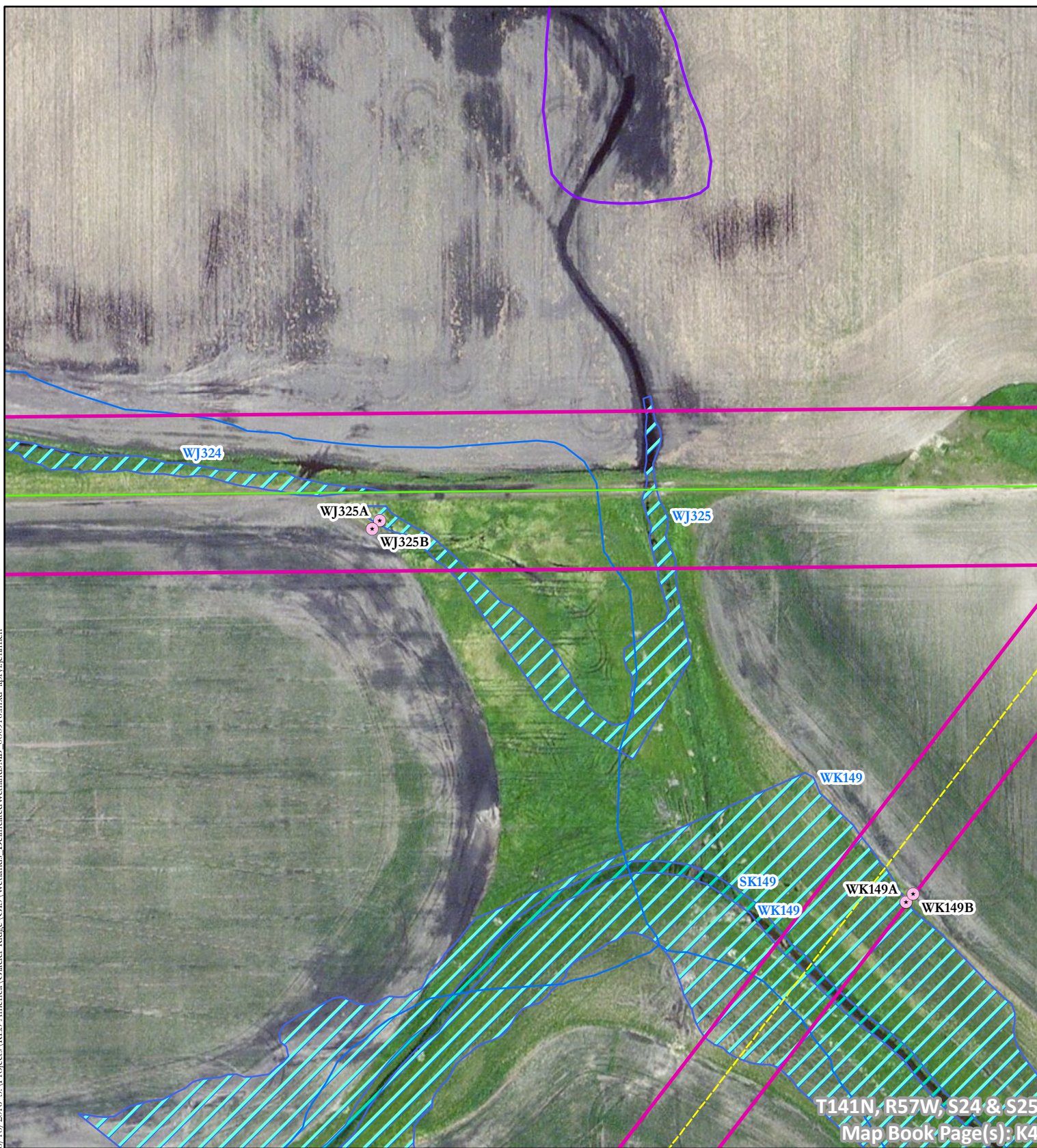
Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

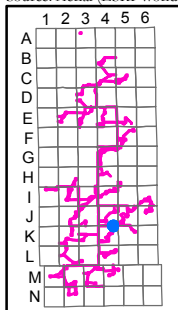
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T141N, R57W, S24 & S25
Map Book Page(s): K4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▨ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- - - Collection Alt
- Access Road
- - - Access Road Alt
- ▨ O&M/Substation



Wetland ID: WJ325
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ325 overview looking to the southeast.



Wetland sample point WJ325A



Non-wetland sample point WJ325B

WJ346

Non-Wetland Delineation Point

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ346A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T140N R57W S3
 Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 46° 58' 36.97' Long: -97° 51' 10.09' Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka Complex IWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? (If no, explain in remarks)
 Are vegetation X, soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u> Y </u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Planted ag field, crops have been washed out. Photos: A-3299, B-3300, Overview 3301 E

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: <u> </u>) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|--|--------------------|
| 1 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Total Number of Dominant Species Across all Strata: | <u>0</u> (B) |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index Worksheet | |
| 1 <u> </u> | | | | Total % Cover of: | |
| 2 <u> </u> | | | | OBL species <u>0</u> x 1 = | <u>0</u> |
| 3 <u> </u> | | | | FACW species <u>0</u> x 2 = | <u>0</u> |
| 4 <u> </u> | | | | FAC species <u>0</u> x 3 = | <u>0</u> |
| 5 <u> </u> | | | | FACU species <u>0</u> x 4 = | <u>0</u> |
| | | | | UPL species <u>0</u> x 5 = | <u>0</u> |
| | <u>0</u> | = Total Cover | | Column totals <u>0</u> (A) | <u>0</u> (B) |
| <u>Herb stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index = B/A = | <u> </u> |
| 1 <u> </u> | | | | Hydrophytic Vegetation Indicators: | |
| 2 <u> </u> | | | | <u> </u> Rapid test for hydrophytic vegetation | |
| 3 <u> </u> | | | | <u> </u> Dominance test is >50% | |
| 4 <u> </u> | | | | <u> </u> Prevalence index is ≤3.0* | |
| 5 <u> </u> | | | | <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 6 <u> </u> | | | | <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 7 <u> </u> | | | | | |
| 8 <u> </u> | | | | | |
| 9 <u> </u> | | | | | |
| 10 <u> </u> | | | | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: <u> </u>) | | | | | |
| 1 <u> </u> | | | | | |
| 2 <u> </u> | | | | | |
| | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>100</u> | | | | Hydrophytic vegetation present? <u> Y </u> | |

Remarks:

SOIL

Sampling Point: WJ346A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-28 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 28-30 | 10YR 2/1 | 50 | 10YR 4/1 | 50 | D | M | Si Cl Lo | |
| 30-36 | 2.5Y 5/2 | 95 | 10YR 5/8 | 5 | C | PL | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

| | | | |
|--|--|--|--|
| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | | |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

| | |
|---|--------------------------------------|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u>Y</u> |
| Remarks: _____ | |

HYDROLOGY

| | |
|---|---|
| Wetland Hydrology Indicators: | |
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |
| <input type="checkbox"/> Salt Crust (B11) | |
| <input type="checkbox"/> Aquatic Invertebrates (B13) | |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | |
| <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | |
| <input type="checkbox"/> Presence of Reduced Iron (C4) | |
| <input type="checkbox"/> Thin Muck Surface (C7) | |
| <input type="checkbox"/> Other (Explain in Remarks) | |

| | |
|--|--|
| Field Observations: | |
| Surface water present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | Indicators of wetland hydrology present? <u>Y</u> |
| Water table present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | |
| Saturation present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe) | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WJ346B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T140N R57W S3
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): F Lat: 46° 58' 36.85" Long: -97° 51' 10.04" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka Complex IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: <p align="center">Planted with beans</p> | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|--------------------|------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 2 | _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 3 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 4 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 5 | _____ | _____ | _____ | _____ | UPL species <u>60</u> x 5 = <u>300</u> | |
| | | <u>0</u> | = Total Cover | | Column totals <u>60</u> (A) <u>300</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>5.00</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | ____ Rapid test for hydrophytic vegetation | |
| 1 | <u>Glycine max</u> | <u>60</u> | <u>Y</u> | <u>UPL</u> | ____ Dominance test is >50% | |
| 2 | _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 3 | _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 4 | _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>60</u> | = Total Cover | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| Woody vine stratum | | | | | Hydrophytic vegetation present? | |
| (Plot size: _____) | | | | | <u>N</u> | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>40</u> | | | | | | |

Remarks:

SOIL

Sampling Point: WJ346B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-28 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 28-30 | 10YR 2/1 | 90 | 10YR 5/2 | 10 | D | PL | Si Cl | |
| 30-35 | 10YR 5/2 | 90 | 10YR 2/1 | 10 | D | PL | Si Cl | trace pebbles |
| 35-40 | 10YR 5/2 | 99 | 10YR 5/8 | 1 | C | PL | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

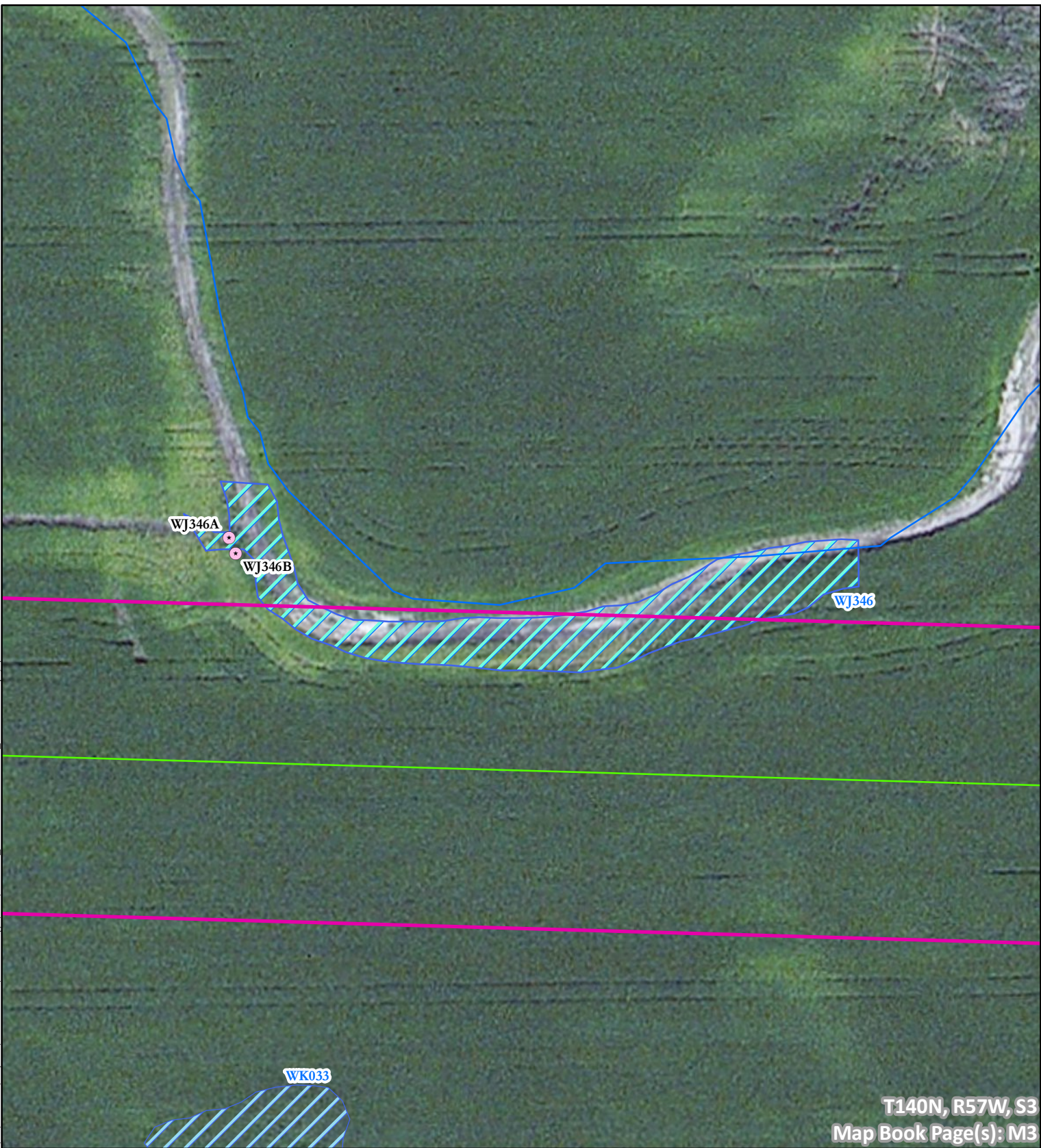
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 30
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

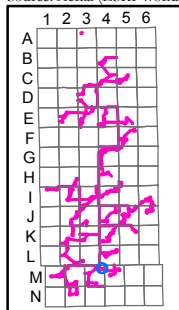
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T140N, R57W, S3
Map Book Page(s): M3

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- Stream Feature
- Non-Jurisdictional
- USACE Jurisdictional
- Survey Corridor

Desktop Data

- NHD
- NWI Wetland
- USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- O&M/Substation



Wetland ID: WJ346
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WJ346 overview looking to the south.



Wetland sample point WJ346A



Non-wetland sample point WJ346B

WK036

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/23/16 @ 3:15
 Applicant/Owner: RES America State: ND Sampling Point: WK036A
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S2 T140N R57W
 Landform (hillslope, terrace, etc.): drainageway Local relief (concave, convex, none): concave Slope (%): 1 to 2
 Subregion (LRR): F Lat: 46° 58' 36.91" Long: -97° 50' 18.14" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka Complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | |

Remarks:
 Drainageway possibly alterned for agricultural drainage

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Staus | Dominance Test Worksheet | |
|---|------------------|------------------|------------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>0</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | | | <u>0</u> = Total Cover | | |
| <u>Sapling/Shrub stratur</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Staus | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| | | | <u>0</u> = Total Cover | UPL species <u>0</u> x 5 = <u>0</u> | |
| | | | | Column totals <u>0</u> (A) <u>0</u> (B) | |
| | | | | Prevalence Index = B/A = _____ | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Staus | Hydrophytic Vegetation Indicators: | |
| 1 _____ | _____ | _____ | _____ | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | | | <u>0</u> = Total Cover | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Staus | Hydrophytic vegetation present? <u>Y</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| | | | <u>0</u> = Total Cover | | |
| % Bare Ground in Herb Stratum: <u>100</u> | | | | | |

Remarks:
 Drowned out/washed out area in cropfield. No veg in sample plot

SOIL

Sampling Point: WK036A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-5 | 10YR 2/1 | 100 | | | | | Si Lo w/gravel | |
| 5-21 | 5Y 6/2 | 97 | 2.5Y 4/6 | 3 | C | PL | Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Small fish observed in pooled water in, now, mostly dry channel

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/23/16 @ 3:15
 Applicant/Owner: RES America State: ND Sampling Point: WK036B
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S2 T140N R57W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 5-Jan
 Subregion (LRR): F Lat: 46° 58' 36.82" Long: -97° 50' 18.20" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka Complex IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? | <u>N</u> | |
| Indicators of wetland hydrology present? | <u>N</u> | |
| Remarks: | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
|---|--------------------|------------------|------------------|------------------|--|
| 1 | _____ | _____ | _____ | _____ | Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>0</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| | | <u>0</u> | = Total Cover | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____ |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| | | <u>0</u> | = Total Cover | | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: ____ Rapid test for hydrophytic vegetation ____ Dominance test is >50% ____ Prevalence index is ≤3.0* ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| 6 | _____ | _____ | _____ | _____ | |
| 7 | _____ | _____ | _____ | _____ | |
| 8 | _____ | _____ | _____ | _____ | |
| 9 | _____ | _____ | _____ | _____ | |
| 10 | _____ | _____ | _____ | _____ | |
| | | <u>0</u> | = Total Cover | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u>N</u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| | | <u>0</u> | = Total Cover | | |
| % Bare Ground in Herb Stratum: <u>100</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK036B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-5 | 2.5Y 4/2 | 100 | | | | | loam | |
| 5-21 | 2.5Y 5/3 | 100 | | | | | Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- Histisol (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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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)**

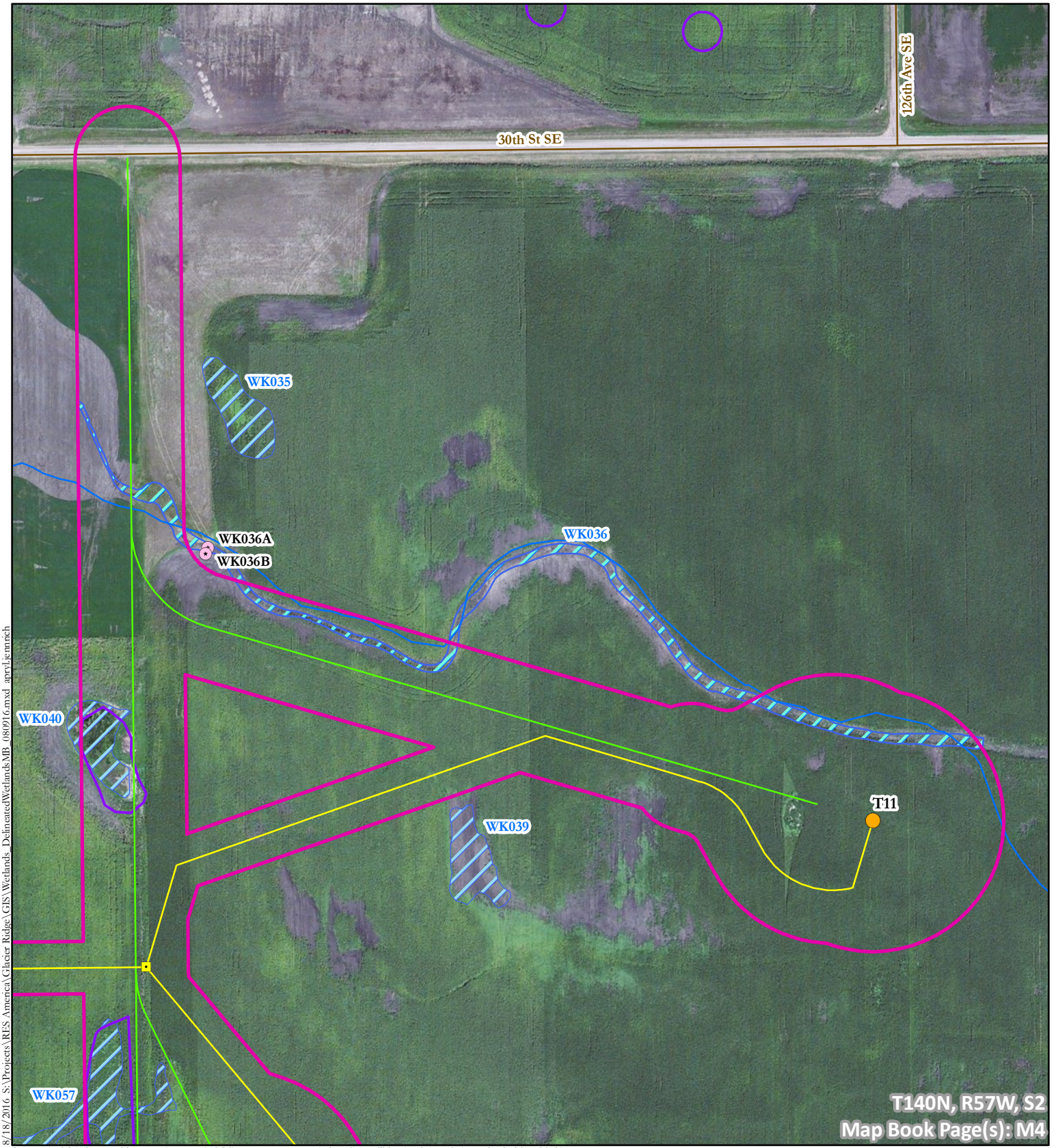
Field Observations:

Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

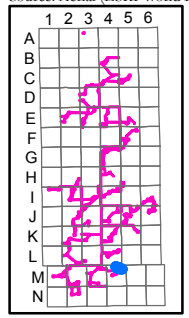
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

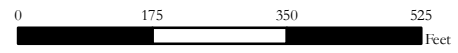


T140N, R57W, S2
Map Book Page(s): M4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



- | Survey Data | | Desktop Data | | Facilities | |
|-------------|----------------------|--------------|----------------|------------|-----------------|
| | Sample Point | | NHD | | Jbox |
| | Stream Feature | | NWI Wetland | | Turbine |
| | Non-Jurisdictional | | USFWS Easement | | Collection |
| | USACE Jurisdictional | | Road | | Collection Alt |
| | Survey Corridor | | | | Access Road |
| | | | | | Access Road Alt |
| | | | | | O&M/Substation |



Wetland ID: WK036
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK036 overview looking to the west.



