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August 13, 2018

VIA EMAIL AND U.S. MAIL

Darrell Nitschke
Executive Secretary
North Dakota Public Service Commission
600 East Boulevard
Bismarck, North Dakota 58505-0480

RE: NORTHERN STATES POWER COMPANY
SITE MODIFICATION - FOXTAIL WIND
CASE NO. PU-17-284

Dear Mr. Nitschke:

Northern States Power Company, doing business as Xcel Energy, respectfully submits this filing and attached documentation pursuant to Provision No. 38 – Modification of Energy Conversion Facility or Energy Conversion Site Plan - of the Certification Relating to Order Provisions – Wind Conversion Facility Siting for the Foxtail Wind project pursuant to the North Dakota Public Service Commission's ("Commission") January 31, 2018 Findings of Fact, Conclusions of Law and Order ("Order"), in the above-referenced case.

Since the issuance of the January 31, 2018 Order, Foxtail Wind, LLC has made modifications to the size and type of turbines as described in Paragraphs 4-6 of the Order. The turbine change is one of the measures taken to mitigate the economic impacts of the 2017 Tax Cut and Jobs Act (TCJA). The combination of V-110 and V-120 turbine generators is expected to achieve a greater capacity factor that will result in a higher annual energy production, which in turn reduces the levelized cost of energy and mitigates the impacts of the TJCA.

Previously, the project was to consist of up to 75 turbines with a combination of Vestas V-110 and V-116. With the modification, the project will now consist of up to 75 Vestas with a combination of V-110 and V-120 turbines and will have a name-plate generating capacity of up to 150 megawatts (MW). Both turbine models are 2 MW turbines. The turbine towers will be conical tubular steel with a hub height of up to 262 feet. The V-120 turbines will measure 459

feet from the base of the tower to the tip of the upright blade with a rotor diameter of 394 feet. The portion of the foundation that is above ground is 18 feet wide at the base of the tower. A transformer inside the V-110 and V-120 turbines will be used to step up the voltage to 34.5 kV.

We have provided the following attachments as required by Provision 38 of the Certification Relating to Order Provisions – Wind Energy Conversion Facility Siting:

Attachment A – Summary of Proposed Micro-Siting Adjustment
Attachment B – Updated Site Plan (revised July 26, 2018)
Attachment C – Archaeological Addendum Survey Report Summary
Attachment D – North Dakota Historical Society response re: review of Class III Cultural Resource Survey
Attachment E – Revised Wetlands and Other Waters of the United States Delineation Report
Attachment F – Revised Acoustic Assessment
Attachment G – Revised Shadow Flicker Assessment
Attachment H – Affidavit of Christopher Clark, President – NSPM

As indicated in Attachments F and G, the Project continues to meet the Commission's sound level requirement at all but two participating landowner's residences, for which waivers are in place. Based on the updated shadow flicker analysis, potential shadow flicker levels are expected to remain below 30 hours per year at all non-participating residences, and all but one participating residence. The turbine model change and resulting minor incremental changes to the acoustic and shadow flicker analysis were discussed with the impacted landowners and waivers are in place with these landowners.

An original and seven copies of this filing are being provided via U.S. Mail.

Please feel free to contact me at (701) 241-8632 or dave.sederquist@xcelenergy.com should you have any questions.

SINCERELY,

David H. Sederquist
SR. CONSULTANT, REGULATION & FINANCE

ENCLOSURES

Foxtail Wind Project
Summary of Proposed Micro-siting Adjustments

	Original Turbine #	Revised Turbine #	Proposed Move (Ft, Direction)		Reason(s) for Turbine Adjustment
1	T5	T5	85	SE	Constrained by avoidance area(s)
2	T26	T26	85	SE	Wetland(s)
3	T58	T59	85	NW	Grade; Constrained by avoidance area(s)
4	T60	T61	39	NW	Grade; Wetland(s); Constrained by avoidance area(s)
5	T61	T62	85	SE	Grade; Constrained by avoidance area(s)
6	T62	T63	44	SW	Grade; Constrained by avoidance area(s)
7	T67	T67	44	NW	Grade; Wetland(s); Constrained by avoidance area(s)
8	T70	T70	46	NW	Grade; Wetland(s)
9	T72	T72	45	NW	Grade; Constrained by avoidance area(s)
10	T73	T73	87	NW	Grade; Constrained by avoidance area(s)
11	T75	T75	120	E	Grade; Constrained by avoidance area(s)

Foxtail Wind Farm
Site Plan and Transportation Routes

Version: V7 Date: 07/26/2018

Xcel Energy® RESPONSIBLE BY NATURE®

0 0.25 0.5 1 Miles

N

Turbine

Crane Path
Collection
Access Roads
Existing Transmission

Haul Routes
Construction Traffic Only Roads
Heavy Haul & Construction Traffic Roads
No Heavy Haul or Construction Traffic Roads

Facility
Parcel
Section
Township

AECOM
1000 East Calgary Avenue
Suite 1
Bismarck, ND 58503
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Archaeological Addendum Survey Report Summary

To	Xcel Energy, Inc.
Subject	Foxtail Value Engineering: An Addendum to the Class III Intensive Resource Survey for the Foxtail Wind Energy Center in Dickey County, North Dakota
From	AECOM
Date	June 22, 2018

Introduction and Purpose

Foxtail Wind, LLC (Foxtail Wind) filed an Application for a Certificate of Site Compatibility (Certificate) to construct the Foxtail Wind Energy Center (Project) in Dickey County, in southeastern North Dakota on July 17, 2017. On October 4, 2017, the North Dakota Public Service Commission (Commission) deemed Foxtail Wind's Application complete and assigned it to Case No. PU-17-284. The public hearing was held on November 20, 2017 in Ellendale, North Dakota, and the Certificate was issued in January 2018. The Project will be constructed and operated by Northern States Power Company, a Minnesota Corporation, d/b/a Xcel Energy (Xcel Energy). NextEra Energy Resources, LLC (NEER) developed the project in collaboration with Xcel Energy to reflect the engineering and design inputs necessary to transfer ownership of the Project to Xcel Energy in 2018 according to the executed Purchase & Sale Agreement (PSA). Xcel Energy currently proposes to construct the Project in two phases between 2018 and 2019.

After the issuance of this Certificate, Xcel Energy identified several locations where changes to the construction corridor would make construction more efficient and cost effective. These areas, referred to as Value Engineering changes, were located outside the previous survey corridor and the purpose of this investigation was to provide the necessary information for the State Historical Society of North Dakota (SHSND) review by confirming the presence or absence of archaeological sites within the Value Engineering Survey Corridor (Survey Corridor). AECOM was contracted by Xcel Energy to conduct an addendum Class III: Intensive Cultural Resource Inventory for the Project prior to the construction of the Project. The original Class III Intensive Cultural Resource Report for the Foxtail Wind Energy Center received a concurrence letter from the SHSND in October 2017.

The Survey Corridor included all areas that may be permanently or temporarily affected during construction of the Project. To allow for flexibility in Project planning and design, AECOM surveyed a 200 foot (60.69 meter) wide Survey Corridor surrounding the addendum Value Engineering areas for proposed service road reroutes, additional collection lines, and one crane path. These areas comprise 53 acres (21.45 hectares).

The addendum Value Engineering Survey Corridors were covered under the previous Foxtail Class I Literature Review and one mile study area.

Results

During the Class III Intensive Cultural Resource Survey, AECOM documented two new archaeological sites, including one prehistoric isolated find, a Knife River Flint flake, and one historic trash scatter. Both sites were recommended not eligible for the National Register of Historic Places (NRHP).

A Traditional Cultural Properties (TCP) survey was also undertaken for the Project, completed by a Traditional Cultural Surveyor from the Standing Rock Sioux Tribe. No TCPs were documented during the survey.

Recommendations

AECOM is not recommending avoidance for either of the two newly documented sites, as it is recommended that neither site is eligible for the NRHP.

Table 1: Newly Documented Sites Not Recommended for Avoidance

Site Name	Type	NRHP Recommendation
32DI526	Historic Trash Scatter	Not Eligible
32DIX291	Prehistoric Isolated Fine: One Knife River Flint Flake	Not Eligible

AECOM continues to recommend avoidance of all previous project cultural resources that are potentially eligible for listing on the NRHP, sites deemed culturally sensitive, or sites that have not been evaluated for eligibility following the guidelines outlined by the North Dakota State Historic Preservation Office.

Foxtail Wind has committed to avoiding effects to archaeological resources that could be considered archaeologically or culturally significant. In the absence of a formal evaluation of the significance of the identified archaeological resources, AECOM recommends that resources, with the exception of isolated finds, be avoided. It is AECOM's understanding that the current proposed infrastructure incorporates all previous recommended avoidance buffers. If the Project is redesigned in such a way that a resource cannot be avoided, AECOM recommends additional investigation that would constitute formal evaluation of site significance.

AECOM recommends a determination of *No Historic Properties Affected* as documented herein and mapped. If further areas beyond the combined Foxtail Survey Corridor are to be used during construction, AECOM recommends the completion of further addendum Class III cultural resources surveys to determine the presence or absence of any cultural resources within these areas.

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

June 22, 2018

Ms. Melinda McCarthy
Principal Investigator
AECOM
1000 East Calgary Avenue, Suite 1
Bismarck, ND 58503

ND SHPO Ref: 17-0099B ND Public Service Commission (PSC) "Foxtail Value Engineering: An Addendum to the Class III Intensive Cultural Resource Survey for the Foxtail Wind Energy Center in Dickey County, North Dakota"

Dear Ms. McCarthy,

We reviewed ND SHPO Ref: 17-0099B ND Public Service Commission (PSC) "Foxtail Value Engineering: An Addendum to the Class III Intensive Cultural Resource Survey for the Foxtail Wind Energy Center in Dickey County, North Dakota," which addresses additional areas of project impact. We find this report acceptable. There has been a good faith effort to identify and avoid impacts to "Significant Sites," provided the project remains as described and mapped in this report dated June 2018.

Thank you for the opportunity to review this project. If you have questions please contact or Susan Quinnell at squinnell@nd.gov or (701) 328-3576.

Sincerely,

Claudia J. Berg
Director, State Historical Society of North Dakota

Revised Wetlands and Other Waters of the United States Delineation Report

Foxtail Wind Energy Center
Northern States Power Company
Xcel Energy
Dickey County, North Dakota

Prepared for:

Foxtail Wind, LLC
414 Nicollet Mall, 8th Floor
Minneapolis, Minnesota 55401

Prepared by:

AECOM
1000 East Calgary Avenue, Suite 1
Bismarck, North Dakota 58503

June 29, 2018

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1.0 INTRODUCTION

Foxtail Wind, LLC (Foxtail Wind) filed an Application for a Certificate of Site Compatibility (Certificate) to construct the Foxtail Wind Energy Center (Project) in Dickey County, in southeastern North Dakota on July 17, 2017. On October 4, 2017, the North Dakota Public Service Commission (Commission) deemed Foxtail Wind's Application complete and assigned it to Case No. PU-17-284. The public hearing was held on November 20, 2017 in Ellendale, North Dakota and the Certificate was issued in January 2018. The Project will be constructed and operated by Northern States Power Company, a Minnesota Corporation, d/b/a Xcel Energy (Xcel Energy). NextEra Energy Resources, LLC (NEER) developed the project in collaboration with Xcel Energy to reflect the engineering and design inputs necessary to transfer ownership of the Project to Xcel Energy in 2018 according to the executed Purchase & Sale Agreement (PSA). Xcel Energy currently proposes to construct the Project in two phases between 2018 and 2019. **Figure 1-1** displays the Project Area. The Project Area encompasses approximately 20,029 acres and is the area within which Foxtail Wind negotiated easements with landowners.

The original Foxtail Wetlands and WOUS Report dated September 2017 was filed with the Commission on September 13, 2017. This revised report includes additional survey areas and changes to the Project layout that were not included in the original report.

The Project will have a nameplate capacity of approximately 150 megawatts (MW), consisting of 75 wind turbines using both Hybrid Vestas V-120 and Vestas V-110 turbine generators. Additional facilities include access roads, underground electrical collection systems and cabling, a collection substation, an operations and maintenance (O&M) building, a and construction laydown area (**Figure 1-2**). Interconnection would occur with the Montana-Dakota Utilities (MDU) transmission system, connecting to the MDU 230 kV Ellendale-Tatanka transmission line at a new substation.

Xcel Energy contracted AECOM to conduct wetland and other waters of the United States (WOUS) delineations in support of the Project. Field surveys were completed November 2016 through May 2018. Presented in this report are descriptions of the methodology, results, and conclusions of the wetland and other WOUS determination surveys. Foxtail Wind has committed to avoiding and minimizing impacts to wetlands and other WOUS.

2.0 ENVIRONMENTAL SETTING

The Project Area encompasses approximately 20,029 acres and is located in the Northwestern Glaciated Plains Ecoregion (Bryce et al. 1996). This region formed when glaciers retreated north, leaving a plethora of shallow depressions that are now shallow lakes and wetlands. Land use in this area consists of herbaceous grasslands, pasture, hayland, and cultivated crops (Homer et al. 2015). Small drainages and streams are found within the Project Area, all eventually draining east into the Elm River. These water complexes may be used for hunting, bird watching, and potentially fishing; however, they are not likely utilized for boating activities other than small watercraft on larger waters used for hunting or fishing. Trees and shrubs in the Project Area are sparse and limited to shelterbelts between fields, windbreaks surrounding farmsteads, along drainages, and near wetlands.

2.1 Soils

AECOM acquired soils data for the Project Area from a Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) site-specific soil report (Soil Survey Staff 2017). Within the Project Area, the USDA has mapped 38 soil map units. Of the 38 soil map units, eight soil map units, 11.7 percent of the acreage within the Project Area, are classified as somewhat poorly drained, poorly drained, and very poorly drained; these eight soils have hydric soil components. The characteristics of these hydric soils are presented in **Table 2-1** below.

Table 2-1 Hydric Soil Characteristics

Map Unit Name	Area (acres)	Percent of Project Area	Drainage Class
Southam silty clay loam	1,043.8	5.2%	Very poorly drained
Hamerly-Tonka-Parnell complex	631.8	3.2%	Somewhat poorly drained
Parnell silty clay loam	286.1	1.4%	Very poorly drained
Vallers loam	171.3	0.9%	Poorly drained
Tonka silt loam	161.1	0.8%	Poorly drained
Harriet loam	13.6	0.1%	Poorly drained
Divide loam	29.6	0.1%	Somewhat poorly drained
Lowe-Fluvaquents, channeled complex	0.1	0.0%	Poorly drained
Water	20.1	0.1%	Not applicable

Source: Soil Survey Staff (2017)

2.2 Geography and Topography

The Project Area is in the western portion of Dickey County and lies immediately west of the Missouri Escarpment. This escarpment extends north to south, dividing the county into the Missouri Coteau on the west and the Glaciated Plains on the east (Bluemle 1979). Elevations west of the Missouri Escarpment average 300 to 400 feet higher than on the east. The topography of the Missouri Coteau is characterized by poorly drained depressions, which receive snowmelt and runoff water from closely spaced rolling hills, while the topography of the Glaciated Plains is nearly level with limited areas on rolling land. Given the irregularity of the landscape, streams and rivers are nearly absent and, instead, are replaced by unpredictable potholes and drainage systems.

2.3 Hydrology

The hydrology of the Project Area is influenced by unpredictable potholes and irregular drainages and is entirely within the Missouri River Basin. Small drainages and streams are found within the Project Area, all eventually draining eastward into the Elm River. The U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) was used to assess hydrological features in and around the Project Area (USGS 2017). According to the NHD, the Project lies within six sub-watersheds (12-Digit Hydrologic Units) as listed in **Table 2-2** below.

Table 2-2 Sub-Watersheds within the Project Area

Sub-Watershed Name	12-Digit Hydrologic Unit Code	Sub-Basin
Hilles Lake	101600040103	Town of Freedonia
Wilson Dam	101600040303	South Fork Maple River
101600040102	101600040102	Town of Freedonia
Pheasant Lake	101600040501	Elm Lake
Wood Lake	101600040502	Elm Lake
Webber Gulch	101600040504	Elm Lake

Source: USGS (2017)

2.4 Vegetation and Land Use

The Project Area is representative of the prairie pothole region topography with wetlands occurring in nearly every low area with larger bodies of water frequently connected by wetland channels. This region is associated with mixed-grass prairie (Dyke et al. 2015). Vegetation of the mixed-grass prairie consists mainly of Western wheatgrass (*Pascopyrum smithii*), little bluestem (*Schizachyrium scoparium*), purple prairie clover (*Dalea purpurea*), and common yarrow (*Achillea millefoium*) with prairie cordgrass (*Spartina pectinata*), and reed canary grass (*Phalaris arundinacea*) occurring in low areas. Much of the native prairie within the Project Area has been replaced by wheat, alfalfa, and other commercial crops. Streams and rivers are nearly absent in the Missouri Coteau ecoregion. Due to the high concentration of wetlands, a considerable amount of the remaining native prairie is used extensively for livestock grazing. Areas with reduced slope and minimal wetlands have been converted to cropland. Land use within the Project Area is shown in **Figure 2-1**.

2.5 Precipitation and Growing Season

The NRCS Climate Analysis for Wetlands (WETS) Tables provides historical data based on a 30 year average (1971-2000) of temperature and precipitation data from the Ellendale, North Dakota monitoring station (USDA 2016). The records of 30 years of precipitation included in the WETS table estimates the growing season (days with an average temperature >32°F) near the Project Area to occur from May 7 through September 20. The average annual precipitation of the Project Area is 21.43 inches, with an average monthly rainfall exceeding two inches in May, June, July, August, and September. Annual average snow fall is 39.8 inches.

According to the U.S. Drought Monitor, western Dickey County was considered Abnormally Dry starting May 9, 2017 and has continued to increase in drought intensity since as shown in **Table 2-3** (Heim 2017). The drought severity classification is categorized with D1 being the least intense and D4 being the most intense (**Table 2-4**).

Table 2-3 Drought Intensity Status for Western Dickey County

Date	Drought Intensity Status
May 9, 2017	D0 (Abnormally Dry)
May 16, 2017	D0 (Abnormally Dry)
May 23, 2017	D1 (Moderate Drought)
May 30, 2017	D1 (Moderate Drought)
June 6, 2017	D2 (Severe Drought)
June 13, 2017	D2 (Severe Drought)
June 20, 2017	D2 (Severe Drought)
June 27, 2017	D2 (Severe Drought)
July 4, 2017	D3 (Extreme Drought)
July 11, 2017	D3 (Extreme Drought)
July 18, 2017	D3 (Extreme Drought)
July 25, 2017	D3 (Extreme Drought)
August 1, 2017	D3 (Extreme Drought)
August 8, 2017	D3 (Extreme Drought)
August 15, 2017	D3 (Extreme Drought)
August 22, 2017	D2 (Severe Drought)
May 15, 2018	D0 (Abnormally Dry)
May 22, 2018	None (No Drought)
May 29, 2018	None (No Drought)
June 5, 2018	None (No Drought)

Source: Heim (2018)

Table 2-4 Drought Category Descriptions and Possible Impacts

Category	Description	Possible Impacts
None	No Drought	None
D0	Abnormally Dry	Going into drought: Short-term dryness slowing planting and growth of crops or pastures Coming out of drought: Some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures Streams, reservoirs, or wells low, some water shortages developing or imminent Voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely Water shortages common Water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses Widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses Shortages of water in reservoirs, streams, and wells creating water emergencies

Source: Heim (2018)

3.0 REGULATORY SETTING

3.1 Federal Regulations

3.1.1 Clean Water Act

All discharges of dredged or fill material into jurisdictional waters of the U.S. that result in permanent or temporary losses of WOUS, are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA). Additionally, the USACE regulates projects in navigable waters under Section 10 of the Rivers and Harbors Act. The definition of WOUS (33 CFR 328.3[a]) is as follows:

> 1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
>
> 2. All interstate waters including interstate wetlands;
>
> 3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
>
> > i. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
> >
> > ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
> >
> > iii. Which are used or could be used for industrial purpose by industries in interstate commerce;
>
> 4. All impoundments of waters otherwise defined as waters of the United States under the definition;
>
> 5. Tributaries of waters identified in paragraphs (a)(1)-(4) of this section;
>
> 6. The territorial seas;
>
> 7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States.
>
> 8. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

Under USACE 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” (33 CFR 328[b]).

In the absence of wetlands in or adjacent to non-tidal waters, the lateral extent of USACE jurisdiction is determined by the ordinary high water mark, 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 CFR 328[e]).

The USACE Nationwide Permits (NWPs) 12: Utility Line Activities and 14: Linear Transportation Projects, authorize the discharge of dredged or fill material into non-tidal WOUS given that there is not a loss of greater than ½-acre of WOUS for any "single and complete project" or that permanent access roads are not constructed above grade in WOUS for a distance of more than 500 feet. "Single and complete project" refers to each discrete intersection between Project infrastructure and jurisdictional wetlands and other WOUS. Preconstruction notification (PCN) to the USACE is required under both NWPs if permanent impacts exceed the 0.10-acre threshold. However, for permanent impacts less than 0.10-acre, no PCN would be required. Foxtail Wind has committed to avoiding and minimizing impacts to potentially jurisdictional waters with the goal of not exceeding the 0.10-acre threshold of permanent impacts, which would trigger the need for a PCN.

3.1.2 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) manages lands including wetland easements within the Project Area. These easements are legal agreements between landowners and the USFWS to protect wetlands that are vital to wildlife habitat. The USFWS owns the perpetual rights to certain wetland basins within wetland easements which cannot be burned, drained, filled, or leveled without authorization under a Special Use Permit from the USFWS. The upland portions of wetland easements may be developed without a permit as long as the wetland basins are avoided. However, landowners are permitted to till and farm these areas when they are not wet. No permanent impacts to these basins are allowed from construction activities for the Project. Foxtail Wind is working with USFWS Refuge staff to avoid impacts to protected basins with the USFWS wetland easements.

3.2 State Regulations

North Dakota regulates wetlands through Section 401 water quality certification under the CWA. The North Dakota Department of Health (NDDH) is the regulatory agency that issues the Section 401 certification. The NDDH does not have a permitting program specific to wetlands, and defers to regulations under the CWA. Additionally, the North Dakota State Water Commission (SWC) is the regulatory body that permits water-related projects in the state of North Dakota. The SWC issues two types of permits relating to wetlands: a Drainage Permit and a Construction Permit. The SWC does not have a permit requirement for fill placed in a wetland.

The Drainage Permit is issued for projects that drain ponds, sloughs, lakes, wetlands, or any similar series, which has a watershed greater than 80 acres, or for a subsurface drain having an area of 80 acres or more. The Construction Permit is required if a water control structure is constructed or modified and is capable of retaining, diverting, or obstructing more than 50 acre-feet of water for dikes, other devices, and low-hazard dams, or 25 acre-feet of water for medium-hazard and high-hazard dams.

The Project does not meet the criteria for any of the SWC permits. Therefore, no SWC permit for wetlands is required for this Project.

4.0 WETLAND AND OTHER WATERS DELINEATION METHODS

4.1 Desktop Analyses

AECOM conducted a desktop analysis of the Project Area to identify locations where Project features (turbines, collection lines, access roads, etc.) intersected possible wetlands or other WOUS features. The desktop analysis used publicly available online mapping tools, as described in this section below.

The U.S. Fish and Wildlife Service (USFWS) online Wetlands Mapper tool depicts wetlands mapped as part of the National Wetland Inventory (NWI) Program (USFWS 2017). The NWI dataset identified 1,429 wetlands in the Project Area as depicted in **Figure 4-1**.

The NHD was utilized to identify perennial and intermittent streams, ponds, and lakes. The online database NHD Viewer tool was queried for the Project Area (USGS 2017). The query found 10 NHD features that intersect Project infrastructure (**Figure 4-1**). Three features were identified as waterbodies (ponds, lakes, and impoundments) and seven features were identified as intermittent streams. No perennial stream features were identified in the Project Area.

The NRCS is the source for hydric soils information, as shown in **Table 2-1** in Section 2.1 of this report (Soil Survey Staff 2017). Data were obtained for the Project Area and were used to cross-check against field sites that were initially observed to exhibit wetland or surface water conditions. Hydric soils were identified in the Project Area associated with NWI and NHD mapped features (**Figure 4-2**). Additionally, the Web Soil Survey was queried for drainage class across the Project Area. Less than 10% of soils documented in the Project Area were classified as poorly drained or very poorly drained.

Due to the Project Area's rural location, no Federal Emergency Management Agency (FEMA) flood rating maps have been developed for the area (USDHS, FEMA 2017).

4.2 Turbine Micrositing

AECOM completed two separate rounds of micrositing efforts in the spring and summer of 2017 by wetland scientists. The micrositing process was conducted in the field alongside with NextEra and surveying field teams. The objective of micrositing was to identify wetlands and other WOUS and avoid siting Project features in these areas. Where possible, Project feature locations were re-located or eliminated during the micrositing process to avoid impacts to wetlands or other WOUS and reduce the number of wetland delineations.

4.3 Wetland Delineations

Field wetland delineations were conducted in November 2016, April 2017, June 2017, July 2017, August 2017, and May 2018. The delineations were conducted in areas where Project infrastructure and survey corridors intersected wetlands. In order to provide flexibility for potential Project design changes, the survey corridor included a 300-foot radius around turbine locations, a 200-ft corridor around access roads, a 50-foot corridor around collection lines, and a 5 acre buffer around buildings. **Table 4-1** below provides the estimated temporary and permanent disturbance areas by infrastructure type provided by Foxtail Wind.

Table 4-1 Project Area of Impact Assumptions

Project Component	Temporary Construction Disturbance	Construction Disturbance to be Reclaimed	Permanent Disturbance during Operations
Wind Turbines [a]	4.5 acres per turbine	4.44 acres per turbine	0.06 acres per turbine
Access Roads [b]	50 feet wide per linear foot of road	34 feet wide per linear foot of road	16 feet wide per linear foot of road
Collection Lines [c]	50 feet wide per linear foot	50 feet wider per linear foot minus 12 feet by 8 feet per junction box	12 feet by 8 feet for each junction box
O&M Building	5 acres	3.4 acres	1.6 acres
Collection Substation	5 acres	3.2 acres	1.8 acres
Construction Laydown Area [d]	7 acres	7 acres	0 acres

[a] Construction impacts assumed a 250-foot construction radius around the turbine, which equates to approximately 4.5 acres per turbine. Impacts during operation account for an 18-foot diameter turbine base with a 20-foot buffer for the gravel pad, or 0.06 acres per turbine.

[b] Easement width necessary for construction based on turbine types. Temporary and permanent impacts represent a conservative estimate of disturbance. Roads required to support crane access to turbines during operation would remain up to 38 feet wide; other access roads may be built at 16 feet or reduced later to 16 feet. Access road impacts also assume all roads are new access roads and do not consider improvements to existing roads separately.

[c] Where collection lines run parallel to access roads, the respective impact buffers generally do not overlap.

[d] Assumes 7-acre laydown area.

Wetland delineations for the Project followed methodology from the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE 2010). The delineation process was utilized to document dominant vegetation, soils, and hydrology in areas of interest (i.e., areas with potential intersections between planned Project infrastructure and potential wetland ecosystems). For a site to be considered a wetland, there must be dominance by hydrophytic vegetation, presence of hydric soils, and characteristic wetland hydrology. Under normal conditions, if a sample plot lacks any of these three criteria, it is considered upland. To determine these three variables, the field team designated paired sample plots, placed at discrete (typically less than 20 feet) distances from one another, for each wetland. One sample plot represented wetland conditions; the other sample plot represented upland conditions. Each sample plot featured a hand-dug soil pit averaging 16 inches in depth. The sample plot also included nested concentric sampling rings for vegetation cover and species identification, as follows:

- Herbaceous vegetation was identified within a 5-foot radius of the sample plot center;
- Sapling/shrub vegetation was identified within a 15-foot radius of the sample plot center; and,
- Trees and woody vines were documented within a 30-foot radius of the sample plot center.

A Wetland Determination Data Form, specific to the Great Plains Region, was completed for each paired wetland and upland sample plot. In cases where wetlands were assessed outside of the growing season, assessed during drought conditions, or when a wetland boundary was difficult to assess, AECOM conservatively mapped the wetland boundaries to ensure no wetlands were missed.

4.3.1 Hydrophytic Vegetation Indicators

The dominant vegetation at each sample plot was identified to species level and each species was assigned a wetland indicator status using the State of North Dakota 2016 and 2017 Wetland Plant Lists (Lichvar et al. 2016). The field team used Wetland Plants of the Northern Great Plains (Chadde 2012) and Weeds of the West (Whitson et al. 2009) as field references for identifying unknown plant species.

Hydrophytic vegetation, or plants that are indicators of wetlands, include those species designated as obligate (OBL), facultative wetland (FACW), or facultative (FAC). As a general rule, hydrophytes dominate a sample plot when greater than 50 percent of the evaluated species are OBL, FACW, or FAC. Upland plants include those listed with facultative upland (FACU) or upland (UPL) status or plant species that are not listed (NL). Table 3 provides descriptions of these indicators.

Table 4-2 Wetland Indicator Status

Indicator Status	Occurrence in Wetlands
Obligate (OBL)	Almost always occur in wetlands under natural conditions (estimated probability >99%).
Facultative Wetland (FACW)	Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands (estimated probability 1%-33%).
Facultative (FAC)	Equally likely to occur in wetlands or non-wetlands (estimated probability 34%- 66%).
Facultative Upland (FACU)	Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
Upland (UPL)	Almost always occur in non-wetlands under natural conditions (estimated probability >99%).
Not Listed (NL)	Not listed plants are assumed to be UPL as defined in the user notes for the 2016 Wetland Plant List.

4.3.2 Hydric Soils Indicators

Soil from each soil pit was evaluated for hue, value, and chroma in each observable horizon using Munsell Soil Color Charts (Gretag/Macbeth 2009). Each soil horizon was also checked for texture and for the presence of redoximorphic features, depleted matrix, saturation, and other specific criteria used to document hydric conditions.

4.3.3 Wetland Hydrology Indicators

One primary indicator is sufficient to conclude that wetland hydrology is present. In the absence of a primary indicator, two or more secondary indicators are required to conclude that wetland hydrology is present. For each wetland, hydrology was analyzed for all primary and secondary wetland indicators. Once established, the soil pits were left open a sufficient amount of time to allow the apparent high water table, if present, to stabilize. Depth to surface water, water table, and saturation were recorded when present.

4.3.4 Wetland Mapping

Wetland scientists mapped delineations with a Trimble Geo 7X GPS by walking the outer limit of visibly identifiable wetland vegetation between the paired wetland and upland sample plots. The Trimble Geo 7X GPS unit provides sub-meter survey accuracy (post-processing). The field-collected data were plotted as a map layer using geographic information system (GIS) software. Additionally, the Trimble Geo 7X GPS was used to record the locations of the wetland and upland soil pits. Photographs of select wetlands are provided in the photographic log in **Appendix A**.

4.4 Other WOUS Assessment

Since the USACE does not have a data form for other WOUS for the Great Plains Region, data for other waterbodies, such as streams and ponds, were recorded on an AECOM Other Waters Data Form. The data form documented the waterbody features, flow characteristics, substrate, and vegetation features. A Trimble Geo 7X GPS was used to map the ordinary high water mark (OHWM) in areas crossed by Project infrastructure and survey corridors.

5.0 WETLANDS AND OTHER WOUS DELINEATION RESULTS

5.1 Wetland Delineation Results

A total of 253 wetlands were delineated within the survey corridor, of these delineated wetlands, three will be permanently impacted by Project infrastructure. The 250 wetlands that will not be impacted were either within the survey corridor but outside of the planned Project footprint, were previously in the Project footprint but the layout was modified to avoid impacts, or will be bored for collection lines. Maps depicting the survey corridor boundary and delineated wetlands are included in **Figure 5-1**.

5.1.1 Wetlands Permanently Impacted by Project Infrastructure

There are three wetlands that will be permanently impacted by Project infrastructure. These wetlands are summarized below including the approximate acreage, location, likely jurisdictional status, and best management practices (BMPs) to minimize wetland impacts.

FT-WETLAND-22A intersects an access road to turbine 39 (**Figure 5-1**, **Map 8**). The wetland is located in S36, T131N, and R66W (latitude: 46.117791, longitude: -98.887657) and is bordered by agricultural fields. The total permanent impacts to the wetland are approximately 0.02 acres. By minimizing the permanent impacts to less than 0.10-acre and with no streams noted to flow to or from the wetland making the wetland appear isolated, this does not likely meet the definition of a jurisdictional WOUS and no PCN or permit will be required. The footprint within the wetland during access road construction will be minimized to the maximum extent possible while still meeting site access and safety requirements. All appropriate erosion control measures will be implemented prior to installation of the crossing.