Wetland sample point WK036A



Non-wetland sample point WK036B

WK048

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16 @ 11:20
 Applicant/Owner: RES America State: ND Sampling Point: WK048A
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S3 T140N R57W
 Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Convex Slope (%): 1
 Subregion (LRR): F Lat: 46° 58' 31.41" Long: -97° 51' 33.41" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka Complex IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |

Remarks:
 2930 WK048A (E), 2931 WK048B (W), 2932 S from N end, 2933 N from S end, 2934 S from S end, 2935 N from N end

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | | |
|--------------------------------|----------------------------|------------------|------------------|------------------|---|--|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>1</u> (A) | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>2</u> (B) | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>50.00%</u> (A/B) | |
| 4 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | | |
| 1 | _____ | | | | Total % Cover of: | | |
| 2 | _____ | | | | OBL species | <u>0</u> x 1 = <u>0</u> | |
| 3 | _____ | | | | FACW species | <u>0</u> x 2 = <u>0</u> | |
| 4 | _____ | | | | FAC species | <u>5</u> x 3 = <u>15</u> | |
| 5 | _____ | | | | FACU species | <u>0</u> x 4 = <u>0</u> | |
| | | <u>0</u> | = Total Cover | | UPL species | <u>10</u> x 5 = <u>50</u> | |
| | | | | | Column totals | <u>15</u> (A) <u>65</u> (B) | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = | <u>4.33</u> | |
| 1 | <u>Glycine max</u> | <u>10</u> | <u>Y</u> | <u>UPL</u> | Hydrophytic Vegetation Indicators: | | |
| 2 | <u>Xanthium strumarium</u> | <u>5</u> | <u>Y</u> | <u>FAC</u> | _____ | Rapid test for hydrophytic vegetation | |
| 3 | _____ | | | | _____ | Dominance test is >50% | |
| 4 | _____ | | | | _____ | Prevalence index is ≤3.0* | |
| 5 | _____ | | | | _____ | Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 6 | _____ | | | | _____ | <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 7 | _____ | | | | | | |
| 8 | _____ | | | | | | |
| 9 | _____ | | | | | | |
| 10 | _____ | | | | | | |
| | | <u>15</u> | = Total Cover | | | | |
| Woody vine stratum | (Plot size: _____) | | | | | | |
| 1 | _____ | | | | | | |
| 2 | _____ | | | | | | |
| | | <u>0</u> | = Total Cover | | | | |
| % Bare Ground in Herb Stratum: | | <u>85</u> | | | | | Hydrophytic vegetation present? |
| | | | | | | <u>Y</u> | |

Remarks:

SOIL

Sampling Point: WK048A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-5 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 5-29 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 29-36 | 10YR 4/1 | 80 | 10YR 3/6 | 20 | C | PL/M | Sa Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X No _____ Depth (inches): 1"
 Water table present? Yes X No _____ Depth (inches): 28"
 Saturation present? Yes X No _____ Depth (inches): 0"-5", 28"+
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 Flowing north

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/24/16 @ 11:50
 Applicant/Owner: RES America State: ND Sampling Point: WK048B
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S3 T140N R57W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 5
 Subregion (LRR): F Lat: 46° 58' 31.45" Long: -97° 51' 33.61" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka Complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
|--|-------------------------------|------------------|------------------|------------------|---|
| 1 | _____ | _____ | _____ | _____ | Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>2</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B) |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>15</u> x 3 = <u>45</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>25</u> x 5 = <u>125</u> Column totals <u>40</u> (A) <u>170</u> (B) Prevalence Index = B/A = <u>4.25</u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: ___ Rapid test for hydrophytic vegetation ___ Dominance test is >50% ___ Prevalence index is ≤3.0* ___ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ___ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 | <u>Glycine max</u> | 25 | Y | UPL | |
| 2 | <u>Echinochloa crus-galli</u> | 10 | Y | FAC | |
| 3 | <u>Xanthium strumarium</u> | 5 | N | FAC | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| 6 | _____ | _____ | _____ | _____ | |
| 7 | _____ | _____ | _____ | _____ | |
| 8 | _____ | _____ | _____ | _____ | |
| 9 | _____ | _____ | _____ | _____ | |
| 10 | _____ | _____ | _____ | _____ | |
| 40 = Total Cover | | | | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u>N</u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>60</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK048B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-3 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 3-18 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 18-23 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 23-35 | 5Y 5/2 | 95 | 2.5Y 5/6 | 5 | C | PL | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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): 30"
 Saturation present? Yes No Depth (inches): 30"
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

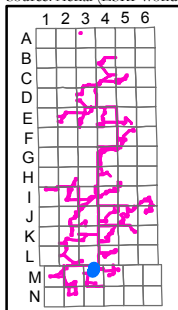
Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T140N, R57W, S3
Map Book Page(s): M3

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▨ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WK048
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK048 overview looking to the south.



Wetland sample point WK048A



Non-wetland sample point WK048B

WK058

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK058B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T140N R57W S2
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 46° 58' 24.93" Long: -97° 50' 16.74" Datum: NAD83
 Soil Map Unit Name: Haverly-Tonka Complex IWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |

Remarks:
 Ag field planted with beans. Photos: B-3323, C-3324, Overview WNW 3325

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|---|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>1</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>100.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>5</u> x 2 = <u>10</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>2</u> x 5 = <u>10</u> |
| <u>Herb stratum</u> (Plot size: _____) | | | | Column totals | <u>7</u> (A) <u>20</u> (B) |
| 1 <u>Alopecurus pratensis</u> | <u>5</u> | <u>Y</u> | <u>FACW</u> | Prevalence Index = B/A = | <u>2.86</u> |
| 2 <u>Glycine max</u> | <u>2</u> | <u>N</u> | <u>UPL</u> | | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>7</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 _____ | _____ | _____ | _____ | _____ | Rapid test for hydrophytic vegetation |
| 2 _____ | _____ | _____ | _____ | <u>X</u> | Dominance test is >50% |
| | <u>0</u> | = Total Cover | | <u>X</u> | Prevalence index is ≤3.0* |
| % Bare Ground in Herb Stratum: <u>93</u> | | | | _____ | Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) |
| | | | | _____ | Problematic hydrophytic vegetation* (explain) |
| | | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| | | | | | Hydrophytic vegetation present? |
| | | | | | <u>Y</u> |

Remarks:

SOIL

Sampling Point: WK058B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-8 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 8-14 | 10YR 5/1 | 98 | 10YR 5/8 | 2 | C | PL | Cl Lo | |
| 14-20 | 10YR 2/1 | 50 | 10YR 5/1 | 49 | D | M | Cl Lo | |
| | | | 10YR 5/8 | 1 | C | PL | | |
| 20-27 | 10YR 7/1 | 100 | | | | | Cl | |
| 27-30 | 10YR 7/1 | 95 | 10YR 5/8 | 5 | C | PL | Cl | |
| | | | | | | | | |
| | | | | | | | | |

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

| | | | |
|--|--|--|--|
| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| | (MLRA 72 & 73 of LRR H) | *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic | |

| | |
|---|--|
| Restrictive Layer (if observed): | Hydric soil present? <u> Y </u> |
| Type: _____ | |
| Depth (inches): _____ | |
| Remarks: | |

HYDROLOGY

| | |
|--|---|
| Wetland Hydrology Indicators: | |
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| | <input type="checkbox"/> Drainage Patterns (B10) |
| | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| | <input type="checkbox"/> Crayfish Burrows (C8) |
| | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| | <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |
| | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |

| | | |
|---|--|--|
| Field Observations: | | Indicators of wetland hydrology present? <u> Y </u> |
| Surface water present? Yes <u> </u> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Water table present? Yes <u> </u> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Saturation present? Yes <input checked="" type="checkbox"/> No <u> </u> Depth (inches): <u> 8 </u> | | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK058C
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T140N R57W S2
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): F Lat: 46° 58' 25.06" Long: -97° 50' 16.70" Datum: NAD83
 Soil Map Unit Name: Haverly-Tonka Complex IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:

Ag field planted with beans.

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 6 _____ | _____ | _____ | _____ | UPL species <u>90</u> x 5 = <u>450</u> | |
| 7 _____ | _____ | _____ | _____ | Column totals <u>90</u> (A) <u>450</u> (B) | |
| 8 _____ | _____ | _____ | _____ | Prevalence Index = B/A = <u>5.00</u> | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>90</u> = Total Cover | | | | | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>90</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| <u>90</u> = Total Cover | | | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>10</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK058C

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-16 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 16-26 | 10YR 5/3 | 100 | | | | | Cl Lo | |
| 26-28 | 10YR 5/3 | 99 | 10YR 5/6 | 1 | C | PL | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

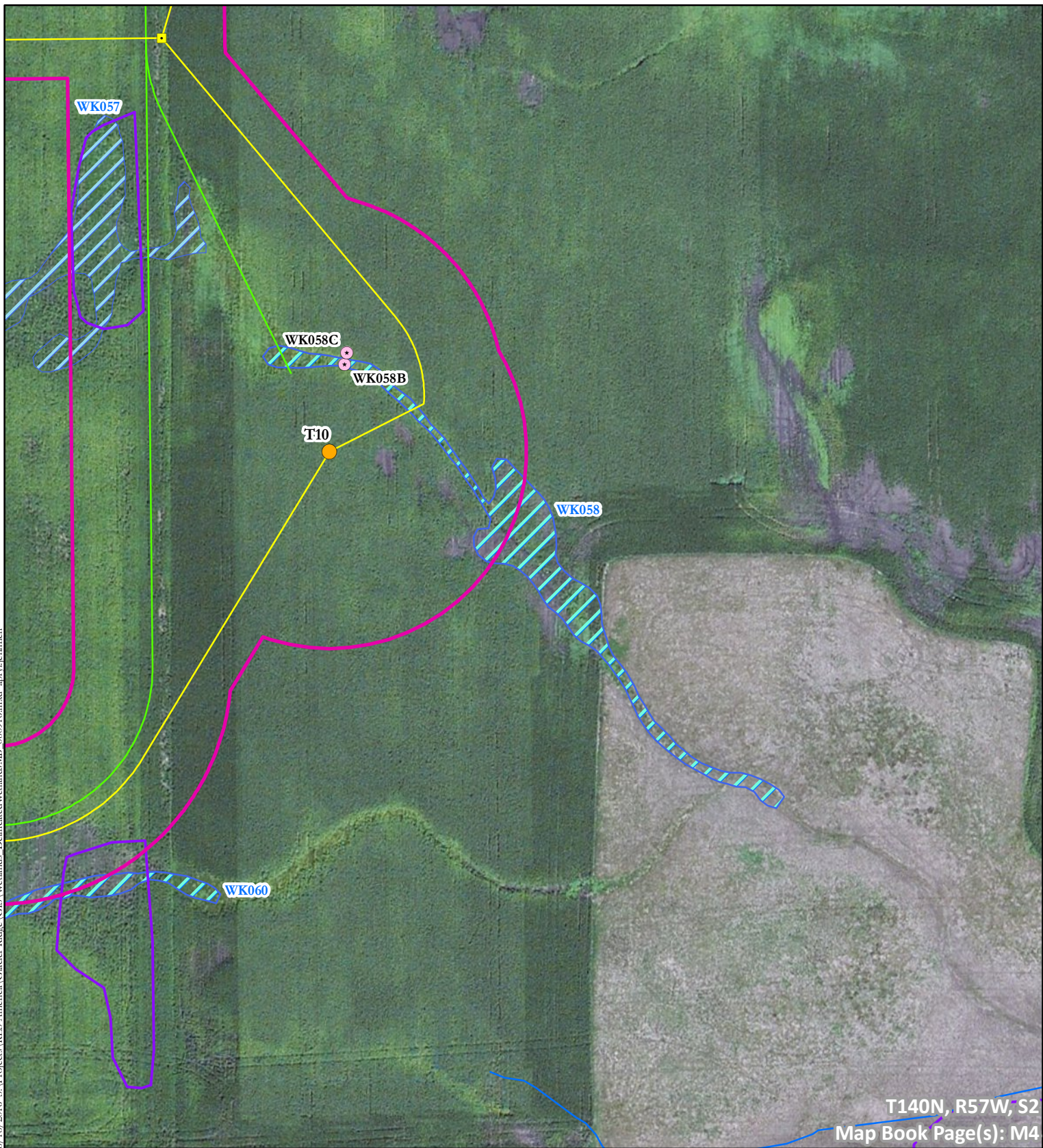
Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): _____
 Saturation present? Yes No Depth (inches): 24
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

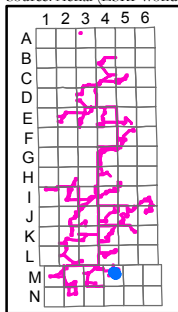
Remarks:

8/18/2016 8:15:10 AM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T140N, R57W, S2
Map Book Page(s): M4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

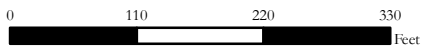
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▨ Survey Corridor

Desktop Data

- ~ NHD
- ▨ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WK058
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota





Wetland WK058 overview looking to the west-northwest.



Wetland sample point WK058A



Non-wetland sample point WK058B

WK060

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK060A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T140N R57W S2
 Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR): F Lat: 46° 58' 16.55' Long: -97° 50' 36.76' Datum: NAD83
 Soil Map Unit Name: Barnes-Buse loams vWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? (If no, explain in remarks)
 Are vegetation X, soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u> Y </u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Drainage in ag field planted with beans, beans are washed out. Photos: A-3302, B-3303, Overview-3304 E

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|------------------------------------|--------------------|------------------------|------------------|------------------|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u> 0 </u> (A) Total Number of Dominant Species Across all Strata: <u> 0 </u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u> 0.00% </u> (A/B) | |
| 2 | _____ | _____ | _____ | _____ | | |
| 3 | _____ | _____ | _____ | _____ | | |
| 4 | _____ | _____ | _____ | _____ | | |
| <u> 0 </u> = Total Cover | | | | | | |
| Sapling/Shrub stratum | | (Plot size: _____) | | | Prevalence Index Worksheet | |
| 1 | _____ | _____ | _____ | _____ | | Total % Cover of: OBL species <u> 0 </u> x 1 = <u> 0 </u> FACW species <u> 0 </u> x 2 = <u> 0 </u> FAC species <u> 0 </u> x 3 = <u> 0 </u> FACU species <u> 0 </u> x 4 = <u> 0 </u> UPL species <u> 0 </u> x 5 = <u> 0 </u> Column totals <u> 0 </u> (A) <u> 0 </u> (B) Prevalence Index = B/A = <u> _____ </u> |
| 2 | _____ | _____ | _____ | _____ | | |
| 3 | _____ | _____ | _____ | _____ | | |
| 4 | _____ | _____ | _____ | _____ | | |
| 5 | _____ | _____ | _____ | _____ | | |
| <u> 0 </u> = Total Cover | | | | | | |
| Herb stratum | | (Plot size: _____) | | | Hydrophytic Vegetation Indicators: | |
| 1 | _____ | _____ | _____ | _____ | | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <input checked="" type="checkbox"/> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 2 | _____ | _____ | _____ | _____ | | |
| 3 | _____ | _____ | _____ | _____ | | |
| 4 | _____ | _____ | _____ | _____ | | |
| 5 | _____ | _____ | _____ | _____ | | |
| 6 | _____ | _____ | _____ | _____ | | |
| 7 | _____ | _____ | _____ | _____ | | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| <u> 0 </u> = Total Cover | | | | | | |
| Woody vine stratum | | (Plot size: _____) | | | Hydrophytic vegetation present? <u> Y </u> | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| <u> 0 </u> = Total Cover | | | | | | |
| % Bare Ground in Herb Stratum: | | <u> 100 </u> | | | | |

Remarks:

SOIL

Sampling Point: WK060A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-24 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 24-30 | 10Y 5/2 | 98 | 10YR 6/8 | 2 | C | PL | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes No _____ Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK060B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T140N R57W S2
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 3
 Subregion (LRR): F Lat: 46° 58' 16.66" Long: -97° 50' 36.66" Datum: NAD83
 Soil Map Unit Name: Barnes-Buse loams IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:

Ag field planted with beans

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|----------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| | <u>0</u> | = Total Cover | | UPL species <u>90</u> x 5 = <u>450</u> | |
| <u>Herb stratum</u> (Plot size: _____) | | | | Column totals <u>90</u> (A) | <u>450</u> (B) |
| 1 <u>Glycine max</u> | <u>90</u> | <u>Y</u> | <u>UPL</u> | Prevalence Index = B/A = <u>5.00</u> | |
| 2 _____ | _____ | _____ | _____ | | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>90</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 _____ | _____ | _____ | _____ | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| | | | | ____ Prevalence index is ≤3.0* | |
| | | | | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| | | | | ____ Problematic hydrophytic vegetation* (explain) | |
| | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| | | | | Hydrophytic vegetation present? | <u>N</u> |
| % Bare Ground in Herb Stratum: <u>10</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK060B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|-----|-------|-------|----------|----------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-35 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 35-36 | 10YR 2/1 | 50 | 10YR 3/2 | 50 | | M | Si Cl Lo | Blended matrix |
| | | | 10YR 4/6 | <1% | C | PL | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

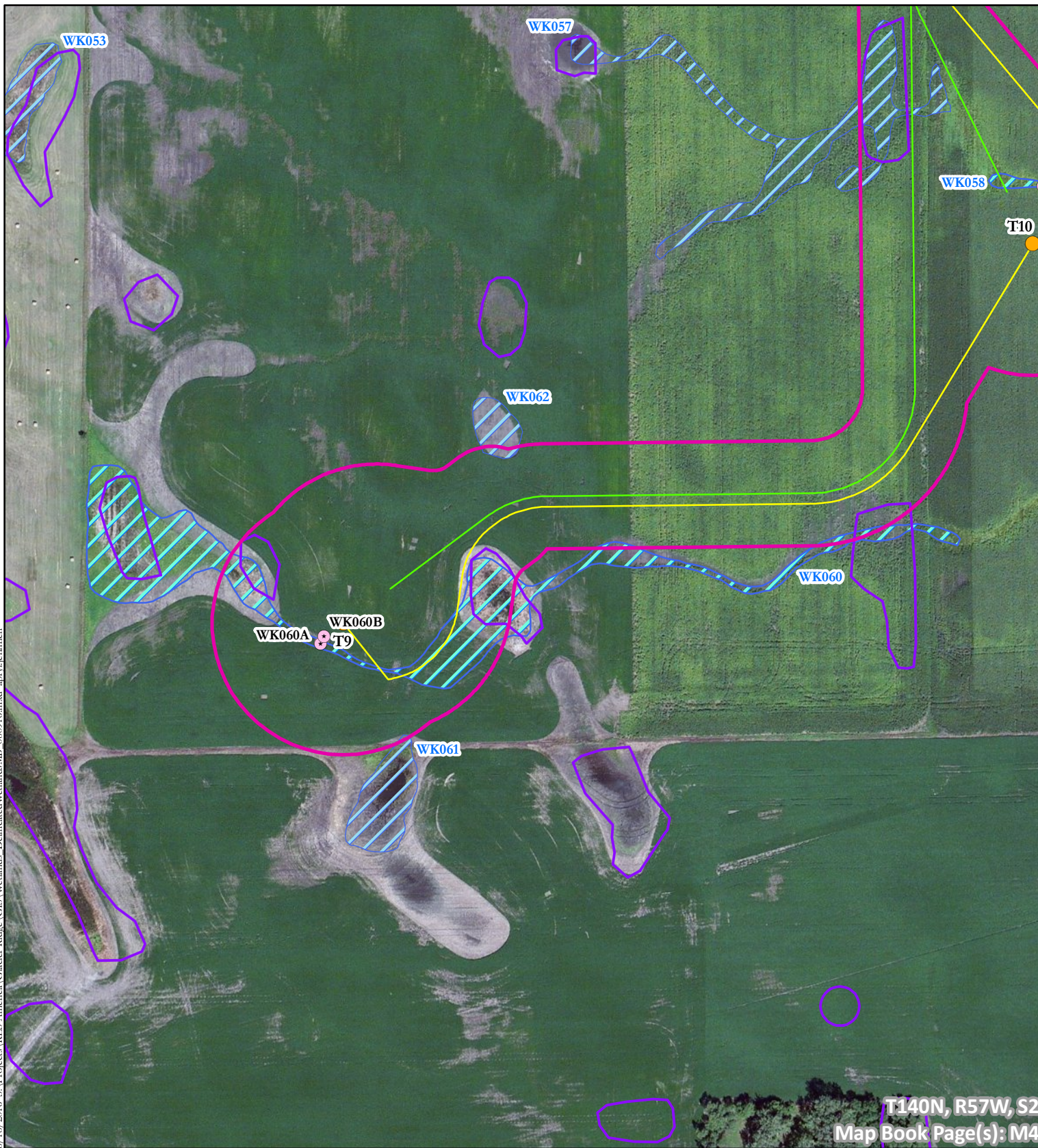
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

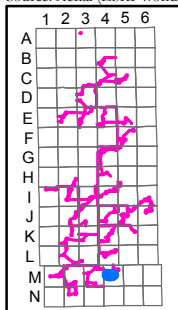
Remarks:

S:\Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvlgjennrich



T140N, R57W, S2
Map Book Page(s): M4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WK060
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK060 overview looking to the east.



Wetland sample point WK060A



Non-wetland sample point WK060B

WK064

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK064A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R57W S36
 Landform (hillslope, terrace, etc.): Drainage Swale Local relief (concave, convex, none): Concave Slope (%): 0
 Subregion (LRR): F Lat: 46° 59' 10.66" Long: -97° 50' 56.55" Datum: NAD83
 Soil Map Unit Name: Lowe-Fluvaquents IWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|---|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: <p align="center">Photos: A-3305, B-3306, Overview E - 3307</p> | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | | |
|--|-----------------------------|------------------|------------------|------------------|---|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>1</u> (B) | | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>5</u> x 1 = <u>5</u> | | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>75</u> x 2 = <u>150</u> | | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>0</u> x 3 = <u>0</u> | | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | | |
| | | <u>0</u> | = Total Cover | | UPL species <u>0</u> x 5 = <u>0</u> | | |
| | | <u>80</u> | = Total Cover | | Column totals <u>80</u> (A) <u>155</u> (B) | | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>1.94</u> | | |
| 1 | <u>Phalaris arundinacea</u> | <u>75</u> | <u>Y</u> | <u>FACW</u> | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | | |
| 2 | <u>Persicaria amphibia</u> | <u>5</u> | <u>N</u> | <u>OBL</u> | | | |
| 3 | _____ | _____ | _____ | _____ | | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| 5 | _____ | _____ | _____ | _____ | | | |
| 6 | _____ | _____ | _____ | _____ | | | |
| 7 | _____ | _____ | _____ | _____ | | | |
| 8 | _____ | _____ | _____ | _____ | | | |
| 9 | _____ | _____ | _____ | _____ | | | |
| 10 | _____ | _____ | _____ | _____ | | | |
| | | <u>80</u> | = Total Cover | | | | |
| Woody vine stratum | (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | | |
| 2 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>15</u> | | | | | | Hydrophytic vegetation present? <u>Y</u> | |

Remarks:

SOIL

Sampling Point: WK064A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-32 | 10YR 2/1 | 100 | | | | | Sa Lo | |
| 32-38 | 10YR 5/2 | 95 | 10YR 6/6 | 5 | C | PL | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
|---|--|--|--|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| | (MLRA 72 & 73 of LRR H) | *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic | |

| | |
|---|--------------------------------------|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u>Y</u> |
| Remarks: _____ | |

HYDROLOGY

| Wetland Hydrology Indicators: | |
|---|---|
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| | <input checked="" type="checkbox"/> Drainage Patterns (B10) |
| | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| | <input type="checkbox"/> Crayfish Burrows (C8) |
| | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| | <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |
| | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |

| | | |
|--|--|--|
| Field Observations: | | Indicators of wetland hydrology present? <u>Y</u> |
| Surface water present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Water table present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Saturation present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u> | | |
| (includes capillary fringe) | | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK064B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R57W S36
 Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 1
 Subregion (LRR): F Lat: 46° 59' 10.69" Long: -97° 50' 56.60" Datum: NAD83
 Soil Map Unit Name: Lowe-Fluvaquents vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--------------------------------------|-----------------------------|------------------|------------------|------------------|---|-------------------------------|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 2 | _____ | _____ | _____ | _____ | FACW species | <u>5</u> x 2 = <u>10</u> |
| 3 | _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 4 | _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| 5 | _____ | _____ | _____ | _____ | UPL species | <u>95</u> x 5 = <u>475</u> |
| | | <u>0</u> | = Total Cover | | Column totals | <u>100</u> (A) <u>485</u> (B) |
| | | | | | Prevalence Index = B/A = <u>4.85</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | ____ Rapid test for hydrophytic vegetation | |
| 1 | <u>Bromus inermis</u> | <u>95</u> | <u>Y</u> | <u>UPL</u> | ____ Dominance test is >50% | |
| 2 | <u>Phalaris arundinacea</u> | <u>5</u> | <u>N</u> | <u>FACW</u> | ____ Prevalence index is ≤3.0* | |
| 3 | _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 4 | _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 5 | _____ | _____ | _____ | _____ | ____ | |
| 6 | _____ | _____ | _____ | _____ | ____ | |
| 7 | _____ | _____ | _____ | _____ | ____ | |
| 8 | _____ | _____ | _____ | _____ | ____ | |
| 9 | _____ | _____ | _____ | _____ | ____ | |
| 10 | _____ | _____ | _____ | _____ | ____ | |
| | | <u>100</u> | = Total Cover | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| Woody vine stratum | | | | | Hydrophytic vegetation present? | |
| (Plot size: _____) | | | | | <u>N</u> | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: _____ | | | | | | |
| Remarks: | | | | | | |

SOIL

Sampling Point: WK064B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-38 | 10YR 2/1 | 100 | | | | | Sa Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |

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

| | | | |
|--|--|--|--|
| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input checked="" type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | | |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

| | |
|---|--------------------------------------|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u>Y</u> |
| Remarks: A12 Assumed | |

HYDROLOGY

Wetland Hydrology Indicators:

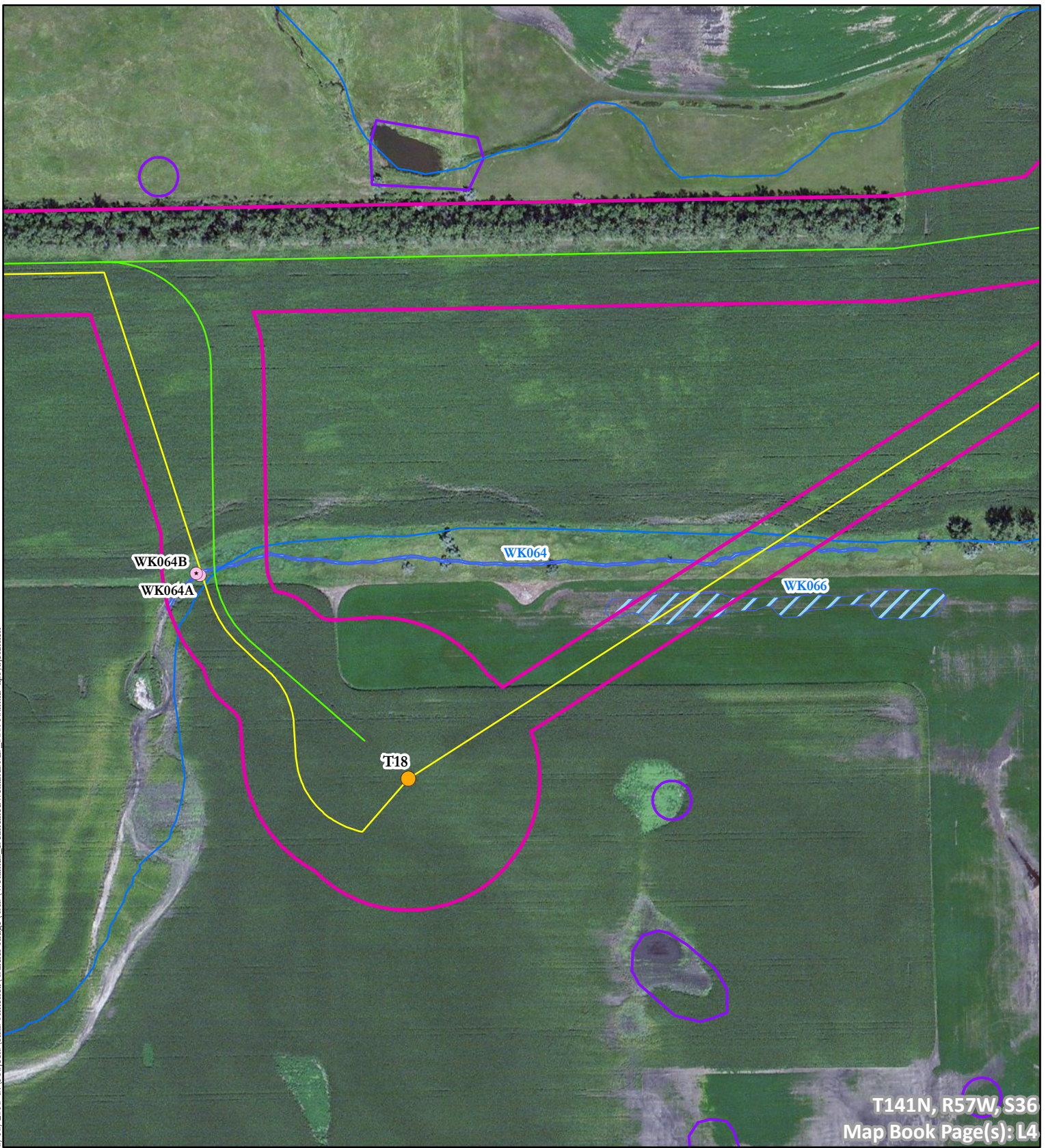
| | | |
|--|---|---|
| Primary Indicators (minimum of one is required; check all that apply) | | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

| | | |
|---|--|--|
| Field Observations: | | Indicators of wetland hydrology present? <u>N</u> |
| Surface water present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Water table present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Saturation present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe) | | |

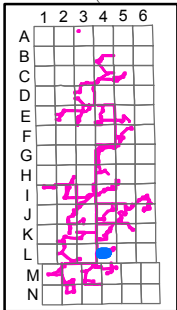
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

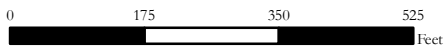
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WK064

**Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota**





Wetland WK064 overview looking to the east.



Wetland sample point WK064A



Non-wetland sample point WK064B

WK123

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK123A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S19
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 0
 Subregion (LRR): F Lat: 47° 00' 28.67" Long: -97° 49' 15.59" Datum: NAD83
 Soil Map Unit Name: Vallers loam IWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |

Remarks:
 Photos: A-3312, B-3313, Overview-3314 E, Overview-3315 NW

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: <u> </u>) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|--|----------------------|
| 1 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Number of Dominant Species that are OBL, FACW, or FAC: | <u>3</u> (A) |
| 2 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Total Number of Dominant Species Across all Strata: | <u>3</u> (B) |
| 3 <u> </u> | <u> </u> | <u> </u> | <u> </u> | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>100.00%</u> (A/B) |
| 4 <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index Worksheet | |
| 1 <u> </u> | | | | Total % Cover of: | |
| 2 <u> </u> | | | | OBL species <u>25</u> x 1 = | <u>25</u> |
| 3 <u> </u> | | | | FACW species <u>25</u> x 2 = | <u>50</u> |
| 4 <u> </u> | | | | FAC species <u>0</u> x 3 = | <u>0</u> |
| 5 <u> </u> | | | | FACU species <u>0</u> x 4 = | <u>0</u> |
| | | | | UPL species <u>0</u> x 5 = | <u>0</u> |
| | <u>0</u> | = Total Cover | | Column totals <u>50</u> (A) | <u>75</u> (B) |
| <u>Herb stratum</u> (Plot size: <u> </u>) | | | | Prevalence Index = B/A = | <u>1.50</u> |
| 1 <u>Typha angustifolia</u> | 25 | Y | OBL | | |
| 2 <u>Spartina pectinata</u> | 15 | Y | FACW | | |
| 3 <u>Hordeum jubatum</u> | 10 | Y | FACW | | |
| 4 <u> </u> | | | | | |
| 5 <u> </u> | | | | | |
| 6 <u> </u> | | | | | |
| 7 <u> </u> | | | | | |
| 8 <u> </u> | | | | | |
| 9 <u> </u> | | | | | |
| 10 <u> </u> | | | | | |
| | <u>50</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: <u> </u>) | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u> </u> | | | | <u> </u> Rapid test for hydrophytic vegetation | |
| 2 <u> </u> | | | | <u>X</u> Dominance test is >50% | |
| | | | | <u>X</u> Prevalence index is ≤3.0* | |
| | | | | <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| | | | | <u> </u> Problematic hydrophytic vegetation* (explain) | |
| | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| | <u>0</u> | = Total Cover | | Hydrophytic vegetation present? | <u>Y</u> |
| % Bare Ground in Herb Stratum: <u>50</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK123A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-3 | 10YR 2/1 | 100 | | | | | Muck | |
| 3-9 | 10YR 2/1 | 100 | | | | | Si Cl | |
| 9-16 | 10YR 3/1 | 85 | 10YR 6/2 | 15 | D | M | Si Cl | |
| 16-30 | 10YR 5/2 | 60 | 10YR 5/6 | 40 | C | M | Si Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input checked="" type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input checked="" type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input checked="" type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes No _____ Depth (inches): 0
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK123B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S19
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): F Lat: 47° 00' 28.59" Long: -97° 49' 15.59" Datum: NAD83
 Soil Map Unit Name: Vallers loam vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? <u> N </u> |
| Hydric soil present? | <u>N</u> | |
| Indicators of wetland hydrology present? | <u>N</u> | |
| Remarks: | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: <u> </u>) | Absolute % Cover | Dominant Species | Indicator Status | |
|--|-----------------------------|-----------------------|------------------|------------------|--|
| 1 | | | | | Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u> 0 </u> (A) Total Number of Dominant Species Across all Strata: <u> 1 </u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u> 0.00% </u> (A/B) |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| | | <u> 0 </u> | = Total Cover | | |
| Sapling/Shrub stratum | (Plot size: <u> </u>) | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u> 0 </u> x 1 = <u> 0 </u> FACW species <u> 0 </u> x 2 = <u> 0 </u> FAC species <u> 0 </u> x 3 = <u> 0 </u> FACU species <u> 1 </u> x 4 = <u> 4 </u> UPL species <u> 95 </u> x 5 = <u> 475 </u> Column totals <u> 96 </u> (A) <u> 479 </u> (B) Prevalence Index = B/A = <u> 4.99 </u> |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| | | <u> 0 </u> | = Total Cover | | |
| Herb stratum | (Plot size: <u> </u>) | | | | Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u> </u> Dominance test is >50% <u> </u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 | <u>Bromus inermis</u> | <u>95</u> | <u>Y</u> | <u>UPL</u> | |
| 2 | <u>Cirsium arvense</u> | <u>1</u> | <u>N</u> | <u>FACU</u> | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| | | <u> 96 </u> | = Total Cover | | |
| Woody vine stratum | (Plot size: <u> </u>) | | | | Hydrophytic vegetation present? <u> N </u> |
| 1 | | | | | |
| 2 | | | | | |
| | | <u> 0 </u> | = Total Cover | | |
| % Bare Ground in Herb Stratum: <u> 50 </u> | | | | | |

Remarks:

SOIL

Sampling Point: WK123B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-14 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 14-24 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 24-34 | 10YR 4/1 | 100 | | | | | Si Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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 X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 24
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

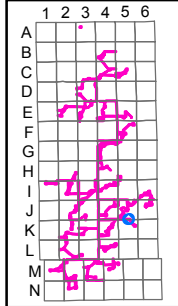
Saturation at 24"

8/18/2016 8:18 AM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvlgjennrich



T141N, R56W, S19
Map Book Page(s): J5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

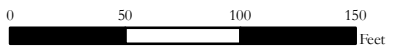
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WK123
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK123 overview looking to the northwest.



Wetland sample point WK123A



Non-wetland sample point WK123B

WK125

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK125A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S30
 Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope (%): 0
 Subregion (LRR): F Lat: 47° 0' 28.33" Long: -97° 49' 19.44" Datum: NAD83
 Soil Map Unit Name: Vallers loam IWI Classification: PEMC

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation , soil , or hydrology significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation , soil , or hydrology naturally problematic? needed, explain any answers in remarks.) Yes

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Photos: A-3308, B-3309, Overview-3310 E, Overview-3311 - S | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | | |
|--|---------------------------|------------------|------------------|------------------|---|---|--|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) | | |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>3</u> (B) | | |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B) | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet | | |
| 1 | _____ | _____ | _____ | _____ | Total % Cover of: | | |
| 2 | _____ | _____ | _____ | _____ | OBL species <u>25</u> x 1 = <u>25</u> | | |
| 3 | _____ | _____ | _____ | _____ | FACW species <u>30</u> x 2 = <u>60</u> | | |
| 4 | _____ | _____ | _____ | _____ | FAC species <u>25</u> x 3 = <u>75</u> | | |
| 5 | _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | | |
| | | <u>0</u> | = Total Cover | | UPL species <u>0</u> x 5 = <u>0</u> | | |
| | | <u>80</u> | = Total Cover | | Column totals <u>80</u> (A) <u>160</u> (B) | | |
| Herb stratum | (Plot size: _____) | | | | Prevalence Index = B/A = <u>2.00</u> | | |
| 1 | <u>Spartina pectinata</u> | <u>30</u> | <u>Y</u> | <u>FACW</u> | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Rapid test for hydrophytic vegetation <input checked="" type="checkbox"/> Dominance test is >50% <input checked="" type="checkbox"/> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | | |
| 2 | <u>Rumex crispus</u> | <u>25</u> | <u>Y</u> | <u>FAC</u> | | | |
| 3 | <u>Typha angustifolia</u> | <u>25</u> | <u>Y</u> | <u>OBL</u> | | | |
| 4 | _____ | _____ | _____ | _____ | | | |
| 5 | _____ | _____ | _____ | _____ | | | |
| 6 | _____ | _____ | _____ | _____ | | | |
| 7 | _____ | _____ | _____ | _____ | | | |
| 8 | _____ | _____ | _____ | _____ | | | |
| 9 | _____ | _____ | _____ | _____ | | | |
| 10 | _____ | _____ | _____ | _____ | | | |
| | | <u>80</u> | = Total Cover | | | | |
| Woody vine stratum | (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | | |
| 2 | _____ | _____ | _____ | _____ | | | |
| | | <u>0</u> | = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>15</u> | | | | | | Hydrophytic vegetation present? <u>Y</u> | |

Remarks:

SOIL

Sampling Point: WK125A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|----|----------------|----|-------|-------|---------|-----------------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-12 | 10YR 2/1 | | | | | | Cl Lo | H2S odor e 4" |
| 12-15 | 10YR 3/2 | 50 | 10YR 5/3 | 50 | | M | Cl Lo | Blended matrix colors |
| 15-22 | 10YR 6/2 | 98 | 10YR 5/8 | 2 | C | PL | Cl Lo | |
| 22-24 | 10YR 6/2 | 98 | 10YR 5/8 | 2 | C | PL | Cl | |
| 24-34 | 10YR 6/2 | 90 | 10YR 5/8 | 10 | C | PL | Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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): 27
 Saturation present? Yes No Depth (inches): 0
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK125B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S30
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 5
 Subregion (LRR): F Lat: 47° 0' 28.34" Long: -97° 49' 19.46" Datum: NAD83
 Soil Map Unit Name: Vallers loam IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) Yes

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |
| Remarks: | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | |
|--|------------------|------------------|------------------|--|
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| Sapling/Shrub stratum (Plot size: _____) | | | | |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| Herb stratum (Plot size: _____) | | | | |
| 1 <u>Bromus inermis</u> | 80 | Y | UPL | |
| 2 <u>Spartina pectinata</u> | 2 | N | FACW | |
| 3 _____ | _____ | _____ | _____ | |
| 4 _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | |
| 6 _____ | _____ | _____ | _____ | |
| 7 _____ | _____ | _____ | _____ | |
| 8 _____ | _____ | _____ | _____ | |
| 9 _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | |
| 82 = Total Cover | | | | |
| Woody vine stratum (Plot size: _____) | | | | |
| 1 _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | |
| 0 = Total Cover | | | | |
| % Bare Ground in Herb Stratum: <u>0</u> | | | | |

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: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species 0 x 1 = 0

FACW species 2 x 2 = 4

FAC species 0 x 3 = 0

FACU species 0 x 4 = 0

UPL species 80 x 5 = 400

Column totals 82 (A) 404 (B)

Prevalence Index = B/A = 4.93

Hydrophytic Vegetation Indicators:

____ Rapid test for hydrophytic vegetation

____ Dominance test is >50%

____ Prevalence index is ≤3.0*

____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks:

SOIL

Sampling Point: WK125B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-18 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 18-24 | 10YR 4/1 | 100 | | | | | Si Cl Lo | |
| 24-27 | 10YR 5/2 | 100 | | | | | Cl Lo | |
| 27-28 | 10YR 5/3 | 100 | | | | | Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

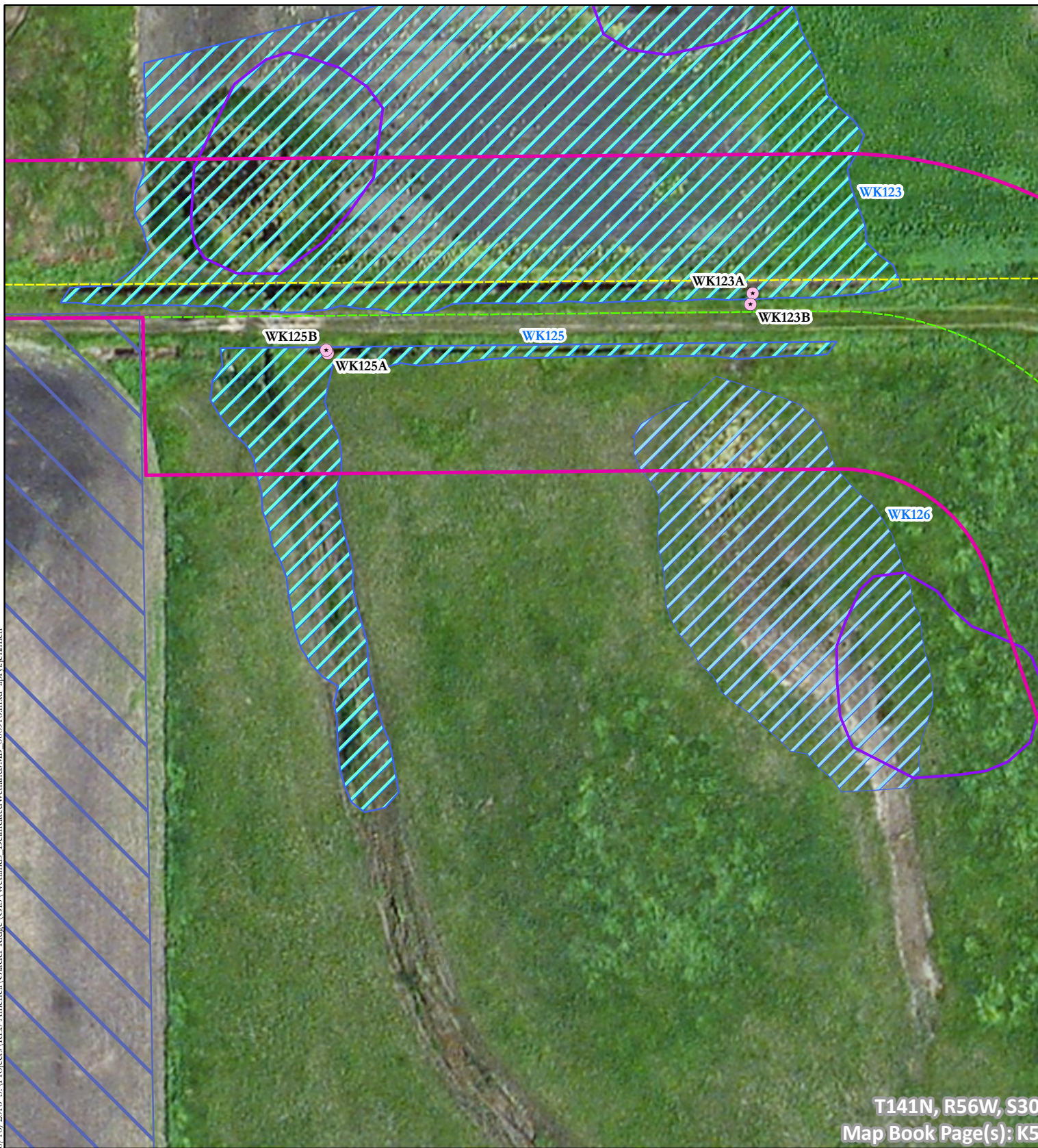
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

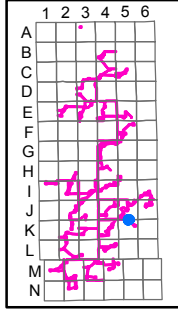
Remarks:

8/18/2016 8:18 AM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T141N, R56W, S30
Map Book Page(s): K5

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

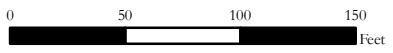
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WK125
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK125 overview looking to the south.



Wetland sample point WK125A



Non-wetland sample point WK125B

WK135

Shallow Marsh Wetland

&

SK135

Non-Relatively Permanent Water

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/28/16
 Applicant/Owner: RES America State: ND Sampling Point: WK135A
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S17 T141N R56W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 2
 Subregion (LRR): F Lat: 47° 1' 32.74" Long: -97° 48' 13.16" Datum: NAD83
 Soil Map Unit Name: Lowe-Fluvaquents channeled complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? <u>Y</u> | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? <u>Y</u> | <u>Y</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | <u>Y</u> | |
| Remarks: <p align="center">Photo 3076 S</p> | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|---|--|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>2</u> (B) | |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B) | |
| 4 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| Sapling/Shrub stratum (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>20</u> x 3 = <u>60</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| 0 = Total Cover | | | | UPL species <u>50</u> x 5 = <u>250</u> | |
| | | | | Column totals <u>70</u> (A) <u>310</u> (B) | |
| | | | | Prevalence Index = B/A = <u>4.43</u> | |
| Herb stratum (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | 50 | Y | UPL | ____ Rapid test for hydrophytic vegetation | |
| 2 <u>Echinochloa crus-galli</u> | 20 | Y | FAC | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| 70 = Total Cover | | | | | |
| Woody vine stratum (Plot size: _____) | | | | | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| 0 = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>30</u> | | | | Hydrophytic vegetation present? <u>Y</u> | |

Remarks:

Cultivated field

SOIL

Sampling Point: WK135A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-42 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:
 Couldn't probe deep enough to identify 2nd layer, A12 assumed.