FT-WETLAND-35A intersects an access road northeast of the intersection of 91st St SE and 72nd Ave SE and southwest of an access road split to turbine 45 and turbine 48 (**Figure 5-1**, **Map 11**). The wetland is located in S6, T130N, and R65W (latitude: 46.099168, longitude: -98.878823) and in pasture land. The total permanent impacts to the wetland are approximately 0.04 acres. By minimizing the permanent impacts to less than 0.10-acre and with no streams noted to flow to or from the wetland making the wetland appear isolated, this does not likely meet the definition of a jurisdictional WOUS and no PCN or permit will be required. The footprint within the wetland during construction will be minimized to the maximum extent possible while still meeting site access and safety requirements. All appropriate erosion control measures will be implemented prior to installation of the crossing.

FT-WETLAND-25F is a large wetland complex that intersects an access road east of turbine 48 and west of turbine 49 (**Figure 5-1**, **Map 11**). The wetland is located in S6, T130N, and R65W (latitude: 46.10171, longitude: -98.862133) and is bordered by agricultural fields. The total permanent impacts to the wetland by the access road are approximately 0.003 acres, and the collection line and crane path will be temporary impacts. This wetland appears to have surface connectivity to a TNW; however, by minimizing the permanent impacts to less than 0.10-acre, no PCN or permit will be required. The footprint within the wetland during construction will be minimized to the maximum extent possible while still meeting site access and safety requirements. All appropriate erosion control measures will be implemented prior to installation of the crossing.

5.1.2 Wetlands Temporarily Impacted by Project Infrastructure

There are 23 wetlands that will be temporarily impacted by Project infrastructure. **Table 5-1** summarizes the delineated wetlands that will be temporarily impacted by Project infrastructure, approximate acreage, location, likely jurisdictional status, and location within the Project infrastructure of each wetland.

Table 5-1 Wetlands Temporarily Impacted by Project Infrastructure

Wetland ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Sheet Map Number[2]	Project Infrastructure
FT-WETLAND-22A	46.117791	-98.887657	Non-jurisdictional	8	Temporarily impacted by construction limits; 0.04 acres
FT-WETLAND-31A	46.127296	-98.893533	Non-jurisdictional	5	Temporarily impacted by construction limits; 0.16 acres
FT-WETLAND-35A	46.099168	-98.878823	Non-jurisdictional	11	Temporarily impacted by construction limits; 0.06 acres
FT-WETLAND-40A	46.096108	-98.879316	Non-jurisdictional	13	Temporarily impacted by construction limits; 0.02 acres
FT-WETLAND-67A	46.090800	-98.901958	Non-jurisdictional	12	Temporarily impacted by construction limits; 0.35 acres
FT-WETLAND-68A	46.091672	-98.900637	Non-jurisdictional	12	Temporarily impacted by collection line construction; 0.49 acres
FT-WETLAND-3F	46.048603	-98.874222	Non-jurisdictional	21	Temporarily impacted by construction limits; 0.01 acres
FT-WETLAND-25F	46.102714	-98.86420	Non-jurisdictional	11	Temporarily impacted by crane path; 0.08 acres
FT-WETLAND-25F	46.105360	-98.856278	Non-jurisdictional	11	Temporarily impacted by construction limits; 0.03 acres
FT-WETLAND-31F	46.066269	-98.855895	Non-jurisdictional	17	Temporarily impacted by construction limits; 0.12 acres
FT-WETLAND-33F	46.098778	-98.877609	Non-jurisdictional	13	Temporarily impacted by construction limits; 0.10 acres
FT-WETLAND-49F	46.093403	-98.897481	Non-jurisdictional	12	Temporarily impacted by access road construction; 0.26 acres
FT-WETLAND-3G	46.102503	-98.856286	Non-jurisdictional	11	Temporarily impacted by crane path; 0.007 acres
FT-WETLAND-5J	46.130595	-98.856203	Non-jurisdictional	6	Temporarily impacted by construction limits; 0.08 acres
FT-WETLAND-1J	46.092241	-98.88116	Non-jurisdictional	12	Temporarily impacted by construction limits; 0.04 acres
FT-WETLAND-2J	46.090419	-98.881193	Non-jurisdictional	12	Temporarily impacted by construction limits; 0.02 acres
FT-WETLAND-6J	46.093723	-98.899721	Non-jurisdictional	12	Temporarily impacted by construction limits; 0.03 acres
FT-WETLAND-7J	46.089116	-98.881201	Non-jurisdictional	12	Temporarily impacted by construction limits; 0.04 acres
FT-WETLAND-8J	46.086413	-98.881211	Non-jurisdictional	15	Temporarily impacted by construction limits; 0.05 acres
FT-WETLAND-9J	46.083942	-98.881398	Non-jurisdictional	15	Temporarily impacted by construction limits; 0.11 acres
FT-WETLAND-10J	46.082095	-98.881668	Non-jurisdictional	15	Temporarily impacted by construction limits; 0.07 acres
FT-WETLAND-11J	46.080010	-98.881284	Non-jurisdictional	15	Temporarily impacted by construction limits; 0.02 acres
FT-WETLAND-12J	46.078049	-98.881301	Non-jurisdictional	15	Temporarily impacted by construction limits; 0.05 acres
FT-WETLAND-13J	46.070113	-98.881317	Non-jurisdictional	16	Temporarily impacted by construction limits; 0.06 acres

[1] Note that only the USACE can render an approved Jurisdictional Determination (JD). The likely jurisdictional status listed in Table 5-1 reflects AECOM's best professional judgement of Jurisdictional WOUS. Without a USACE rendered JD, impacts should be avoided to the greatest extent possible to these wetlands.

[2] Refer to **Figure 5-1**.

5.1.3 Wetlands Not Impacted by Project Infrastructure

Wetlands that were mapped during different design phases of the Project and are either no longer intersected by current infrastructure design are not anticipated to have temporary, or permanent impacts resulting from Project construction, are listed in **Table 5-2**. Impacts to these wetlands have been avoided by shifts in Project infrastructure and/or by boring collection lines under jurisdictional features, which is not regulated by the USACE.

Table 5-2 Wetlands Not Impacted by Project Infrastructure

Wetland ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Project Infrastructure
FT-WETLAND-1A	46.140123	-98.848261	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-2A	46.136559	-98.850749	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-3A	46.136722	-98.853041	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-4A	46.139696	-98.846448	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-5A	46.127426	-98.839092	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-6A	46.124748	-98.847325	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-7A	46.125145	-98.851553	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8A	46.125687	-98.850204	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-9A	46.124382	-98.858643	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-10A	46.123965	-98.859666	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-11A	46.124161	-98.860268	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-12A	46.124149	-98.864446	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-13A	46.123554	-98.865126	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-14A	46.123435	-98.867086	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-15A	46.124061	-98.867995	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-16A	46.123850	-98.870783	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-17A	46.122571	-98.872366	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-18A	46.141899	-98.876538	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-19A	46.140807	-98.874576	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-20A	46.133902	-98.872561	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-21A	46.13512	-98.872489	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-23A	46.118649	-98.890524	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-24A	46.118932	-98.891689	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-25A	46.142167	-98.891374	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-26A	46.139719	-98.883415	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-27A	46.138372	-98.885571	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-28A	46.132018	-98.883157	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-30A	46.129906	-98.888587	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-32A	46.135921	-98.908725	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-34A	46.098992	-98.900002	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-35B	46.046195	-98.873016	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-36A	46.117691	-98.845043	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-37A	46.116969	-98.858412	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-38A	46.115359	-98.857409	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-39A	46.094025	-98.880405	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-41A	46.096040	-98.877583	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-42A	46.096034	-98.833414	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-43A	46.096047	-98.835544	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-44A	46.095808	-98.836460	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-45A	46.094654	-98.838135	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-46A	46.094275	-98.837475	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-48A	46.095700	-98.842043	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-50A	46.096861	-98.843595	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-51A	46.095269	-98.844377	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-52A	46.094980	-98.846646	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-53A	46.095006	-98.849933	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-54A	46.096658	-98.857446	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-55A	46.095739	-98.858505	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-56A	46.096094	-98.859228	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-57A	46.092071	-98.856265	Non-jurisdictional	No anticipated temporary or permanent impacts

Wetland ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Project Infrastructure
FT-WETLAND-58A	46.096382	-98.862721	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-59A	46.095459	-98.863752	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-60A	46.095643	-98.868169	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-61A	46.094294	-98.870821	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-62A	46.066318	-98.865099	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-63A	46.065224	-98.866885	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-64A	46.067043	-98.874041	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-65A	46.067264	-98.875542	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-66A	46.086563	-98.903136	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-69A	46.091746	-98.893780	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-70A	46.091829	-98.896065	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-71A	46.052041	-98.862959	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-72A	46.047152	-98.864786	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-74A	46.046472	-98.865376	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-75A	46.040389	-98.875124	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-76A	46.116594	-98.866673	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-77A	46.116262	-98.867103	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1B	46.104231	-98.870947	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-2B	46.104227	-98.864293	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-3B	46.10458	-98.865265	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-5B	46.109348	-98.876544	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-6B	46.111507	-98.873211	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-7B	46.111079	-98.871950	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8B	46.113286	-98.869168	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-9B	46.098535	-98.894301	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-10B	46.098620	-98.892041	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-11B	46.098410	-98.89199	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-12B	46.079632	-98.844991	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-13B	46.081482	-98.842318	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-14B	46.08590	-98.839798	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-15B	46.089776	-98.837193	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-16B	46.090098	-98.833576	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-17B	46.090236	-98.836825	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-18B	46.090046	-98.838318	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-19B	46.088519	-98.840665	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-20B	46.089019	-98.849617	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-21B	46.090021	-98.851044	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-22B	46.085612	-98.857853	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-23B	46.093764	-98.874754	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-24B	46.091116	-98.876645	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-25B	46.090496	-98.880805	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-26B	46.091608	-98.882823	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-27B	46.091427	-98.883928	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-28B	46.091871	-98.88932	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-29B	46.091547	-98.890462	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-30B	46.091706	-98.891805	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-31B	46.051839	-98.879269	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-32B	46.049945	-98.878078	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-33B	46.047562	-98.874954	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-34B	46.046691	-98.872769	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-36B	46.046306	-98.872934	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1C	46.131163	-98.858672	Non-jurisdictional	No anticipated temporary or permanent impacts

Wetland ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Project Infrastructure
FT-WETLAND-2C	46.130202	-98.857908	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-3C	46.129157	-98.864689	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-4C	46.131298	-98.872475	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-5C	46.134946	-98.879142	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-6C	46.132402	-98.883895	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-7C	46.133433	-98.884699	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8C	46.130027	-98.894775	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-9C	46.119205	-98.904381	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-10C	46.120262	-98.905042	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-11C	46.124317	-98.904606	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-12C	46.102425	-98.878178	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-13C	46.106060	-98.856776	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-14C	46.107163	-98.857241	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-15C	46.090680	-98.850359	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-16C	46.115806	-98.906869	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-17C	46.066452	-98.851328	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-18C	46.067048	-98.851510	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-19C	46.067500	-98.850524	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-20C	46.087401	-98.906066	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-21C	46.087366	-98.906051	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-22C	46.059385	-98.855890	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-23C	46.059092	-98.858264	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1D	46.130920	-98.851425	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-2D	46.095908	-98.854876	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-3D	46.094678	-98.855754	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-4D	46.093615	-98.866761	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8D	46.101965	-98.876144	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1E	46.040127	-98.880052	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-2E	46.069070	-98.857962	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-3E	46.140333	-98.850552	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-4E	46.133055	-98.851089	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-5E	46.126522	-98.839893	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-6E	46.126162	-98.840851	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-7E	46.123405	-98.851244	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8E	46.122888	-98.857826	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-9E	46.124073	-98.857005	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-10E	46.126074	-98.870079	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-11E	46.126548	-98.871023	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-12E	46.117909	-98.863192	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-13E	46.133410	-98.899677	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-14E	46.129936	-98.898069	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-15E	46.135281	-98.894143	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-16E	46.113984	-98.903967	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-17E	46.119744	-98.907405	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-18E	46.118356	-98.903643	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-19E	46.137376	-98.886485	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-20E	46.133779	-98.882159	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-21E	46.126508	-98.900542	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-22E	46.121013	-98.902998	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1F	46.037489	-98.878134	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-2F	46.043534	-98.873175	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-4F	46.082297	-98.844054	Non-jurisdictional	No anticipated temporary or permanent impacts

Wetland ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Project Infrastructure
FT-WETLAND-5F	46.068526	-98.848241	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-6F	46.066220	-98.848305	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-7F	46.063819	-98.848533	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8F	46.064373	-98.849821	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-9F	46.064782	-98.851626	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-10F	46.064695	-98.852449	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-11F	46.069026	-98.865115	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-12F	46.069173	-98.876199	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-13F	46.094040	-98.875759	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-14F	46.09463	-98.867830	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-15F	46.093609	-98.869476	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-16F	46.093147	-98.871604	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-17F	46.096231	-98.851593	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-18F	46.096043	-98.845976	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-19F	46.098174	-98.826948	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-20F	46.098349	-98.829566	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-21F	46.095217	-98.835232	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-22F	46.094525	-98.835592	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-23F	46.101251	-98.870549	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-24F	46.101228	-98.867644	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-26F	46.105110	-98.877379	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-27F	46.049056	-98.868303	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-28F	46.057551	-98.852619	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-29F	46.059192	-98.867603	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-30F	46.062960	-98.869236	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-32F	46.109624	-98.873297	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-34F	46.111691	-98.868299	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-35F	46.111154	-98.867109	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-36F	46.116859	-98.851801	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-37F	46.114674	-98.869631	Jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-38F	46.086819	-98.835940	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-39F	46.086564	-98.836755	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-40F	46.088636	-98.84339	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-41F	46.083404	-98.841497	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-42F	46.082499	-98.842822	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-43F	46.082355	-98.844059	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-44F	46.079287	-98.848359	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-45F	46.106219	-98.859503	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-46F	46.108155	-98.856663	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-47F	46.108236	-98.853518	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-48F	46.105683	-98.863196	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-50F	46.092416	-98.862057	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-51F	46.093180	-98.863749	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-52F	46.093347	-98.864462	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-53F	46.107174	-98.894591	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-54F	46.123649	-98.882001	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-55F	46.123041	-98.884966	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-56F	46.136622	-98.879072	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-57F	46.127579	-98.848576	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-58F	46.130482	-98.868684	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1G	46.047748	-98.876102	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-2G	46.095851	-98.846666	Non-jurisdictional	No anticipated temporary or permanent impacts

Wetland ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Project Infrastructure
FT-WETLAND-4G	46.107034	-98.873868	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-5G	46.114727	-98.856626	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-6G	46.040049	-98.876732	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-7G	46.040623	-98.878841	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8G	46.130511	-98.864435	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-9G	46.061445	-98.865575	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-10G	46.105000	-98.879344	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-11G	46.106994	-98.870272	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-12G	46.108366	-98.870134	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-13G	46.116657	-98.906871	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-14G	46.115235	-98.904670	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1H	46.098185	-98.834374	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-2H	46.097784	-98.863602	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-3H	46.097866	-98.865242	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-4H	46.082462	-98.847414	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-5H	46.098671	-98.872658	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-6H	46.098365	-98.872998	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-7H	46.134399	-98.922143	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-8H	46.140679	-98.88616	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-9H	46.127561	-98.894296	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-10H	46.127231	-98.871664	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-1I	46.128417	-98.887869	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-3J	46.134780	-98.900284	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-WETLAND-4J	46.123838	-98.844072	Non-jurisdictional	No anticipated temporary or permanent impacts

[1] Note that only the USACE can render an approved Jurisdictional Determination (JD). The likely jurisdictional status listed in Table 5-2 reflects AECOM's best professional judgement of Jurisdictional WOUS. Without a USACE rendered JD, impacts should be avoided to the greatest extent possible to these wetlands.

5.2 Other WOUS Results

5.2.1 Streams

A total of 29 stream locations were mapped within the survey corridor, of these mapped streams, four will be permanently impacted on the Project infrastructure. The 25 streams that will not be impacted are either within the survey corridor but outside of the planned Project footprint, were previously in the Project footprint but the layout was modified to avoid impacts, or will be bored for collection lines. Maps depicting the survey corridor boundary and delineated streams are included in **Figure 5-1**. Each delineated stream is a tributary of a stream that eventually flows into the Elm River, which connects with the James River in South Dakota. The James River is considered a traditional navigable water (TNW) by the USACE.

5.2.1.1 Streams Permanently Impacted by Project Infrastructure

There are four separate stream locations that will be permanently impacted by Project infrastructure; each crossing would be considered a "single and complete project" if jurisdictional to the USACE. The stream crossings are summarized below including approximate acreage, location, likely jurisdictional status, flow regime, and location within the Project infrastructure of each stream crossing. The flow regime of a stream describes how often it contains flowing water. Perennial streams contain flowing water for the whole year. Intermittent streams flow in response to both precipitation events and from spring sources; this flow is typically not year-long. Ephemeral streams flow only in response to precipitation events and, as such, are more often dry than flowing. The OHWM was measured where the stream was to be crossed by planned elements of the Project infrastructure.

FT-STREAM-1A intersects the access road to turbine 62 and south of 93rd St SE (**Figure 5-1**, **Map 16 and 17**). The stream is located in S19, T130N, and R65W (latitude: 46.067556, longitude -98.863893) in pasture land and is an unnamed tributary to the Elm River. The total permanent impacts to the intermittent stream are approximately 0.01 acres.

FT-STREAM-1A (2) intersects the access road south of turbine 60 and north of turbine 59 (**Figure 5-1**, **Map 16**). The stream is located in S19, T130N, and R65W (latitude: 46.067556, longitude -98.877074) in pasture land and is an unnamed tributary to the Elm River. The total permanent impacts to the intermittent stream are approximately 0.01 acres.

FT-STREAM-2A intersects the access road north of turbine 64 and southeast of turbine 59 (**Figure 5-1**, **Map 18**). The stream is located in S19, T130N, and R65W (latitude: 46.060330, longitude -98.872466) in pasture land and is an unnamed tributary to the Elm River. The total permanent impacts to the intermittent stream are approximately 0.01 acres.

FT-STREAM-2F (2) intersects the access road to turbine 60 and south of 93rd St SE (**Figure 5-1**, **Map 16**). The stream is located in S19, T130N, and R65W (latitude: 46.068966, longitude -98.875374) in pasture land and is an unnamed tributary to the Elm River. The total permanent impacts to the intermittent stream are approximately 0.01 acres.

Construction impacts to all four stream crossings have been minimized in the current layout. By minimizing the permanent impacts to less than 0.10-acre for all four stream crossings, no PCN or permit will be required. Construction within each stream will be minimized to the maximum extent possible while still meeting site access and safety requirements. Additionally, the construction easement has been minimized around the stream to minimize temporary impacts. All appropriate erosion control measures will be implemented prior to installation of the crossing.

5.2.1.2 Streams Temporarily Impacted by Project Infrastructure

There will be nine stream crossings temporarily impacted by Project infrastructure. **Table 5-3** summarizes the delineated streams that will be temporarily impacted by Project infrastructure, approximate acreage, location, likely jurisdictional status, flow regime, and location within the Project infrastructure of each stream.

Table 5-3 Streams Temporarily Impacted by Project Infrastructure

Stream ID	Latitude	Longitude	Flow Regime	Likely Jurisdictional Status[1]	Sheet Map Number[2]	Project Infrastructure
FT-STREAM-1A	46.067556	-98.863893	Intermittent	Jurisdictional	16	Temporarily impacted by construction limits; 0.05 acres
FT-STREAM-1A	46.066993	-98.861190	Intermittent	Jurisdictional	17	Temporarily impacted by crane path; 0.13 acres
FT-STREAM-1A (2)	46.066930	-98.877940	Intermittent	Jurisdictional	16	Temporarily impacted by construction limits; 0.21 acres
FT-STREAM-3A	46.115411	-98.865497	Intermittent	Jurisdictional	9	Temporarily impacted by crane path; 0.04 acres
FT-STREAM-1C	46.106618	-98.853282	Intermittent	Jurisdictional	11	Temporarily impacted by construction limits; 0.02 acres
FT-STREAM-3C	46.066398	-98.855997	Intermittent	Jurisdictional	17	Temporarily impacted by construction limits; 0.02 acres
FT-STREAM-2F (2)	46.068966	-98.875374	Intermittent	Jurisdictional	16	Temporarily impacted by construction limits; 0.01 acres

Stream ID	Latitude	Longitude	Flow Regime	Likely Jurisdictional Status[1]	Sheet Map Number[2]	Project Infrastructure
FT-STREAM-1I	46.129327	-98.853315	Ephemeral	Jurisdictional	6	Temporarily impacted by construction limits; 0.02 acres
FT-STREAM-1J	46.129826	-98.855368	Ephemeral	Jurisdictional	6	Temporarily impacted by construction limits; 0.09 acres

[1] Note that only the USACE can render an approved Jurisdictional Determination (JD). The likely jurisdictional status listed in Table 5-2 reflects AECOM's best professional judgement of Jurisdictional WOUS. Without a USACE rendered JD, impacts should be avoided to the greatest extent possible to these wetlands.

[2] Refer to **Figure 5-1**.

5.2.1.3 Streams Not Impacted by Project Infrastructure

Streams that were mapped during different design phases of the Project and are either no longer intersected by current infrastructure design or are not anticipated to have temporary or permanent impacts resulting from Project construction are listed in **Table 5-4**. Impacts to these streams have been avoided by shifts in Project infrastructure and/or by boring collection lines under jurisdictional features, which is not regulated by the USACE.

Table 5-4 Streams Not Impacted by Project Infrastructure

Stream ID	Latitude	Longitude	Flow Regime	Likely Jurisdictional Status[1]	Project Infrastructure
FT-STREAM-1A (2)	46.066908	-98.877938	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-2C	46.086948	-98.857518	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-3C	46.066520	-98.856418	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-1E	46.129196	-98.918964	Ephemeral	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-2E	46.112740	-98.901528	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-2F (1)	46.064316	-98.868440	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-3F	46.054848	-98.863544	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-4F	46.058624	-98.843299	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-5F	46.063736	-98.841774	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-6F	46.093808	-98.832781	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-7F	46.090497	-98.842130	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-8F	46.089300	-98.858761	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-9F	46.121733	-98.891391	Ephemeral	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-10F	46.127193	-98.848187	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-11F	46.130075	-98.867119	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-1H	46.054192	-98.866169	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-2H	46.099595	-98.872174	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-3H	46.062298	-98.842108	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts
FT-STREAM-4H	46.071839	-98.841502	Intermittent	Jurisdictional	No anticipated temporary or permanent impacts

Stream ID	Latitude	Longitude	Flow Regime	Likely Jurisdictional Status[1]	Project Infrastructure
FT-STREAM-5H	46.128013	-98.918947	Intermittent	Non-jurisdictional	No anticipated temporary or permanent impacts

[1] Note that only the USACE can render an approved Jurisdictional Determination (JD). The likely jurisdictional status listed in Table 5-2 reflects AECOM's best professional judgement of Jurisdictional WOUS. Without a USACE rendered JD, impacts should be avoided to the greatest extent possible to these wetlands.

5.2.2 Ponds Temporarily Impacted by Project Infrastructure

There will be one pond temporarily impacted by Project infrastructure. **Table 5-5** summarizes the delineated pond that will be temporarily impacted by Project infrastructure, approximate acreage, location, likely jurisdictional status, flow regime, and location within the Project infrastructure of each pond. All temporary impacts are less than 0.10-acre.

Table 5-5 Ponds Temporarily Impacted by Project Infrastructure

Pond ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Sheet Map Number[2]	Project Infrastructure
FT-POND-5E (2)	46.118026	-98.889218	Non-jurisdictional	8	Temporarily impacted by construction limits; 0.01 acres

[1] Note that only the USACE can render an approved Jurisdictional Determination (JD). The likely jurisdictional status listed in Table 5-5 reflects AECOM's best professional judgement of Jurisdictional WOUS. Without a USACE rendered JD, impacts should be avoided to the greatest extent possible to these ponds.

[2] Refer to **Figure 5-1**.

5.2.2.1 Ponds Not Impacted by Project Infrastructure

Ponds that were mapped during different design phases of the Project and are either no longer intersected by current infrastructure design or are not anticipated to have temporary or permanent impacts resulting from Project construction are listed in **Table 5-6**. Impacts to these ponds have been avoided by shifts in Project infrastructure and/or by boring collection lines under jurisdictional features, which is not regulated by the USACE.

Table 5-6 Ponds Not Impacted by Project Infrastructure

Pond ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Project Infrastructure
FT-POND-1A	46.124164	-98.851547	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-2A	46.133836	-98.911729	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-1B	46.124161	-98.851532	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-1C	46.123671	-98.906182	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-1E	46.123138	-98.844969	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-2E	46.118546	-98.917221	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-3E	46.075694	-98.842328	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-4E	46.106904	-98.854716	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-5E (1)	46.109818	-98.896988	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-5E (2)	46.117177	-98.889133	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-5E (3)	46.106838	-98.898971	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-6E	46.084103	-98.849582	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-1F	46.095573	-98.850948	Non-jurisdictional	No anticipated temporary or permanent impacts

Pond ID	Latitude	Longitude	Likely Jurisdictional Status[1]	Project Infrastructure
FT-POND-2F	46.093624	-98.835589	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-3F	46.065528	-98.850142	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-1G	46.061849	-98.866894	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-2G	46.132565	-98.893749	Non-jurisdictional	No anticipated temporary or permanent impacts
FT-POND-1H	46.098274	-98.869302	Jurisdictional	No anticipated temporary or permanent impacts
FT-POND-2H	46.085485	-98.842984	Non-jurisdictional	No anticipated temporary or permanent impacts

[1] Note that only the USACE can render an approved Jurisdictional Determination (JD). The likely jurisdictional status listed in Table 5-6 reflects AECOM's best professional judgement of Jurisdictional WOUS. Without a USACE rendered JD, impacts should be avoided to the greatest extent possible to these ponds.

5.3 Upland Features

Several swale features were observed during the field surveys. Swales are linear or curvilinear depressional features that naturally collect overland flows from surrounding uplands. Many of the swale locations that were mapped by the field team were initially investigated because the desktop analysis identified NHD-mapped intermittent and ephemeral streams at these locations. Upon field observation, the locations marked as swales were determined to lack defined beds, banks, and scoured channels. They were not dominated by wetland plants, but instead, were generally vegetated with upland species. They are non-jurisdictional and do not need to be avoided.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The Project Area was analyzed for wetlands and other water bodies potentially under jurisdiction of the USACE, which include: 1) TNWs, 2) wetlands adjacent to TNWs, 3) non-navigable tributaries of TNWs that are relatively permanent (i.e. tributaries that typically flow year-round or have continuous flow at least seasonally), 4) wetlands that directly abut such tributaries, and 5) water bodies that have a significant nexus with a TNW (USACE 2007). All of the potentially jurisdictional wetlands and streams documented were hydrologically connected to the Elm River, which connects with the James River in South Dakota. The James River is considered a TNW by the USACE.

The Foxtail Wind Energy Project Area, evaluated by AECOM, contains eight permanent wetland and other WOUS crossings. These eight features included three wetlands, four streams, and one pond. A total of 253 wetlands or other WOUS are either outside the construction easement or will be bored under to avoid impacts. Wetlands or other WOUS that occur in construction easements should be flagged and avoided when in close proximity to areas of potential impact.

6.1 Collection Lines

Wetlands and other WOUS intersect disturbance areas for electrical collection lines. The installation of electrical collection lines is typically considered a temporary disturbance. USACE recommends the installation of electrical collection lines using direct bury or boring techniques. This process is not regulated by the USACE and is, therefore, not subject to permitting. If this technique is not available, installation of the electrical collection lines by trenching is regulated under the Section 404 permitting process because it causes the temporary placement of dredged material in jurisdictional features. Foxtail Wind has committed to boring under the wetlands and WOUS where impacts are expected over 0.10-acre. Boring under jurisdictional features is also not regulated by the USACE; therefore, no PCN or permit would likely be required.

6.2 Access Roads

Wetlands and other WOUS intersect the temporary disturbance and permanent disturbance areas for access roads. Foxtail Wind has committed to utilizing matting to protect any jurisdictional feature prior to crossing, flagging off nearby wetlands and shifting or minimizing construction corridors to avoid temporary impacts, and minimizing permanent impacts to less than 0.10- acre; therefore, no PCN or permit would likely be required.

6.3 O&M Building and Collection Substation

Based on the current layout, no wetlands were delineated within the current parcels identified for construction of the O&M building and collection substation. Foxtail Wind is committed to siting all buildings and construction outside of these wetlands.

6.4 USACE Permitting

Based on the estimated permanent and temporary impacts to wetlands and other WOUS from the Project, a CWA Section 404 permit is not required. If no permit is required but temporary impacts are necessary, the USACE would likely require the action follow the General and Regional Conditions of the applicable NWPs included in **Appendix B**. NWP 12: Utility Line Activities and NWP 14: Linear Transportation Activities are the two permits that likely may apply to the Project. NWP 12 applies to projects that install power transmitting infrastructure; NWP 14 was established for road projects. The USACE in particular emphasizes the following measures to minimize impacts to wetlands or other WOUS:

- The use of mats or other measures to minimize soil disturbance in jurisdictional areas;

- Ensure no temporary fills remain in the jurisdictional areas; and,
- Any affected jurisdictional areas be returned to pre-construction contours and the affected areas be revegetated.

AECOM also recommends Foxtail Wind follow BMPs during construction of the Project to further avoid and minimize impacts to wetlands and other WOUS. The following bullet points summarize recommended BMPs specific to wetlands and other WOUS:

- Avoid and/or minimize impacting drainage features such as ditches, culverts, levees, tiles, and terraces.
- Identify, avoid, and/or minimize adverse impacts to wetlands and waterbodies, including placing structure foundations below the OHWM of WOUS.
- Access road construction should minimize impacts to streams.
- All permanent or temporary crossings of waterbodies should be designed to maintain low flows for aquatic species movement and designed to function during high flows.
- Work within WOUS should occur during periods of low flow or no flow.

7.0 LITERATURE CITED

Bluemle, J.P. 1979. Geology of Dickey and Lamoure Counties – N.D.G.S. Bulletin 70, N.D.S.W.C. County Groundwater Studies 28, Pt. 1.

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

Chadde, S.W. 2012. Wetland Plants of the Northern Great Plains: A complete guide to the wetland and aquatic plants of North and South Dakota, Nebraska, eastern Montana, and eastern Wyoming. San Bernardino, CA: Steve Chadde.

Dyke, S.R., S.K. Johnson, and P.T. Isakson. 2015. North Dakota State Wildlife Action Plan. North Dakota Game and Fish Department, Bismarck, ND.

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Gretag/Macbeth. 2009. Munsell® Soil Color Charts 2009 Revision. New Windsor, NY.

Heim, R. 2018. U.S. Drought Monitor, North Dakota. Accessed May 23, 2018. Available online at: http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?ND

Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing 81: 345-354.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.