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input checked="" type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

Surface water present? Yes No Depth (inches): _____
 Water table present? Yes No Depth (inches): 16"
 Saturation present? Yes No Depth (inches): 13"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/28/16
 Applicant/Owner: RES America State: ND Sampling Point: WK135B
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S17 T141N R56W
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 10
 Subregion (LRR): F Lat: 47° 1' 32.87" Long: -97° 48' 13.20" Datum: NAD83
 Soil Map Unit Name: Lowe-Fluvaquents channeled complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>N</u> | Is the sampled area within a wetland? | <u>N</u> |
| Hydric soil present? | <u>N</u> | | |
| Indicators of wetland hydrology present? | <u>N</u> | | |
| Remarks: <p align="center">Photo 3077 N</p> | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|-------------------------------|------------------|------------------|------------------|--|------------------------------|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 | _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>1</u> (B) |
| 3 | _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 | _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 2 | _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 3 | _____ | _____ | _____ | _____ | FAC species | <u>8</u> x 3 = <u>24</u> |
| 4 | _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| 5 | _____ | _____ | _____ | _____ | UPL species | <u>50</u> x 5 = <u>250</u> |
| | | <u>0</u> | = Total Cover | | Column totals | <u>58</u> (A) <u>274</u> (B) |
| Herb stratum | | | | | Prevalence Index = B/A = <u>4.72</u> | |
| (Plot size: _____) | | | | | Hydrophytic Vegetation Indicators: | |
| 1 | <u>Glycine max</u> | <u>50</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 | <u>Echinochloa crus-galli</u> | <u>5</u> | <u>N</u> | <u>FAC</u> | ____ Dominance test is >50% | |
| 3 | <u>Xanthium strumarium</u> | <u>3</u> | <u>N</u> | <u>FAC</u> | ____ Prevalence index is ≤3.0* | |
| 4 | _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 | _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 | _____ | _____ | _____ | _____ | ____ *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 | _____ | _____ | _____ | _____ | Hydrophytic vegetation present? <u>N</u> | |
| 8 | _____ | _____ | _____ | _____ | | |
| 9 | _____ | _____ | _____ | _____ | | |
| 10 | _____ | _____ | _____ | _____ | | |
| | | <u>58</u> | = Total Cover | | | |
| Woody vine stratum | | | | | | |
| (Plot size: _____) | | | | | | |
| 1 | _____ | _____ | _____ | _____ | | |
| 2 | _____ | _____ | _____ | _____ | | |
| | | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: <u>42</u> | | | | | | |

Remarks:

SOIL

Sampling Point: WK135B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-33 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 33-35 | 5Y 5/2 | 98 | 10YR 4/6 | 2 | C | PL | Si Cl Lo | |
| 35-40 | 5Y 5/2 | 100 | | | | | Si Cl Lo | |
| 40-42 | 5Y 6/2 | 96 | 2.5Y 5/6 | 4 | C | PL | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

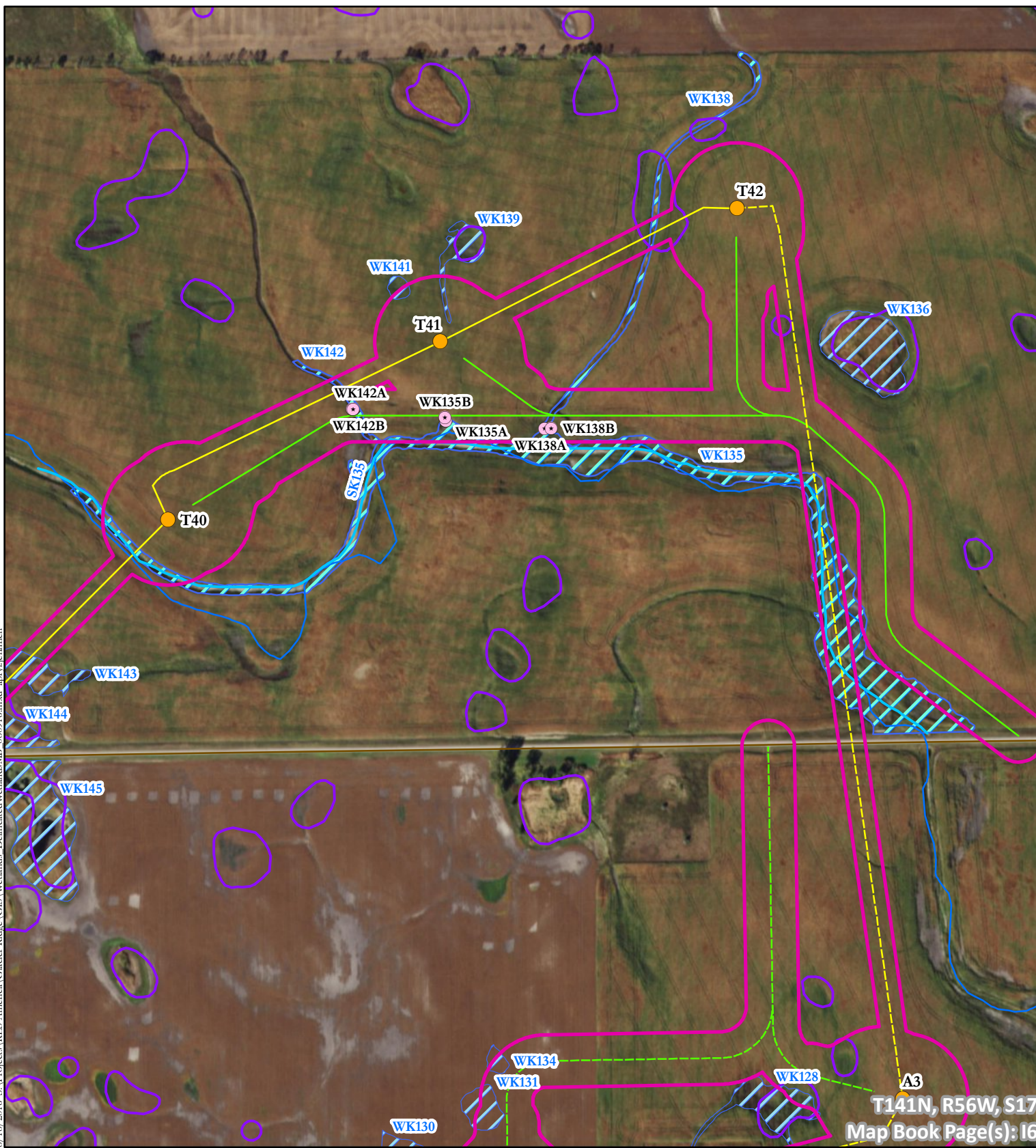
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

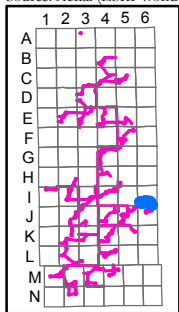
Remarks:

8/18/2016 8:11 Projects\RES America\Glacier Ridge\GIS\Wetlands-Delineated\Wetlands_MB_080916.mxd aprvlgennrich



T141N, R56W, S17
Map Book Page(s): 16

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

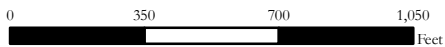
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- - - Collection Alt
- Access Road
- - - Access Road Alt
- ▭ O&M/Substation



Wetland ID: WK135
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK135 overview looking to the southeast toward NRPW SK135.



Wetland sample point WK135A



Non-wetland sample point WK135B

WK138

Shallow Marsh Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK138A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S17
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 1' 32.42" Long: -97° 48' 7.71" Datum: NAD83
 Soil Map Unit Name: Lowe-Fluvaquents IWI Classification: PEMAf

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | | |
|--|----------|--|----------|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? | <u>Y</u> |
| Hydric soil present? | <u>Y</u> | | |
| Indicators of wetland hydrology present? | <u>Y</u> | | |
| Remarks: Panted with beans. Photos: A-3319, B-3320, Overview-3321-S | | | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|--------------------|------------------|------------------|-------------------------|--|--|
| 1 _____ | | | | | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) | |
| 2 _____ | | | | | Total Number of Dominant Species Across all Strata: <u>2</u> (B) | |
| 3 _____ | | | | | Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B) | |
| 4 _____ | | | | | | |
| | | | | <u>0</u> = Total Cover | | |
| Sapling/Shrub stratum | | | | | Prevalence Index Worksheet | |
| (Plot size: _____) | | | | | Total % Cover of: | |
| 1 _____ | | | | | OBL species <u>0</u> x 1 = <u>0</u> | |
| 2 _____ | | | | | FACW species <u>0</u> x 2 = <u>0</u> | |
| 3 _____ | | | | | FAC species <u>20</u> x 3 = <u>60</u> | |
| 4 _____ | | | | | FACU species <u>0</u> x 4 = <u>0</u> | |
| 5 _____ | | | | | UPL species <u>20</u> x 5 = <u>100</u> | |
| | | | | <u>0</u> = Total Cover | Column totals <u>40</u> (A) <u>160</u> (B) | |
| | | | | | Prevalence Index = B/A = <u>4.00</u> | |
| Herb stratum | | | | | Hydrophytic Vegetation Indicators: | |
| (Plot size: _____) | | | | | <input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* <input type="checkbox"/> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 1 <u>Glycine max</u> | | 20 | Y | UPL | <input checked="" type="checkbox"/> Problematic hydrophytic vegetation* (explain) | |
| 2 <u>Echinochloa crus-galli</u> | | 20 | Y | FAC | | |
| 3 _____ | | | | | | |
| 4 _____ | | | | | | |
| 5 _____ | | | | | | |
| 6 _____ | | | | | | |
| 7 _____ | | | | | | |
| 8 _____ | | | | | | |
| 9 _____ | | | | | | |
| 10 _____ | | | | | | |
| | | | | <u>40</u> = Total Cover | | |
| Woody vine stratum | | | | | Hydrophytic vegetation present? | |
| (Plot size: _____) | | | | | <u>Y</u> | |
| 1 _____ | | | | | | |
| 2 _____ | | | | | | |
| | | | | <u>0</u> = Total Cover | | |
| % Bare Ground in Herb Stratum: <u>60</u> | | | | | | |

Remarks:

SOIL

Sampling Point: WK138A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|----|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-16 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 16-18 | 10YR 4/1 | 100 | | | | | Cl Lo | |
| 18-25 | 10YR 5/1 | 98 | 10YR 5/8 | 2 | C | PL | Cl Lo | |
| 25-28 | 10YR 6/1 | 60 | 10YR 5/8 | 40 | C | PL/M | Sa Cl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

Very close to A12, BPJ

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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? Yes No _____ Depth (inches): 18
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK138B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S17
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 1' 32.44" Long: -97° 48' 7.36" Datum: NAD83
 Soil Map Unit Name: Lowe-Fluvaquents vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |
| Remarks: | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|--|--------------------|------------------|------------------|------------------|---|
| 1 | _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| | | <u>0</u> | = Total Cover | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>75</u> x 5 = <u>375</u> Column totals <u>75</u> (A) <u>375</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| | | <u>0</u> | = Total Cover | | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: ___ Rapid test for hydrophytic vegetation ___ Dominance test is >50% ___ Prevalence index is ≤3.0* ___ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ___ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 | <u>Glycine max</u> | <u>75</u> | <u>Y</u> | <u>UPL</u> | |
| 2 | _____ | _____ | _____ | _____ | |
| 3 | _____ | _____ | _____ | _____ | |
| 4 | _____ | _____ | _____ | _____ | |
| 5 | _____ | _____ | _____ | _____ | |
| 6 | _____ | _____ | _____ | _____ | |
| 7 | _____ | _____ | _____ | _____ | |
| 8 | _____ | _____ | _____ | _____ | |
| 9 | _____ | _____ | _____ | _____ | |
| 10 | _____ | _____ | _____ | _____ | |
| | | <u>75</u> | = Total Cover | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u>N</u> |
| 1 | _____ | _____ | _____ | _____ | |
| 2 | _____ | _____ | _____ | _____ | |
| | | <u>0</u> | = Total Cover | | |
| % Bare Ground in Herb Stratum: <u>25</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK138B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-18 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 18-28 | 10YR 3/2 | 100 | | | | | Si Cl Lo | |
| 28-32 | 10YR 5/1 | 99 | 10YR 5/8 | 1 | | | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
|---|--|--|--|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic | |

| | |
|---|--|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u> N </u> |
| Remarks: | |

HYDROLOGY

| Wetland Hydrology Indicators: | |
|---|---|
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |
| <input type="checkbox"/> Salt Crust (B11) | |
| <input type="checkbox"/> Aquatic Invertebrates (B13) | |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | |
| <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | |
| <input type="checkbox"/> Presence of Reduced Iron (C4) | |
| <input type="checkbox"/> Thin Muck Surface (C7) | |
| <input type="checkbox"/> Other (Explain in Remarks) | |

| | | |
|---|--|--|
| Field Observations: | | Indicators of wetland hydrology present? <u> N </u> |
| Surface water present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Water table present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Saturation present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u> 30 </u> | | |
| (includes capillary fringe) | | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

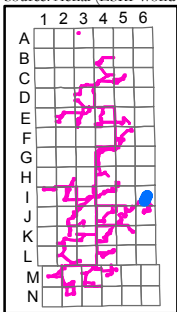
Remarks:

8/18/2016 8:11:05 AM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_081016.mxd aprvl.jennrich



T141N, R56W, S17
Map Book Page(s): 16

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

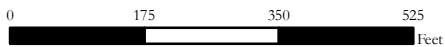
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▨ Survey Corridor

Desktop Data

- ~ NHD
- ▨ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- - - Collection Alt
- Access Road
- - - Access Road Alt
- ▨ O&M/Substation



Wetland ID: WK138
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK138 overview looking to the south.



Wetland sample point WK138A



Non-wetland sample point WK138B

WK142

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK142A
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S17
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 1' 33.25" Long: -97° 48' 18.24" Datum: NAD83
 Soil Map Unit Name: Balaton-Wyard loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:
 Photos: A-3316, B-3317, Overview-3318 S

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|---------------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: | <u>0</u> (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: | <u>0</u> (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: | <u>0.00%</u> (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species | <u>0</u> x 1 = <u>0</u> |
| 3 _____ | _____ | _____ | _____ | FACW species | <u>0</u> x 2 = <u>0</u> |
| 4 _____ | _____ | _____ | _____ | FAC species | <u>0</u> x 3 = <u>0</u> |
| 5 _____ | _____ | _____ | _____ | FACU species | <u>0</u> x 4 = <u>0</u> |
| | <u>0</u> | = Total Cover | | UPL species | <u>0</u> x 5 = <u>0</u> |
| | | | | Column totals | <u>0</u> (A) <u>0</u> (B) |
| | | | | Prevalence Index = B/A = | _____ |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 _____ | _____ | _____ | _____ | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? | |
| 1 _____ | _____ | _____ | _____ | align="center"> <u>Y</u> | |
| 2 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| % Bare Ground in Herb Stratum: | <u>99</u> | | | | |

Remarks:

SOIL

Sampling Point: WK142A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-28 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 28-36 | 10YR 5/1 | 97 | 10YR 6/8 | 3 | C | PL | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
|---|--|--|--|
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input checked="" type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| | (MLRA 72 & 73 of LRR H) | *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic | |

| | |
|---|--------------------------------------|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u>Y</u> |
| Remarks: _____ | |

HYDROLOGY

| Wetland Hydrology Indicators: | |
|---|---|
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |

| | | |
|---|--|--|
| Field Observations: | | Indicators of wetland hydrology present? <u>Y</u> |
| Surface water present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Water table present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | | |
| Saturation present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>16</u> | | |
| (includes capillary fringe) | | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 8/3/16
 Applicant/Owner: RES America State: ND Sampling Point: WK142B
 Investigator(s): Apryl Jennrich/Mike Wallgren Section, Township, Range: T141N R56W S17
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR): F Lat: 47° 11 33.24" Long: -97° 48' 18.29" Datum: NAD83
 Soil Map Unit Name: Balaton-Wyard loams vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | |
| Remarks: | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|--|--------------------|------------------|------------------|------------------|---|
| 1 | | | | | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| | | <u>0</u> | = Total Cover | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>5</u> x 5 = <u>25</u> Column totals <u>5</u> (A) <u>25</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| | | <u>0</u> | = Total Cover | | |
| Herb stratum | (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: ___ Rapid test for hydrophytic vegetation ___ Dominance test is >50% ___ Prevalence index is ≤3.0* ___ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) ___ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 1 | <u>Glycine max</u> | <u>5</u> | <u>Y</u> | <u>UPL</u> | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| | | <u>5</u> | = Total Cover | | |
| Woody vine stratum | (Plot size: _____) | | | | Hydrophytic vegetation present? <u>N</u> |
| 1 | | | | | |
| 2 | | | | | |
| | | <u>0</u> | = Total Cover | | |
| % Bare Ground in Herb Stratum: <u>95</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK142B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-22 | 10YR 2/1 | 100 | | | | | Cl Lo | |
| 22-26 | 10YR 3/2 | 100 | | | | | Cl Lo | |
| 26-30 | 10YR 5/1 | 99 | 10YR 5/8 | 1 | C | PL | Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

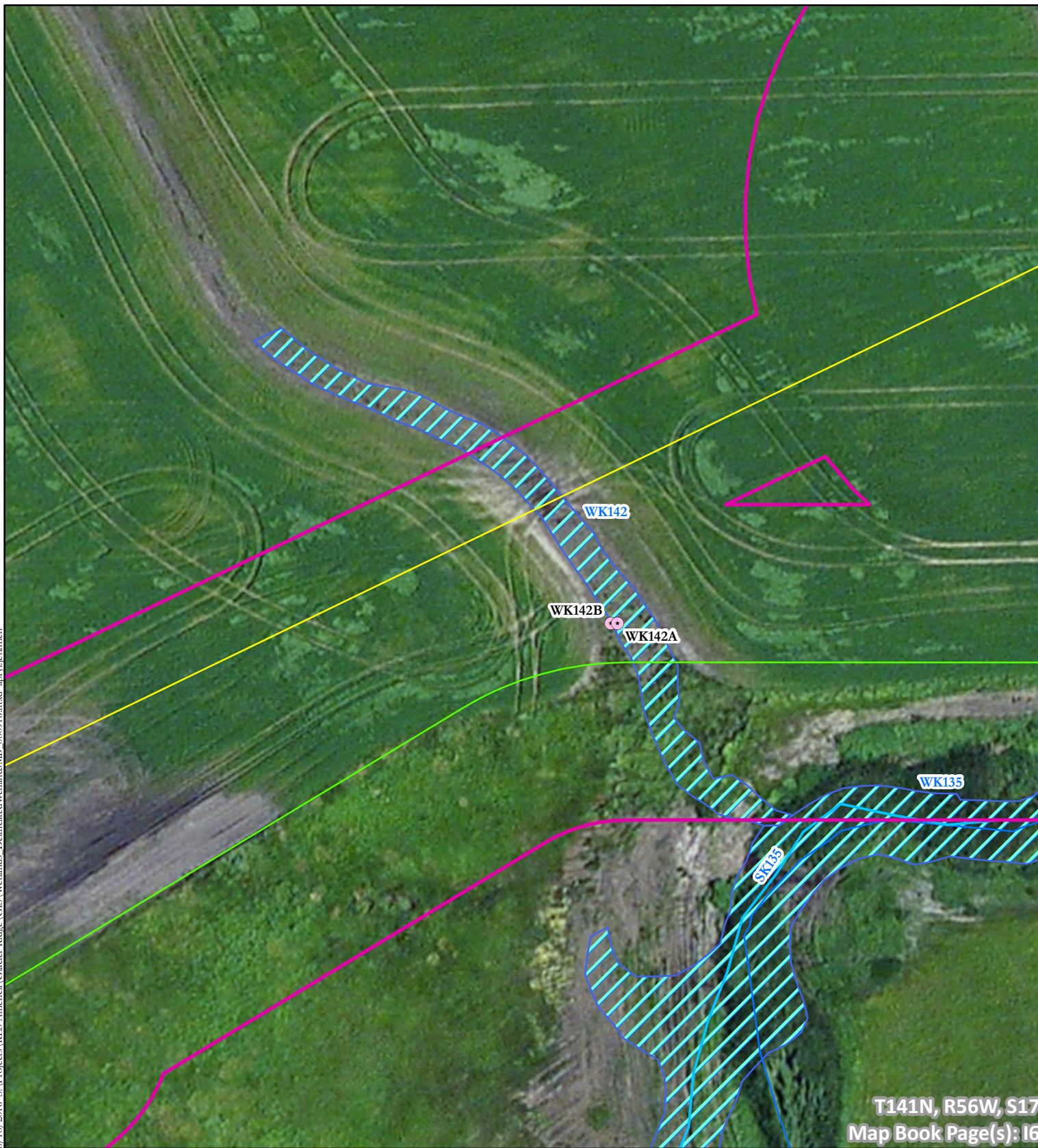
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes X No _____ Depth (inches): 16
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

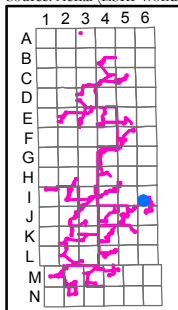
Remarks:

8/18/2016 8:11 PM Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvljennrich



T141N, R56W, S17
Map Book Page(s): 16

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

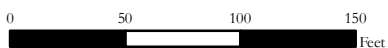
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▨ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▨ O&M/Substation



Wetland ID: WK142
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK142 overview looking to the south.