Soil Survey Staff. 2017. Web Soil Survey. USDA (U.S. Department of Agriculture)/NRCS (Natural Resources Conservation Service). Accessed March 14, 2017. Available online at: http://websoilsurvey.sc.egov.usda.gov

USACE (U.S. Army Corps of Engineers). 2007. U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook. Accessed December 12, 2016. Available online at: http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/jd_guidebook_051207final.pdf

USACE. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

USDA (U.S. Department of Agriculture). 2016. USDA Field Office Climate Data - WETS Tables. Accessed December 12, 2016. Available online at: http://www.wcc.nrcs.usda.gov/climate/navigate_wets.htm

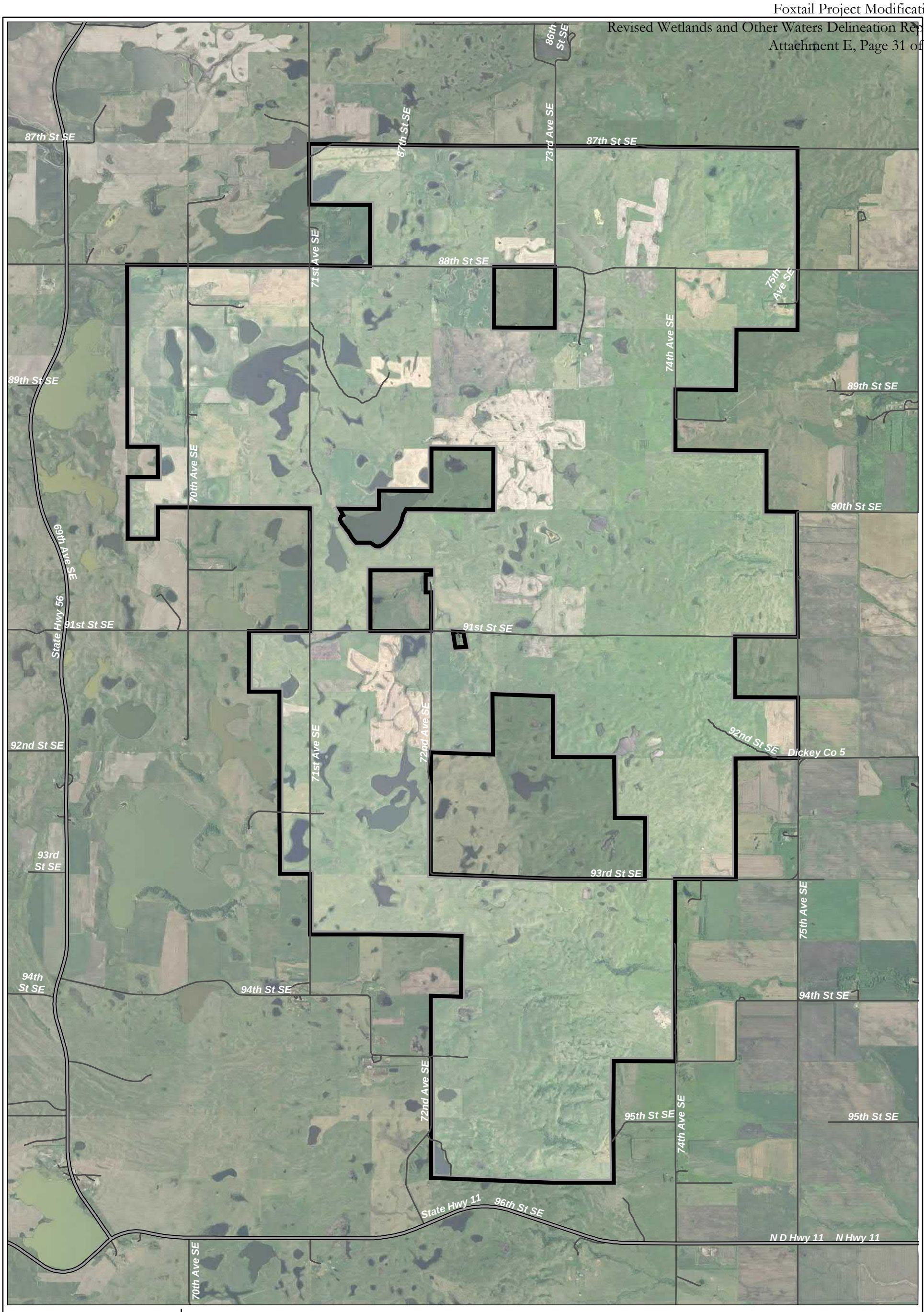
USDHS (U.S. Department of Homeland Security), FEMA (Federal Emergency Management Agency). 2017. FEMA Flood Map Service Center: Dickey County, ND. Accessed May, 5 2017. Available online at: https://msc.fema.gov/portal/search?AddressQuery=Dickey%20county%20nd

USFWS (U.S. Fish and Wildlife Service). 2017. National Wetlands Inventory. Accessed March 30, 2017. Available online at: http://www.fws.gov/wetlands/Wetlands-Mapper.html

USGS (U.S. Geological Survey). 2017. National Hydrography Dataset. Accessed May, 5 2017. Available online at: http://nhd.usgs.gov/data.html

Whitson, T.D. (ed.), L.C. Burrill, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Lee, and R. Parker. 2009. Weeds of the West. Las Cruces, NM: Western Society of Weed Science in cooperation with the Western United States Land Grant Universities Cooperative Extension Services.

Figures



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Legend

Project Boundary

Transportation

State Highway

County Road

Other Road

N

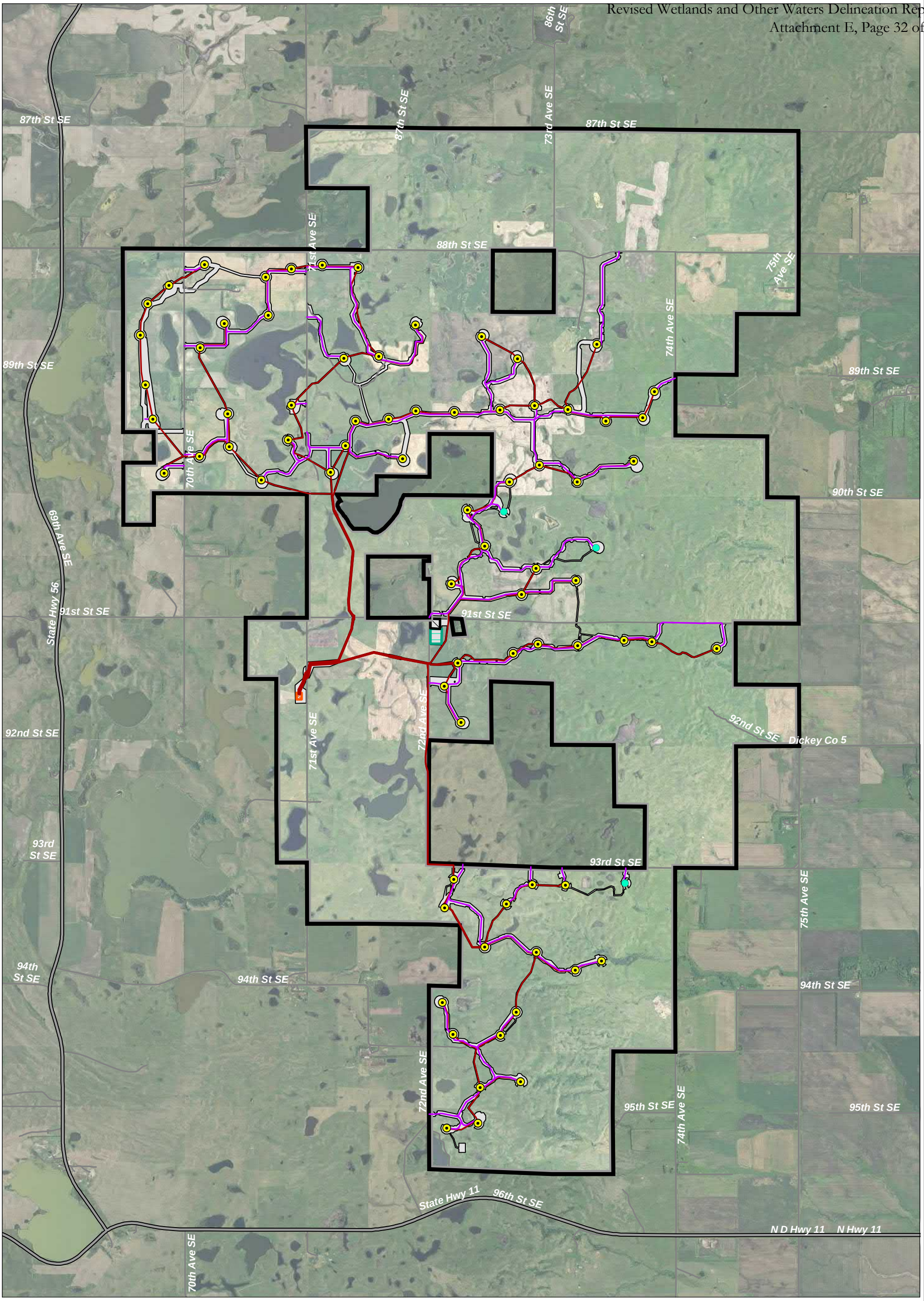
0 0.5 1

Miles

Figure 1-1
Project Location
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®

AECOM



Legend

- Project Boundary
- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- O&M Property
- Substation
- Laydown Area

Transportation

- State Highway
- County Road
- Other Road

N

0 0.5 1
Miles

Figure 1-2
Project Layout
Foxtail Wind Energy Center
Dickey County, ND

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AECOM

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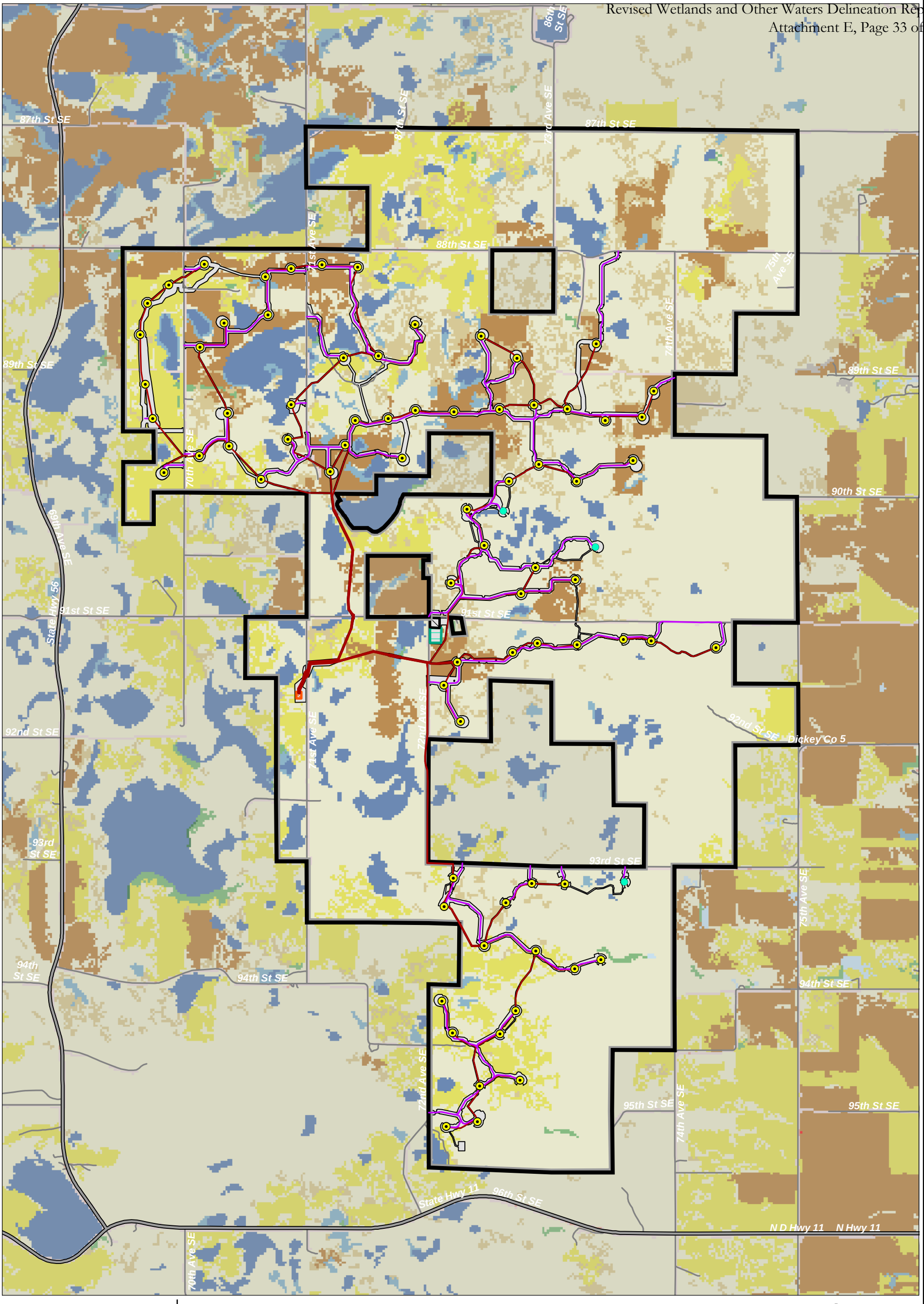

Legend

- Project Boundary
- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- O&M Property
- Substation
- Laydown Area

National Landcover Dataset (Homer et al. 2015)

- Deciduous Forest
- Evergreen Forest
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Grassland/Herbaceous
- Cultivated Crops
- Pasture/Hay
- Shrub/Scrub
- Emergent Herbaceous Wetlands
- Woody Wetlands
- Open Water
- Barren Land (Rock/Sand/Clay)

N

0 0.5 1

Miles

Figure 2-1
Land Cover
Foxtail Wind Energy Center
Dickey County, ND

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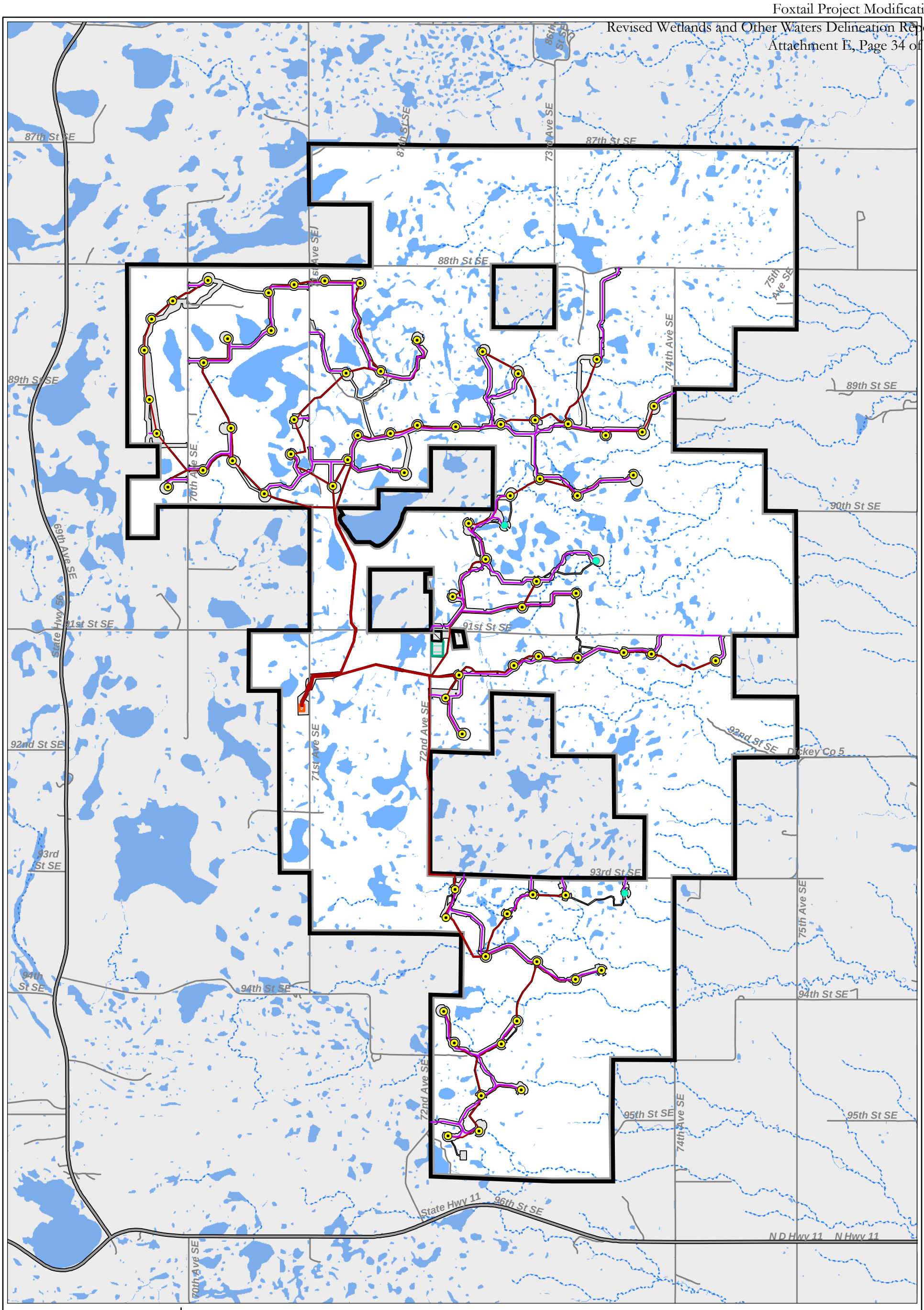

Legend

- Project Boundary
- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- O&M Property
- Substation
- Laydown Area
- National Hydrography Dataset (USGS 2018)
- National Wetlands Inventory (USFWS 2018)

N

0 0.5 1

Miles

Figure 4-1

National Wetlands Inventory and Surface Waters

Foxtail Wind Energy Center
Dickey County, ND

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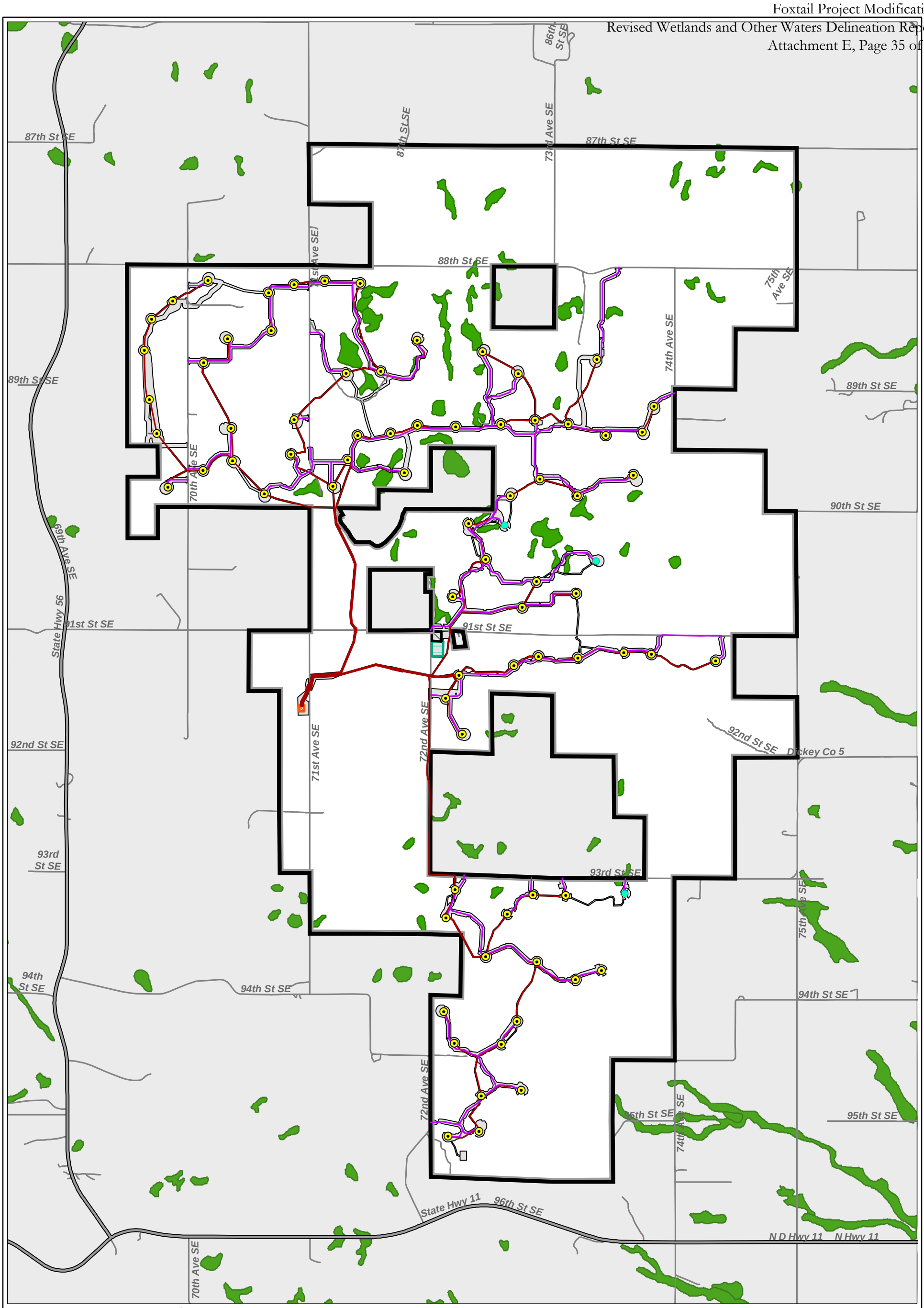

Legend

- Project Boundary
- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- O&M Property
- Substation
- Laydown Area
- Hydric Soils (Soil Survey Staff 2018)

N

0 0.5 1
Miles

Figure 4-2
Hydric Soils
Foxtail Wind Energy Center
Dickey County, ND

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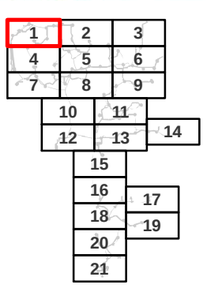
T-6
T-5
T-4
T-3
T-11
T-10
T-9
T-8
70th Ave SE
71st Ave SE
FT-WETLAND-32A
FT-WETLAND-3J
FT-WETLAND-7H
FT-POND-2A
FT-WETLAND-13E



Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 1 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
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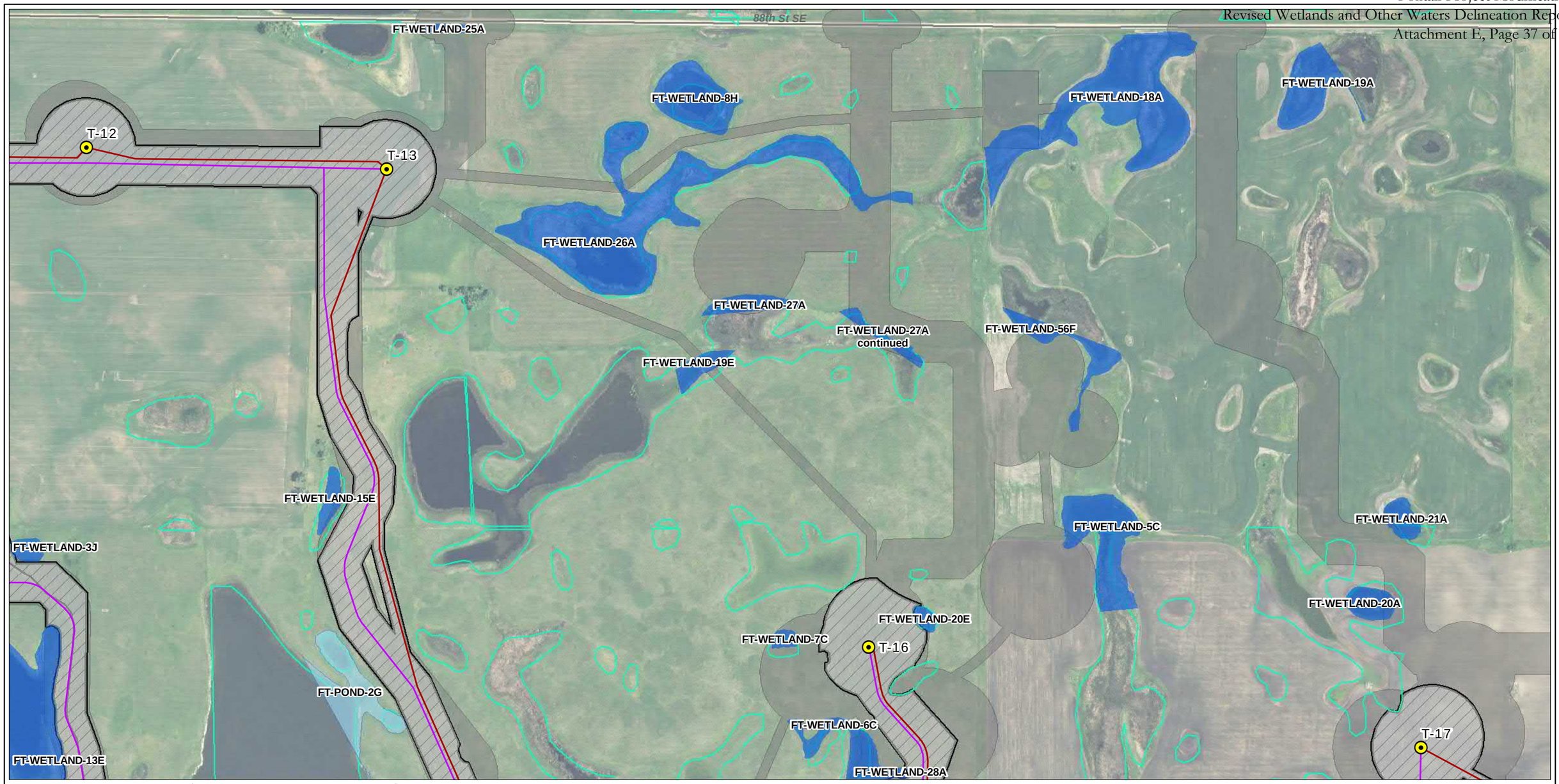

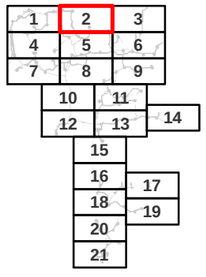

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 2 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
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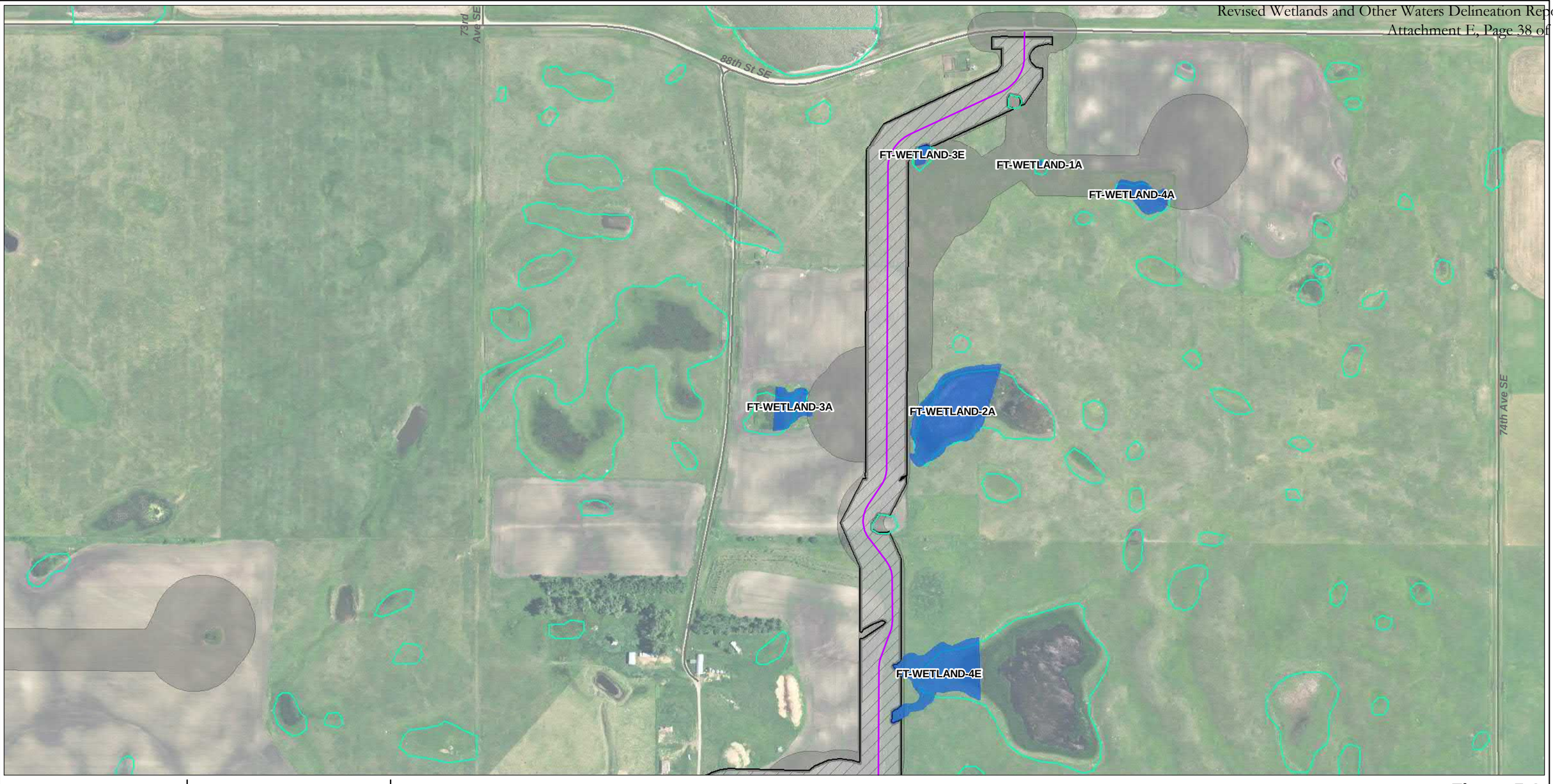

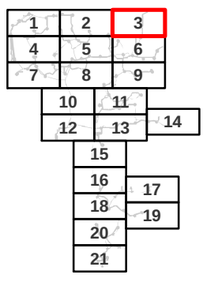

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 3 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
AECOM

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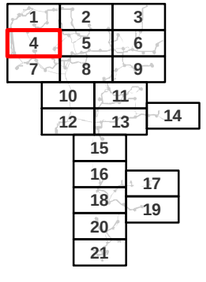

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 4 of 21
Foxtail Wind Energy Center
Dickey County, ND

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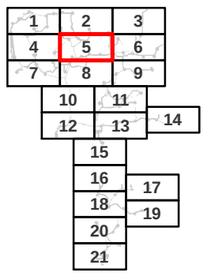

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 5 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
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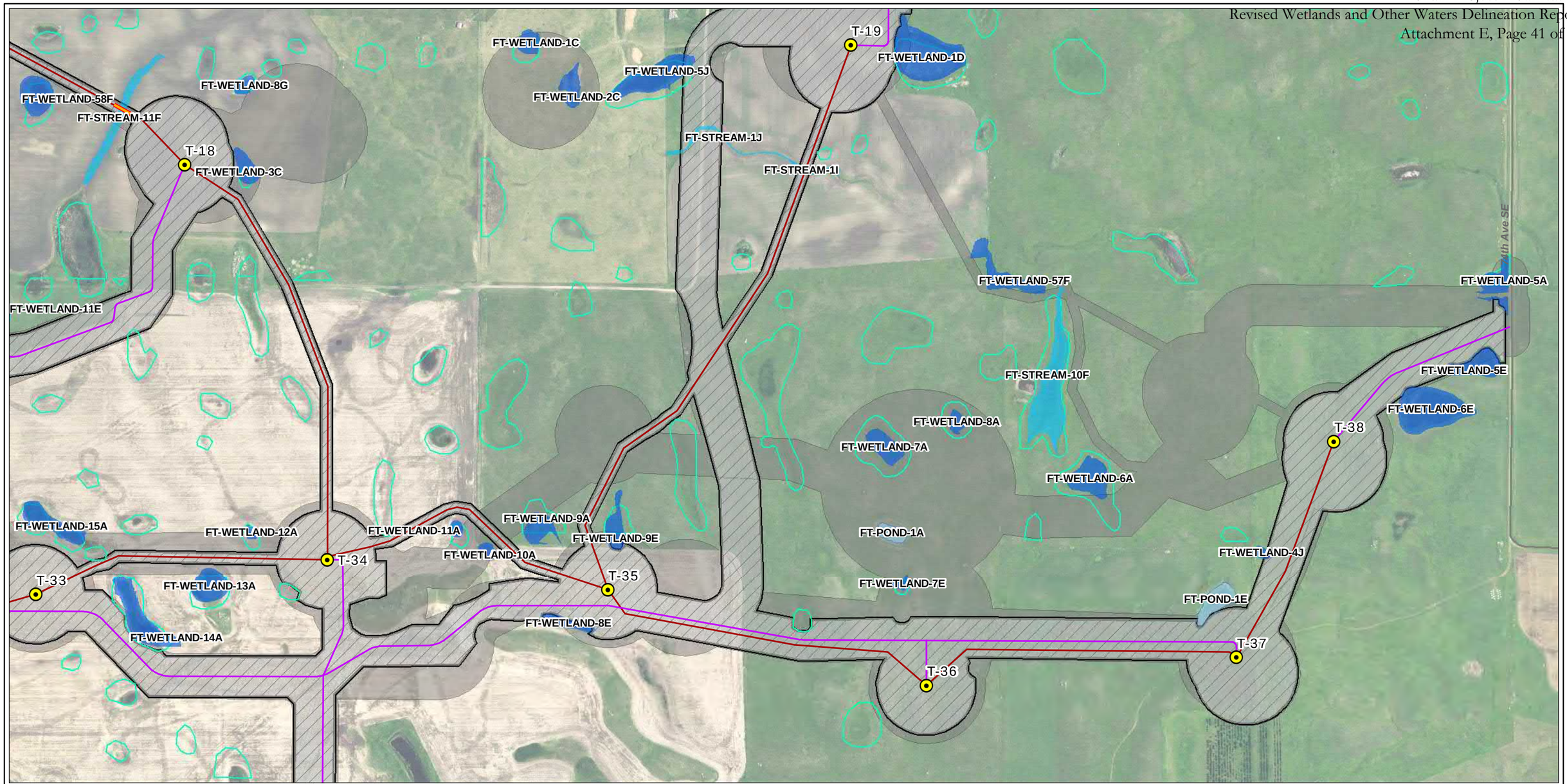