Wetland sample point WK142A



Non-wetland sample point WK142B

WK149

Seasonally Flooded Wetland

&

SK149

Non-Relatively Permanent Water

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/28/16
 Applicant/Owner: RES America State: ND Sampling Point: WK149A
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S25 T141N R57W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): F Lat: 47° 0' 23.59" Long: -97° 50' 11.62" Datum: NAD83
 Soil Map Unit Name: Vallers loam, saline vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | | |
|--|----------|---|
| Hydrophytic vegetation present? | <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? | <u>Y</u> | |
| Indicators of wetland hydrology present? | <u>Y</u> | |

Remarks:

Photo 3089 (W)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|------------------|---|----------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>2</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | <u>0</u> | = Total Cover | | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | | | | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>50</u> x 3 = <u>150</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>2</u> x 4 = <u>8</u> | |
| | <u>0</u> | = Total Cover | | UPL species <u>25</u> x 5 = <u>125</u> | |
| <u>Herb stratum</u> (Plot size: _____) | | | | Column totals <u>77</u> (A) | <u>283</u> (B) |
| 1 <u>Xanthium strumarium</u> | <u>50</u> | <u>Y</u> | <u>FAC</u> | Prevalence Index = B/A = <u>3.68</u> | |
| 2 <u>Glycine max</u> | <u>25</u> | <u>Y</u> | <u>UPL</u> | | |
| 3 <u>Cirsium arvense</u> | <u>2</u> | <u>N</u> | <u>FACU</u> | | |
| 4 _____ | _____ | _____ | _____ | | |
| 5 _____ | _____ | _____ | _____ | | |
| 6 _____ | _____ | _____ | _____ | | |
| 7 _____ | _____ | _____ | _____ | | |
| 8 _____ | _____ | _____ | _____ | | |
| 9 _____ | _____ | _____ | _____ | | |
| 10 _____ | _____ | _____ | _____ | | |
| | <u>77</u> | = Total Cover | | | |
| <u>Woody vine stratum</u> (Plot size: _____) | | | | Hydrophytic Vegetation Indicators: | |
| 1 _____ | _____ | _____ | _____ | ____ Rapid test for hydrophytic vegetation | |
| 2 _____ | _____ | _____ | _____ | ____ Dominance test is >50% | |
| | <u>0</u> | = Total Cover | | ____ Prevalence index is ≤3.0* | |
| | | | | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| % Bare Ground in Herb Stratum: <u>23</u> | | | | ____ <u>X</u> Problematic hydrophytic vegetation* (explain) | |
| | | | | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| | | | | Hydrophytic vegetation present? | <u>Y</u> |

Remarks:

SOIL

Sampling Point: WK149A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-10 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 10-20 | 5YR 5/1 | 100 | | | | | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

| | | | |
|--|--|--|--|
| Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) | | Indicators for Problematic Hydric Soils: | |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) | |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) | |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) | |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) | |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> High Plains Depressions (F16) | | |
| | (MLRA 72 & 73 of LRR H) | *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic | |

| | |
|---|--------------------------------------|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? <u>Y</u> |
| Remarks: _____ | |

HYDROLOGY

| | |
|---|---|
| Wetland Hydrology Indicators: | |
| Primary Indicators (minimum of one is required; check all that apply) | Secondary Indicators (minimum of two required) |
| <input type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input checked="" type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | |
| <input type="checkbox"/> Salt Crust (B11) | |
| <input type="checkbox"/> Aquatic Invertebrates (B13) | |
| <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | |
| <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | |
| <input type="checkbox"/> Presence of Reduced Iron (C4) | |
| <input type="checkbox"/> Thin Muck Surface (C7) | |
| <input type="checkbox"/> Other (Explain in Remarks) | |

| | |
|--|--|
| Field Observations: | |
| Surface water present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | Indicators of wetland hydrology present? <u>Y</u> |
| Water table present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ | |
| Saturation present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe) | |

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/28/16
 Applicant/Owner: RES America State: ND Sampling Point: WK149B
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S25 T141N R57W
 Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): None Slope (%): 5
 Subregion (LRR): F Lat: 47° 0' 23.68" Long: -97° 50' 11.49" Datum: NAD83
 Soil Map Unit Name: Vallers loam, saline vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |

Remarks:

Photo 3090 (E)

VEGETATION -- Use scientific names of plants.

| <u>Tree Stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|---|------------------|------------------|-------------------------|---|-------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> | (A) |
| 2 _____ | _____ | _____ | _____ | Total Number of Dominant Species Across all Strata: <u>2</u> | (B) |
| 3 _____ | _____ | _____ | _____ | Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> | (A/B) |
| 4 _____ | _____ | _____ | _____ | | |
| | | | <u>0</u> = Total Cover | | |
| <u>Sapling/Shrub stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Prevalence Index Worksheet | |
| 1 _____ | _____ | _____ | _____ | Total % Cover of: | |
| 2 _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 3 _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 4 _____ | _____ | _____ | _____ | FAC species <u>15</u> x 3 = <u>45</u> | |
| 5 _____ | _____ | _____ | _____ | FACU species <u>0</u> x 4 = <u>0</u> | |
| | | | <u>0</u> = Total Cover | UPL species <u>60</u> x 5 = <u>300</u> | |
| | | | | Column totals <u>75</u> (A) <u>345</u> (B) | |
| | | | | Prevalence Index = B/A = <u>4.60</u> | |
| <u>Herb stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic Vegetation Indicators: | |
| 1 <u>Glycine max</u> | <u>60</u> | <u>Y</u> | <u>UPL</u> | ____ Rapid test for hydrophytic vegetation | |
| 2 <u>Xanthium strumarium</u> | <u>15</u> | <u>Y</u> | <u>FAC</u> | ____ Dominance test is >50% | |
| 3 _____ | _____ | _____ | _____ | ____ Prevalence index is ≤3.0* | |
| 4 _____ | _____ | _____ | _____ | ____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) | |
| 5 _____ | _____ | _____ | _____ | ____ Problematic hydrophytic vegetation* (explain) | |
| 6 _____ | _____ | _____ | _____ | ____ | |
| 7 _____ | _____ | _____ | _____ | ____ | |
| 8 _____ | _____ | _____ | _____ | ____ | |
| 9 _____ | _____ | _____ | _____ | ____ | |
| 10 _____ | _____ | _____ | _____ | ____ | |
| | | | <u>75</u> = Total Cover | *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| <u>Woody vine stratum</u> (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Hydrophytic vegetation present? <u>N</u> | |
| 1 _____ | _____ | _____ | _____ | | |
| 2 _____ | _____ | _____ | _____ | | |
| | | | <u>0</u> = Total Cover | | |
| % Bare Ground in Herb Stratum: <u>25</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK149B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-13 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 13-26 | 5Y 5/1 | 100 | | | | | Si Cl Lo | |
| 26-29 | 5Y 5/3 | 97 | 10YR 4/6 | 3 | C | PL | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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:

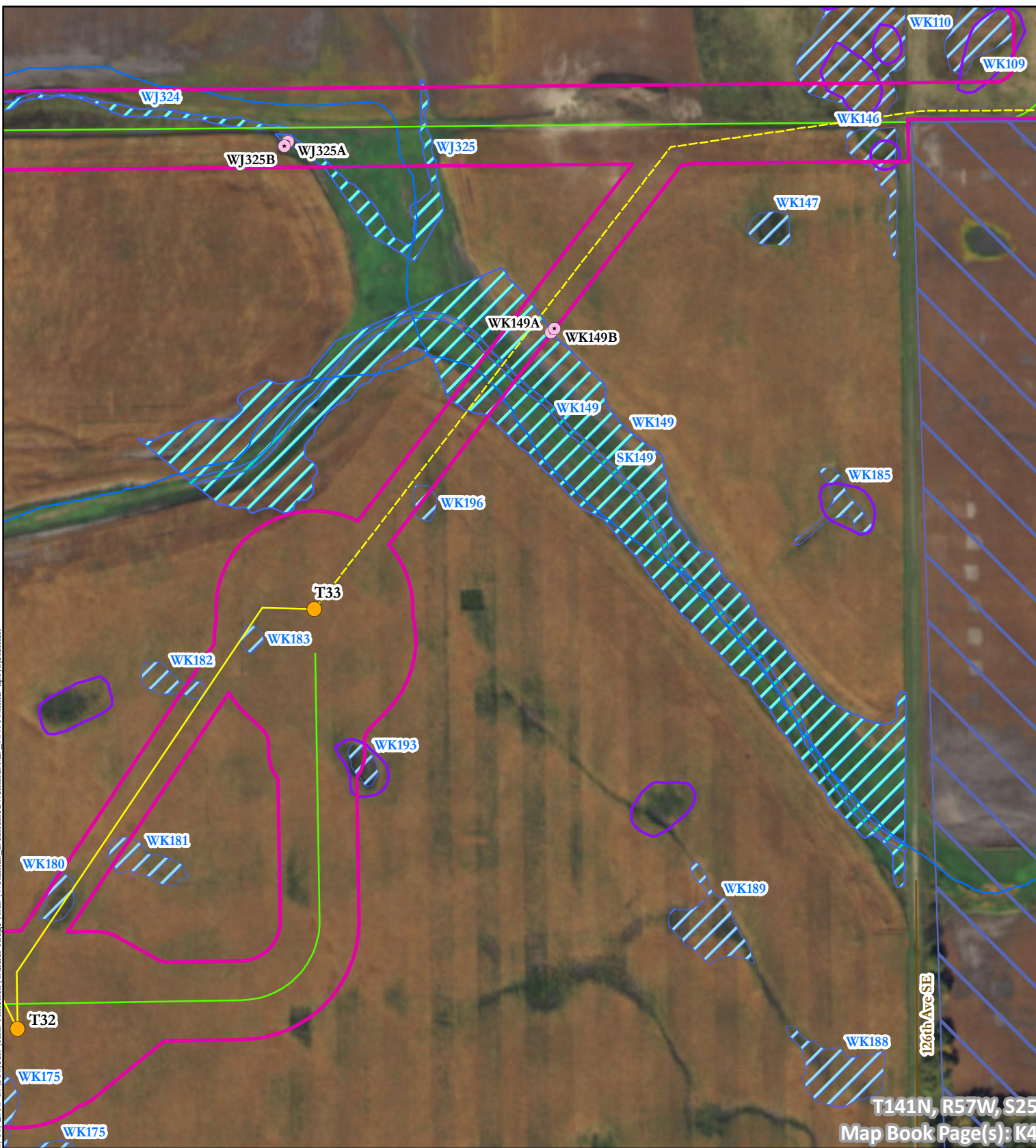
Surface water present? Yes _____ No Depth (inches): _____
 Water table present? Yes _____ No Depth (inches): _____
 Saturation present? Yes _____ No Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

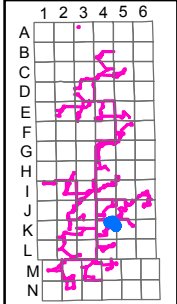
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

8/18/2016 5:10 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvlgennrich



Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

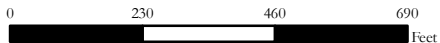
- Sample Point
- ~ Stream Feature
- ▭ Non-Jurisdictional
- ▭ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▭ USFWS Easement
- Road

Facilities

- ▭ Jbox
- Turbine
- Collection
- Collection Alt
- Access Road
- Access Road Alt
- ▭ O&M/Substation



Wetland ID: WK149
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK149 overview looking to the north toward NRPW SK149.



Wetland sample point WK149A



Non-wetland sample point WK149B

WK166

Seasonally Flooded Wetland

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/29/16
 Applicant/Owner: RES America State: ND Sampling Point: WK166A
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S25 T141N R57W
 Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): concave Slope (%): 1
 Subregion (LRR): F Lat: 46° 59' 53.89" Long: -97° 50' 36.81" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka complex IWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|--|---|
| Hydrophytic vegetation present? <u>Y</u> | Is the sampled area within a wetland? <u>Y</u> |
| Hydric soil present? <u>Y</u> | |
| Indicators of wetland hydrology present? <u>Y</u> | |
| Remarks: <p align="center">Photo 3118 (W)</p> | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet |
|--|--------------------|------------------|------------------|------------------|--|
| 1 _____ | | | | | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) |
| 2 _____ | | | | | |
| 3 _____ | | | | | |
| 4 _____ | | | | | |
| <u>0</u> = Total Cover | | | | | |
| Sapling/Shrub stratum | (Plot size: _____) | | | | Prevalence Index Worksheet |
| 1 _____ | | | | | Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>15</u> x 5 = <u>75</u> Column totals <u>15</u> (A) <u>75</u> (B) Prevalence Index = B/A = <u>5.00</u> |
| 2 _____ | | | | | |
| 3 _____ | | | | | |
| 4 _____ | | | | | |
| 5 _____ | | | | | |
| <u>0</u> = Total Cover | | | | | |
| Herb stratum | (Plot size: _____) | | | | |
| 1 <u>Glycine max</u> | | <u>15</u> | <u>Y</u> | <u>UPL</u> | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u>X</u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic |
| 2 _____ | | | | | |
| 3 _____ | | | | | |
| 4 _____ | | | | | |
| 5 _____ | | | | | |
| 6 _____ | | | | | |
| 7 _____ | | | | | |
| 8 _____ | | | | | |
| 9 _____ | | | | | |
| 10 _____ | | | | | |
| <u>15</u> = Total Cover | | | | | |
| Woody vine stratum | (Plot size: _____) | | | | |
| 1 _____ | | | | | |
| 2 _____ | | | | | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>85</u> | | | | | Hydrophytic vegetation present? <u>Y</u> |

Remarks:

Cultivated cropland

SOIL

Sampling Point: WK166A

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-2 | 10YR 2/1 | 100 | | | | | Si Lo | |
| 2-19 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 19-23 | 10YR 4/2 | 96 | 10YR 4/6 | 4 | C | PL | Si Cl Lo | |
| 23-28 | 5Y 4/2 | 95 | 10YR 4/2 | 5 | C | PL | Si Cl Lo | |
| 28-30 | 5Y 5/3 | 98 | 2.5Y 5/6 | 2 | C | PL | Si Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

- 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:

- 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 (TF12)
- Other (explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is 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
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on 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): 17"
 Saturation present? Yes No Depth (inches): 17"
 (includes capillary fringe)

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site Glacier Ridge Wind Farm City/County: Barnes County Sampling Date: 6/29/16
 Applicant/Owner: RES America State: ND Sampling Point: WK166B
 Investigator(s): Kathy Bellrichard/Greg Thomson Section, Township, Range: S25 T141N R57W
 Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): none Slope (%): 3
 Subregion (LRR): F Lat: 46° 59' 53.77" Long: -97° 50' 36.85" Datum: NAD83
 Soil Map Unit Name: Hamerly-Tonka complex vWI Classification: NA

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)
 Are vegetation X, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? (If
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? needed, explain any answers in remarks.) No

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

| | |
|---|---|
| Hydrophytic vegetation present? <u>N</u> | Is the sampled area within a wetland? <u>N</u> |
| Hydric soil present? <u>N</u> | |
| Indicators of wetland hydrology present? <u>N</u> | |
| Remarks: <p align="center">Photo 3119 (SW)</p> | |

VEGETATION -- Use scientific names of plants.

| Tree Stratum | Absolute % Cover | Dominant Species | Indicator Status | Dominance Test Worksheet | |
|--|------------------|------------------|------------------|---|------------------|
| 1 _____ | _____ | _____ | _____ | Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B) | |
| 2 _____ | _____ | _____ | _____ | | |
| 3 _____ | _____ | _____ | _____ | | |
| 4 _____ | _____ | _____ | _____ | | |
| <u>0</u> = Total Cover | | | | Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>50</u> x 5 = <u>250</u> Column totals <u>50</u> (A) <u>250</u> (B) Prevalence Index = B/A = <u>5.00</u> | |
| Sapling/Shrub stratum | Plot size: _____ | Absolute % Cover | Dominant Species | | Indicator Status |
| 1 _____ | _____ | _____ | _____ | | _____ |
| 2 _____ | _____ | _____ | _____ | | _____ |
| 3 _____ | _____ | _____ | _____ | | _____ |
| 4 _____ | _____ | _____ | _____ | _____ | |
| 5 _____ | _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | Hydrophytic Vegetation Indicators: _____ Rapid test for hydrophytic vegetation _____ Dominance test is >50% _____ Prevalence index is ≤3.0* _____ Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic | |
| Herb stratum | Plot size: _____ | Absolute % Cover | Dominant Species | | Indicator Status |
| 1 <u>Glycine max</u> | _____ | <u>50</u> | <u>Y</u> | | <u>UPL</u> |
| 2 _____ | _____ | _____ | _____ | | _____ |
| 3 _____ | _____ | _____ | _____ | | _____ |
| 4 _____ | _____ | _____ | _____ | | _____ |
| 5 _____ | _____ | _____ | _____ | | _____ |
| 6 _____ | _____ | _____ | _____ | | _____ |
| 7 _____ | _____ | _____ | _____ | | _____ |
| 8 _____ | _____ | _____ | _____ | | _____ |
| 9 _____ | _____ | _____ | _____ | _____ | |
| 10 _____ | _____ | _____ | _____ | _____ | |
| <u>50</u> = Total Cover | | | | Hydrophytic vegetation present? <u>N</u> | |
| Woody vine stratum | Plot size: _____ | Absolute % Cover | Dominant Species | | Indicator Status |
| 1 _____ | _____ | _____ | _____ | _____ | |
| 2 _____ | _____ | _____ | _____ | _____ | |
| <u>0</u> = Total Cover | | | | | |
| % Bare Ground in Herb Stratum: <u>50</u> | | | | | |

Remarks:

SOIL

Sampling Point: WK166B

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|-----|----------------|---|-------|-------|----------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-21 | 10YR 2/1 | 100 | | | | | Si Cl Lo | |
| 21-23 | 2.5Y 3/2 | 100 | | | | | Si Cl Lo | |
| 23-30 | 2.5Y 4/2 | 98 | 10YR 4/6 | 2 | C | PL | Cl Lo | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

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

Indicators for Problematic Hydric Soils:

- | | | |
|--|--|---|
| <input type="checkbox"/> Histisol (A1) | <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Sandy Redox (S5) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Stripped Matrix (S6) | <input type="checkbox"/> Dark Surface (S7) (LRR G) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Mucky Mineral (F1) | <input type="checkbox"/> High Plains Depressions (F16) |
| <input type="checkbox"/> Stratified Layers (A5) (LRR F) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> (LRR H outside of MLRA 72 & 73) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) | <input type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Reduced Vertic (F18) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Red Parent Material (TF2) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Other (explain in remarks) |
| <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) | <input type="checkbox"/> High Plains Depressions (F16) | <input type="checkbox"/> *Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F) | <input type="checkbox"/> (MLRA 72 & 73 of LRR H) | |

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (minimum of two required)

- | | | |
|---|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Salt Crust (B11) | <input type="checkbox"/> Surface Soil Cracks (B6) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Invertebrates (B13) | <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Drainage Patterns (B10) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Dry-Season Water Table (C2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled) | <input type="checkbox"/> Crayfish Burrows (C8) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> FAC-Neutral Test (D5) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery | | <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F) |
| <input type="checkbox"/> Water-Stained Leaves (B9) | | |

Field Observations:

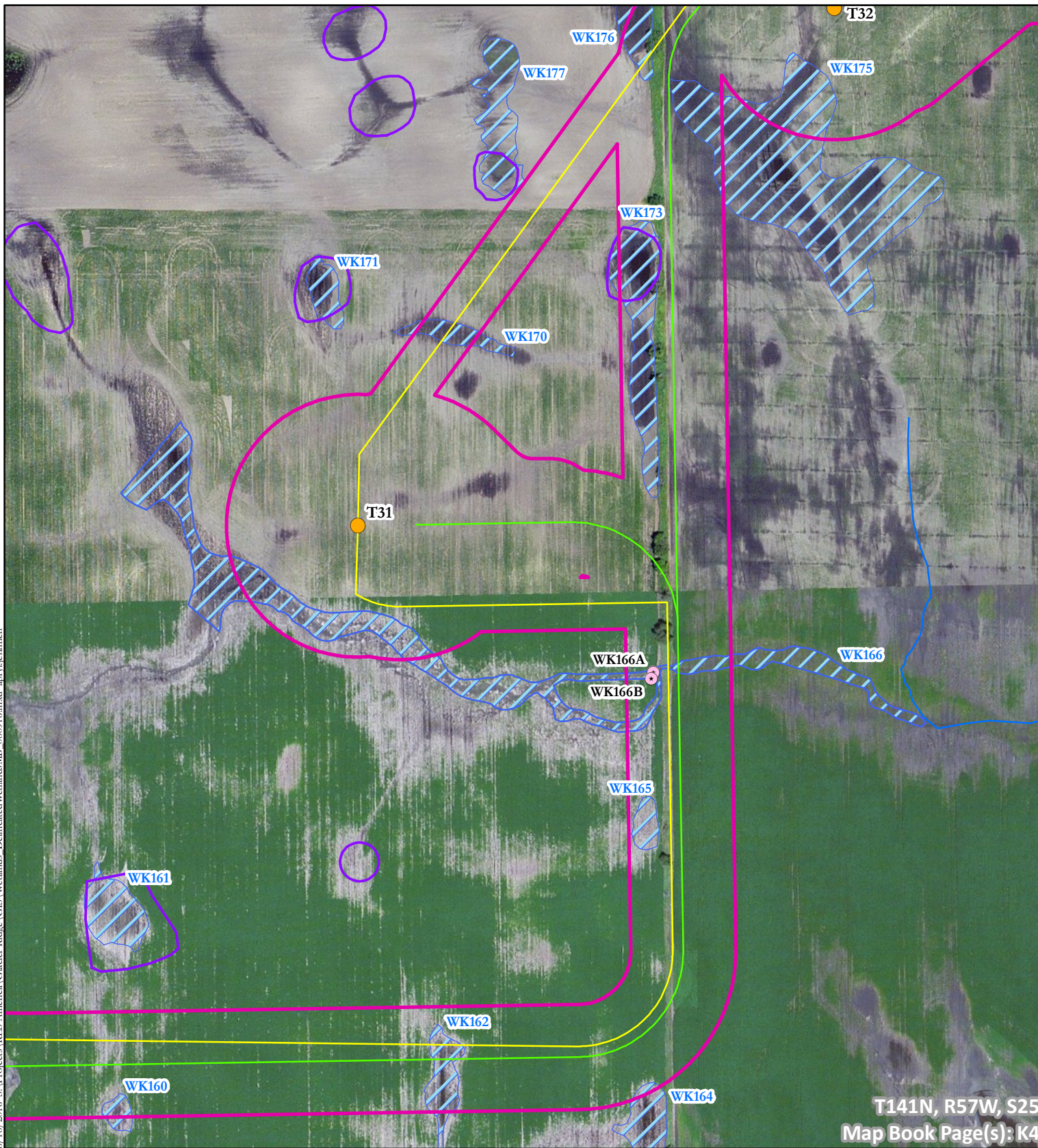
Surface water present? Yes _____ No X Depth (inches): _____
 Water table present? Yes _____ No X Depth (inches): _____
 Saturation present? Yes _____ No X Depth (inches): _____
 (includes capillary fringe)

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

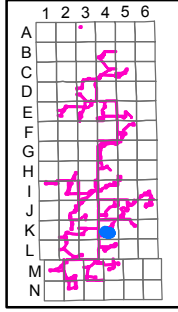
Remarks:

8/18/2016 8:11 Projects\RES America\Glacier Ridge\GIS\Wetlands - Delineated\WetlandsMB_080916.mxd aprvlgennrich



T141N, R57W, S25
Map Book Page(s): K4

Source: Aerial (ESRI World Imagery); NHD (USGS); NWI, Easements (USFWS); Facilities (RES America); Wetlands (Tetra Tech).



Survey Data

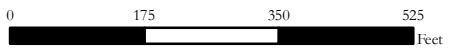
- Sample Point
- ~ Stream Feature
- ▨ Non-Jurisdictional
- ▨ USACE Jurisdictional
- ▭ Survey Corridor

Desktop Data

- ~ NHD
- ~ NWI Wetland
- ▨ USFWS Easement
- Road

Facilities

- ▣ Jbox
- Turbine
- Collection
- - - Collection Alt
- Access Road
- - - Access Road Alt
- ▨ O&M/Substation



Wetland ID: WK166
Wetland Delineations
Glacier Ridge Wind, LLC
Barnes County, North Dakota



Wetland Delineation Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Wetland WK166 overview looking to the west.