Figure 5-1
Delineated Wetlands
Map 6 of 21
Foxtail Wind Energy Center
Dickey County, ND

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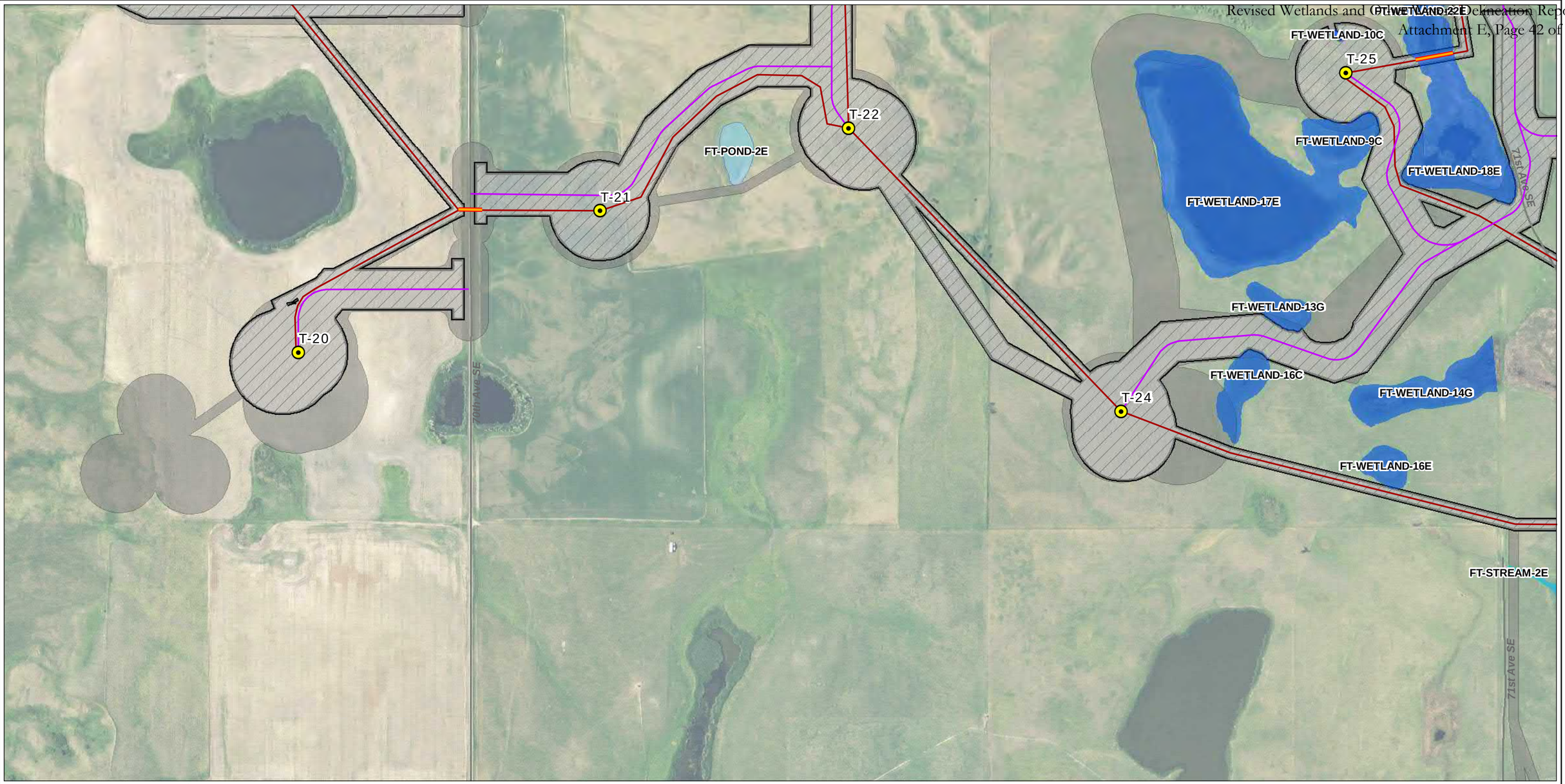

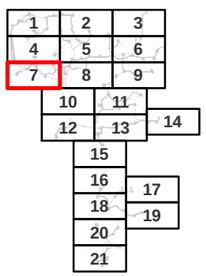

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 7 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
AECOM

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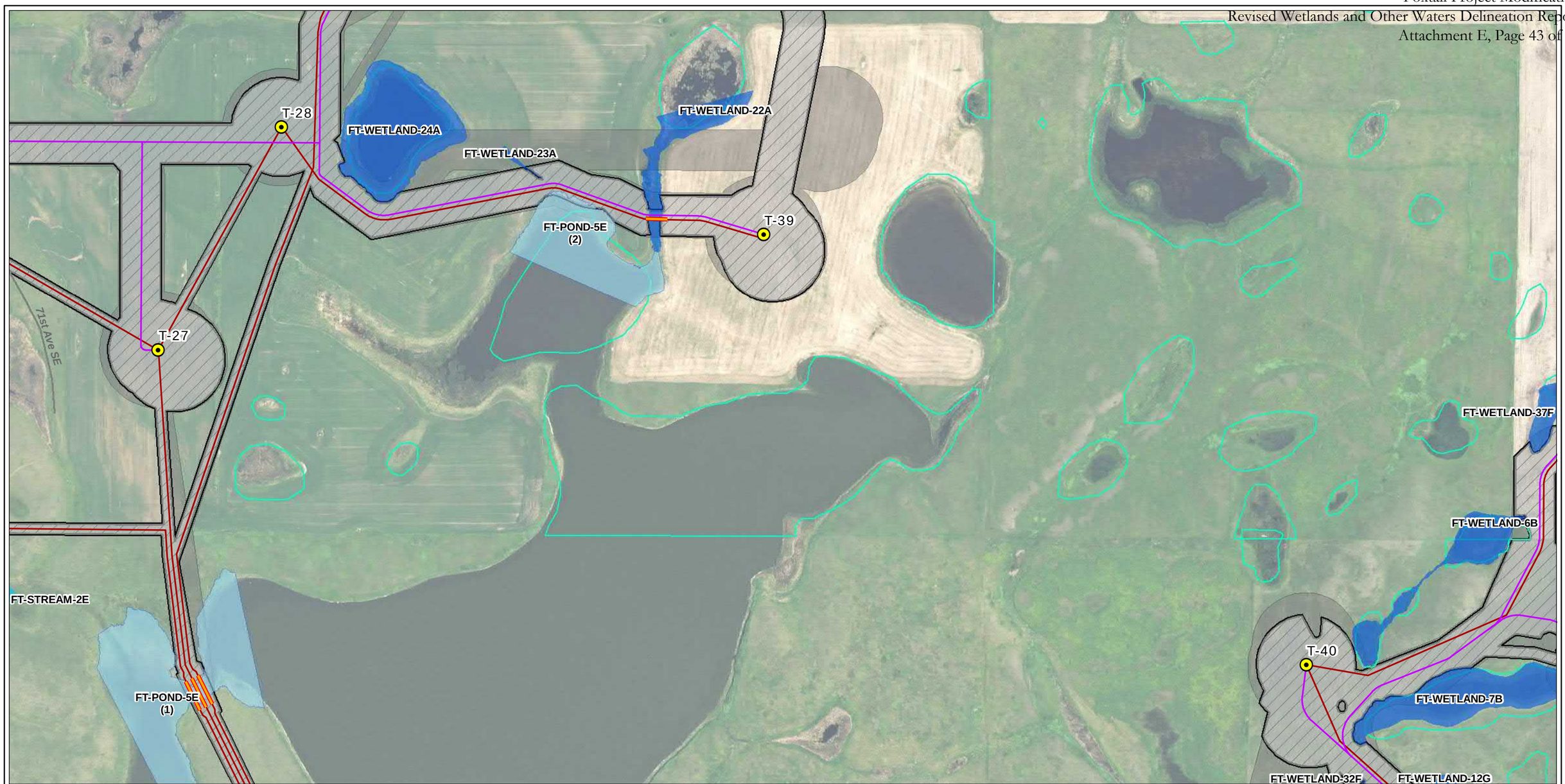

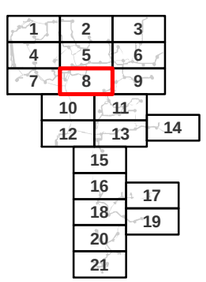

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 8 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
AECOM

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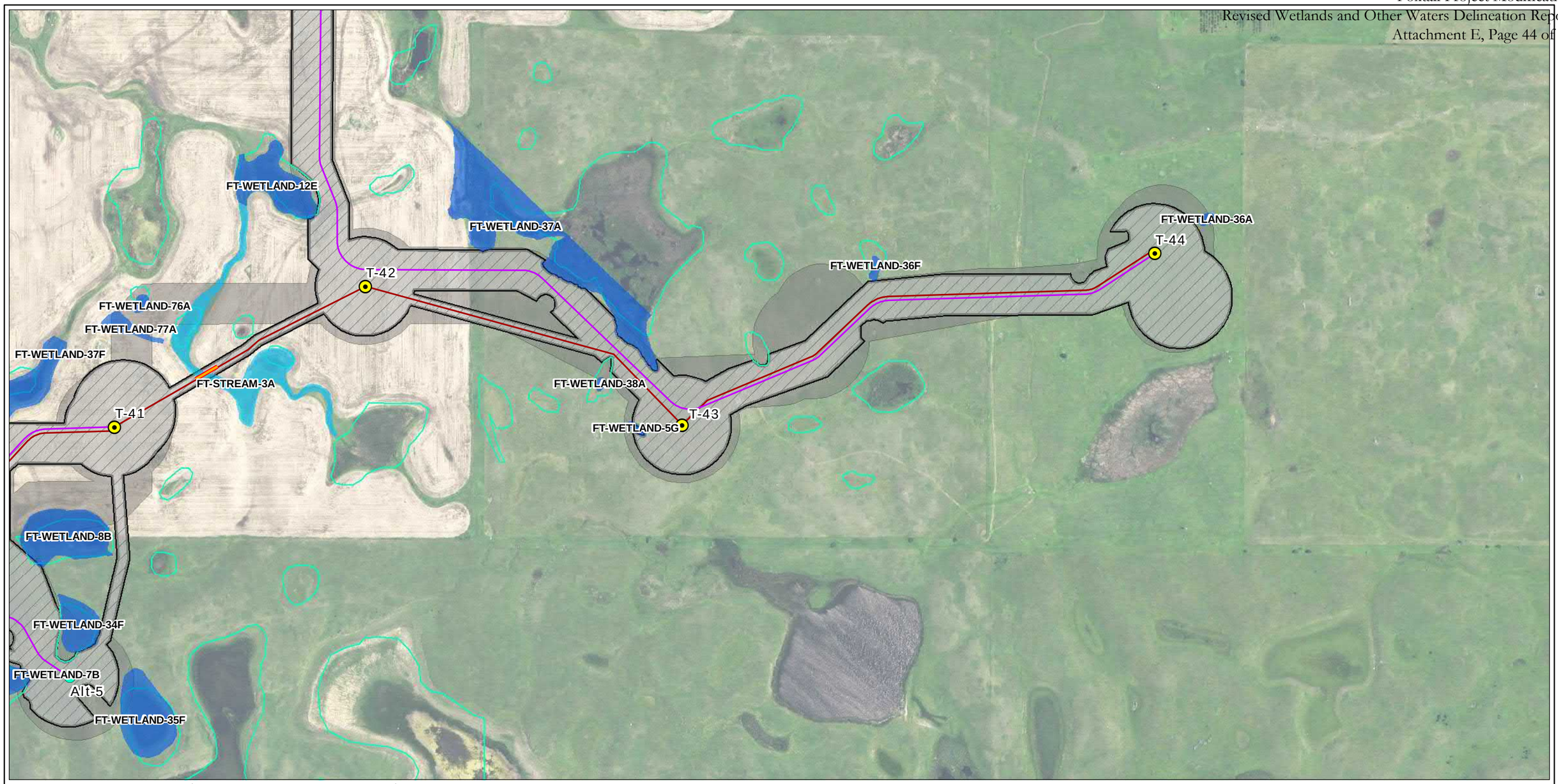

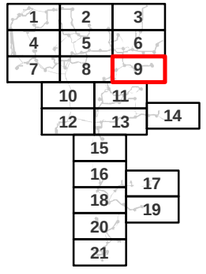

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 9 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
AECOM

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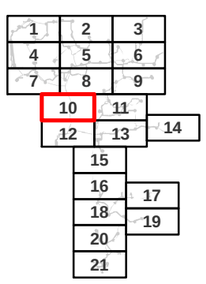

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 10 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
AECOM

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FT-WETLAND-5B
FT-WETLAND-32F
FT-WETLAND-12G
FT-WETLAND-46F
FT-WETLAND-47F
T-46
FT-WETLAND-14C
FT-WETLAND-45F
Alt-6
FT-POND-4E
FT-WETLAND-4G
FT-WETLAND-11G
FT-WETLAND-13C
FT-WETLAND-48F
FT-STREAM-1C
FT-WETLAND-10G
FT-WETLAND-1B
T-47
FT-WETLAND-3B
FT-WETLAND-26F
FT-WETLAND-2B
T-49
T-45
FT-WETLAND-12C
FT-WETLAND-8D
FT-WETLAND-23F
T-48
FT-WETLAND-3G
FT-WETLAND-24F
FT-WETLAND-35A
FT-STREAM-2H
FT-WETLAND-25F

NORTH DAKOTA
Project Location

1 2 3
4 5 6
7 8 9
10 11
12 13 14
15
16 17
18 19
20
21

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 11 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
AECOM

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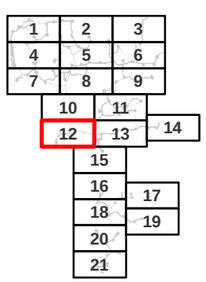
FT-WETLAND-34A
FT-WETLAND-9B
FT-WETLAND-10B
FT-WETLAND-11B
FT-WETLAND-26B
FT-WETLAND-39A
FT-WETLAND-6J
FT-WETLAND-49F
FT-WETLAND-68A
FT-WETLAND-70A
FT-WETLAND-69A
FT-WETLAND-28B
FT-WETLAND-30B
FT-WETLAND-29B
FT-WETLAND-1J
FT-WETLAND-27B
FT-WETLAND-67A
FT-WETLAND-2J
FT-WETLAND-25B
FT-WETLAND-7J
230th Ave SE
230th Ave SE



Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 12 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
AECOM

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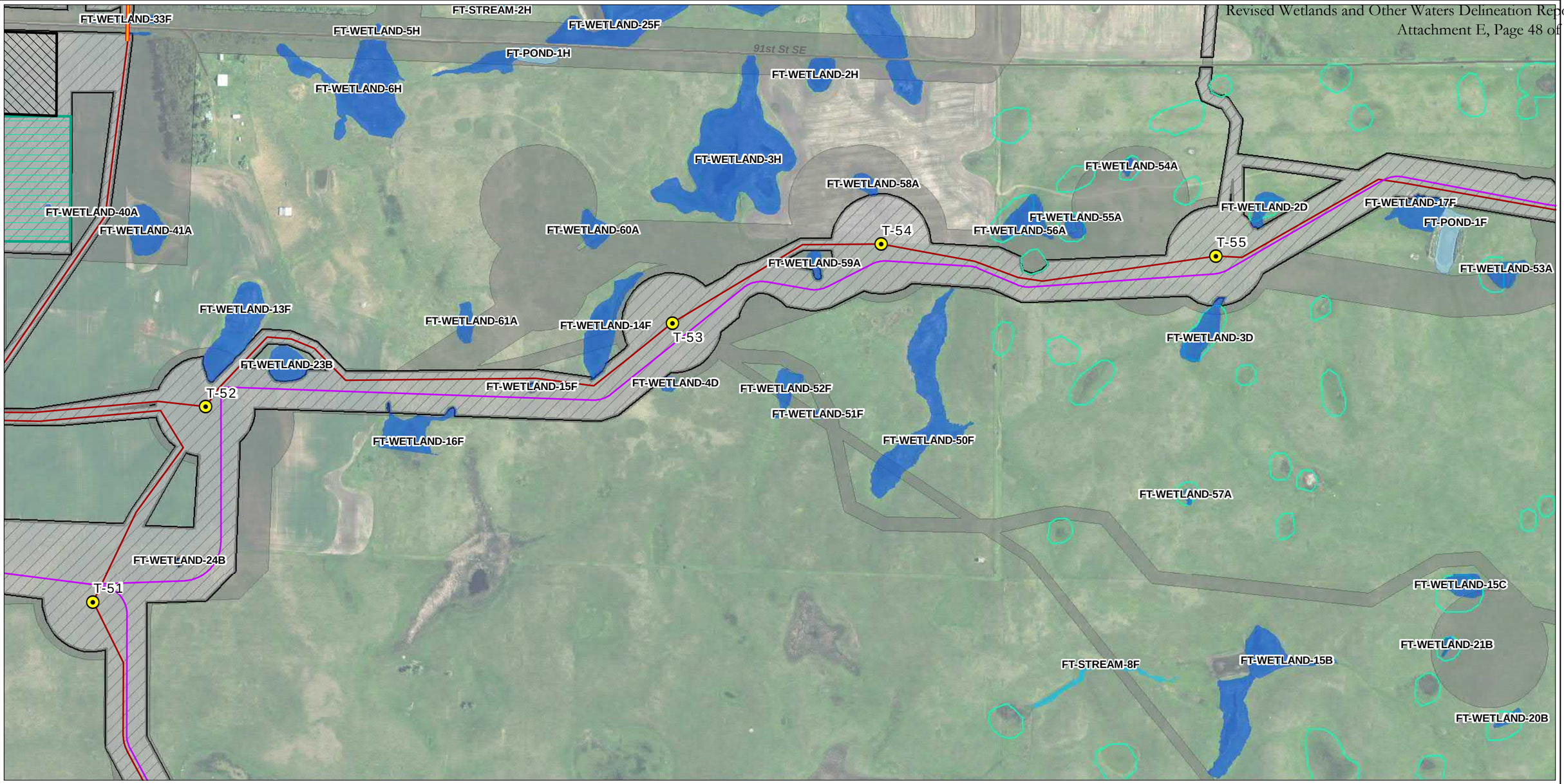

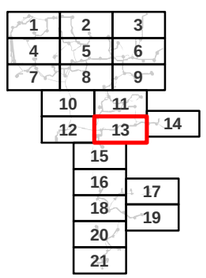

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000

Feet

Figure 5-1
Delineated Wetlands
Map 13 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®

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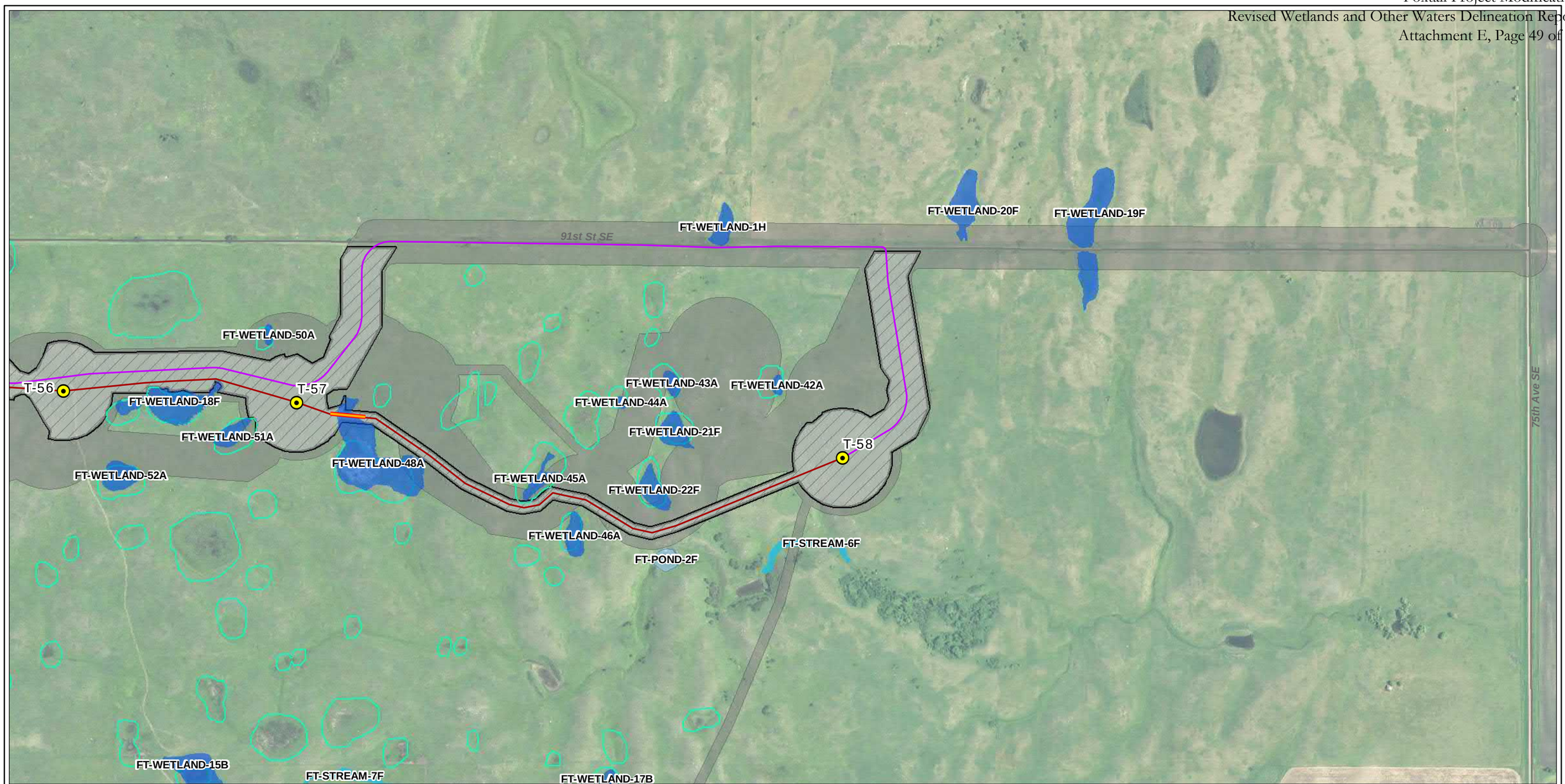

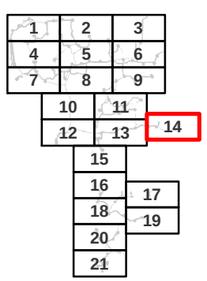

Legend

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- Collection System
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- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 14 of 21
Foxtail Wind Energy Center
Dickey County, ND

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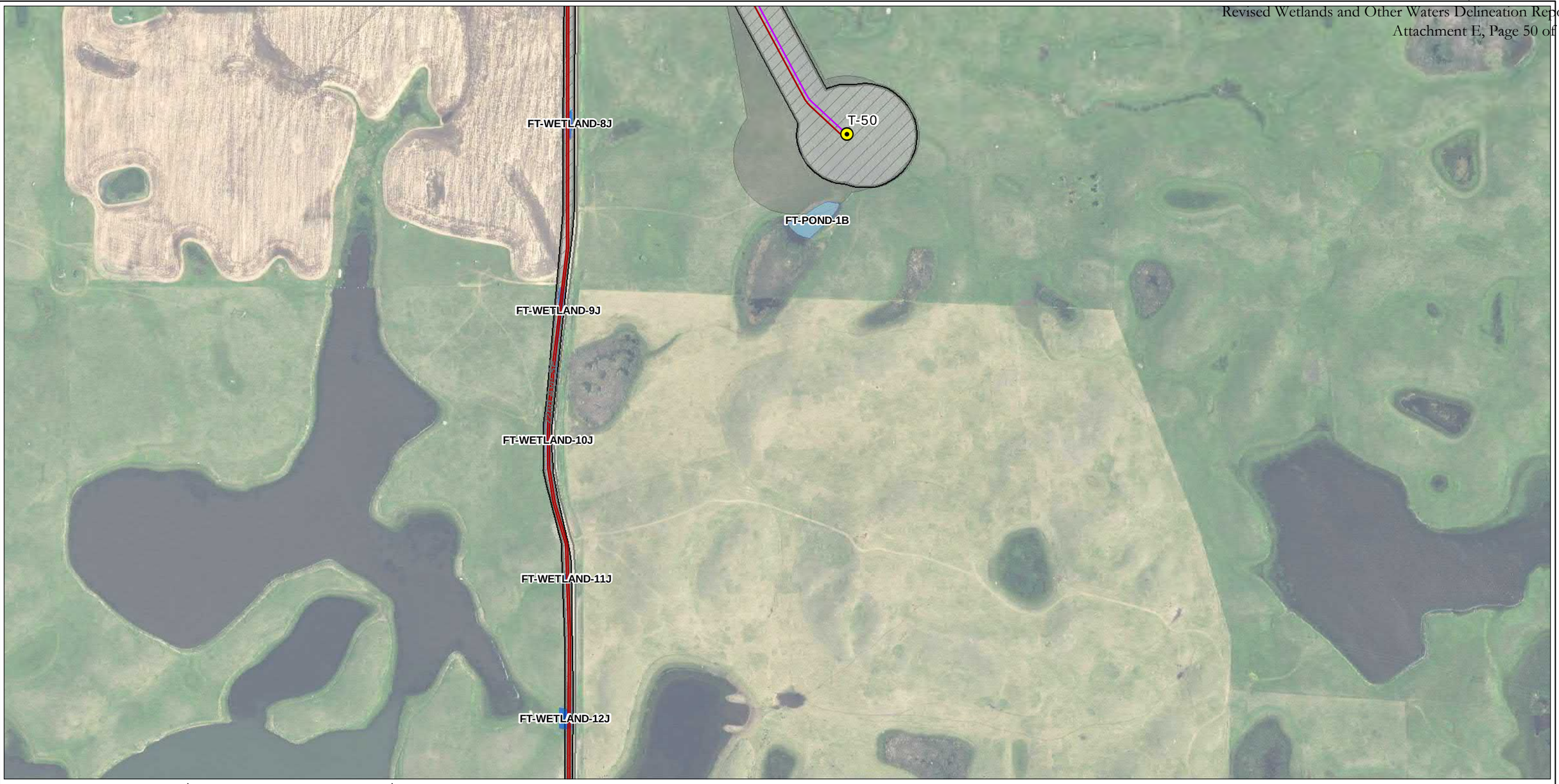

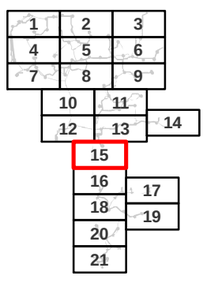

Legend

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- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 15 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
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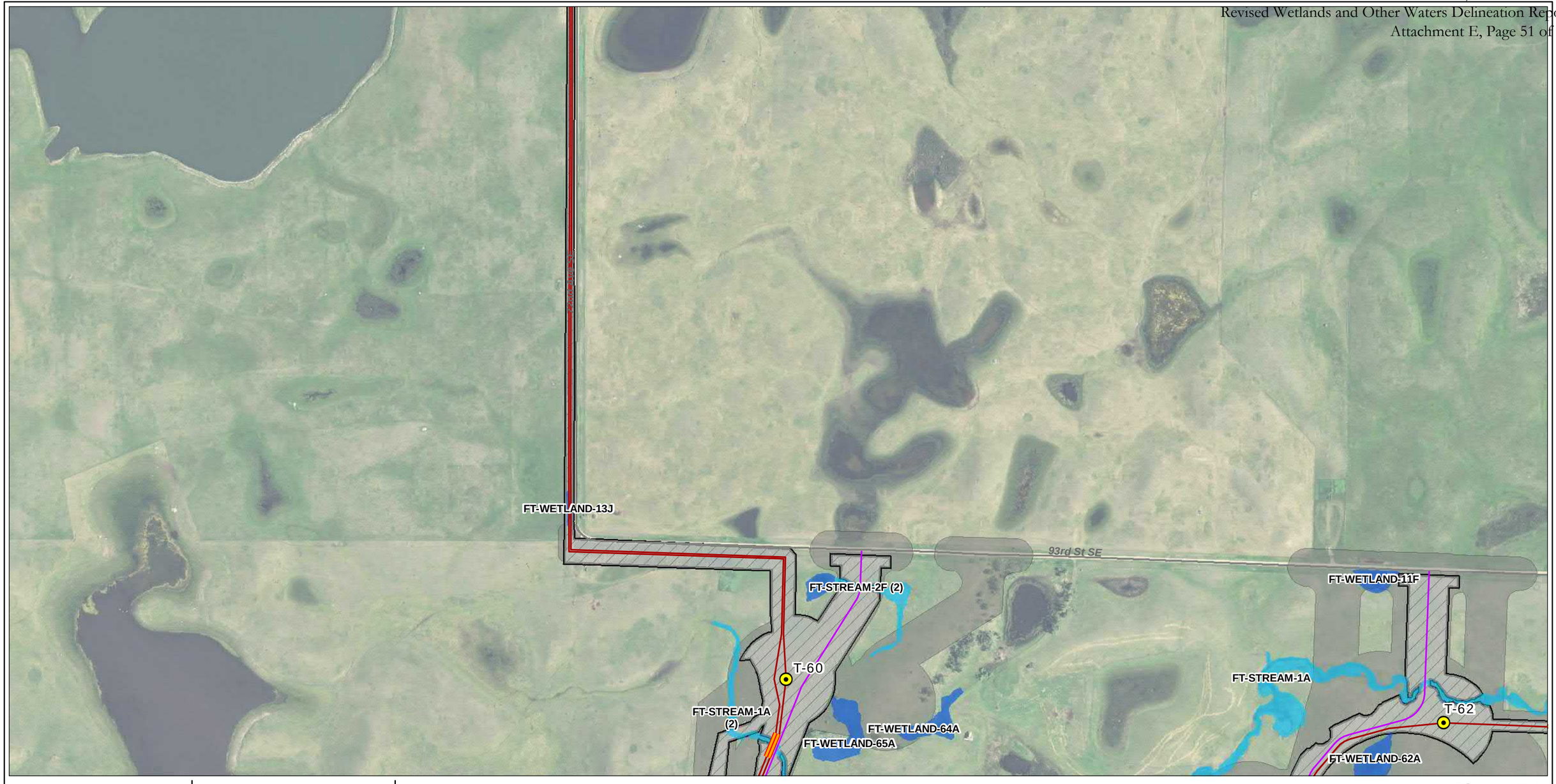

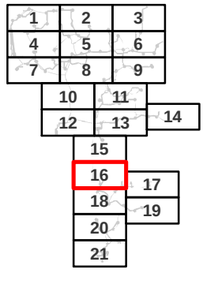

Legend

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- Alternate Turbine
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- Collection System
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- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000

Feet

Figure 5-1
Delineated Wetlands
Map 16 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®

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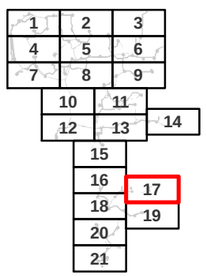

Legend

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- Collection System
- Survey Corridor
- Bore Location
- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 17 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
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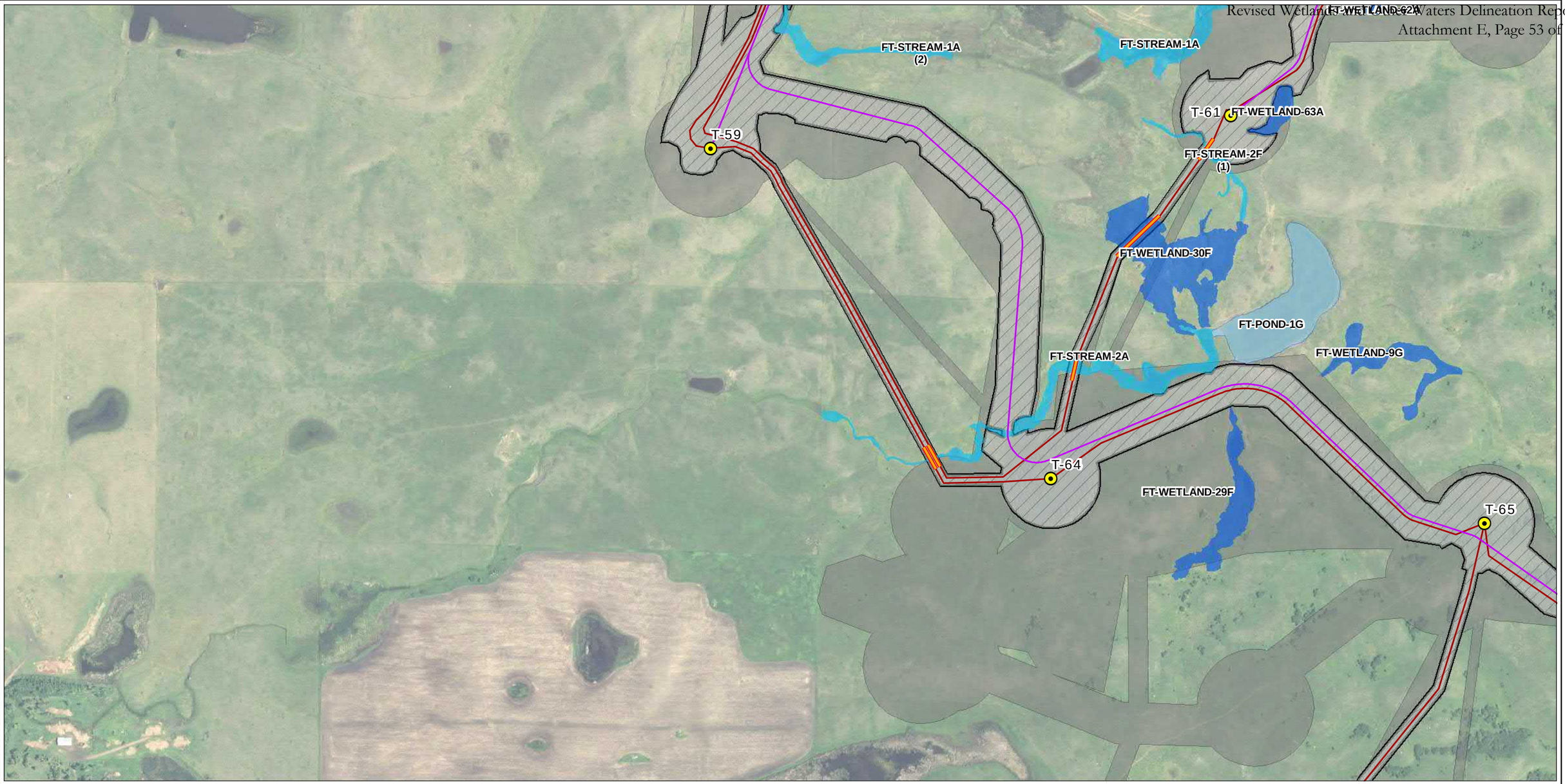

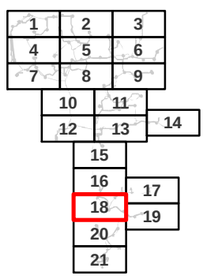

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
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- Bore Location
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- Substation
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- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 18 of 21
Foxtail Wind Energy Center
Dickey County, ND

Xcel Energy®
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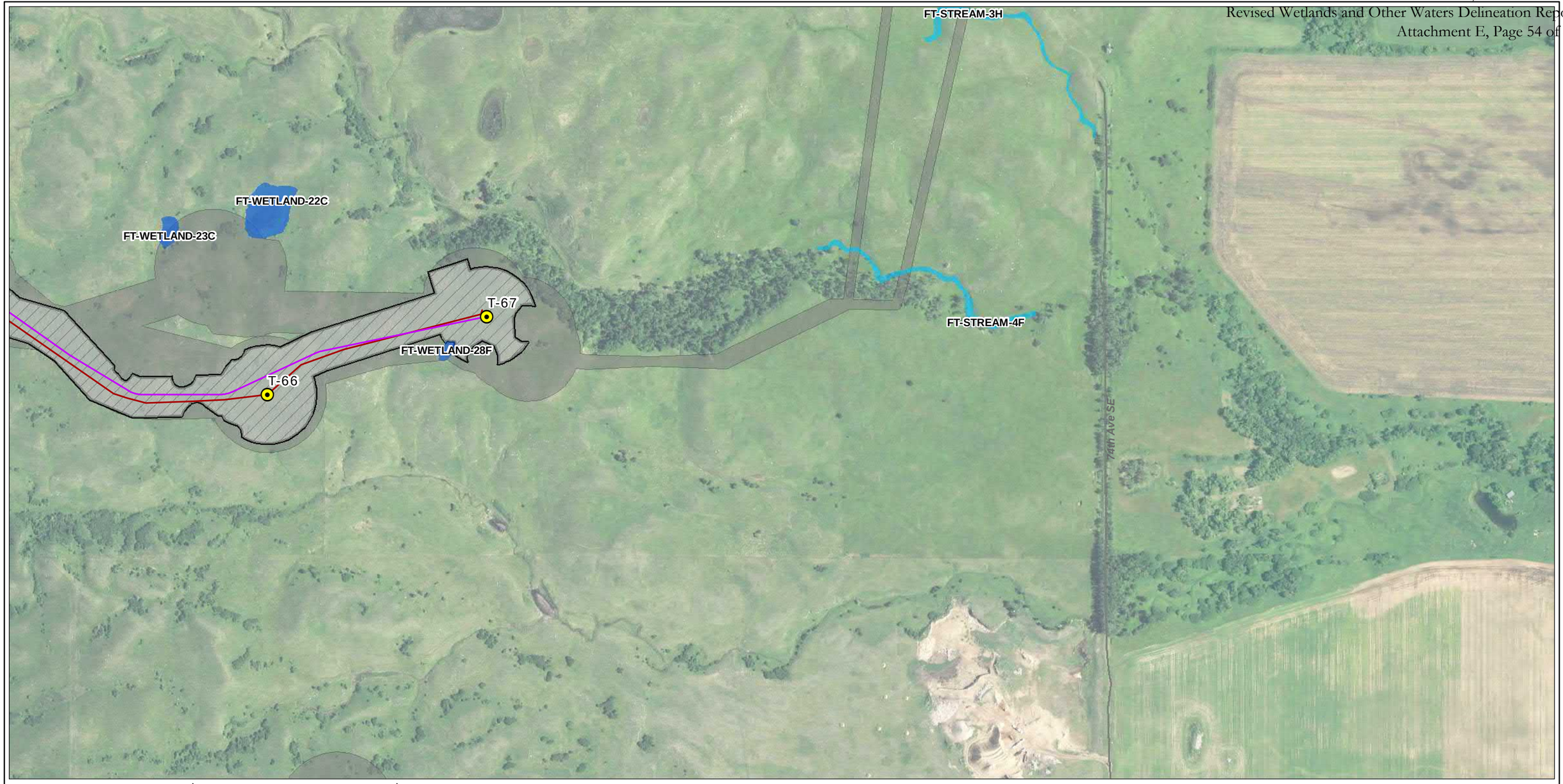

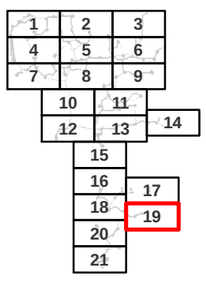

Legend

- Construction Limits
- Proposed Turbine
- Alternate Turbine
- Access Road
- Collection System
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- Bore Location
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- Substation
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- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 19 of 21
Foxtail Wind Energy Center
Dickey County, ND

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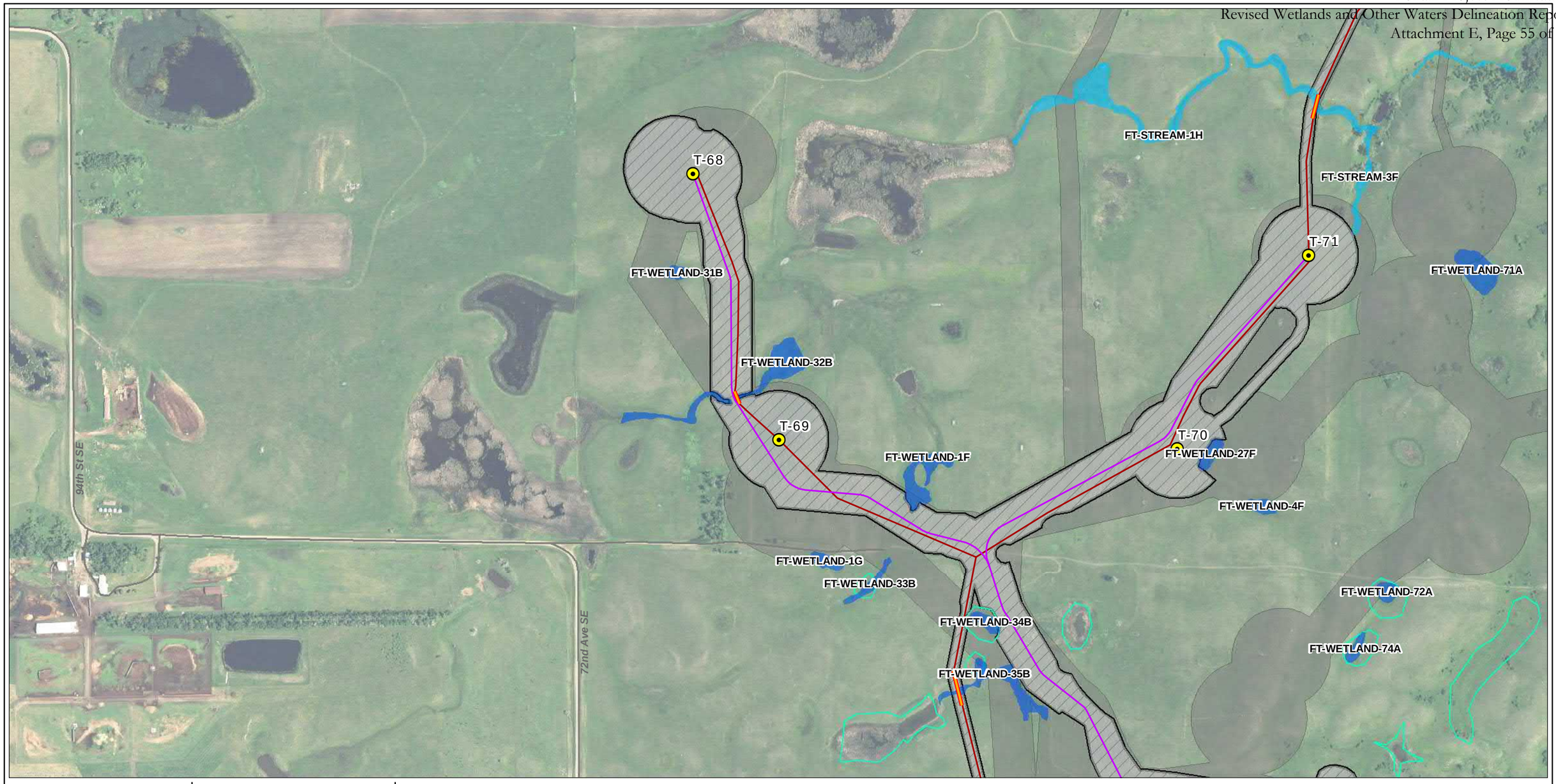

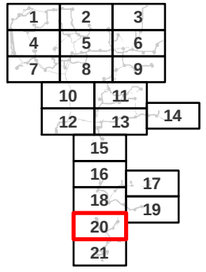

Legend

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Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 20 of 21
Foxtail Wind Energy Center
Dickey County, ND

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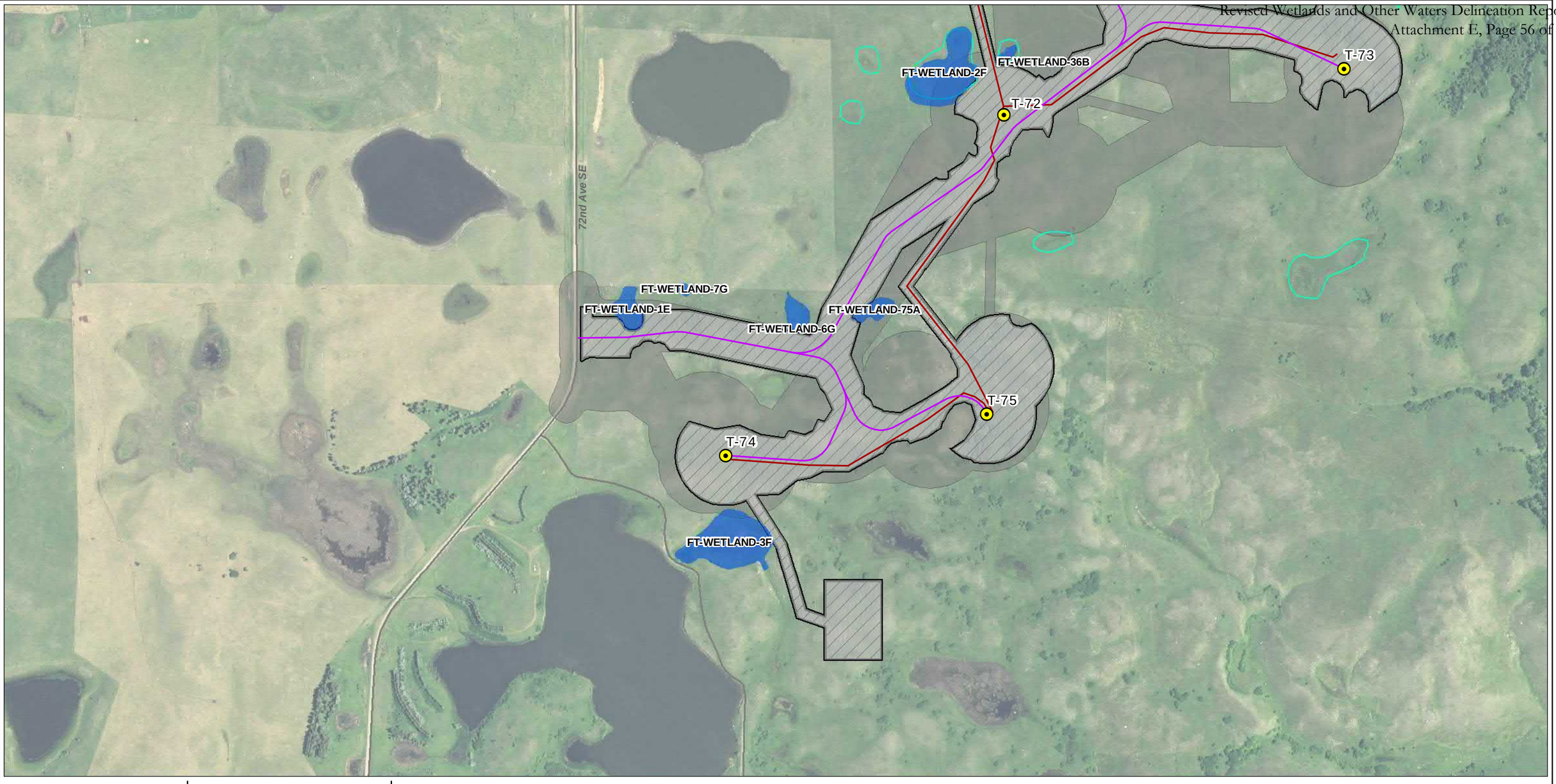

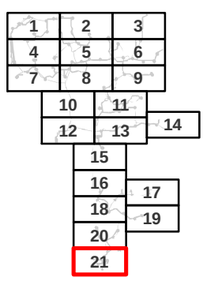

Legend

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- O&M Property
- Substation
- Laydown Area
- USFWS Wetland Easement

Delineated Wetlands

- Pond
- Stream
- Wetland

N

0 500 1,000
Feet

Figure 5-1
Delineated Wetlands
Map 21 of 21
Foxtail Wind Energy Center
Dickey County, ND

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Appendix A

Photographic Log

Foxtail Wind Energy Project

Photo No.:	Date:
1	**5/16/2017**

Description:

FT-WT-3D
Wetland soil that contains prominent redox concentrations.

Hydric soil indicators include: A11 (Depleted Below Dark Surface) and F3 (Depleted Matrix).

Photo No.:	Date:
2	**6/5/2017**

Description:

FT-WT-5E
Wetland soil that contains prominent redox concentrations.

Hydric soil indicators include: F6 (Redox Dark Surface)

Foxtail Wind Energy Project

Photo No.:	Date:
3	**6/7/2017**

Description:

FT-POND-1F
Overview photo facing north. Man-made cattle pond. Soil piles from excavation were placed adjacent to cattle pond.

Photo No.:	Date:
4	**6/8/2017**

Description:

FT-WT-22F
Wetland soil that contains prominent redox concentrations.

Hydric soil indicators include: F6 (Redox Dark Surface)

Foxtail Wind Energy Project

Photo No.:	Date:
5	**6/8/2017**

Description:

FT-POND-2F
Overview photo facing south. A reservoir located along a stream. Contained western painted turtles (Chrysemys picta belli) and northern leopard frogs (Lithobates pipens). Downstream is FT-STREAM-6F. Several more reservoirs located downstream.

Photo No.:	Date:
6	**6/9/2017**

Description:

FT-WETLAND-17E
Overview photo facing west. Wetland fringe around small, shallow lake/pond.

Foxtail Wind Energy Project

Photo No.:	Date:
7	**6/9/2017**

Description:

FT-STREAM-3F
Overview photo facing south. Very defined banks at most locations along stream. Some glacial erratics present in large numbers in several areas throughout stream bed. Stream is located in hilly valley along the coteau.

Photo No.:	Date:
8	**6/9/2017**

Description:

FT-STREAM-3F
Close-up on small to medium sized glacial erratics and very gently flowing stream.

Foxtail Wind Energy Project

Photo No.:	Date:
9	**6/11/2017**

Description:

FT-WT-36F
Wetland soil that contains prominent redox concentrations.

Hydric soil indicators include: F6 (Redox Dark Surface)

Photo No.:	Date:
10	**6/11/2017**

Description:

FT-WETLAND-37F
Overview photo facing north. Wetland surrounded by crop field.

Foxtail Wind Energy Project

Photo No.:	Date:
11	**6/13/2017**

Description:

FT-POND-5E
Overview photo facing east. American white pelicans (Pelecanus erythrorhyncho) and shorebirds present. Located along portions of the shoreline is foam, hardstem bulrush (Schoenoplectus acutus), and various sized glacial erratics.

Photo No.:	Date:
12	**6/14/2017**

Description:

FT-POND-6E
Overview photo facing northeast. Hardstem bulrush (Schoenoplectus acutus) and glacial erratics located along the shoreline. Located in grazed cattle pasture.

Foxtail Wind Energy Project

Photo No.:	Date:
13	**6/15/2017**

Description:

FT-WT-58F
Wetland soil that contains prominent redox concentrations.

Hydric soil indicators include: F6 (Redox Dark Surface), F8 (Redox Depressions)

Photo No.:	Date:
14	**7/3/2017**

Description:

FT-POND-1G
Overview photo facing east. Man-made reservoir used as a cattle pond. Contained northern leopard frogs (Lithobates pipens), shorebirds, ducks, and American white pelicans (Pelecanus erythrorhyncho).

Foxtail Wind Energy Project

Photo No.:	Date:
15	**7/4/2017**

Description:

FT-STREAM-3F
Overview photo facing north. This portion of the stream is dominated by wetland vegetation. Some cottonwood trees (Populus deltoides) line the stream edge.

Photo No.:	Date:
16	**7/27/2017**

Description:

FT-STREAM-1H
Overview photo facing east. Stream channel is dominated by mostly hybrid cattails (Typha x glauca). Stream eventually enters FT-WETLAND-3F.

Foxtail Wind Energy Project

Photo No.:	Date:
17	**7/27/2017**

Description:

FT-POND-1H
Overview photo facing east. Wetland manipulated by the section line road and excavation of wetland to create a cattle pond. Soil stockpile located on south side of pond. Culvert connects to FT-WETLAND-25F under section line road.

Photo No.:	Date:
18	**7/28/2017**

Description:

FT-POND-2H
Overview photo facing north. Northeast corner of pond has been manipulated to create cattle pond. Soil piles from excavation were placed adjacent to cattle pond. Cobbles, gravel, wetland species, and bareground line the shoreline. Shorebirds and ducks present.

Foxtail Wind Energy Project

Photo No.:	Date:
19	**7/28/2017**

Description:

FT-WETLAND-4H
Overview photo facing north. Located in grazed cattle pasture. Shoreline sparsely vegetated in some locations with rocky gravel along shoreline.

Photo No.:	Date:
20	**7/29/2017**

Description:

FT-WETLAND-7H
Overview photo facing east. Wetland predominantly surrounded by corn field, up to edge of wetland.

Foxtail Wind Energy Project

Photo No.:	Date:
21	**7/29/2017**

Description:

FT-WETLAND-7H
Close up photo of hybrid cattails (Typha x glauca).

Photo No.:	Date:
22	**7/29/2017**

Description:

FT-WETLAND-8H
Overview photo facing northwest. Wetland abuts hayfield. Wetland dominated by mostly hybrid cattails (Typha x glauca).

Appendix B

USACE Nationwide Permits General and Regional Conditions

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case- specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization.

Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.
(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.
(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or

is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre- construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or Study River (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the

proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non- Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(d) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(e) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the

Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106

consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects,

both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)).

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:
"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and

implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre- construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the

potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) Agency Coordination:

(1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from

the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

District Engineer's Decision

In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and

cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2-acre.

1. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site- specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31)

2017 Nationwide Permits
Regional Conditions
Omaha District
State of North Dakota

1. **Wetlands Classified as Peatlands – Revoked for use**

All NWPs, with the exception of 3, 5, 20, 32, 38 and 45, are revoked for use in peatlands. Peatlands are permanently or seasonally saturated and inundated wetlands where conditions inhibit organic matter decomposition and allow for the accumulation of peat. Under cool, anaerobic, and acidic conditions, the rate of organic matter accumulation exceeds organic decay.

2. **Wetlands Classified as Peatlands – Preconstruction Notification Requirement**

For NWPs 3, 5, 20, 32, 38 and 45 permittees must notify the Corps in accordance with General Condition 32 (PCN) prior to initiating any regulated activity impacting peatlands.

3. **Waters Adjacent to Natural Springs – Preconstruction Notification Requirement**

For all NWPs permittees must notify the Corps in accordance with General Condition No. 32 (PCN) for regulated activities located within 100 feet of the water source in natural spring areas. For purposes of this condition, a spring source is defined as any location where there is flow emanating from a distinct point at any time during the growing season. Springs do not include seeps and other groundwater discharge areas where there is no distinct point source.

4. **Missouri River, including Lake Sakakawea and Lake Oahe – PCN Requirement**

For all NWPs permittees must notify the Corps in accordance with General Condition No. 32 (PCN) prior to initiating any regulated activity occurring in or under the Missouri River, including Lake Sakakawea and Lake Oahe. In addition, any activity occurring in an off channel area (marinas, bays, etc.) of any of these waterbodies, a preconstruction notification is required.

5. **Spawning Areas**

Spawning restrictions and important fish habitat areas, if applicable, can be accessed on the North Dakota Game & Fish Department's website at:
http://gf.nd.gov/gnf/conservation/docs/spawning-restriction-exclusions.pdf

No regulated activity within the Red River of the North shall occur between 15 April and 1 July. Spawning season restrictions do not apply to projects involving dredging or other discharges of less than 25 cubic yards of material in any jurisdictional water.

6. **Counter-Sinking Culverts and Associated Riprap – All NWPs**

In streams with intermittent or perennial flow and a stable stream bed, culvert stream crossings shall be installed with the culvert invert set below the natural streambed according to the table below. This regional condition does not apply in instances where the lowering of the culvert invert would allow a headcut to migrate upstream of the project into an unaffected stream reach or result in lowering the elevation of the stream reach.

Riprap inlet and outlet protection shall be placed to match the height of the culvert invert.

Culvert Type	Drainage Area	Minimum Distance Culvert Invert Shall Be Lowered Below Stream Flow Line
All culvert types	≤ 100 acres	Not required
Pipe diameter <8.0 ft	100 to 640 acres	0.5 ft
Pipe diameter <8.0 ft	>640 acres	1.0 ft
Pipe diameter ≥ 8.0 ft	All drainage sizes	1.0 ft
Box culvert	All drainage sizes	1.0 ft

REGIONAL CONDITIONS APPLICABLE TO SPECIFIC NATIONWIDE PERMITS

NWP 7 – Outfall Structures and Associated Intake Structures and NWP 12 – Utility Line Activities.

Intake Structures – Intake screens with a maximum mesh opening of ¼-inch must be provided, inspected annually, and maintained. Wire, Johnson-like, screens must have a maximum distance between wires of 1/8-inch. Water velocity at the intake screen shall not exceed ½-foot per second.

Pumping plant sound levels will not exceed 75 dB at 50 feet.

Intakes located in Lake Sakakawea, above river mile 1519, and on the Yellowstone River, are subject to the following conditions:

- The intakes shall be floating.
- At the beginning of the pumping season, the intake shall be placed over water with a minimum depth of 20 feet.
- If the 20-foot depth is not attainable, then the intake shall be located over the deepest water available.
- If the water depth falls below six feet, the intake shall be moved to deeper water or the maximum intake velocity shall be limited to ¼ foot per second.

Intakes located in Lake Sakakawea, below river mile 1519, and the Missouri River below Garrison Dam are subject to the following conditions:

- The intakes shall be submerged.
- At the beginning of the pumping season, the intake will be placed at least 20 vertical feet below the existing water level.
- The intake shall be elevated 2 to 4 feet off the bottom of the river or reservoir bed.
- If the 20-foot depth is not attainable, then the intake velocity shall be limited to ¼-foot per second with intake placed at the maximum practicable attainable depth.

Intakes and associated utility lines that are proposed to cross sandbars in areas designated as piping plover critical habitat are prohibited.

Utility Lines

- Any temporary open trench associated with utility lines are to be closed within 30 days of excavation. This time limit may be extended by notifying the North Dakota Regulatory Office and receiving a written response that the extension is acceptable.

NWP 11 – Temporary Recreational Structures – Boat Docks

To ensure that the work or structure shall not cause unreasonable obstruction to the free navigation of the navigable waters, the following conditions are required:

- No boat dock shall be located on a sandbar or barren sand feature. The farthest point riverward of a dock shall not exceed a total length of 30 feet from the ordinary high watermark. Information Note: Issuance of this permit does not supersede authorization required by the North Dakota State Engineer's Office.
- Any boat dock shall be anchored to the top of the high bank.
- Any boat dock located within an excavated bay or marina that is off the main river channel may be anchored to the bay or marina bottom with spuds.

Section 10 Waters located in the State of North Dakota are:

Bois de Sioux River
James River
Missouri River
Red River of the North
Upper Des Lacs Lake
Yellowstone River

NWP 13 – Bank Stabilization

Permittees must notify the Corps in accordance with General Condition No. 32 (PCN) prior to initiating any regulated activity. The notification must also include photo evidence of erosion in the area. Prohibited materials found at http://www.nwo.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/2034/Article/487696/prohibited-restricted-materials.aspx cannot be used in waters of the U.S.

NWP 23 – Approved Categorical Exclusions

Permittees must notify the Corps in accordance with General Condition No. 32 (PCN) prior to initiating any regulated activity. In addition to information required by General Condition 32 (PCN), permittees must identify the approved categorical exclusion that applies and provide documentation that the project fits the categorical exclusion.

GENERAL CONDITIONS (REGIONAL ADDITIONS)

General Condition 32 Notification– PCN

Prospective permittees should be aware that a field aquatic resources delineation may be required for applications where notification is required in accordance with General Condition 32 (PCN) and/or mitigation may be required. Specific guidelines outlining the aquatic resources delineation process in the State of North Dakota and the Corps 1987 Wetland Delineation Manual and applicable Regional supplements to the Manual can be accessed on the North Dakota Regulatory Office's website at: http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/NorthDakota.aspx

Revised Acoustic Assessment

Foxtail Wind Energy Center
Northern States Power Company
Xcel Energy
Dickey County, North Dakota

Prepared for:

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July 2018

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EXECUTIVE SUMMARY

An acoustic assessment has been completed by AECOM for the proposed Foxtail Wind Energy Center (Project) located in Dickey County, North Dakota. If constructed, the Project would consist of 75 wind turbine generators (WTGs) and associated access roads, a substation, switch yard, laydown yard, an operations and maintenance building, a meteorological tower, collection lines, and a concrete batch plant. For the acoustic assessment, two Project WTG layout designs were considered: one with alternates (78 WTGs), and the other without (75 WTGs). The WTGs comprising these layout designs include two Vestas Wind Systems WTG model types, a 2.0 megawatt (MW) V-120 generator, and a 2.0 MW V-110 generator. The objective of this assessment was to determine whether nominal operations of the Project would be compliant with the applicable North Dakota Public Service Commission (Commission) 50 dBA noise limit.

WTG noise source data was obtained from Vestas Wind Systems for the proposed V-120 and V-110 2.0 MW generators. Outdoor sound propagation modeling of aggregate WTG operation noise was performed with Datakustik CadnaA software, a commercially available computer software program that predicts noise levels near industrial noise sources based on International Organization of Standardization (ISO) 9613-2 standards for outdoor sound propagation calculation (ISO 1996). This software uses industry-accepted propagation algorithms and accepts input of sound reference levels as provided by equipment manufacturers and other sources of relevant information.

Future predicted noise levels attributed to aggregate WTG operation were predicted and compared with the Commission threshold at each occupied residential land use in the Project vicinity. The results of this assessment conclude that there will be a total of two impacts at occupied residences (identified as receptors R07 and R32) under two of the three operation scenarios for both WTG layouts. The landowners for both receptors have executed agreements with Foxtail Wind waiving the Commission noise limit exceedance. Thus, the Project is compliant with regulatory noise thresholds.

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1.0 INTRODUCTION

Foxtail Wind, LLC (Foxtail Wind) filed an Application for a Certificate of Site Compatibility (Certificate) to construct the Foxtail Wind Energy Center (Project) in Dickey County, in southeastern North Dakota on July 17, 2017. On October 4, 2017, the North Dakota Public Service Commission (Commission) deemed Foxtail Wind's Application complete and assigned it to Case No. PU-17-284. The public hearing was held on November 20, 2017 in Ellendale, North Dakota. The Project will be constructed and operated by Northern States Power Company (NSP), a subsidiary of Xcel Energy (Xcel). NextEra Energy Resources, LLC (NEER) developed the project in collaboration with NSP/Xcel to reflect the engineering and design inputs necessary to transfer ownership of the Project to NSP/Xcel in 2018 according to the executed Purchase & Sale Agreement (PSA). NSP/Xcel currently proposes to construct the Project in two phases between 2018 and 2019.

AECOM has updated the original acoustic assessment from August 2017 for the Project to reflect changes in turbine models and turbine shifts that occurred during the micrositing process. The original Certificate proposed the use of Hybrid Vestas V-116 and V-110 utility-grade turbines; however, the Project will now use both Hybrid Vestas V-120 utility-grade wind turbines and the Vestas V-110 turbine generators, each rated at 2.0 MW. The Project will have a nameplate capacity of approximately 150 megawatts (MW), consisting of up to 75 wind turbines. In addition to the 75 primary turbines, up to three alternative turbine locations have also been considered. The alternate turbine locations are proposed to provide siting flexibility based on on-going environmental studies and landowner preferences. Only 75 turbines will be constructed.

1.1 Study Area and Existing Environment

The Project area encompasses approximately 20,029 acres in western Dickey County. The broader noise study area encompasses approximately 51,070 acres, approximately bounded on the north by 86th Street SE, on the east by County Road 2, on the south by 97th Street SE, and on the west by 67th Avenue SE. The major roadways within the Project vicinity are 68th Avenue SE (State Highway 56) and 96th Street SE (State Highway 11), which generally follow the western and southern boundaries of the study area respectively. The land uses within the study area are primarily agricultural, with rural farmstead residences and ancillary structures dispersed throughout the study area. The topography in this region is characterized by rolling grassy terrain, interspersed with natural lakes and ponds.

The noise-sensitive land uses in the area are solely rural farmstead residences. All structures (whether in habitable condition or not) were analyzed for Project-related noise impacts. A total of 50 structures were identified within the study area, 26 of which are considered unlikely to be or unequivocally unoccupied, with the remaining 24 structures considered either inhabited or capable of habitation. Determination of habitation for existing structures was limited to public knowledge and roadside surveys in order to reduce disturbances to non-participating land owners. For purposes of conservatism in this analysis, all structures located on non-participating land that were identified as capable of habitation were considered active residential structures. Receptors that were identified as participating in the Project are associated with the wind farm development via a legal agreement with the owner of the subject property.