Wetland sample point WK166A



Non-wetland sample point WK166B

APPENDIX C – SURVEYED WETLANDS AND OTHER WATERS FEATURES

Table C-1: Surveyed Streams

| Stream ID | Map Book Page | Stream Type | Cowardin Class | Jurisdiction | Average Width (feet) |
|-----------|---------------|-------------|----------------|--------------|----------------------|
| SJ109 | F5 | NRPW | R4USC | USACE | 5 |
| SJ112 | F5 | NRPW | R4USC | USACE | 5 |
| SJ170 | F5 | RPW | R2UBH | USACE | 4 |
| SK085 | K3 | NRPW | R4USCd | USACE | 3 |
| SK135 | I6 | NRPW | R4USC | USACE | 12 |
| SK149 | K4 | NRPW | R4USCd | USACE | 12 |

Table C-2: Surveyed Wetlands

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ001 | D5 | Seasonally Flooded Basin | PEMAf | | 0.376 |
| WJ006 | D5 | Seasonally Flooded Basin | PEMAf | | 0.043 |
| WJ007 | C4 | Shallow Marsh | PEMC | USACE | 5.767 |
| WJ009 | C4 | Seasonally Flooded Basin | PEMAf | | 0.155 |
| WJ010 | C4 | Seasonally Flooded Basin | PEMAf | | 1.425 |
| WJ011 | C4 | Seasonally Flooded Basin | PEMAf | | 0.020 |
| WJ012 | C4 | Seasonally Flooded Basin | PEMAf | | 0.144 |
| WJ013 | C4 | Seasonally Flooded Basin | PEMAf | | 0.349 |
| WJ014 | C4 | Seasonally Flooded Basin | PEMAf | | 0.185 |
| WJ015 | C4 | Seasonally Flooded Basin | PEMAf | | 0.128 |
| WJ016 | C4 | Seasonally Flooded Basin | PEMAf | | 0.098 |
| WJ017 | C3 | Seasonally Flooded Basin | PEMAf | | 0.195 |
| WJ018 | C4 | Seasonally Flooded Basin | PEMAf | | 0.131 |
| WJ021 | C3 | Shallow Marsh | PEMC/PEMAf | | 0.645 |
| WJ023 | C3 | Seasonally Flooded Basin | PEMAf | | 0.095 |
| WJ024 | C3 | Seasonally Flooded Basin | PEMAf | | 0.086 |
| WJ025 | C3 | Seasonally Flooded Basin | PEMAf | | 0.302 |
| WJ026 | C3 | Seasonally Flooded Basin | PEMA | | 0.183 |
| WJ027 | C3 | Shallow Marsh | PEMC/PEMAf | | 0.227 |
| WJ028 | C3 | Seasonally Flooded Basin | PEMAf | | 0.243 |
| WJ029 | D3 | Seasonally Flooded Basin | PEMAf | | 0.273 |
| WJ030 | D3 | Seasonally Flooded Basin | PEMAf | | 0.115 |
| WJ031 | D3 | Shallow Marsh | PEMC/PEMAf | | 0.934 |
| WJ032 | D3 | Shallow Marsh | PEMC/PEMAf | | 0.124 |
| WJ033 | D3 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.156 |
| WJ034 | E2 | Seasonally Flooded Basin | PEMAf | | 0.250 |
| WJ035 | E2 | Seasonally Flooded Basin | PEMAf | | 0.366 |
| WJ036 | E2 | Shallow Marsh | PEMC/PEMAf | | 0.448 |
| WJ038 | E2 | Seasonally Flooded Basin | PEMA | | 0.049 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|---------------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ040 | E4 | Seasonally Flooded Basin | PEMAf | | 0.334 |
| WJ042 | E4 | Seasonally Flooded Basin | PEMAf | | 0.397 |
| WJ043 | E4 | Shallow Marsh | PEMC/PEMAf | | 0.469 |
| WJ044 | E4 | Shallow Marsh | PEMC/PEMAf | | 0.248 |
| WJ048 | E4 | Seasonally Flooded Basin | PEMAf | | 0.158 |
| WJ049 | E4 | Seasonally Flooded Basin | PEMAf | | 0.382 |
| WJ050 | E4 | Seasonally Flooded Basin | PEMAf | USACE | 1.249 |
| WJ051 | E4 | Seasonally Flooded Basin | PEMAf | | 0.376 |
| WJ052 | E4 | Seasonally Flooded Basin | PEMA/PEMBf | | 2.015 |
| WJ053 | E4 | Seasonally Flooded Basin | PEMAf | | 0.257 |
| WJ054 | E4 | Seasonally Flooded Basin | PEMAf | | 0.318 |
| WJ055 | E4 | Seasonally Flooded Basin | PEMAf | | 0.034 |
| WJ056 | E3 | Seasonally Flooded Basin | PEMAf | | 0.143 |
| WJ057 | E3 | Shallow Marsh | PEMC/PEMAf | | 0.480 |
| WJ058 | E2 | Shallow Marsh | PEMC/PEMAf | USACE | 0.368 |
| WJ060 | E3 | Seasonally Flooded Basin | PEMAf | | 0.103 |
| WJ061 | E3 | Shallow Open Water | PEMH/PEMC/ PEMAf | | 15.941 |
| WJ062 | E3 | Wet Meadow | PEMB | | 0.042 |
| WJ063 | E3 | Wet Meadow | PEMB | | 0.280 |
| WJ064 | E3 | Wet Meadow | PEMB | | 0.024 |
| WJ065 | E3 | Deep Marsh | PEMF/PEMC/ PEMB | | 1.246 |
| WJ066 | E3 | Seasonally Flooded Basin | PEMAf | | 0.386 |
| WJ067 | E3 | Seasonally Flooded Basin | PEMAf | | 0.056 |
| WJ068 | D3 | Shallow Marsh | PEMH/PEMC | | 0.322 |
| WJ069 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.884 |
| WJ070 | B4 | Shallow Marsh | PEMC | | 0.753 |
| WJ071 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.235 |
| WJ072 | B4 | Seasonally Flooded Basin | PEMAf | | 0.169 |
| WJ074 | B4 | Seasonally Flooded Basin | PEMAf | | 0.306 |
| WJ076 | B4 | Seasonally Flooded Basin | PEMAf | | 0.071 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ077 | B4 | Seasonally Flooded Basin | PEMAf | | 0.098 |
| WJ079 | B4 | Seasonally Flooded Basin | PEMAf | | 0.255 |
| WJ080 | B4 | Seasonally Flooded Basin | PEMAf | | 0.132 |
| WJ082 | B4 | Seasonally Flooded Basin | PEMAf | | 0.228 |
| WJ084 | B4 | Shallow Marsh | PEMC | USACE | 14.679 |
| WJ085 | C4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE, USFWS | 4.036 |
| WJ086 | C4 | Seasonally Flooded Basin | PEMAf | | 0.090 |
| WJ087 | C4 | Seasonally Flooded Basin | PEMAf | | 0.028 |
| WJ088 | E3 | Seasonally Flooded Basin | PEMAf | | 0.357 |
| WJ090 | E3 | Shallow Open Water | PEMH/PEMAf | | 4.239 |
| WJ091 | E3 | Seasonally Flooded Basin | PEMAf | | 0.545 |
| WJ092 | E3 | Seasonally Flooded Basin | PEMAf | | 0.559 |
| WJ093 | E3 | Seasonally Flooded Basin | PEMAf | | 0.044 |
| WJ094 | E3 | Seasonally Flooded Basin | PEMAf | | 0.042 |
| WJ095 | E3 | Seasonally Flooded Basin | PEMAf | | 0.465 |
| WJ096 | E3 | Seasonally Flooded Basin | PEMAf | | 0.189 |
| WJ097 | E3 | Seasonally Flooded Basin | PEMAf | | 0.057 |
| WJ098 | E3 | Seasonally Flooded Basin | PEMAf | | 1.163 |
| WJ099 | E3 | Seasonally Flooded Basin | PEMAf | | 0.045 |
| WJ100 | E5 | Seasonally Flooded Basin | PEMAf | | 1.096 |
| WJ101 | E5 | Seasonally Flooded Basin | PEMAf | | 0.157 |
| WJ102 | E5 | Seasonally Flooded Basin | PEMAf | | 0.132 |
| WJ103 | E5 | Seasonally Flooded Basin | PEMAf | | 0.223 |
| WJ104 | E5 | Seasonally Flooded Basin | PEMAf | | 1.471 |
| WJ105 | E5 | Seasonally Flooded Basin | PEMAf | | 0.401 |
| WJ106 | E5 | Seasonally Flooded Basin | PEMAf | | 0.438 |
| WJ107 | F5 | Seasonally Flooded Basin | PEMAf | | 0.282 |
| WJ108 | F4 | Seasonally Flooded Basin | PEMA | USACE | 0.014 |
| WJ115 | G4 | Seasonally Flooded Basin | PEMAf | | 0.037 |
| WJ116 | F5 | Seasonally Flooded Basin | PEMAf | USACE | 0.289 |
| WJ117 | F5 | Seasonally Flooded Basin | PEMAf | | 0.108 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ118 | F5 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.970 |
| WJ119 | F5 | Seasonally Flooded Basin | PEMAf | | 0.083 |
| WJ120 | F5 | Seasonally Flooded Basin | PEMAf | | 0.266 |
| WJ121 | F5 | Seasonally Flooded Basin | PEMAf | | 0.193 |
| WJ122 | F5 | Seasonally Flooded Basin | PEMAf | | 0.087 |
| WJ123 | F5 | Seasonally Flooded Basin | PEMAf | | 0.109 |
| WJ124 | F5 | Seasonally Flooded Basin | PEMAf | | 0.107 |
| WJ125 | F5 | Seasonally Flooded Basin | PEMAf | | 0.204 |
| WJ127 | F5 | Seasonally Flooded Basin | PEMAf | | 0.089 |
| WJ128 | F5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 21.818 |
| WJ129 | F5 | Seasonally Flooded Basin | PEMAf | | 0.957 |
| WJ130 | F5 | Seasonally Flooded Basin | PEMAf | | 0.039 |
| WJ131 | F5 | Seasonally Flooded Basin | PEMAf | | 0.107 |
| WJ132 | F5 | Shallow Marsh | PEMC/PEMAf | | 0.962 |
| WJ134 | F5 | Seasonally Flooded Basin | PEMAf | | 1.008 |
| WJ135 | G4 | Seasonally Flooded Basin | PEMAf | | 0.089 |
| WJ137 | G4 | Seasonally Flooded Basin | PEMAf | | 1.019 |
| WJ138 | G4 | Seasonally Flooded Basin | PEMAf | | 0.052 |
| WJ141 | G4 | Seasonally Flooded Basin | PEMAf | | 0.275 |
| WJ142 | G4 | Seasonally Flooded Basin | PEMAf | | 0.218 |
| WJ143 | G4 | Seasonally Flooded Basin | PEMAf | | 0.097 |
| WJ144 | G4 | Seasonally Flooded Basin | PEMAf | | 0.033 |
| WJ145 | G4 | Seasonally Flooded Basin | PEMAf | | 0.172 |
| WJ146 | G4 | Seasonally Flooded Basin | PEMAf | | 0.400 |
| WJ147 | G4 | Seasonally Flooded Basin | PEMAf | | 0.063 |
| WJ148 | G4 | Seasonally Flooded Basin | PEMAf | | 0.202 |
| WJ150 | G4 | Seasonally Flooded Basin | PEMAf | | 0.059 |
| WJ151 | G4 | Seasonally Flooded Basin | PEMAf | | 0.275 |
| WJ152 | G4 | Seasonally Flooded Basin | PEMAf | | 0.063 |
| WJ154 | G4 | Seasonally Flooded Basin | PEMAf | | 0.098 |
| WJ155 | G4 | Seasonally Flooded Basin | PEMAf | USACE | 0.048 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|-------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ157 | G4 | Seasonally Flooded Basin | PEMAf | | 0.132 |
| WJ158 | G4 | Seasonally Flooded Basin | PEMAf | | 0.030 |
| WJ159 | G4 | Seasonally Flooded Basin | PEMAf | | 0.063 |
| WJ160 | G4 | Seasonally Flooded Basin | PEMAf | | 0.263 |
| WJ161 | F4 | Seasonally Flooded Basin | PEMA/PEMC | | 0.410 |
| WJ162 | G4 | Seasonally Flooded Basin | PEMAf | | 0.024 |
| WJ163 | G4 | Seasonally Flooded Basin | PEMAf | | 0.042 |
| WJ164 | G4 | Seasonally Flooded Basin | PEMAf | | 0.097 |
| WJ165 | G4 | Seasonally Flooded Basin | PEMAf | | 0.014 |
| WJ166 | G4 | Seasonally Flooded Basin | PEMAf | | 0.161 |
| WJ167 | G4 | Seasonally Flooded Basin | PEMAf | | 0.053 |
| WJ168 | G4 | Seasonally Flooded Basin | PEMAf | | 0.068 |
| WJ169 | F5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.156 |
| WJ171 | F5 | Seasonally Flooded Basin | PEMAf | | 0.294 |
| WJ172 | F5 | Wet Meadow | PEMBf/PEMAf | USACE, USFWS | 0.801 |
| WJ173 | F5 | Seasonally Flooded Basin | PEMAf | | 0.081 |
| WJ174 | F5 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.082 |
| WJ175 | E5 | Seasonally Flooded Basin | PEMAf | | 0.310 |
| WJ176 | E5 | Seasonally Flooded Basin | PEMAf | | 0.305 |
| WJ177 | E5 | Seasonally Flooded Basin | PEMAf | | 0.618 |
| WJ178 | E5 | Wet Meadow | PEMB | | 2.216 |
| WJ179 | E5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 1.747 |
| WJ180 | D3 | Shallow Marsh | PEMC/PEMB | | 0.779 |
| WJ181 | E3 | Shallow Marsh | PEMC | | 0.046 |
| WJ182 | D3 | Seasonally Flooded Basin | PEMA | | 0.016 |
| WJ183 | D3 | Shallow Marsh | PEMC | USACE | 0.211 |
| WJ184 | D3 | Seasonally Flooded Basin | PEMAf | | 0.219 |
| WJ185 | D3 | Shallow Marsh | PEMC/PEMAf | USACE | 2.252 |
| WJ186 | H4 | Seasonally Flooded Basin | PEMAf | | 0.593 |
| WJ187 | H4 | Seasonally Flooded Basin | PEMAf | | 0.244 |
| WJ188 | G4 | Seasonally Flooded Basin | PEMAf | | 0.062 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ189 | H4 | Seasonally Flooded Basin | PEMAf | USACE | 0.213 |
| WJ191 | H4 | Seasonally Flooded Basin | PEMA | USACE | 0.098 |
| WJ196 | H4 | Seasonally Flooded Basin | PEMAf | | 0.660 |
| WJ198 | H4 | Shallow Marsh | PEMC | USACE | 0.225 |
| WJ199 | H4 | Seasonally Flooded Basin | PEMAf | | 0.091 |
| WJ200 | H4 | Seasonally Flooded Basin | PEMAf | | 0.114 |
| WJ201 | H4 | Seasonally Flooded Basin | PEMAf | | 0.199 |
| WJ202 | H3 | Seasonally Flooded Basin | PEMAf | USACE | 0.200 |
| WJ203 | H3 | Shallow Marsh | PEMC/PFO | | 0.404 |
| WJ204 | H5 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.647 |
| WJ205 | H5 | Seasonally Flooded Basin | PEMAf | USACE | 0.525 |
| WJ206 | H5 | Seasonally Flooded Basin | PEMA | | 0.365 |
| WJ207 | I5 | Shallow Marsh | PEMC/PEMAf | USACE | 2.313 |
| WJ210 | I4 | Seasonally Flooded Basin | PEMA | USACE | 4.858 |
| WJ211 | I4 | Seasonally Flooded Basin | PEMAf | | 0.194 |
| WJ213 | I4 | Seasonally Flooded Basin | PEMAf | | 0.040 |
| WJ215 | I4 | Seasonally Flooded Basin | PEMAf | | 0.025 |
| WJ217 | I4 | Seasonally Flooded Basin | PEMAf | | 0.256 |
| WJ218 | I4 | Seasonally Flooded Basin | PEMAf | | 0.501 |
| WJ219 | I4 | Seasonally Flooded Basin | PEMAf | | 0.231 |
| WJ220 | I4 | Seasonally Flooded Basin | PEMAf | | 0.434 |
| WJ221 | I4 | Seasonally Flooded Basin | PEMAf | | 0.209 |
| WJ222 | I4 | Seasonally Flooded Basin | PEMAf | | 0.196 |
| WJ223 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.037 |
| WJ224 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.335 |
| WJ225 | I3 | Seasonally Flooded Basin | PEMAf | | 0.037 |
| WJ226 | I3 | Seasonally Flooded Basin | PEMAf | | 0.156 |
| WJ227 | I3 | Shallow Marsh | PEMC | USACE | 0.191 |
| WJ228 | I3 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.738 |
| WJ230 | I3 | Seasonally Flooded Basin | PEMAf | | 0.082 |
| WJ231 | I3 | Seasonally Flooded Basin | PEMAf | | 0.167 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ232 | I3 | Seasonally Flooded Basin | PEMAf | | 0.156 |
| WJ233 | I3 | Seasonally Flooded Basin | PEMAf | | 1.180 |
| WJ234 | I3 | Shallow Marsh | PEMC/PEMA | | 6.789 |
| WJ235 | I3 | Deep Marsh | PEMF | | 0.528 |
| WJ236 | I3 | Seasonally Flooded Basin | PEMAf | | 0.082 |
| WJ237 | I3 | Seasonally Flooded Basin | PEMAf | | 0.390 |
| WJ238 | I3 | Deep Marsh | PEMF/PEMAf | | 0.239 |
| WJ239 | I3 | Seasonally Flooded Basin | PEMAf | | 0.038 |
| WJ240 | I3 | Seasonally Flooded Basin | PEMAf | | 0.028 |
| WJ241 | I3 | Shallow Marsh | PEMC | USACE | 0.323 |
| WJ245 | J3 | Shallow Marsh | PEMC | | 1.946 |
| WJ246 | J2 | Shallow Open Water | PEMH | | 1.402 |
| WJ247 | J2 | Seasonally Flooded Basin | PEMA | | 0.061 |
| WJ250 | J2 | Seasonally Flooded Basin | PEMAf | | 0.066 |
| WJ251 | J2 | Seasonally Flooded Basin | PEMAf | | 0.362 |
| WJ252 | J2 | Seasonally Flooded Basin | PEMAf | | 0.162 |
| WJ253 | J2 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.521 |
| WJ254 | J2 | Wet Meadow | PEMBf | | 0.178 |
| WJ255 | J2 | Seasonally Flooded Basin | PEMAf | | 0.206 |
| WJ256 | J2 | Seasonally Flooded Basin | PEMAf | | 0.188 |
| WJ257 | J2 | Seasonally Flooded Basin | PEMAf | | 0.097 |
| WJ258 | J2 | Seasonally Flooded Basin | PEMAf | | 0.113 |
| WJ259 | J3 | Seasonally Flooded Basin | PEMAf | | 0.010 |
| WJ261 | J2 | Seasonally Flooded Basin | PEMAf | | 0.261 |
| WJ263 | J2 | Seasonally Flooded Basin | PEMAf | | 0.082 |
| WJ264 | K2 | Seasonally Flooded Basin | PEMAf | | 0.471 |
| WJ265 | J2 | Wet Meadow | PEMBf | | 0.075 |
| WJ266 | D3 | Seasonally Flooded Basin | PEMAf | | 0.242 |
| WJ267 | D3 | Seasonally Flooded Basin | PEMAf | | 0.110 |
| WJ268 | D3 | Seasonally Flooded Basin | PEMAf | | 0.161 |
| WJ269 | D3 | Shallow Marsh | PEMC | | 0.809 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ270 | D3 | Seasonally Flooded Basin | PEMAf | | 0.059 |
| WJ271 | D3 | Shallow Marsh | PEMC | USACE | 0.190 |
| WJ272 | D3 | Seasonally Flooded Basin | PEMAf | | 0.192 |
| WJ273 | I3 | Wet Meadow | PEMB/PEMAf | USACE | 1.972 |
| WJ274 | I3 | Shallow Marsh | PEMC/PEMAf | | 0.072 |
| WJ275 | I3 | Seasonally Flooded Basin | PEMAf | | 0.081 |
| WJ276 | I3 | Seasonally Flooded Basin | PEMAf | | 0.064 |
| WJ278 | H1 | Shallow Marsh | PEMC | | 0.022 |
| WJ279 | I1 | Seasonally Flooded Basin | PEMAf | | 0.327 |
| WJ280 | H2 | Shallow Marsh | PEMC/PEMAf | | 0.225 |
| WJ281 | H2 | Shallow Marsh | PEMC/PEMAf | | 1.353 |
| WJ282 | H2 | Seasonally Flooded Basin | PEMA | | 0.060 |
| WJ283 | H2 | Seasonally Flooded Basin | PEMA | | 0.019 |
| WJ284 | H2 | Seasonally Flooded Basin | PEMAf | | 0.198 |
| WJ285 | H2 | Shallow Marsh | PEMC/PEMAf | | 0.849 |
| WJ286 | H2 | Seasonally Flooded Basin | PEMAf | | 0.028 |
| WJ287 | H2 | Seasonally Flooded Basin | PEMAf | | 0.062 |
| WJ288 | H2 | Seasonally Flooded Basin | PEMAf | | 0.175 |
| WJ289 | H2 | Seasonally Flooded Basin | PEMAf | | 0.293 |
| WJ290 | H2 | Seasonally Flooded Basin | PEMAf | | 0.071 |
| WJ291 | H2 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 3.279 |
| WJ292 | H2 | Shallow Open Water | PEMH/PEMAf | | 0.230 |
| WJ293 | I4 | Seasonally Flooded Basin | PEMAf | | 0.074 |
| WJ294 | I4 | Seasonally Flooded Basin | PEMAf | USACE | 0.845 |
| WJ295 | I4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.348 |
| WJ296 | I4 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.261 |
| WJ297 | I3 | Seasonally Flooded Basin | PEMAf | | 0.178 |
| WJ298 | J4 | Seasonally Flooded Basin | PEMAf | | 0.384 |
| WJ299 | J4 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.637 |
| WJ300 | J5 | Shallow Marsh | PEMC/PEMAf | | 0.480 |
| WJ302 | J4 | Seasonally Flooded Basin | PEMAf | | 0.158 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|-------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ303 | J4 | Seasonally Flooded Basin | PEMAf | | 0.285 |
| WJ304 | J4 | Seasonally Flooded Basin | PEMAf | | 0.288 |
| WJ305 | J4 | Seasonally Flooded Basin | PEMAf | | 0.475 |
| WJ306 | J4 | Seasonally Flooded Basin | PEMAf | | 0.206 |
| WJ307 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.050 |
| WJ308 | J4 | Shallow Marsh | PEMC/PEMAh | | 3.644 |
| WJ309 | J4 | Seasonally Flooded Basin | PEMAf | | 0.115 |
| WJ312 | K3 | Seasonally Flooded Basin | PEMAf | | 0.037 |
| WJ313 | K3 | Seasonally Flooded Basin | PEMAf | | 0.027 |
| WJ314 | L3 | Seasonally Flooded Basin | PEMA | USACE | 0.018 |
| WJ315 | E4 | Seasonally Flooded Basin | PEMAf | | 0.142 |
| WJ316 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | | 0.484 |
| WJ317 | E4 | Seasonally Flooded Basin | PEMAf | USACE, USFWS | 1.527 |
| WJ318 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USACE, USFWS | 2.371 |
| WJ319 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | | 4.222 |
| WJ320 | E4 | Shallow Marsh | PEMC | | 0.215 |
| WJ321 | I2 | Seasonally Flooded Basin | PEMAf/PEMC | | 2.194 |
| WJ322 | I2 | Seasonally Flooded Basin | PEMAf/PEMB | | 1.301 |
| WJ323 | I2 | Seasonally Flooded Basin | PEMAf | | 2.263 |
| WJ324 | J4 | Shallow Marsh | PEMC/PEMB | USACE | 2.810 |
| WJ325 | K4 | Seasonally Flooded Basin | PEMA | USACE | 0.617 |
| WJ326 | I2 | Shallow Marsh | PEMC/PEMAf | | 0.391 |
| WJ327 | I2 | Seasonally Flooded Basin | PEMAf | | 0.212 |
| WJ328 | I2 | Seasonally Flooded Basin | PEMAf | | 0.401 |
| WJ329 | I2 | Seasonally Flooded Basin | PEMAf | | 0.079 |
| WJ330 | I2 | Seasonally Flooded Basin | PEMAf | | 0.156 |
| WJ331 | I2 | Seasonally Flooded Basin | PEMAf | | 0.073 |
| WJ333 | I2 | Seasonally Flooded Basin | PEMAf | | 0.018 |
| WJ334 | I2 | Seasonally Flooded Basin | PEMAf | | 0.060 |
| WJ335 | I2 | Seasonally Flooded Basin | PEMAf | | 0.220 |
| WJ337 | I2 | Seasonally Flooded Basin | PEMAf | | 0.187 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ338 | I2 | Seasonally Flooded Basin | PEMAf | | 0.246 |
| WJ339 | E5 | Shallow Marsh | PEMC/PEMAf | | 0.354 |
| WJ340 | E4 | Seasonally Flooded Basin | PEMAf | | 0.232 |
| WJ341 | E4 | Seasonally Flooded Basin | PEMAf | | 0.142 |
| WJ342 | E4 | Seasonally Flooded Basin | PEMAf | | 0.075 |
| WJ346 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.341 |
| WJ347 | A3 | Shallow Marsh | PEMC | | 0.120 |
| WK001 | M1 | Seasonally Flooded Basin | PEMAf | | 0.161 |
| WK002 | M2 | Seasonally Flooded Basin | PEMAf | | 0.520 |
| WK005 | M2 | Shallow Marsh | PEMC | | 0.633 |
| WK006 | M2 | Seasonally Flooded Basin | PEMAf | | 0.228 |
| WK007 | M2 | Seasonally Flooded Basin | PEMAf | | 0.072 |
| WK008 | M2 | Seasonally Flooded Basin | PEMAf | | 0.106 |
| WK009 | M2 | Seasonally Flooded Basin | PEMAf | | 0.381 |
| WK010 | N2 | Seasonally Flooded Basin | PEMAf | | 0.099 |
| WK011 | M2 | Shallow Marsh | PEMC | | 1.454 |
| WK012 | M2 | Seasonally Flooded Basin | PEMAf | | 0.163 |
| WK015 | M2 | Seasonally Flooded Basin | PEMAf | | 0.034 |
| WK016 | M2 | Shallow Open Water | PABH/PEMC | | 20.808 |
| WK017 | N2 | Seasonally Flooded Basin | PEMAf | | 0.016 |
| WK018 | N2 | Seasonally Flooded Basin | PEMAf | | 0.052 |
| WK019 | N2 | Seasonally Flooded Basin | PEMAf | | 0.120 |
| WK020 | N2 | Shallow Marsh | PEMC | USACE | 2.076 |
| WK021 | N2 | Deep Marsh | PABF/PEMC | | 15.219 |
| WK022 | N2 | Seasonally Flooded Basin | PEMAf | | 0.251 |
| WK024 | M3 | Shallow Marsh | PEMC/PEMB | | 0.697 |
| WK026 | M3 | Seasonally Flooded Basin | PEMAf | | 0.303 |
| WK027 | M3 | Seasonally Flooded Basin | PEMAf | | 0.787 |
| WK028 | M3 | Seasonally Flooded Basin | PEMAf | | 0.257 |
| WK029 | M3 | Seasonally Flooded Basin | PEMAf | | 0.393 |
| WK030 | M3 | Seasonally Flooded Basin | PEMAf | | 0.850 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK031 | M3 | Seasonally Flooded Basin | PEMAf | | 0.145 |
| WK033 | M3 | Seasonally Flooded Basin | PEMAf | | 0.224 |
| WK035 | M4 | Seasonally Flooded Basin | PEMAf | | 0.324 |
| WK036 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.843 |
| WK039 | M4 | Seasonally Flooded Basin | PEMAf | | 0.301 |
| WK040 | M4 | Seasonally Flooded Basin | PEMAf | | 0.300 |
| WK045 | M3 | Seasonally Flooded Basin | PEMAf | | 0.023 |
| WK047 | M3 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK048 | M3 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 1.641 |
| WK049 | M3 | Seasonally Flooded Basin | PEMAf | | 0.363 |
| WK050 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.056 |
| WK051 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.042 |
| WK052 | M4 | Wet Meadow | PEMBf | | 2.038 |
| WK053 | M4 | Wet Meadow | PEMB | | 0.329 |
| WK054 | M4 | Seasonally Flooded Basin | PEMAf | | 0.148 |
| WK055 | M4 | Seasonally Flooded Basin | PEMAf | | 0.121 |
| WK057 | M4 | Seasonally Flooded Basin | PEMAf | | 1.097 |
| WK058 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.556 |
| WK060 | M4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 2.271 |
| WK061 | M4 | Seasonally Flooded Basin | PEMAf | | 0.423 |
| WK062 | M4 | Seasonally Flooded Basin | PEMAf | | 0.185 |
| WK063 | L4 | Seasonally Flooded Basin | PEMAf | | 0.101 |
| WK064 | L4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.131 |
| WK066 | L4 | Seasonally Flooded Basin | PEMAf | | 0.563 |
| WK068 | L2 | Shallow Marsh | PEMC/PEMAf | | 0.614 |
| WK070 | K2 | Seasonally Flooded Basin | PEMAf | | 0.645 |
| WK071 | K2 | Shallow Marsh | PEMC | | 1.559 |
| WK075 | K2 | Seasonally Flooded Basin | PEMAf | | 0.074 |
| WK077 | J3 | Shallow Marsh | PEMC | | 0.276 |
| WK079 | K3 | Shallow Marsh | PEMC | USACE | 0.514 |
| WK080 | K3 | Seasonally Flooded Basin | PEMAf | | 0.208 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK081 | K3 | Seasonally Flooded Basin | PEMAf | | 0.276 |
| WK082 | K3 | Shallow Marsh | PEMC/PEMAf | | 0.444 |
| WK083 | K3 | Seasonally Flooded Basin | PEMAf | | 0.202 |
| WK084 | K3 | Wet Meadow | PEMBd | USACE | 0.211 |
| WK086 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.134 |
| WK087 | J5 | Wet Meadow | PEMB | | 0.214 |
| WK088 | J5 | Shallow Marsh | PEMC | | 1.152 |
| WK089 | J5 | Shallow Marsh | PEMC | | 2.256 |
| WK090 | J5 | Shallow Marsh | PEMC | | 0.417 |
| WK091 | J5 | Shallow Marsh | PEMC | | 0.131 |
| WK092 | J5 | Seasonally Flooded Basin | PEMA | | 0.152 |
| WK093 | J5 | Shallow Marsh | PEMC | | 0.494 |
| WK094 | J5 | Shallow Marsh | PEMC | | 0.949 |
| WK095 | J5 | Shallow Marsh | PEMC | | 1.851 |
| WK096 | J5 | Shallow Marsh | PEMC | | 0.378 |
| WK097 | J5 | Shallow Marsh | PEMC | | 0.723 |
| WK098 | J5 | Shallow Marsh | PEMC | | 1.223 |
| WK099 | J5 | Shallow Marsh | PEMC | | 0.477 |
| WK100 | J5 | Shallow Marsh | PEMC | | 0.491 |
| WK101 | J5 | Seasonally Flooded Basin | PEMA | | 0.024 |
| WK102 | J5 | Seasonally Flooded Basin | PEMA | | 0.132 |
| WK103 | J5 | Seasonally Flooded Basin | PEMAf | | 0.213 |
| WK104 | J5 | Seasonally Flooded Basin | PEMA/PEMC | | 1.177 |
| WK106 | J5 | Shallow Marsh | PEMC | | 0.266 |
| WK107 | J5 | Shallow Marsh | PEMC | | 0.455 |
| WK108 | J5 | Shallow Marsh | PEMC | | 0.576 |
| WK109 | J5 | Shallow Marsh | PEMC/PEMAf | | 0.445 |
| WK110 | J4 | Shallow Marsh | PEMC | | 2.739 |
| WK111 | J5 | Shallow Marsh | PEMC | | 1.169 |
| WK112 | J5 | Seasonally Flooded Basin | PEMAf | | 0.473 |
| WK113 | J5 | Shallow Marsh | PEMC | | 0.345 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|---------------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK114 | J5 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK115 | J5 | Seasonally Flooded Basin | PEMAf | | 0.397 |
| WK116 | J5 | Seasonally Flooded Basin | PEMAf | | 0.119 |
| WK117 | J5 | Wet Meadow | PEMB/PEMA/ PEMCf | USACE | 15.753 |
| WK118 | J5 | Shallow Marsh | PEMC | | 0.667 |
| WK119 | J5 | Seasonally Flooded Basin | PEMAf | | 0.183 |
| WK120 | J5 | Shallow Marsh | PEMC | | 0.285 |
| WK121 | J5 | Seasonally Flooded Basin | PEMAf | | 0.129 |
| WK122 | J5 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.823 |
| WK123 | J5 | Shallow Marsh | PEMC/PEMAf | USACE | 2.064 |
| WK125 | K5 | Shallow Marsh | PEMC | USACE | 0.377 |
| WK126 | K5 | Shallow Marsh | PEMC | | 0.722 |
| WK128 | J6 | Seasonally Flooded Basin | PEMAf | | 1.157 |
| WK129 | J6 | Shallow Marsh | PEMC | | 1.776 |
| WK130 | J6 | Seasonally Flooded Basin | PEMAf | | 0.487 |
| WK131 | J6 | Seasonally Flooded Basin | PEMAf | | 0.445 |
| WK134 | J6 | Seasonally Flooded Basin | PEMAf | | 0.136 |
| WK135 | I6 | Shallow Marsh | PEMCd/PEMAf | USACE | 8.247 |
| WK136 | I6 | Shallow Marsh | PEMC | | 1.767 |
| WK138 | I6 | Shallow Marsh | PEMCd/ PEMAf | USACE | 0.930 |
| WK139 | I6 | Seasonally Flooded Basin | PEMAf | | 0.505 |
| WK141 | I6 | Seasonally Flooded Basin | PEMAf | | 0.131 |
| WK142 | I6 | Seasonally Flooded Basin | PEMAf | USACE | 0.218 |
| WK143 | I6 | Shallow Marsh | PEMC/PEMAf | | 0.675 |
| WK144 | I6 | Shallow Marsh | PEMC | | 1.745 |
| WK145 | J6 | Shallow Marsh | PEMC/PEMAf | | 3.394 |
| WK146 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.385 |
| WK147 | K4 | Seasonally Flooded Basin | PEMAf | | 0.181 |
| WK149 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 10.288 |
| WK150 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.240 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|----------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK151 | M3 | Seasonally Flooded Basin | PEMAf | | 0.061 |
| WK152 | M2 | Seasonally Flooded Basin | PEMAf | | 0.232 |
| WK153 | M2 | Seasonally Flooded Basin | PEMAf | | 0.248 |
| WK154 | L3 | Seasonally Flooded Basin | PEMAf | | 0.266 |
| WK155 | L3 | Shallow Marsh | PEMC | USACE | 0.266 |
| WK156 | K4 | Seasonally Flooded Basin | PEMAf | | 0.117 |
| WK157 | K4 | Seasonally Flooded Basin | PEMAf | | 0.114 |
| WK158 | K4 | Seasonally Flooded Basin | PEMAf | | 0.237 |
| WK160 | K4 | Seasonally Flooded Basin | PEMAf | | 0.066 |
| WK161 | K4 | Seasonally Flooded Basin | PEMAf | | 0.284 |
| WK162 | K4 | Seasonally Flooded Basin | PEMAf | | 0.209 |
| WK164 | K4 | Seasonally Flooded Basin | PEMAf | | 0.274 |
| WK165 | K4 | Seasonally Flooded Basin | PEMAf | | 0.091 |
| WK166 | K4 | Seasonally Flooded Basin | PEMAf | | 1.721 |
| WK170 | K4 | Seasonally Flooded Basin | PEMAf | | 0.141 |
| WK171 | K4 | Seasonally Flooded Basin | PEMAf | | 0.142 |
| WK173 | K4 | Seasonally Flooded Basin | PEMAf | | 0.620 |
| WK175 | K4 | Seasonally Flooded Basin | PEMAf | | 2.374 |
| WK176 | K4 | Seasonally Flooded Basin | PEMAf | | 0.215 |
| WK177 | K4 | Seasonally Flooded Basin | PEMAf | | 0.414 |
| WK178 | K4 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK180 | K4 | Seasonally Flooded Basin | PEMAf | | 0.165 |
| WK181 | K4 | Seasonally Flooded Basin | PEMAf | | 0.307 |
| WK182 | K4 | Seasonally Flooded Basin | PEMAf | | 0.188 |
| WK183 | K4 | Seasonally Flooded Basin | PEMAf | | 0.067 |
| WK184 | K5 | Shallow Marsh | PEMC | USACE | 1.248 |
| WK185 | K4 | Seasonally Flooded Basin | PEMAf | | 0.233 |
| WK188 | K4 | Seasonally Flooded Basin | PEMAf | | 0.618 |
| WK189 | K4 | Seasonally Flooded Basin | PEMAf | | 0.550 |
| WK193 | K4 | Seasonally Flooded Basin | PEMAf | | 0.125 |
| WK196 | K4 | Seasonally Flooded Basin | PEMAf | | 0.099 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK197 | J4 | Seasonally Flooded Basin | PEMAf | | 0.199 |
| WK198 | J4 | Seasonally Flooded Basin | PEMAf | | 0.115 |
| WK199 | J4 | Seasonally Flooded Basin | PEMAf | | 0.466 |
| WK200 | J4 | Shallow Marsh | PEMC/PEMAf | | 0.980 |
| WK201 | J4 | Shallow Marsh | PEMC/PEMAf | | 0.477 |
| WK203 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 1.700 |
| WK204 | J4 | Seasonally Flooded Basin | PEMAf | | 0.428 |
| WK205 | J4 | Seasonally Flooded Basin | PEMAf | | 0.114 |
| WK206 | J4 | Seasonally Flooded Basin | PEMAf | | 0.134 |
| WK207 | J4 | Seasonally Flooded Basin | PEMAf | | 0.219 |
| WK208 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.895 |
| WK209 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.319 |
| WK210 | J4 | Shallow Marsh | PEMC/PEMAf | | 0.453 |
| WK211 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.360 |
| WK212 | J4 | Seasonally Flooded Basin | PEMAf | | 1.111 |
| WK213 | J4 | Seasonally Flooded Basin | PEMAf | | 0.946 |
| WK214 | J3 | Seasonally Flooded Basin | PEMAf | | 0.205 |
| WK215 | J3 | Seasonally Flooded Basin | PEMA | | 0.183 |
| WK216 | J3 | Seasonally Flooded Basin | PEMAf | | 0.292 |
| WK217 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 0.355 |
| WK218 | J3 | Shallow Marsh | PEMC | USACE | 0.314 |
| WK219 | I4 | Seasonally Flooded Basin | PEMAf | | 0.229 |
| WK220 | I4 | Seasonally Flooded Basin | PEMAf | | 0.442 |
| WK221 | I4 | Seasonally Flooded Basin | PEMAf | | 0.560 |
| WK222 | I3 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK223 | I3 | Seasonally Flooded Basin | PEMAf | | 0.148 |
| WK224 | I3 | Seasonally Flooded Basin | PEMAf | | 0.124 |
| WK225 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 1.727 |
| WK226 | K3 | Seasonally Flooded Basin | PEMAf | | 0.135 |
| WK227 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 1.224 |
| WK228 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.146 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|----------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK229 | K3 | Seasonally Flooded Basin | PEMAf | | 0.092 |
| WK230 | K3 | Seasonally Flooded Basin | PEMAf | | 0.234 |
| WK231 | K3 | Seasonally Flooded Basin | PEMAf | | 0.195 |
| WK232 | K3 | Seasonally Flooded Basin | PEMAf | | 0.356 |
| WK233 | L3 | Seasonally Flooded Basin | PEMAf | USACE | 0.043 |

APPENDIX D – PHOTOGRAPHS

Wetlands and Other Waters Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Photograph 1 (North): View of a typical farmed Type 1 seasonally flooded wetland (WJ001).



Photograph 2 (Southwest): A view of a typical unfarmed Type 1 seasonally flooded wetland (WJ026).

Wetlands and Other Waters Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Photograph 3 (South): A view of a typical farmed Type 2 wet meadow wetland (WK052).



Photograph 4 (South): A view of a typical unfarmed Type 2 wet meadow wetland (WJ062).

Wetlands and Other Waters Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Photograph 5 (West): A view of a typical unfarmed Type 3 shallow marsh in an agricultural field (WJ285).



Photograph 6 (South): A view of a typical unfarmed Type 3 shallow marsh in an uncultivated area (WK126).

Wetlands and Other Waters Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



Photograph 7 (South): A view of a typical Type 4 deep marsh in an uncultivated area (WJ065).



Photograph 8 (South): A view of a typical Type 5 open water wetland in an uncultivated area (WK126).

Wetlands and Other Waters Photographs, Glacier Ridge Wind Farm, Barnes County, North Dakota



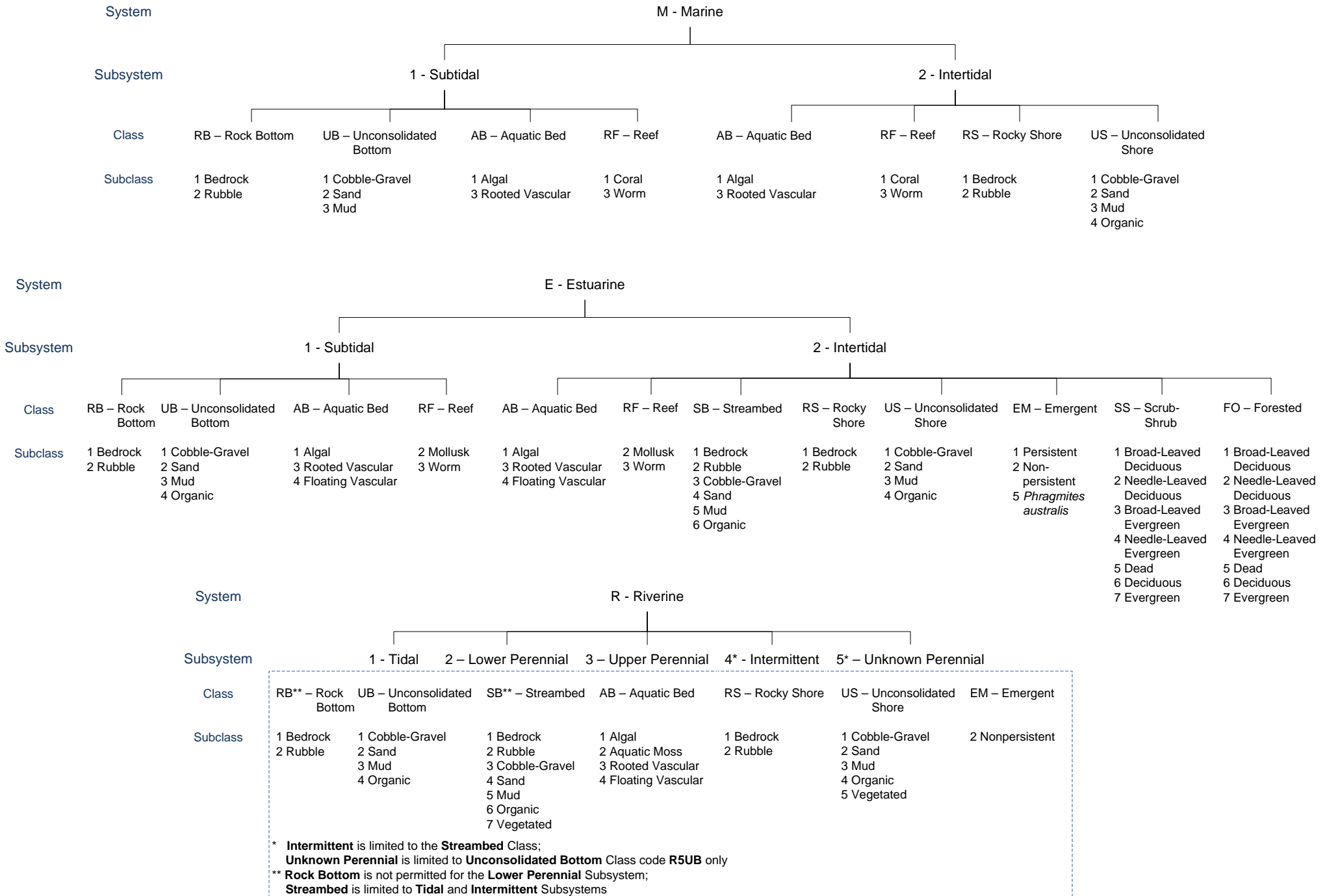
Photograph 9 (East): A view of a typical non-relatively permanent water (SK135).