Dickey County, ND would generally be considered a rural agricultural area and thus would be expected to have reasonably low ambient noise levels. Existing noise sources in the area are likely dominated by distant traffic noise from the nearby arterial highways, and would also include intermittent aircraft overflights, noise from agricultural operations, and wind-generated noises.

1.2 Acoustical Terminology

For purposes of document brevity, AECOM assumes the reader is familiar with basic acoustical principles. Readers desiring an expanded introduction to noise fundamentals beyond what is presented in this section should consult industry-accepted reference texts such as *Noise & Vibration Control Engineering* (Beranek & Ver 1992) or *Engineering Noise Control* (Bies & Hansen 2003). Fundamental concepts and terms related to noise, as discussed in this technical report, are summarized in the following paragraphs.

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in cycles per second or Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB) using a logarithmic scale.

Sound level is usually expressed by reference to a known standard. This report refers to both sound pressure level (SPL) and sound power level (PWL). In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 microPascals (µPa). SPL depends not only on the power of the source, but also on the distance from the source and on the acoustical characteristics of the space surrounding the source. Unlike sound pressure, which varies with distance from a source, sound power is the acoustic power of a source typically expressed in Watts. Sound power is the acoustic power radiated from a source, expressed in decibels as a sound power level (PWL) using a reference power value of 10^{-12} Watts.

Due to its definition with respect to a reference sound pressure, a sound level of 0 dB is not the complete absence of sound but instead the approximate threshold of average healthy human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect under laboratory conditions is about 1 to 2 dB. A 3 to 5 dB change, on the other hand, is readily perceived under most circumstances. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if decreased by 10 dB, halving) of the sound's loudness, even though the actual change in sound energy is an order of magnitude.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Hertz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second, it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone); however, most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that represents human hearing, which is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A weighting," and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve of frequency-dependent adjustments.

Although dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum (L_{max}) and minimum (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the "acoustic floor" for that location.

2.0 REGUALTORY SETTING & NOISE IMPACT CRITERIA

A review was conducted of Federal, State, and Local laws, ordinances, regulations, and standards (LORS), applicable to noise generated by Project construction and operation. This review did not identify any applicable LORS at the federal level. At the state level, the State of North Dakota Public Service Commission (Commission) establishes noise or "sound" limits which apply to wind energy conversion facilities within the state. No applicable LORS at the local level (participating counties/municipalities) were identified.

2.1 State of North Dakota

NDAC Section 69-06-08-01(4) reads as follows:

> *A wind energy conversion facility site must not include a geographic area where, due to operation of the facility, the sound within one hundred feet of an inhabited residence or a community building will exceed fifty dBA. The sound level avoidance area criteria may be waived in writing by the owner of the occupied residence or the community building.*

Project aerial mapping was reviewed to identify all structures, including residential and community buildings, within the Project vicinity. Sound levels produced by the Project were predicted at a distance of 100-feet from all inhabited structures and assessed for compliance against the Commission maximum sound level of 50 dBA. Although not required for compliance assessment, sound levels were also predicted at identified uninhabited structures and are included in detailed modeling result tables in **Appendix A**.

2.2 Dickey County

Dickey County does not have a legislative code; thus, noise regulations rely on State legislation.

3.0 NOISE PREDICTION METHODOLOGY & RESULTS

3.1 Review of Sound Generated by WTG Facilities

Sound generated by operation of a modern downwind-mast (i.e., the supporting tower is downstream of the spinning bladed rotor) WTG is an amalgam of the following noise-producing sources:

- Interaction of the bladed rotor with incoming wind, and to a lesser degree the aerodynamic wake of the bladed rotor with the WTG mast; and
- The mechanical equipment housed within the nacelle just behind the WTG bladed rotor hub, which includes a gearbox, generator, and cooling fan.

For large, utility-scale WTGs currently engineered and offered by leading manufacturers, such as the 2.0 MW models considered for this Project, mechanical noises from the nacelle tend to be much less than the dominant sound produced from aerodynamic effects resulting from rotor interaction with the incoming wind.

At rest when there is little or no wind energy to convert, a WTG produces negligible sound. As wind speeds rise up to a "cut-in" magnitude, the WTG bladed rotor begins rotation and generates power. WTG energy conversion and corresponding aerodynamic noise then increases with increasingly greater received wind speed up to a maximum rotational speed when the WTG maximum power capacity is attained. Although the WTG may experience elevated wind speeds that exceed what is necessary for this maximum power capacity, the rotor rotational speed would not increase further and thus produce an essentially constant sound power level under such elevated wind conditions.

While the WTG sound power may thus achieve a maximum level associated with full power production capacity under wind conditions that exceed those necessary for maximum blade rotation, those same elevated wind conditions are likely to produce greater outdoor background sound levels that would acoustically contribute to the ambient sound as measured and perceived at a receiver location on the ground. Although the Commission ignores this non-Project acoustical contribution to the ambient sound environment, background SPL due to steady winds traversing the Project vicinity may be estimated as follows (Hau, 2000):

$$SPL_{wind}\ (dBA) = 27.7 + 2.5 * V_{wind};\ \text{where } V_{wind} \text{ is in meters per second (m/s)}$$

Thus, with sustained steady winds at 4 m/s, the background SPL is likely to be as high as 38 dBA. At receiver positions sufficiently distant from Project WTGs that are exposed to high wind velocities, the background noise may actually be dominant and mask the Project-attributed sound contribution to the measured and perceived ambient sound level.

3.2 Modeling Software and Calculation Methods

The DataKustik CadnaA® Noise Prediction Model (Version 2017) was used to estimate the aggregate SPL from proposed Project operation layouts at the identified noise-sensitive receptors. CadnaA® is a Windows® based software program that predicts noise levels near noise sources based on ISO 9613-2 standard for outdoor sound propagation calculation. The model uses these industry-accepted propagation algorithms and accepts full-octave band (1/1) PWL (in dB re: one picoWatt) provided by the equipment manufacturer and other sources.

The software's calculations account for classical sound wave geometric divergence, reflection off of surfaces, source directivity, meteorological effects, and attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding from structures and/or topography. Topographical information

was imported into the model using official United States Geological Survey (USGS) National Elevation Dataset (NED) to accurately represent existing topography in the Project area.

3.3 Modeling Input Parameters

3.3.1 Meteorological Input and Model Configuration

The sound propagation prediction model developed for this analysis assumed an outdoor air temperature of 50-degrees Fahrenheit (ºF), a relative humidity of 70%, and an average ground absorption coefficient, which can range from zero (0, for acoustically reflective surfaces, such as water or pavement) to unity (1, for acoustically absorptive ground coverings, such as loose porous soils or snow), set to a conservative and industry-recommended average of 0.5. All three of these parameters are consistent with modeling recommendations from the Institute of Acoustics (IOA 2013).

Sound attenuation due to atmospheric absorption improves with increasing acoustical frequency, and varies with temperature and moisture content. While sound attenuation due to this environmental factor is generally modest at distances less than 1,000 feet, over greater distances the result will be substantially reduced high frequency noise and the apparent preservation of low frequency noise that attenuates (due to ground and atmospheric absorption) at much lower rates.

With respect to wind speed and direction, the ISO 9613-2 standard conservatively calculates attenuation for meteorological conditions considered “favorable” to propagation: downwind (i.e., the receiver of interest is downstream of the noise-producing source). Acknowledged as a physical impossibility (i.e., because wind is experienced as having direction), this downwind assumption is considered omnidirectional by ISO 9613-2 and intended to represent most meteorological conditions experienced by the Project and its vicinity. Such conditions are assumed to be valid for study of WTG operation noise for two scenarios: 1) WTG operation under wind conditions enabling “cut-in” bladed rotor speed and at which power conversion would begin to occur; and 2) WTG operation under wind conditions at which “maximum [rotor] rotational speed” is expected along with maximum power production per tower.

However, and as discussed in Clause 8 of the aforementioned ISO 9613-2 standard, anomalous meteorological conditions may occur that would enhance sound propagation from the aggregate operating WTGs. These uncommon conditions are characterized as a “C_{met}” value, which results in an additive dB adjustment to the values calculated from the aforementioned downwind-favoring ISO 9613-2 default method. The North Dakota Commission neither mandates nor recommends that these anomalous conditions be considered in an assessment of WTG operation noise; however, in the interest of providing NSP/Xcel a conservative noise prediction assessment for the Project, this noise analysis includes study of a third scenario: maximum rotor speed under anomalous meteorological conditions. In other words, this third scenario includes consideration of C_{met}, which the CadnaA program includes as an input parameter for such anticipated circumstances. These anomalous meteorological conditions could include infrequently occurring periods of temperature inversions or stable air layers, resulting in wind shear, which would cause more emitted sound to refract towards the ground (and thus receivers) instead of upwards into the atmosphere.

3.3.2 Receiver Input

Representative receiver points were modeled at each identified residential structure in the Project area. The inhabitability of structures, while noted in the results section of this report, did not preclude a prediction of noise levels at the receiver location. Receivers were modeled at a height of 4 meters (relative to ground), which could be typical of the height of a second-story listener and is recommended for wind turbine noise modeling as it reduces the influence of ground absorption factors that may be misrepresented in prediction results.

Per the Commission noise regulation, sound levels from Project operations are to be assessed "within 100 feet of an inhabited residence," thus, modeled receiver locations were placed approximately 100 feet from each inhabited structure in the direction of the nearest proposed WTG. As mentioned in Section 1.1, modeled receiver locations were similarly placed near uninhabited structures.

3.3.3 Source Input

The Project plans to install Vestas-brand V-120 and V-110 WTG units throughout the Project vicinity. Sources in the model were located at each discrete proposed WTG pole location as a single, omnidirectional point source, with a relative height of 80 meters (specified hub height). Performance specifications and proprietary noise data for the selected WTG units were provided by the manufacturer for the purpose of this study. **Table 1** displays the various A-weighted sound power level ratings for the Vestas V-120 and V-110 WTGs at wind speeds of 3 to 11 meters per second.

Table 1. A-Weighted Sound Power Levels Correlated with Wind Speed

Hub Height Wind Speeds:	WTG Lmax Sound Power Level (PWL, dB) at Reference Wind Speed								
	3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s
Vestas V-110	95.3	96.1	97.5	101.7	103.6	106.1	107.6	107.6	107.6
Vestas V-120	97.7	97.9	100.4	104.2	107.0	109.6	110.5	110.5	110.5

In addition to anticipated noise levels at various wind speeds and blade types, these specifications also reported the spectral content of the WTGs in one-third octave band center frequency (OBCF) resolution. These documents report that source measurements were conducted in accordance with the International Electrotechnical Commission (IEC) standard 61400-11 for acoustic measurement techniques. Specified one-third OBCF sound power levels provided by the manufacturer for both WTG models are presented in **Table 2**. Since no power level uncertainty values were provided in the manufacturer specifications, a typical +2 dB adjustment was applied across all frequency bands for each WTG source.

Table 2. WTG – Sound Power Level by One-Third Octave Band Center Frequency (1/3 OBCF)

WTG Model	Scenario	Wind Speed	One-Third OBCF, Hz (bold) and Respective A-Weighted Sound Power Level, dBA									Total PWL
V-110 Standard Blade	Cut-In	3 m/s	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	95.3
			54.8	58.9	62.8	67.0	71.0	73.3	75.0	77.4	78.6	
			200	**250**	**315**	**400**	**500**	**630**	**800**	**1k**	**1.25k**	
			79.4	80.5	82.3	82.6	83.8	84.5	84.4	85.7	86.3	
			1.6k	**2k**	**2.5k**	**3.15k**	**4k**	**5k**	**6.3k**	**8k**	**10k**	
			85.5	84.7	83.1	80.5	77.3	73.2	67.1	59.7	52.2	
	Max	9 m/s	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	107.6
			64.9	68.9	72.9	77.4	81.4	84.2	86.4	89.1	91.0	
			200	**250**	**315**	**400**	**500**	**630**	**800**	**1k**	**1.25k**	
			92.6	94.4	96	95.9	97.5	97.8	97.6	97.8	97.3	
			1.6k	**2k**	**2.5k**	**3.15k**	**4k**	**5k**	**6.3k**	**8k**	**10k**	
			97.1	95.6	92.8	90.3	87.6	84.2	79.7	74.2	68	
V-120 Standard Blade	Cut-In	3 m/s	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	97.7
			54.3	61.9	66.9	70.0	73.8	76.8	78.9	80.9	83.2	
			200	**250**	**315**	**400**	**500**	**630**	**800**	**1k**	**1.25k**	
			85	86.4	85.9	85.5	87.7	87.3	86.9	87.2	86.7	
			1.6k	**2k**	**2.5k**	**3.15k**	**4k**	**5k**	**6.3k**	**8k**	**10k**	
			85.9	84.5	83.8	82.5	80.9	77	72.9	67	60.1	
	Max	10 m/s	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	110.5
			68.0	71.0	74.6	78.9	81.6	84.2	86.9	89.3	90.3	
			200	**250**	**315**	**400**	**500**	**630**	**800**	**1k**	**1.25k**	
			90.8	93.3	95.5	96.4	97.9	100.5	100.7	102	102.2	
			1.6k	**2k**	**2.5k**	**3.15k**	**4k**	**5k**	**6.3k**	**8k**	**10k**	
			101.1	99.8	98.5	95.9	93.1	89.5	84.5	77.1	70.1	

3.3.4 Modeled Scenarios

The predictive acoustic assessment reviewed two Project WTG layouts: one with additional WTG locations ("With Alternates"), and one without the additional WTGs ("No Alternates"). Both scenarios were modeled under the following operating/meteorological conditions, deemed representative of the entire operational range of the Project:

- Cut-In, or, the minimum wind speed required to generate electricity through rotor rotation;
- Maximum turbine rotational speed; and,
- Maximum turbine rotational speed under anomalous meteorological conditions.

3.4 Modeling Results

Each predictive operations model assumed that all WTGs would be operating concurrently at the same analyzed operation condition. Predicted levels in this section are presented in both tabulated form (**Tables 3** and **4**) and as noise contour plots (**Figures 1** through **6**), which depict the propagation of Project operational noise upon the Project area as color-coded isopleths (a.k.a., Project-attributed noise level "contours," reminiscent of topographical contours that depict equivalent grade elevation). While aggregate WTG operation noise may be compliant with the Commission requirements, under the right meteorological conditions, it may be possible for WTG noise to be audible at a noise-sensitive receptor (NSR).

Predicted operational noise levels associated with the "No Alternates" layout, for each of the above-mentioned operating conditions, are provided below in **Table 3**. **Figures 1** through **3**, located at the end of this section, display predicted noise level contours associated with each of these three operating conditions.

Table 3. Summary of Predicted Noise Levels, Occupied Structures, "No Alternates" Layout

Receiver ID	Nearest WTG ID	Distance to Nearest WTG (m)	Modeled Receiver Coordinates (UTM Zone 14, NAD 83)		Predicted Sound Level (dBA, SPL)		
			Easting (m)	Northing (m)	Cut-In Rotation	Maximum Rotation	Maximum Rotation Under Anomalous
R04	4	1198	504718	5110064	32	43	45
R05	4	2352	503234	5109794	26	36	37
R07	10	412	506666	5109352	42	54	57
R09	20	1141	506262	5105925	34	45	47
R14	38	2145	513814	5109359	21	33	34
R16	58	2831	506811	5102390	25	35	36
R18	68	2058	507343	5100283	26	37	38
R20	69	1049	508485	5099326	33	45	46
R21	74	2326	507782	5096671	23	34	35
R22	75	1902	511104	5096921	21	31	32
R25	67	1825	513250	5100181	28	38	39
R26	41	787	512553	5101399	32	43	46
R28	41	2255	513886	5102327	26	36	37
R32	51	415	509571	5104838	40	52	55
R34	38	3655	514856	5110461	14	26	27
R39	6	1139	506421	5110789	33	44	45
R45	38	3322	515481	5108010	20	31	31
R47	41	3189	514720	5100308	22	31	32
R48	73	3132	512740	5096871	23	32	33
R50	20	3294	505944	5103638	24	34	34
R51	3	2172	503289	5108224	27	38	39
R53	68	1905	507481	5100152	28	39	40
R23	73	2255	512329	5097789	26	36	37
R29	57	1374	513647	5103418	27	38	40

Predicted operational noise levels associated with the "With Alternates" layout are provided below in **Table 4**. **Figures 4** through **6**, located at the end of this section, display predicted noise level contours associated with each of the three operating conditions.

Table 4. Summary of Predicted Noise Levels, Occupied Structures, "With Alternates" Layout

Receiver ID	Nearest WTG ID	Distance to Nearest WTG (m)	Modeled Receiver Coordinates (UTM Zone 14, NAD 83)		Predicted Sound Level (dBA, SPL)		
			Easting (m)	Northing (m)	Cut-In Rotation	Maximum Rotation	Maximum Rotation Under Anomalous
R04	4	1198	504718	5110064	32	43	45
R05	4	2352	503234	5109794	26	36	37
R07	10	412	506666	5109352	42	54	57
R09	20	1141	506262	5105925	34	45	47
R14	38	2145	513814	5109359	22	33	34
R16	58	2831	506811	5102390	25	35	36
R18	68	2058	507343	5100283	26	37	38
R20	69	1049	508485	5099326	33	45	46
R21	74	2326	507782	5096671	23	34	35
R22	75	1902	511104	5096921	21	31	32
R25	67	1825	513250	5100181	28	38	39
R26	41	787	512553	5101399	32	43	46
R28	41	2255	513886	5102327	26	36	37
R32	51	415	509571	5104838	40	52	55
R34	38	3655	514856	5110461	14	26	27
R39	6	1139	506421	5110789	33	44	45
R45	38	3322	515481	5108010	20	31	31
R47	41	3189	514720	5100308	22	31	32
R48	73	3132	512740	5096871	23	32	33
R50	20	3294	505944	5103638	24	34	34
R51	3	2172	503289	5108224	27	38	39
R53	68	1905	507481	5100152	28	39	40
R23	73	2255	512329	5097789	26	36	37
R29	57	1374	513647	5103418	27	38	40

4.0 ADDITIONAL NOISE CONSIDERATIONS

4.1 Substation Noise

Noise generated by the substation would be dominated by "humming" sound from the transformer(s). Assuming the main transformer is rated for up to 162 megavolt-amperes (MVA) to accommodate power received from the Project WTGs, the Electric Power Plant Environmental Noise Guide (EPPENG) published by the Edison Electric Institute (EEI, 1984) suggests OBCF sound power levels for a "quiet" transformer as shown in **Table 5**. OBCF sound power levels for a "standard" type would be 10 dB higher per octave band.

Table 5. Substation – Sound Power Level by Octave Band Center Frequency (OBCF)

OBCF A-Weighted Power Level, dBA									Total PWL
31.5	63	125	250	500	1k	2k	4k	8k	
88	94	96	91	91	85	80	75	68	100

The substation is located on 71st Ave SE, south of 91st St SE and is no closer than approximately 5,000 feet from the two closest occupied NSRs: R16 to the south-southwest and R50 to the west. At this distance, noise from an operating "quiet" or "standard" type transformer would be far less than 50 dBA and thus compliant with the Commission requirements. At distances of no less than 500 feet, the 50 dBA threshold would still be met with a "quiet" transformer. For a "standard" transformer, this minimum distance would be 1,300 feet. While compliant with this assessment criterion, under the right conditions it may be possible for transformer noise to be audible at an NSR.

4.2 Construction Noise

The Project will be constructed in multiple phases and will involve the development of access roads, excavation and forming of WTG foundations, site preparation for crane lifting, and WTG assembly and commission. Typical large-scale wind projects undergo the following construction phases:

1. *Site Clearing*: Predominantly characterized by establishing Project offices, equipment storage areas, and construction staging areas. Erosion and sedimentation control measures would be completed as well in preparation of initial hauling routes.
2. *Grading*: The Project area access roads will be graded and formed during this phase. Excavation would also occur at WTG locations in preparation of foundation installations in Phase 3.
3. *Foundation Work*: Foundations constructed from reinforced concrete would be constructed at each WTG location.
4. *WTG Installation*: After delivery of WTG components, a single crane will house pole segments, nacelle housing, and the rotor/propeller assembly into position, followed by commission of the WTG.

Depending on the finalized schedule and anticipated delivery of WTG components and assembly equipment, construction phases throughout the Project area may overlap, as WTGs are commonly erected in small groups or strings as site development progresses. Aside from WTG construction, additional activities would include the construction of maintenance facilities, transmission line installation, and other supporting infrastructure.

The amount of construction equipment and the number of workers in any given area of the Project area would vary, but activity would tend to be concentrated in certain areas and then move as the

WTGs would be erected in a manner resembling an assembly line. These variations would also result in varying levels of construction-related noise.

Conventional construction activities at the Project site would result in a short-term, temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would primarily be experienced close to the noise source(s). The estimated magnitude of the noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction, and the distance between the noise source and receiver of interest. Project construction traffic, consisting of delivery of WTG components and other materials, along public roads and Project access routes can also temporarily elevate typical roadway traffic volumes and thus increase noise levels experienced at receivers near such ground transportation routes. While most construction activities would be expected to occur during daytime hours, WTG sites can often require limited nighttime activities such as concrete pours for tower foundations.

4.3 Maintenance Noise

Upon completion and commissioning of the Project, an appropriate set of vehicles and related equipment can be expected to travel to and from, as well as within, the Project site in order to conduct regular inspections and maintenance of the WTGs and substation. Vehicles may also be involved for conducting regular security patrols of the Project site. Noise from these post-construction vehicles and activities are thus generally expected to be intermittent in nature and temporarily occurring over the life of the Project. Additionally, noise levels from such vehicles and activities are expected to be insignificant compared to expected nominal WTG operations.

5.0 CONCULSIONS

Project operational noise has been predicted and assessed against the 50 dBA Commission noise limit. The predictive operational noise modeling, performed with CadnaA software (and its algorithm basis per ISO 9613-2) and inclusive of conservative parameter assumptions and uncertainty corrections, demonstrates that there will be a total of two impacts at occupied residences which will occur in maximum rotational wind speed scenarios for both WTG layouts: Receptor R07, which experiences predicted levels of 53 to 56 dBA, and R32, which experiences predicted levels ranging from 51 to 54 dBA. These results are not significantly different than the August 2017 Acoustic Assessment. Additionally, the landowners for both receptors have executed agreements with Foxtail Wind waiving the Commission noise limit exceedance.

6.0 LITERATURE CITED

Beranek, L. L. and I. L. Ver, eds, 1992, Noise and Vibration Control Engineering, John Wiley & Sons, Inc., New York, NY.

Bies, D. and Hansen, C., 2003, Engineering Noise Control: Theory and Practice, Third Edition, E & FN Spon Press, New York, NY.

Edison Electric Institute, 1984, Electrical Power Plant Environmental Noise Guide, Report No. 3637, prepared by Bolt Beranek and Newman Inc.

Hau, E., 2000, Wind Turbines: Fundamentals, Technologies, Application, Economics, Springer-Verlag, Berlin, Germany.

Institute of Acoustics (IOA), 2013, A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.

International Organization for Standardization (ISO), 1996, “Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.” ISO 9613-2:1996(E).

State of North Dakota, Energy conversion facility siting criteria, 69-06-08-01, North Dakota Administrative Code. Last accessed on June 19, 2017: http://www.legis.nd.gov/information/acdata/pdf/69-06-08.pdf

Figures

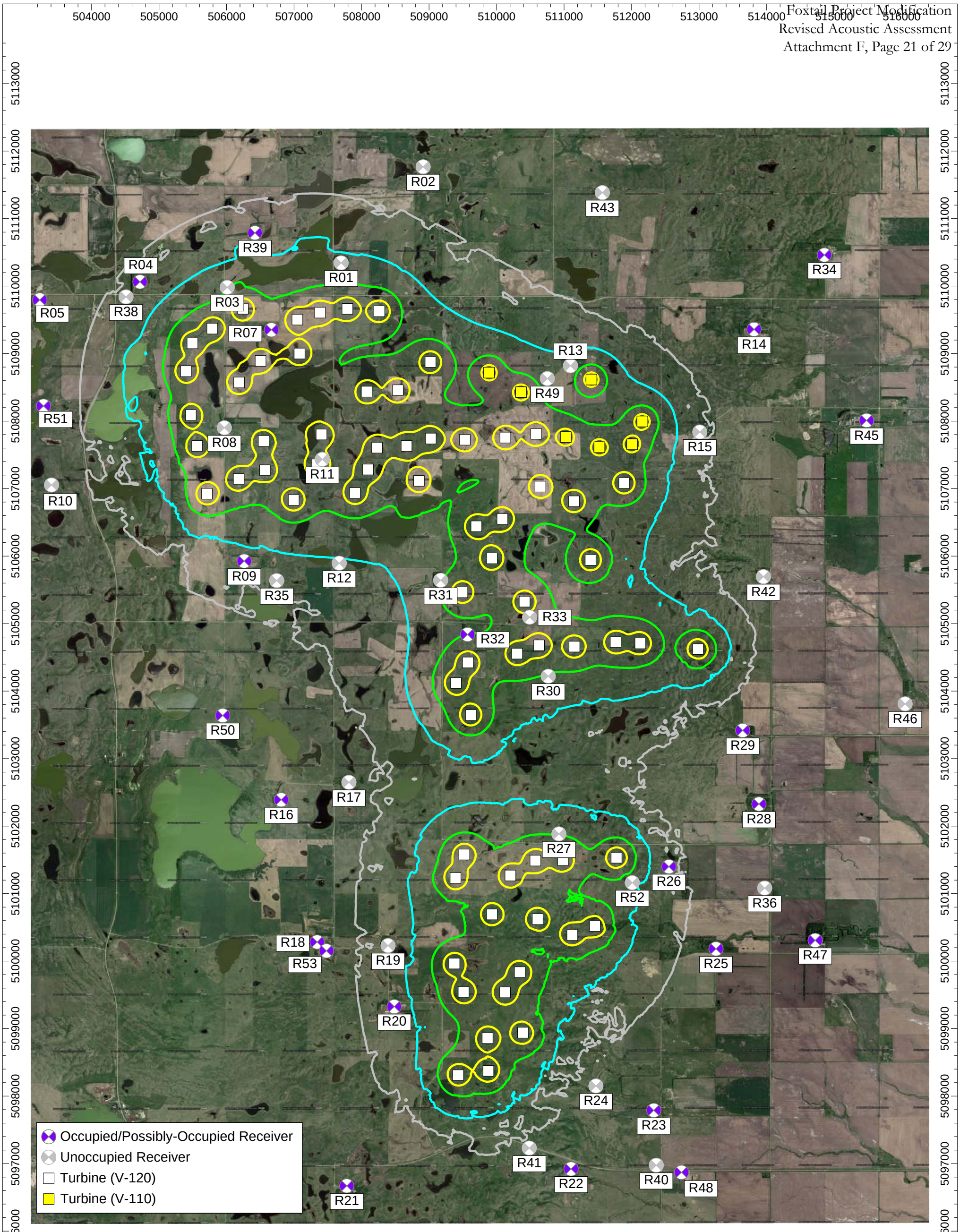

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Figure 1: No Alternates - Wind Turbines at Cut-In Wind Speed and Typical Meteorological Conditions

Predicted Project Operation Noise Contours
Foxtail Wind Energy Center - Dickey County, ND
Northern States Power Company | Xcel Energy

Sound Level Contour Ranges (dBA)

- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA

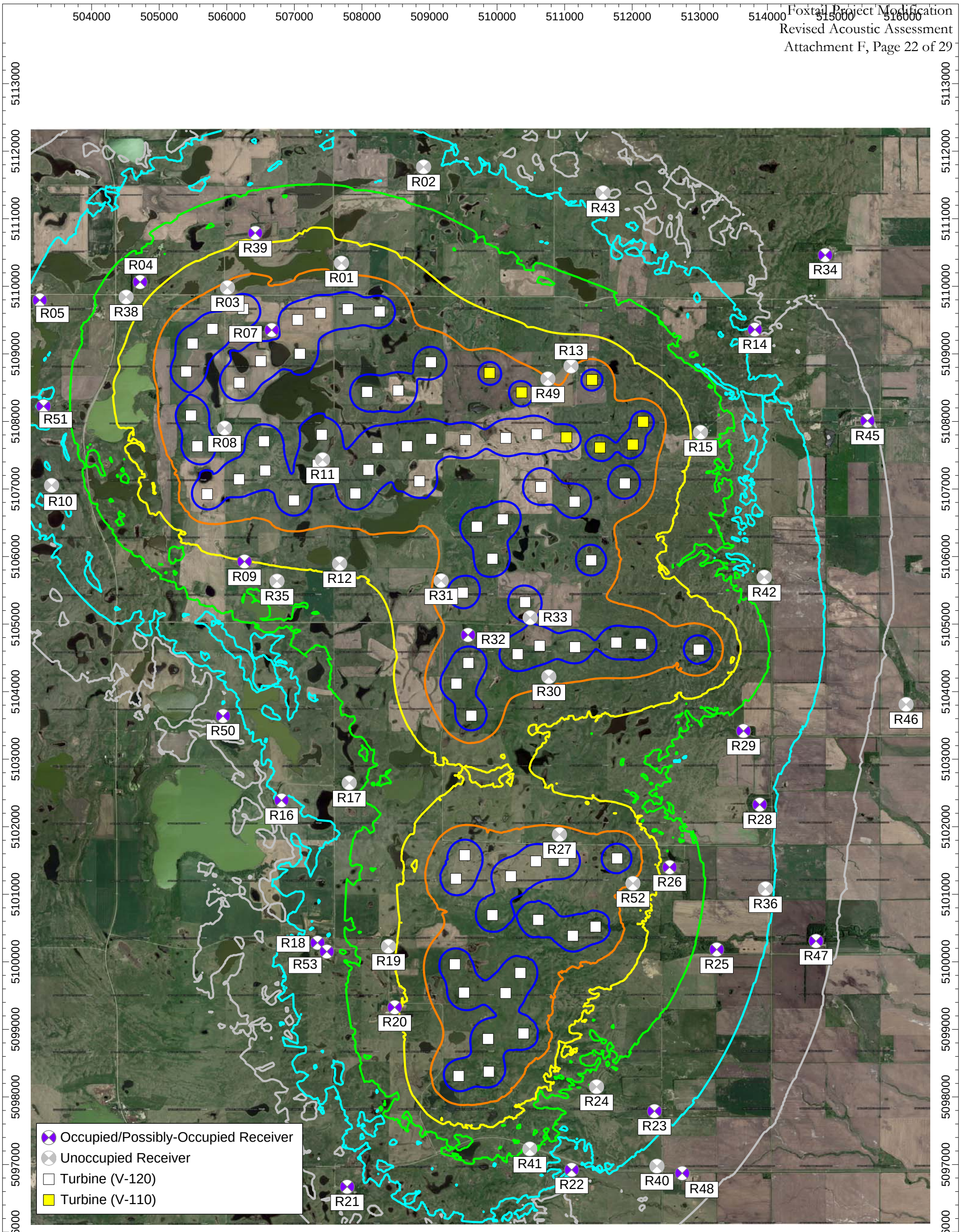

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Figure 2: No Alternates - Wind Turbines at Maximum Rotational Wind Speed and Typical Meteorological Conditions

Predicted Project Operation Noise Contours
Foxtail Wind Energy Center - Dickey County, ND
Northern States Power Company | Xcel Energy

Sound Level Contour Ranges (dBA)

- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA

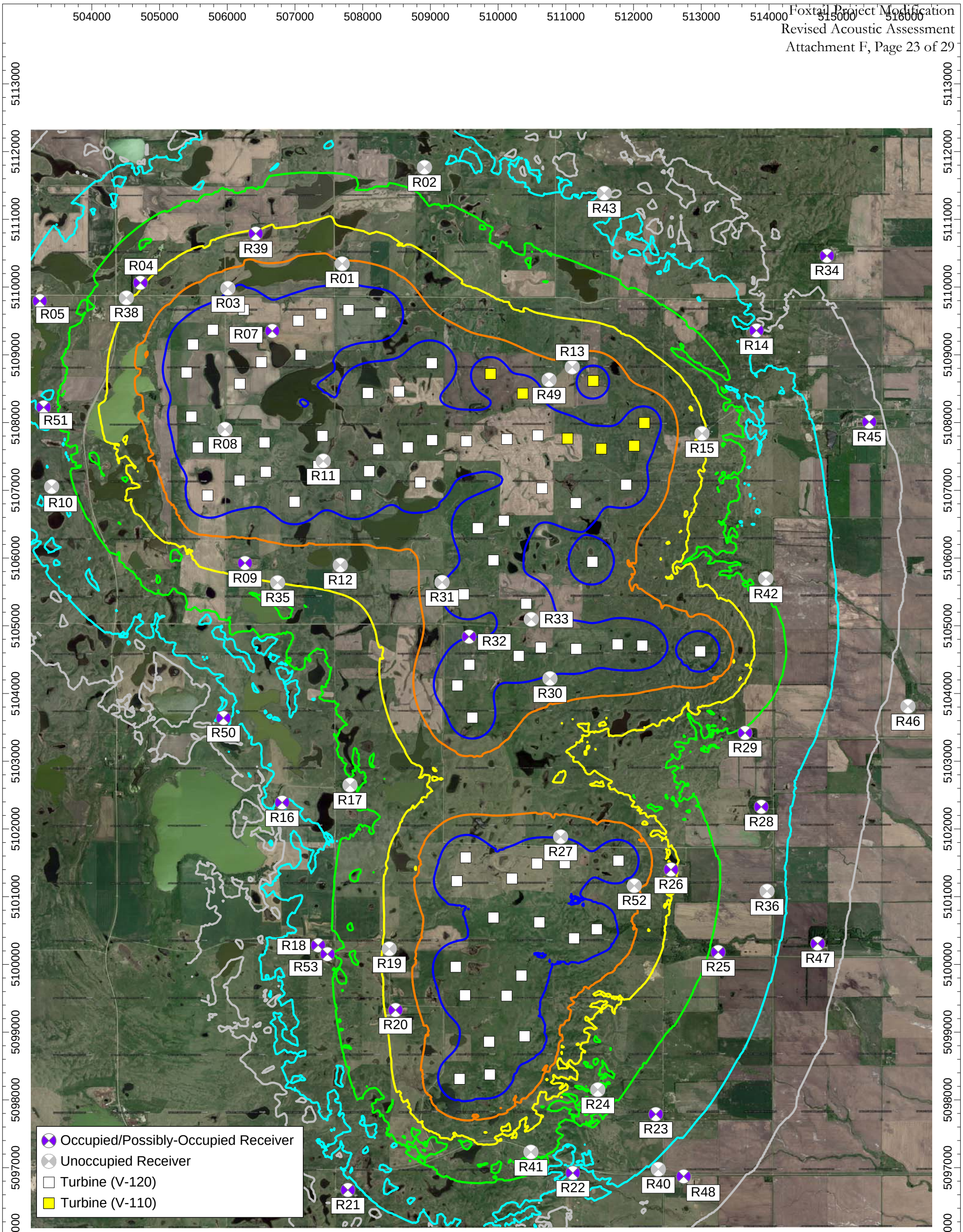

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Figure 3: No Alternates - Wind Turbines at Maximum Rotational Wind Speed and Anomalous Meteorological Conditions

Predicted Project Operation Noise Contours
Foxtail Wind Energy Center - Dickey County, ND
Northern States Power Company | Xcel Energy

Sound Level Contour Ranges (dBA)

- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA

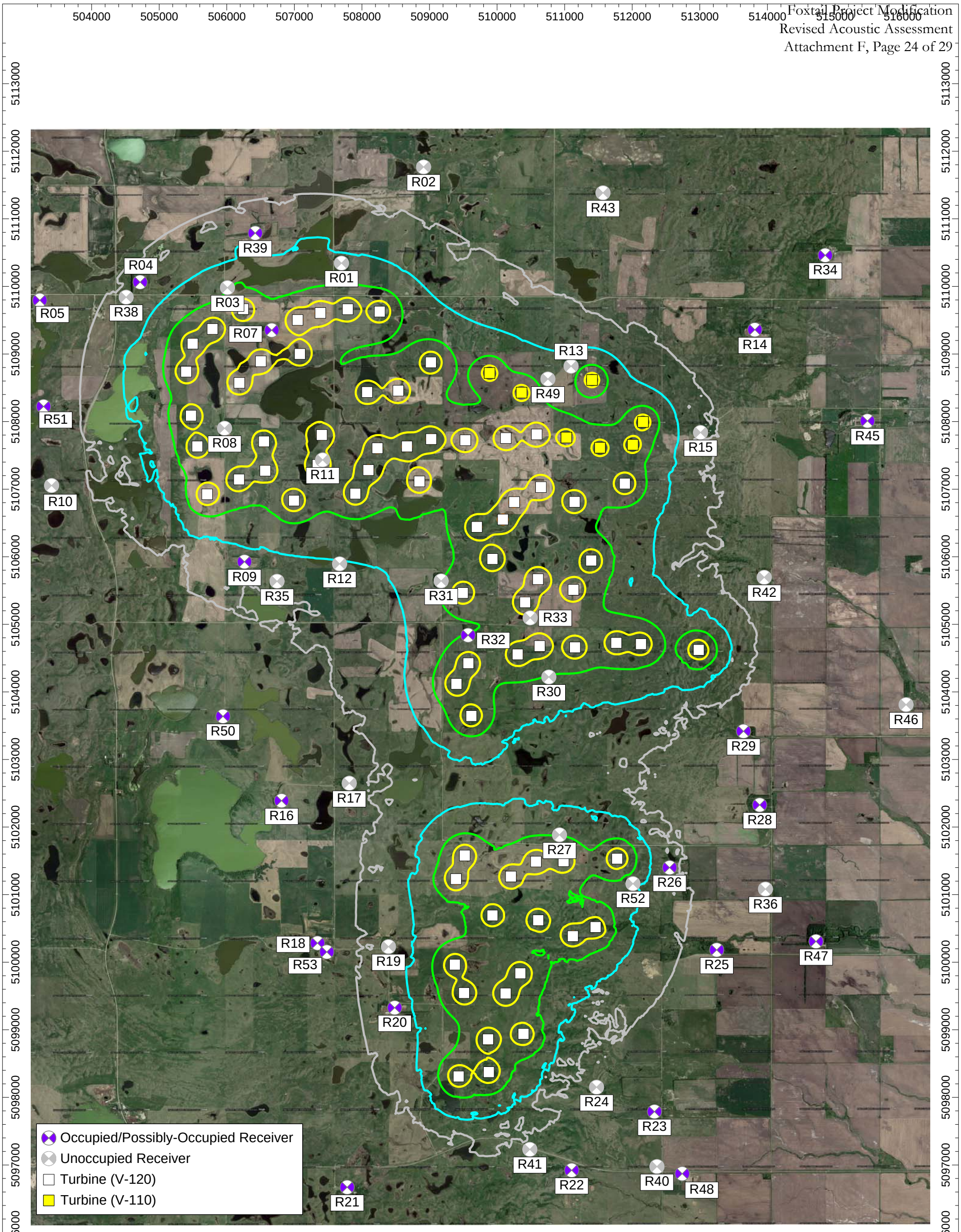

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Figure 4: With Alternates - Wind Turbines at Cut-In Wind Speed and Typical Meteorological Conditions

Predicted Project Operation Noise Contours
Foxtail Wind Energy Center - Dickey County, ND
Northern States Power Company | Xcel Energy

Sound Level Contour Ranges (dBA)

- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA

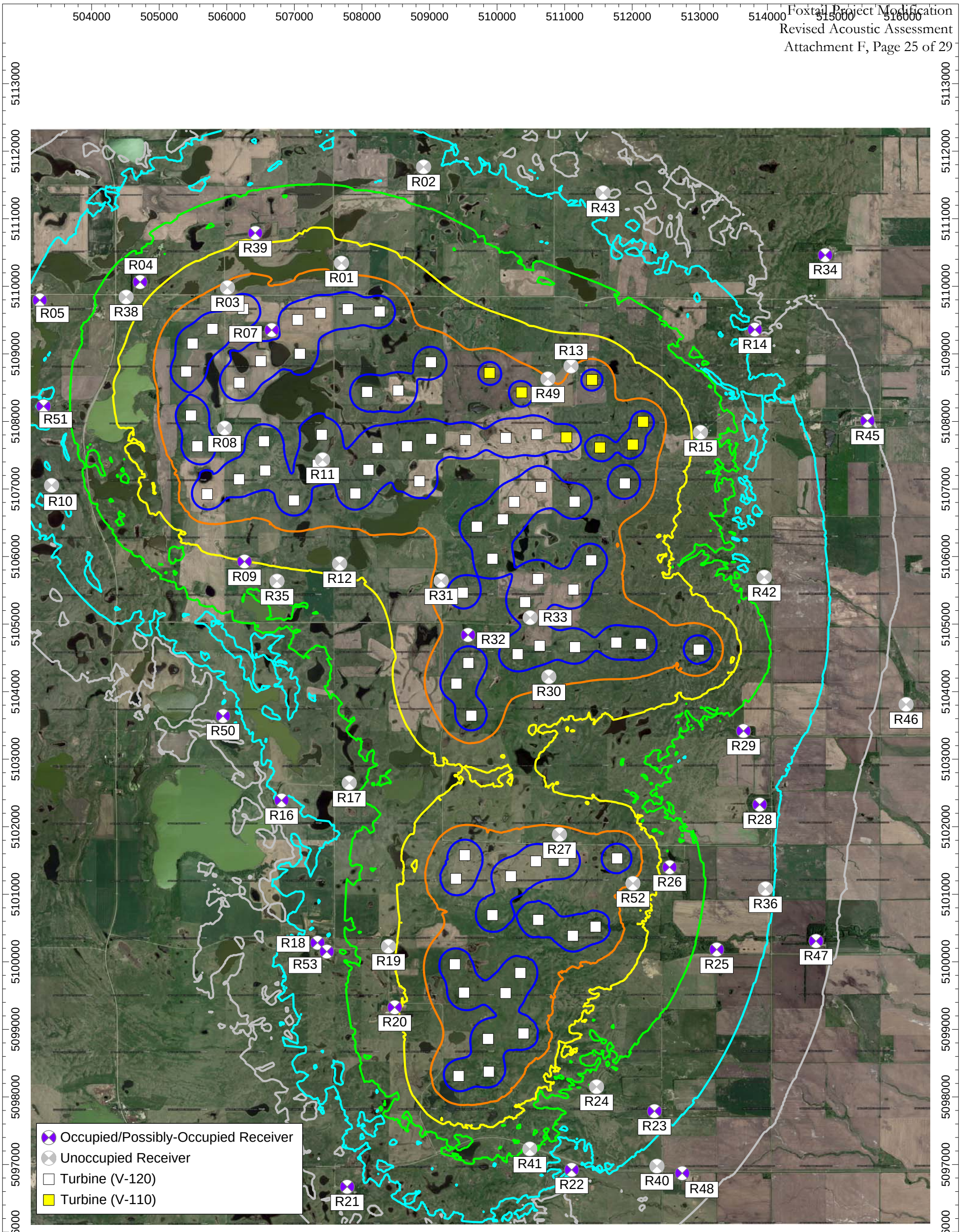

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Figure 5: With Alternates - Wind Turbines at Maximum Rotational Wind Speed and Typical Meteorological Conditions

Predicted Project Operation Noise Contours
Foxtail Wind Energy Center - Dickey County, ND
Northern States Power Company | Xcel Energy

Sound Level Contour Ranges (dBA)

- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA

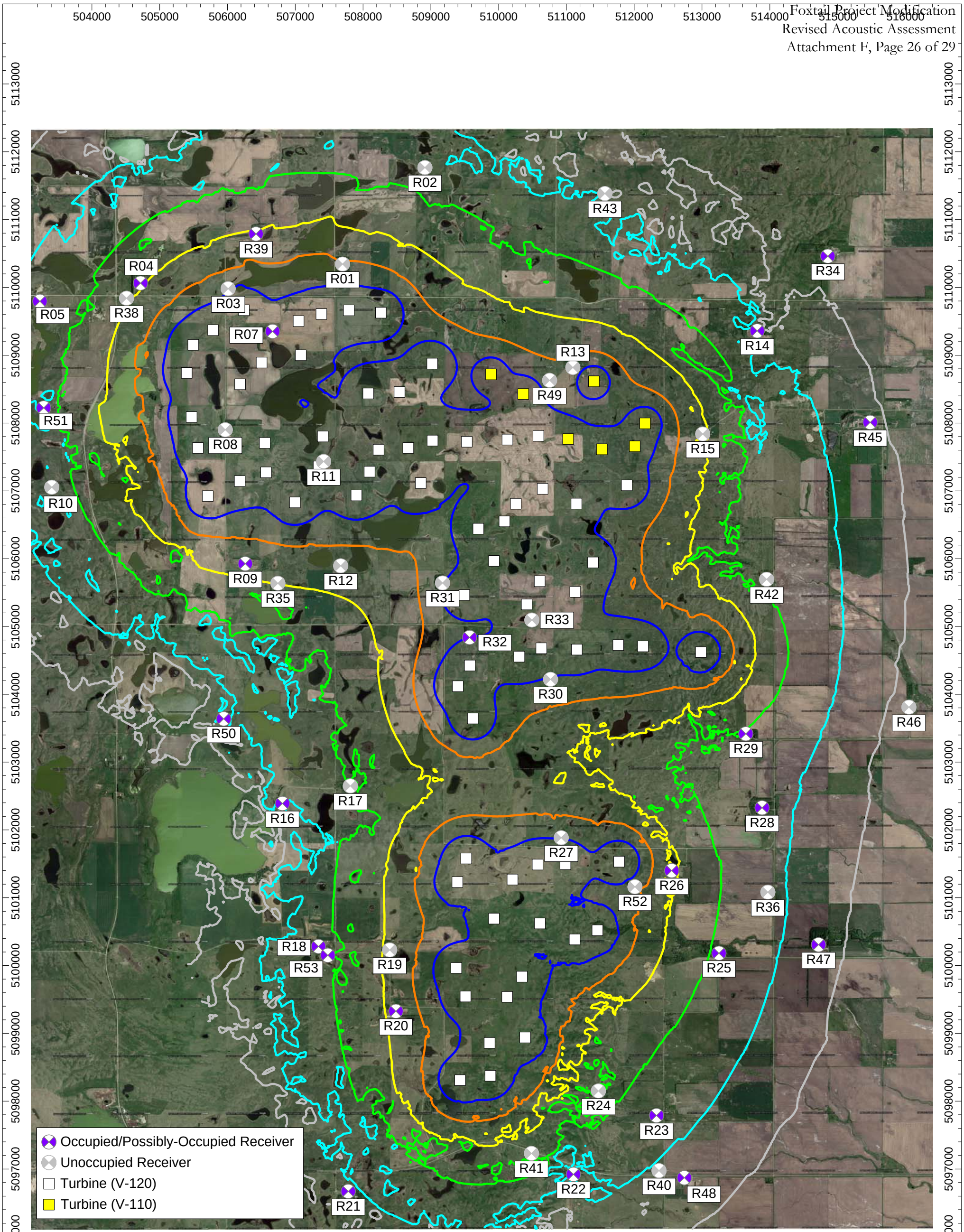

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Figure 6: With Alternates - Wind Turbines at Maximum Rotational Wind Speed and Anomalous Meteorological Conditions

Predicted Project Operation Noise Contours
Foxtail Wind Energy Center - Dickey County, ND
Northern States Power Company | Xcel Energy

Sound Level Contour Ranges (dBA)

- 30 dBA
- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA

Appendix A

Detailed Modeling Results

Receiver ID	Occupation Status	Receptor Located on Participating Land?	Nearest WTG ID	Distance to Nearest WTG (m)	Modeled Receiver Coordinates (UTM Zone 14, NAD 83) Easting (m)	Northing (m)	Predicted Opertion Noise Levels (Leq, dBA) Per Scenario No Alternates Cut-In	Maximum Rotational	CMET Anomalous	With Alternates Cut-In	Maximum Rotational	CMET Anomalous
R04	Occupied	No	4	1198	504717.7	5110063.6	31.6	42.9	44.5	31.6	42.9	44.5
R05	Occupied	No	4	2352	503233.5	5109794.4	25.8	36.1	37.0	25.8	36.1	37.0
R07	Occupied	Yes	10	412	506665.7	5109352.1	41.9	54.1	56.9	41.9	54.1	56.9
R09	Occupied	No	20	1141	506262.4	5105925.4	33.7	44.9	46.6	33.7	44.9	46.6
R14	Occupied	No	38	2145	513814.5	5109359.4	21.4	33.2	34.1	21.7	33.4	34.3
R16	Occupied	No	58	2831	506810.5	5102390.2	25.3	35.2	36.0	25.3	35.2	36.0
R18	Occupied	No	68	2058	507342.8	5100282.6	26.2	36.7	37.7	26.2	36.7	37.7
R20	Occupied	No	69	1049	508485.3	5099326.5	33.1	44.5	46.4	33.1	44.5	46.4
R21	Occupied	No	74	2326	507781.6	5096670.6	23.4	33.7	34.5	23.4	33.7	34.5
R22	Occupied	Yes	75	1902	511103.7	5096921.4	20.9	31.3	32.4	20.9	31.3	32.4
R25	Occupied	No	67	1825	513250.1	5100181.3	27.6	38.2	39.2	27.6	38.2	39.2
R26	Occupied	No	41	787	512552.8	5101399.5	31.6	43.3	45.8	31.6	43.3	45.9
R28	Occupied	No	41	2255	513886.4	5102327.3	25.6	35.8	36.7	25.7	36.0	36.8
R32	Occupied	Yes	51	415	509570.5	5104838.3	40.0	52.1	54.9	40.2	52.3	55.0
R34	Occupied	No	38	3655	514856.4	5110460.9	14.2	26.3	26.9	14.2	26.3	26.9
R39	Occupied	No	6	1139	506420.7	5110789.2	32.6	43.8	45.4	32.6	43.8	45.4
R45	Occupied	No	38	3322	515480.6	5108010.1	19.9	30.8	31.4	19.9	30.8	31.4
R47	Occupied	No	41	3189	514719.7	5100307.6	21.5	31.3	32.0	21.5	31.3	32.0
R48	Occupied	No	73	3132	512740.0	5096870.9	22.5	32.4	33.1	22.5	32.4	33.1
R50	Occupied	No	20	3294	505944.2	5103638.2	23.8	33.6	34.3	23.8	33.6	34.3
R51	Occupied	No	3	2172	503289.2	5108223.5	27.4	37.9	38.8	27.4	37.9	38.8
R53	Occupied	No	68	1905	507480.5	5100151.8	27.9	38.5	39.6	27.9	38.5	39.6
R23	Possibly Occupied	No	73	2255	512328.6	5097789.4	25.8	36.2	37.1	25.8	36.2	37.1
R29	Possibly Occupied	Yes	57	1374	513646.8	5103418.3	27.3	38.3	39.6	27.4	38.3	39.7

Receiver ID	Occupation Status	Receptor Located on Participating Land?	Nearest WTG ID	Distance to Nearest WTG (m)	Modeled Receiver Coordinates (UTM Zone 14, NAD 83) Easting (m)	Northing (m)	Predicted Opertion Noise Levels (Leq, dBA) Per Scenario No Alternates Cut-In	Maximum Rotational	CMET Anomalous	With Alternates Cut-In	Maximum Rotational	CMET Anomalous
R01	Not occupied	No	12	689	507697.7	5110344.3	36.2	48.0	50.6	36.2	48.0	50.6
R02	Not occupied	No	13	2237	508912.5	5111767.4	26.7	37.1	38.0	26.7	37.1	38.0
R03	Not occupied	No	6	393	506010.0	5109981.6	39.1	51.3	54.0	39.1	51.3	54.0
R08	Not occupied	No	1	485	505968.0	5107901.4	40.9	53.0	55.8	40.9	53.0	55.8
R10	Not occupied	No	1	2234	503408.5	5107052.9	26.9	37.4	38.3	26.9	37.4	38.3
R11	Not occupied	Yes	25	105	507418.8	5107433.3	48.1	60.7	63.7	48.1	60.7	63.7
R12	Not occupied	Yes	27	1066	507669.1	5105894.4	34.6	45.8	47.4	34.8	45.9	47.5
R13	Not occupied	Yes	19	372	511094.7	5108819.4	37.3	49.5	52.0	37.4	49.5	52.1
R15	Not occupied	No	38	865	513010.8	5107838.3	31.8	43.7	45.7	32.0	43.8	45.8
R17	Not occupied	Yes	59	2017	507812.6	5102648.2	27.6	38.2	39.2	27.7	38.3	39.2
R19	Not occupied	No	68	1018	508392.8	5100230.1	32.8	44.1	45.9	32.8	44.1	45.9
R24	Not occupied	No	73	1340	511472.3	5098151.1	25.9	37.3	38.9	25.9	37.3	38.9
R27	Not occupied	No	62	394	510923.7	5101884.5	39.8	51.9	54.7	39.8	51.9	54.7
R30	Not occupied	Yes	53	477	510765.4	5104220.7	39.5	51.6	54.4	39.8	51.8	54.5
R31	Not occupied	No	45	366	509172.5	5105641.4	39.6	51.7	54.4	39.8	51.9	54.5
R33	Not occupied	Yes	47	243	510490.7	5105095.1	43.3	55.7	58.6	43.8	56.2	59.1
R35	Not occupied	No	24	1220	506744.0	5105637.2	32.5	43.5	44.9	32.5	43.5	44.9
R36	Not occupied	No	41	2241	513971.4	5101082.2	25.4	35.6	36.4	25.4	35.6	36.4
R38	Not occupied	No	4	1201	504511.0	5109840.9	31.6	42.8	44.3	31.6	42.8	44.3
R40	Not occupied	No	73	2787	512365.2	5096975.8	23.6	33.7	34.5	23.6	33.7	34.5
R41	Not occupied	Yes	75	1296	510484.5	5097230.6	29.1	40.4	42.0	29.1	40.4	42.0
R42	Not occupied	Yes	57	1447	513953.6	5105695.0	26.5	37.6	38.9	26.6	37.7	39.0
R43	Not occupied	Yes	19	2775	511566.8	5111384.1	21.2	32.2	32.9	21.3	32.2	32.9
R46	Not occupied	No	57	3175	516052.0	5103810.2	17.6	27.4	28.1	17.6	27.4	28.1
R49	Not occupied	Yes	18	439	510752.1	5108630.0	37.9	50.0	52.6	38.0	50.1	52.7
R52	Not occupied	Yes	41	438	512011.0	5101161.6	36.4	48.7	51.6	36.4	48.7	51.6

Revised Shadow Flicker Assessment

Foxtail Wind Energy Center
Northern States Power Company
Xcel Energy
Dickey County, North Dakota

Prepared for:

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July 2018

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1.0 INTRODUCTION

Foxtail Wind, LLC (Foxtail Wind) filed an Application for a Certificate of Site Compatibility (Certificate) to construct the Foxtail Wind Energy Center (Project) in Dickey County, in southeastern North Dakota on July 17, 2017. On October 4, 2017, the North Dakota Public Service Commission (Commission) deemed Foxtail Wind's Application complete and assigned it to Case No. PU-17-284. The public hearing was held on November 20, 2017 in Ellendale, North Dakota. The Project will be constructed and operated by Northern States Power Company (NSP), a subsidiary of Xcel Energy (Xcel). NextEra Energy Resources, LLC (NEER) developed the project in collaboration with NSP/Xcel to reflect the engineering and design inputs necessary to transfer ownership of the Project to NSP/Xcel in 2018 according to the executed Purchase & Sale Agreement (PSA). NSP/Xcel currently proposes to construct the Project in two phases between 2018 and 2019.

AECOM has updated the original shadow flicker analysis report from August 2017 for the Project to reflect changes in turbine models and turbine shifts that occurred during the micrositing process. The original Certificate proposed the use of Hybrid Vestas V-116 and V-110 utility-grade turbines; however, the Project will now use both Hybrid Vestas V-120 utility-grade wind turbines and the Vestas V-110 turbine generators, each rated at 2.0 MW. The Project will have a nameplate capacity of approximately 150 megawatts (MW), consisting of up to 75 wind turbines. In addition to the 75 primary turbines, up to three alternative turbine locations have also been considered. The alternate turbine locations are proposed to provide siting flexibility based on on-going environmental studies and landowner preferences. Only 75 turbines will be constructed.

2.0 PROJECT COMPONENTS

The Project will consist of up to 75 wind turbines (**Figure 1**). The wind turbine technology proposed for this Project is 3-bladed, upwind, horizontal-axis wind turbines that are state of the art technology. The Hybrid Vestas V-120 utility-grade wind turbine has a nominal nameplate rating of 2.0 MW. Each turbine will have an 80-meter (262 feet) hub height and a 120-meter (394 feet) rotor diameter with a swept area of 11,310 m^2. This rotor diameter is larger than the Vestas V-116 originally proposed by four meters. The Vestas V-110 turbine has a nominal nameplate rating of 2.0 MW, an 80-meter hub height, and a 110-meter (361 feet) rotor diameter with a swept area of 9,503 m^2. Both turbines begin operation in wind speeds of 3.0 meters per second (m/s), or 6.7 miles per hour (mph), and are designed to operate in wind speeds of up to 20 m/s (45 mph). The coordinates for the 78 (75 proposed and 3 alternate locations) turbines are listed in **Table 1**. Seven turbines are proposed as the V-110 model and the rest of the turbines are proposed as the V-120 model.

3.0 SHADOW FLICKER BACKGROUND

Shadow flicker is a temporary condition resulting from the sun casting intermittent shadows from the rotating blades of a wind turbine onto a sensitive receptor such as a window in a building. The flicker is due to alternating light intensity between the direct beam of sunlight and the shadow from the turbine blades. For shadow flicker to occur, the following criteria must be met:

1. The sun must be shining and not obscured by any cloud cover.

2. The wind turbine blades must be between the sun and the shadow receptor. The wind turbine must be facing directly towards (or away from) the sun such that the rotational plane of the blades is perpendicular to the azimuth of incident sun rays. For this to occur, the wind direction would have to perpetually be parallel to the azimuth of the incident sun rays throughout the day.

3. The line of sight between the turbine and the shadow receptor must be clear. Light impermeable obstacles, such as trees, buildings or other structures, will prevent or reduce shadow flicker from occurring at the receptor. Terrain can also affect the exposure at a receptor.

4. The receptor has to be close enough to the turbine to be in the shadow. The shadow from a turbine extends furthest when the sun is low in the sky (sunrise and sunset) such that receptors to the east or west of a turbine will be exposed more than receptors to the north and south of a turbine.

5. The turbine is operational and not stationary due to a lack of wind or maintenance activities.

The frequency of shadow flicker is dependent on the wind turbine's rotor blade speed and the number of blades on the rotor. Shadow flicker intensity diminishes with greater receptor-to-turbine separation distance. Shadow flicker intensity for receptor-to-turbine distances beyond 2,500 meters (8,202 feet) is very low and generally considered imperceptible. In general, increasing proximity to turbines may make shadow flicker more noticeable, with the largest number of shadow flicker hours, along with greatest shadow flicker intensity, occurring nearest the wind turbines.

From a health standpoint, the low flicker frequencies associated with wind turbines, are a nuisance (Frontiers in Public Health 2014). There have been public concerns that flickering light from wind turbines can have negative health effects, such as triggering seizures in people with epilepsy, but these concerns are unfounded. The UK Epilepsy Society states that turbine blades would need to rotate at speeds greater than 3 Hertz (flashes per second) to potentially cause seizures in persons with photosensitive epilepsy (Epilepsy Society 2016); however, turbines on commercial wind farms rotate at speeds of 2 Hertz or less.

Shadow flicker impacts are not regulated in applicable state or federal law, and there is no permitting threshold with regard to hours per year of anticipated impacts to a receptor from a wind energy project. However, a widely used industry standard of 30 hours per year has been used for this shadow flicker impact analysis.

4.0 WINDFARM SHADOW FLICKER ANALYSIS

The updated shadow flicker analysis for the Project was completed using the WindFarm modelling software. As discussed above, the Project will install up to 75 wind turbines. The 75 proposed locations as well as three alternate locations have been assessed in two scenarios:

- Scenario A: 75 wind turbines (proposed locations only)
- Scenario B: 78 wind turbines (proposed and alternate locations)

WindFarm considers the terrain features determined by U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data, receptor, and turbine locations in the modelling analysis. It is generally accepted that shadow flicker from wind turbines does not occur beyond a certain distance from a wind turbine (Department of Energy and Climate Change 2011). The *Update of UK Shadow Flicker Evidence Base* by Parsons Brinckerhoff, on behalf of the Department of Energy and Climate Change, this distance is equivalent to 10 rotor diameters. AECOM conservatively calculated a maximum distance of 1,400 meters (80 meter hub height plus 60 meter blade times 10). WindFarm also assumes the sun is shining during all daytime hours and that the turbines are always operating. This method produces a theoretical worst case astronomical prediction at each receptor. Hourly meteorological data from the nearby Oakes, North Dakota agricultural weather network station shows that the wind blows predominantly from the northwest or south and that receptors to the east or west of a turbine are less likely to experience shadow flicker (NDAWN 2017).

The orientation of windows at each receptor location will determine what rooms at each receptor would be exposed to shadow flicker. AECOM did not catalogue the number or orientation of windows at each receptor; instead each receptor is assumed to have eight windows (one every 45 degrees) to capture all angles for exposure. The amount of bright sunshine can also affect the frequency and duration of exposure to shadow flicker. **Table 2** summarizes the percentage of bright sunshine (classified as zero or few clouds) at Jamestown Airport, North Dakota, and Aberdeen, South Dakota based on 30-year climatological data (1983 – 2012) from the National Climatic Data Center (NCDC 2017). The average between the two airports during daytime hours is 44.3% bright sunshine. This factor was used to adjust the number of hours when shadow flicker occurs on an annual basis.

The analysis is inherently conservative by assuming that the receptors all have a direct in-line view of the incoming shadow flicker sunlight and does not account for trees or other obstructions which may block sunlight. In reality, the windows of many houses will not face the sun directly. Adding to the analysis' conservatism, both the primary and alternate turbines are modeled cumulatively for Scenario B, as Foxtail Wind will only construct up to 75 turbines.

The receptors in this analysis have been classified into two different categories. A total of 50 structures were identified within and near the Project area, 26 of which are considered unlikely to be or unequivocally unoccupied, with the remaining 24 structures considered either inhabited or capable of habitation. Determination of habitation for existing structures was limited to public knowledge and roadside surveys in order to reduce disturbances to non-participating land owners. For purposes of conservatism in this analysis, all structures located on non-participating land that were identified as capable of habitation were considered active residential structures. Receptors that were identified as participating in the Project are associated with the wind farm development via a legal agreement with the owner of the subject property.

5.0 SHADOW FLICKER ANALYSIS RESULTS

The shadow flicker analysis accounts for the placement of turbines, receptors, and sun angle such that the time when the turbine is in between the sun and the receptor is included in the total hours per year that shadow flicker could occur. However, this is a conservative analysis that does not account for maintenance time, wind speeds less than 3 m/s when the turbines will not operate, light permeable obstacles such as trees and other structures, or that the turbine will rarely be directly facing the sun, which will shorten the shadow from the turbine blades. The house number in the study files correspond to the Receptor ID and it was assumed that there are eight windows (located at 0, 45, 90, 135, 180, 225, 270, and 315 degrees from north) at each house located 2 meters high off the ground.

5.1 Scenario A Results

The results of the Scenario A analysis are summarized in **Table 3** and **Table 4** and shown on **Figure 2**. The worst case maximum shadow flicker per year at an occupied receptor is 105.0 hours per year based on annual percentage of sunshine in **Table 2**.

5.2 Scenario B Results

The results of the Scenario B analysis are summarized in **Table 5** and **Table 6** and shown on **Figure 3**. The worst case maximum shadow flicker per year at an occupied receptor is 105.0 hours per year based on annual percentage of sunshine in **Table 2**.

The results for occupied and unoccupied receptors for both scenarios are shown in **Appendix A**.

6.0 CONCLUSIONS

As expected, the analysis predicts that shadow flicker impacts will be greatest at locations nearer to the wind turbines. Foxtail Wind has used a minimum setback of three times the turbine height per North Dakota Administrative Code (NDAC) Section 69-06-08-01(2). The analysis of potential shadow flicker impacts from the Project on nearby receptors shows that shadow flicker impacts within the area of study are expected to be minor and well within acceptable ranges for avoiding nuisance conditions. Predicted shadow flicker impacts are less than the industry standard of 30 hours per year for all occupied residential receptors except one participating landowner (Receptor R07). These results are not significantly different than the August 2017 Shadow Flicker report. Additionally, the landowner owning Receptor 07 has executed an agreement with Foxtail Wind waiving the 30 hours per year exceedance.

The analysis was deliberately conservative and actual shadow flicker is expected to occur for less than the modeled durations. The analysis assumes that the receptors all have a direct in-line view of the incoming shadow flicker sunlight and does not account for trees or other obstructions which may block sunlight. In reality, the windows of many houses will not face the sun directly for the key shadow flicker impact times. Adding to the analysis' conservatism, both the primary and alternate turbines were modeled cumulatively. Foxtail Wind will only construct up to 75 turbines, which is fewer wind turbines than were included in the Scenario B modeled results.

7.0 LITERATURE CITED

Department of Energy and Climate Change. 2011. Update of UK Shadow Flicker Evidence Base. Accessed June 19, 2017. Available online at: https://www.gov.uk/government/publications/update-of-uk-shadow-flicker-evidence-base

Epilepsy Society. 2016. Wind Turbines and Photosensitive Epilepsy. Accessed June 22, 2017. Available online at: https://www.epilepsysociety.org.uk/wind-turbines-and-photosensitive-epilepsy#.WU1pn1UrLcs

Frontiers in Public Health. 2014. Wind Turbines and Human Health. Accessed August 30, 2017. Available online at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4063257/

NCDC (National Climatic Data Center). 2017. Local Climate Station Summaries. Accessed June 14, 2017. Available online at: https://www7.ncdc.noaa.gov/CDO/cdoselect.cmd?datasetabbv=SUMMARIES&countryabbv=&georegionabbv=&resolution=0

NDAWN (North Dakota Agricultural Weather Network). 2017. Oakes, North Dakota Hourly Wind Speed and Direction for 2012-2016. Accessed June 20, 2017. Available online at: https://ndawn.ndsu.nodak.edu/station-info.html?station=43

Tables

Table 1. Wind Turbine Locations

Turbine ID	UTM Coordinates		Turbine ID	UTM Coordinates		Turbine ID	UTM Coordinates	
	X	Y		X	Y		X	Y
1	505565	5107632	27	507903	5106934	53	510630	5104678
2	505470	5108088	28	508096	5107283	54	511153	5104659
3	505399	5108738	29	508230	5107607	55	511764	5104726
4	505495	5109153	30	508666	5107632	56	512129	5104708
5	505789	5109370	31	509025	5107741	57	512984	5104621
6	506243	5109665	32	509531	5107724	58	509392	5101231
7	506186	5108573	33	510130	5107756	59	509522	5101579
8	506504	5108892	34	510586	5107810	60	510205	5101268
9	507082	5109001	35(1)	511025	5107763	61	510575	5101490
10	507049	5109503	36(1)	511523	5107613	62	510984	5101495
11	507385	5109608	37(1)	512008	5107657	63	510086	5106551
12	507791	5109662	38(1)	512160	5107995	64	509932	5100692
13	508263	5109628	39	508851	5107115	65	510609	5100622
14	508077	5108436	40	509701	5106441	66	511122	5100386
15	508537	5108458	41	511777	5101532	67	511458	5100520
16	509021	5108876	42	510649	5107030	68	509375	5099964
17(1)	509889	5108718	43	511147	5106812	69	509511	5099545
18(1)	510363	5108428	44	511891	5107082	70	510126	5099538
19(1)	511405	5108615	45	509493	5105465	71	510345	5099836
20	505710	5106923	46	509931	5105967	72	509866	5098859
21	506181	5107144	47	510415	5105326	73	510390	5098940
22	506569	5107273	48	511393	5105944	74	509431	5098310
23	506551	5107706	49	509619	5103644	75	509878	5098375
24	506994	5106831	50	509399	5104119	Alt7	511129	5105510
25	507345	5107359	51	509575	5104424	Alt6	510606	5105668
26	507406	5107802	52	510304	5104555	Alt5	510254	5106809

(1) V-110 Turbines. All other turbines are V-120.

Table 2. Percent of Bright Sunshine at Nearby Airports

Hour	% Bright Sunshine (Jamestown, ND)	% Bright Sunshine (Aberdeen, SD)	% Bright Sunshine (Average)
0	0.0	0.0	0.0
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	49.6	55.2	52.4
7	49.2	49.1	49.2
8	49.1	47.5	48.3
9	48.0	46.9	47.5
10	46.6	46.5	46.6
11	44.9	44.1	44.5
12	43.4	47.3	45.4
13	41.7	41.2	41.5
14	40.1	40.4	40.3
15	39.7	39.6	39.7
16	40.2	40.1	40.2
17	40.4	40.7	40.6
18	40.6	47.5	44.1
19	39.7	40.7	40.2
20	0.0	0.0	0.0
21	0.0	0.0	0.0
22	0.0	0.0	0.0
23	0.0	0.0	0.0
Daytime Hours (0600-1900)	**43.8**	**44.8**	**44.3**

Table 3. Scenario A Statistical Summary of Predicted Shadow Flicker at Occupied/Possibly Occupied Receptors

Total Shadow Flicker Time (expected)	Number of Receptors
Total	24
= 0 Hours	19
> 0 Hours < 10 Hours	1
> 10 Hours < 20 Hours	2
> 20 Hours < 30 Hours	1
> 30 Hours	1 (Receptor R07)

Table 4. Scenario A Results by Modeled Receptor

WindFarm ID	Receptor ID	Receptor Status		Nearest Turbine ID	Distance to Nearest Turbine (m)	Modeled Receptor Coordinates (UTM Zone 14, NAD 83)		Adjusted Total Hours of Shadow Flicker per Year
		Occupation Status	Receptor Located on Participating Land?			Easting (m)	Northing (m)	
H4	R04	Occupied	No	4	1,198	504718	5110064	9.5
H5	R05	Occupied	No	4	2,353	503234	5109794	0.0
H6	R07	Occupied	Yes	10	412	506666	5109352	105..0
H8	R09	Occupied	No	20	1,141	506262	5105925	0.0
H13	R14	Occupied	No	38	2,145	513814	5109359	0.0
H15	R16	Occupied	No	58	2,831	506811	5102390	0.0
H17	R18	Occupied	No	68	2,058	507343	5100283	0.0
H19	R20	Occupied	No	69	1,049	508485	5099326	10.9
H20	R21	Occupied	No	74	2,326	507782	5096671	0.0
H21	R22	Occupied	Yes	75	1,902	511104	5096921	0.0
H24	R25	Occupied	No	67	1,825	513250	5100181	0.0
H25	R26	Occupied	No	41	787	512553	5101399	11.4
H27	R28	Occupied	No	41	2,255	513886	5102327	0.0
H31	R32	Occupied	Yes	51	415	509571	5104838	21.2
H33	R34	Occupied	No	38	3,655	514856	5110461	0.0
H37	R39	Occupied	No	6	1,139	506421	5110789	0.0
H42	R45	Occupied	No	38	3,322	515481	5108010	0.0
H44	R47	Occupied	No	41	3,189	514720	5100308	0.0
H45	R48	Occupied	No	73	3,132	512740	5096871	0.0
H47	R50	Occupied	No	20	3,294	505944	5103638	0.0
H48	R51	Occupied	No	3	2,172	503289	5108224	0.0
H50	R53	Occupied	No	68	1,905	507481	5100152	0.0
H22	R23	Possibly Occupied	No	73	2,255	512329	5097789	0.0
H28	R29	Possibly Occupied	Yes	57	1,374	513647	5103418	0.0

Table 5. Scenario B Results by Modeled Receptor

WindFarm ID	Receptor ID	Receptor Status		Nearest Turbine ID	Distance to Nearest Turbine (m)	Modeled Receptor Coordinates (UTM Zone 14, NAD 83)		Adjusted Total Hours of Shadow Flicker per Year
		Occupation Status	Receptor Located on Participating Land?			Easting (m)	Northing (m)	
H4	R04	Occupied	No	4	1,198	504718	5110064	9.5
H5	R05	Occupied	No	4	2,353	503234	5109794	0.0
H6	R07	Occupied	Yes	10	412	506666	5109352	105.0
H8	R09	Occupied	No	20	1,141	506262	5105925	0.0
H13	R14	Occupied	No	38	2,145	513814	5109359	0.0
H15	R16	Occupied	No	58	2,831	506811	5102390	0.0
H17	R18	Occupied	No	68	2,058	507343	5100283	0.0
H19	R20	Occupied	No	69	1,049	508485	5099326	10.9
H20	R21	Occupied	No	74	2,326	507782	5096671	0.0
H21	R22	Occupied	No	75	1,902	511104	5096921	0.0
H24	R25	Occupied	No	67	1,825	513250	5100181	0.0
H25	R26	Occupied	No	41	787	512553	5101399	11.4
H27	R28	Occupied	No	41	2,255	513886	5102327	0.0
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H44	R47	Occupied	No	41	3,189	514720	5100308	0.0
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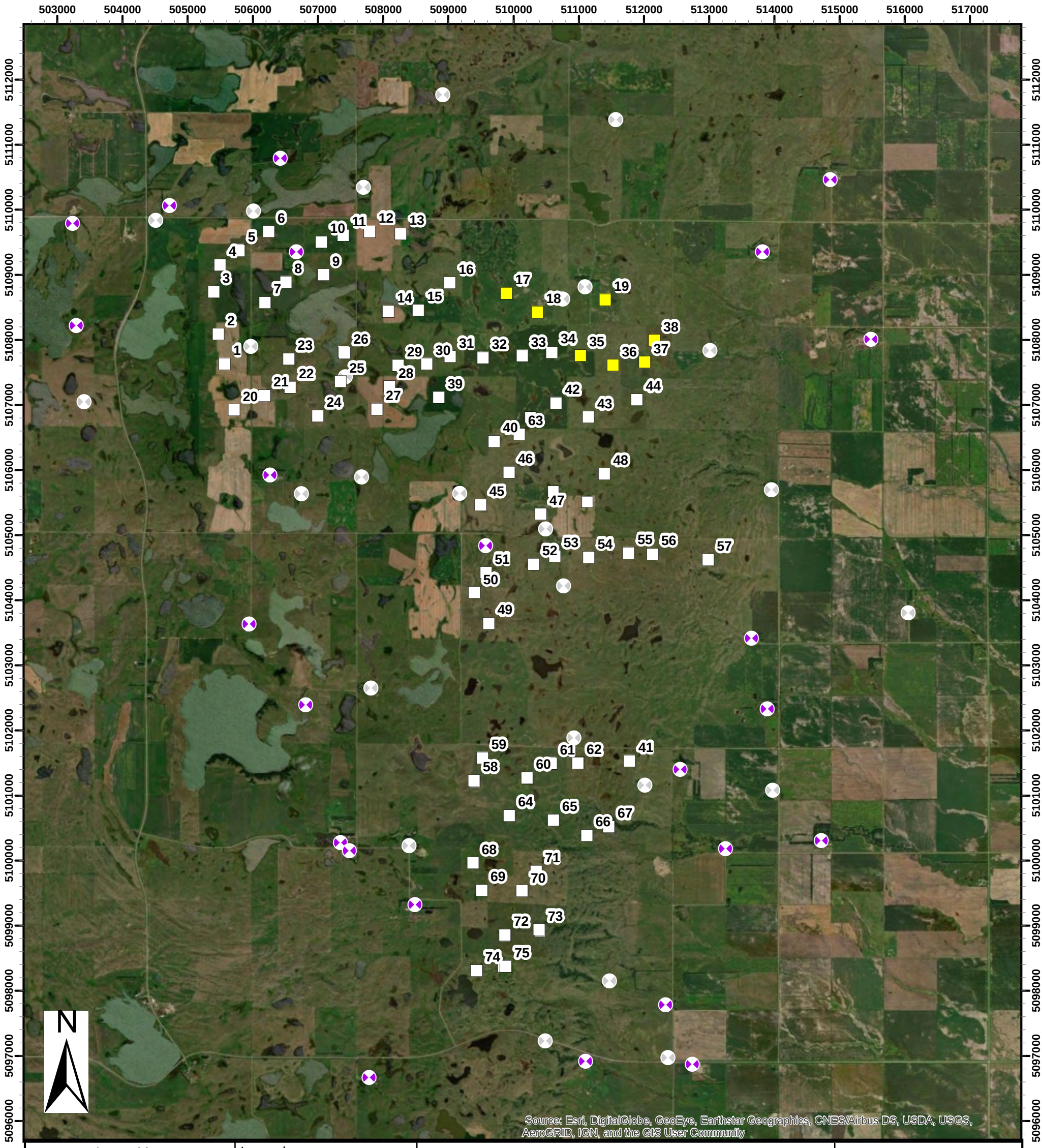
H47	R50	Occupied	No	20	3,294	505944	5103638	0.0
H48	R51	Occupied	No	3	2,172	503289	5108224	0.0
H50	R53	Occupied	No	68	1,905	507481	5100152	0.0
H22	R23	Possibly Occupied	No	73	2,255	512329	5097789	0.0
H28	R29	Possibly Occupied	Yes	57	1,374	513647	5103418	0.0

Table 6. Scenario B Statistical Summary of Predicted Shadow Flicker at Occupied/Possibly Occupied Receptors

Total Shadow Flicker Time (expected)	Number of Receptors
Total	24
= 0 Hours	19
> 0 Hours < 10 Hours	1
> 10 Hours < 20 Hours	2
> 20 Hours < 30 Hours	1
> 30 Hours	1 (Receptor R07)

Figures



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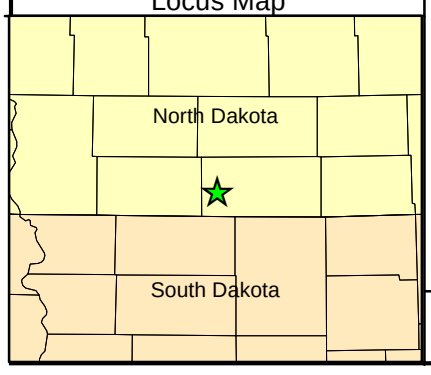


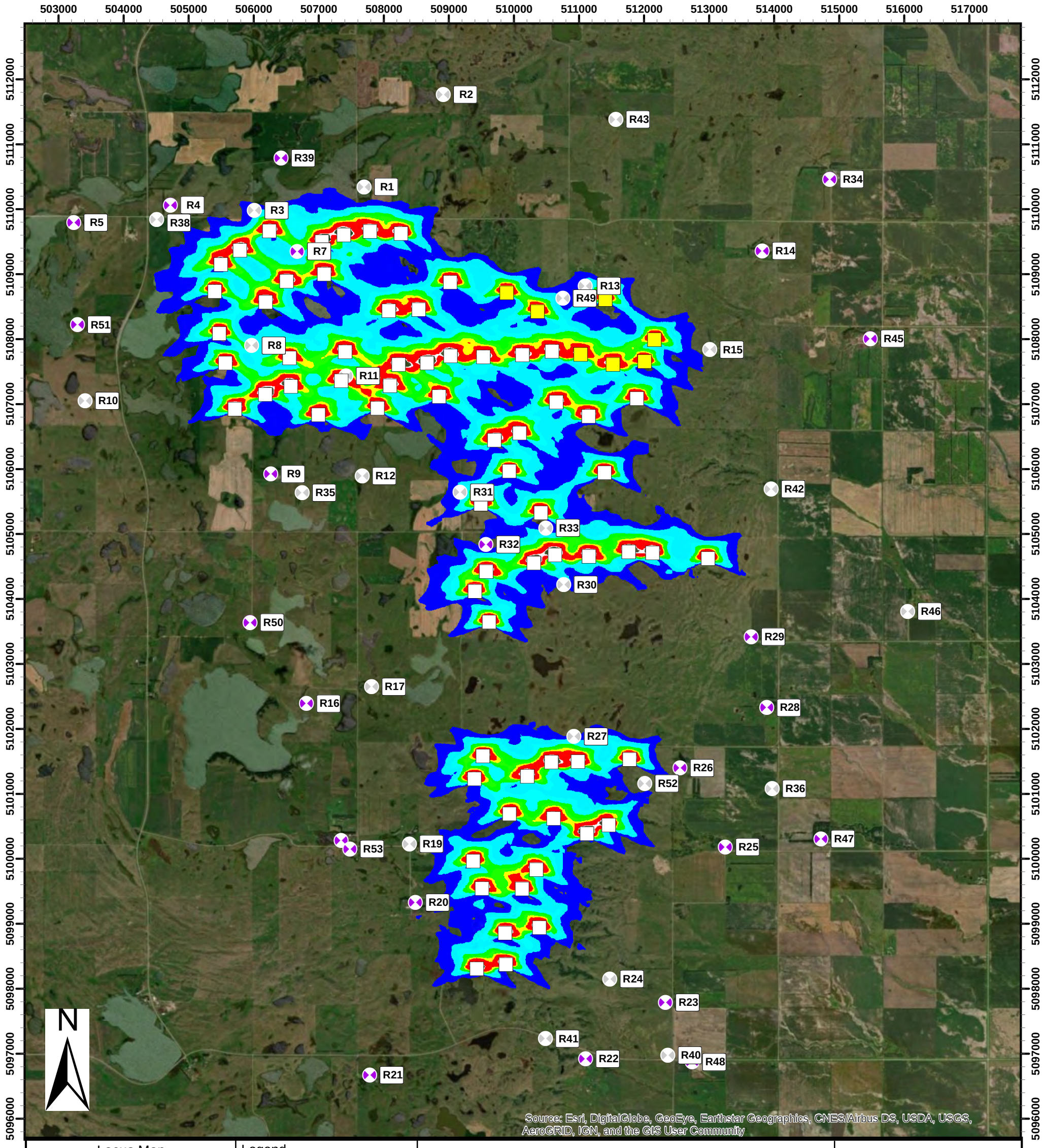
Legend
- Turbine (V-120)
- Turbine (V-110)
- Occupied/Possibly Occupied Receptor
- Unoccupied Receptor

Northern States Power Company
Xcel Energy
Foxtail Wind Energy Center
Figure 1
Wind Turbine and Receptor Locations

Xcel Energy®

AECOM

Scale 0 1 2 4 6 8 Kilometers



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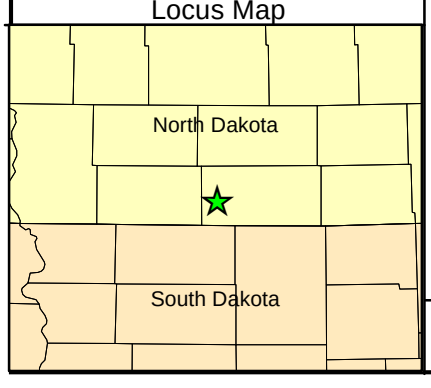


Legend

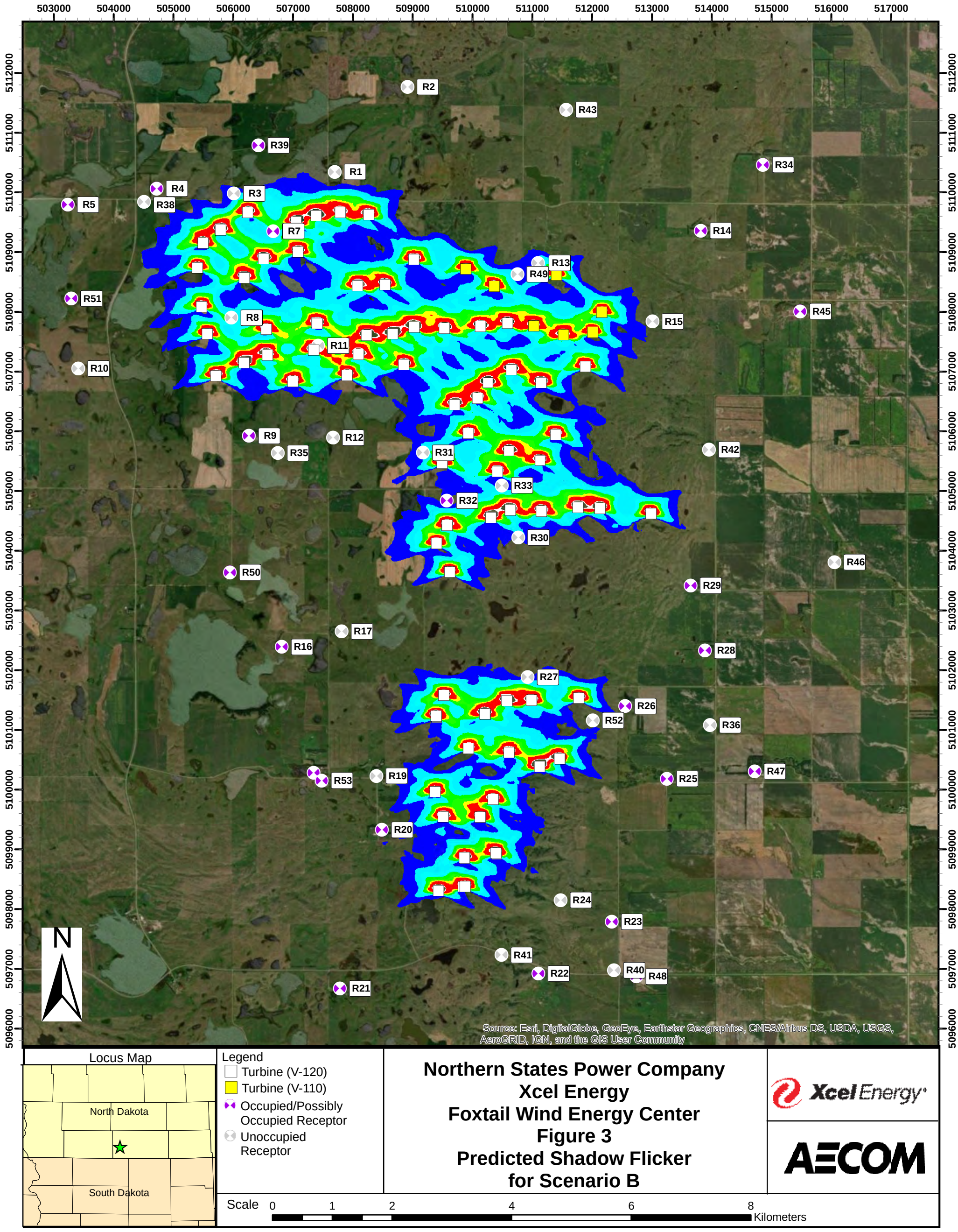
- Turbine (V-120)
- Turbine (V-110)
- Occupied/Possibly Occupied Receptor
- Unoccupied Receptor

Northern States Power Company
Xcel Energy
Foxtail Wind Energy Center
Figure 2
Predicted Shadow Flicker for Scenario A

Xcel Energy®

AECOM

Scale 0 1 2 4 6 8 Kilometers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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Locus Map
North Dakota
South Dakota
Legend
Turbine (V-120)
Turbine (V-110)
Occupied/Possibly Occupied Receptor
Unoccupied Receptor
Northern States Power Company
Xcel Energy
Foxtail Wind Energy Center
Figure 3
Predicted Shadow Flicker
for Scenario B
Xcel Energy
AECOM
Scale
0
1
2
4
6
8
Kilometers

Appendix A

Detailed Shadow Flicker Results

Scenario A Shadow Flicker Results

		Receptor Status				Modeled Receiver Coordinates (UTM Zone 14, NAD 83)		
WindFarm ID	Receptor ID	Occupation Status	Receptor Located on Participating Land?	Nearest Turbine ID	Distance to Nearest Turbine (m)	Easting (m)	Northing (m)	Total Adjusted Hours per Year
H6	R7	Occupied	Yes	10	412	506666	5109352	105.0
H31	R32	Occupied	Yes	51	415	509571	5104838	21.2
H25	R26	Occupied	No	41	787	512553	5101399	11.4
H19	R20	Occupied	No	69	1,049	508485	5099326	10.9
H4	R4	Occupied	No	4	1,198	504718	5110064	9.5
H5	R5	Occupied	No	4	2,352	503234	5109794	0.0
H8	R9	Occupied	No	20	1,141	506262	5105925	0.0
H13	R14	Occupied	No	38	2,145	513814	5109359	0.0
H15	R16	Occupied	No	58	2,831	506811	5102390	0.0
H17	R18	Occupied	No	68	2,058	507343	5100283	0.0
H20	R21	Occupied	No	74	2,326	507782	5096671	0.0
H21	R22	Occupied	No	75	1,902	511104	5096921	0.0
H24	R25	Occupied	No	67	1,825	513250	5100181	0.0
H27	R28	Occupied	No	41	2,255	513886	5102327	0.0
H33	R34	Occupied	No	38	3,655	514856	5110461	0.0
H37	R39	Occupied	No	6	1,139	506421	5110789	0.0
H42	R45	Occupied	No	38	3,322	515481	5108010	0.0
H44	R47	Occupied	No	41	3,189	514720	5100308	0.0
H45	R48	Occupied	No	73	3,132	512740	5096871	0.0
H47	R50	Occupied	No	20	3,294	505944	5103638	0.0
H48	R51	Occupied	No	3	2,172	503289	5108224	0.0
H50	R53	Occupied	No	68	1,905	507481	5100152	0.0
H22	R23	Possibly Occupied	No	73	2,255	512329	5097789	0.0
H28	R29	Possibly Occupied	No	57	1,374	513647	5103418	0.0
H10	R11	Not occupied	Yes	25	105	507419	5107433	454.6

Scenario A Shadow Flicker Results

		Receptor Status				Modeled Receiver Coordinates (UTM Zone 14, NAD 83)		
WindFarm ID	Receptor ID	Occupation Status	Receptor Located on Participating Land?	Nearest Turbine ID	Distance to Nearest Turbine (m)	Easting (m)	Northing (m)	Total Adjusted Hours per Year
H7	R8	Not occupied	Yes	1	485	505968	5107901	114.5
H30	R31	Not occupied	No	45	366	509172	5105641	70.4
H12	R13	Not occupied	Yes	19	372	511095	5108819	61.8
H3	R3	Not occupied	No	6	393	506010	5109982	60.1
H46	R49	Not occupied	Yes	18	439	510752	5108630	52.0
H32	R33	Not occupied	Yes	47	243	510491	5105095	44.9
H26	R27	Not occupied	No	62	394	510924	5101885	41.6
H29	R30	Not occupied	Yes	53	477	510765	5104221	40.3
H14	R15	Not occupied	No	38	865	513011	5107838	24.1
H18	R19	Not occupied	No	68	1,018	508393	5100230	11.8
H36	R38	Not occupied	No	4	1,201	504511	5109841	10.9
H49	R52	Not occupied	Yes	41	438	512011	5101162	8.0
H1	R1	Not occupied	No	12	689	507698	5110344	5.8
H2	R2	Not occupied	No	13	2,237	508912	5111767	0.0
H9	R10	Not occupied	No	1	2,234	503409	5107053	0.0
H11	R12	Not occupied	No	27	1,066	507669	5105894	0.0
H16	R17	Not occupied	No	59	2,017	507813	5102648	0.0
H23	R24	Not occupied	No	73	1,340	511472	5098151	0.0
H34	R35	Not occupied	No	24	1,220	506744	5105637	0.0
H35	R36	Not occupied	No	41	2,241	513971	5101082	0.0
H38	R40	Not occupied	No	73	2,787	512365	5096976	0.0
H39	R41	Not occupied	No	75	1,296	510484	5097231	0.0
H40	R42	Not occupied	No	57	1,447	513954	5105695	0.0
H41	R43	Not occupied	No	19	2,775	511567	5111384	0.0
H43	R46	Not occupied	No	57	3,175	516052	5103810	0.0

Scenario B Shadow Flicker Results

WindFarm ID	Receptor ID	Receptor Status		Nearest Turbine ID	Distance to Nearest Turbine (m)	Coordinates		Total Adjusted Hours per Year
		Occupation Status	Receptor Located on Participating Land?			Easting (m)	Northing (m)	
H6	R7	Occupied	Yes	10	412	506666	5109352	105.0
H31	R32	Occupied	Yes	51	415	509571	5104838	21.2
H25	R26	Occupied	No	41	787	512553	5101399	11.4
H19	R20	Occupied	No	69	1,049	508485	5099326	10.9
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H5	R5	Occupied	No	4	2,352	503234	5109794	0.0
H8	R9	Occupied	No	20	1,141	506262	5105925	0.0
H13	R14	Occupied	No	38	2,145	513814	5109359	0.0
H15	R16	Occupied	No	58	2,831	506811	5102390	0.0
H17	R18	Occupied	No	68	2,058	507343	5100283	0.0
H20	R21	Occupied	No	74	2,326	507782	5096671	0.0
H21	R22	Occupied	No	75	1,902	511104	5096921	0.0
H24	R25	Occupied	No	67	1,825	513250	5100181	0.0
H27	R28	Occupied	No	41	2,255	513886	5102327	0.0
H33	R34	Occupied	No	38	3,655	514856	5110461	0.0
H37	R39	Occupied	No	6	1,139	506421	5110789	0.0
H42	R45	Occupied	No	38	3,322	515481	5108010	0.0
H44	R47	Occupied	No	41	3,189	514720	5100308	0.0
H45	R48	Occupied	No	73	3,132	512740	5096871	0.0
H47	R50	Occupied	No	20	3,294	505944	5103638	0.0
H48	R51	Occupied	No	3	2,172	503289	5108224	0.0
H50	R53	Occupied	No	68	1,905	507481	5100152	0.0
H22	R23	Possibly Occupied	No	73	2,255	512329	5097789	0.0
H28	R29	Possibly Occupied	No	57	1,374	513647	5103418	0.0
H10	R11	Not occupied	Yes	25	105	507419	5107433	454.6
H7	R8	Not occupied	Yes	1	485	505968	5107901	114.5
H30	R31	Not occupied	No	45	366	509172	5105641	70.4
H12	R13	Not occupied	Yes	19	372	511095	5108819	61.8

Scenario B Shadow Flicker Results

		Receptor Status				Coordinates		
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H46	R49	Not occupied	Yes	18	439	510752	5108630	52.0
H32	R33	Not occupied	Yes	47	243	510491	5105095	44.9
H26	R27	Not occupied	No	62	394	510924	5101885	41.6
H29	R30	Not occupied	Yes	53	477	510765	5104221	40.3
H14	R15	Not occupied	No	38	865	513011	5107838	24.1
H18	R19	Not occupied	No	68	1,018	508393	5100230	11.8
H36	R38	Not occupied	No	4	1,201	504511	5109841	10.9
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H1	R1	Not occupied	No	12	689	507698	5110344	5.8
H2	R2	Not occupied	No	13	2,237	508912	5111767	0.0
H9	R10	Not occupied	No	1	2,234	503409	5107053	0.0
H11	R12	Not occupied	No	27	1,066	507669	5105894	0.0
H16	R17	Not occupied	No	59	2,017	507813	5102648	0.0
H23	R24	Not occupied	No	73	1,340	511472	5098151	0.0
H34	R35	Not occupied	No	24	1,220	506744	5105637	0.0
H35	R36	Not occupied	No	41	2,241	513971	5101082	0.0
H38	R40	Not occupied	No	73	2,787	512365	5096976	0.0
H39	R41	Not occupied	No	75	1,296	510484	5097231	0.0
H40	R42	Not occupied	No	57	1,447	513954	5105695	0.0
H41	R43	Not occupied	No	19	2,775	511567	5111384	0.0
H43	R46	Not occupied	No	57	3,175	516052	5103810	0.0

IN THE MATTER OF THE
PROJECT MODIFICATIONS
TO FOXTAIL WIND ENERGY
CENTER, CERTIFICATE OF
SITE COMPATIBILITY NUMBER 53

CASE NO. PU-17-284

AFFIDAVIT OF CHRISTOPHER B. CLARK

Christopher B. Clark, under oath, states:

1. I am employed by Northern States Power Company, a Minnesota corporation (NSP or the Company), which is a public utility operating subsidiary of Xcel Energy Inc., a registered public utility holding company. My business address is 414 Nicollet Mall, Minneapolis, Minnesota 55401. My title is President – Northern States Power Company – Minnesota.

2. I have more than 20 years of experience in the public utility industry and have worked extensively in connection with the Company's purchases and construction of wind energy generation facilities. The Company's engineering and construction team has extensive experience in the field of engineering and construction of electric power infrastructure.

3. I am submitting this Affidavit pursuant to Provision No. 38 of the Certification Relating to Order Provisions – Wind Energy Conversion Facility Siting ("Certification"), which is part of the Commission's Order in Case No. PU-17-284 issuing Certificate of Site Compatibility Number 53 for the construction, operation, and maintenance of an energy conversion facility known as the Foxtail Wind Energy Center dated January 31, 2018 ("Order").

4. I have reviewed all the terms and conditions to Certificate of Site Compatibility Number 53.

5. The Company agrees to abide by all of the terms and conditions in Certificate of Site Compatibility Number 53 and stands ready, willing and able to perform the obligations stated therein.

6. I have authority to bind the Company in the commitments made in this Affidavit.

Dated this 13 date of August, 2018.

Christopher B. Clark
President – NSPM

Subscribed and sworn to before me
this 13 day of August, 2018.

MARY ANN MARTINEZ
Notary Public
State of Minnesota
My Commission Expires
January 31, 2020

Notary Public
My Commission Expires: January 31, 2020