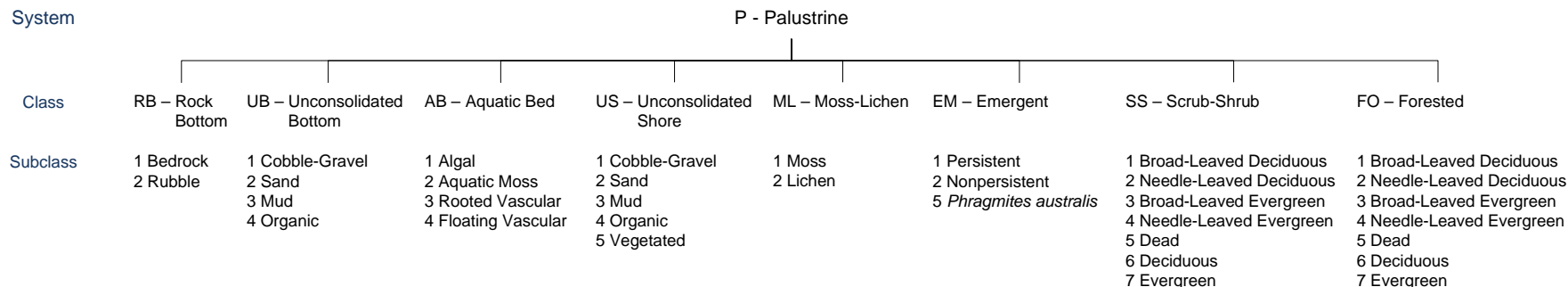
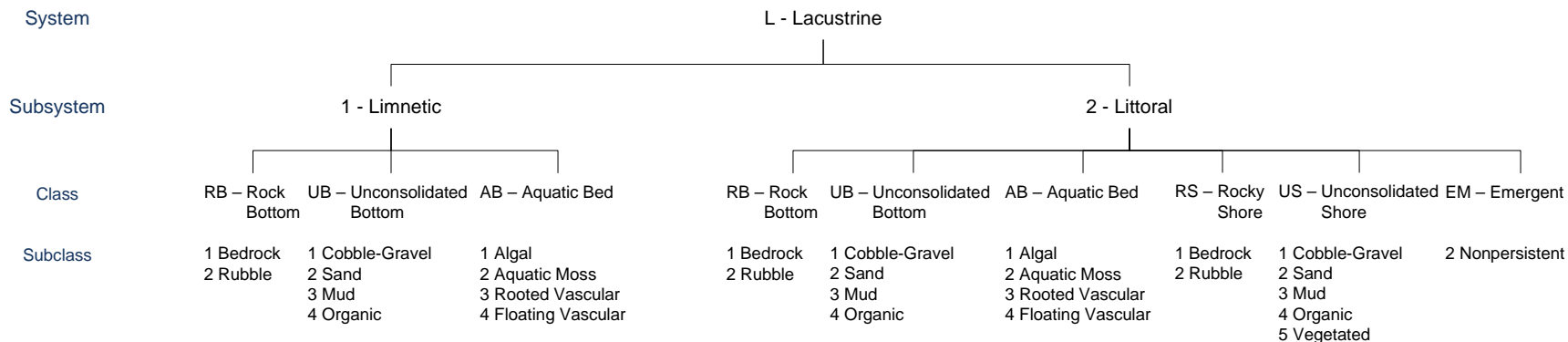
Photograph 10 (East): A view of a typical relatively permanent water (SJ170)

APPENDIX E – COWARDIN WETLAND CLASSIFICATION KEY

WETLANDS AND DEEPWATER HABITATS CLASSIFICATION



WETLANDS AND DEEPWATER HABITATS CLASSIFICATION



| MODIFIERS | | | | | | | |
|--|-----------------------|---------------------------------|--------------------------|-------------------------|-----------------|----------------------------------|-----------|
| In order to more adequately describe the wetland and deepwater habitats, one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system. | | | | | | | |
| Water Regime | | | Special Modifiers | Water Chemistry | | | Soil |
| Nontidal | Saltwater Tidal | Freshwater Tidal | | Coastal Halinity | Inland Salinity | pH Modifiers for all Fresh Water | |
| A Temporarily Flooded | L Subtidal | S Temporarily Flooded-Tidal | b Beaver | 1 Hyperhaline | 7 Hypersaline | a Acid | g Organic |
| B Saturated | M Irregularly Exposed | R Seasonally Flooded-Tidal | d Partly Drained/Ditched | 2 Euhaline | 8 Eusaline | t Circumneutral | n Mineral |
| C Seasonally Flooded | N Regularly Flooded | T Semipermanently Flooded-Tidal | f Farmed | 3 Mixohaline (Brackish) | 9 Mixosaline | i Alkaline | |
| E Seasonally Flooded/ Saturated | P Irregularly Flooded | V Permanently Flooded-Tidal | h Diked/Impounded | 4 Polyhaline | 0 Fresh | | |
| F Semipermanently Flooded | | | r Artificial | 5 Mesohaline | | | |
| G Intermittently Exposed | | | s Spoil | 6 Oligohaline | | | |
| H Permanently Flooded | | | x Excavated | 0 Fresh | | | |
| J Intermittently Flooded | | | | | | | |
| K Artificially Flooded | | | | | | | |

APPENDIX F – ESTIMATED IMPACTS TO WETLANDS AND OTHER WATERS

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|-----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ128 | F5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 0.367 | 1.100 | 1.467 |
| WJ071 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | USFWS | 0.076 | 0.226 | 0.301 |
| WJ189 | H4 | Seasonally Flooded Basin | PEMAf | USACE | 0.057 | 0.000 | 0.057 |
| WJ069 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | USFWS | 0.054 | 0.356 | 0.410 |
| WK123 | J5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.040 | 0.346 | 0.387 |
| WJ324 | J4 | Shallow Marsh | PEMC/PEMB | USACE | 0.033 | 0.235 | 0.268 |
| WJ205 | H5 | Seasonally Flooded Basin | PEMAf | USACE | 0.025 | 0.338 | 0.362 |
| WJ326 | I2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.023 | 0.066 | 0.089 |
| WK058 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.014 | 0.187 | 0.201 |
| WK142 | I6 | Seasonally Flooded Basin | PEMAf | USACE | 0.012 | 0.046 | 0.059 |
| WJ284 | H2 | Seasonally Flooded Basin | PEMAf | USFWS | 0.011 | 0.026 | 0.037 |
| WK138 | I6 | Shallow Marsh | PEMCd/ PEMAf | USACE | 0.011 | 0.047 | 0.057 |
| WK036 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.008 | 0.186 | 0.194 |
| WJ325 | K4 | Seasonally Flooded Basin | PEMA | USACE | 0.007 | 0.033 | 0.040 |
| WK060 | M4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 0.005 | 0.506 | 0.510 |
| WJ177 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.004 | 0.469 | 0.473 |
| WJ072 | B4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.004 | 0.024 | 0.029 |
| SK064 | L4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.002 | 0.015 | 0.017 |
| WJ106 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.002 | 0.416 | 0.418 |
| SJ112 | F5 | NRPW | R4USC | USACE | 0.001 | 0.005 | 0.006 |
| WJ105 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | <0.001 | 0.226 | 0.226 |
| WK135 | I6 | Shallow Marsh | PEMCd/ PEMAf | USACE | 0.000 | 1.177 | 1.177 |
| WK225 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 1.130 | 1.130 |

¹ Wetlands and other waters are listed in descending order of permanent impacts and then temporary impacts

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|----------------|-----------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ084 | B4 | Shallow Marsh | PEMC | USACE | 0.000 | 1.071 | 1.071 |
| WJ281 | H2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.917 | 0.917 |
| WJ291 | H2 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 0.000 | 0.585 | 0.585 |
| WJ273 | I3 | Wet Meadow | PEMB/PEMAf | USACE | 0.000 | 0.546 | 0.546 |
| WJ172 | F5 | Wet Meadow | PEMBf/PEMAf | USACE, USFWS | 0.000 | 0.536 | 0.536 |
| WK227 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.521 | 0.521 |
| WJ085 | C4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE, USFWS | 0.000 | 0.444 | 0.444 |
| WJ179 | E5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 0.000 | 0.419 | 0.419 |
| WJ317 | E4 | Seasonally Flooded Basin | PEMAf | USACE, USFWS | 0.000 | 0.418 | 0.418 |
| WJ210 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.413 | 0.413 |
| WJ207 | I5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.410 | 0.410 |
| WJ178 | E5 | Wet Meadow | PEMB | USFWS | 0.000 | 0.301 | 0.301 |
| WK048 | M3 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 0.000 | 0.278 | 0.278 |
| WK149 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 0.000 | 0.265 | 0.265 |
| WJ294 | I4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.260 | 0.260 |
| SK135 | I6 | NRPW | R4USC | USACE | 0.000 | 0.229 | 0.229 |
| WJ171 | F5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.204 | 0.204 |
| WK217 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.194 | 0.194 |
| WJ007 | C4 | Shallow Marsh | PEMC | USACE | 0.000 | 0.186 | 0.186 |
| WK218 | J3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.155 | 0.155 |
| WJ050 | E4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.151 | 0.151 |
| WJ316 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USFWS | 0.000 | 0.123 | 0.123 |
| WK203 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.091 | 0.091 |
| WK125 | K5 | Shallow Marsh | PEMC | USACE | 0.000 | 0.090 | 0.090 |
| WJ202 | H3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.087 | 0.087 |

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ173 | F5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.081 | 0.081 |
| WJ295 | I4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.078 | 0.078 |
| WJ058 | E2 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.075 | 0.075 |
| WK086 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.075 | 0.075 |
| WK150 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.074 | 0.074 |
| WJ176 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.069 | 0.069 |
| WK155 | L3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.063 | 0.063 |
| WJ116 | F5 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.057 | 0.057 |
| WJ282 | H2 | Seasonally Flooded Basin | PEMA | USFWS | 0.000 | 0.056 | 0.056 |
| WJ224 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.056 | 0.056 |
| WJ280 | H2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.051 | 0.051 |
| WJ086 | C4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.049 | 0.049 |
| WK228 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.049 | 0.049 |
| WJ185 | D3 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.041 | 0.041 |
| WJ271 | D3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.040 | 0.040 |
| WJ339 | E5 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.040 | 0.040 |
| WK084 | K3 | Wet Meadow | PEMBd | USACE | 0.000 | 0.038 | 0.038 |
| WJ286 | H2 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.028 | 0.028 |
| WJ318 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USACE, USFWS | 0.000 | 0.027 | 0.027 |
| WJ198 | H4 | Shallow Marsh | PEMC | USACE | 0.000 | 0.027 | 0.027 |
| WK209 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.026 | 0.026 |
| WJ227 | I3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.026 | 0.026 |
| WJ087 | C4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.024 | 0.024 |
| WJ191 | H4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.024 | 0.024 |
| WJ340 | E4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.021 | 0.021 |

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ169 | F5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.019 | 0.019 |
| WJ319 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USFWS | 0.000 | 0.017 | 0.017 |
| WK233 | L3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.015 | 0.015 |
| WJ314 | L3 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.014 | 0.014 |
| SK149 | K4 | NRPW | R4USCd | USACE | 0.000 | 0.014 | 0.014 |
| WK211 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.014 | 0.014 |
| WJ307 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.010 | 0.010 |
| WK051 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.009 | 0.009 |
| WJ155 | G4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.007 | 0.007 |
| WJ223 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.005 | 0.005 |
| WJ108 | F4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.005 | 0.005 |
| SJ170 | F5 | RPW | R2UBH | USACE | 0.000 | 0.004 | 0.004 |
| SK085 | K3 | NRPW | R4USCd | USACE | 0.000 | 0.003 | 0.003 |
| WK208 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.003 | 0.003 |
| WJ241 | I3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.002 | 0.002 |
| WJ285 | H2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.001 | 0.001 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ052 | E4 | Seasonally Flooded Basin | PEMAf/ PEMBf | None | 0.112 | 1.442 | 1.554 |
| WK088 | J5 | Shallow Marsh | PEMC | None | 0.027 | 1.044 | 1.071 |
| WJ233 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.011 | 0.550 | 0.561 |
| WJ104 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.081 | 0.409 | 0.490 |
| WJ321 | I2 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.001 | 0.451 | 0.453 |
| WJ118 | F5 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.431 | 0.431 |
| WK166 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.415 | 0.423 |
| WJ220 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.089 | 0.330 | 0.419 |
| WK112 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.060 | 0.352 | 0.411 |
| WK175 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.007 | 0.384 | 0.391 |
| WJ204 | H5 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.365 | 0.365 |
| WK011 | M2 | Shallow Marsh | PEMC | None | 0.000 | 0.358 | 0.358 |
| WJ234 | I3 | Shallow Marsh | PEMC/PEMA | None | 0.052 | 0.306 | 0.358 |
| WK115 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.330 | 0.330 |
| WK144 | I6 | Shallow Marsh | PEMC | None | 0.000 | 0.302 | 0.302 |
| WK216 | J3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.292 | 0.292 |
| WK090 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.283 | 0.283 |
| WJ203 | H3 | Shallow Marsh | PEMC/PFO | None | 0.000 | 0.274 | 0.274 |
| WJ322 | I2 | Seasonally Flooded Basin | PEMAf/PEMB | None | 0.014 | 0.259 | 0.273 |
| WJ299 | J4 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.064 | 0.202 | 0.266 |
| WJ100 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.070 | 0.195 | 0.265 |
| WK100 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.256 | 0.256 |
| WJ120 | F5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.256 | 0.256 |

² Wetlands and other waters are listed in descending order of total impact

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|---------------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK232 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.245 | 0.245 |
| WJ246 | J2 | Shallow Open Water | PEMH | None | 0.046 | 0.198 | 0.244 |
| WJ042 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.243 | 0.243 |
| WJ323 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.242 | 0.242 |
| WJ090 | E3 | Shallow Open Water | PEMH/PEMAf | None | 0.070 | 0.169 | 0.239 |
| WK104 | J5 | Seasonally Flooded Basin | PEMA/PEMC | None | 0.065 | 0.166 | 0.231 |
| WK052 | M4 | Wet Meadow | PEMBf | None | 0.000 | 0.226 | 0.226 |
| WJ142 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.218 | 0.218 |
| WJ061 | E3 | Shallow Open Water | PEMH/PEMC/ PEMAf | None | 0.000 | 0.213 | 0.213 |
| WK214 | J3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.196 | 0.196 |
| WJ180 | D3 | Shallow Marsh | PEMC/PEMB | None | 0.000 | 0.189 | 0.189 |
| WJ092 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.041 | 0.146 | 0.187 |
| WJ251 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.177 | 0.185 |
| WJ025 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.043 | 0.142 | 0.185 |
| WJ254 | J2 | Wet Meadow | PEMBf | None | 0.000 | 0.178 | 0.178 |
| WJ297 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.178 | 0.178 |
| WJ098 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.177 | 0.177 |
| WK215 | J3 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.176 | 0.176 |
| WJ328 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.169 | 0.169 |
| WJ091 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.045 | 0.124 | 0.169 |
| WK022 | N2 | Seasonally Flooded Basin | PEMAf | None | 0.051 | 0.108 | 0.160 |
| WK120 | J5 | Shallow Marsh | PEMC | None | 0.054 | 0.106 | 0.159 |
| WJ308 | J4 | Shallow Marsh | PEMC/PEMAh | None | 0.000 | 0.159 | 0.159 |
| WJ186 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.048 | 0.110 | 0.159 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|--------------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ255 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.157 | 0.157 |
| WJ066 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.034 | 0.123 | 0.157 |
| WK021 | N2 | Deep Marsh | PABF/PEMC | None | 0.000 | 0.157 | 0.157 |
| WJ009 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.155 | 0.155 |
| WK154 | L3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.148 | 0.148 |
| WK207 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.147 | 0.147 |
| WJ043 | E4 | Shallow Marsh | PEMC/PEMAf | None | 0.043 | 0.098 | 0.141 |
| WJ033 | D3 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.041 | 0.099 | 0.140 |
| WK220 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.139 | 0.139 |
| WK077 | J3 | Shallow Marsh | PEMC | None | 0.000 | 0.138 | 0.138 |
| WK206 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.002 | 0.132 | 0.134 |
| WJ095 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.132 | 0.132 |
| WJ010 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.130 | 0.130 |
| WJ065 | E3 | Deep Marsh | PEMF/PEMC/ PEMB | None | 0.000 | 0.127 | 0.127 |
| WK224 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.124 | 0.124 |
| WK178 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.122 | 0.122 |
| WK114 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.122 | 0.122 |
| WK222 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.122 | 0.122 |
| WJ056 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.038 | 0.082 | 0.119 |
| WK116 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.119 | 0.119 |
| WK157 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.114 | 0.114 |
| WJ298 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.024 | 0.091 | 0.114 |
| WK205 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.114 | 0.114 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ338 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.112 | 0.112 |
| WK221 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.111 | 0.111 |
| WK113 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.110 | 0.110 |
| WJ206 | H5 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.109 | 0.109 |
| WJ305 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.108 | 0.108 |
| WK143 | I6 | Shallow Marsh | PEMC/PEMAf | None | 0.000 | 0.107 | 0.107 |
| WJ187 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.105 | 0.105 |
| WJ269 | D3 | Shallow Marsh | PEMC | None | 0.000 | 0.102 | 0.102 |
| WK080 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.032 | 0.069 | 0.101 |
| WJ304 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.099 | 0.099 |
| WJ253 | J2 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.099 | 0.099 |
| WK027 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.099 | 0.099 |
| WK119 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.097 | 0.097 |
| WK066 | L4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.096 | 0.096 |
| WJ023 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.095 | 0.095 |
| WK229 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.092 | 0.092 |
| WK162 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.022 | 0.068 | 0.089 |
| WK180 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.089 | 0.089 |
| WJ245 | J3 | Shallow Marsh | PEMC | None | 0.000 | 0.088 | 0.088 |
| WJ222 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.088 | 0.088 |
| WJ226 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.087 | 0.087 |
| WJ051 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.021 | 0.065 | 0.086 |
| WJ024 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.020 | 0.065 | 0.086 |
| WJ070 | B4 | Shallow Marsh | PEMC | None | 0.002 | 0.081 | 0.083 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ302 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.029 | 0.052 | 0.080 |
| WJ329 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.057 | 0.022 | 0.079 |
| WJ228 | I3 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.015 | 0.061 | 0.076 |
| WK103 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.022 | 0.054 | 0.076 |
| WK204 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.019 | 0.054 | 0.073 |
| WJ028 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.016 | 0.055 | 0.071 |
| WK231 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.071 | 0.071 |
| WJ161 | F4 | Seasonally Flooded Basin | PEMA/PEMC | None | 0.003 | 0.067 | 0.071 |
| WJ137 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.070 | 0.070 |
| WJ096 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.069 | 0.069 |
| WJ001 | D5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.067 | 0.067 |
| WK183 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.067 | 0.067 |
| WJ217 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.065 | 0.065 |
| WJ275 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.064 | 0.064 |
| WK139 | I6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.064 | 0.064 |
| WJ076 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.026 | 0.038 | 0.063 |
| WJ016 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.019 | 0.043 | 0.063 |
| WJ261 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.061 | 0.061 |
| WK129 | J6 | Shallow Marsh | PEMC | None | 0.000 | 0.059 | 0.059 |
| WK057 | M4 | Seasonally Flooded Basin | PEMAf | None | 0.005 | 0.054 | 0.059 |
| WK091 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.059 | 0.059 |
| WK110 | J4 | Shallow Marsh | PEMC | None | 0.006 | 0.050 | 0.055 |
| WJ151 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.011 | 0.044 | 0.055 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK122 | J5 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.053 | 0.053 |
| WJ258 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.053 | 0.053 |
| WJ027 | C3 | Shallow Marsh | PEMC/PEMAf | None | 0.015 | 0.036 | 0.051 |
| WK146 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.050 | 0.050 |
| WK121 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.042 | 0.049 |
| WJ257 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.049 | 0.049 |
| WK040 | M4 | Seasonally Flooded Basin | PEMAf | None | 0.002 | 0.047 | 0.049 |
| WJ131 | F5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.049 | 0.049 |
| WK212 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.049 | 0.049 |
| WK141 | I6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.048 | 0.048 |
| WJ296 | I4 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.048 | 0.048 |
| WJ175 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.048 | 0.048 |
| WJ164 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.015 | 0.031 | 0.046 |
| WK197 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.006 | 0.040 | 0.046 |
| WJ160 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.001 | 0.044 | 0.046 |
| WJ103 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.015 | 0.030 | 0.045 |
| WJ181 | E3 | Shallow Marsh | PEMC | None | 0.000 | 0.044 | 0.044 |
| WJ093 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.044 | 0.044 |
| WJ147 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.041 | 0.041 |
| WK031 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.041 | 0.041 |
| WK176 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.041 | 0.041 |
| WJ213 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.040 | 0.040 |
| WK170 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.039 | 0.039 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ115 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.037 | 0.037 |
| WJ337 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.037 | 0.037 |
| WJ167 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WJ218 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WJ309 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WJ135 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WK009 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.034 | 0.034 |
| WK173 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.034 | 0.034 |
| WK070 | K2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ159 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ265 | J2 | Wet Meadow | PEMBf | None | 0.000 | 0.033 | 0.033 |
| WJ144 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ146 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ335 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.031 | 0.031 |
| WJ143 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.030 | 0.030 |
| WK030 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.029 | 0.029 |
| WJ306 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.028 | 0.028 |
| WK026 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.027 | 0.027 |
| WK199 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.027 | 0.027 |
| WJ094 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.027 | 0.027 |
| WJ063 | E3 | Wet Meadow | PEMB | None | 0.000 | 0.026 | 0.026 |
| WJ231 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.013 | 0.012 | 0.026 |
| WK152 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.025 | 0.025 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK010 | N2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.025 | 0.025 |
| WJ200 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.024 | 0.024 |
| WK101 | J5 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.024 | 0.024 |
| WJ293 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.023 | 0.023 |
| WJ088 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.023 | 0.023 |
| WJ256 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.015 | 0.023 |
| WJ040 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.022 | 0.022 |
| WJ074 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.022 | 0.022 |
| WJ211 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.022 | 0.022 |
| WK230 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.021 | 0.021 |
| WJ221 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.021 | 0.021 |
| WJ303 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.021 | 0.021 |
| WK131 | J6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.020 | 0.020 |
| WJ266 | D3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.020 | 0.020 |
| WJ163 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.019 | 0.019 |
| WJ062 | E3 | Wet Meadow | PEMB | None | 0.000 | 0.019 | 0.019 |
| WK007 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.018 | 0.018 |
| WJ333 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.012 | 0.006 | 0.018 |
| WK151 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.018 | 0.018 |
| WK016 | M2 | Shallow Open Water | PABH/PEMC | None | 0.000 | 0.018 | 0.018 |
| WJ034 | E2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.017 | 0.017 |
| WJ064 | E3 | Wet Meadow | PEMB | None | 0.000 | 0.016 | 0.016 |
| WK219 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.016 | 0.016 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ121 | F5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.016 | 0.016 |
| WJ235 | I3 | Deep Marsh | PEMF | None | 0.000 | 0.015 | 0.015 |
| WJ247 | J2 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.015 | 0.015 |
| WJ017 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.015 | 0.015 |
| WK182 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.015 | 0.015 |
| WJ237 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.015 | 0.015 |
| WK145 | J6 | Shallow Marsh | PEMC/PEMAf | None | 0.000 | 0.014 | 0.014 |
| WJ141 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.014 | 0.014 |
| WK128 | J6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.013 | 0.013 |
| WJ327 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.012 | 0.012 |
| WJ165 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.004 | 0.007 | 0.012 |
| WJ148 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.011 | 0.011 |
| WJ263 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.011 | 0.011 |
| WJ077 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.011 | 0.011 |
| WJ035 | E2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.010 | 0.010 |
| WJ038 | E2 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.009 | 0.009 |
| WJ162 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.009 | 0.009 |
| WK033 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.008 | 0.008 |
| WJ313 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.008 | 0.008 |
| WJ097 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.008 | 0.008 |
| WJ232 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |
| WJ199 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |
| WJ012 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK083 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |
| WJ259 | J3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.006 | 0.006 |
| WK002 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.006 | 0.006 |
| WJ026 | C3 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.005 | 0.005 |
| WJ032 | D3 | Shallow Marsh | PEMC/ PEMAf | None | 0.000 | 0.004 | 0.004 |
| WJ079 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WJ236 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WK061 | M4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WK196 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WJ230 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WJ067 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.002 | 0.002 |
| WJ036 | E2 | Shallow Marsh | PEMC/ PEMAf | None | 0.000 | 0.002 | 0.002 |
| WJ145 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.002 | 0.002 |
| WJ082 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.002 | 0.002 |
| WK181 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.001 | 0.001 |
| WJ267 | D3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.001 | 0.001 |
| WK089 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.000 | 0.000 |
| WJ054 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WJ330 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WJ225 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WK156 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WJ029 | D3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |