Consolidated Application to the North Dakota Public Service Commission for a Certificate of Corridor Compatibility and Route Permit

Northern Divide 345-kV Transmission Line
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Burke and Mountrail Counties, North Dakota

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1.0 INTRODUCTION

Pursuant to North Dakota Century Code (N.D.C.C.) Section 49-22-08.2, Northern Divide Wind, LLC[1] (Northern Divide Wind), a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC (NextEra), submits this consolidated application for a North Dakota Public Service Commission (Commission) Certificate of Corridor Compatibility (Certificate) and Transmission Facility Route Permit (Route Permit) to construct the 41-mile Northern Divide 345-kilovolt (kV) Transmission Line (Project) in Burke and Mountrail Counties, North Dakota (**Figure 1-1** through **1-3**).

The Project will convey power from the planned Northern Divide Wind Energy Center (Wind Energy Center) to the point of interconnection at the existing Basin Electric Power Cooperative (Basin Electric) Tande Substation (**Figure 1-4**). The Tande Substation was identified as the optimal point of interconnection based on Basin Electric's interconnection studies and the Wind Energy Center's load injection needs. Due to the size of the Tande Substation, the Project is required to connect at a capacity of 345-kV. Northern Divide Wind signed a 30-year power purchase agreement (PPA) with Basin Electric for the output of the Wind Energy Center. Pursuant to this agreement, Basin Electric will purchase all the electrical output generated by the Wind Energy Center for 30 years. The Wind Energy Center will have a nameplate capacity of approximately 200 megawatts (MW), consisting of up to 74 turbines located in Burke County, North Dakota.

Concurrently with this application, Northern Divide Wind is also filing an application for a Certificate of Site Compatibility for the Wind Energy Center. Pursuant to N.D.C.C. Section 49-22-13, Northern Divide Wind respectfully requests that the hearing on this application for a Certificate and Route Permit be consolidated and held on the same date and in conjunction with the hearing on its separately filed application for the Wind Energy Center Certificate of Site Compatibility.

NextEra, through its subsidiaries and affiliates, develops renewable projects throughout the United States and Canada. NextEra is one of the world's leading generators of wind energy, operating more than 15,000 MW of emissions-free wind energy. In North Dakota, NextEra affiliates own and/or operate 14 wind facilities (that generate approximately ±1,250 MW) with another 200 MW wind energy project currently under construction. NextEra designs, constructs, and operates its facilities in an environmentally sound and responsible manner. NextEra's 2019 Corporate Responsibility Report in **Appendix A** describes NextEra's environmental accountability, management, and stewardship policies that are intended to:

- Design, construct, operate, and maintain its facilities in an environmentally sound and responsible manner;
- Prevent pollution, minimize waste, and conserve natural resources;
- Avoid, minimize, and/or mitigate impacts to habitat and wildlife; and
- Engage stakeholders to build trust and partner toward common goals for environmental stewardship and protection.

1.1 Project History

In 2017, Burke Wind, LLC (Burke Wind) proposed a 345-kV transmission line in Burke and Mountrail Counties and filed an application for a Certificate and Route Permit with the Commission in Case No. PU-18-302 (Previous Project). In the development of the Project, Northern Divide Wind applied study results (**Appendix B**) from the Previous Project because a majority of the Project Route remains

[1] On August 29, 2019, NextEra changed the name of Burke Wind, LLC to Northern Divide Wind, LLC, the applicant in this docket. References to Northern Divide Wind herein reflect this update. Corporate paperwork, including documentation of the name change, is being filed with the Commission.

unchanged and was studied under the Previous Project. In redesigning the Project and Wind Energy Center, Northern Divide Wind incorporated the feedback provided on the Previous Project design by the Commission, the North Dakota Game and Fish Department (NDGFD), U.S. Fish and Wildlife Service (USFWS), and other stakeholders. Considering this feedback, Northern Divide Wind redesigned the Wind Energy Center, which resulted in a modification to the northern five miles of the Project Route (**Illustration 1-1**).

1.2 Compliance with the Energy Conversion and Transmission Facility Siting Act

The North Dakota Energy Conversion and Transmission Facility Siting Act requires an application for a Certificate to meet the criteria set forth in N.D.C.C. Section 49-22 and the North Dakota Administrative Code (N.D. Admin Code) Article 69-06. The siting of a transmission facility is to be made in an orderly manner compatible with environmental preservation and the efficient use of resources (N.D.C.C. Section 49-22-02).

Northern Divide Wind will comply with the exclusion and avoidance areas and selection and policy criteria set forth in N.D. Admin Code Section 69-06-08-02 in the design of the Project and has provided information on such areas in this application. In addition, sufficient Project design and technical information have been provided for a thorough evaluation. **Table 1-1** outlines the requirements to fulfill a Certificate and Route Permit application and the application section that addresses the requirement.

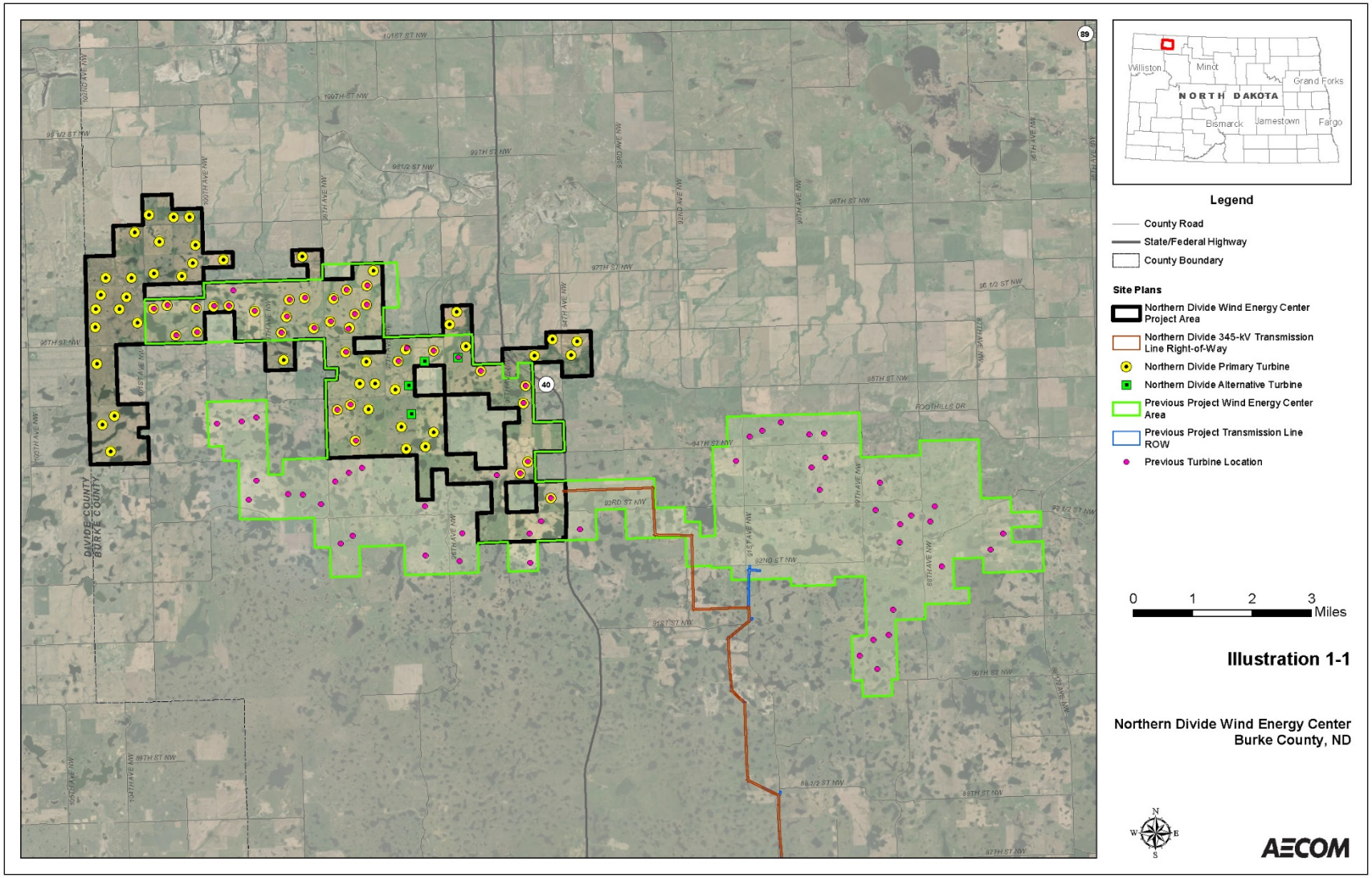


Illustration 1-1 Northern Divide Wind Projects compared to Previous Projects

Table 1-1 Certificate and Route Permit Checklist

Code and Subsection	Description	Section Addressed
N.D. Admin Code 69-06-05-01	**Transmission Facility Permit**	
Subsection 2	**Contents**	
a.	A description of:	
	(1) The type of facility proposed	1.0, 1.2, 2.1
	(2) Purpose of the facility	1.0, 1.2, 2.1
	(3) The technology to be used	4.1
	(4) The type of product to be transmitted	1.0, 1.2, 2.1
	(5) The source of the product to be transmitted	1.0, 1.2, 2.1
	(6) The final destination of the transmission line	1.0, 1.2, 2.1
	(7) The proposed size and design, including: a. Right-of-way width b. Length of the facility c. The span length for electric facilities d. Proposed type of structure for electric facilities e. The voltage for electric facilities f. The requirement for, and location of, any new associated facilities	1.0, 1.2, 1.3, 4.1.1, Appendix D
b.	The anticipated time schedule for accomplishing major events, including:	
	(1) Obtaining the certification of corridor compatibility; (2) Obtaining the route permit; (3) Completing right-of-way acquisition; (4) Starting construction; (5) Completing construction; (6) Testing operations; (7) Commencing operations.	1.4
c.	A copy of each evaluative study or assessment of the environmental impact of the proposed facility submitted to the agencies listed in section 69-06-01-05 and each response received.	Appendix B
d.	An analysis of the need for the proposed facility based on present and projected demand for the product transmitted, including the most recent system studies supporting the analysis of the need.	2.1
e.	A description of any feasible alternative methods for serving the need	2.2
f.	The width of a corridor must be at least ten percent of its length, but not less than one mile [1.61 kilometers] or greater than six miles [9.66 kilometers] unless another appropriate width is determined by the commission.	1.2
g.	A study area that includes a proposed corridor of sufficient width to enable the commission to evaluate the factors addressed in North Dakota Century Code section 49-22-09.	1.2
h.	A discussion of the factors in North Dakota Century Code section 49-22-09 to aid the commission's evaluation of the proposed route.	1.2
i.	A discussion of the applicant's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	1.0, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, Figure 3-1, Figure 5-2, Figure 5-3, Appendix A, Appendix D
j.	Identification and map of the criteria that led to the proposed route location within the designated corridor, including exclusion areas, avoidance areas, selection criteria, policy criteria, design construction limitations, and economic considerations.	3.0, 3.1, 3.2, 3.3, 3.4, 3.5, Figure 1-3, Figure 3-1, Appendix D

Code and Subsection	Description	Section Addressed
k.	A discussion of the relative value of each criteria and how the applicant selected the proposed corridor location, giving consideration to all criteria and how the location, construction, and operation of the facility will affect each criteria.	1.0, 1.2, 2.1
l.	A discussion of the general mitigative measures that the applicant will take to minimize adverse impacts that result from a route location in the proposed corridor and the construction and operation of the facility.	5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3, 5.11.3, 5.12.3, 5.13.3
m.	Qualifications of each person involved in the corridor location study.	9.0
n.	A map identifying the criteria that led to the proposed route location within the designated corridor and the location of any new associated facilities. Several different criteria may be shown on each map depending on the map scale and the density and nature of the criteria.	Figure 1-1, Figure 1-2, Figure 1-3, Figure 1-4, Appendix D
o.	An eight and one-half-inch by eleven-inch black and white map suitable for newspaper publication depicting the site area	Provided on CD
p.	A discussion of present and future natural resource development in the area	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13
q.	Map and GIS requirements. The applicant shall provide information that is complete, current, presented clearly and concisely, and supported by appropriate references to technical and other written material available to the commission.	Figure 1-1, Figure 1-2, Figure 1-3, Figure 1-4, Appendix D
N.D. Admin Code 69-06-08-02	**Transmission facility corridor and route criteria**	
	The following criteria must guide and govern the preparation of the inventory of exclusion and avoidance areas, and the corridor and route suitability evaluation process:	
1.	Exclusion Areas	3.1, Figure 3-1
2.	Avoidance Areas	3.2, Figure 3-1
3.	Selection Criteria	3.3
4.	Policy Criteria	3.4
N.D.C.C. 49-22-08	**Application for a certificate - Notice of filing - Amendment - Designation of a site or corridor.**	
Section 1	**An application for a certificate shall be in such form as the commission may prescribe, containing the following information:**	
a.	A description of the size and type of facility.	1.0, 1.2
b.	A summary of any studies which have been made of the environmental impact of the facility.	5.12, 5.13, Appendix B, Appendix D
c.	A statement explaining the need for the facility.	1.0, 1.2, 2.1
d.	An identification of the location of the preferred site for any energy conversion facility.	1.0, 1.2, 2.1
e.	An identification of the location of the preferred corridor for any transmission facility.	1.0, 1.2, 2.1
f.	A description of the merits and detriments of any location identified and a comprehensive analysis with supporting data showing the reasons why the preferred location is best suited for the facility.	1.0, 1.2, 2.1
g.	A description of mitigative measures that will be taken to minimize all foreseen adverse impacts resulting from the location, construction, and operation of the proposed facility.	5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3, 5.11.3, 5.12.3, 5.13.3

Code and Subsection	Description	Section Addressed
h.	An evaluation of the proposed site or corridor with regard to the applicable considerations set out in section 49-22-09 and the criteria established pursuant to section 49-22-05.1.	1.2, 3.0, 3.1, 3.2, 3.3, 3.4
i.	Such other information as the applicant may consider relevant or the commission may require.	3.5
N.D.C.C. 49-22-08.1	**Application for a permit - Notice of filing - Amendment - Designation of a route.**	
Section 1	An application for a route permit for a transmission facility within a designated corridor shall be filed no later than two years after the issuance of the certificate and shall be in such form as the commission may prescribe, containing the following information:	
a.	A description of the type, size and design of the proposed facility.	1.0, 1.2, 2.1
b.	A description of the location of the proposed facility.	1.0, 1.2
c.	An evaluation of the proposed route with regard to the applicable considerations set out in section 49-22-09 and the criteria established pursuant to section 49-22- 05.1.	1.2
d.	A description of mitigative measures that will be taken to minimize all foreseen adverse impacts resulting from the location, construction, and operation of the proposed facility.	5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3, 5.11.3, 5.12.3, 5.13.3
e.	A description of the right-of-way preparation and construction and reclamation procedures.	1.2, 4.2, 4.2.1, 4.1.2, 4.2.3
f.	A statement setting forth the manner in which:	
	(1) The utility will inform affected landowners of easement acquisition, and necessary easement conditions and restrictions.	1.3, 1.4, 2.2, 3.0, 3.3, 3.4, 4.2.1
	(2) The utility will compensate landowners for easements, without reference to the actual consideration to be paid.	1.3, 1.4, 4.1.2
g.	Such other information as the utility may consider relevant or the commission may require.	3.5
N.D.C.C. 49-22-09	**Factors to be considered in evaluating applications and designation of sites, corridors, and routes.** The commission shall be guided by, but is not limited to, the following considerations, where applicable, to aid the evaluation and designation of sites, corridors, and routes:	
1.	Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	5.1.3, 5.2.3, 5.3.3, 5.4.3, 5.5.3, 5.6.3, 5.7.3, 5.8.3, 5.9.3, 5.10.3, 5.11.3, 5.12.3, 5.13.3, 8.1
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	8.2
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility.	8.3
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.	8.4
5.	Alternatives to the proposed site, corridor or route which are developed during the hearing process and which minimize adverse effects.	2.2, 8.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	5.9, 5.10, 5.11, 5.12, 5.13,8.6
7.	The direct and indirect economic impacts of the proposed facility.	5.1, 5.2, 5.8, 5.9, 8.7
8.	Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	8.8
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	3.1, 5.7, 5.8, 8.9

Code and Subsection	Description	Section Addressed
10.	The effect of the proposed site or route on areas which are unique because of biological wealth or because they are habitats for rare and endangered species.	5.12,5.13, 8.10
11.	Problems raised by federal agencies, other state agencies, and local entities.	6.0, 8.12, Appendix C

1.3 Project Summary

The Project is located in Burke and Mountrail Counties in northwestern North Dakota, a primarily rural, agricultural area located approximately one mile west of Powers Lake, two miles northwest of White Earth, three miles east of Tioga, three miles east of Battleview, and 10 miles south of Columbus. The Project runs in a north-south direction and is approximately 41 miles long, with 23 miles in Burke County and 18 miles in Mountrail County. The Project begins with a connection to the Wind Energy Center collection substation in Burke County and terminates at the interconnection point at the Tande Substation in Mountrail County (**Figure 1-1**). The Wind Energy Center collection substation is being developed as part of the Wind Energy Center and is not included within this Project. Terms used in this application associated with the Project are defined in **Table 1-2.**

Table 1-2 Project Terms

Term	Definition/Description
Project Route	In accordance with N.D.C.C. Section 49-22-03(11), "Route" means the location of an electric transmission facility within a designated corridor. The Project Route is approximately 41 miles long.
Project Right-of-Way (ROW)	The area around the Project Route where easements were acquired. The Project ROW is the typical easement that will be used during construction and maintained during the life of the Project. The Project ROW is typically 150 feet wide. The Project ROW encompasses the Project Route.
Study Corridor	The Study Corridor analyzed for the Project is one-mile wide (0.5 miles on either side of the Project Route) and encompasses approximately 25,776 acres.

Upon evaluation of the one-mile Study Corridor, Northern Divide Wind seeks a Certificate for a corridor spanning 150 feet in width which is referred to throughout the application as the Project ROW and defined above.

The Project will be sited along existing roads, to the extent possible, to minimize impacts to farming and ranching operations and natural resources. The Project Route, Study Corridor, and ROW are entirely within Burke and Mountrail Counties, North Dakota (**Figures 1-3** and **1-4**). All the land located within the Project ROW is privately owned with the exception of approximately 0.5 miles of North Dakota Department of Trust Land (NDDTL). There are a total of 48 landowners within the Project ROW. Each landowner has signed leases and is participating, with the exception of NDDTL, which will execute a lease after Commission approval (**Figure 1-5**). **Table 1-3** shows the Township, Range, and Sections of the Project Route and Project ROW. **Table 1-4** shows the Township, Range, and Sections of the Study Corridor.

Table 1-3 Project Route and Project ROW Public Land Survey System Subdivisions

County	Township Name	Township	Range	Sections [1]
Burke	Leaf Mountain	161 North	93 West	15-17, 22, 23, 25, 26, 35
	Clearly	160 North	93 West	4, 9, 10, 15, 22, 26, 27, 34, 35
	Colville	159 North	93 West	3, 4, 8, 9, 17, 20, 29, 32-34
Mountrail	Powers Lake	158 North	93 West	3, 4, 9, 10, 15, 21, 22, 27, 28, 33, 34
	Sorkness	157 North	93 West	3, 4, 7 - 9, 18
	White Earth	157 North	94 West	13-15, 20-22, 29

[1] Note that locations within the Project Route and Project ROW may be located within the Section but may not encompass the entire Section.

Table 1-4 Study Corridor Public Land Survey System Subdivisions

County	Township Name	Township	Range	Sections [1]
Burke	Leaf Mountain	161 North	93 West	14-17, 20-23, 25, 26-27, 34-36
	Clearly	160 North	93 West	3-5, 9, 10, 15, 16, 21-23, 26, 27, 34, 35
	Colville	159 North	93 West	2-5, 8-10, 16, 17, 20, 21, 28, 29, 32-34
Mountrail	Powers Lake	158 North	93 West	3-5, 9, 10, 14-16, 21-23, 27, 28, 33, 34
	Sorkness	157 North	93 West	3-10, 17, 18
	White Earth	157 North	94 West	10-17, 20-23, 28, 29

[1] Note that locations within the Study Corridor may be located within the Section but may not encompass the entire Section.

1.4 Project Impact Assumptions

The Project is located in the area in which Northern Divide Wind has negotiated easements with landowners. Permanent impacts are those required for Project operation, consisting mostly of individual structure locations. Temporary impacts are those impacts that result during construction to accommodate equipment and temporary activities outside of the areas that will remain as the permanent Project footprint during operation (**Table 1-5**).

Table 1-5 Estimated Project Ground Disturbing Impacts

Project Component	Assumptions	Impact Multiplier [1]	Permanent Impact (acres)	Temporary Impact (acres)
Monopole transmission poles (direct embed)	Permanent: 5-foot radius poles/pole foundations = 78.54 sq. ft. per pole = 0.0018 acres Temporary: Up to 50-foot radius around poles for construction work area = 7.854 sq. ft. = 0.18 acres	265 transmission support poles	0.477	47.7
Monopole transmission poles (drilled shaft foundation)	Permanent: 10-foot radius poles/pole foundations = 314.16 sq. ft. per pole = 0.0072 acres Temporary: Up to 50-foot radius around poles for construction work area = 7,854 sq. ft. = 0.18 acres	14 transmission support poles	0.101	2.5
Transmission support anchors	Permanent: 0.75-foot radius anchor foundation = 1.77 sq. ft. per anchor = 0.000041 acres Temporary: Up to 20-foot by 20-foot radius around guy anchors for construction work area = 400 sq. ft. = 0.01 acres	276 transmission support anchors	0.011	2.8
Access roads	Permanent: None Temporary: 15 feet wide	13.4 miles of access roads	None	24.5
Wire stringing, pulling and tensioning sites	Permanent: None Temporary: 1 acre per pulling site	23 pulling sites	None	23.0
		Totals (acres) [2]	**0.589**	**100.5**

[1] The number of poles is based on preliminary engineering design and could change during final design.
[2] Total impact areas may overestimate actual impacts. These totals reflect conservative, scenarios.

1.5 Project Schedule

Key schedule milestones include:

1. **Certificate and Route Permit**: Requested by May 2020.

2. **Land Acquisition**: All land easement agreements have been completed with the exception of NDDTL, which will be leased after Project approval from the Commission.

3. **Equipment Procurement, Manufacture and Delivery**: Ordering of long-lead equipment is in progress.

4. **Construction**: Anticipate construction activities running approximately 6 months from May through October 2020.

5. **Test and Operations**: Anticipate beginning in November 2020.

6. **Commercial Operation**: Anticipated by the end of November 2020.

7. **Expansions or Additions:** Northern Divide Wind has no plans for expansions or additions to the Project.

1.6 Project Ownership

Northern Divide Wind will own the entire Project and, as a result, will manage the construction of all equipment and associated facilities. Northern Divide Wind has selected a third-party EPC contractor to perform construction.

2.0 NEED FOR FACILITY

2.1 Need Analysis

The need for the Project is driven by the need for the planned Wind Energy Center and the preferred point of interconnection. The Wind Energy Center substation was located to minimize power loss from the collection system in order to allow for efficient collection of generated power from the turbines. The point of interconnection is located at the southern terminus of the Project at the Tande Substation. Due to the size of the Tande Substation the Project is required to connect at a capacity of 345-kV.

Northern Divide Wind executed a 30-year PPA with Basin Electric for the Project in October 2016. The Tande Substation was constructed in 2017 to meet regional electricity demands, primarily from ongoing oil and gas activities in the Bakken, and to meet electric transmission reliability standards in accordance with the requirements of the North American Electric Reliability Corporation. Preliminary Basin Electric interconnection studies determined that Tande Substation was the optimized point of interconnection based on the Project's proximity.

2.2 Alternatives

Northern Divide Wind identified the point of interconnection at the Tande Substation based on Basin Electric's interconnection studies and the Wind Energy Center's load injection needs. There is no existing infrastructure that could connect the Wind Energy Center to existing transmission. The location of the Wind Energy Center was identified as an optimal site from wind resource, transmission, landowner participation, economic, and environmental perspectives. Therefore, there is no feasible alternative method to serving the facility need. The Project Route is the most viable alternative based on landowner preferences, adjacent to existing public roads or section lines, and it is the most direct route that also minimizes impacts on the exclusion, avoidance, selection, and policy criteria identified in N.D. Admin Code Section 69-06-08-02.

2.3 Ten-Year Plan

Northern Divide Wind will file a Ten-Year Plan for the Wind Energy Center with the Commission in compliance with N.D.C.C. Section 49-22-04.

3.0 SITE SELECTION CRITERIA

Northern Divide Wind has secured voluntary agreements with all landowners along the Project Route. The Project Route was also identified based on site inspection, topographic maps, known environmentally sensitive areas, review of Burke and Mountrail Counties and state transmission line requirements, and communications with local, state, and federal agencies. NextEra subsidiaries have used a similar siting process in developing past transmission line projects in North Dakota. Through this process, NextEra subsidiaries address environmental issues that commonly arise during project development and work within the parameters of local, state, and federal requirements. North Dakota has several site selection criteria that are considered by the Commission to determine suitability of the transmission line. Northern Divide Wind has reviewed the criteria in N.D. Admin Code Chapter 69-06-08 and has considered these criteria in Project design. These criteria are discussed in this section.

The location of the Wind Energy Center was identified as an optimal site for wind resources, landowner participation, and economic and environmental perspectives. The Project Route is derived largely from the location of the Wind Energy Center and Basin Electric's preferred point of interconnection at the Tande Substation, as well as landowner cooperation and favorable environmental conditions.

3.1 Exclusion Areas

In accordance with N.D. Admin Code Section 69-06-08-02(1), which implements N.D.C.C. Section 49-22-05.1, the geographical areas listed in **Table 3-1** must be excluded in the consideration of a transmission facility route. Exclusion and avoidance areas may be located within a corridor, but at no given point can such an area or areas encompass more than 50 percent of the corridor width unless there is no reasonable alternative. N.D. Admin Code Section 69-06-08-02 further specifies that a buffer zone of a reasonable width to protect the integrity of the area must be included. Natural screening may be considered in determining the width of the buffer zone. **Figure 3-1** depicts the exclusion areas.

Table 3-1 Exclusion Areas

Exclusion Area	Description if Present in or Applicable to the Project	Section Addressed
Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas.	Not applicable	5.6, 5.7, 8.8, 8.9
Designated or registered state: parks; historic sites; monuments; historical markers; archaeological sites; and nature preserves.	Archaeological sites, as identified through a Class I Literature Search and a Class III Cultural Resources Inventory are present in the Project ROW, which the Project will avoid.	5.6, 5.7, 8.8, 8.9, Figure 3-1[1]
County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions.	Not applicable.	5.7, 8.8
Areas critical to the life stages of threatened or endangered animal or plant species.	Not applicable.	5.12, 5.13, 8.10
Areas where animal or plant species that are unique or rare to this state will be irreversibly damaged.	Not applicable.	5.12, 5.13, 8.10
Areas within 1,200 feet of the geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.	The Project complies.	Table 3-5

Exclusion Area	Description if Present in or Applicable to the Project	Section Addressed
Areas within 30 feet on either side of a direct line between ICBM launch or launch control facilities to avoid microwave interference.	The Project Complies.	Table 3-5

[1] Known archaeological sites are not depicted on **Figure 3-1** due to confidentiality.

3.2 Avoidance Areas

In accordance with N.D. Admin Code Section 69-06-08-02(2), the geographical areas listed in **Table 3-2** cannot be approved as a site for routing of a transmission facility unless the applicant shows that, under the circumstances, there is no reasonable alternative. N.D. Admin Code Section 69-06-08-02(2) further requires a buffer zone of a reasonable width to protect the integrity of the area. Natural screening may be considered in determining the width of the buffer zone. As with exclusion areas, most categories of avoidance areas are not present in the Study Corridor. Avoidance areas are mapped for the Study Corridor on **Figure 3-1**.

Table 3-2 Avoidance Areas

Avoidance Areas	Description if Present in or Applicable to the Project	Section Addressed
Designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.	Not applicable.	5.6, 5.7, 8.8, 8.9
Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands.	Not applicable.	5.6, 5.7, 8.8, 8.9
Historical resources which are not specifically designated as exclusion or avoidance areas.	Historic farmsteads and cemeteries are present in the Project ROW, which the Project will avoid.	5.6, 8.9
Areas which are geologically unstable.	Not applicable.	5.9
Within 500 feet of a residence, school, or place of business.	In accordance with N.D.C.C. Section 49-22-05.1(3), Northern Divide Wind has obtained a written waiver from the owner of the one residence located within 500 feet from the outermost portion of the transmission line facility to the nearest point of the applicable feature.	5.1, Figure 3-1, Appendix D
Reservoirs and municipal water supplies.	Not applicable.	5.3, 5.10, 5.11
Water sources for organized rural water districts.	Not applicable.	5.3, 5.10, 5.11
Irrigated land.	Not applicable.	5.8
Areas of recreational significance which are not designated as exclusion areas.	Not applicable.	5.7

3.3 Selection Criteria

In accordance with N.D. Admin Code Section 69-06-08-02(3), a site can be approved in an area only when the applicant demonstrates to the Commission that any significant adverse effects resulting from the location, construction, and operation of the facility in that area, as they relate to the criteria listed in **Table**

3-3, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum.

Table 3-3 Selection Criteria

Selection Criteria	Potential Effects	Section Addressed
The impact upon agriculture:		
Agricultural production	Negligible/minimal effect anticipated. Landowners will be compensated through an easement payment for loss of agricultural production. Only land needed during operations will be permanently affected. Temporarily disturbed areas will be restored as practicable.	5.2, 5.8, Figure 5-1
Family farms and ranches	Negligible/minimal effect anticipated. Transmission lines are a compatible use with existing family farms and ranches and will not displace any farms or ranches.	5.8
Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation	No effect anticipated. Participating landowners have not expressed concerns related to economically suitable irrigation on their land. No irrigation is occurring within the Study Corridor.	5.9
Surface drainage patterns and ground water flow patterns	No effect anticipated. Project infrastructure will avoid impacts to surface waters and will be designed in such a manner that runoff from the upper portions of the watershed can flow unrestricted to the lower portion of the watershed.	5.10, 5.11, Figure 5-3
The impact upon:		
Sound-sensitive land uses.	Negligible/minimal effect anticipated. Following construction, there will be a minimal amount of sound from the Project as a result of corona effects, which occur when air molecules near conducting wire are ionized due to changes in the electric field intensity at the conductor surface. The sound is most noticeable when conductors are wet as a result of precipitation.	5.5
The visual effect on the adjacent area.	Negligible/minimal effect anticipated. The Project will be visible to landowners and travelers along roadways. Existing transmission lines, oil and gas well pads, and associated access roads are present in the viewshed.	1.2
Extractive and storage resources.	No effect anticipated.	N/A
Wetlands, woodlands, and wooded areas.	Negligible/minimal effect anticipated. The Project will avoid direct impacts to all wetlands. Trees/shrubs will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications.	4.2, 5.11, Figure 5-1, Figure 5-3, Appendix D
Radio and television reception, and other communication or electronic control facilities.	No effect anticipated.	5.3

Selection Criteria	Potential Effects	Section Addressed
Human health and safety.	No effect anticipated based on compliance with sound standards and design and construction standards to meet or exceed the National Electrical Safety Code. Regular maintenance and inspections will be performed during the life of the Project to ensure its continued integrity.	5.4
Animal health and safety.	No effect anticipated. Construction work will be coordinated with landowners to avoid impacts to livestock. Northern Divide Wind will implement a Wildlife Response and Reporting System the Project is complete.	5.8, 5.12
Plant life.	Negligible/minimal effect anticipated. The Project will result in less than one acre of permanent ground disturbance, including loss of the existing plant populations. Trees/shrubs will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications. Temporarily disturbed areas will be restored as practicable.	4.2, 5.2, Figure 5-1

3.4 Policy Criteria

In accordance with N.D. Admin Code Section 69-06-08-02(4), the Commission may give preference to an applicant that will maximize benefits that result from the adoption of the policies and practices listed in **Table 3-4** and may require the adoption of such policies and practices as appropriate.

Table 3-4 Policy Criteria

Policy Criteria	Potential Benefits	Section Addressed
Location and design.	Northern Divide Wind commits to minimize and mitigate environmental impacts, following the National Electrical Safety Code requirements and policies, designing the system to efficiently transfer electricity, ensuring worker and public health and safety, and constructing facilities to most effectively and efficiently meet its delivery obligations.	1.0, 1.2, 4.1, Figure 4-1, Figure 4-2, Appendix D
Training and utilization of available labor in this state for the general and specialized skills required.	Northern Divide Wind has utilized several local firms in developing the Project and compiling this application and will continue to use local labor to the extent practicable.	5.1
Economies of construction and operation.	Northern Divide Wind will utilize local contractors to the extent practicable.	5.1
Use of citizen coordinating committees.	Not applicable.	5.1
A commitment of a portion of the transmitted product for use in this state.	Basin Electric Power Cooperative will purchase the energy from the Project's associated wind energy center for 30 to serve their customers, which are in 9 states, including North Dakota.	1.2, 2.1
Labor relations.	Not applicable.	5.1
The coordination of facilities.	Existing facilities were considered in the location of the Project. Northern Divide Wind will avoid impacts to existing infrastructure, other than interconnecting to Tande Substation.	1.2, 2.1

Policy Criteria	Potential Benefits	Section Addressed
Monitoring of impacts.	Northern Divide Wind and the EPC contractor will employ best management practices during construction to monitor soil impacts and segregate topsoil. A stormwater pollution prevention plan will be prepared for the Project.	4.2
Utilization of Project ROW and Project Corridor.	Northern Divide Wind has routed the Project parallel to existing roadways and section lines to the extent practicable.	1.2
Other existing or proposed transmission facilities.	Northern Divide Wind is open to utilizing or paralleling existing utility ROWs when siting transmission routes, as practicable.	1.2, 2.1

3.5 Setback Requirements

The setbacks used in designing the Project comply with or exceed those required by the Commission. Setbacks were measured from the outermost portion of the transmission line facility to the nearest point of the applicable feature. The Project complies with or exceeds the following transmission line corridor and route criteria exclusion and avoidance areas provided in N.D. Admin Code Section 69-06-08-02(1)-(2). **Table 3-5** lists the setbacks utilized in designing the Project.

Table 3-5 Setback Distances as Designated by the Commission

Setback Type	Setback Distance
The geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.	1,200 feet
Areas on either side of a direct line between ICBM launch or launch control facilities to avoid microwave interference.	30 feet
Residence, school, or place of business.	500 feet [1]

[1] Per NDCC 49-22-05.1(2), the residence setback may be waived in writing by the owner of the residence.

Table 3-6 Setback Distances as Designated by Burke and Mountrail Counties

Setback Type	Setback Distance
Burke County	
From all section lines and the centerline of all township and county roads.	150 feet
From the centerlines of all federal and state highways.	250 feet
Mountrail County	
From all section lines and the centerline of all township and county roads.	150 feet
From the centerlines of all federal and state highways.	250 feet

3.6 County Criteria

The Burke County Commission approved the Burke Wind Conditional Use Permit (CUP) and Zoning Request for the Previous Project on September 4, 2018. The Burke County Planning and Zoning Board and County Commission approved Northern Divide Wind's request for a Zoning Request and CUP amendment to the Project on November 19, 2019.

4.0 ENGINEERING AND OPERATIONAL DESIGN ANALYSIS

4.1 Project Layout and Associated Facilities

4.1.1 Transmission Line Design

The Project will consist of 279 steel monopole structures and associated wires (*e.g.,* electric conductors, shield wires, fiber optics). The structure height will range from 90 to 180 feet (120-foot average) (**Figure 4-1**), meeting minimum conductor-to-ground clearance as required by National Electrical Safety Code (NESC) rules. Final engineering design will determine specific structure heights in order to maintain NESC clearances at the lowest point of conductor sag for all normal operating conditions. Clearances may be increased to account for site-specific situations.

Structure foundation types include 265 direct embed and 14 drilled shaft, with both types ranging from 15 to 50 feet deep and 6 to 15 feet in diameter. Structure spans will range from 350 to 1,350 feet (775-foot average) (**Appendix D**). Structure placement depends on site-specific considerations, including geological, environmental, and engineering constraints identified during final design. Currently, all proposed structure locations avoid sensitive areas such as aquatic, biological, cultural, and tribal resources, and will generally be placed at the edges of farm fields to avoid disruption to agricultural practices.

Of the 279 structures, 55 are turning structures: 26 dead-end with eight guys per structure, two light-angle with four guys per structure, 15 medium-angle with four guys per structure, nine self-supporting dead-ends (no guys), and three self-supporting medium angles (no guys) (**Figure 4-2**). Specialty structures and foundations may be required in certain circumstances. Other hardware that is not associated with the transmission of electricity includes aerial marker spheres, bird flight diverters, and other equipment to avoid and reduce bird mortality.

The Project includes a shield wire strung at the top of the structures to provide lightning protection. The shield wire is bundled with a fiber optic cable that forms part of the Project communications system, allowing for monitoring and remote control of interconnection facility components. Bird flight diverters will be mounted to the shield wire per Avian Power Line Interaction Committee (APLIC) guidelines.

4.1.2 Project Access

Northern Divide Wind will use existing access, including public and private access to the maximum extent possible. Where existing access is unavailable, temporary access roads will be utilized to access areas where there are environmental constraints between structures limiting access or where structures are not located adjacent to existing roads. All access roads avoid aquatic, biological, cultural, and tribal resource constraints and any changes made to temporary access roads during construction will be surveyed. Temporary access will only be as wide as needed and construction will predominantly take place when the ground is dry and hard enough to support construction equipment with no improvements, but occasionally timber mats may be required. Generally, little to no grading or vegetation clearing will be required.

4.2 Project Construction

Structures will be installed at existing grades. Therefore, structure locations will not be graded or leveled, unless it is necessary to provide a reasonably level area for construction crews and equipment, such as auger trucks, cranes, and other installation vehicles (*e.g.*, bucket trucks, stringing, and clipping trucks). Some structure locations may require soil analysis for the purpose of determining soil properties for engineering analysis. An experienced geotechnical testing laboratory will perform the sampling and analysis. The geotechnical drill rig will need access to the test sites and will avoid identified environmental constraint areas.

Temporary ground disturbance will occur during the setting of structures and support anchors. These disturbances will occur during the boring of the hole used for setting the structure and support anchor. Support anchors will extend into the subsurface and be approximately 0.75-foot in radius. Boring equipment will be used to facilitate the installation of the transmission foundation. Soil removed during boring activities will be spread around the base of the structure.

Boring equipment will be used to facilitate the installation of transmission foundations. The foundations will be constructed of reinforced concrete with prefabricated anchor bolt cases placed in the boreholes. Soil removed during boring activities will be sloped around the structure after installation or in adjacent upland areas. Approximately 150 cubic yards of concrete will be required per drilled shaft foundation with the large majority of the structures directly embedded.

The most noticeable impact on the Project Route will be land disturbance in the area of transmission structure construction to allow adequate room for operation of equipment. Following the structure installation, the disturbed area will be groomed and seeded, including replacement of trees and herbaceous vegetation off the ROW. Where practicable, trees and low-growing vegetation will not be removed if future growth will not interfere with the operation or maintenance of the line. There may be limited use of herbicides to remove or control the growth of vegetation in some areas. Herbaceous and smaller woody plants will not be disturbed, except for those that will be crushed unavoidably during structure installation. During operations, vegetation will be monitored regularly and trimmed so that it does not exceed safety provisions. The Project will be constructed to maintain minimum conductor-to-ground clearance as required by the NESC.

After structures have been erected, conductors will be installed by establishing stringing setup areas within the ROW. These stringing setup areas will be located approximately every three to four miles along the route. Conductors will be installed between setup areas using a “controlled tension method,” which ensures that the cable comes off the reel at a constant tension without backlashes. Conductor stringing operations will also require brief access to each structure to secure the conductor wires to the insulators or shield wire clamps once final line sag is established.

Stringing equipment generally consists of wire pullers, tensioners, conductor reels, shield wire reels, and stringing blocks. Stringing operations consist of pulling lightweight cables or ropes through the stringing sheaves located at every structure site. This cable or rope will be used to pull the conductors through the sheaves under sufficient tension to keep the conductor from coming into contact with the ground. Temporary guard or clearance poles will be installed over existing distribution or communication lines, streets, roads, highways, railways, or other obstructions after any necessary notifications are made and/or permits are obtained. This ensures that conductors will not obstruct traffic or come into contact with existing energized conductors or other cables and protects the conductors from damage. Once a section of a line has been installed, temporary structures will be removed, holes backfilled, and the area of disturbance reseeded to produce the same cover that was removed.

Debris associated with transmission line construction may include construction materials such as packaging material, insulator crates, conductor reels, and wrapping. This debris may also include excess excavated soil and removed vegetation. Materials with salvage value, including conductor reels, unused conductor and hardware, structures, and other materials, will be removed from the site for reuse. Excess soil and vegetation will be spread across uplands in the ROW. Solid waste will be temporarily stored within the ROW and then transported to appropriate disposal facilities. Debris will be disposed of in accordance with local, state, and federal regulations.

Temporary staging areas will be located within the ROW and will be limited to the structure site areas for structure laydown and framing prior to structure installation. Disturbed areas will be restored to their original condition to the maximum extent practicable.

Construction tasks include the following:

- Pre-Construction: Environmental surveys, geotechnical analysis, cultural resources surveys, avian surveys, micro-siting, engineering, design, land procurement, various utility studies, and long-lead equipment procurement.
- Surveying: Initial line-survey work, consisting of aerial photography, survey control, route centerline location, profile surveys, and access surveys.
- Structures: Vegetation removal (as needed) and drilling for foundations.
- Delivery and Assembly: Flatbed truck deliveries to installation locations, structure assembly with cranes and bucket trucks, backfill foundation footings with rock and tamp into place to prevent structure movement or settling.
- Wire Installation: Wires will be strung, pulled, and tensioned using heavy, truck-mounted winches that also carry reels of conductor and cable.

Post-construction reclamation activities generally include:

- Cleaning up all construction sites, including removing and properly disposing of debris;
- Removing all temporary facilities, including staging areas;
- Installing appropriate erosion control measures; and
- Reseeding and replacing trees and shrubs as necessary in disturbed areas with vegetation similar to vegetation that was removed and restoring the areas to their original condition to the extent practicable. Trees and shrubs will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications.

4.2.1 Construction Management

The EPC contractor will have primary responsibility for construction management, using the services of local contractors where possible and appropriate, and will undertake the following activities:

- Securing building, electrical, grading, road, and utility permits;
- Performing detailed civil, structural and electrical engineering;
- Scheduling execution of construction activities;
- Forecasting Project labor requirements and budgeting;
- Coordinating and managing the work of all Project subcontractors; and
- Providing direct supervision for the installation of all Project components including foundations, structures, insulators and conductors, and interconnection equipment.

Construction activities under the EPC's supervision will generally consist of:

- Project development;
- Foundation excavation;
- Concrete foundation installation;
- Electrical and communications equipment installation;
- Transmission line assembly and erection;
- System testing; and
- Restoration of temporary impact areas.

Throughout the construction phase, ongoing coordination will occur between Northern Divide Wind and the EPC. The EPC's on-site Project construction manager will help to coordinate ongoing communication with local officials and landowners. Northern Divide Wind, the EPC construction manager, and the O&M staff manager will work together to ensure a smooth transition from construction through Project commissioning and operation.

4.2.2 Commissioning

The Project will be commissioned after completion of the construction phase and detailed inspection and testing. Inspection and testing will occur for each component of the Project.

4.2.3 Operation and Maintenance

The Project will operate in conjunction with the Wind Energy Center and be monitored through the Supervisory Control and Data Acquisitions (SCADA) system located at the Wind Energy Center O&M building. Project O&M will consist of continuous remote monitoring and regular on-site inspections and as maintenance is needed.

5.0 ENVIRONMENTAL ANALYSIS

5.1 Socioeconomics

5.1.1 Description of Resources

Burke County had a population of 1,968 in 2010, with an estimated 6.7 percent increase in 2018 for an estimated total population of 2,100 in 2018 (U.S. Census Bureau 2018a). The County contains 1,129 square miles of land, with a density of approximately 2.0 persons per square mile. As of 2018, it is estimated that approximately 20.8 percent of the county population is 65 years or older, while approximately 8.3 percent of the population is under 5 years of age.

Mountrail County had a population of 7,673 in 2010, with an estimated 33.3 percent increase in 2018 for an estimated total population of 10,218 in 2018 (U.S. Census Bureau 2018b). The County contains 1,825 square miles of land, with a density of approximately 4.2 persons per square mile. As of 2018, it is estimated that approximately 15.3 percent of the county population is 65 years or older, while approximately 8.5 percent of the population is under 5 years of age.

Recent oil and gas development activity has had a large impact on the local economy. Burke County ranks eighth in barrels of oil produced per county in North Dakota with 295,916 barrels produced in August 2019 (NDDMR 2019b) and ranks sixth in cubic feet of gas produced with 771,270 thousand cubic feet produced in August 2019 (NDDMR 2019c). Mountrail County ranks third in barrels of oil produced per county in North Dakota with 7,257,683 barrels produced in August 2019 (NDDMR 2019b) and ranks fourth in cubic feet of gas produced with 11,808,048 thousand cubic feet produced in August 2019 (NDDMR 2019c).

Agriculture continues to play a significant role in the Burke and Mountrail County economies with 488 and 584 farms, respectively (USDA, NASS 2017). According to the 2017 Census of Agriculture, total market value of agricultural products produced in Burke County was $71,578,000 (85% crops and 15% livestock sales), and in Mountrail County was $135,742,000 (78% crops and 22% livestock sales). Principal crops include wheat, barley, oats, corn, and soybean; cattle the primary livestock.

5.1.2 Impacts

The Project will have positive economic impacts for the local population, including lease and royalty payments for participating landowners, employment, and property and sales tax revenue. No residents will be displaced.

Northern Divide Wind estimates that the Project along with the Wind Energy Center will provide over $30 million in tax revenue to Burke and Mountrail Counties over 30 years. In addition, the Project and Wind Energy Center will create approximately 200 to 300 temporary construction jobs and five to seven full-time O&M jobs.

Landowner compensation has been established under individual lease agreements and includes compensation for crop damage during surveys and construction. In general, agricultural areas surrounding each structure can still be farmed. In addition, in an environment of uncertain and often declining agricultural prices and yields, the supplemental income provided to farmers is expected to provide stability to farm incomes and thus will help assure the continued viability of farming in the Study Corridor. Project construction will not cause additional impacts to leading industries within Burke and Mountrail Counties. There is no indication that any minority or low-income population is concentrated in any one area of the Project, or that the Project will be placed in an area occupied primarily by any minority or low-income group.

In addition, wages and salaries paid to local contractors and workers in Burke and Mountrail Counties will contribute to the personal income of the region. Additional personal income will be generated for residents in the counties as well as the state by circulation and recirculation of dollars paid out by the applicant as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies, and other products and services will benefit businesses in the counties and the state.

It is likely that general skilled labor is available either in the counties or the state to serve the basic infrastructure and site development needs of the Project. Specialized labor will be required for certain components of the Project. It is likely that this labor will be imported from other areas of the state or from other states, as the relatively short duration of construction does not warrant special training of local or regional labor. Balancing the use of local contractors and imported specialized contractors will likely alleviate any labor relations issues.

No effects on permanent housing are anticipated. During construction, out-of-town laborers will likely use lodging facilities in and around the cities of Tioga and Stanley. Most full-time O&M employees are expected to reside locally. Sufficient permanent housing is available within Burke and Mountrail Counties to accommodate these new employees.

Long-term beneficial impacts to the counties' tax base as a result of the construction and operation of the Project will contribute to improving the local economy in this area of North Dakota. The development of wind energy in this region has been important in diversifying and strengthening the economic base of North Dakota. In addition, North Dakota as an important producer of renewable energy, such as wind, has spurred the development of wind-related businesses in the area and contributes to economic growth in the state; there are four wind energy-related manufacturing facilities in North Dakota (AWEA 2019).

5.1.3 Mitigative Measures

Socioeconomic impacts will be primarily positive, with an influx of wages and expenditures made at local businesses during construction and an increase in the Counties' tax base due to construction and an increase in the counties' tax base due to taxation of transmission infrastructure. In addition, the lease payments paid to landowners will offset potential financial losses associated with removing land from agricultural production.

5.2 Land Use and Vegetation

5.2.1 Description of Resources

The Study Corridor is located in rural North Dakota in an area predominantly comprised of cultivated land, hayfields, pasturelands, and grasslands. Accordingly, much of the Study Corridor is utilized for agriculture supporting both livestock grazing and crops. The Study Corridor is not within any city limits or within an area of any known military installments. Wooded areas within the Study Corridor are limited to shelterbelts between fields, windbreaks surrounding farmsteads, along drainages, and near wetlands.

A desktop land use classification was completed using current and historical Google Earth aerial imagery (Google Earth 2019) and North Dakota statewide historical imagery from 1957- 1962, 1995-1998, 2003-2006, 2009, 2010, 2012, and 2014-2018 (ND GIS Hub 2019). Parcels of land were classified based on features such as rock piles indicating extensive mechanized rock clearing; presence and amount of trees and shrubs; field edge changes; absence of scattered rocks; straight line features indicating plowing, disking, harvesting, or planting; or any other features indicating human disturbance. Land use was grouped into six different categories and each category was defined as follows:

1. Cropland: parcels of land that are currently being used for agricultural crop production.
2. Broken Grassland: grassland where the soil has been historically disturbed by tilling, construction, or other mechanical methods.

3. Unbroken Grassland: grassland where the soil has not been disturbed by tilling, construction, or other mechanical methods. Native prairie is considered unbroken grassland. Areas used as pasture and hayland that have not been cultivated are also considered unbroken grassland (*e.g.*, cultivated or extensive mechanized rock clearing) are also considered unbroken grassland.
4. Tree Row: deliberately planted tree rows.
5. Forest/Shrubland: native forested areas that were not deliberately planted and areas predominantly vegetated with shrubs.
6. Existing infrastructure: residences, farmsteads, oil well pads.
7. Wetland: wetlands and other surface waters such as ponds and streams.

Once land cover features were evaluated, Google Earth and geographic information system (GIS) mapping software were used to produce a digital data layer of polygons delineating the land use. See **Table 5-1** below for the land use within the Project ROW. Unbroken grasslands and other land uses are presented **Figure 5-1**.

Table 5-1 Land Use Classification within the Project ROW

Land Cover	Acreage within Project ROW [1]	Percentage of Project ROW [1]	Acres Permanently Impacted by Project Infrastructure
Cropland	328	44%	0.28
Unbroken Grassland	280	38%	0.25
Wetland	72	10%	0.00
Broken Grassland	46	6%	0.03
Existing Infrastructure	10	1%	0.01
Forest/Shrubland	8	<1%	0.01
Tree Row	<1	<1%	0.00

[1] Rounded to the nearest whole number.

The USFWS manages lands including their easements within the Project ROW (**Figure 5-2; Appendix D**). These easements are agreements between landowners and the USFWS to protect wetlands and grasslands that are vital to wildlife habitat. The USFWS owns the perpetual rights to certain wetland basins within wetland easements that 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. USFWS easements were provided from the USFWS Crosby Wetland Management District for the Study Corridor. Within the Project ROW there are approximately 29 acres of wetland easements and 12 acres of grassland easements. Northern Divide Wind will not place infrastructure or have any temporary impacts on any USFWS easements. Within the Project ROW there are no National Wildlife Refuges (NWR) and no Waterfowl Production Areas (WPA). The nearest NWR is the Lostwood NWR, which is located approximated 6.5 miles from the Project Route.

The NDGFD holds Private Land Open to Sportsmen (PLOTS) agreements with private landowners within the Project ROW and allows walk-in public hunting access to otherwise private land. Normal farming and ranching activities are allowed in these PLOTS agreements. There are approximately 26 acres within the Project ROW and nine structures located within enrolled PLOTS agreements (**Figure 5-2**; **Appendix D**). The PLOTS agreement will be negotiated between the individual landowner and the NDGFD. PLOTS agreements are subject to change on an annual basis.

Conservation Reserve Program (CRP) lands are administered by the Farm Service Agency (FSA) through the U.S. Department of Agriculture (USDA). In exchange for yearly compensation, CRP lands are removed from agriculture production and planted with species that will improve environmental quality and health, with a long-term goal of establishing valuable land cover to improve water quality, prevent soil erosion,

and reduce the loss of wildlife habitat (USDA, FSA 2019). Specific CRP acres are subject to privacy laws between each landowner and the FSA. Any land taken out of CRP will be negotiated between the individual landowner and the FSA.

There are 13 state noxious weeds: absinth wormwood (*Artemisia absinthium*), Canada thistle (*Cirsium arvense*), dalmatian toadflax (*Linaria genistifolia*), diffuse knapweed (*Centaurea diffusa*), houndstongue (*Cynoglossum officinale*), leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), palmer amaranth (*Amaranthus palmeri*), purple loosestrife (*Lythrum salicaria*), Russian knapweed (*Acroptilon repens*), Saltcedar (*Tamarix chinensis, T. parviflora, T. ramosissima*), spotted knapweed (*Centaurea maculosa*), yellow toadflax (*Linaria vulgaris*), and one additional noxious weed listed for Burke and Mountrail Counties, common tansy (*Tanacetum vulgare*) (NDDA 2019).

5.2.2 Impacts

The Project will not result in a significant change in land use. No residences or farms will be displaced due to construction activities. No structures will be located within USFWS easements. Any land taken out of CRP will be negotiated between the individual landowner and the FSA.

5.2.3 Mitigative Measures

The Project will not change the land use in the majority of the Project ROW. The land use will not involve any ongoing industrial use of non-renewable resources or emissions into the environment. Northern Divide Wind will implement the following mitigative measures, to the extent practicable:

- The Project will be sited off of public recreational lands.
- Avoid all direct impacts to USFWS wetland and grassland easements.
- Coordination with local Natural Resources Conservation Service (NRCS) staff to revegetate non-cropland and pasture areas temporarily disturbed during construction with locally sourced native seed mixes appropriate to the region.
- Reseed temporarily disturbed areas or restore to crop, based on the conditions of the area prior to construction and based on landowner preference.
- Develop and implement a noxious weed prevention plan to prescribe methods to prevent and control the spread of noxious weeds during construction of the Project.

5.3 Public Services

5.3.1 Description of Resources

Local Government Services

Within the Study Corridor is a network of established roads and utilities that provide access and necessary services to cities, communities, homesteads, and farms. There are no incorporated or unincorporated cities within the Study Corridor. The Study Corridor is located approximately one mile west of Powers Lake, two miles northwest of White Earth, three miles east of Tioga, three miles east of Battleview, and 10 miles south of Columbus. The county seat of Burke County is Bowbells, and the county seat of Mountrail County is Stanley.

Roads

Roads located within the Study Corridor are State Highway 40, State Highway 50, county roads (gravel graded and drained roads), private roads, township roads, section lines, private roads, oil and gas access roads, and sand and gravel mine access roads. Roads within the Study Corridor fall under the North Dakota Department of Transportation (NDDOT) District Boundary of Williston, North Dakota.

Traffic

The NDDOT supplies annual average daily traffic (AADT) levels for major roadways in North Dakota. The data is used for planning and transportation engineering. The total volume is used to calculate vehicle traffic of major roadways for a year. Existing traffic volumes on roadways are documented in **Table 5-2**. Additional county and township roads run through the Study Corridor, but no vehicle count data are available for these roads. In general, the NDDOT indicates that roads with vehicle counts under 100 AADT are rarely counted and roads with no count data are likely lower than those with count data.

Table 5-2 Existing Daily Traffic Levels

Roadway Segment	Average Daily Traffic	Average Daily Truck Traffic	Year
94th St NW east of State Highway 40	10	5	2017
87th St NW & 93rd Ave NW	30	10	2017
86th St East of 94th Ave	170	-	2013
74th St NW & 92nd Ave NW	155	-	2017
101st Ave NW at railroad crossing	110	25	2014

Source: NDDOT's Transportation Information Map (NDDOT 2019)

Air Traffic

There are no public airports or private airports/airstrips within the Study Corridor. The closest airport/airstrip is the Tioga Municipal Airport southeast of Tioga, North Dakota which is located approximately two miles southwest of the Study Corridor. The nearest airport certified for commercial carrier operations is the Estevan Regional Airport, located in Estevan, Saskatchewan, Canada approximately 31 miles north of the Study Corridor. Existing public and private airports within 25 miles (excluding Canadian airports) of the Study Corridor are documented in **Table 5-3**. Spray planes used for aerial application of pesticides or fertilizer operated by local spray plane operators may occur within the Study Corridor.

Table 5-3 Public/Private Airports

Airport	Type	Direction from the Study Corridor
Columbus Municipal Airport	Public	North
Strom Private Airport	Private	North
Bowbells Municipal Airport	Public	Northeast
Stanley Municipal Airport	Public	Southeast
Tioga Municipal Airport	Public	Southwest
Moen Airport	Private	Southwest

Source: ND GIS Hub Data Portal (ND GIS Hub 2019)

Water Supply

The Western Area Water Supply Authority supplies potable water to communities near the Project Area. Northern Divide Wind will evaluate obtaining water for construction from an on-site water well or obtain water from the cities of Crosby, Bowbells, Stanley, Ross, Tioga, or Wildrose and truck the water to the construction site. Northern Divide Wind will consult with Crosby, Bowbells, Stanley, Ross, Tioga, or Wildrose to obtain the appropriate permits and/or approvals.

Telecommunications

Northern Divide Wind conducted a preliminary telecommunications study to identify all non-federal microwave telecommunication systems within the Study Corridor.

The corona-induced broadband electromagnetic radiation (EMR) from transmission lines can produce interference with some communications signals if there is an overlap in the signal and EMR frequencies. Broadband corona EMR discharge typically occurs in the frequency spectrum from below 100 kilohertz (kHz) to approximately 1,000 megahertz (MHz), which overlaps with the frequencies used for AM and FM radio and some television signals.

5.3.2 Impacts

The Project is expected to have a minimal effect on existing services and infrastructure. The following is a brief description of the impacts that may occur during construction and operation.

Local Government Services

No impact is expected to local services.

Roads

No permanent access roads will be built to construct or maintain the Project. Much of the Project Route is adjacent to existing public roads or section lines and can be accessed with minimal off-road work.

Traffic

There will be a temporary increase in truck traffic during construction activities. Impacts to state highways, county roads, private roads, township roads, section lines, private roads, oil and gas access roads, and sand and gravel mine access roads are considered negligible. Approximately 19 concrete trucks will be required per transmission structure foundation for the 14 structures that utilize drilled shaft foundations. While there may be some noticeable increase in heavy vehicle traffic in discrete locations for limited amounts of time, the capacity of route and level-of-service to the traveling public will be negligible.

Truck access to the Project is provided by adjacent highways to the Study Corridor, which includes State Highway 5, State Highway 40, State Highway 50, and U.S. Highway 2. Roads located within the Study Corridor are county roads (gravel graded and drained roads), township roads, section lines, and State Highway 40. Specific truck routes will be dictated by delivery location. Additional operating permits will be issued by the state or county for over-sized truck movements.

Air Traffic

The Project will not be considered an obstruction to air navigation under Federal Aviation Administration (FAA) regulations. No part of the Project will exceed 200 feet in height above ground level. The Project will include bird flight diverters, which can provide visibility during the day for low flying aircraft.

Water Supply

Construction will not significantly impact local water supply. Construction will require approximately three million gallons of water for foundations, backfill, and compaction and 10-12 million gallons of water for dust control. Construction water estimates are subject to change due to final site investigation and weather. Water for construction will be brought on-site via trucks, most likely from the Western Area Water Supply Authority, the cities of Crosby, Bowbells, Stanley, Ross, Tioga, or Wildrose or via an on-site water well. The abandonment of existing wells is not required. The Project will not require appropriation of surface water or permanent dewatering. Temporary dewatering of groundwater (*i.e.*, locally lowering groundwater levels in the vicinity of the excavation) may be required during construction of transmission structures.

Telecommunications

Existing telephone and fiber optic cables within the Project ROW will be located in the field by the respective utility companies prior to construction to ensure that impacts to telephone and fiber optic cables will be avoided. No impacts to Federal Communications Commission-licensed microwave beam paths are anticipated, because there are no beam paths within the Study Corridor.

With sufficient corona activity, some radio and television interference can be noticeable; however, the radio sound generated by a transmission line is very low in power and interference is generally only experienced in very close proximity to the transmission line. These effects are most pronounced directly underneath the line conductors and decrease with distance from the transmission line. The level of interference with reception of a radio signal also depends on the relative locations of the radio transmitter, the radio receiver, and the transmission line. A transmission line that is directly between a radio transmitter and a listener's receiver may be more likely to interfere with that listener's reception, whereas a transmission line behind or beside the listener in relation to the transmitter will not necessarily cause interference depending on the radio receiver's antenna.

As digital signal processing has been integrated into television and radio receivers, the potential interference impact of corona-generated radio sound has been further reduced. Moreover, the advent of cable and satellite television service, and the federally mandated conversion to digital television broadcast in June 2009 have greatly reduced the occurrence of corona-generated interference. Newer digital television receivers are equipped with systems to filter out interference.

5.3.3 Mitigative Measures

Construction and operation will be in accordance with all applicable local, state, and federal permits and laws, as well as industry construction and operation standards. Due to the minor impacts expected on the existing communications infrastructure during Project construction and operation, additional mitigation measures are not required.

Local Government Services

No impact to local government services is anticipated, and no mitigation is required.

Roads

The capacity of any route and level-of-service to the traveling public will not be affected, and no mitigation is required.

Traffic

Northern Divide Wind is working closely with local landowners to locate temporary access roads in order to minimize land-use disruptions to the extent possible.

Air Traffic

No impact to air traffic is anticipated, and no mitigation is required.

Water Supply

The abandonment of wells is not required. However, in the event wells are abandoned, they will be sealed as required by North Dakota law.

Telecommunications

No impact to telecommunications is anticipated, and no mitigation is required.

5.4 Human Health and Safety

5.4.1 Description of Resources

Long-Range Radar, Weather Radar, Military Training Route, and Special Airspace

AECOM queried the online U.S. Department of Defense (USDOD) Preliminary Screening Tool to obtain a preliminary review of potential impacts to Long Range Radar and Weather Radars, Military Training Routes and Special Airspaces (FAA 2019). The USDOD Preliminary Screening Tool then produces a map relating the structure to any of the USDOD/U.S. Department of Homeland Security (USDHS), and National Oceanic and Atmospheric Administration (NOAA) resources listed above.

Electromagnetic Fields

Power frequency electromagnetic fields (EMF) are created wherever electricity flows. Leading U.S. and international scientific organizations, such as the National Cancer Institute and the World Health Organization, have evaluated EMF research. These organizations generally conclude that overall the body of scientific research does not show that exposure to EMF causes or contributes to any type of cancer or any other disease or illness (NIEHS 1999).

Hazardous Materials/Hazardous Waste

Potential hazards may consist of aboveground storage tanks containing water, brine, condensate, or hydrocarbon mixtures associated with oil/gas development. Other potential hazards may exist in rural areas from farm dumps and agricultural chemicals. A Phase I Environmental Site Assessment (ESA) will be conducted in the Study Corridor prior to construction to identify any recognized environmental conditions that may exist.

Security

The Study Corridor is located in an area that has low population density. Construction and operation of the Project will have minimal impact on the security and safety of the local communities.

5.4.2 Impacts

Long-Range Radar, Weather Radar, Military Training Route, and Special Airspace

The results of the USDOD Preliminary Screening Tool indicated no anticipated impacts to air defense and homeland security radars, impacts are not likely for the Project to weather surveillance radar, and impacts are not likely for three of the four Project location corners for military operations. The southwest corner falls within the confines of Military Training Route (MTR) IR678 (**Appendix B**). The Military Aviation and Installation Assurance Siting Clearinghouse in coordination with the USDOD performed an informal review of the Project and indicated that the Project will have minimal impact on military operations conducted in the area (**Appendix C**).

Electromagnetic Fields

Many studies of EMF have been conducted, but none has identified a cause and effect relationship between EMF exposure and health effects or a mechanism by which EMF could cause disease (NIEHS 1999). No impacts from EMF are expected.

Hazardous Materials/Hazardous Waste

Northern Divide Wind conducted a preliminary, internal Phase I ESA as part of the initial scoping of the Project. The Phase I ESA was conducted in an area larger than the Study Corridor and encompassed the Wind Energy Center. The Phase I ESA identified 26 oil-gas facilities with reportable spill incidents. The spilled materials included crude oil, brine (produced water/saltwater), and drilling mud. Many of these spill

incidents occurred within the earthen containment berm (dike) surrounding the oil and gas facility wellhead and storage tank batteries, but several did release outside the dike and impacted adjacent lands. Review of Incident Summaries, available on the North Dakota Department of Health website, indicated that 24 of the 26 identified spill incidents have been remediated and no further action was required by the regulating agency. The two identified spill incidents that have not been remediated are located within the Study Corridor.

In October 2014, a brine release occurred when a brine pipeline broke at the west edge of the Sequoia 6093 42-34H lease site. The brine that was released flowed toward the east/southeast with the topographic gradient toward the unnamed intermittent creek. The responsible party conducted emergency remedial activities immediately following the brine release. Remediation and monitoring are currently undergoing. The Project was designed to span this release.

In March 2015, 500 barrels (approximately 21,000 gallons) of brine was released from a pipeline located next to the Connie 6093 14-5H oil-gas well. The brine was reported to have discharged to the adjacent pasture and into a slough potentially impacting surface water quality and wildlife. During the subsequent months and years, cleanup of the spill was conducted by the responsible party.

Prior to construction, Northern Divide Wind will conduct another Phase I ESA and the results will be used to minimize risk associated with potential recognized environmental conditions that may pose a threat to human health and safety. Significant findings are not anticipated due to the known historic uses of the property. As with any construction activity, there is the possibility of accidentally spilling fuel, hydraulic fluid, or other hazardous substances during construction of the Project. The potential of such events will be minimized through implementation of a Spill Prevention, Control, and Countermeasure Plan, which will include the following:

- Construction equipment will be equipped with spill cleanup kits.
- Equipment refueling will take place at secure areas, away from wetlands or drainages.
- Workers will be trained in spill clean-up and the use of the spill cleanup kits.

These measures will ensure that surface and groundwater quality will not be degraded through inadvertent spillage of contaminants.

Security

Project construction and operation will have minimal impacts to the security and safety of the local communities.

5.4.3 Mitigative Measures

Long-Range Radar, Weather Radar, Military Training Route, and Special Airspace

Regarding military operations, Northern Divide Wind will follow the recommended actions prescribed in **Appendix B** for a more detailed review of MTR IR678. However, Northern Divide Wind anticipates no to minimal impact as this portion of the Project is located within the area of the Tande Substation and several other existing transmission lines, and no part of the Project will exceed 200 feet in height above ground level.

Electromagnetic Fields

Since no significant adverse impacts are anticipated, no mitigative measures are proposed at this time.

Hazardous Materials/Hazardous Waste

Since no significant findings are anticipated, no mitigation is proposed at this time. Any petroleum wastes generated will be handled and disposed of in accordance with local, state, and federal regulations.

Security

The following security measures will be taken to reduce the chance of physical and property damage, as well as personal injury, at the site:

- Security measures will be taken during the construction and operation of the Project, including temporary and permanent (safety) fencing, warning signs, and locks on equipment.
- Northern Divide Wind will provide educational materials to landowners near the Project and upon request to interested persons about the Project.

5.5 Audible Sound, Corona Discharge, and Aeolian Vibration

5.5.1 Description of Resources

Corona from transmission line conductors can generate electromagnetic “noise” at the same frequencies transmitted by radio and television signals. Corona consists of the breakdown or ionization of air within a few centimeters of conductors and hardware. This sound can cause interference with signal reception depending on the frequency and strength of the radio and television signal. Tightening loose hardware on the transmission line usually resolves the problem.

Aeolian vibration is produced when a steady flow of wind interacts with an object such as a transmission line. Wind must blow steadily and perpendicular to the lines to set up oscillating forces.

The Study Corridor is primarily rural and agricultural. There are no populated towns within the Study Corridor. The closest incorporated city is Powers Lake, which is approximately one mile east of the Study Corridor. The existing acoustic environment is defined primarily by distant traffic sound from the nearby arterial highways and will also include intermittent aircraft overflights and sound from agricultural operations. In addition to anthropogenic sound sources, the windy conditions of this site define a somewhat elevated ambient sound level, which increases with wind speed. Windy conditions can generate sound caused by the rustling of grass and tree leaves.

5.5.2 Impacts

The Project will periodically generate audible sound including sound from construction and maintenance, corona discharge, and aeolian vibration.

Sound from Maintenance and Construction

Project construction and maintenance may cause short-term but unavoidable sound impacts due to construction and equipment. Construction and maintenance activities will also generate traffic that will have potential sound effects, such as trucks travelling to and from the Project on public roads. Sound generated by construction activities is generally exempt from state and local noise regulation. Once the Project has been built, no significant construction sound impacts are anticipated. Project maintenance will occur periodically but is not expected to result in significant sound generation

Corona Discharge

Corona effects occur when air molecules near conducting wire are ionized due to changes in the electric field intensity at the conductor surface. Measures such as carefully handling the conductor during construction to avoid nicking or scraping or otherwise damaging the surface and using hardware with no sharp edges or points are typically adequate to control corona. Corona effects are expected to be low

enough that no objectionable audible sound will result outside the Project ROW. The sound is most noticeable when conductors are wet as a result of precipitation.

Aeolian Vibration

Aeolian vibration is produced when a steady flow of wind interacts with an object such as a transmission line. Wind must blow steadily and perpendicular to the lines to set up oscillating forces. The resulting vibration can produce resonance if the frequency of the vibration matches the natural frequency of the line. However, aeolian vibration is expected to be minimal outside of the Project ROW.

5.5.3 Mitigative Measures

Sound from construction will be short-term and temporary, so significant impacts resulting from construction sounds are not anticipated, and no significant long-term acoustic impacts are anticipated from operation of the Project. Corona associated with the Project is expected to be low enough so that no radio or television interference is anticipated outside of the Project ROW. Similarly, aeolian vibration is not expected to be significant outside of the Project ROW. Therefore, no mitigation will be required for the audible sound generated by the Project.

5.6 Cultural Resources

5.6.1 Description of Resources

Class I Literature Review

In February 2017, Atwell, LLC (Atwell) performed a Class I Cultural Resources Inventory or Literature Review of a larger Transmission Line Assessment Area used to initially site the Project. The Transmission Line Assessment Area examined at that time was approximately 124,786 acres in size and included a minimum four-mile wide area surrounding the Study Corridor and a one-mile buffer of the Project Route. The Class I Literature Review included a file review completed at the State Historical Society of North Dakota (SHSND).

AECOM updated the Class I Literature Reviews in February of 2018 and December of 2018 through a file search of the North Dakota Cultural Resources Survey (NDCRS) data files maintained by the SHSND. The methods employed for the Class I Literature Review follow the North Dakota State Historic Preservation Office (NDSHPO) Guidelines Manual for Cultural Resources Inventory Projects (SHSND 2018).

Review of NDCRS data files included review of archaeological, historical, and architectural resource forms and cultural resources survey reports, as well as Cultural Heritage Forms available at the SHSND in Bismarck, North Dakota. During this updated review, a Study Area was comprised of the Project Route plus a one-mile buffer. AECOM utilized this Study Area to take into consideration any resources that might potentially be impacted by Project construction activities. In addition, AECOM reviewed the National Register of Historic Places (NRHP) records maintained by the National Park Service to find listings of historic properties listed on the NRHP. Historic plat maps and U.S. Geological Survey (USGS) topographic maps were also reviewed.

The Class I Literature Review identified 48 previous cultural resource inventories conducted in the Study Area. A total of 235 previously recorded cultural resources are present within the Study Area. These include 165 resources previously recorded on NDCRS forms and 70 previously recorded Cultural Heritage Sites. A total of 87 of the previously recorded resources are present within the Project ROW, including 60 Cultural Heritage Sites, eight archaeological sites, and 19 site leads.

Cultural resources can be defined as any resource that has cultural character (King 2004). Expanding upon this simple definition, “cultural resources” include all landscapes, buildings, sites, districts, structures, or objects that have been created by or associated with humans and are considered to have historical or cultural value. The term “historic property” includes only those cultural resources that are listed in or eligible

for listing in the NRHP, which was established by the National Historic Preservation Act, 1966 (16 U.S. Code 470 *et seq*., as amended). Finally, "site" refers to any location in which human activities have occurred and where material evidence of those activities remains.

Sites are defined as locations of past human activity older than 50 years, containing one or more cultural features, six or more artifacts, intact subsurface cultural materials, or a combination of these qualities, within an area of approximately 60 square meters (645 square feet), and spatially discrete from areas of similar content by approximately 60 meters (approximately 200 feet) (NDSHPO 2018). Isolated finds are defined as areas of past human activity older than 50 years, containing five or fewer artifacts with limited potential to possess subsurface cultural materials (NDSHPO 2018). Site leads are either a) isolated finds, as defined above, with the potential to possess substantial subsurface deposits, or b) locations reported by non-archaeologists as containing cultural resources that have not been field verified by an archaeologist (NDSHPO 2018).

Of the resources recorded on NDCRS forms, one has been previously recommended as eligible for the NRHP. This site, the Burlington Northern/Great Northern Railroad, was evaluated as eligible under Criterion A for its association with 1920s railroad development in North Dakota. A further 109 resources have not been formally evaluated for eligibility for the NRHP. A total of 23 resources have been previously recommended not eligible for the NRHP.

Seventy Sites of Religious and/or Cultural Significance to Tribes (SRCSTT) previously recorded on Cultural Heritage Forms were identified in the Study Area. All previously recorded SRCSTTs were recommended eligible by Traditional Cultural Surveyors (TCS) in the field. No resources currently listed on the NRHP were identified in the Study Area.

Nearly all of the Native American site leads were depressions or lithic scatters. Many of the Native American site leads recorded in the Study Corridor were documented through notes and maps compiled by Thad Hecker, an avocational archaeologist, who identified the site locations in the early- to mid-20th century. The exact location of the features Hecker recorded are not well known, and the features are typically only mapped as accurately as the quarter section (160 acres) in which they might be located. The Euro-American sites include collapsed storage buildings, foundations, cultural material scatters, or a combination of these feature types.

Class III Cultural Resources Inventory for Archaeological Resources

Northern Divide Wind and AECOM coordinated with the SHSND on the appropriate scope and level of survey. A Class III Cultural Resource Inventory, which included a 200-foot-wide area centered on the Project Route, 300-foot radius around turning structures, and 400-foot area around pulling locations (Survey Corridor), has been completed to identify archaeological resources, and a Class III Cultural Resources Inventory Report is currently underway.

Class III Cultural Resources Inventory for Architectural Resources

Per NDSHPO, a Class II/III architectural inventory is not required for transmission lines of this Project's size. Architectural resources were documented as part of the Class III Cultural Resources Inventory only if they fell within the direct Survey Corridor and will be included in the Class III Cultural Resources Inventory Report. Historical resources that are not designated as exclusion areas, such as historic farmsteads and cemeteries, are present within the Project ROW. Northern Divide Wind will avoid impacts to historic resources.

Native American Coordination

Northern Divide Wind sent outreach letters to the following 24 Native American Tribes on July 20, 2017 for both the Project and the associated Project Transmission Line:

- Cheyenne River Sioux Tribe
- Chippewa Cree-Rocky Boy's

- Crow Creek Sioux Tribe
- Crow Nation
- Flandreau Santee Sioux Tribe
- Fort Peck Assiniboine and Sioux Tribes
- Lower Brule Sioux Tribe
- Lower Sioux Indian Community
- Manda, Hidatsa, and Arikara Nations
- Northern Arapaho
- Northern Cheyenne Tribe
- Oglala Lakota Nation
- Prairie Island Indian Community
- Red Lake Band of Chippewa Indians
- Rosebud Sioux Tribe
- Santee Sioux Nation
- Sisseton-Wahpeton Oyate
- Spirit Lake Tribe
- Standing Rock Sioux Tribe
- Turtle Mountain Band of Chippewa Indians
- Upper Sioux Community
- White Earth Nation of Minnesota Chippewa
- Yankton Sioux Tribe

Since that time, numerous discussions have taken place with the following eight interested Native American Tribes to discuss the Project, survey plans, and cultural resource report content and format:

- Cheyenne River Sioux Tribe
- Northern Cheyenne Tribe
- Rosebud Sioux Tribe
- Sisseton Wahpeton Oyate
- Spirit Lake Tribe
- Standing Rock Sioux Tribe
- Turtle Mountain Band of Chippewa Indians
- Yankton Sioux Tribe

The first stage of tribal participation focused on assisting with the micrositing of proposed turbine and service road locations for the Previous Project in November and December 2017. During this stage, representatives from the Standing Rock Sioux Tribe and the Rosebud Sioux Tribe visited each turbine and service road location with representatives from Northern Divide Wind and AECOM to assess the locations for potential cultural resources and sites of cultural and religious significance to the tribe (SCRSTT). After completion of this preliminary stage, AECOM provided all micrositing results to Northern Divide Wind along with avoidance recommendations. Based on this information, Northern Divide Wind revised the Previous Project infrastructure. A second round of micrositing was conducted in May 2018. A tribal representative from the Rosebud Sioux Tribe participated in this effort.

In May through August 2018, stage two of the tribal study focused on field surveys. During stage two, TCS from the Rosebud Sioux Tribe, Turtle Mountain Band of Chippewa Indians, Northern Cheyenne Tribe, and the Spirit Lake Tribe completed a joint field survey together with cultural resources consultants for SCRSTT and cultural resources.

A third round of micrositing was conducted in August 2019 to ensure tribal coordination on the current Project. A tribal representative from the Rosebud Sioux Tribe participated in this effort. In September 2019, TCS from the Rosebud Sioux Tribe, Turtle Mountain Band of Chippewa Indians, and the Spirit Lake Tribe completed a joint field survey together with cultural resources consultants for SCRSTT and cultural

resources. If future location changes in Project infrastructure occur, further fieldwork and tribal coordination will be completed. TCS from the Rosebud Sioux Tribe, Turtle Mountain Band of Chippewa Indians, Northern Cheyenne Tribe, and the Spirit Lake Tribe will be invited to assist in joint tribal and cultural resource consultant field surveys.

Northern Divide Wind, participating Tribal Historic Preservation Officers, cultural resource consultants, and the SHSND are coordinating preparation of a report that includes the results of the joint surveys into a Class III Cultural Resources Inventory Report.

5.6.2 Impacts

Archaeological Resources

Northern Divide Wind utilizes an avoidance strategy and will avoid newly documented sites and previously documented archaeological sites that are recommended for avoidance by the SHSND and participating Tribal Historic Preservation Officers. Because numerous archaeological leads in the Study Corridor are mapped at the quarter section (160 acres) level, identification of lead locations based on available historic information was not possible. However, Class III cultural resources inventories are being conducted to identify any features within the archaeological Survey Corridor that are associated with archaeological leads. These features will be recorded as new archaeological sites. AECOM will create avoidance buffers for previously recorded archaeological sites and newly recorded archaeological sites, including those associated with archaeological leads. The buffers will be delineated prior to construction to ensure avoidance of archaeological resources. The pedestrian survey and shovel testing associated with the Class III Cultural Resources Inventory was completed in May through October 2018. Additional surveys were completed May through June 2019, and September through October 2019. Once complete, the resulting second cultural resources report will be submitted to the SHSND for review and concurrence and a management summary will be submitted to the Commission.

5.6.3 Mitigative Measures

Archaeological sites will be avoided during construction in accordance with recommendations from the SHSND and participating Tribal Historic Preservation Officers. Additionally, Northern Divide Wind is prepared to provide mitigation for indirect impacts to architectural resources, if requested by SHSND.

Cultural sites that are recommended for avoidance by the SHSND and participating Tribal Historic Preservation Officers that are in close proximity to the Project ROW will be fenced to reduce the potential for inadvertent disturbance. An Unanticipated Discoveries Plan will be prepared and will outline the procedure utilized to address any unanticipated discoveries of cultural resources, including possible human remains. In the event that unanticipated discoveries are made during construction, the Unanticipated Discoveries Plan will provide direction to on-site personnel and their consultants regarding proper procedures for addressing the discoveries. In the event that burials are discovered during construction, construction would stop within 100 feet of the site and the site will be protected until the Burke or Mountrail County Sheriff's office has been contacted. The Sheriff will contact the North Dakota State Forensic Examiner to determine if the remains are associated with a crime scene. If the remains are determined not to be part of an active crime scene or investigation, the North Dakota Chief Archaeologist will be contacted to coordinate how to proceed. Therefore, no significant impacts to cultural resources are anticipated.

5.7 Recreational Resources

5.7.1 Description of Resources

There are no designated recreational areas such as municipal, state or federal parks, NWRs, Wildlife Management Areas (WMAs), or designated scenic trails within the Study Corridor. The nearest designated recreational areas from the Study Corridor are public fishing waters managed by the NDGFD which

includes the White Earth Dam (0.5 miles north), Powers Lake (one mile east), and Smishek Lake (0.25 miles east). Recreational opportunities at the public fishing waters include fishing but can also include camping and hiking.

There are approximately nine acres of school trust lands located within the Project ROW. School trust land is managed by the NDDTL. These lands are dedicated to producing income for the schools and designated trust funds of North Dakota. Ninety-nine percent of North Dakota's school trust lands are leased to farmers and ranchers (NDDTL 2018). School trust land is generally open to walk-in public use; however, lessees may restrict access if livestock are present.

5.7.2 Impacts

No recreational resources will be directly impacted as impacts to recreational resources would mainly be visual in nature. Sportsman, landowners, and sightseers that make use of private land, NWRs, WPAs, WMAs, fishing waters, and school trust lands could potentially be temporarily impacted by construction activities. Recreational opportunities that rely on wildlife resources may be temporarily impacted during construction as wildlife may avoid the busier construction areas.

5.7.3 Mitigative Measures

No recreational resources will be directly impacted as impacts to recreational resources will mainly be visual in nature. Therefore, no mitigation is proposed.

5.8 Effects on Land-Based Economies

5.8.1 Description of Resources

The majority of the Project ROW is located in cropland. Croplands encompass 328 acres (approximately 44 percent) of the Project ROW; unbroken grasslands comprise 280 acres (approximately 38 percent) of the Project ROW; and broken grassland comprises 46 acres (approximately 6 percent) of the Project ROW (**Figure 5-1**).

5.8.2 Impacts

Agriculture is the principal land use within the Study Corridor. The majority of land within or adjacent to the Project ROW will still be available for agriculture following construction. Construction and operation of the Project will not interfere with continued use of the surrounding areas for agricultural uses.

5.8.3 Mitigative Measures

Northern Divide Wind will work with landowners to minimize impacts to their land. Much of the Project Route is adjacent to existing public roads or section lines and can be accessed with minimal off-ROW access. During construction, areas will be separated from grazing animals by temporary or permanent fencing. Once construction activities have been completed, temporary construction areas will be restored to their previous use. Although the Project will result in the conversion of approximately 0.28 acres of farmland to a transmission facility, economic losses to producers of the land are anticipated to be minimal in comparison to the additional income provided by the transmission facility and restoration and reseeding of temporarily impacted areas.

5.9 Geologic and Groundwater Resources

5.9.1 Description of Resources

The Study Corridor is divided into three Class IV ecoregions which are more detailed ecoregions for state-level applications (Bryce *et al.* 1996). The three ecoregions are the Northern Missouri Coteau, Missouri Coteau Slope, and River Breaks. The Northern Missouri Coteau lies in a transition zone to a more boreal

climate to the north and a more arid climate to the west. Willow and aspen, southern outliers of aspen parkland to the north, may occur at wetland margins. The Missouri Coteau Slope has a simple drainage pattern and fewer wetland depressions than the Missouri Coteau. Due to the level to gently rolling topography, there is more cropland than on the Missouri Coteau. Cattle graze on the steeper land that occurs along drainages. **Figure 1-4** shows the topography of the Study Corridor.

Aquifers present within the Study Corridor include the White Earth aquifer, the Shell Creek-White Lake aquifer, and the Clearly aquifer (NDSWC 2019). There are four active sand and/or gravel mines located within the Study Corridor (Anderson 2012). There are two abandoned coal mines and no active coal mines within the Study Corridor (ND GIS Hub 2019). A landslide area as indicted by the North Dakota Geological Survey landslide mapping program is present within the Project ROW within the White Earth River Valley. A geotechnical testing laboratory will perform sampling and analysis, and areas which are geologically unstable will be avoided and spanned as necessary.

5.9.2 Impacts

Impacts to geological resources are anticipated to be minimal. As of the date of this application, there are 12 active oil and gas wells and no active coal mines within the Study Corridor (NDDMR 2019a). If the Project impacts sand and gravel resources, the regional supply of these materials will not be adversely impacted due to the abundance of this resource in the area. The landslide area as indicted by the North Dakota Geological Survey landslide mapping program will be spanned as necessary.

Impacts to groundwater resources are anticipated to be minimal. Major groundwater withdrawals will not be necessary due to the limited amount of water needed for Project development. Based on the large distance between each transmission structure foundation, the Project will not contribute to significant impacts on groundwater flow or recharge. If groundwater is disturbed by the construction of transmission structure foundations, it is anticipated that it will resume its natural course of flow upon construction completion.

5.9.3 Mitigative Measures

Northern Divide Wind has coordinated with landowners regarding impacts to existing sand and gravel mines. If dewatering of excavations is necessary during construction and as long as the water is known to be uncontaminated, all water will be discharged according to items outlined in the Storm Water Pollution Prevention Plan (SWPPP). If discharge water is suspected to be contaminated, an application for a temporary discharge permit (NDG-070000) will be submitted to the North Dakota Department of Environmental Quality (NDDEQ).

5.10 Surface Water and Floodplain Resources

5.10.1 Description of Resources

USFWS National Wetlands Inventory (NWI) data and USGS National Hydrography Dataset (NHD) data were used to identify potential surface waters within the Study Corridor (USFWS 2019a, USGS 2019). This data was used as a precursor for field delineations (**Figure 5-3; Appendix D**). The White Earth River, Paulsen Creek, Paradise Meadow, Harms Lake, small drainages, and wetlands are found within the Study Corridor. Due to the Study Corridor's rural location, the Federal Emergency Management Agency (FEMA) has not developed flood rating maps for the area (USDHS, FEMA 2019).

5.10.2 Impacts

Project construction will temporarily and permanently disturb land and, as a result, have the potential to impact surface water resources, but no direct impacts are proposed. Since no flood rating map has been developed for the Study Corridor, floodplain resources will not be impacted.

5.10.3 Mitigative Measures

Northern Divide Wind will implement the following measures, to the extent practicable:

- The Project will be built to allow stormwater runoff to flow unrestricted.
- Maintain appropriate water and soil conservation practices during construction through the implementation of best management practices outlined in the SWPPP. These practices include silt fencing, temporary reseeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod stabilization.
- Coverage under the NDDEQ National Pollutant Discharge Elimination System (NPDES) general construction permit will be obtained prior to the start of construction.
- Provide contractors with static constraint maps and ensure compliance through onsite environmental construction monitoring.

5.11 Wetlands

5.11.1 Description of Resources

Wetlands are an important natural resource providing a number of critical ecosystem functions. Some of these functions include flood flow attenuation, streambank stabilization, discharge and recharge of ground water, detention and removal of sediments, and the detention, removal, and transformation of nutrients and contaminants. Wetlands also provide habitat for wildlife and sites for human recreation, education, and aesthetic enjoyment. The Project is located within the Prairie Pothole Region. Prairie potholes (*i.e.*, emergent wetlands, freshwater ponds) are scattered throughout the northern portion of the Study Corridor overlapping the Northern Missouri Coteau and are fringed with a variety of vegetative cover types. Intermittent drainages associated with the White Earth River and Paulsen Creek are present in the southern portion of the Study Corridor.

Wetlands are defined in the 1977 Executive Order 11990 – Protection of wetlands and in Section 404 of the Clean Water Act of 1986, as areas that are inundated or saturated by surface or ground water 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. The three parameters that define a wetland, as outlined in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual, are hydric soils, hydrophytic vegetation, and hydrology (Environmental Laboratory 1987). Wetlands generally include swamps, marshes, bogs, and similar areas such as slough, potholes, and river overflows. The functions of wetlands include providing habitat for wildlife, improving water quality through filtration and purification, storing floodwaters, and recharging groundwater.

A desktop analysis of the Study Corridor using NWI, NHD, and aerial photography data was performed to identify probable locations of wetlands and waterbodies prior to field work (**Figure 5-3**; **Appendix D**). The initial desktop analysis was followed by a site visit to microsite structure locations. Micrositing provided a preliminary field review to identify potential critical issues regarding the turbine locations. Field wetland delineations were completed in August, September, October, and November 2019.

The wetland delineations followed methodology from the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and Regional Supplement to the USACE Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE 2010). Each wetland was identified, and sufficient information was gathered for the preparation of jurisdictional determinations, should they be warranted.

5.11.2 Impacts

Northern Divide Wind will avoid direct, permanent impacts to all wetlands regardless of their jurisdictional status, including those protected by USFWS easements. Wetlands will be spanned, and no structures or Project facilities will be placed in a wetland.

5.11.3 Mitigative Measures

Northern Divide Wind will implement the following mitigative measures, to the extent practicable:

- Avoid all direct impacts to wetlands, including temporary impacts during construction.
- Avoid all direct impacts to USFWS wetland easements.
- Obtain coverage under the NDDEQ NPDES general construction permit prior to the start of construction.
- Maintain appropriate water and soil conservation practices during construction through the implementation of BMPs outlined in the SWPPP. These practices include silt fencing, temporary reseeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways and sod stabilization.
- Delineate and flag wetlands in close proximity to Project features prior to construction.
- Provide contractors with static constraint maps and ensure compliance through onsite environmental construction monitoring.

5.12 Wildlife

5.12.1 Description of Resources

The following studies were conducted to document wildlife habitat and use. The studies were conducted concurrent with studies conducted for the prior iteration of the Wind Energy Center and were conducted with respect to the voluntary USFWS Wind Energy Guidelines (USFWS 2012):

- Eagle and raptor nest aerial surveys completed in April 2018
- Sharp-tailed grouse (*Tympanuchus phasianellus*) lek surveys completed from April through May 2018
- Desktop bat habitat assessment completed in 2018
- Dakota Skipper surveys completed in 2017 through 2019
- Desktop whooping crane (*Grus americana*) habitat assessment completed in 2019

Surveys will be conducted in the spring of 2020 to avoid any potential impacts to eagle/raptor nests and sharp-tailed grouse leks (**Appendix C**).

Avian Species

Based on the field observations of the habitat present within the Project ROW, most avian species that are likely to occur are those which are found in grassland, wetland, and agricultural habitats. A wide range of avian use field surveys were conducted as part of the prior iteration of the Wind Energy Center immediately north of the Project ROW. During the course of these surveys conducted between April 2017 and March 2018, over 150 species were recorded and one federally listed species (whooping crane [*Grus americana*]) was recorded migrating at least 500 feet overhead (Derby and Thorn 2019; **Appendix B**).

Sharp-tailed grouse (*Tympanuchus phasianellus*) lek surveys for the Previous Project identified a total of five confirmed leks and one possible lek within the Study Corridor. During the lek survey confirmed leks were defined as three or more birds together with at least one male displaying (Atwell 2018a; **Appendix B**). Possible leks were defined as auditory detections of multiple grouse that could not be verified visually after their initial detection on a ground-based survey. Standing flocks of birds that were not actively lekking at time of observation, possibly because of extreme cold weather, were also noted as possible leks.

Aerial raptor nest surveys for the Previous Project resulted in no detections of any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*) nests within the Study Corridor or buffer (Atwell 2018a; **Appendix B**). Within the Project ROW, the aerial raptor nest survey identified five inactive red-tailed hawk (*Buteo jamaicensis*) nests, two inactive unknown raptor nests, and one active great horned owl (*Bubo virginianus*) nest.

Bat Species

North Dakota is home to 11 bat species, of which the northern long-eared bat (NLEB; *Myotis septentrionalis*) is the only federally listed species (threatened) (NDGFD 2019). Based on a review of publicly available publications, datasets, agency occurrence maps, and field observations, a bat habitat assessment was conducted to determine the amount of suitable habitat for bats within the Project ROW (Atwell 2018b; **Appendix B**). The bat habitat assessment evaluation indicates that the bat community within the Project ROW is likely to include the big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*).

Preferred bat roosting and foraging habitat in North Dakota consists of woodlands (primarily coniferous) with a nearby water source, riparian corridors, and rock crevices (Gillam *et al*. 2012). Snags and trees with loose bark to roost under are commonly used; large cottonwood trees (>3 foot diameter at breast height) tend to be a preferred tree of choice for several roosting species. Some species will also utilize buildings and bridges for roosting.

While trees and potential bat habitat is sparse throughout the Project, the southern 8.5 miles of the Project may contain more potential bat habitat in compared to northern portions of the Project due to proximity to the White River and wooded ravines (Atwell 2018b; **Appendix B**). The rocky outcroppings and cliffs could support hibernacula for some bat species.

5.12.2 Impacts

Avian Species

Potential impacts from the Project to avian species once constructed include collisions with transmission lines. Potential impacts to raptor nests and grouse leks were minimized to the greatest extent practicable through site planning and avoidance of documented nest and lek locations. There was one active raptor nest identified during the aerial raptor nest survey located approximately 125 feet outside the Project ROW (Atwell 2018a; **Appendix B**). Raptor nests will be avoided to the extent practicable and disturbance minimized during nesting season. Vegetative removal will be conducted outside of this March through July period to the extent practicable to avoid impacts to previously undetected nests. Any tree removal needed from March through July will be preceded by a visual check of the trees for any raptor nests. No raptor nests with eggs or chicks will be removed at any time.

Bat Species

Impacts to bats are expected to be low based on the low amount of impacts to forested habitat and no known hibernacula within the Project ROW. No collision risk with the Project is anticipated.

5.12.3 Mitigative Measures

Northern Divide Wind conducted environmental studies, relied upon studies conducted as part of the Previous Project, and consulted with the NDGFD and USFWS on appropriate avoidance, minimization, and offset measures so that the Project would have minimal environmental impacts (Section 6 and **Appendix C**). Based on the above, the following measures will be used, to the extent practicable, by Northern Divide Wind:

- Design utility lines, and mark with bird flight diverters, with respect to APLIC guidelines to prevent bird collision, as practicable (APLIC 2012).
- Minimize construction activities to the extent practicable within 0.5 mile of known sharp-tailed grouse lek locations during the lekking and breeding season.
- Avoid construction to the extent practicable with 0.25 mile of active raptor nest locations during the nesting season.

- If any raptor nest is discovered during construction, the nest will be monitored to determine if there is a change in the nest activity status in order to avoid impacts that might have the potential to precipitate nest abandonment.
- Provide contractors with static constraint maps and ensure compliance through onsite environmental construction monitoring.
- Implement a 25-mph speed limit on Project roads to minimize wildlife collisions.
- Prepare a voluntary Wildlife Conservation Strategy (WCS) that includes an adaptive management approach, so that information gathered during post-construction monitoring can be used to inform future management decisions at the Project.
- Implement an operational Wildlife Response and Reporting System (WRRS). The WRRS will include reporting protocols to report and document bird and bat mortality during routine maintenance activities. If a dead or injured bird or bat is found, its location will be marked and reported to the Plant Lead/Site Supervisor. The dead or injured bird or bat will not be removed from the location it was found.

5.13 Federally Protected Species

5.13.1 Description of Resources

The USFWS administers the Endangered Species Act (ESA), which mandates protection of species federally listed as threatened or endangered (T&E) and their associated habitats. An endangered species is one in danger of extinction throughout all or a significant portion of its range. A threatened species is one likely to become endangered in the foreseeable future. Critical habitat for T&E species can be designated if that habitat includes specific areas that are occupied by a species at the time of listing or unoccupied areas that are considered essential to the conservation of a species. Candidate species receive no statutory protection from the USFWS unless they are formally listed. North Dakota does not have a state T&E species list; however, it recognizes those federally listed under the ESA.

Nine species are federally listed in North Dakota, and the USFWS Information for Planning and Conservation (IPaC) tool (USFWS 2019b) indicated that seven T&E species could potentially occur within the counties crossed by the Study Corridor. These species include four birds, one mammal, one fish, and one insect: piping plover (*Charadrius melodus*) (threatened), red knot (*Calidris canutus rufa*) (threatened), whooping crane (endangered), least tern (*Sterna antillarum*) (endangered), NLEB (threatened), pallid sturgeon (*Scaphirhynchus albus*) (endangered), and Dakota skipper (*Hesperia dacotae*) (endangered). However, USFWS recently proposed a rule in the Federal Register to remove the least tern from protection under the ESA (USFWS 2019d).

Additionally, bald and golden eagles are both protected under the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA protects bald eagles and golden eagles throughout their range in the U.S. Although it does not designate critical habitat, BGEPA protects individual eagles and nests from disturbance. These federally protected species are described in greater detail below.

Piping Plover (Federally Threatened)

Piping plovers are small shorebirds with a gray to brown back and a white belly (NDGFD 2015). Adults have orange legs and a black tipped orange bill. Males have a distinct black band that runs across the forehead and a single black band that encircles the body at the breast. Females will have the same but paler features. Their preferred nesting habitat is limited to sandy or gravelly beach and sandbars or alkaline wetlands while feeding on insects near the waterline. More than three-fourths of piping plovers in North Dakota nest on prairie alkali lakes, while the rest use the Missouri River (USFWS 2013c). The piping plover is a federally threatened species.

Piping plover populations are threatened by habitat loss due to vegetation encroachment, shoreline development, anthropogenic and animal disturbances, and water management activities, such as dam

construction and channelization. Critical habitat has been federally designated for the piping plover in North Dakota. This habitat runs mainly along the shores of the Missouri River and Lake Sakakawea but encompasses some surrounding wildlife refuge areas as well. No designated critical habitat is located within the Study Corridor, and no suitable piping plover habitat was observed in the Study Corridor during the onsite surveys. The nearest designated critical habitat is located approximately 20 miles north, of the Study Corridor, so it is unlikely, although possible, the piping plover will occur within the Study Corridor.

Red Knot (Federally Threatened)

Red knots are medium-sized shorebirds with a red head and breast, a white abdomen and under tail, thick black legs, and finely mottled gray, black, and brown back wings (NDGFD 2015). In the winter, the adults turn a mottled pale gray color. They prefer to breed and nest in drier tundra areas with sparsely vegetated hillsides. The red knot is a federally threatened species. There is no federally designated critical habitat for this species in North Dakota.

The USFWS listed the rufa subspecies of red knot as threatened on December 11, 2014. The red knot is noted for its long-distance migrations of up to 9,320 miles between circumpolar breeding habitats and marine wintering habitats in southern latitudes of South America. Most of the known migration routes for the rufa subspecies are along coastal regions of Canada and the U.S. However, an interior migratory route was identified to and from the Arctic passing through Saskatchewan and Alberta Canada through the Great Plains states to non-breeding areas mostly in Texas and Louisiana along coastal areas of the Gulf of Mexico (Skagen *et al*. 1999). Population sizes for knots are in decline around the world, especially C. c. rufa, which declined from about 82,000 individuals in the 1980s to fewer than 30,000 in 2010 (Baker *et al*. 2013). Threats to the red knot include the loss of habitat in both breeding and nonbreeding areas, disruption of natural predator cycles on the breeding grounds, reduced prey availability at stopover areas and throughout the nonbreeding range and increasing frequency and severity of asynchronies ("mismatches") in the timing of the birds' annual migratory cycle relative to favorable food and weather conditions (USFWS 2014b). No suitable red knot habitat was observed in the Study Corridor during the onsite surveys. However, it is possible, but unlikely, that red knots will occur within the Study Corridor during migration.

Whooping Crane (Federally Endangered)

Whooping cranes are North America's tallest bird, standing five feet tall when erect (NDGFD 2015). Their plumage is all white with the exception of black wing tips and a red/black crown. They have long black legs and can have a wing span of over seven feet. The whooping crane is a federally listed endangered species. There is no federally designated critical habitat for this species in North Dakota.

The whooping crane was considered endangered in the United States in 1970 and the endangered listing was 'grandfathered' into the ESA of 1973 (CWS and USFWS 2007). The whooping crane population was reduced to 16 individuals belonging to one flock that migrated between Wood Buffalo National Park in Canada and the Aransas National Wildlife Refuge in Texas. With conservation efforts the Aransas-Wood Buffalo National Park population, the single self-sustaining wild population, has been steadily rising with the population estimated 2018 – 2019 winter population of whooping cranes within the primary wintering grounds estimated at 504 birds (412–660, 95.0% confidence interval); there were another estimated 12 whooping cranes thought to be outside of the primary wintering grounds when systematic surveys were conducted (USFWS 2019h). A 200-mile wide migration corridor has been delineated for this population that contains 95 percent of all verified sightings. Spring migration occurs primarily in April and May whereas fall migration occurs primarily in October and November (Urbanek and Lewis 2015). Stopover habitat during migration includes a variety of croplands with roosting occurring in shallow, freshwater inland wetlands.

The Project is located within the USFWS-defined 75% occurrence frequency band of the whooping crane migration corridor (USFWS 2010). The southernmost mile of the Project Route intersects the centerline of

the 75% migratory corridor (with the remainder of the Project Route located east of the migratory corridor centerline). On April 10, 2017, a group of three actively migrating whooping cranes were observed flying north through airspace within the Study Corridor approximately one mile west of the northern terminus of the Project Route. These cranes were recorded migrating at least 150 meters overhead (*i.e.*, above transmission line height) (Derby and Thorn 2019; **Appendix B**).

Least Tern (Federally Endangered)

Least terns are the smallest members of the tern family. The interior least tern is a migratory bird species, nesting along freshwater habitats of the Missouri and Mississippi rivers and their major tributaries and overwintering in the Caribbean and South America. Least terns primarily feed on small fish (USFWS 2019c).

On October 23, 2019 the USFWS proposed to delist the least tern from the ESA due to recovery (USFWS 2019d). USFWS states that interior least tern populations are healthy, stable and increasing, and the species no longer faces the threat of extinction. When the interior least tern was listed under the ESA in 1985, there were fewer than 2,000 birds and only a few dozen nesting sites scattered across the United States. Today there are more than 18,000 interior least terns at more than 480 nesting sites in 18 states. With the lack of gravelly or sandy beaches or sandbars identified within the Study Corridor, it is unlikely that the Project will affect the least tern. However, it is possible, but unlikely, that least terns may occur within the Study Corridor.

Northern Long-Eared Bat (Federally Threatened)

The NLEB is a medium sized brown bat three to four inches in length with a nine to 10-inch wingspan and has the largest ears of the Myotis genus (NDGFD 2015). The NLEB either roost singularly or in colonies underneath bark, in cavities, or in crevices of trees. During the winter, the NLEB hibernate in cool caves or mines. The NLEB is a federally listed threatened species.

The NLEB was listed as threatened on April 2, 2015, under an interim Section 4(d) rule. The final 4(d) rule was released on January 14, 2016 (USFWS 2016b). The USFWS determined that white-nose syndrome (WNS) is the primary threat to NLEB and regulating other sources of mortality or harm, such as from general habitat loss, will not effectively conserve this species. Additionally, in 2016 the USFWS determined designating critical habitat for NLEB was not prudent.

The 4(d) rule limits the prohibition of take to counties affected by WNS and an additional 150-mile buffer around these counties (the WNS Zone). However, under the final 4(d) rule, incidental take by wind turbine collision is not prohibited. Regulatory mechanisms for wind facilities were not included in the final 4(d) rule because the primary factor causing the rapid population decline in NLEB is WNS, and the best available information suggests that NLEB fatalities caused by transmission lines are not contributing significantly to the species' decline. Incidental take is prohibited within known NLEB hibernacula, and if tree removal occurs at an occupied hibernaculum during any time of year or maternal roost site from June 1 through July 31 (USFWS 2016b). However, there are no known NLEB hibernacula or maternal roost sites within or in the vicinity of the Project.

NLEB are believed to occur from Maine to North Carolina on the Atlantic Coast, westward to eastern Oklahoma and north through the Dakotas, reaching into eastern Montana and Wyoming (USFWS 2013a). However, recent information from North Dakota State University has indicated the species is unlikely to occur across much of North Dakota and may be limited to the badlands in the western portion of the state (Dr. E. Giliam, pers. comm). The NLEB is considered common only in discrete portions of its western range, including the Black Hills of South Dakota. This species roosts in trees during the spring, summer, and fall. The species prefers large, contiguous tracks of upland forested habitat during the summer residency period. Natural roosting habitats in the Study Corridor are limited to individual trees and wind breaks. NLEB do not undertake long-distance seasonal migrations between summer and winter ranges

but do undertake shorter distance movements between summer roosts and winter hibernacula. These seasonal movements are generally between 35 miles and 55 miles, but may be substantially longer in some areas, perhaps as great as 168 miles. Information on habitat use during migration is limited, but individuals in transit are likely to use foraging habitats at least part of the time. NLEB spend winter hibernating in caves and mines. However, there are no known wintering hibernacula within North Dakota, the closest likely being in the Black Hills of South Dakota or in caves in Minnesota.

Occurrence of the species in North Dakota is expected to be uncommon or rare (USFWS 2013a), and the likelihood of the species occurring in the Study Corridor during the summer residency period is low due to the lack of potentially suitable roosting and foraging habitat. Therefore, there is a low likelihood of Project-related impacts to this species.

Pallid Sturgeon (Federally Endangered)

Pallid sturgeon are bottom dwelling, slow growing fish that feed primarily on small fish and immature aquatic insects. This species of sturgeon is seldom seen and is one of the least understood fish in the Missouri and Mississippi River drainages. The pallid sturgeon was listed as endangered in 1990 and recovery efforts include research to learn more about its life history and habitat requirements, artificial propagation to improve its numbers, habitat improvement and reducing mortality from commercial fishing (USFWS 2019e).

No tributaries to the Missouri River where pallid sturgeon are known to occur are within the Study Corridor. Since the pallid sturgeon is only found within the Missouri River and its larger tributaries, pallid sturgeon will not occur within or around the Study Corridor.

Dakota Skipper (Federally Threatened)

The Dakota skipper was listed as threatened under the Endangered Species Act (16 U.S.C. ch. 35 § 1531 et seq.) by the USFWS, effective on November 24, 2014 (USFWS 2014a). The primary causes for decline in Dakota skipper populations include the loss or fragmentation of high-quality native prairie habitat from overgrazing, conversion to agriculture, invasion by nonnative plants, urbanization, and disruption of natural prairie fire cycles (USFWS 2019f).

The Dakota skipper larval and adult foraging habitats are recognized by the USFWS as occurring in undisturbed native prairie, but also include those areas that may be invaded by Kentucky bluegrass (*Poa pratensis*) (USFWS 2016a). Suitable habitat for Dakota skipper includes two types: Type A and Type B (Royer *et al*. 2014; USFWS 2016a, 2018a). The Study Corridor only contains Type B Habitat.

Type B habitat occurs primarily on rolling terrain over gravelly glacial moraine deposits and is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), and needleandthread (*Hesperostipa comata*) or porcupinegrasse (*Hesperostipa spartea*), and often invaded by Kentucky bluegrass. In a variant of Type B habitats common to western North Dakota, western wheatgrass (*Pascopyrum smithii*) is also typical. Bluebell bellflower (*Campanula rotundifolia*) and prairie lily (*Lilium philadelphicum*) are present in Type B habitats, but they support more extensive stands of purple coneflower (*Echinacea purpurea*), prairie coneflower (*Ratibida columnifera*), and common gaillardia (blanketflower; *Gaillardia aristata*). Type B habitat typically supports a high diversity and abundance of native forbs, including purple coneflower, purple prairie clover (*Dalea purpurea*), white prairie clover (*Dalea candida*), yellow sundrops (*Calylophus serrulatus*), prairie groundsel (*Packera plattensis*), groundplum milkvetch (*Astragalus crassicarpus*), eastern pasqueflower (*Pulsatilla patens*), old man's whiskers (prairie smoke; *Geum triflorum*), western silver aster (*Symphyotrichum sericeum*), dotted blazing star (*Liatris punctata*), tall blazing star (*Liatris aspera*), meadow zizia (heartleaf golden Alexanders; *Zizia aptera*), blanket flower (*Gaillardia* species), prairie sagewort (*Artemisia frigida*), and leadplant (*Amorpha canescens*) (USFWS 2016a; 2018a).

The Dakota skipper flight period is two to four weeks long, with year-to-year variability due to the weather and forb flowering times that occurs between mid-June and mid-July. Plants that are nectar sources for the Dakota skipper provide water and nutrients for adult Dakota skippers during their flight period (USFWS 2016a). Flowering forbs must be present in abundant quantity and near suitable larval habitat to provide reliable sources of nectar for adults during their flight period. They are not known to disperse widely (Swengel 1996; Burke *et al*. 2011) and typically do not travel more than one kilometer between habitat patches (USFWS 2018b). However, average movement distances for individuals have been documented as less than 300 meters (Dana 1991).

During the flight period, eggs are laid on broadleaf plants (McCabe 1981) and grasses (Dana 1991). The eggs hatch after incubating for seven to 20 days, and the larvae then crawl to the bases of grass plants where they form shelters at or below the ground surface (Dana 1991). At night, they emerge from their shelters to forage. For growth and survival, larvae rely on native grasses such as little bluestem, big bluestem, sideoats grama (*Bouteloua curtipendula*), and prairie dropseed (*Sporobolus heterolepis*) (USFWS 2016a). Dakota skippers have six to seven larval stages (instars). They overwinter in their ground-level or subsurface shelters during either the fourth or fifth instar and resume feeding the following spring. One generation of Dakota skippers is completed per year.

The USFWS considers the Dakota skipper possibly absent in Burke County and present in Mountrail County. Occurrences have been documented in one township in Burke County and three in Mountrail County (USFWS 2019g). The closest townships with previously documented occurrences are both located approximately eight miles east of the Project Route.

SWCA Environmental Consultants (SWCA) completed a desktop analysis to determine the presence of potential undisturbed grassland that could be habitat for the Dakota skipper (SWCA 2019; **Appendix B**). The Study Corridor was evaluated using GIS layers and aerial imagery interpretation. All areas mapped in publicly available GIS layers as cultivated, forest, wetland, open water, or disturbed (*e.g.*, roads, farmsteads, and towns) were removed from the potential habitat layer. During aerial imagery interpretation, any area that showed evidence of disturbance (*e.g.*, cultivation) was removed from the potential habitat layer. Aerial imagery interpretation was completed by a SWCA habitat biologist experienced with Dakota skipper habitat. SWCA completed field surveys on areas of potential habitat (as identified during the desktop analysis) that intersected with the construction footprint to determine the presence/absence of suitable habitat (USFWS 2018a). The surveys were conducted by a biologist experienced identifying Dakota skipper suitable habitat. All suitable habitat determinations were reviewed and approved by Mr. Jake Powell, a SWCA senior ecologist who holds an USFWS Dakota skipper scientific recovery permit (Permit No. TE64070B-1).

Bald Eagle (Federally Protected under BGEPA)

Bald eagles occur throughout the contiguous United States, Alaska, and Canada (Buehler 2000). Bald eagles may occur in North Dakota as breeders, winter residents, migrants or year-round residents. The nesting period in North Dakota begins with nest building or maintenance in January-February and ends when the young fledge, typically in July. Although bald eagle nests have historically been found primarily along the Missouri River and Red River, the number of bald eagle nests has increased in North Dakota over the last 20 years as the population continues to recover. Nesting bald eagles now occur in more than half of the counties in the state (Dyke *et al.* 2015). Most of the nests occur near streams and mid- to large-sized lakes, but bald eagles are also initiating nests in areas not considered traditional nesting habitat such as cottonwood trees surrounded by cropland or grassland (Dyke *et al*. 2015). The home range size of bald eagles is variable. Populations in Oregon and Washington have home ranges of 2.7 to 18.1 square miles, with an average of 8.5 square miles (Watson *et al.* 1991), and in Montana the average home range size was 3.5 square miles (Stangl 1994). Along the Mississippi River in Minnesota, nests were located an average of 0.94 mile from the nearest neighboring nest (Mundahl *et al*. 2013).

During the non-breeding season (September through January), bald eagles typically concentrate near large bodies of water where the water remains unfrozen and will roost up to 20 miles from foraging sites, depending on abundance of prey (Buehler 2000, USFWS 2013b). Bald eagles are opportunistic foragers that prey primarily on fish, but also feed on other aquatic and terrestrial vertebrates, as well as on carrion (Buehler 2000).

No bald eagle nests were located within the Study Corridor or three-mile survey area either side of the Study Corridor (Derby and Agudelo 2019). Bald eagles may use the Study Corridor during the year but are unlikely to nest within the Study Corridor due to general lack of suitable habitat.

Golden Eagle (Federally Protected under BGEPA)

Golden eagles are common in western North America west of the 100th meridian with small populations also present in the eastern portions of Canada and the United States (Kochert *et al*. 2002). Golden eagles in the western U.S. are most commonly associated with open and semi-open habitats such as shrublands, grasslands, woodland-brushlands, and coniferous forests as well as in farmland and riparian habitats. Both year-round and migratory golden eagles occur in North Dakota (NDGFD 2015). Golden eagles nest on cliffs, utility poles, and in large trees in open areas from late January through August (Kochert *et al*. 2002). Golden eagles in North Dakota nest mainly west of the Missouri River (Dyke *et al*. 2015), and egg-laying occurs from late March to early May (Stewart 1975, DeLong 2004). The species feeds upon a wide variety of prey species but tends to hunt small to medium-sized mammals such as hares, rabbits, ground squirrels, marmots, and prairie dogs depending upon local availability (Bloom and Hawks 1982, Kochert *et al*. 2002).

No golden eagle nests were located within the Study Corridor or buffer during aerial surveys. Golden eagles may potentially occur in the Study Corridor during any time of the year but are unlikely to be breeding within the Study Corridor due to a lack of suitable habitat.

5.13.2 Impacts

Northern Divide Wind is developing a voluntary WCS, which includes an adaptive management approach so that information gathered, and experience gained, from post-construction monitoring can be used to inform future management decisions at the Project. Based on operational data from the WRRS protocol in use at NextEra's operating wind farms in North Dakota, there have been no mortalities of any federally listed species. Per the WRRS protocol, if a dead or injured federally listed species is found, it must be left undisturbed and reported to USFWS. No irreversible damage to rare or unique animal or plant species is anticipated. Individual species are discussed below.

Piping Plover

There were no piping plover observations during avian surveys. The species is known to occur in Burke and Mountrail Counties. The closest designated critical habitats is located approximately three miles east of the Study Corridor so it is unlikely, although possible, the piping plover will occur within the Study Corridor (USFWS 2013d). It is unlikely that the Project will affect the species as there were none recorded during avian surveys. The potential for indirect impacts such as habitat loss is unlikely as all direct impacts to wetlands will be avoided.

Red Knot

There were no red knot observations during avian surveys. The species is known to occur in Burke and Mountrail Counties; however, there are no stopover sites consistently used by red knots in North Dakota. With no red knot observations during avian surveys and since there is no preferred stopover habitat identified within the Study Corridor, it is unlikely that the Project will affect the red knot.

Whooping Crane

Power lines represent a documented collision mortality risk for whooping cranes (Stehn and Wassenich 2008). Collisions with the transmission line and the complete avoidance of the area around the Project are the two potential impacts of wind development on whooping cranes. The Project will avoid direct impacts to and span all wetlands. Additionally, the Project will include bird flight diverters per APLIC guidelines to provide visibility and minimize collisions.

Least Tern

There were no least tern observations during avian surveys. The species is known to occur in Mountrail County; however, the closest habitat use area to the Study Corridor is approximately 16 miles south at Lake Sakakawea. With the lack of gravelly or sandy beaches or sandbars identified within the Study Corridor, the Project is not likely to impact the least tern.

Northern Long-Eared Bat

There is little suitable roosting or foraging habitat in the Study Corridor and no known hibernacula in North Dakota for the NLEB. The species is highly unlikely to collide the transmission line during the spring and fall periods when migrating between summer roosts and winter hibernacula; however migratory movements by the species are short, which further reduces the likelihood of individuals encountering the Study Corridor. Due to the limited amount of forested habitat within the Study Corridor, and with suspected occurrence by the species limited throughout the state, the NLEB's likelihood of occurrence within the Study Corridor is low; therefore, likelihood of Project-related impacts is also low.

Pallid Sturgeon

No large tributaries to the Missouri River occur within the Study Corridor. Since the pallid sturgeon is only found within the Missouri River and its larger tributaries, pallid sturgeon will not occur within or around the Study Corridor and no impacts will occur.

Dakota Skipper

Approximately 215 acres of suitable Dakota skipper habitat were assessed for the Project (SWCA 2019; **Appendix B**) and Project infrastructure avoids impact to all suitable Dakota skipper habitat. No Project construction activities will occur within identified suitable Dakota Skipper habitat. Avoidance will include siting structures and other temporary and permanent infrastructure outside of suitable habitat boundaries. Suitable Dakota skipper habitat boundaries will be marked during construction to restrict entry by construction equipment. Thus, no impacts to Dakota skipper are anticipated.

Bald and Golden Eagle

No eagle nests were identified within three miles of the Study Corridor; as such no impacts are anticipated. In addition, the transmission line will be outfitted with bird flight diverters following APLIC guidelines which will also increase visibility of the lines for large raptors such as eagles, thereby reducing collision risk with the transmission lines. Therefore, the impacts of the Project on eagle are likely to be low.

5.13.3 Mitigative Measures

Northern Divide Wind conducted environmental studies, relied upon studies conducted as part of the Previous Project, and consulted with the NDGFD and USFWS on appropriate avoidance, minimization, and offset measures so that the Project would have minimal environmental impacts (Section 6 and **Appendix C**). Based on the above the following measures will be used, to the extent practicable, by Northern Divide Wind:

- Field-verified suitable Dakota skipper habitat has been and will continue to be avoided. High visibility fencing (*e.g.*, snow fence) will be placed around field-verified suitable Dakota skipper

habitat areas in close proximity to construction to restrict construction equipment from disturbing these areas.

- No construction will occur during the Dakota skipper adult flight period (between June 15 and July 18) in areas proximal to field-verified Dakota skipper habitat.
- Educate construction contractors about threatened and endangered species and associated mitigative measures being implemented for each respective species.
- Provide the appropriate whooping crane identification guide materials to be in all Project maintenance and operations vehicles for reference.
- Provide contractors with training, spatial data and static constraints maps that identity where field verified suitable Dakota skipper habitat is located and where construction equipment is restricted.
- Provide contractors with static constraint maps and ensure compliance through onsite environmental construction monitoring.

6.0 PUBLIC AND AGENCY COORDINATION

The Project largely overlaps the Previous Project. Many of the previous public and agency coordination efforts informed Project development. However, as the Project is newly proposed, Northern Divide Wind and its representatives contacted key local, state, and federal agencies per Section 69-06-01-05 of the N.D. Admin Code. This started in July 2019 with in-person meetings with the NDGFD and USFWS, as well as issuing the requisite agency notification letters in August 2019 to inform them of the Project, in conjunction with the Wind Energy Center and requests for assistance in identifying concerns or issues within the Study Corridor. Northern Divide Wind has also maintained close coordination with landowner stakeholders throughout the process via in-person meetings, mailers, and phone calls, and Native American Tribes as described in Section 5.6. Coordination with Burke and Mountrail Counties are described in Section 3.6. Northern Divide Wind will continue to meet with county officials as the Project moves forward and Northern Divide Wind seeks any necessary local permits (*e.g.*, building permit). Public and agency correspondence as of November 21, 2019 are included in **Appendix C. Table 6-1** summarizes the responses received from agencies to date.

Table 6-1 Summary of Agency Comments

Agency	Comment Date	Comment Summary	Section Addressed
U.S. Army Corps of Engineers (USACE)	Aug. 26, 2019	A Section 10 permit would be required for work impacting navigable waters. A Section 404 permit would be required for the discharge of dredge or fill material (temporarily or permanently) in waters on the United States. The USACE has determined that the Project may need a Clean Water Act Section 404 permit.	5.11, Table 7-1
North Dakota Department of Trust Lands (NDDTL)	Aug. 28, 2019	To obtain an easement across trust lands, an on-line application form must be completed. Any proposed towers or lines would be subject to review by the surface division staff and approval by the Land Commissioner of behalf of the Board of University and School Lands. There are school trust surface interests that are managed by the NDDTL on behalf of the Board of University and School Lands which are located within or near the proposed Study Corridor. There are no active coal leases on school trust lands within the Study Corridor.	1.2, 1.4, 5.7, Table 7-1
State Historical Society of North Dakota (SHSND)	Aug. 29, 2019	The SHSND recommends a current Class I to determine any additional recorded cultural resources in the Study Corridor; a Class II (reconnaissance) and Class III (pedestrian) survey by a permitted architectural historian for standing buildings and structures over 50 years old in the visual area of potential effects; and a Class III archaeological survey of all areas of direct impact including crane paths, MET towers, access roads, turbine locations, and staging areas unless the footprint has been recently surveyed for cultural resources.	5.6, Table 7-1

Agency	Comment Date	Comment Summary	Section Addressed
North Dakota Geological Survey	Aug. 30, 2019	It appears that there are some locations in the southern portion of the transmission line corridor boundaries that contain areas mapped as landslide or features that suggest slope instability. Also, there appears to be several areas within the proposed Study Corridor that contain mineable coal resources. A review of the Commission's Abandoned Mine Land (AML) locations data also shows seven AML locations just north of White Earth, ND that should be noted.	5.9
North Dakota Aeronautics Commission	Aug. 30, 2019	Due to the proximity to the Tioga Municipal Airport, the agency recommended that an airspace case be filed with the Federal Aviation Administration (FAA). If the height is above 200 feet above ground level, then the Project should to submit a case to the FAA for review and if the Project falls into any in the FAR Part 77 then the Project is required to file a case with the FAA	5.3
North Dakota Department of Environmental Quality (NDDEQ)	Sept. 4, 2019	The NDDEQ believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. Disturbing one or more acres requires a permit to discharge stormwater runoff. Care should be taken to avoid spills. Noise from construction activities may have adverse effects on persons who live near the construction area. All solid waste materials must be managed and transported in accordance with the state's solid and hazardous waste rules.	4.2 5.3, 5.5, 5.10, 5.11, Table 7-1
North Dakota State Water Commission (NDSWC)	Sept. 9, 2019	Initial review indicates the Project does not require a conditional or temporary permit for water appropriation. However, if surface water or groundwater will be diverted for construction of the Project, a water permit will be required per N.D.C.C. 61-04-02. If a NDSWC observation well must be removed, the Project was requested to contact the Water Appropriations Division. There are no floodplains identified and/or mapped at the Project location. No permits relative to the National Flood Insurance Program are required based on the current effective Flood Insurance Rate Map and State minimum standards.	5.10, Table 7-1

Agency	Comment Date	Comment Summary	Section Addressed
North Dakota Game and Fish Department (NDGFD)	Sept. 12, 2019	The risk of Whooping Cranes striking a transmission line will be elevated in this area as compared to the rest of the state. Collisions with transmission lines are the leading cause of death in the wild for whooping cranes. Contact the U.S. Fish and Wildlife Habitat and Population Evaluation Team in Bismarck to request the Whooping Crane model of predicted use of landscapes. The Project overlaps with one of the few places in the state where a high concentration of Sprague's' pipits persists. If a road needs to be created for the Project, a sizeable loss to native prairie and an increase in habitat fragmentation would result. If that road is to be maintained, it is likely that disturbance will have long lasting impacts to species of conservation concern, specifically those sensitive to habitat fragmentation. The NDGFD is concerned about what bringing new transmission to the area might mean for future development. The mosaic of grasslands and wetlands in this area is extremely valuable to a high number of wildlife species and the cumulative impacts of multiple projects in the area is of tremendous concern.	5.2, 5.11, 5.13, Appendix B
North Dakota Department of Transportation (NDDOT)	Sept. 20, 2019	This Project should have no adverse effect on the NDDOT highways. If any work needs to be done on highway right of way, appropriate permits and risk management documents will need to be obtained from the NDDOT District Engineer.	5.3, Table 7-1
NDGFD	Nov. 19, 2019	The NDGFD acknowledges Northern Divide Wind has taken the Department's recommendations seriously, resulting in significant impact avoidance and minimization. The NDGFD also recognizes Northern Divide Wind's voluntarily offset proposal.	1.3, 5.13, Appendix C

7.0 POTENTIAL PERMITS/APPROVALS

Table 7-1 outlines the federal, state, and county permits or approvals that have been identified as potentially required for the construction and operation of the Project. Permits dependent on the final Project layout will be applied for after receiving Commission approval, but prior to construction.

Table 7-1 Potential Permits and Approvals Required for Construction and Operation

Agency	Type of Approval	Status*	Need
Federal Approvals			
United States Army Corps of Engineers	Nationwide Permit 12	N/A	Wetlands and other surface waters are avoided.
	Section 404 Permit	N/A	
	Section 10 permit	N/A	
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasure Plan	3	Required if more than 1,320 gallons of oil storage is located on-site.
U.S. Fish and Wildlife Service (USFWS)	Special Use Permit	N/A	All Project infrastructure is sited outside of USWFS easements.
State of North Dakota			
North Dakota Public Service Commission	Certificate of Site Compatibility and Route Permit Transmission Facility	2	Required for construction of transmission facility over 115-kV.
State Historical Society of North Dakota (SHSND)	Concurrence with effect determinations	2	Reports for the Class III cultural resources inventories will be submitted to SHSND for review when complete.
North Dakota Department of Environmental Quality	National Pollutant Discharge Elimination System Permit: General Construction Storm Water	3	Required for disturbance of over one acre of land and a stormwater pollution prevention plan must be prepared.
North Dakota Highway Patrol	Overheight/Overweight Permit	3	Required for hauling construction equipment and materials on state highways.
North Dakota Department of Transportation	Road Approach/Access Permit	3	Required for construction of access roads from state highways.
	Utility Permit/Risk Management Documents	3	Required for utility crossings on state highway rights-of-way.
North Dakota State Water Commission	Drainage Permit	N/A	The Project will not drain a pond, slough, lake or sheetwater, or any series thereof, that has a watershed area (*i.e.*, drainage area) of 80 acres or more.
	Conditional or Temporary Permit for water appropriation	N/A	No water appropriation required.
	Water Permit	3	Required if drilling a well.
North Dakota Department of Trust Lands (NDDTL)	Rights-of-Way Easement	3	Required transmission lines on NDDTL.

Agency	Type of Approval	Status*	Need
Burke County			
Burke County Commission	Conditional Use Permit	1	Required to construct, operate, or maintain the Project.
	County Road and Crossing Permit	3	Required to install a conduit across a county road.
	Utility Occupancy Permit	3	Required to install a utility within a road right-of-way.
	Road Use Agreement	1	Required for road use.
Mountrail County			
Mountrail County Board	Zoning Request Application	1	Required to construct, operate, or maintain the Project.
	County Road and Crossing Permit	2	Required to install a conduit across a county road.
	Road Use Agreement	2	Required for road use.

*Status Explanation:
1 Completed and approved
2 Applied and/or decision pending
3 Will apply for prior to construction as applicable

8.0 FACTORS CONSIDERED

The North Dakota Energy Conversion and Transmission Facility Siting Act lists 11 factors to guide the Commission in the evaluation and designation of the Project, Study Corridor, and Project Route (N.D.C.C. Section 49-22-09).

8.1 Public Health and Welfare, Natural Resources, and the Environment

The preceding sections discuss the research and investigations relating to the effects of the Project on public health and welfare, natural resources, and the environment. These effects and the proposed mitigation to minimize these effects are summarized in Section 5.

8.2 Technologies to Minimize Adverse Environmental Effects

Northern Divide Wind will utilize the most current technologies to minimize impacts to the environment. Current technologies include designing utility lines according to APLIC guidelines to prevent bird collision, as practicable and mark overhead transmission lines with bird flight diverters in keeping with the APLIC guidelines (APLIC 2012).

8.3 Beneficial Uses of Waste Energy

This factor is not applicable to this Project. No waste energy is produced by a transmission line.

8.4 Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental effects are described for each resource area in Section 5.

8.5 Alternatives to the Project Route

Other alternatives were considered for the Project Route within the area between the existing Tande Substation and the Wind Energy Center substation. Northern Divide Wind believes that the Project Route is the most viable route alternative based on landowner preferences and the fact that the Project Route follows and is the most direct route that also minimizes impacts on the exclusion, avoidance, selection, and policy criteria identified in N.D. Admin Code Section 69-06-08-02.

8.6 Irreversible and Irretrievable Commitment of Natural Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. There are few commitments of resources associated with this Project that are irreversible and irretrievable, but these include those resources primarily related to construction.

Labor and natural resources will be used in the fabrication and preparation of construction materials. These materials are usually not retrievable. Construction resources that will be used include aggregate resources, concrete, steel, and hydrocarbon fuel. Of the 279 structures, 265 structures will utilize direct embed foundations and 14 structures will utilize drilled shaft foundations. Direct embed foundations are estimated to range from 15 to 50 feet in length and 6 to 15 feet in diameter. Drilled shaft foundations are estimated to range from 15 to 50 feet in length and 6 to 15 feet in diameter. During construction, vehicles will be traveling to and from the site, utilizing hydrocarbon fuels. These resources are not in short supply, and their use will not have an adverse effect on the availability of these resources. In addition, the anticipated economic benefits of the Project will balance the irretrievable commitment of resources resulting from the construction of the Project (see Section 8.7).

8.7 Direct and Indirect Economic Impacts

Economic impacts include impacts associated with the temporary disturbance of up to 100.6 acres of land during construction, which could potentially interrupt farming and ranching for landowners. Permanent impacts will be lower, at approximately 0.6 acres. In general, agricultural areas surrounding each structure can still be farmed, and landowner compensation has been established in individual lease agreements.

The remaining direct and indirect economic impacts are primarily positive. The rural economy and energy production in the county and state is diversified. To the extent that local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Burke and Mountrail Counties will contribute to the total personal income of the region. Additional personal income will be generated for residents in the counties and the state by circulation and recirculation of dollars paid out by the Northern Divide Wind as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies, and other products and services benefit businesses in the counties and the state.

Long-term beneficial impacts to the counties' tax base as a result of the construction and operation of the Project will contribute to improving the local economy in this area of North Dakota. The development of Project in this region will be important in diversifying and strengthening the economic base of northwestern North Dakota. Additional revenues are expected from property and income taxes.

8.8 Existing Development Plans of the State, Local, Government and Private Entities at or in the Vicinity of the Site

No conflicts are anticipated with existing state and local government and private entities' development plans.

8.9 Effect of Site on Scenic Areas and Cultural Resources

There are no designated scenic resources that will be affected by the Project. As described in Section 5.6, a Class I Literature Review was conducted and a Class III Cultural Resources Inventory for archaeology was completed. Northern Divide Wind will avoid directly impacting resources that have been recommended for avoidance. Once complete, the Class III Cultural Resources Inventory Report will be submitted to the SHSND for review and concurrence, and a summary will be provided to the Commission.

8.10 Effect of Site on Biological Resources

Detailed discussion of potential impacts and proposed mitigation measures on biological resources is provided in Section 5.2 (Land Use and Vegetation), Section 5.11 (Wetlands), Section 5.12 (Wildlife), and Section 5.13 (Federally Protected Species).

8.11 Problems Identified by the Agencies

Agency coordination and potential permits/approvals are discussed in Section 6 and Section 7, respectively. A copy of agency response letters is included in **Appendix C**.

9.0 QUALIFICATIONS OF CONTRIBUTORS

Table 9-1 Qualifications of Contributors

Name Project Role	Education and Professional Experience
Dustin Jones Environmental Services Project Manager NextEra	Mr. Jones has 17 years of environmental permitting experience as both a consultant and environmental manager in the renewable industry. His primary responsibility is permitting and licensing projects on private and public land in compliance with federal and state environmental laws. He is a certified wetland delineator and obtained his Bachelor of Science in Wildlife and Fisheries Sciences from Texas A&M University.
John Bulich Engineering Senior Project Manager NextEra	Mr. Bulich has over 25 years of experience in Engineering design and management, with over 15 with NextEra working on combined cycle, transmission, and renewable projects (wind, solar, and energy storage). His primary responsibility is Engineering Management of the wind farm collection, substation, and transmission line. He holds a Bachelor of Science in Mechanical Engineering from Clemson University and is a Registered Professional Engineer
Clay Cameron Wind Development NextEra	Mr. Cameron has over 21 years of experience in project management including development, construction, federal, state, and local permitting and compliance. His responsibilities include financial feasibility analysis, cost and schedule management, and coordination of functional project teams and customer relationships. He has 10 years of experience in the utility industry including roles of increasing responsibility in community development, engineering & construction, and project development. He studied business management at Louisiana State University, and holds a State of Florida General Contractor license, and a State of California General Engineering license.
Carolyn Stewart Director Tribal Relations NextEra	Ms. Stewart is Director Tribal Relations for NextEra and is responsible for all indigenous and tribal relations efforts in the U.S. and Canada. She has 40 years of energy industry experience in conventional and renewable energy development, energy planning, and gas distribution and electric distribution operations, including nearly 21 years of tribal renewable energy project development and tribal relations experience. She earned a Bachelor of Science in Finance from the University of Illinois, and an M.B.A. from University of Chicago Graduate School of Business.
Richard Estabrook, PhD, RPA Environmental Services Project Manager – Archaeologist NextEra	Dr. Estabrook has over 30 years of cultural resources management experience, both as a consultant and as an environmental manager in the renewable industry. He obtained his Bachelor of Arts in Anthropology from Stony Brook University, his Master of Arts in Public Archaeology from University of South Florida, his GIS Certificate from University of South Florida, and his PhD in Applied Anthropology/Archaeology from University of South Florida.
Tracy C. Davis Senior Attorney NextEra	Ms. Davis has over 15 years of experience practicing energy regulatory law, and has served as in-house counsel for NextEra for the past six years. Her responsibilities include representation of NextEra subsidiaries and affiliates before state regulatory commissions, including the North Dakota Public Service Commission. She has a Bachelor of Arts and a Doctor of Jurisprudence from the University of Texas at Austin.
Lindsey Churchill, PhD, PWS Project Manager AECOM	Dr. Churchill has 12 years of environmental permitting experience in wetland and natural resources. Her responsibilities included project management, application preparation, and oversight of the wetlands and cultural resources surveys. She has a PhD in Natural Resources Management from North Dakota State University, a Master of Science in Natural Resources Management from NDSU, and Bachelor of Science in biology and mathematics from University of Jamestown. She is registered as a Professional Wetland Scientist and a USACE certified wetland delineator.

Name Project Role	Education and Professional Experience
Melinda McCarthy, MA, RPA Archaeologist/GIS Analyst AECOM	Ms. McCarthy has 11 years of cultural resources and historic preservation experience. Her responsibilities included leading the cultural resources archaeology and architecture surveys, GIS, and tribal outreach. She has a Bachelor of Arts in Anthropology with an emphasis in Archeology and a Master of Arts in History with a specialization in Historic Preservation, both from Southeast Missouri State University. She is permitted as a Principal Investigator through the North Dakota State Historic Preservation Office (NDSHPO) in North Dakota.
Marcia Bender, MA, RPA Archaeologist AECOM	Ms. Bender has 16 years of cultural resources experience. Her responsibilities included leading the cultural resources archaeology and tribal surveys. She has a Bachelor of Arts in Anthropology and a Master of Arts in Anthropology with an emphasis in Archaeology, both from Wichita State University. She is permitted as a Principal Investigator through NDSHPO in North Dakota.
Dirk Churchill Environmental Specialist AECOM	Mr. Churchill has 8 years of experience in environmental assessment, permitting, and compliance services. His responsibilities included application preparation and leading the wetland surveys. He has a Bachelor of Science in Natural Resources Management from Natural Resources Management from North Dakota State University. He is a USACE certified wetland delineator.
Steven Ensley GIS Analyst AECOM	Mr. Ensley has 14 years of experience as a GIS specialist within the Planning, Design and Development group. His responsibilities included mapping, data analysis, and technical expertise. He has a Bachelor of Science in Environmental Conservation from Northern Michigan University.

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11.0 ACRONYMS AND ABBREVIATIONS

AAA	Airport Airspace Analysis
AADT	annual average daily traffic
APLIC	Avian Power Line Interaction Committee
Atwell	Atwell, LLC
AWEA	American Wind Energy Association
Basin Electric	Basin Electric Power Cooperative
BGEPA	Bald and Golden Eagle Protection Act
Burke Wind	Burke Wind, LLC
Certificate	Certificate of Corridor Compatibility
Commission	North Dakota Public Service Commission
CRP	Conservation Reserve Program
CUP	Conditional Use Permit
CWS	Canadian Wildlife Service
EMF	electromagnetic fields
EMR	electromagnetic radiation
EPC	engineering, procurement, and construction
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FSA	Farm Service Agency
GIS	geographic information systems
ICBM	Intercontinental ballistic missile
IPaC	Information for Planning and Conservation
kHz	kilohertz
kV	kilovolt
MHz	megahertz
mph	miles per hour
NASS	National Agricultural Statistics Service
N.D. Admin Code	North Dakota Administrative Code
N.D.C.C.	North Dakota Century Code
NDCRS	North Dakota Cultural Resources Survey
NDDA	North Dakota Department of Agriculture
NDDEQ	North Dakota Department of Environmental Quality
NDDMR	North Dakota Department of Mineral Resources
NDDOT	North Dakota Department of Transportation
NDGFD	North Dakota Game and Fish Department
NDSHPO	North Dakota State Historic Preservation Office
NDSWC	North Dakota State Water Commission
NextEra	NextEra Energy Resources, LLC
NESC	National Electrical Safety Code
NHD	National Hydrography Dataset
NIEHS	National Institute of Environmental Health Sciences
NLEB	northern long-eared bat
NPDES	National Pollutant Discharge Elimination System

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O&M	operations and maintenance
OE	Obstruction Evaluation
PCN	preconstruction notification
Phase I ESA	Phase I Environmental Site Assessment
PPA	power purchase agreement
PLOTS	Private Land Open to Sportsmen
Project	Northern Divide 345-kV Transmission Line
Route Permit	Transmission Facility Route Permit
ROW	right-of-way
SCADA	Supervisory Control and Data Acquisitions
SCRSTT	sites of cultural and religious significance to the tribe
SHSND	State Historical Society of North Dakota
SRCSTT	Sites of Religious and/or Cultural Significance to Tribes
SWCA	SWCA Environmental Consultants
SWPPP	Storm Water Pollution Prevention Plan
T&E	threatened and endangered
TCS	Traditional Cultural Surveyors
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDHS	U.S. Department of Homeland Security
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCS	Wildlife Conservation Strategy
WEST	Western EcoSystems Technology, Inc.
Wind Energy Center	Northern Divide Wind Energy Center
WMA	Wildlife Management Area
WNS	white nose syndrome
WOTUS	Waters of the United States
WPA	Waterfowl Production Area
WRRS	Wildlife Response and Reporting System

Figures

95TH ST NW
94TH ST NW
84TH AVE NW
82ND AVE NW
93RD ST NW
90TH ST NW
DIVIDE COUNTY
BURKE COUNTY
40
87TH ST NW
86TH ST NW
85TH ST NW
85TH AVE NW
104TH AVE NW
84TH ST NW
83RD ST NW
82ND ST NW
81ST ST NW
90TH AVE NW
88TH AVE NW
50
40
Powers Lake
50
79TH ST NW
107TH AVE NW
106TH AVE NW
100TH AVE NW
77TH ST NW
76TH ST NW
101ST AVE NW
99TH AVE NW
93RD AVE NW
75TH ST NW
103RD AVE NW
74TH ST NW
86TH AVE NW
92ND AVE NW
91ST AVE NW
87TH AVE NW
73RD ST NW
94TH AVE NW
72ND ST NW
40
WILLIAMS COUNTY
MOUNTRAIL COUNTY
96TH AVE NW
71ST ST NW
102ND AVE NW
70TH ST NW
69TH ST NW
Tioga
67TH ST NW
66TH ST NW
White Earth

Figure 1-1
Project Location and Site Plan (Street Map)

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

N
W E
S

0 1 2 Miles

AECOM

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route



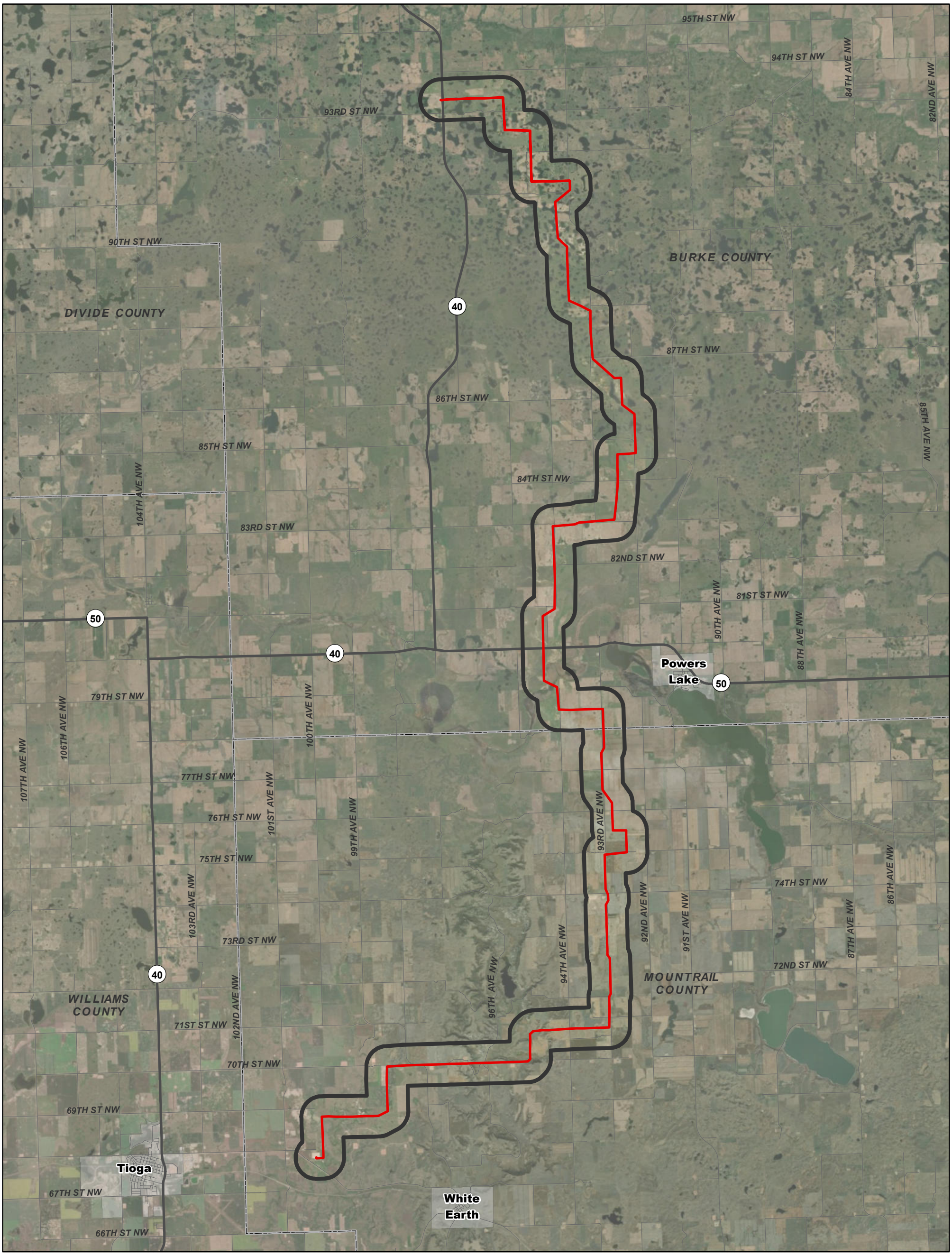


Figure 1-2
Project Location and Site Plan (Aerial)

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

N
W E
S

0 1 2 Miles

AECOM

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route



Figure 1-3
Project Location and Site Plan (Topographic)

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route

N W E S

0 1 2 Miles

AECOM



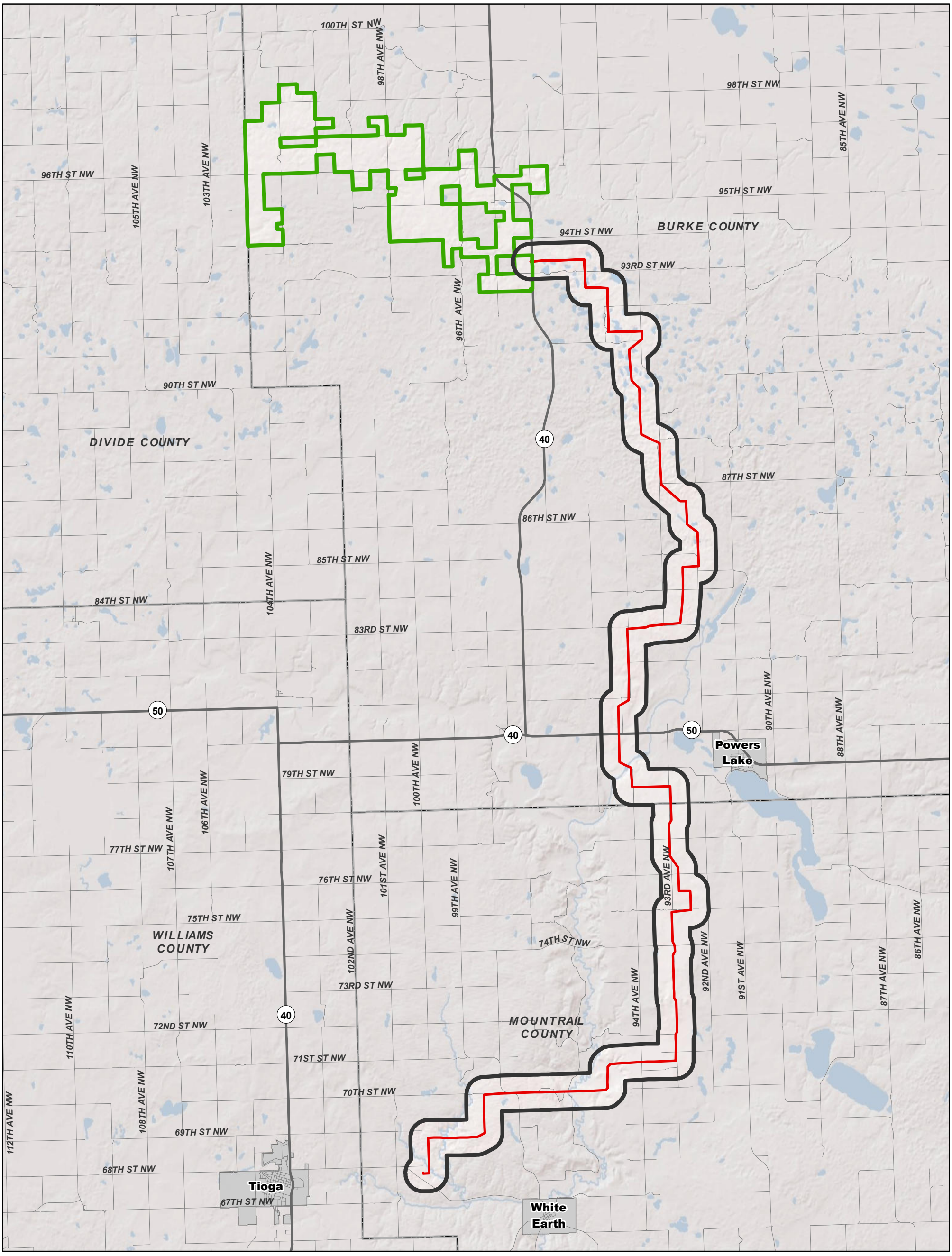


Figure 1-4
Study Corridor and Wind Energy Center

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

N
W E
S

0 1 2 Miles

AECOM

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide Wind Energy Center Project Area
- Northern Divide 345-kV Transmission Line Project Route



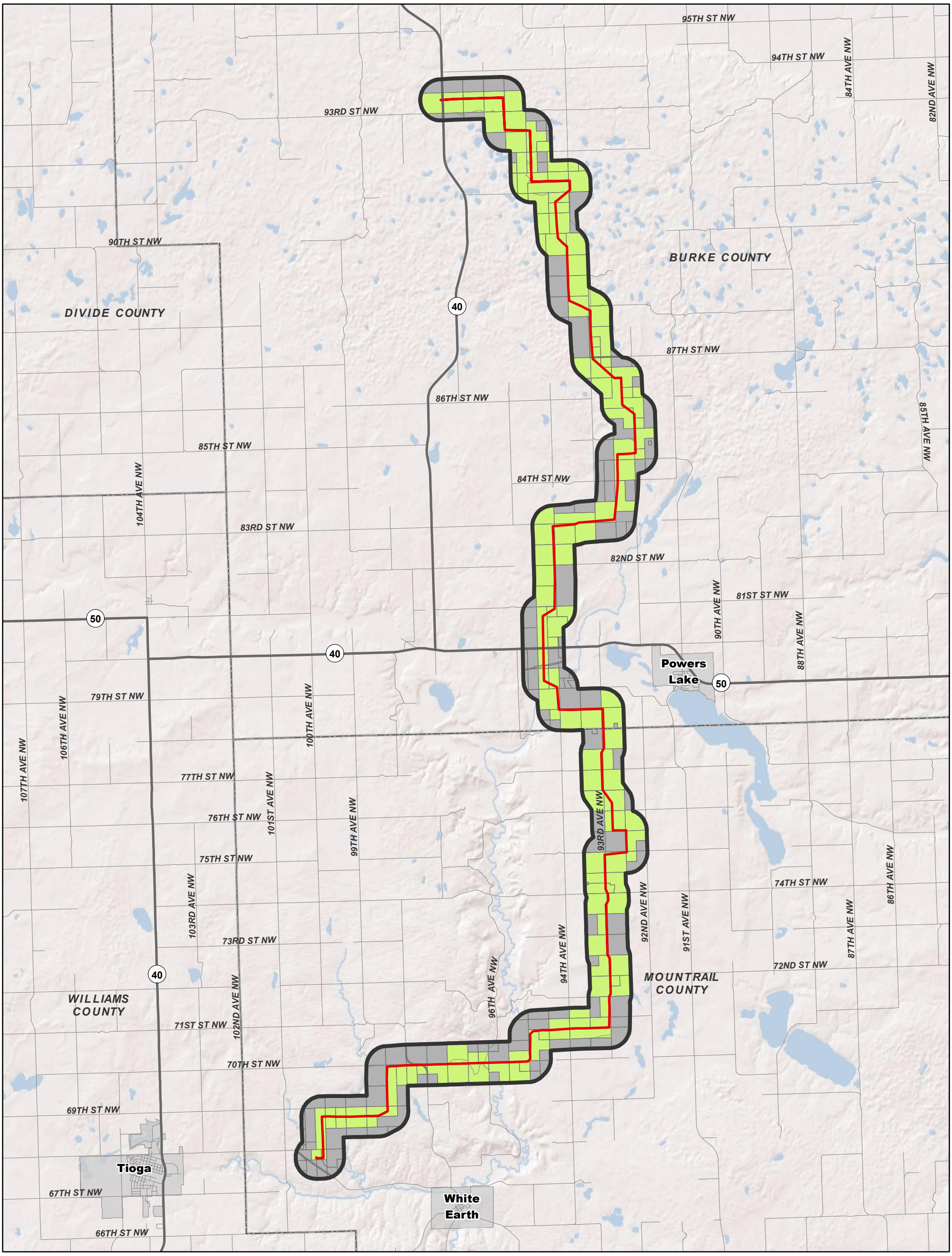


Figure 1-5
Participating Landowners

Northern Divide
345-kV Transmission Line
Burke and Mountrail
Counties, North Dakota

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route

Land Owners

- Participating Landowner
- Non-Participating Landowner



N W E S

0 1 2 Miles

AECOM

95TH ST NW
94TH ST NW
84TH AVE NW
82ND AVE NW
93RD ST NW
90TH ST NW
DIVIDE COUNTY
BURKE COUNTY
40
87TH ST NW
86TH ST NW
85TH ST NW
85TH AVE NW
104TH AVE NW
84TH ST NW
83RD ST NW
82ND ST NW
50
81ST ST NW
90TH AVE NW
88TH AVE NW
Powers Lake
79TH ST NW
107TH AVE NW
106TH AVE NW
100TH AVE NW
77TH ST NW
76TH ST NW
101ST AVE NW
99TH AVE NW
93RD AVE NW
75TH ST NW
103RD AVE NW
74TH ST NW
86TH AVE NW
92ND AVE NW
91ST AVE NW
87TH AVE NW
73RD ST NW
94TH AVE NW
72ND ST NW
96TH AVE NW
MOUNTRAIL COUNTY
WILLIAMS COUNTY
71ST ST NW
102ND AVE NW
70TH ST NW
69TH ST NW
Tioga
67TH ST NW
White Earth
66TH ST NW

Figure 3-1
Exclusion and Avoidance Areas

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

N
W E
S

0 1 2 Miles

AECOM

Legend

County Road
State/Federal Highway
County Boundary

Site Plan

Northern Divide 345-kV Transmission Line Study Corridor
Northern Divide 345-kV Transmission Line Project Route

Avoidance Areas

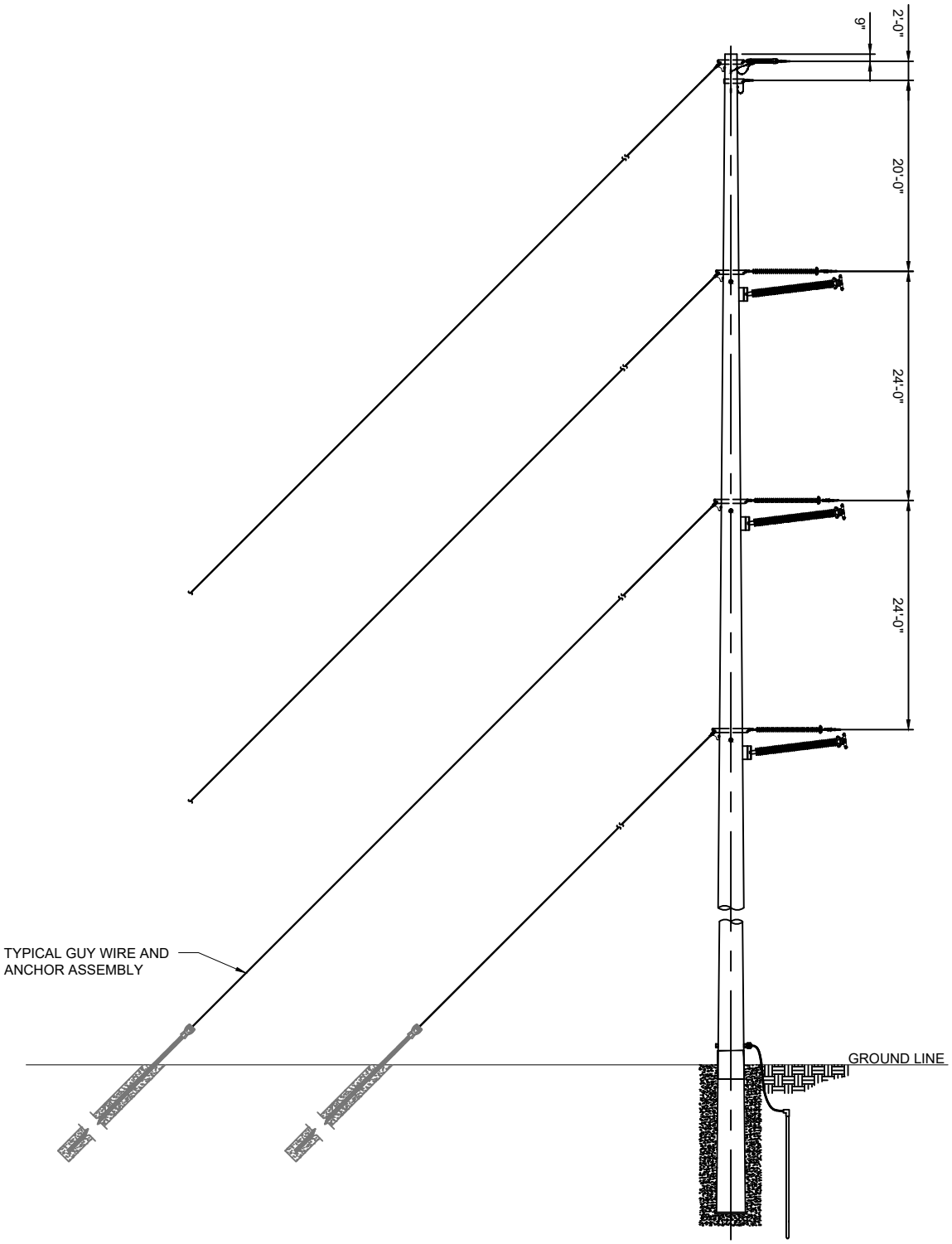
Residence*
Wildlife Management Area
Waterfowl Production Area

**Within 500 feet from the outermost portion of the transmission line facility to the nearest point of the residence.*

Known archaeological sites are not depicted due to confidentiality.



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Figure 4-1a Typical Structure Layout

no.	date	by	ckd	description
C	11/12/19	MSP	JPC	UPDATED PROJECT NAME
B	6/1/18	MSP	JPC	ISSUED FOR ND PSC APPLICATION
A	11/14/17	MSP	JPC	ISSUED FOR REVIEW

BURNS McDONNELL
9400 WARD PARKWAY, KANSAS CITY, MO 64114
PROJECT 99793

date	detailed
11/14/2017	M. PEPICH
designed	checked
M. PEPICH	A. HERRMANN

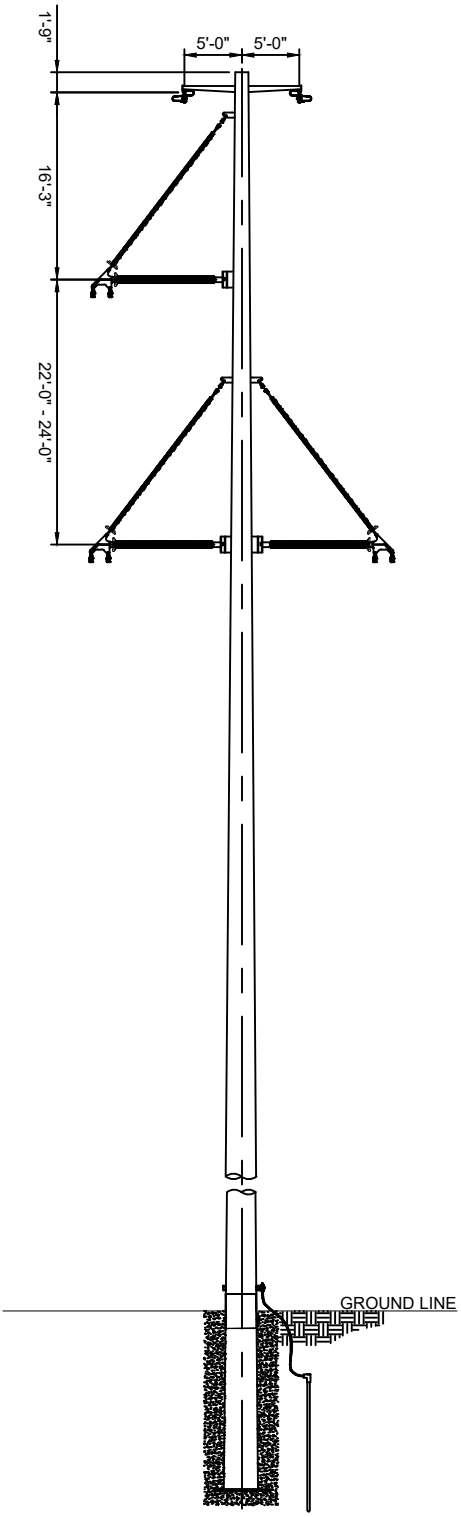
NORTHERN DIVIDE WIND, LLC
700 UNIVERSE BLVD.
JUNO BEACH, FL 33408

NORTHERN DIVIDE 345kV T/L PROJECT
EXHIBIT DRAWING
TYPICAL STRUCTURE LAYOUT
MONOPOLE GUYED DEADEND

drawing	sheet	rev.
BC1-00948	1	C

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Figure 4-1b Typical Structure Layout

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B	6/1/18	MSP	JPC	ISSUED FOR ND PSC APPLICATION
A	11/14/17	MSP	JPC	ISSUED FOR REVIEW

BURNS McDONNELL

9400 WARD PARKWAY, KANSAS CITY, MO 64114

PROJECT 99783

date	detailed
11/14/2017	M. PEPICH
designed	checked
M. PEPICH	A. HERRMANN

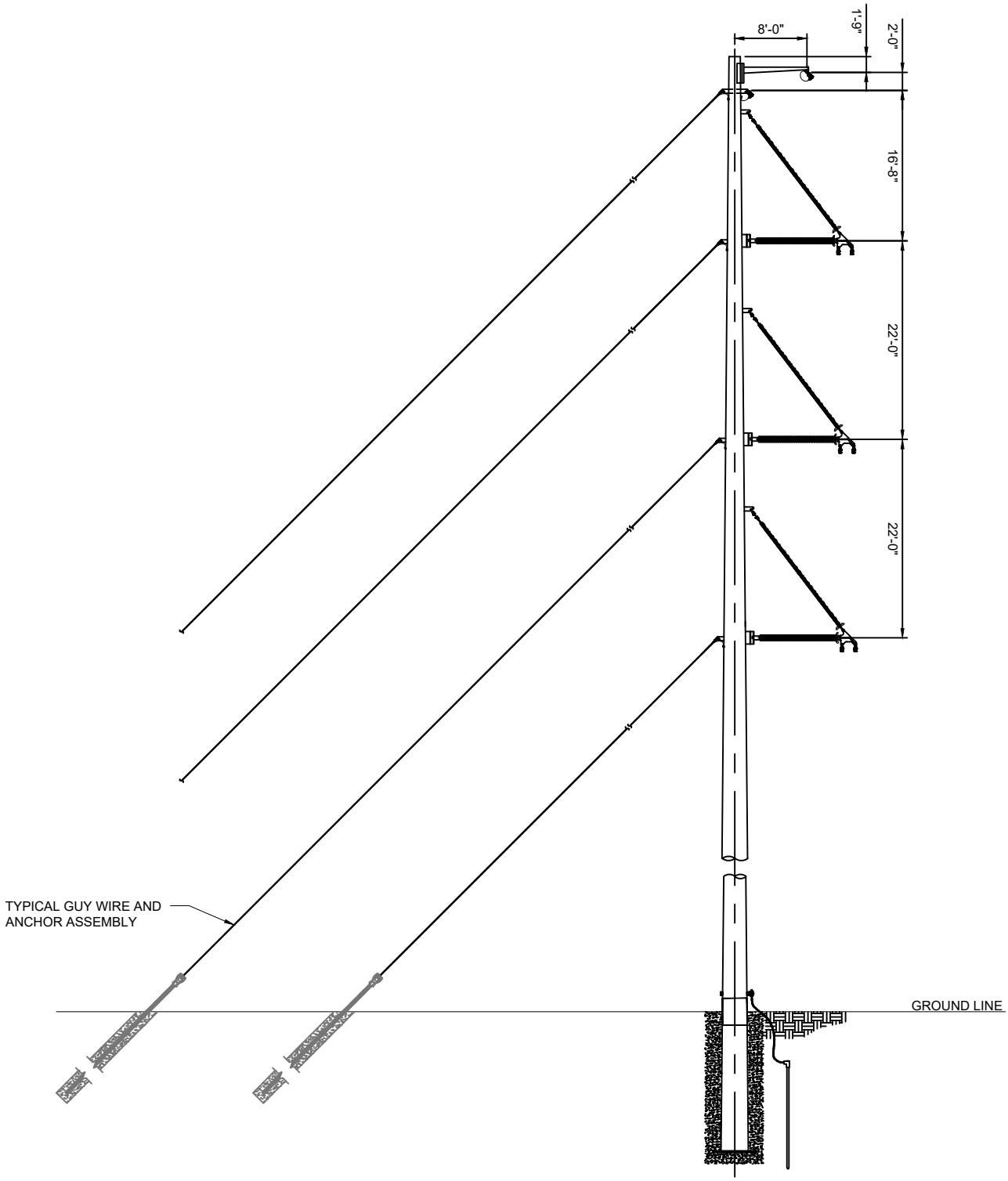
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700 UNIVERSE BLVD.
JUNO BEACH, FL 33408

NORTHERN DIVIDE 345kV T/L PROJECT
EXHIBIT DRAWING
TYPICAL STRUCTURE LAYOUT
MONOPOLE TANGENT

drawing	sheet	rev.
BC1-00946	1	C

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Figure 4-1c Typical Structure Layout

no.	date	by	ckd	description
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A	6/1/18	MSP	JPC	ISSUED FOR ND PSC APPLICATION

BURNS McDONNELL
9400 WARD PARKWAY, KANSAS CITY, MO 64114
PROJECT 99793

date 6/1/2018 | detailed M. PEPICH
designed M. PEPICH | checked A. HERRMANN

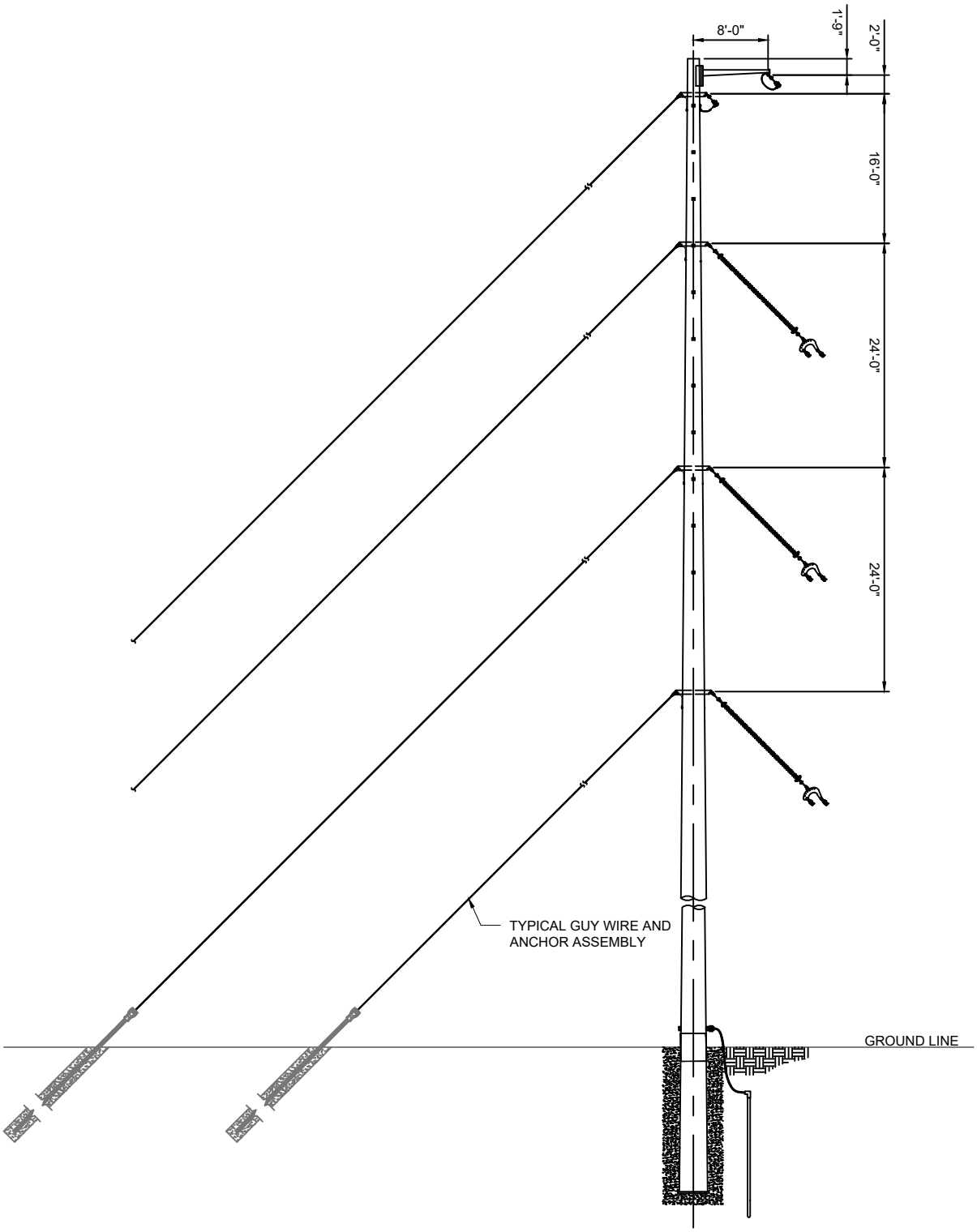
NORTHERN DIVIDE WIND, LLC
700 UNIVERSE BLVD.
JUNO BEACH, FL 33408

NORTHERN DIVIDE 345kV T/L PROJECT
EXHIBIT DRAWING
TYPICAL STRUCTURE LAYOUT
MONOPOLE GUYED LIGHT RUNNING ANGLE

drawing BC1-00950 | sheet 1 | rev. B

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Figure 4-1d Typical Structure Layout

no.	date	by	ckd	description
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A	11/14/17	MSP	JPC	ISSUED FOR REVIEW

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9400 WARD PARKWAY, KANSAS CITY, MO 64114

PROJECT 99793

date	detailed
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designed	checked
M. PEPICH	A. HERRMANN

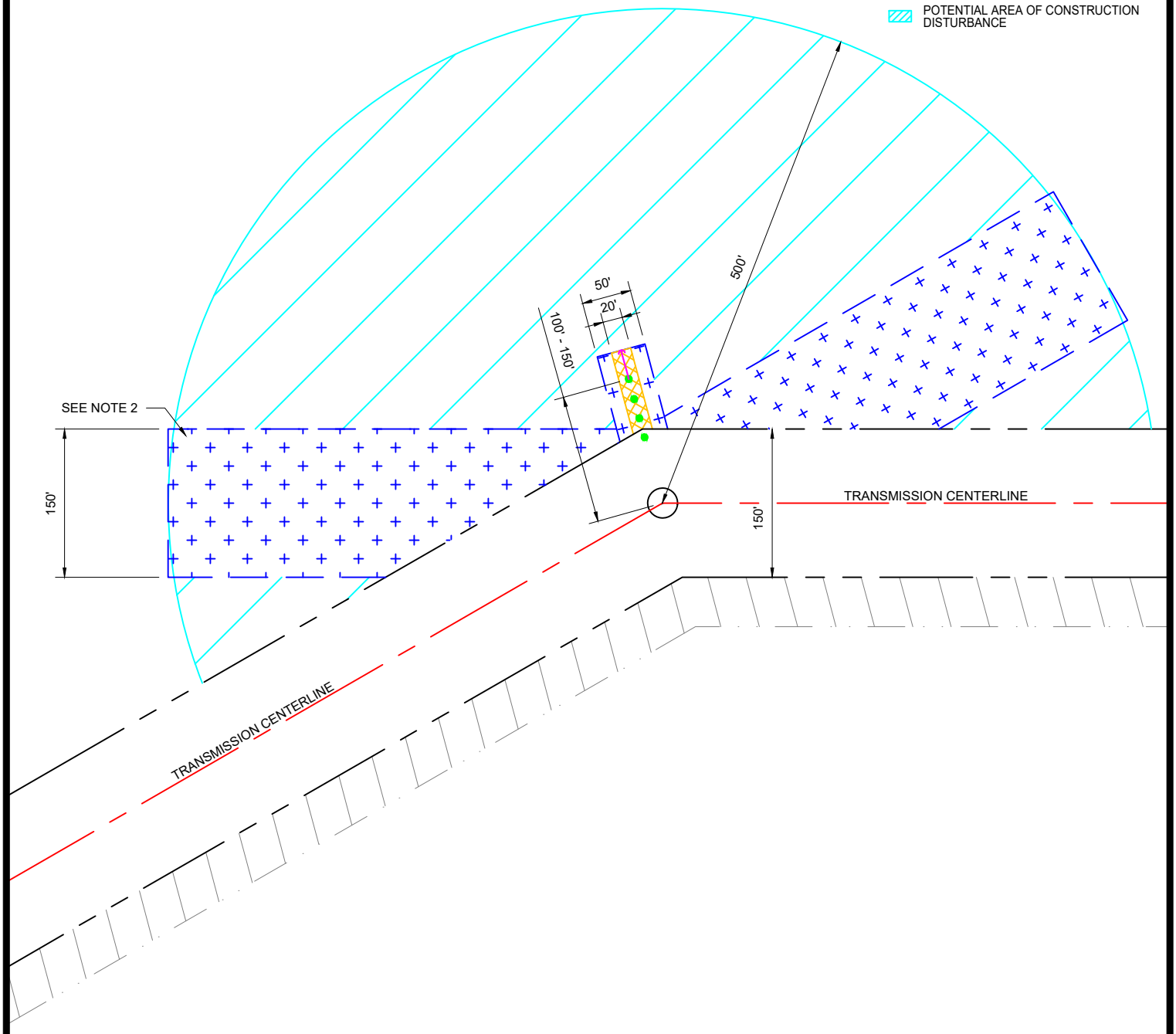
NORTHERN DIVIDE WIND, LLC
700 UNIVERSE BLVD.
JUNO BEACH, FL 33408

NORTHERN DIVIDE 345kV T/L PROJECT
EXHIBIT DRAWING
TYPICAL STRUCTURE LAYOUT
MONOPOLE GUYED MEDIUM RUNNING ANGLE

drawing	sheet	rev.
BC1-00947	1	C

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1. DIMENSIONS AND GENERAL CONFIGURATION SHOWN ARE BASED ON PRELIMINARY DESIGN INFORMATION AND ARE SUBJECT TO MINOR VARIATIONS IF REQUIRED DURING DETAILED DESIGN.
2. IF RUNNING ANGLE STRUCTURE IS LOCATED NEAR A ROAD SUCH THAT THE TEMPORARY CONSTRUCTION EASEMENT OVERLAPS THE ROAD ROW, THE TOTAL LENGTH OF THE EASEMENT MAY NEED TO INCREASE TO ALLOW WORK CREWS TO WORK ON THE OPPOSITE SIDE OF THE ROAD.

Figure 4-2a Guy Easement Exhibit

no.	date	by	ckd	description
B	11/12/19	MSP	ANH	UPDATED PROJECT NAME
A	6/1/18	MSP	ANH	ISSUED FOR ND PSC APPLICATION

BURNS McDONNELL
9400 WARD PARKWAY, KANSAS CITY, MO 64114

PROJECT 99793

date	detailed
6/1/2018	M. PEPICH
designed	checked
M. PEPICH	A. HERRMANN

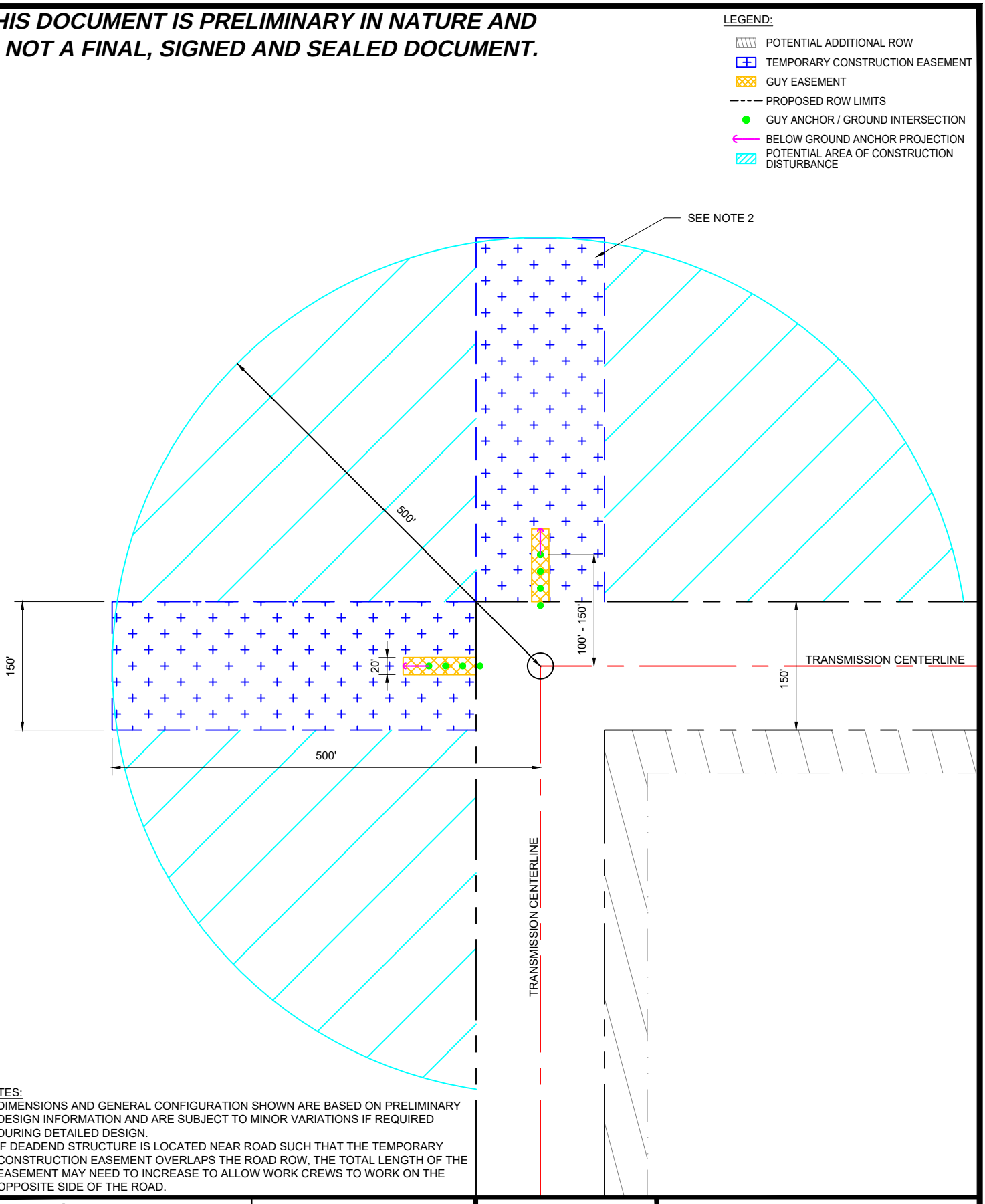
NORTHERN DIVIDE WIND, LLC
700 UNIVERSE BLVD.
JUNO BEACH, FL 33408

NORTHERN DIVIDE 345kV T/L PROJECT
GUY EASEMENT EXHIBIT
SINGLE CIRCUIT RUNNING ANGLE STRUCTURE

drawing	sheet	rev.
BC1-00931	1	B

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2. IF DEADEND STRUCTURE IS LOCATED NEAR ROAD SUCH THAT THE TEMPORARY CONSTRUCTION EASEMENT OVERLAPS THE ROAD ROW, THE TOTAL LENGTH OF THE EASEMENT MAY NEED TO INCREASE TO ALLOW WORK CREWS TO WORK ON THE OPPOSITE SIDE OF THE ROAD.

Figure 4-2b Guy Easement Exhibit

no.	date	by	ckd	description
B	11/12/19	MSP	ANH	UPDATED PROJECT NAME
A	6/1/18	MSP	ANH	ISSUED FOR ND PSC APPLICATION

BURNS McDONNELL
9400 WARD PARKWAY, KANSAS CITY, MO 64114
PROJECT 99793

date 6/1/2018
designed M. PEPICH
detailed M. PEPICH
checked A. HERRMANN

NORTHERN DIVIDE WIND, LLC
700 UNIVERSE BLVD.
JUNO BEACH, FL 33408

NORTHERN DIVIDE 345kV T/L PROJECT
GUY EASEMENT EXHIBIT
SINGLE CIRCUIT DEADEND STRUCTURE

drawing BC1-00931
sheet 2
rev. B

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95TH ST NW
94TH ST NW
84TH AVE NW
82ND AVE NW
93RD ST NW
90TH ST NW
DIVIDE COUNTY
BURKE COUNTY
40
87TH ST NW
86TH ST NW
85TH AVE NW
85TH ST NW
104TH AVE NW
84TH ST NW
83RD ST NW
82ND ST NW
90TH AVE NW
81ST ST NW
88TH AVE NW
50
40
Powers Lake
50
79TH ST NW
106TH AVE NW
100TH AVE NW
107TH AVE NW
77TH ST NW
101ST AVE NW
99TH AVE NW
93RD AVE NW
76TH ST NW
75TH ST NW
74TH ST NW
86TH AVE NW
103RD AVE NW
73RD ST NW
92ND AVE NW
91ST AVE NW
87TH AVE NW
40
94TH AVE NW
MOUNTRAIL COUNTY
72ND ST NW
WILLIAMS COUNTY
96TH AVE NW
71ST ST NW
102ND AVE NW
70TH ST NW
69TH ST NW
Tioga
67TH ST NW
White Earth
66TH ST NW

Figure 5-1
Land Use Classification

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route

Land Use Classification

- Cropland (46%)
- Unbroken Grassland (35%)
- Wetland (11%)
- Broken Grassland (4%)
- Existing Infrastructure (2%)
- Forest/Shrubland (1%)
- Tree Row (<1%)

N W E S

0 1 2 Miles

AECOM



95TH ST NW
94TH ST NW
84TH AVE NW
82ND AVE NW
93RD ST NW
90TH ST NW
BURKE COUNTY
DIVIDE COUNTY
40
87TH ST NW
86TH ST NW
85TH AVE NW
85TH ST NW
104TH AVE NW
84TH ST NW
83RD ST NW
82ND ST NW
50
81ST ST NW
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99TH AVE NW
76TH ST NW
93RD AVE NW
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103RD AVE NW
73RD ST NW
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91ST AVE NW
87TH AVE NW
72ND ST NW
94TH AVE NW
96TH AVE NW
MOUNTRAIL COUNTY
WILLIAMS COUNTY
102ND AVE NW
71ST ST NW
70TH ST NW
69TH ST NW
Tioga
67TH ST NW
White Earth
66TH ST NW

Figure 5-2
Public Lands, Easements, & Agreements

Northern Divide
345-kV Transmission Line
Burke and Mountrail
Counties, North Dakota

N W E S

0 1 2 Miles

AECOM

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route

Public Lands, Easements, & Agreements

- Private Land Open to Sportsmen Agreement
- USFWS Wetland Easement
- USFWS Grassland Easement
- Wildlife Management Area
- Waterfowl Production Area
- State Trust Land



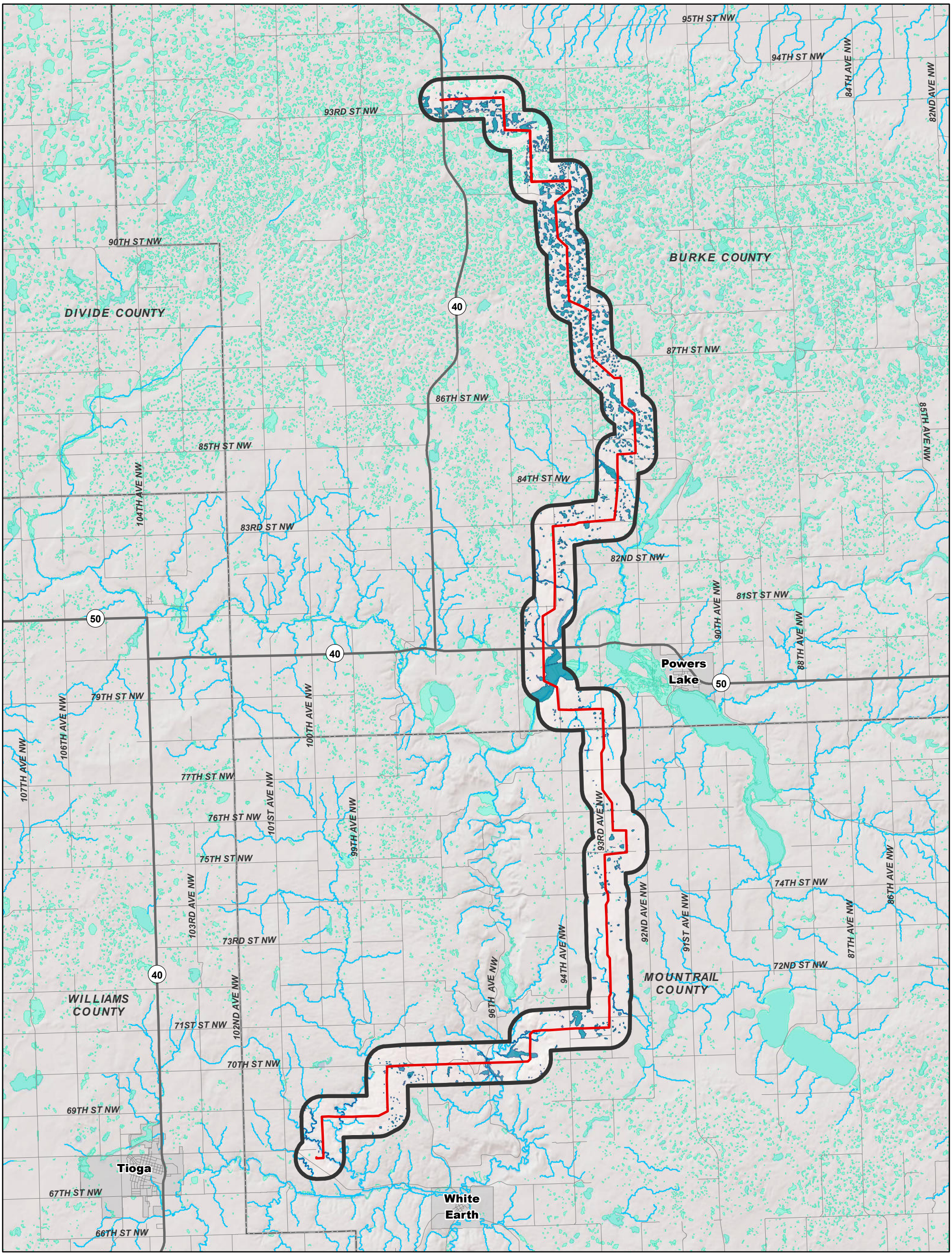


Figure 5-3
National Wetlands Inventory and Surface Waters

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

Legend

- County Road
- State/Federal Highway
- County Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route

Surface Water Resources

- Delineated Wetland
- National Wetlands Inventory (USFWS 2018)
- National Hydrography Dataset (USGS 2018)



N W E S

0 1 2 Miles

AECOM

Appendix A

Excerpt of NextEra Energy, Inc.'s 2019 Corporate Responsibility Report

2019 SUSTAINABILITY EXECUTIVE DIGEST
CORPORATE PROFILE





NEXTera® ENERGY

THIS IS OUR ERA THIS IS AMERICA'S ENERGY ERA™




Jim Robo

Our Vision

Be the largest and most capable clean energy infrastructure company in North America

Our Values

We Are Committed to Excellence
We Do the Right Thing
We Treat People with Respect

NYSE Ticker Symbol: NEE

Recognitions

Most Admired Companies (Fortune) – No. 1 in electric & gas utilities industry – 12 times, including 2019

Change the World (Fortune) – 2018

A World's Most Ethical Company® (Ethisphere Institute) – 12 times, including 2019

America's Best Employers (Forbes) – four times, including 2019

Best Employers for Diversity (Forbes) – 2019

A Fortune 200 company; included in the S&P 100 Index

At a Glance (2018)

~14,300 employees	~$6.6 billion in net income attributable to NextEra Energy
Operations in 36 states, four Canadian provinces	~$103.7 billion in total assets
~$16.7 billion in operating revenue	~45,500 megawatts (MW) of net generating capacity

Data in At a Glance is as of Dec. 31, 2018.
Cautionary statements and risk factors that may affect future results can be found on the inside back cover of this report.
Information and data contained in this report does not include Gulf Power Company, as the transaction was completed on Jan. 1, 2019.

To view our complete sustainability profile, visit **NextEraEnergy.com/Sustainability**.

Eras are defined by the people who power them, and, at NextEra Energy, our teams are writing a bright script for an American Energy Era that is affordable, efficient and clean. Through investment and innovation, we are solving the world's toughest energy challenges as we prove that a sustainable energy future is not only possible, but also beneficial to our shareholders.

In 2018, NextEra Energy was America's No. 1 capital investor in energy infrastructure and the fifth largest capital investor across all sectors. Our disruption of the energy sector is evident by the fact that no other company, in any industry, has done more than NextEra Energy to address carbon dioxide (CO_2) emissions.

Yet, we are far from finished. We recently announced a goal to reduce our CO_2 emissions rate by 67% by 2025, from a 2005 baseline, which will equate to a nearly 40% reduction in absolute CO_2 emissions, despite a near doubling of electricity production over that time. To put this into perspective, if all of the nation's utilities were able to achieve NextEra Energy's projected 2025 emissions rate, absolute CO_2 emissions for the power sector would be approximately 75% lower than they were in 2005.

We remain the largest generator of renewable energy from the wind and the sun. In fact, NextEra Energy Resources has more wind capacity in its portfolio than all but seven countries in the world. Florida Power & Light Company, a national leader in solar energy, is installing more than 30 million solar panels by 2030. And we continue to be a world leader in battery storage, with FPL recently announcing plans to build the world's largest battery storage project while approximately 40% of all NextEra Energy Resources' solar contracts signed in 2018 include an energy storage component.

NextEra Energy has accomplished these leadership positions through a commitment to excellence and by leveraging big data, machine learning and artificial intelligence to deliver results for our stakeholders and across our businesses.

We are deeply committed to doing well by doing good, and that means respecting our environment, providing value for our customers, sustaining our communities, focusing on continuous improvement and innovation, investing in our team and growing shareholder value. I hope you'll take some time to review the materials throughout this report to learn more about how NextEra Energy is creating a more sustainable energy future for America.

Through investment and innovation, we're powering America into the next era by making our company and our country more sustainable. By disrupting our own industry, our shared vision of sustainability will define the next era – America's Energy Era.

You can find more details on our sustainability performance throughout NextEraEnergy.com/Sustainability and on our company websites, including NextEraEnergy.com, FPL.com and NextEraEnergyResources.com.

Sincerely,

Jim Robo
Chairman and Chief Executive Officer



NextEra Energy was America's No. 1 capital investor in energy infrastructure in 2018. The Sholes Wind Energy Center in Randolph, Nebraska, is among the company's renewable energy projects under construction.

Respecting Our Environment

- In 2018, we achieved our lowest-ever emissions rates of carbon dioxide (CO_2), sulfur dioxide (SO_2) and nitrogen oxide (NO_x) — rates that were 55%, 96% and 81% lower, respectively, than the average U.S. utility sector.
- We remain the world's largest generator of renewable energy from the wind and sun. In 2018, nearly 100% of the power produced at our facilities was generated from a diverse mix of clean or renewable sources, including wind, solar, combined-cycle natural gas and nuclear.
- We've avoided the use of more than 14 billion gallons of water in 2018 due to our investments in water-free solar and wind energy. In addition, nearly 99% of the water we use is returned to its original source.
- We're committed to being an industry leader in environmental protection and stewardship, and that includes wildlife and habitat protection. That's why we've created wildlife programs to protect several species and their habitats.

For decades, NextEra Energy has been reducing emissions through the development of renewable energy and modernization of its generation fleet. The company's new goal is to reduce its CO_2 emissions rate 67% by 2025, from a 2005 baseline. This equates to a nearly 40% reduction in absolute CO_2 emissions, despite the company's total expected electricity production almost doubling over that time.

EMISSIONS REDUCTION TARGET

67%

LOWER

CO_2

rate by 2025

*Achievement of the CO_2 emissions rate goal will be dependent on many factors, including, but not limited to, future technology development, governmental policy and mergers and acquisitions.

Please note that the environmental attributes of NextEra Energy's electric generating facilities have been or likely will be sold or transferred to third parties, who are solely entitled to the reporting rights and ownership of the environmental attributes, such as renewable energy credits, emissions reductions, offsets, allowances and the avoided emission of greenhouse gas pollutants.



To view our complete sustainability profile, visit **NextEraEnergy.com/Sustainability**.

FPL's Turkey Point Nuclear Plant canals are home to hundreds of American crocodiles. FPL's crocodile management program has been a key component in moving the classification of crocodiles from endangered to threatened under the Endangered Species Act.

Outstanding Customer Value

- Our customers range from families to small businesses to industrial complexes to utilities, retail electricity providers, power cooperatives and municipalities, as well as individual companies and other organizations committed to renewable and sustainable energy across the U.S. and Canada.
- We're committed to providing our customers with energy that is affordable, reliable and clean. Since 2001, our investments in infrastructure have saved customers nearly $10 billion by improving the efficiency of our power plants, therefore, using less fuel to generate electricity.
- In 2018, FPL was recognized as one of the nation's most trusted electric utilities by Market Strategies International for the fifth year in a row.
- In 2018, FPL processed more than $27.3 million in ASSIST payments for more than 94,000 customers in need of help paying their electric bills.

care to share

Since 1994, our Care To Share® program has raised more than

$25 million, helping 97,000 families



FPL'S TYPICAL RESIDENTIAL CUSTOMER BILL IS NEARLY **30% BELOW** THE NATIONAL AVERAGE AND LOWER THAN 45 STATES.

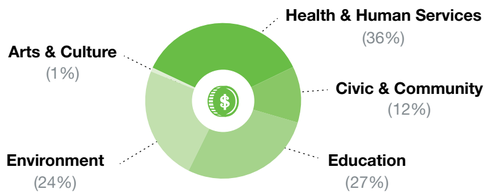
To view our complete sustainability profile, visit **NextEraEnergy.com/Sustainability**.

FPL crews help restore power in the aftermath of Hurricane Michael in Altha, Florida. FPL crews supported four out-of-state restoration efforts in 2018, including Hurricanes Maria, Florence and Michael, as well as the Camp Fire in Northern California.

Sustaining Our Communities

- In 2018, NextEra Energy was America's No. 1 capital investor in energy infrastructure and the fifth largest capital investor across all sectors. We're supporting communities by creating thousands of jobs and, in 2018, we paid $663 million in property taxes across the U.S. and Canada to support local service organizations, governments, schools and more.
- NextEra Energy and its employees contributed more than $13.7 million in 2018 to support wide-ranging initiatives and causes that contribute to the well-being of our communities.
- As part of our Power to Care volunteer program, our employees contributed 85,000 hours in 2018 to their local communities through company-sponsored projects and personal volunteer time.
- We support nearly 120 robotics teams across Florida and partner with the FIRST organization to sponsor a regional tournament in South Florida, as well as a science show for approximately 52,000 grade school students each year.
- NextEra Energy supported four out-of-state restoration efforts in 2018, including Hurricanes Maria, Florence and Michael, as well as the Camp Fire in Northern California.

Charitable Giving in 2018



In 2018, our employees

Raised more than
$4.3 million
for the community

Volunteered
85,000
hours of service

Donated more than
$198,880
in education matching gifts

Served on more than
250
community organization boards

Donated more than
$187,000
worth of **Dollars for Doers** grants

Maintained the CEO Volunteer Circle membership with
252
employees

To view our complete sustainability profile, visit **NextEraEnergy.com/Sustainability**.

As part of NextEra Energy's commitment to supporting education, energy centers often host tours for students, such as this field trip to the Tuscola Bay Wind Energy Center in Tuscola, Michigan.

Investing in Our Team

- The safety of our employees is paramount. And, we believe that all injuries are preventable. Since 2003, our safety performance has improved by 80%.
- Our employees spent more than 1.1 million hours in 2018 growing their skills, completing classroom, field and online courses focused on technical and commercial skills, leadership and career development, personal and professional effectiveness, and process and project management.
- NextEra Energy's Corporate Diversity Council sponsors the company's diversity and inclusion strategy by executing business-unit specific initiatives, which results in a diverse and inclusive culture where employees feel valued and motivated to do their best every day.
- NextEra Energy was named to Forbes' list of America's Best Employers for Diversity for the second consecutive year in 2019, as well as to Forbes' list of America's Best Employers for the fourth consecutive year.

STRIVING TO BE WELL IN 2018

64	on-site fitness centers
11,000	on-site health center visits
7,300	on-site wellness screenings
5,700	employees attended approximately 170 health and wellness presentations
2,600	flu shots provided to employees and their families
8,100	employees use a comprehensive computer program to help address ergonomics needs



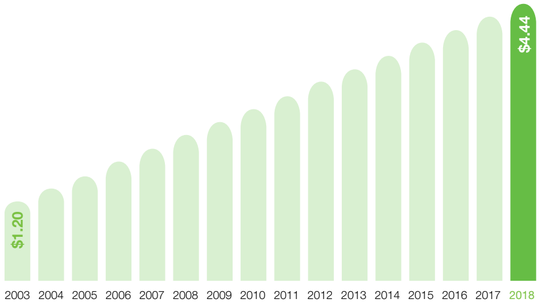
1.1 MILLION

HOURS OF TRAINING COMPLETED

Growing Shareholder Value

- NextEra Energy has a long-term track record of delivering value to shareholders. For the 15 years ending Dec. 31, 2018, NextEra Energy delivered a total shareholder return of approximately 770%, compared to 98% for the S&P 500 Utilities Index and 207% for the S&P 500 Index.
- NextEra Energy achieved a compound annual growth rate in dividends per share of approximately 9.1% from 2003 through Dec. 31, 2018. NextEra Energy also achieved a compound annual growth rate in adjusted earnings per share of approximately 7.8% for the same time period.
- Since 2003, NextEra Energy has outperformed every company in the S&P 500 Utilities Index and 83% of the companies in the S&P 500 Index.
- We continue to have one of the strongest balance sheets and highest credit ratings for electric utilities in the U.S.

DIVIDENDS PER SHARE





To view our complete sustainability profile, visit **NextEraEnergy.com/Sustainability**.

FPL's state-of-the-art Distribution Control Center in Riviera Beach, Florida, is a Category 5-rated facility designed to ensure greater everyday reliability and more efficient communication, collaboration and response during emergency events.



NextEra Energy

Powering America's Energy Era

As America's No. 1 capital investor in energy infrastructure and the fifth largest capital investor across all sectors in 2018, NextEra Energy is helping ensure that the next energy to power our dreams will be American energy.

Leading the industry

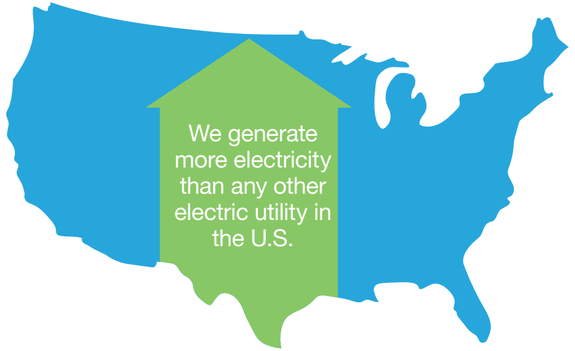
- We generate more electricity than any other electric utility in the U.S., and our market capitalization makes us the largest utility company in the world.
- We're the world's largest generator of renewable energy from the wind and sun. In 2018, we generated more than 18% more wind and solar energy than the next competitor.
- According to Fortune, we are among the top 25 companies in the world, across all industries, for innovation, use of corporate assets, social responsibility and long-term investment value.

Investing in infrastructure

- We were America's No. 1 capital investor in energy infrastructure and the fifth largest capital investor across all sectors in 2018.
- We made capital investments of approximately $83 billion in the U.S. from 2009 to 2018.
- We're planning to make between $50 and $55 billion in new infrastructure investments from 2019 through 2022.

Leading the nation in innovative, clean energy

- We have the largest share of North American wind capacity, an amount that has nearly tripled over the past decade. We're also using the latest technology, including taller towers and wider rotor diameters, which has increased efficiency and lowered costs.
- We have been pioneering universal solar for nearly 30 years. We built the largest U.S. solar photovoltaic (PV) plant of its time, constructed the world's first solar-gas hybrid plant and are currently in the midst of one of the largest solar expansions ever in the U.S. with FPL's plans to install more than 30 million solar panels by 2030.
- We are a world leader in battery storage, and we're continuing to lead the industry with plans to build the world's largest solar-powered battery system and the company's first co-located combined wind, solar and battery storage project.
- We leverage big data, machine learning, artificial intelligence and advanced analytics to make smart decisions that optimize project development, maximize revenues and reduce operational costs.



WE INVESTED $83 BILLION IN U.S. ENERGY INFRASTRUCTURE FROM 2009 THROUGH 2018

NextEra Energy at a Glance (2018)	
Operating in	36 U.S. states, four Canadian provinces
Operating Revenue	~$16.7 billion
Net Generating Capacity	~45,500 megawatts (MW)
Employees	~14,300

Wind Technician Owen Hadley helps maintain the Parry Energy Storage System in Ontario, Canada.



Florida Power & Light Company

Delivering clean, affordable, reliable and smart power

Consistently one of the nation's cleanest and most reliable electric utilities with bills nearly 30% below the national average, FPL is focused on creating innovative solutions to drive down costs and continue to provide tangible benefits for its more than 5 million customers. FPL is more than an energy company – it's a technology company that delivers clean, affordable and reliable power to approximately half the state of Florida.

Increasing efficiency and affordability

- FPL's typical 1,000-kWh residential customer bill is nearly 30% below the national average and lower than 45 states.
- While the cost of everyday items has gone up in recent years, FPL's bills are actually lower than they were a decade ago.
- We've torn down old, oil-fired and coal power plants and replaced them with modern energy centers powered by clean, U.S.-produced natural gas. Since 2001, these investments in more efficient power plants have saved customers nearly $10 billion and prevented 133 million tons of CO_2 emissions by using less fuel to generate electricity. We've also purchased and shut down old, inefficient coal power plants because it is environmentally beneficial and saves customers millions of dollars.
- We offer a variety of smart tools and technologies to help FPL customers monitor their energy use and make their bills even lower.

One of the cleanest utilities in the U.S.

- FPL is the largest electric utility by sales in the U.S. and its highly fuel-efficient power plant fleet is one of the cleanest among all utilities nationwide.
- Our carbon emissions profile is approximately 30% cleaner than the U.S. industry average.
- We're in the midst of one of the largest solar expansions ever in the U.S. with plans to install more than 30 million solar panels by 2030.
- We're continuing to invest in more clean energy sources like zero-emissions solar and high-efficiency natural gas.

Using innovative technology to deliver reliable service

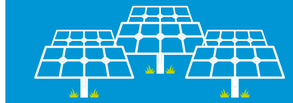
- FPL has installed more than 5 million smart meters and more than 110,000 other intelligent devices across our service area to help monitor and manage the energy grid, detect and prevent power issues, and get life back to normal faster when outages do occur.
- We're integrating predictive analytics and innovative technology, including drones, robots, machine learning and image recognition software to help locate potential issues and fix problems before they affect customers.

Most reliable U.S. electric utility

- FPL's service reliability is approximately 55% better than the national average.
- We've improved our service reliability by more than 30% over the past 10 years.
- Since 2006, we've invested nearly $4 billion to build a stronger, smarter, more storm-resilient energy grid.
- FPL was named the winner of the 2018 ReliabilityOne™ National Reliability Excellence Award presented by PA Consulting for the third time in four years.

30 MILLION

SOLAR PANELS BY 2030



FPL at a Glance (2018)

Service Area	35 counties; 27,000 square miles
Customer Accounts	5 million+
People Served	~10 million
Operating Revenues	~$11.9 billion
Net Generating Capacity	~24,500 MW
Employees	~9,100
Substations	~645
Power Lines	~75,200 circuit miles

The 74.5-MW FPL Sunshine Gateway Solar Energy Center in Columbia County, Florida, came online in January 2019. FPL is in the midst of one of the largest solar expansion ever in the U.S. and is helping to make Florida a global leader in solar energy.



Gulf Power Company

Delivering exceptional value to customers and communities of Northwest Florida

Our team works hard to provide our customers across Northwest Florida with reliable and environmentally responsible energy, offer innovative energy services and solutions, and give back to the communities we call home. Gulf Power Company joined NextEra Energy on Jan. 1, 2019.

Growing our investment in clean energy

- Gulf Power is converting its coal-fired Plant Crist to a clean, highly efficient plant that will run on U.S.-produced natural gas. The conversion is expected to provide net customer savings of approximately $220 million and lower the plant's CO_2 emissions rate by more than 40%.
- Gulf Power has partnered with local military installations to build three large-scale solar energy sites across the Florida Panhandle that produce up to 120 MW from 1.5 million solar panels.
- We're also developing three new 74.5-MW solar energy centers in Escambia and Jackson counties for a total of nearly 225 MW of new solar.
- We're working on plans for additional solar sites, as well as other opportunities to bring more renewable energy options to our customers.

Building a stronger and smarter energy grid

- Strengthening our distribution and transmission systems helps us deliver more reliable energy, in good weather and bad.
- Gulf Power has invested more than $225 million over the last 10 years in infrastructure upgrades across the region, including hardening, substation enhancements and upgrading infrastructure.
- Gulf Power customers are experiencing fewer outages now than ever before. In fact, investments in the energy grid have improved reliability for the company's approximately 460,000 customers by almost 20% since 2010.
- We plan to invest between $650 and $800 million in transmission and distribution projects, including deploying smart grid devices to improve reliability for all Gulf Power customers.

Creating customer value

- Gulf Power has a strong customer brand that we'll continue to improve over the coming years.
- We're measuring and benchmarking customer value metrics to drive performance. For example, we've had a 20% improvement in speed of answering customer calls in the first six months of 2019.
- We're also planning to deploy new customer systems, including billing, call center and customer service support, along with a refreshed website and mobile app.

Supporting economic development in the Panhandle

- Since 2013, Gulf Power has worked with more than 185 companies to help relocate or expand operations in Northwest Florida.
- Our efforts have contributed to the development of more than 60 additional new and expanding businesses and the pledge to create more than 14,000 direct new jobs in the region.
- These additions and expansions are estimated to produce an economic impact to Northwest Florida of more than $1.2 billion in new direct capital investment and generate approximately $14 million in incremental total revenue per year.

Long history of investing in environmental stewardship

- Since 2003, Gulf Power has provided more than $5.8 million in grants to support nearly 100 wildlife and habitat conservation projects through the National Fish and Wildlife Foundation, as well as water restoration projects and recovery efforts of endangered species in Northwest Florida.
- Gulf Power employees also provide hundreds of volunteer hours annually to support habitat restoration and species protection projects.

THREE SOLAR ENERGY CENTERS IN DEVELOPMENT WITH 1.5 MILLION SOLAR PANELS

Gulf Power at a Glance (2018)	
Service Area	8 counties; 7,550 square miles
Customer Accounts	~460,000
Operating Revenues	~1.5 billion
Net Generating Capacity	~2,300 MW
Employees	~1,100
Substations	~135
Power Lines	~9,400 miles

Line Technician Darren Arrington has worked for Gulf Power for nearly 30 years and is committed to delivering reliable service to customers.



NextEra Energy Resources generated more wind energy in 2018 than any other company in the world. The 204-MW New Mexico Wind Energy Center in De Baca and Quay counties began commericial operation in 2003.

NextEra Energy Resources, LLC

Investing in clean energy across America

As the world's largest generator of renewable energy from the wind and sun, NextEra Energy Resources delivers clean energy across North America and provides sustainable solutions to meet evolving energy needs.

A leader in wind energy

- We produced more wind energy in 2018 than any other company in the world and have the largest share of North American wind capacity.
- We operate approximately 120 wind projects in 19 states and four Canadian provinces with a total net generating capacity of approximately 15,000 MW.
- For 2019-2022, we expect to bring online an additional 5,000 to 7,800 MW of clean, emissions-free wind energy.

A leader in solar energy

- NextEra Energy Resources has solar facilities in 22 states, with a total net generating capacity of approximately 2,300 MW.
- We continue to tailor solutions for commercial, utility and public power customers to produce clean solar energy from rooftops, parking structures and vacant land. NextEra Energy Resources develops, builds, finances and operates these projects, called distributed generation, to help customers control costs and meet their renewable energy goals.
- For 2019-2022, we expect to bring online an additional 3,800 to 7,300 MW of clean, emissions-free solar energy.

A world leader in energy storage

- We are a world leader in energy storage with more than 140 MW of battery energy storage systems in operation.
- By storing when energy demand is low and supplying when energy demand is high, we're ensuring Americans have the energy they need, whenever they need it.
- The 20-MW Pinal Central Solar Energy Center in Arizona was NextEra Energy Resources' first project to pair solar energy with an on-site, state-of-the-art 10-MW battery storage system.
- For 2019-2022, we expect to bring online 700 to 1,400 MW of energy storage.

Competitive retail energy solutions

- Gexa Energy, our wholly owned subsidiary, is one of the fastest growing retail electricity providers in the U.S. and a leading provider of affordable energy products and services for residential and commercial customers since 2002.
- Our retail energy brands, Gexa Energy, NextEra Energy Services and Frontier Utilities, serve more than 1.3 million residential and commercial customers in competitive energy markets across North America.

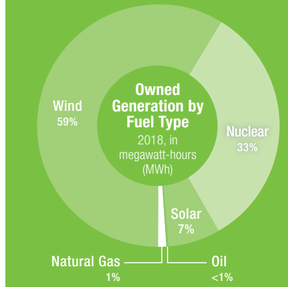
Emissions-free nuclear energy

- NextEra Energy Resources operates emissions-free nuclear power plants in Iowa, New Hampshire and Wisconsin, each of which employs hundreds of highly trained workers in local communities and boosts economic activity by paying millions in state and local taxes each year.
- Nuclear energy is a leading source of electricity in the U.S., providing safe, reliable and low-cost power for homes and businesses. Our nuclear power plant fleet provides the equivalent of more than 5 million homes with clean, safe, reliable electricity.

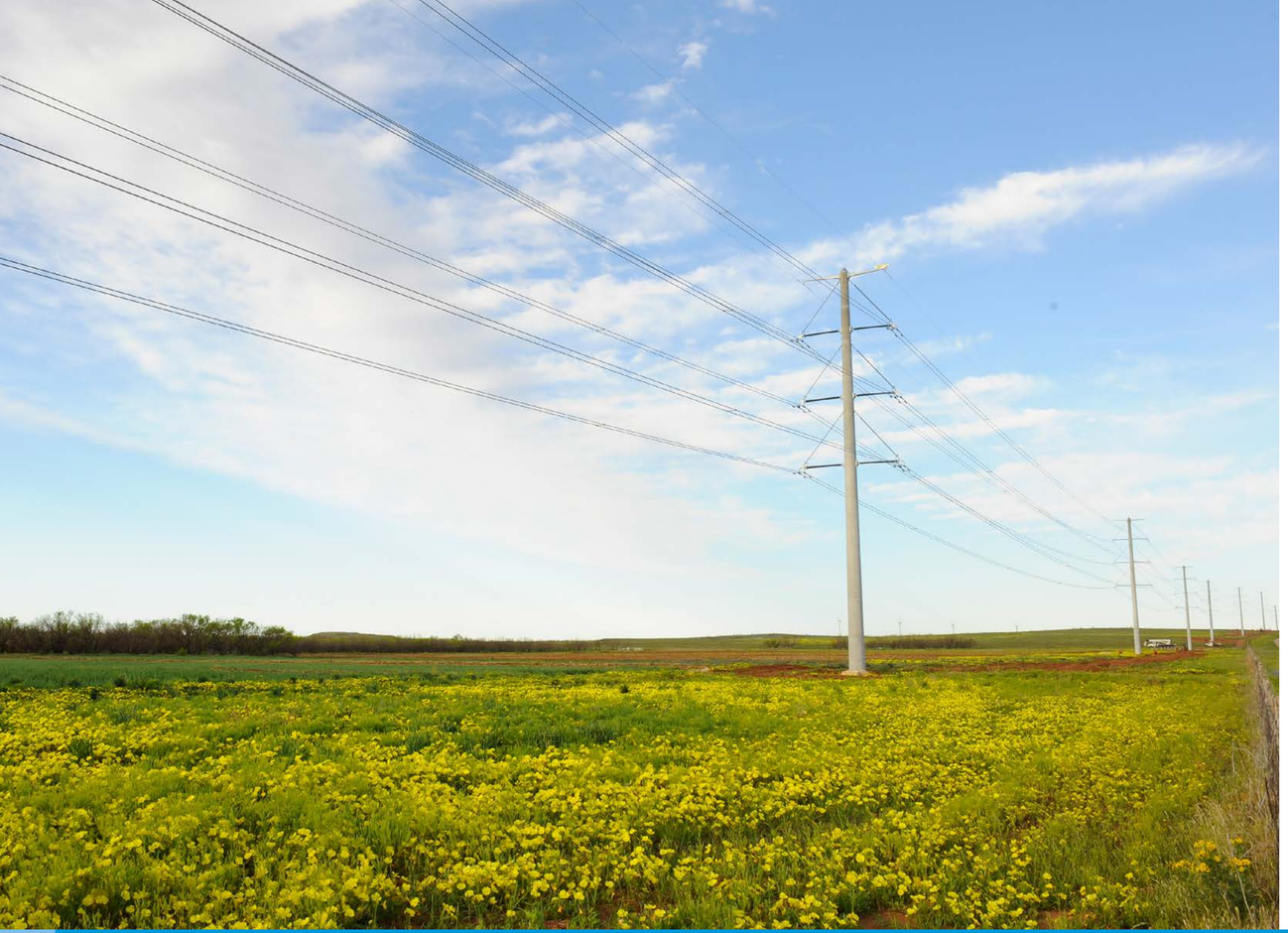
Natural gas infrastructure investor

- NextEra Energy Resources operates natural gas facilities in several states, several of which use combined-cycle technology for increased energy efficiency and lower emissions than conventional fossil-fueled plants.
- We have approximately 8 billion cubic feet of natural gas pipeline capacity in operation or under development.

WORLD'S NO. 1 GENERATOR OF WIND AND SOLAR ENERGY



NextEra Energy Resources at a Glance (2018)	
Operations in	36 U.S. states, four Canadian provinces
Operating Revenues	~$4.9 billion
Net Generating Capacity	~21,000 MW
Employees	~5,100
Substations	~185
Transmission lines	~1,135 miles



North America's No. 1 Competitive Transmission Company

NextEra Energy Transmission

NextEra Energy Transmission is the leading competitive transmission company in North America. We're investing $3 billion in regional utilities to develop, finance, construct, operate and maintain transmission assets across the U.S. and Canada.

NextEra Energy Transmission operates through nine regional subsidiaries to integrate renewable energy and strengthen the electric grid nationwide.

HORIZONWEST TRANSMISSION	The designated developer for two projects in California, including the first competitive transmission project awarded to a non-incumbent in the California Independent System Operator.
LONEstar	Owner and operator of high-voltage transmission lines and associated equipment in Texas, bringing wind power to Central Texas, strengthening the electric grid and enhancing reliability.
NEW HAMPSHIRE TRANSMISSION	The majority owner of Seabrook Substation, which interconnects Seabrook Nuclear Generating Station with three critical high-voltage transmission lines in New England, thereby enhancing reliability.
NEXTera ENERGY TRANSMISSION CANADA	A transmission developer active in Ontario and Alberta, Canada, and through its NextBridge Infrastructure partnership, the selected developer of the first competitive transmission project awarded to a non-incumbent in Ontario.
NEXTera ENERGY TRANSMISSION MIDATLANTIC	A transmission developer active in PJM Interconnection and selected acquirer of transmission assets.
NEXTera ENERGY TRANSMISSION MIDWEST	The designated developer for the largest competitively awarded transmission project in Midcontinent Independent System Operator.
NEXTera ENERGY TRANSMISSION NEW YORK	The designated developer for the first competitively awarded transmission project in the New York Independent System Operator.
NEXTera ENERGY TRANSMISSION SOUTHWEST	A transmission developer operating in Southwest Power Pool and selected acquirer of transmission assets.
TBC Trans Bay Cable	Owner and operator of a high-voltage direct current underwater transmission cable system that can provide more than 40% of the electrical power used in San Francisco.

Lone Star Transmission is located in Central Texas and has 330 miles of double-circuit 345-kV line and six substations.

Delivering Unique Solutions

FPL Energy Services, FPL Services, NextEra Energy Solutions, GEXA Energy Solutions and FPL Home

A leader in providing customer solutions for the toughest energy challenges, FPL Energy Services (FPLES) delivers exceptional customer value and experiences through innovative, convenient and affordable energy solutions that add value and comfort to homes and business.

- **Residential products and services:** FPLES keeps customers running with surge protection (SurgeShield® and Electronics Surge Protection℠), smart home security (MyPlace™), air conditioning filter delivery service (A/C Filter Smart®) and warranties for electrical wiring, plumbing lines, sewer/septic lines, water heaters, appliances and air conditioners. In addition, FPL Home offers licensed and insured technicians who can install and service backup generators, air conditioners, plumbing and electric.
- **Natural gas supply services:** For 20 years, FPLES has been providing Florida businesses with a reliable supply of natural gas at competitive rates, coupled with sophisticated industry analysis and custom consulting services.
- **Commercial lighting solutions:** This program offers lighting upgrades and retrofits for commercial and industrial customers. We install comprehensive energy efficient solutions that reduce costs and improve customers' bottom lines.
- **Energy savings performance contracting:** We develop, design and construct comprehensive, sustainable energy solutions for governments and businesses in Florida, Texas and other states through our family of Energy Service Companies (ESCOs) – FPLES, FPL Services, NextEra Energy Solutions and Gexa Energy Solutions. To date, our ESCO businesses have helped customers save more than $246 million, reducing electricity use by 2.11 million MWh and water use by 5.77 billion gallons. That's enough electricity to power more than 176,000 homes for one year and enough water to fill more than 9,620 Olympic-size swimming pools.

NEXTera ENERGY SOLUTIONS | FPL Services | FPL Energy Services | Gexa ENERGY SOLUTIONS

Florida City Gas

Florida City Gas provides safe, reliable and affordable natural gas service to approximately 110,000 residential and commercial customers in Miami-Dade, Broward, Palm Beach, Brevard, Hendry, Martin, St. Lucie and Indian River counties.

Florida City Gas

NextEra Energy Partners, LP

NextEra Energy Partners, LP is a growth-oriented limited partnership formed by NextEra Energy, Inc. NextEra Energy Partners acquires, manages and owns contracted clean energy projects with stable, long-term cash flows. Headquartered in Juno Beach, Florida, NextEra Energy Partners owns interests in wind and solar projects in the U.S., as well as natural gas infrastructure assets in Texas. The renewable energy projects are contracted, use industry-leading technology and are located in regions that are favorable for generating energy from the wind and sun. The seven natural gas pipelines in the portfolio are all strategically located, serving power producers and municipalities in South Texas, processing plants and producers in the Eagle Ford Shale, and commercial and industrial customers in the Houston area. The NET Mexico Pipeline, the largest pipeline in the portfolio, provides a critical source of natural gas transportation for low-cost, U.S.-sourced shale gas to Mexico.

NEXTera energy PARTNERS

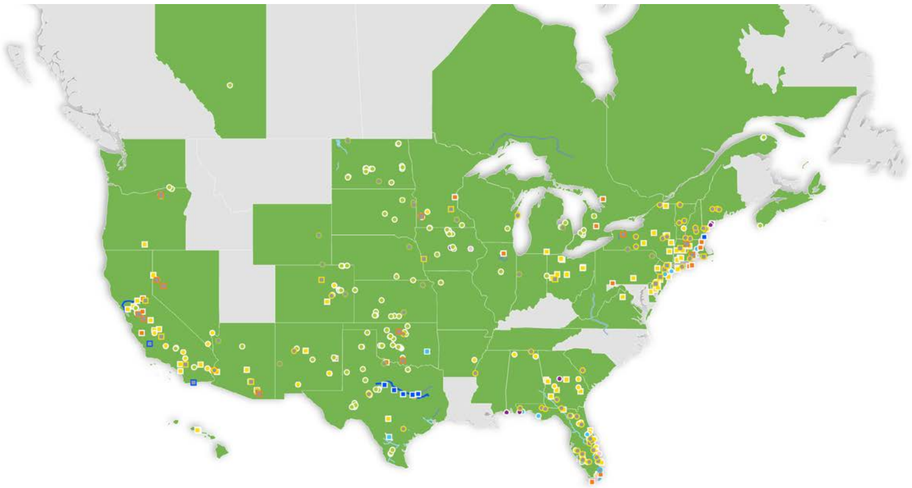


Since 2006, FPL has invested nearly $4 billion to build a stronger, smarter, more storm-resilient energy grid. Engineer Breahna Bean and Business Analyst Kunal Abichandani pictured at the Flagler Service Center in Palm Coast, Florida.

NEXTERA ENERGY IS THE WORLD'S LARGEST UTILITY COMPANY, AND WE'RE PROUD TO BE BUILT AND BASED IN AMERICA.

Our Portfolio

Providing Clean Energy Across North America



LEGEND:

Wind · Natural Gas · Natural Gas (drilling) · Pipeline · Nuclear · Solar (universal) · Solar (DG)
Battery Energy Storage · Transmission · Transmission (substation) · Other · Development/Construction

Locations with more than one facility are illustrated with a single dot; locations are those in operation as of Aug. 1, 2019.

CAUTIONARY STATEMENTS AND RISK FACTORS THAT MAY AFFECT FUTURE RESULTS

This report contains "forward-looking statements" within the meaning of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are not statements of historical facts, but instead represent the current expectations of NextEra Energy, Inc. (NextEra Energy) and Florida Power & Light Company (FPL) regarding future operating results and other future events, many of which, by their nature, are inherently uncertain and outside of NextEra Energy's and FPL's control. Forward-looking statements in this report include, among others, statements concerning adjusted earnings per share expectations and future operating performance, statements concerning future dividends, and results of acquisitions. In some cases, you can identify the forward-looking statements by words or phrases such as "will," "may result," "expect," "anticipate," "believe," "intend," "plan," "seek," "potential," "projection," "forecast," "predict," "goals," "target," "outlook," "should," "would" or similar words or expressions. You should not place undue reliance on these forward-looking statements, which are not a guarantee of future performance. The future results of NextEra Energy and FPL and their business and financial condition are subject to risks and uncertainties that could cause their actual results to differ materially from those expressed or implied in the forward-looking statements, or may require them to limit or eliminate certain operations. These risks and uncertainties include, but are not limited to, the following: effects of extensive regulation of NextEra Energy's and FPL's business operations; inability of NextEra Energy and FPL to recover in a timely manner any significant amount of costs, a return on certain assets or a reasonable return on invested capital through base rates, cost recovery clauses, other regulatory mechanisms or otherwise; impact of political, regulatory and economic factors on regulatory decisions important to NextEra Energy and FPL; disallowance of cost recovery by FPL based on a finding of imprudent use of derivative instruments; effect of any reductions or modifications to, or elimination of, governmental incentives or policies that support utility scale renewable energy projects of NextEra Energy Resources, LLC and its affiliated entities (NextEra Energy Resources) or the imposition of additional tax laws, policies or assessments on renewable energy; impact of new or revised laws, regulations, interpretations or ballot or regulatory initiatives on NextEra Energy and FPL; capital expenditures, increased operating costs and various liabilities attributable to environmental laws, regulations and other standards applicable to NextEra Energy and FPL; effects on NextEra Energy and FPL of federal or state laws or regulations mandating new or additional limits on the production of greenhouse gas emissions; exposure of NextEra Energy and FPL to significant and increasing compliance costs and substantial monetary penalties and other sanctions as a result of extensive federal regulation of their operations and businesses; effect on NextEra Energy and FPL of changes in tax laws, guidance or policies as well as in judgments and estimates used to determine tax-related asset and liability amounts; impact on NextEra Energy and FPL of adverse results of litigation; effect on NextEra Energy and FPL of failure to proceed with projects under development or inability to complete the construction of (or capital improvements to) electric generation, transmission and distribution facilities, gas infrastructure facilities or other facilities on schedule or within budget; impact on development and operating activities of NextEra Energy and FPL resulting from risks related to project siting, financing, construction, permitting, governmental approvals and the negotiation of project development agreements; risks involved in the operation and maintenance of electric generation, transmission and distribution facilities, gas infrastructure facilities, retail gas distribution system in Florida and other facilities; effect on NextEra Energy and FPL of a lack of growth or slower growth in the number of customers or in customer usage; impact on NextEra Energy and FPL of severe weather and other weather conditions; threats of terrorism and catastrophic events that could result from terrorism, cyber attacks or other attempts to disrupt NextEra Energy's and FPL's business or the businesses of third parties; inability to obtain adequate insurance coverage for protection of NextEra Energy and FPL against significant losses and risk that insurance coverage does not provide protection against all significant losses; a prolonged period of low gas and oil prices could impact NextEra Energy Resources' gas infrastructure business and cause NextEra Energy Resources to delay or cancel certain gas infrastructure projects and could result in certain projects becoming impaired; risk to NextEra Energy Resources of increased operating costs resulting from unfavorable supply costs necessary to provide NextEra Energy Resources' full energy and capacity requirement services; inability or failure by NextEra Energy Resources to manage properly or hedge effectively the commodity risk within its portfolio; effect of reductions in the liquidity of energy markets on NextEra Energy's ability to manage operational risks; effectiveness of NextEra Energy's and FPL's risk management tools associated with their hedging and trading procedures to protect against significant losses, including the effect of unforeseen price variances from historical behavior; impact of unavailability or disruption of power transmission or commodity transportation facilities on sale and delivery of power or natural gas by NextEra Energy, including FPL; exposure of NextEra Energy and FPL to credit and performance risk from customers, hedging counterparties and vendors; failure of NextEra Energy or FPL counterparties to perform under derivative contracts or of requirement for NextEra Energy or FPL to post margin cash collateral under derivative contracts; failure or breach of NextEra Energy's or FPL's information technology systems; risks to NextEra Energy and FPL's retail businesses from compromise of sensitive customer data; losses from volatility in the market values of derivative instruments and limited liquidity in OTC markets; impact of negative publicity; inability of NextEra Energy and FPL to maintain, negotiate or renegotiate acceptable franchise agreements with municipalities and counties in Florida; occurrence of work strikes or stoppages and increasing personnel costs; NextEra Energy's ability to successfully identify, complete and integrate acquisitions, including the effect of increased competition for acquisitions; the inability to realize the anticipated benefits of the Gulf Power Company acquisition; environmental, health and financial risks associated with NextEra Energy Resources' and FPL's ownership and operation of nuclear generation facilities; liability of NextEra Energy and FPL for significant retrospective assessments and/or retrospective insurance premiums in the event of an incident at certain nuclear generation facilities; increased operating and capital expenditures and/or reduced revenues at nuclear generation facilities of NextEra Energy or FPL resulting from orders or new regulations of the Nuclear Regulatory Commission; inability to operate any of NextEra Energy Resources' or FPL's owned nuclear generation units through the end of their respective operating licenses or through expected shutdown; effect of disruptions, uncertainty or volatility in the credit and capital markets or actions by third parties in connection with project-specific or other financing arrangements on NextEra Energy's and FPL's ability to fund their liquidity and capital needs and meet their growth objectives; inability of NextEra Energy, FPL and NextEra Energy Capital Holdings, Inc. to maintain their current credit ratings; impairment of NextEra Energy's and FPL's liquidity from inability of credit providers to fund their credit commitments or to maintain their current credit ratings; poor market performance and other economic factors that could affect NextEra Energy's defined benefit pension plan's funded status; poor market performance and other risks to the asset values of NextEra Energy's and FPL's nuclear decommissioning funds; changes in market value and other risks to certain of NextEra Energy's investments; effect of inability of NextEra Energy subsidiaries to pay upstream dividends or repay funds to NextEra Energy or of NextEra Energy's performance under guarantees of subsidiary obligations on NextEra Energy's ability to meet its financial obligations and to pay dividends on its common stock; the fact that the amount and timing of dividends payable on NextEra Energy's common stock, as well as the dividend policy approved by NextEra Energy's board of directors from time to time, and changes to that policy, are within the sole discretion of NextEra Energy's board of directors and, if declared and paid, dividends may be in amounts that are less than might be expected by shareholders; NEP's inability to access sources of capital on commercially reasonable terms could have an effect on its ability to consummate future acquisitions and on the value of NextEra Energy's limited partner interest in NextEra Energy Operating Partners, LP; and effects of disruptions, uncertainty or volatility in the credit and capital markets on the market price of NextEra Energy's common stock. NextEra Energy and FPL discuss these and other risks and uncertainties in their annual report on Form 10-K for the year ended December 31, 2018 and other SEC filings, and this report should be read in conjunction with such SEC filings made through the date of this report. The forward-looking statements made in this report are made only as of the date of this report and NextEra Energy and FPL undertake no obligation to update any forward-looking statements.

ON THE COVER (clockwise from top left): Pratt Wind Energy Center in Pratt, Kansas; employees at the Distribution Control Center in Riviera Beach, Florida; FPL Coral Farms Solar Energy Center in Putnam County, Florida.



NextEra Energy, Inc.
700 Universe Boulevard, Juno Beach, FL 33408

For more information:

NextEraEnergy.com

FPL.com

NextEraEnergyResources.com

GulfPower.com

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Appendix B

Studies and Assessments

B1. U.S. Department of Defense Preliminary Screening Tool

B2. 2020 Grouse Lek and Raptor Nest and Strategy

B3. Dakota Skipper Habitat Evaluation

B4. Wildlife Technical Memorandum

B1. U.S. Department of Defense Preliminary Screening Tool

Federal Aviation Administration

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DoD Preliminary Screening Tool

DoD Preliminary Screening Tool - Desk Reference Guide V_2018.2.0

Disclaimer:

- The DoD Preliminary Screening Tool enables developers to obtain a preliminary review of potential impacts to Long-Range and Weather Radar(s), Military Training Route(s) and Special Airspace(s) prior to official OE/AAA filing. This tool will produce a map relating the structure to any of the DoD/DHS and NOAA resources listed above. The use of this tool is **100 % optional** and will provide a first level of feedback and single points of contact within the DoD/DHS and NOAA to discuss impacts/mitigation efforts on the military training mission and NEXRAD Weather Radars. **The use of this tool does not in any way replace the official FAA processes/procedures.**

Instructions:

- Select a screening type for your initial evaluation. Currently the system supports pre-screening on:
  -Air Defense and Homeland Security radars(Long Range Radar)
  -Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
  -Military Operations
- Enter either a single point or a polygon and click submit to generate a long range radar analysis map.
- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: Long Range Radar ▼ **Geometry Type:** Polygon ▼

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	48	46	27.46	N ▼	102	45	56.67	W ▼
2	48	45	36.72	N ▼	102	40	19.46	W ▼
3	48	27	0.88	N ▼	102	39	24.05	W ▼
4	48	23	42.60	N ▼	102	51	4.23	W ▼

Horizontal Datum: NAD83 ▼



Map Legend:

- **Green:** No anticipated impact to Air Defense and Homeland Security radars. Aeronautical study required.
- **Yellow:** Impact likely to Air Defense and Homeland Security radars. Aeronautical study required.
- **Red:** Impact highly likely to Air Defense and Homeland Security radars. Aeronautical study required.

Note: Map colors will show as depicted in the map legend when using the 'Polygon' Geometry Type; map colors will be subdued when using the 'Single Point' Geometry Type.

Federal Aviation Administration

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Screening Type: NEXRAD ▼ **Geometry Type:** Polygon ▼

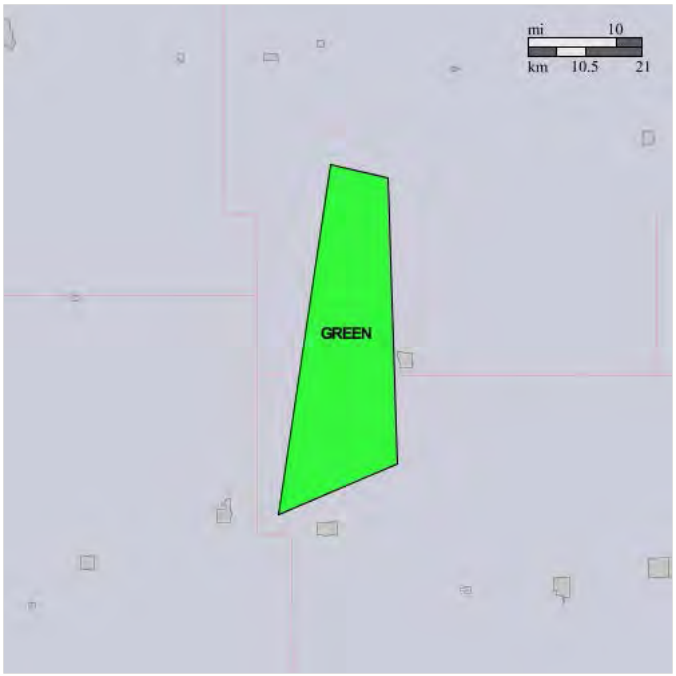
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4	48	23	42.60	N ▼	102	51	4.23	W ▼

Horizontal Datum: NAD83 ▼

Map Legend:

- **Green: No Impact Zone.** Impacts not likely. NOAA will not perform a detailed analysis, but would still like to know about the project.
- **Dk Green: Notification Zone.** Some impacts possible. Consultation with NOAA is optional, but NOAA would still like to know about the project.
- **Yellow: Consultation Zone.** Significant impacts possible. NOAA requests consultation to discuss project details and to perform a detailed impact analysis. NOAA may request mitigation of significant impacts.
- **Orange: Mitigation Zone.** Significant impacts likely. NOAA will likely request mitigation if a detailed analysis indicates that the project will cause significant impacts.
- **Red: No-Build Zone.** Severe impacts likely. NOAA requests developers not build wind turbines within 3 km of the NEXRAD. Detailed impact analysis required.

Note: Map colors will show as depicted in the map legend when using the 'Polygon' Geometry Type; map colors will be subdued when using the 'Single Point' Geometry Type.



Because the NEXRAD can detect wind turbines occasionally at great distance, NOAA would like to know the location of all wind farm projects so that corrupted radar data can be flagged. Send project information directly to NOAA at wind.energy.matters@noaa.gov or through the National Telecommunications & Information Administration (NTIA) in the Dept. of Commerce. NOAA protects all wind project information as proprietary and sensitive.

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DoD Preliminary Screening Tool

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Screening Type: Military Operations ▼ **Geometry Type:** Single Point ▼

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	48	45	36.72	N ▼	102	40	19.46	W ▼

Horizontal Datum: NAD83 ▼

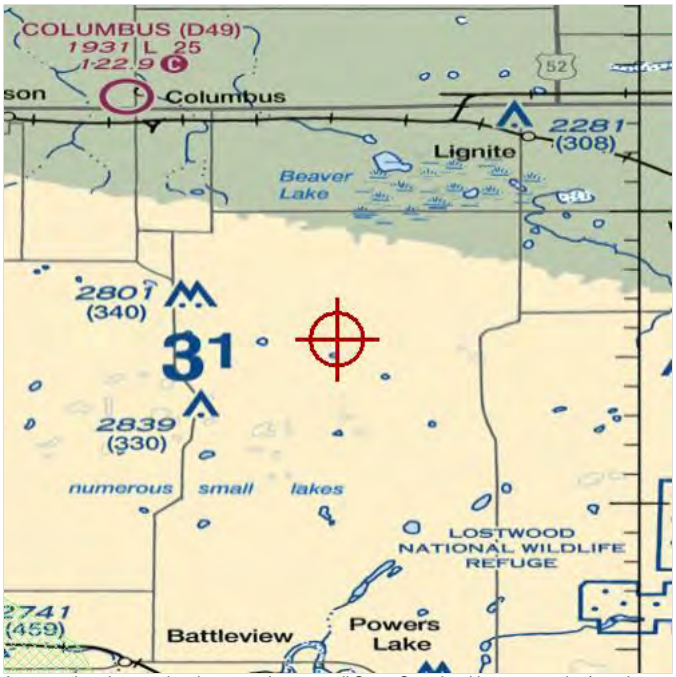
The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact Dr. Thomas (Thom) H. Rennie at the USAF Regional Enviromental Coordinator at (214)767-4678 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact LTC Owen B. Castlemain at the USA Regional Enviromental Coordinator at (817) 222-5921 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact the US Navy Representative, FAA Central Service Area at the USMC Regional Enviromental Coordinator at (817) 222-5930 for confirmation and documentation.

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This is a preliminary review of your proposal and does not preclude official FAA processes.
Your search data is not retained and the privacy of all your searches is assured.



Any questions interpreting the map, please email Steve Sample with your question/s and phone number at steven.sample@pentagon.af.mil

Federal Aviation Administration

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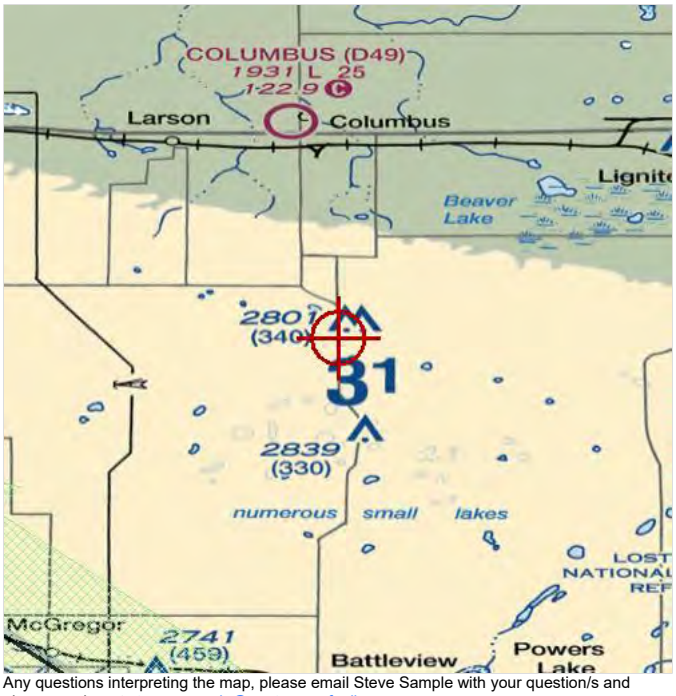
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Screening Type: Military Operations ▼ **Geometry Type:** Single Point ▼

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	48	27	0.88	N ▼	102	39	24.05	W ▼

Horizontal Datum: NAD83 ▼

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact Dr. Thomas (Thom) H. Rennie at the USAF Regional Enviromental Coordinator at (214)767-4678 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact LTC Owen B. Castlemain at the USA Regional Enviromental Coordinator at (817) 222-5921 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact the US Navy Representative, FAA Central Service Area at the USMC Regional Enviromental Coordinator at (817) 222-5930 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact the US Navy Representative, FAA Central Service Area at the USN Regional Enviromental Coordinator at (817) 222-5930 for confirmation and documentation.

This is a preliminary review of your proposal and does not preclude official FAA processes.
Your search data is not retained and the privacy of all your searches is assured.



Any questions interpreting the map, please email Steve Sample with your question/s and phone number at steven.sample@pentagon.af.mil

Federal Aviation Administration

« OE/AAA

DoD Preliminary Screening Tool

DoD Preliminary Screening Tool - Desk Reference Guide V_2018.2.0

Disclaimer:

- The DoD Preliminary Screening Tool enables developers to obtain a preliminary review of potential impacts to Long-Range and Weather Radar(s), Military Training Route(s) and Special Airspace(s) prior to official OE/AAA filing. This tool will produce a map relating the structure to any of the DoD/DHS and NOAA resources listed above. The use of this tool is **100 % optional** and will provide a first level of feedback and single points of contact within the DoD/DHS and NOAA to discuss impacts/mitigation efforts on the military training mission and NEXRAD Weather Radars. **The use of this tool does not in any way replace the official FAA processes/procedures.**

Instructions:

- Select a screening type for your initial evaluation. Currently the system supports pre-screening on:
  -Air Defense and Homeland Security radars(Long Range Radar)
  -Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
  -Military Operations
- Enter either a single point or a polygon and click submit to generate a long range radar analysis map.
- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: Military Operations ▼ **Geometry Type:** Single Point ▼

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	48	23	42.60	N ▼	102	51	4.23	W ▼

Horizontal Datum: NAD83 ▼

Your structure falls within the confines of IR678, and may have an impact on military operations. For a more detailed review, please contact Denny Hough at (701)723-2967. This POC will review the analysis and identify any additional areas of concern. Upon completion of this process, the POC will provide you a letter stating the results of the review.

This is a preliminary review of your proposal and does not preclude official FAA processes.
Your search data is not retained and the privacy of all your searches is assured.



Any questions interpreting the map, please email Steve Sample with your question/s and phone number at steven.sample@pentagon.af.mil

B2. 2020 Grouse Lek and Raptor Nest Strategy

RAPTOR NEST AND GROUSE LEK STRATEGY

Northern Divide Wind, LLC (Northern Divide Wind), a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC (NextEra), is developing the 200-megawatt Northern Divide Wind Energy Center (NDWEC) and 41-mile 345-kilovolt Transmission Line (NDWEC Transmission), collectively referred to as the NDWEC Project. The NDWEC Project is located largely within an area of a previously proposed and previously studied wind energy center (Previous WEC) and transmission line (Previous WEC Transmission), collectively referred to as the Previous Project (Figures 1 and 2). This memo summarizes the Previous Project's raptor nest and grouse lek data that is applicable to the NDWEC Project as well as a strategy to collect data in spring 2020 to support permitting.

Raptor Nests

Atwell (2018b) completed an aerial raptor nest survey in 2017 for the Previous Project. For non-eagle raptor nests, the survey included the Previous Project area whereas eagle nest surveys also included a 10-mile (mi) buffer. The 2017 non-eagle raptor nest survey encompassed the majority of the NDWEC except for a portion along the western and northern edges (Figure 1). Overall, the 2017 non-eagle raptor nest survey found four red-tailed hawk and two great horned owl nest scattered within or in the vicinity (within one mi) of the Previous WEC.

Aerial raptor nest surveys were conducted in 2018 for the Previous WEC Transmission and a 3-mi buffer on either side (Atwell 2018a). The majority of the NDWEC Transmission was included in the Previous WEC Transmission's survey effort, with the exception of a 5-mi extension running northwesterly to the NDWEC (Extension), which was included in the 2017 survey efforts for the NDWEC (Figure 1). Overall, the 2018 survey found five red-tailed hawk inactive nests within one mi of the Previous WEC Transmission (Atwell 2018a). No active raptor nests were located within the 150 feet construction corridor of the Previous WEC Transmission; however, four active nests belonging to two raptor species (great-horned owl and ferruginous hawk) were located within one mi of the Previous WEC Transmission (Atwell 2018a). No eagle nests were located during 2018 surveys conducted for the Previous WEC Transmission (Figure 1).

As the NDWEC's un-surveyed portions consist mostly of tilled cropland (73%), it is expected to have similarly low non-eagle raptor nest density and species composition. Similarly, nest density and species composition within the NDWEC Transmission is expected to be equal to that observed during previous raptor nest surveys, as the survey areas largely overlap. With the 10-mi buffer, the 2017 eagle nest survey captured the entirety of the NDWEC and the Extension. No eagle nests were located during 2017 or 2018 surveys, and limited potential eagle nesting habitat exists within and near the NDWEC Project in the form of scattered woodlands and trees around wetlands.

To confirm the above conclusion of low non-eagle raptor nest density and no eagle nests, Northern Divide Wind will conduct a raptor nest survey in spring 2020 within the NDWEC Project for non-eagle raptors and eagles, plus a 2-mi buffer for eagles around both the NDWEC and the NDWEC Transmission (Figure 3). Additionally, Northern Divide will request updated eagle nest information from the North Dakota Game and Fish Department prior to spring 2020 surveys. Lastly, all tree areas requiring clearing (e.g., tree rows) will be surveyed immediately ahead of construction for presence of any raptor nests built after the 2020 spring survey or otherwise previously undetected, as is normal operating procedures for all NextEra affiliates. Information from historic surveys, surveys in spring 2020, and surveys immediately ahead of construction will be used to form a strategy that avoids direct impacts to nesting raptors. This will include minimizing construction activities within 0.25 mi of any active non-eagle raptor nest location during the nesting season. If the nest cannot be avoided by more than 0.25 mi, the nest may be removed before or after it is active (i.e., when eggs or chicks are absent from the nests) during construction. No active raptor nests will be removed during construction. Based on existing information it is assumed no eagle nests are located within the

NDWEC Project or vicinity, and any newly found occupied or active eagle nests will be avoided by a minimum of one mi during construction until the nests become inactive.

Grouse Leks

Atwell (2018b) conducted ground- and aerial-based sharp-tailed grouse lek surveys in 2017 within the NDWEC and 0.5-mi buffer (Figure 2). The majority of the NDWEC was included in the 2017 survey effort and resulted in six leks being located within or near the NDWEC. The NDWEC features a smaller proportion of unbroken grassland (approximately 7%) than the Previous WEC (approximately 21%).

Aerial- and ground-based sharp-tailed grouse lek surveys were conducted in 2018 for the Previous WEC Transmission and a 1.5-mi buffer on either side (Atwell 2018a). The majority of the NDWEC Transmission was included in the 2018 survey effort, with the exception of the Extension, which was included in the 2017 survey efforts (Figure 2). Results of the Previous WEC Transmission's grouse survey indicated a total of 10 sharp-tailed grouse leks located within 1.5 mi of the Previous WEC Transmission (Atwell 2018a; Figure 2).

Tilled agriculture and grassland habitats within the survey areas are similar to those found throughout the region; therefore, it is expected that the portions of the NDWEC that were un-surveyed in 2017, which consist mostly of tilled cropland, are unlikely to contain a significant number of leks. Similarly, sharp-tailed grouse lek density within areas adjacent to the NDWEC Transmission are expected to be comparable to that observed during previous surveys as survey areas largely overlap (Figure 2).

To confirm the above conclusion of low lek density, Northern Divide Wind will conduct a full lek survey in 2020 within the NDWEC plus a 0.5-mi buffer around both the NDWEC and the NDWEC Transmission (Figure 4). This survey will result in one full year of survey for the entire NDWEC Project as well as a second year of survey for those portions included in previous efforts.

To minimize and avoid impacts to grouse lek locations, Northern Divide Wind applied a 0.5-mi setback around all leks identified in previous years and will place construction timing stipulations on leks found during 2020 surveys. Timing stipulations include minimization of construction activities within 0.5 mi of leks between one hour before sunrise to two hours after sunrise and again one hour before sunset and two hours after sunset during the lekking and breeding season. Construction could continue during the middle of the day within the 0.5-mi buffer around a newly discovered lek. This would avoid impacts to known leks and minimize impacts to new leks.

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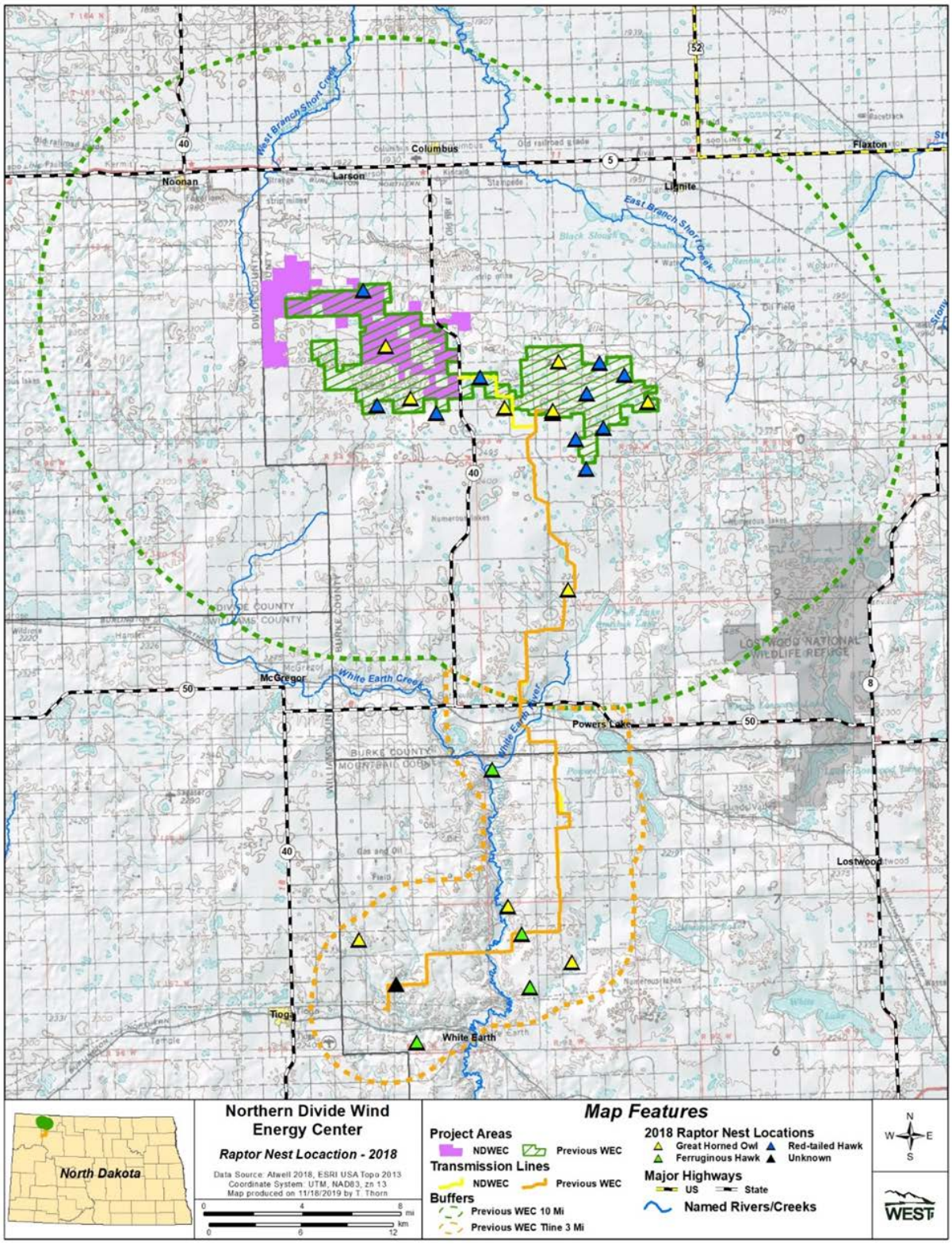


Figure 1. Raptor nest locations from surveys completed for a Previous Wind Energy Center (WEC) and Previous WEC Transmission Line in 2017 and 2018, and proximity to Northern Divide Wind Energy Center (NDWEC) and NDWEC Transmission Line in Burke and Mountrail counties, North Dakota.

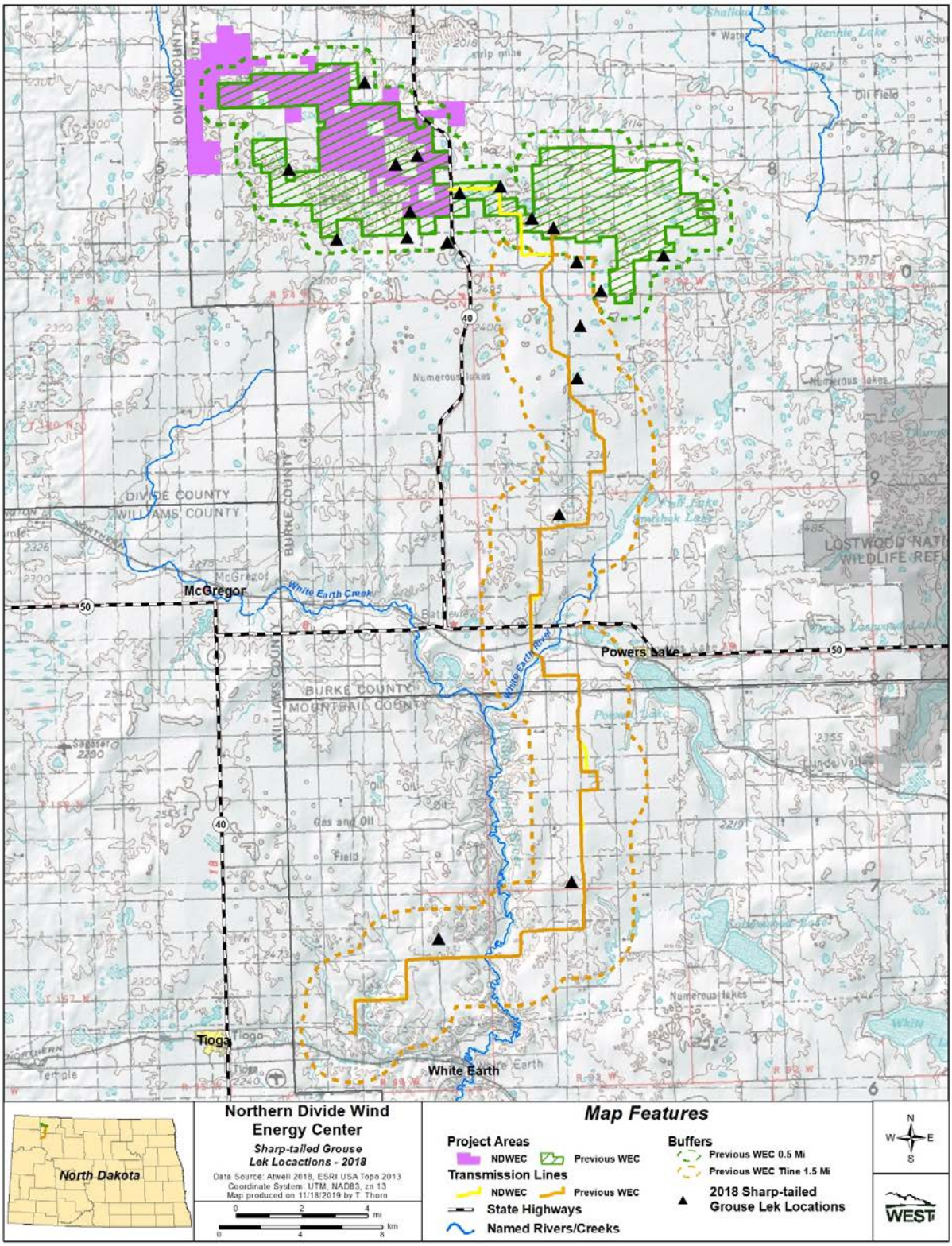


Figure 2. Sharp-tailed grouse lek locations from surveys completed for a Previous Wind Energy Center (WEC) and Previous WEC Transmission Line in 2017 and 2018, and proximity to Northern Divide Wind Energy Center (NDWEC) and NDWEC Transmission Line in Burke and Mountrail counties, North Dakota.

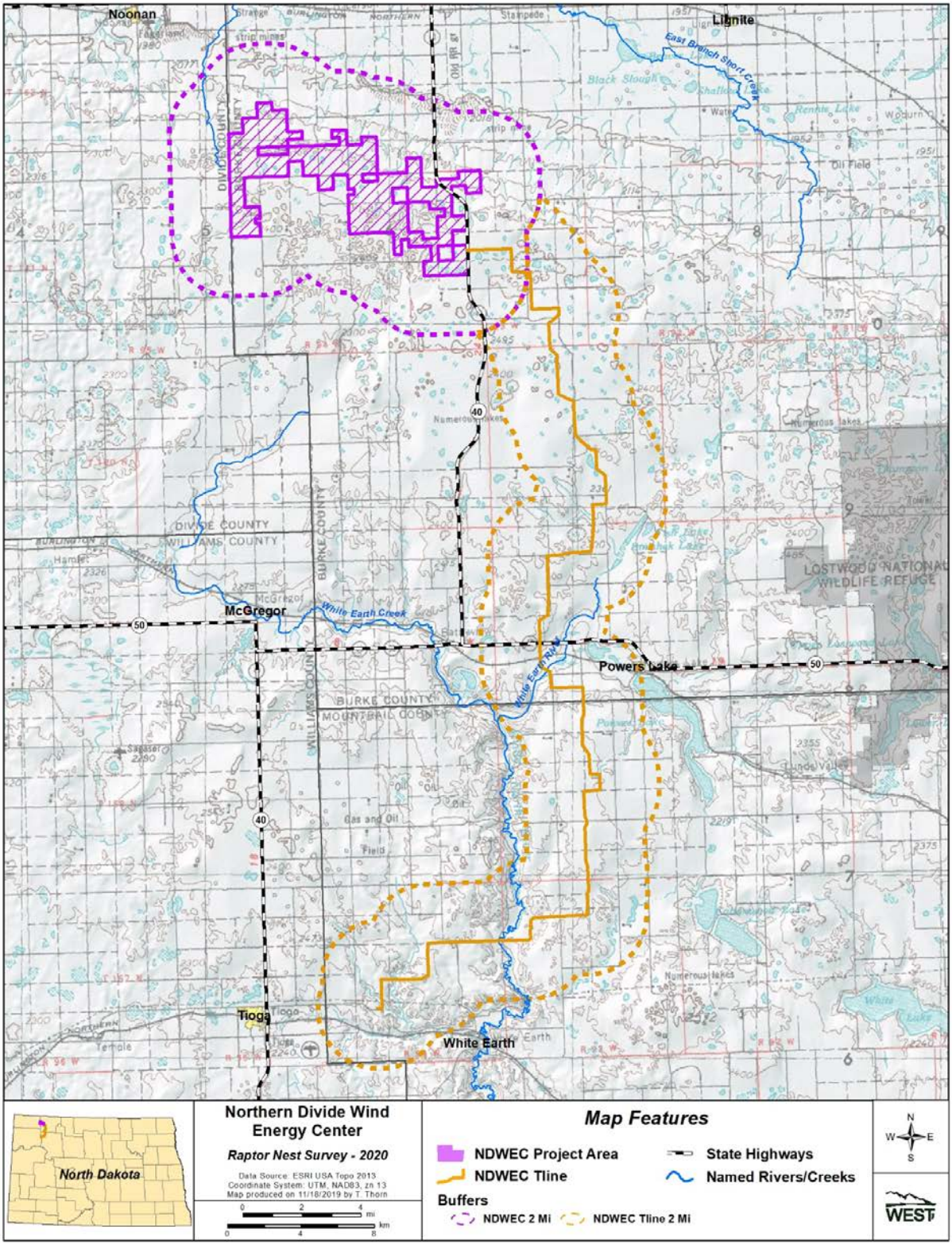


Figure 3. Location of the Northern Divide Wind Energy Center (NDWEC) and NDWEC Transmission Line in Burke and Mountrail counties, North Dakota, and associated buffers for raptor nest surveys proposed for 2020.

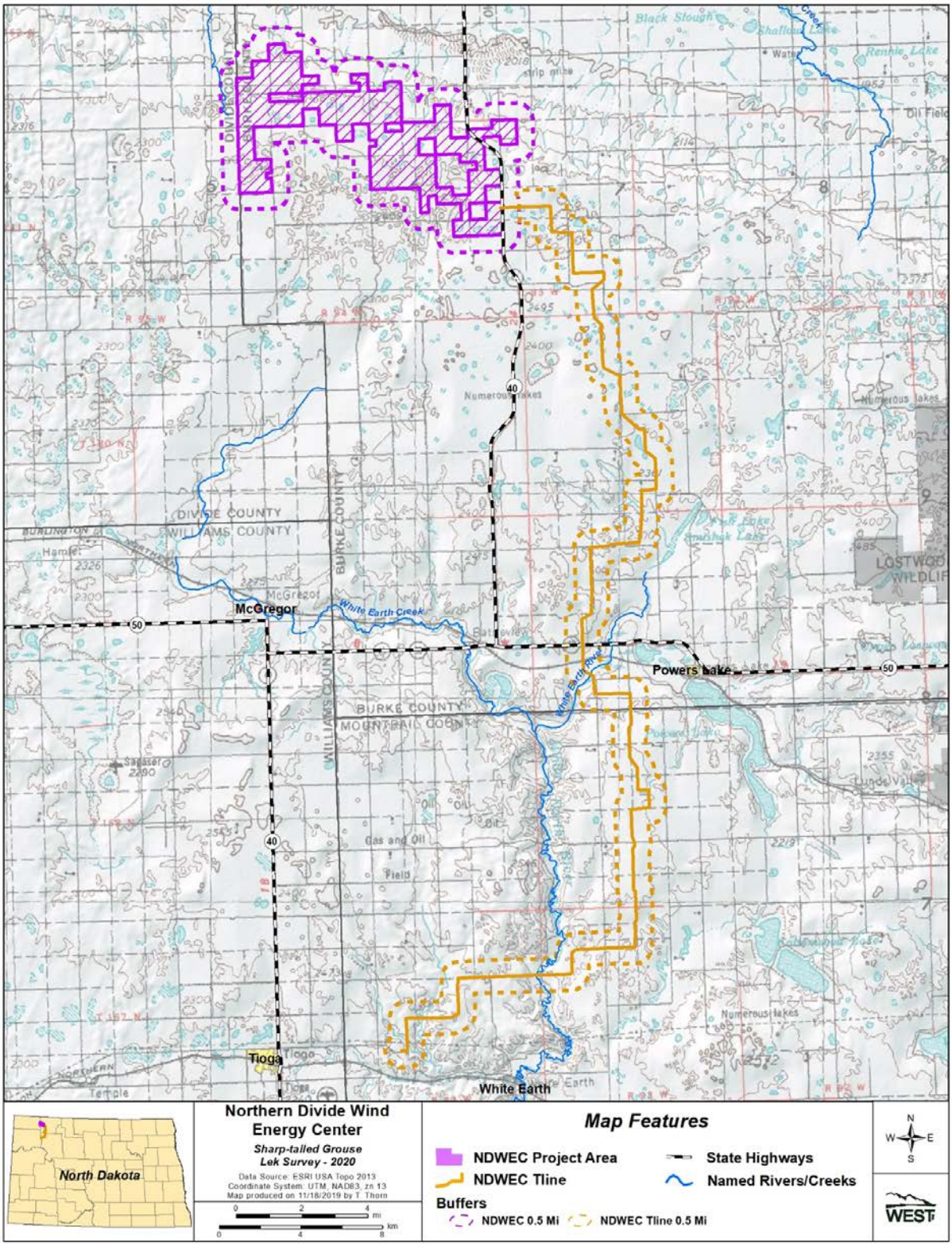


Figure 4. Location of the Northern Divide Wind Energy Center (NDWEC) and NDWEC Transmission Line in Burke and Mountrail counties, North Dakota, and associated buffers for sharp-tailed grouse lek surveys proposed for 2020.

B3. Dakota Skipper Habitat Evaluation

Northern Divide Wind Energy Center and 345-kV Transmission Line Dakota Skipper Suitable Habitat Assessment Report

NOVEMBER 2019

PREPARED FOR

Northern Divide Wind, LLC

PREPARED BY

SWCA Environmental Consultants

NORTHERN DIVIDE WIND ENERGY CENTER AND 345-KV TRANSMISSION LINE DAKOTA SKIPPER SUITABLE HABITAT ASSESSMENT REPORT

Prepared for

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November 22, 2019

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Figure 2. Representative suitable habitat along the transmission line corridor. Little bluestem and abundant purple coneflower within native prairie is visible. 4

Figure 3. Representative unsuitable Dakota skipper habitat in the assessment area. Dominate smooth brome cover with woody vegetation and no nectar species is visible. 5

Tables

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1 INTRODUCTION

Northern Divide Wind, LLC (Northern Divide Wind), a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC, is proposing to construct the 200-MW Northern Divide Wind Energy Center (WEC) and 41-mile 345-kV Transmission Line (the Project). The Project footprint consists of the WEC construction easement, transmission line right-of-way, and temporary transmission line access roads. The WEC is located in Burke County, North Dakota, and the transmission line is located in Burke and Mountrail Counties, North Dakota (see maps in Appendix A). SWCA Environmental Consultants (SWCA) was contracted to assess the presence of Dakota skipper (*Hesperia dacotae*) suitable habitat within the project footprint. Approximately 4,478 acres were assessed within the WEC project boundary and along the transmission line route (see maps in Appendix A).

The assessment included a desktop analysis and subsequent habitat field surveys based on Project information provided by Northern Divide Wind. The desktop analysis identified areas of potential habitat, while the habitat field surveys verified and refined the desktop-identified potential habitat. SWCA conducted multiple field surveys during the growing season of 2017, 2018, and 2019 to account for Project adjustments made by Northern Divide Wind following field surveys to avoid impacts to potential Dakota skipper habitat and other sensitive resources (*e.g.*, wetlands, cultural resources, etc.).

1.1 Dakota Skipper

The U.S. Fish and Wildlife (USFWS) listed the Dakota skipper as threatened under the Endangered Species Act (16 United States Code Chapter 35 § 1531 et seq.) on November 24, 2014 (USFWS 2014). The primary causes for population decline include the loss or fragmentation of high-quality native prairie habitat from overgrazing, conversion to agriculture, invasion by nonnative plants, urbanization, and disruption of natural prairie fire cycles (USFWS 2019a).

The USFWS describes Dakota skipper suitable habitat as those areas that contain and support populations of this species, including any of its life stages, such as larval development and/or adult foraging. The habitat generally occurs in undisturbed native prairie but may also include areas invaded by Kentucky bluegrass (*Poa pratensis*), a non-native, invasive species (USFWS 2016). Suitable habitat includes two types: Type A and Type B (Royer et al. 2014; USFWS 2016, 2018a). The assessment area only contains Type B habitat.

Type B habitat occurs primarily on rolling terrain over gravelly glacial moraine deposits and is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), and needleandthread (*Hesperostipa comata*) or porcupinegrass (*Hesperostipa spartea*), and often invaded by Kentucky bluegrass. In a western North Dakota variant of Type B habitats, western wheatgrass (*Pascopyrum smithii*) is also typical. Bluebell bellflower (*Campanula rotundifolia*) and prairie lily (*Lilium philadelphicum*) are present in some Type B habitats, but they support more extensive stands of purple coneflower (*Echinacea angustifolia*), prairie coneflower (*Ratibida columnifera*), and common gaillardia (blanketflower; *Gaillardia aristata*). Type B habitat typically supports a high diversity and abundance of native forbs, including purple coneflower, purple prairie clover (*Dalea purpurea*), white prairie clover (*Dalea candida*), yellow sundrops (*Calylophus serrulatus*), prairie groundsel (*Packera plattensis*), groundplum milkvetch (*Astragalus crassicarpus*), eastern pasqueflower (*Pulsatilla patens*), old man's whiskers (prairie smoke; *Geum triflorum*), western silver aster (*Symphyotrichum sericeum*), dotted blazing star (*Liatris punctata*), meadow zizia (heartleaf golden Alexanders; *Zizia aptera*), prairie sagewort (*Artemisia frigida*), and leadplant (*Amorpha canescens*) (USFWS 2016, 2018a).

The flight period is 2 to 4 weeks long, with year-to-year variability due to the weather and forb flowering times that occur between mid-June and mid-July. Flowering forbs must be present in abundant quantity and near suitable larval habitat to provide reliable sources of nectar for adults during their flight period. Dakota skipper are not known to disperse widely (Burke et al. 2011; Swengel 1996) and typically do not travel more than 1 kilometer between habitat patches (USFWS 2018b); however, average movement distances for individuals have been documented as less than 300 meters (Dana 1991).

During the flight period, eggs are laid on broadleaf plants (McCabe 1981) and grasses (Dana 1991). The eggs hatch after incubating for 7 to 20 days, and the larvae then crawl to the bases of grass plants where they form shelters at or below the ground surface (Dana 1991). At night, they emerge from their shelters to forage. For growth and survival, larvae rely on native grasses such as little bluestem, big bluestem, sideoats grama (*Bouteloua curtipendula*), and prairie dropseed (*Sporobolus heterolepis*) (USFWS 2016). Dakota skippers have six to seven larval stages (instars). They overwinter in their ground-level or subsurface shelters during either the fourth or fifth instar and resume feeding the following spring. One generation is completed per year.

The USFWS considers the Dakota skipper possibly extirpated in Burke County and present in Mountrail County (USFWS 2018a). Occurrences have been documented in one township in Burke County (Township [T] 160 North [N], Range [R] 91 West [W]) and three townships in Mountrail County (T158N, R91W; T156N, R91W; T154N, R93W) (USFWS 2019b). The closest township with previously documented occurrences is located approximately 13 miles from the WEC and approximately 8 miles from the transmission line.

2 METHODOLOGY

2.1 Desktop Analysis

SWCA evaluated the presence of potential undisturbed native prairie using geographic information system (GIS) layers and aerial imagery interpretation. Areas considered unsuitable habitat included cultivated lands, forest, planted tree rows, crown and ditch constructed roads, wetlands, open water, farmsteads, industrial sites, and agricultural and livestock operation sites (e.g. corrals, water tanks, grain bins, etc.). LANDFIRE 30-meter resolution data (LANDFIRE 2017) were used to eliminate unsuitable habitat types. Additionally, an SWCA biologist experienced with Dakota skipper habitat interpreted aerial imagery (North Dakota GIS Technical Committee 2019), with oversight and review completed by Mr. Jake Powell, an SWCA Senior Ecologist who holds a USFWS Dakota skipper scientific recovery permit (Permit No. TE64070B-1). The aerial imagery interpretation, as well as USFWS National Wetlands Inventory data (USFWS 2017), supported land use and land cover determinations. The desktop analysis resulted in GIS layers that identified areas of potential habitat that were then carried forward for habitat field surveys.

2.2 Habitat Field Surveys

SWCA field biologists experienced with Dakota skipper habitat completed pedestrian surveys of the desktop-identified potential habitat during the growing season when vegetation would be identifiable. These surveys verified whether the potential habitat was suitable or unsuitable. SWCA based suitable habitat determinations on characteristics outlined in the published literature (Rigney 2013; Royer and Marrone 1992; USFWS 2014, 2016, 2018a). Mr. Powell, SWCA Senior Ecologist, was responsible for quality control and oversight of the field teams.

The pedestrian field surveys occurred over multiple mobilizations from 2017 through 2019 to capture Project changes to avoid sensitive environmental and cultural resources and meet engineering efficiency standards and regulatory requirements. Table 1 outlines the dates of field surveys. Some parts of the survey area surveyed during these dates are not reflected on the results maps (Appendix A) or in the survey acreage due to those areas being outside of the final Project footprint.

Table 1. Field Survey Sessions

Field Session Dates	Survey Area
September 7–13, 2017	Eastern side of WEC (old construction easement layout)
March 30–June 1, 2018	Eastern side of WEC (old construction easement layout)
June 11–13, 2018	Transmission line ROW survey area
August 20–23, 2018	Eastern side of WEC (old construction easement layout)
May 23–25, 2019	WEC construction easement, proposed substation location, and transmission line access roads
July 30–August 2, 2019	Transmission line access road reroutes
August 15–17, 2019	Transmission line ROW reroute and access roads
September 20, 2019	WEC construction easement
October 1, 2019	WEC construction easement

3 RESULTS

SWCA assessed approximately 4,478 acres within the WEC project boundary and along the transmission line route. Approximately 5 acres of suitable habitat within the WEC and approximately 214 acres suitable habitat along the transmission line route were identified during the assessment.

The WEC project area contained only two suitable habitat areas, one near turbine 64 and the other near turbine 72 (see map page 3 through 10 in Appendix A). These areas contained an abundance of purple coneflower, with occasional prairie coneflower and little bluestem. Figure 1 is a representative view of suitable habitat within the WEC assessment area.

The suitable habitat along the transmission line route occurs in several areas but is concentrated in the southern portion (see map pages 3 through 10 in Appendix A). The suitable habitat consisted of purple coneflower, with the occasional presence of prairie coneflower and native thistles (*Cirsium* spp.). Little bluestem was more prevalent in Mountrail County than in the Burke County. Kentucky bluegrass, smooth brome (*Bromus inermis*), and western snowberry (*Symphoricarpus occidentalis*) were present in some areas. Figure 2 is a representative view of the suitable habitat in these areas.

Unsuitable habitat had low native plant diversity and was primarily dominated by non-native species, such as Kentucky bluegrass and smooth brome. Sandier areas had extensive wolf willow (silverberry; *Elaeagnus commutata*) populations. Figure 3 is a representative view of unsuitable habitat in the assessment area.



Figure 1. Representative suitable habitat within the WEC. Purple coneflower and small areas of little bluestem, with light woody vegetation cover within native prairie is visible.



Figure 2. Representative suitable habitat along the transmission line corridor. Little bluestem and abundant purple coneflower within native prairie is visible.



Figure 3. Representative unsuitable Dakota skipper habitat in the assessment area. Dominate smooth brome cover with woody vegetation and no nectar species is visible.

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APPENDIX A

Maps

Northern Divide Wind Project Dakota Skipper Assessment

- Turbine
- Transmission Line Pole
- Transmission Line Guy Easement
- Transmission Line Pulling Easement
- Dakota Skipper Assessment Area
- Dakota Skipper Field-verfied Suitable Habitat
- Wind Energy Center Construction Easement
- Transmission Line ROW
- Wind Energy Center Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Miles
0 0.5 1

0 0.5 1
Kilometers

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Base Map: 2018 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Inset Source: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Burke and Mountrail Counties, North Dakota

Projection: NAD 1983 UTM Zone 13N

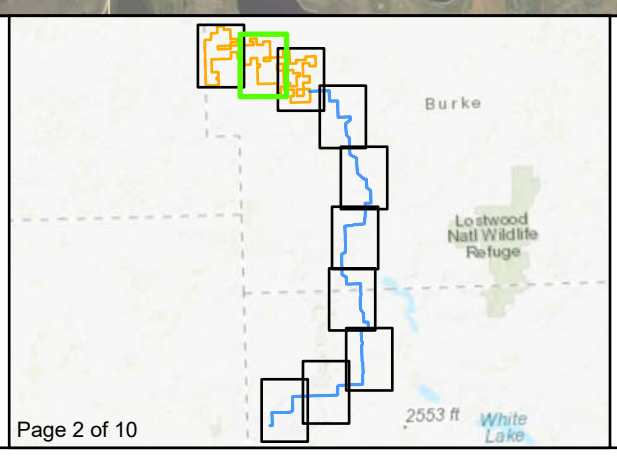
SWCA ENVIRONMENTAL CONSULTANTS

11/22/2019

T162N, R094W
T162N, R093W
T161N, R094W
T161N, R093W
Burke County

Northern Divide Wind Project Dakota Skipper Assessment

- Turbine
- Transmission Line Pole
- Transmission Line Guy Easement
- Transmission Line Pulling Easement
- Dakota Skipper Assessment Area
- Dakota Skipper Field-verfied Suitable Habitat
- Wind Energy Center Construction Easement
- Transmission Line ROW
- Wind Energy Center Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Miles
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Kilometers

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Base Map: 2018 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Inset Source: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Burke and Mountrail Counties, North Dakota

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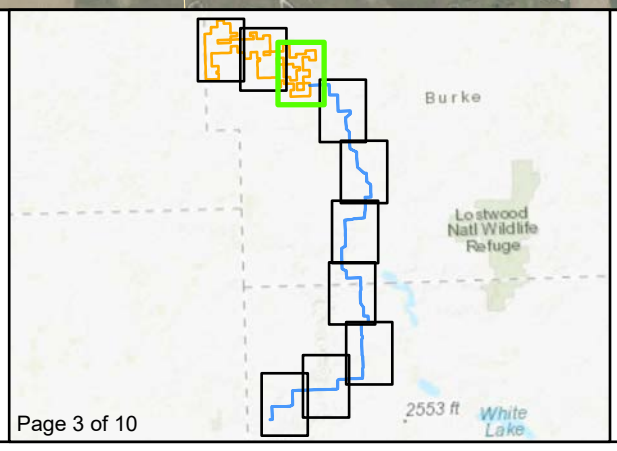
SWCA ENVIRONMENTAL CONSULTANTS

11/22/2019

T162N, R094W
T162N, R093W
T161N, R094W
T161N, R093W
Burke County
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73
74
Alt2
Alt3
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001E
002E
003E
004E
005E
006E
007E
008E

Northern Divide Wind Project Dakota Skipper Assessment

- Turbine
- Transmission Line Pole
- Transmission Line Guy Easement
- Transmission Line Pulling Easement
- Dakota Skipper Assessment Area
- Dakota Skipper Field-verfied Suitable Habitat
- Wind Energy Center Construction Easement
- Transmission Line ROW
- Wind Energy Center Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



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Base Map: 2018 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Inset Source: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Burke and Mountrail Counties, North Dakota

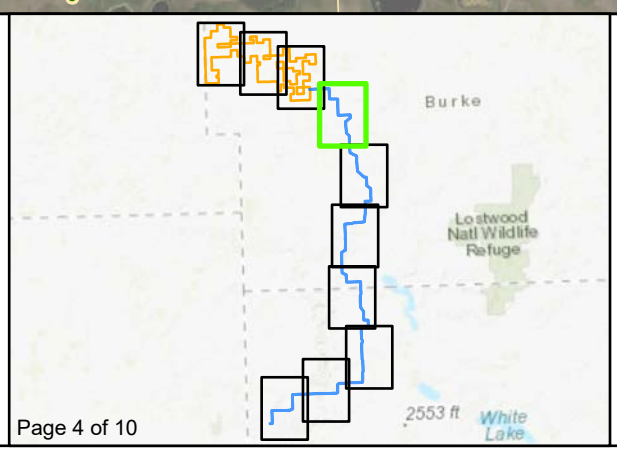
Projection: NAD 1983 UTM Zone 13N

SWCA ENVIRONMENTAL CONSULTANTS

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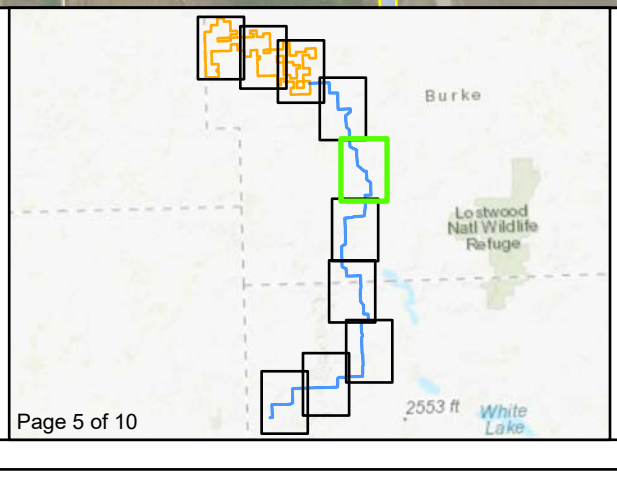
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T160N, R093W

Burke County

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Burke and Mountrail Counties, North Dakota

Projection: NAD 1983 UTM Zone 13N

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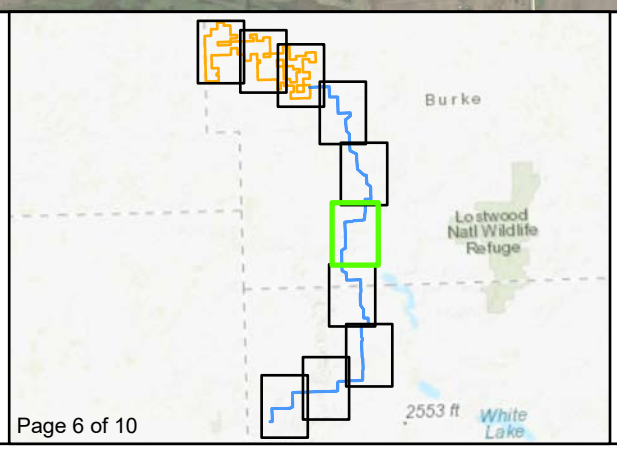
T160N, R093W

Burke County

T159N, R093W

Northern Divide Wind Project Dakota Skipper Assessment

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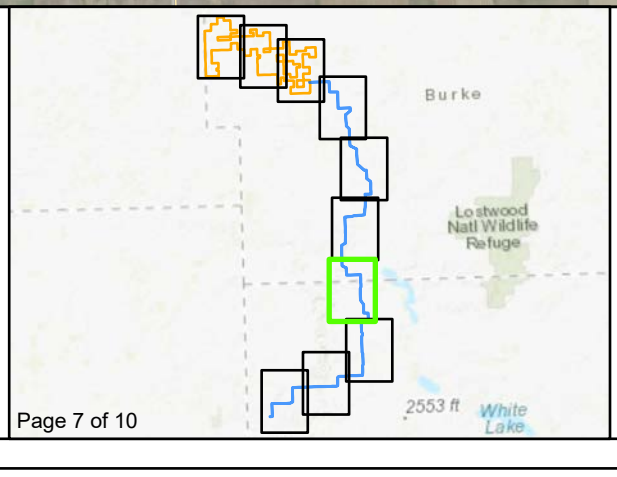
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Northern Divide Wind Project Dakota Skipper Assessment

T159N, R093W
Burke County
T158N, R093W
Mountrail County

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T158N, R093W

T157N, R093W

Mountrail County

Burke

Lostwood Natl Wildlife Refuge

White Lake

2553 ft

Northern Divide Wind Project Dakota Skipper Assessment

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T158N, R094W

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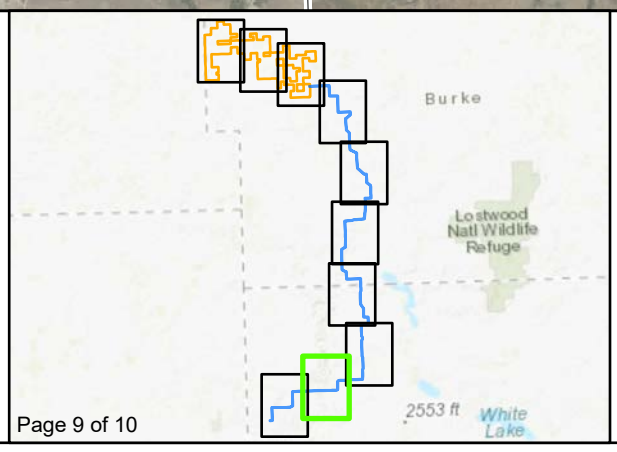
Mountrail County

T157N, R094W

T157N, R093W

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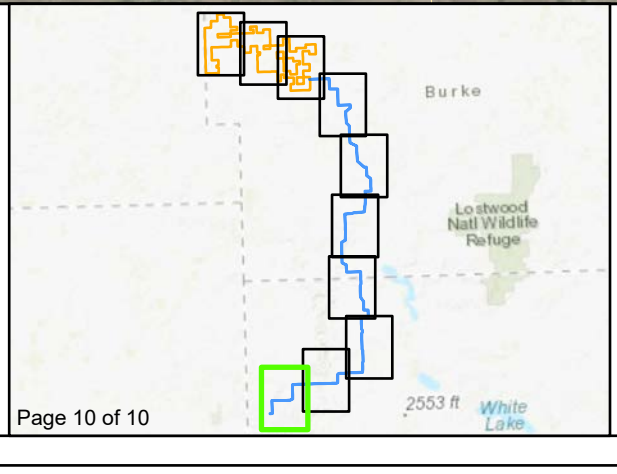
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11/22/2019



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Burke and Mountrail Counties, North Dakota

Projection: NAD 1983 UTM Zone 13N

SWCA ENVIRONMENTAL CONSULTANTS

11/22/2019

B4. Wildlife Technical Memorandum

Whooping Crane, Grouse Lek, Raptor Nest, and Northern Long-eared Bat

ENVIRONMENTAL & STATISTICAL CONSULTANTS

4007 State Street, Suite 109. Bismarck, North Dakota 58503
Phone: 701-250-1756 ◆ www.west-inc.com ◆ Fax: 701-250-1761

TECHNICAL MEMORANDUM

Date: November 20, 2019

To: Northern Divide Wind, LLC

From: Clayton Derby, Western EcoSystems Technology, Inc.

Subject: Northern Divide Wind – 345-kV Transmission Line

INTRODUCTION

Northern Divide Wind, LLC (Northern Divide Wind), a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC (NextEra), is proposing to develop the 200-megawatt Northern Divide Wind Energy Center (NDWEC) and 345-kilovolt Transmission Line (NDWEC Transmission) collectively referred to as the NDWEC Project. The NDWEC Project is located largely within an area of a previously proposed and previously studied wind energy center (Previous WEC) and transmission line (Previous WEC Transmission), collectively referred to as the Previous Project (Figure 1).

Studies conducted for the Previous Project (Attachment 1) have applicability in evaluating wildlife resources for the NDWEC Project as the Previous Project's survey areas largely overlap the NDWEC Project (Figure 1). This memo (a) describes the NDWEC Transmission relative to the Previous WEC Transmission, (b) reviews information from bird and bat studies conducted for the Previous Project and (c) applies this information contextually to the NDWEC Transmission, specifically an approximately 5-mile (mi) segment that extends northwest to the NDWEC (Figure 1).

SITE DESCRIPTION

The NDWEC Transmission is approximately 41 mi long with a 150- to 200-foot (ft) right-of-way. It will connect the NDWEC to the Tande substation (Figure 1). It is located in Burke and Mountrail counties in northwestern North Dakota, approximately one mi west of Powers Lake, eight mi east of McGregor, and three mi east of Tioga (Figure 1).

The NDWEC Transmission runs in a predominantly north-south direction, with approximately 23 mi in Burke County and 18 mi in Mountrail County. The NDWEC Transmission and Previous WEC

Transmission rights-of-way largely overlap, except for a 5-mi extension (Extension) running northwesterly to the NDWEC (Figures 1 and 2).

PREVIOUS STUDIES AND IMPLICATIONS FOR THE NDWEC TRANSMISSION

Northern Divide Wind is relying upon information from the Previous Project studies (Attachment 1) to inform bird and bat resources for the NDWEC Transmission, including the Extension. Table 1 includes a summary of the bird and bat studies conducted for the Previous Project that are applicable to the NDWEC Transmission. The following sections provide a summary of the results of these studies, outlining potential similarities/differences with the Extension.

Table 1. Summary of studies conducted for the Northern Divide Wind Energy Center (NDWEC) and Previous Project (inclusive of a previous wind energy center [Previous WEC] and previous transmission line [Previous WEC Transmission]), in Burke and Mountrail counties, North Dakota.

Study	Type of Study	Date	Assessment Area	Reference
Eagle and Raptor Nests[1]	Aerial	April 2017	Raptor Nest Study Area (Previous WEC and additional 10-mile [mi] buffer for eagles)	Atwell 2018d
Grouse Lek Survey[1]	Aerial	April 2017	Grouse Survey Study Area (Previous WEC and 0.5 mi lek assessment buffer)	Atwell 2018d
Grouse Lek Survey[1]	Ground	April 2017	Grassland habitat within the Previous WEC Grouse Survey Study Area	Atwell 2018d
Whooping Crane Habitat Assessment[1]	Desktop	2018	Previous Project	The Watershed Institute 2018 as cited in Derby et al. 2019b
Whooping Crane Habitat Review[2]	Desktop	2019	NDWEC and four equal-sized Reference Areas	Derby et al. 2019b
Bat Habitat Assessment[1]	Desktop	2018	Previous WEC	Atwell 2018c
NLEB Habitat Assessment[2]	Desktop	2019	NDWEC and 2.5-mi buffer	Derby et al. 2019a
Eagle and Raptor Nests[3]	Aerial	April 2018	Transmission Raptor Nest Study Area (Previous WEC Transmission and 3-mi buffer)	Atwell 2018a
Grouse Lek Survey[3]	Aerial	April – May 2018	Transmission Grouse Survey Study Area (Previous WEC Transmission and 1.5-mi buffer)	Atwell 2018a
Grouse Lek Survey[3]	Ground	April 2018	Grassland habitat within the Previous WEC Transmission Grouse Survey Study Area	Atwell 2018a
Bat Habitat Assessment[3]	Desktop	2018	Transmission Line Assessment Area (Previous WEC Transmission and 1-mi buffer)	Atwell 2018b

[1.] Denotes studies conducted for the Previous WEC.

[2.] Denotes studies conducted for the NDWEC.

[3.] Denotes studies conducted for the Previous WEC Transmission.

Whooping cranes

According to a whooping crane (*Grus americana*) habitat suitability desktop analysis conducted for the Previous Project by The Watershed Institute (TWI), a total of 10,673 wetland habitats intersected the whooping crane habitat assessment area, with emergent wetlands being the dominant type (TWI 2018 as cited in Derby et al. 2019b). Of this total, 905 wetland habitats were evaluated for their suitability, with 277 receiving a score of 12 or higher, indicating potential suitable habitat for whooping cranes; these potential suitable wetland habitats were scattered throughout the Previous Project. According to a desktop analysis conducted by Derby et al. (2019b) and based on Niemuth et al. (2018), the majority of the NDWEC is within the central portion of the whooping crane migration corridor; however, a finer-scale analysis resulted in the NDWEC being within the lower half of probability of use ranges (0-0.5; Derby et al. 2019b). Relative probability of use, as applied to the Extension, is similar to and within the probability of use ranges for the NDWEC and surrounding areas.

Based on the results of these studies, historic sightings of whooping cranes, and the location of the NDWEC Project within the whooping crane migration corridor, use on the ground during migration is possible within the Extension, with an overall likelihood of use similar to that expected in the general region. Northern Divide Wind will install bird flight diverters on the entire NDWEC Transmission, a practice commonly recommended by wildlife agencies and contained in the Avian Power Line Interaction Committee (APLIC) guidance in “Reducing Avian Collisions with Power Lines” (APLIC 2012) to help minimize risk to the species.

Grouse leks

Aerial- and ground-based sharp-tailed grouse (STGR; *Tympanuchus phasianellus*) lek surveys were conducted in 2017 for the Previous WEC and a 0.5-mi buffer (Atwell 2018d) and in 2018 for the Previous WEC Transmission and a 1.5-mi buffer on either side (Atwell 2018a). The majority of the NDWEC Transmission was included in the 2018 survey effort, with the exception of the Extension, which was included in the 2017 survey effort (Figures 1 and 2).

Results from the Previous WEC’s grouse lek survey, as applied to the Extension, indicate there were three STGR leks within 0.5 mi of the Extension (Figure 2). Results of the Previous WEC Transmission’s grouse survey indicated a total of 10 STGR leks located within 1.5 mi of the Previous WEC Transmission (Atwell 2018a). Habitats within the Previous WEC adjacent to the Extension are suitable for STGR leks; similar to tilled agriculture and grassland habitats found throughout the region.

Northern Divide Wind plans to conduct an additional STGR lek survey in 2020 for the NDWEC Project. Northern Divide Wind outlines their lek survey strategy in a memorandum appended to their North Dakota Public Service Commission applications for the NDWEC Project.

Raptor nests

Aerial raptor nest surveys were conducted in 2017 for the Previous WEC and an additional 10-mi buffer for eagles (Atwell 2018d) and in 2018 for the Previous WEC Transmission and a 3-mi buffer on either side (Atwell 2018a). The majority of the NDWEC Transmission was included in the 2018 survey effort, with the exception of the Extension, which was included in the 2017 survey effort (Figures 1 and 2).

Results from the Previous WEC's raptor nest survey, as applied to the Extension, indicate there were two raptor nests (one red-tailed hawk [*Buteo jamaicensis*] and one great-horned owl [*Bubo virginianus*]) within one mi of the Extension (Figure 2). No eagle nests were observed during aerial raptor nest surveys.

Northern Divide Wind plans to conduct a raptor nest survey in spring 2020 for the NDWEC Project. Northern Divide Wind outlines their raptor nest survey strategy in a memorandum appended to their North Dakota Public Service Commission applications for the NDWEC Project. Additionally, Northern Divide Wind will survey areas immediately in advance of construction for presence of any raptor nests built after the 2020 spring survey or otherwise previously undetected, as is normal operating procedures for all NextEra subsidiaries.

Northern long-eared bats

Desktop analyses of potential bat habitat were completed for the Previous Project (Atwell 2018b,c). Results from these studies indicated that the Previous WEC contains limited and fragmented forested habitat and riparian corridors that may be suitable bat habitat; similarly, forested habitat and riparian corridors were fragmented and limited within the Previous WEC Transmission assessment area, with wooded habitat types encompassing less than 2% of the land cover within the assessment area.

In 2019, a northern long-eared bat (NLEB; *Myotis septentrionalis*) desktop habitat analysis was conducted to assess connectivity of suitable foraging, roosting, and communing habitats for NLEB within the NDWEC (Derby et al. 2019a). This assessment indicated the presence of wooded areas that represent potential summer habitat for NLEB within or adjacent to the NDWEC's northern boundary; however, none were connected or near to more contiguous habitat (Derby et al. 2019a). As applied to the Extension and surrounding areas, results from the collective bat studies described above suggest that NLEB presence is unlikely, given the limited forested contiguous habitat, the lack of hibernacula, and the lack of connectivity from other potential habitat.

SUMMARY

Due to the location of the NDWEC Transmission, the adjacent habitat features, and the results of previous studies, potential for sensitive species to occur and use suitable habitats is likely to be equal or lower compared to those obtained during studies conducted for the Previous Project. Use by whooping cranes and NLEB is unlikely, while use by nesting raptors (including eagles) and STGR is expected to be similar to the overall landscape.

LITEATURE CITED

Atwell, LLC (Atwell). 2018a. Burke County Transmission Line Grouse Lek and Raptor Nest Survey Results. Technical Avian Data Summary. Prepared by Atwell for Burke Wind, LLC. June 22, 2018

Atwell, LLC (Atwell). 2018b. Bat Habitat Assessment for Burke County Wind Transmission Line Assessment Area, Burke and Mountrail Counties, North Dakota. Prepared by Atwell for Burke Wind, LLC, Juno Beach, Florida. May 15, 2018. Revision July 24, 2018.

Atwell, LLC (Atwell). 2018c. Burke County Wind Energy Center – Bat Habitat Assessment Addendum. Prepared by Atwell for Burke Wind, LLC. November 27, 2018.

Atwell, LLC (Atwell). 2018d. Burke County Wind Energy Center – Revised Grouse Lek and Raptor Nest Survey Results for 200 MW Project Area. Technical Avian Data Summary Revision. Prepared by Atwell for Burke Wind, LLC, Juno Beach, Florida. November 30, 2018

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Derby, C., T. Thorn, and S. Agudelo. 2019b. Whooping Crane Habitat Review, Northern Divide Wind Energy Center, Burke County, North Dakota. Final Report. Prepared for Northern Divide Wind, LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. November 11, 2019.

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USA Topo. 2013. USA Topo Maps. US Geological Survey (USGS) topographical maps for the United States. ArcGIS. ESRI, producers of ArcGIS software. Redlands, California.

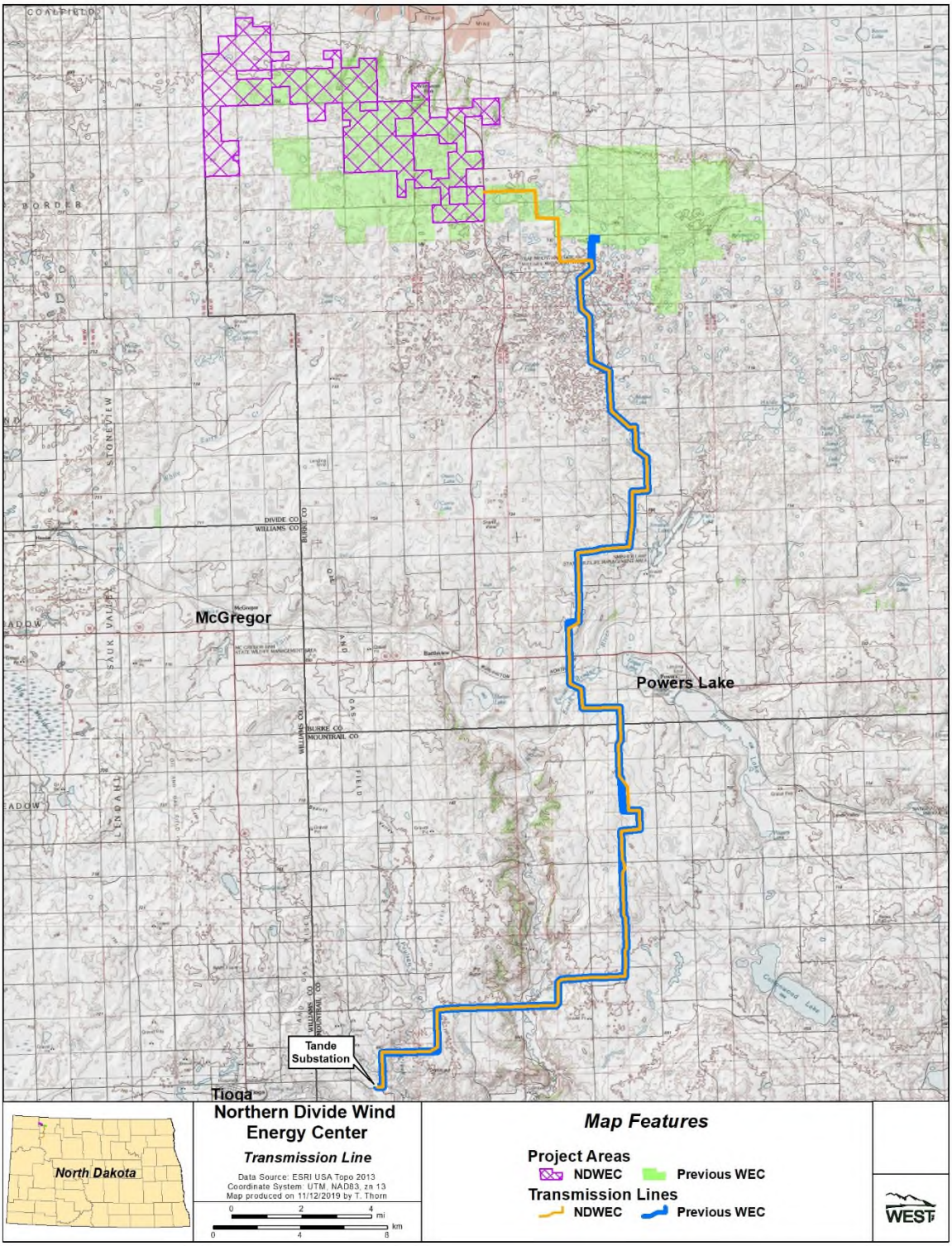


Figure 1. Location of the Northern Divide Wind Energy Center (NDWEC) and NDWEC Transmission Line in Burke and Mountrail counties, North Dakota, relative to the Previous Wind Energy Center (WEC) and Previous WEC Transmission Line.

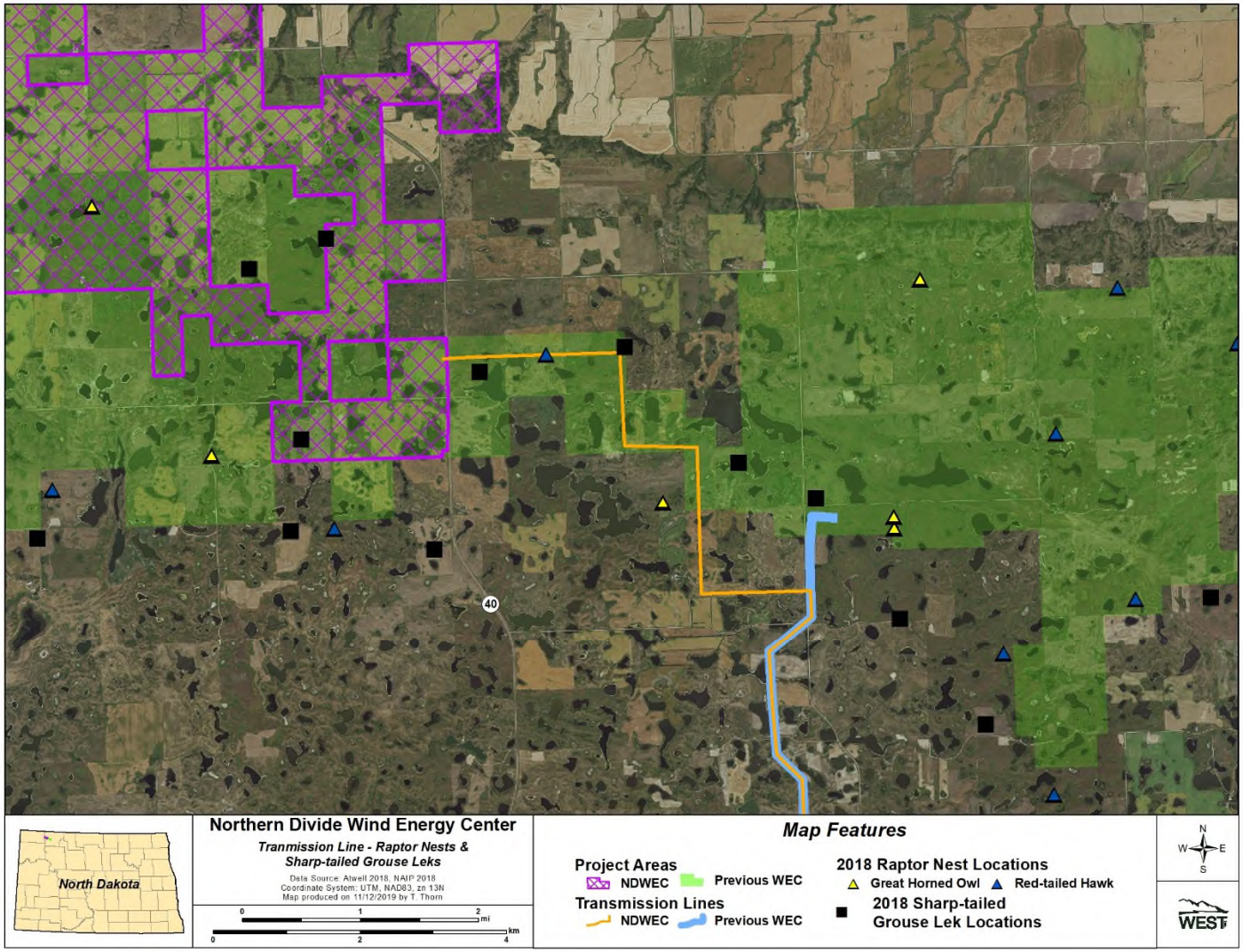


Figure 2. Summary of results of raptor nest and grouse lek surveys conducted for the Previous Wind Energy Center (WEC) and Previous WEC Transmission Line, relative to the Northern Divide Wind Energy Center (NDWEC) Transmission Line Extension, in Burke County, North Dakota.

B4. Attachment 1. Studies Conducted for the Previous Project

List of Studies

A. Burke County Transmission Line Grouse Lek and Raptor Nest Survey Results (Atwell 2018a)

B. Burke County Wind Energy Center – Revised Grouse Lek and Raptor Nest Survey Results for 200 MW Project Area (Atwell 2018d)

C. Bat Habitat Assessment for Burke County Wind Transmission Line Assessment Area, Burke and Mountrail Counties, North Dakota (Atwell 2018b)

D. Burke County Wind Energy Center – Bat Habitat Assessment Addendum (Atwell 2018c)

E. Northern Long-Eared Bat Desktop Habitat Assessment, Northern Divide Wind Energy Center, Burke County, North Dakota (Derby et al 2019a)

F. Whooping Crane Habitat Review, Northern Divide Wind Energy Center, Burke County, North Dakota (Derby et al. 2019b)

B4. Attachment 1A. Burke County Transmission Line Grouse Lek and Raptor Nest Survey Results

Technical Avian Data Summary

TO: Burke Wind, LLC

FROM: Atwell, LLC

DATE: May 29, 2018 (Revision: June 22, 2018)

RE: Burke County Transmission Line Grouse Lek & Raptor Nest Survey Results

Burke Wind, LLC (Burke Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, is developing the Burke County Wind Energy Center (*WEC*) in Burke County, North Dakota. A grouse lek and raptor survey was completed within the wind resource *Project Area* (*Figure 1 & 2*) located within Burke and Mountrail Counties. Burke Wind conducted this study as part of a holistic natural resources review approach to assess potential adverse effects from development of this WEC on species of concern and their habitats. These Tier 3 grouse lek and raptor nest surveys followed pre-survey Tier 2 analysis (as defined within the U.S. Fish & Wildlife Service's [USFWS] Land-based Wind Energy Guidelines; USFWS 2012) that found the earlier version of a larger *transmission line assessment area,* used for transmission line route planning, held potential lekking and nesting habitat for Sharp-tailed Grouse (*Tympanuchus phaisanellus*), eagles, and other raptor species.

Results from the grouse lek and raptor nest surveys will be combined with results from other natural resource studies and will aid in responsibly siting wind turbines, access roads, underground electric collection lines, an electric substation, overhead high-voltage transmission line, and other proposed infrastructure. To date, this thorough approach has enabled Burke Wind to adapt quickly during project design planning and has further minimized potential impacts to sensitive natural resources. Survey data and subsequent analysis that appears within this document only pertain to the approximately 37.4-mile-long Gen-Tie Electric Transmission Line (i.e., *Transmission Line*) in Burke and Mountrail Counties that is being planned as a part of development of the WEC.

On January 24, 2018, raptor nest survey and grouse lek survey methodologies were submitted to the USFWS (Mr. Kevin Shelly) and North Dakota Game and Fish Department (NDGFD; Mr. Steve Dyke) to set forth separate study methodologies for the *Transmission Line,* as opposed to what had already been completed for other segments of the *WEC*. Atwell, LLC (Atwell) requested review of this separate avian services study plan and invited both agencies to pose questions or request additional clarification. Atwell did not receive study plan review communication from the USFWS or NDGFD. As such, Atwell deemed defined survey protocols as sufficient and continued with the identical approach for future survey endeavors associated with the *Transmission Line*.

Ground-based & Aerial Grouse Lek Survey Methodologies

Aerial Transect Lek Surveys

The *Transmission Line* and a 1.5 mile lek-assessment buffer (collectively referred to hereafter as *Transmission Grouse Survey Study Area*; Figure 1) were assessed for Sharp-tailed Grouse lekking grounds during two separate site visit mobilizations from April 4 to May 5, 2018. The assessment buffer is based, in part, on the 2015 North Dakota *State Wildlife Action Plan* (Dyke et al. 2015) description of Sharp-tailed Grouse hens often nesting within 0.5 miles of the lek. Grouse leks located out to at least 1.0 mile could theoretically include active nests within 0.5 miles of the planned route; tripling the accepted setback buffer (i.e., 0.5 miles) yields the 1.5 mile *Transmission Grouse Survey Study Area* (approximately 103.1 square-miles), primarily to accommodate future fluctuations in route planning. Approximately 206 miles of transects were flown across the *Transmission Grouse Survey Study Area* (*Figure 1*).

Atwell utilized a transect band width of no more than 0.5 miles, since a narrower visual threshold (i.e., 0.25 miles on either side of the helicopter) is ideal for detecting this cryptic species. State wildlife agencies have indicated that surveying for Sharp-tailed Grouse leks via helicopter can be difficult (e.g., BLM 2011), and perceived visual detection challenges was Atwell's primary reason for narrowing transect spacing. This transect width has proven effective during prior surveys that Atwell has conducted for Sharp-tailed Grouse, and lekking birds have been readily detectible across a wide range of ground cover backgrounds. Even hunkered grouse are detectable from the air, and a large proportion of encountered grouse flush when encountered (Atwell, pers. comm.). Flushing birds are readily detected across a variety of ground cover backgrounds, particularly birds that are returning to a lek once flushed.

Aerial lek surveys were conducted within the *Transmission Grouse Survey Study Area* during two mobilizations to the *Transmission Line;* surveys were finalized in early May because severe cold weather during the early-April mobilization grounded the helicopter during preferred grouse lek survey window in the early morning (i.e., a narrow window of time around local sunrise) across several days. Aerial transect surveys were conducted by Atwell avian specialists and were flown by *Double M Helicopters* at low speeds (i.e., 30 – 40 knots). Survey transects were flown in 0.5-mile intervals across the *Transmission Grouse Survey Study Area*. A 0.25-mile (400-meter) visibility threshold existed on either side of the aircraft. Transect routes were oriented on a north-south axis, and flown at heights of 50 to 100 feet (15 – 30 meters). Transects did not intersect federal wildlife management areas/refuges so there was no need to adjust the study flight plan for this particular survey. Transects began at 20 minutes before sunrise and ended approximately two hours after sunrise. Two Atwell biologists surveyed simultaneously, one from each side of the aircraft.

The large majority of lek locations were plotted to a precision of 50 meters or less, and all leks were within 100-150 meters of plotted coordinates. More precise mapping of grouse lekking grounds from a moving helicopter in open grassland was occasionally difficult, as landmarks in aerial images that were

used to assist mapping precision during the survey (such as hilltops, potholes, trees, rock outcrops, or roads) were in some cases lacking in grassland-dominated lek habitats.

Confirmed leks were defined as three or more birds together with at least one male displaying, based on Sharp-tailed Grouse species biology, prior experience with lekking grouse species, and information synthesized within Johnsgard (2016). When flushing birds were encountered via aerial transects, birds were observed for return-flight behavior to pin point the exact location of the lek centroid. *Possible* leks were defined as auditory detections of multiple grouse that could not be verified visually, after their initial detection on a ground-based survey. Standing flocks of birds that were not actively lekking at time of observation, possibly because of extreme cold weather, were also noted as *possible* leks. Flushing flocks that did not return to a lek centroid, but where sufficient ground cover disturbance pointed towards a possible lek centroid, were classified as *possible* leks.

Ground-based Roadside Lek Surveys

Ground-based roadside lek surveys were attempted from April 3 to April 5, 2018. Roadside lek surveys were conducted from the majority of available and safely accessible public roadways that traverse the *Transmission Grouse Survey Study Area* and which intersected grassland habitat (grassland habitat determined with available land cover data and desktop review of sources including GIS coverage of NDGFD Micro Native Grassland Conservation Areas; BLM 2011). Surveys were conducted within a limited window commencing 30 minutes before local sunrise and terminating between 60 and 120 minutes after sunrise, based on the suitability of survey weather variables (e.g., wind speed, temperature,. precipitation, etc.). Biologists surveyed for lekking grouse along safe roadside pull-offs at no greater than 0.4-mile increments (Hamilton et al. 2011). Each ground-based survey point was surveyed for a minimum of five (5) minutes.

Eagle & Raptor Nest Survey Methodology

Simultaneously, the *Transmission Line* was assessed for raptor nests, particularly for Bald Eagle (*Haliaeetus leucocephalus*), Golden Eagle (*Aquila chrysaetos*), and Ferruginous Hawk (*Buteo regalis*) nests (e.g., Dyke et al. 2015). This Tier 3 (USFWS 2013) survey followed pre-survey Tier 2 analysis, which concluded that the *Transmission Raptor Nest Study Area* could potentially contain Bald Eagle and Golden Eagle nesting habitat (Johnson 2009, Dyke et al. 2015). Aerial raptor nest surveys were conducted from April 3 to April 5, 2018. These eagle nest buffer survey transects were flown only after peak grouse lekking timing in the early morning hours.

Aerial transect surveys were conducted by Atwell avian specialists and were flown by *Double M Helicopters* at low speeds (30 – 40 knots). Survey transects were conducted in 1-mile intervals across the *Transmission Line* and a surrounding 3-mile eagle assessment buffer (together referred to as the *Transmission Raptor Nest Study Area*). While some guidelines recommend up to a 1-mile setback buffer for sensitive raptor species nests, such as Bald and Golden Eagles and Ferruginous Hawk (USFWS 2008),

other published studies suggest using a 2-mile setback buffer for Golden Eagles (e.g., Suter and Joness 1981). The 3-mile assessment buffer-width is partially based on the more conservative 2-mile recommendation and serves to accommodate possible line route fluctuations.

Since 2017 aerial raptor nest surveys partly overlapped with the *Transmission Line*, 1-mile transects did not extend across a 3-mile buffer of the entire *Transmission Line* (Figure 2). Approximately 115 miles of transects were flown across the *Transmission Raptor Nest Study Area* (approx. 117.9 square-miles). A 0.5-mile (800-meter) visibility threshold existed on either side of the helicopter. Additionally, the entire *Transmission Line* was flown per specified route data available during the time of the survey. Known raptor nests that were delineated during the 2017 aerial nest survey that occurred within 1-mile of the *Transmission Line* were spot checked on April 5, 2018 to confirm persistence from the previous spring and to check for subsequent activity level.

Visibility constraints were minimal during surveys, and deciduous leaf-out conditions never exceeded initial bud-break phase. The *Transmission Raptor Nest Study Area* consists of tilled agricultural lands and associated shelter belts, grassland, numerous glacial potholes, and isolated aspen (*Populus* sp.) stands. High-wall terrain associated with the White Earth River valley was scrutinized from varying angles considering the chance that this area coincides with Golden Eagle habitat (Dyke et al. 2015).

RESULTS

Sharp-tailed Grouse Lek Survey Results Summary

A total of 10 leks are known from within 1.5 miles of the *Transmission Line* (*Figure 1, 2; Appendix II*). Eight (8) confirmed leks were discovered within the proposed *Transmission Grouse Survey Study Area* during the Spring 2018 surveys (*Figure 2; Appendix I*). One of these leks was previously known from surveys conducted during Spring 2017 for the wind resource portion of the WEC. The 1.5-mile *Transmission Line* buffer captured two (2) additional leks that were documented during Spring 2017. These leks averaged 14.5 individuals/lek (*S.D.* = 10.9, *n* = 10).

Confirmed leks were not located during ground-based roadside survey efforts.

In addition to confirmed leks found during aerial surveys, biologists located three (3) possible lek locations during ground-based surveys within the *Transmission Grouse Survey Study Area*. Additionally, individuals (sightings of one or two Sharp-tailed Grouse that were not linked directly to a lek) or flushing flocks, that appeared to be foraging or associated with shelter vegetation, were recorded on 10 instances throughout the *Transmission Grouse Survey Study Area* and are plotted in *Figure 1*.

Eagle Nest Survey Results Summary

Atwell did not detect Bald Eagle or Golden Eagle nests within the *Transmission Raptor Nest Study Area* during April 2018 aerial surveys. Atwell biologists did detect individual eagles of both species that were using habitats within the *Transmission Raptor Nest Study Area* (*Figure 2*). Most eagle observations during aerial transect flights were concentrated within the White Earth River valley. During the early April survey, the vast majority of water features were frozen, and it is possible that the bitter cold temperatures caused eagles to take shelter within this valley, as opposed to being an indication of local nesting.

Other Nesting Raptor Species Results Summary

No active raptor nests occur within the 150 ft. construction corridor of the *Transmission Line*. Similarly, intact yet inactive raptor nest structures were located within the 150 ft. construction corridor of the *Transmission Line* (*Table 1*).

Atwell located four (4) active nests of two species: Great Horned Owl (*Bubo virginianus*) and Ferruginous Hawk within the *Transmission Raptor Nest Study Area* (*Figure 2; Appendix II*). Each of these active nests was observed with either: an incubating adult, an adult defending the nest, or a nest containing eggs or nestlings. None of these active nests were delineated within one-mile of the *Transmission Line* (*Figure 2*).

One probable Ferruginous Hawk nest occurs within the *Transmission Raptor nest Study Area* within Mountrail County, but this nest does not intersect the 150 ft. construction corridor of the *Transmission Line* (*Table* 1, *Figure 2; Appendix II*). This nest appeared to have been built directly on top of a second nest that likely was an original nest but had since become dilapidated. At the time of aerial surveys, this nest cup was empty but an adult was present in attendance of the nest and acting territorial.

Atwell noted fourteen (14) raptor nests within the *Transmission Raptor Nest Study Area* that were associated with an unknown raptor species (*Figure 2*); *Table 1* describes the relationship of those nests that intersect the general *Transmission Line 1-Mile Study Area* to the 150 ft. construction corridor. These nests were described as large enough to be raptor nests (though likely too small to be eagle nests), and of recent construction (2016 or 2017, as evaluated on the condition of nesting material and nest cup structure), yet unattended by hawks or owls. In addition to Ferruginous Hawks and Great Horned Owls, Red-tailed Hawks (*Buteo jamaicensis*), Swainson's Hawks (*Buteo swainsoni*), and Cooper's Hawks (*Accipiter cooperii*) are all potential breeders within the proposed *Transmission Raptor Nest Study Area* and may use these structures later in the season (USFWS 2008).

Where the *Transmission Line* continues north of the *Transmission Raptor Nest Study Area* (*Figure 2*), an additional 21 nest structures that occurred within 1-mile of the *Transmission Line* were spot checked for activity or were discovered as new structures. Sixteen (16) of these nest structures persisted since

previous delineation efforts. Four (4) previously known Great Horned Owl nests were spot-checked and relocated during aerial transect flights; all four nests were confirmed to be active with incubating owls (*Figure 2*). Importantly, an active Ferruginous Hawk nest known from Spring 2017 data, which occurred at a point along the *Transmission Line*, was found to have been no longer present. Known Red-tailed Hawk nests along this portion of the *Transmission Line* were relocated during spot-checked aerial transect flights, but in most instances, this species proved to not be actively nesting at the time of the surveys and these nest structures were deemed *inactive*.

Red-tailed Hawks likely utilize some of the above nest structures, but their nesting activity was low during the time of the survey, possibly owing to the unseasonable severe cold during the time of the early-April survey. Swainson's Hawks were not noted in the area at the time of the survey; this species nesting phenology does not correspond well to when eagles are actively nesting in North Dakota.

Table 1. Raptor Nests within 1-mile Transmission Line Study Area (Burke WEC, North Dakota)

Observation ID	Mapping Category	Latitude	Longitude	150 ft Corridor	1-mile Corridor	Distance (m)
Ferruginous Hawk Nests						
FEHA18_03	Ferruginous Hawk (active)	48.37842	-102.82	No	No	2874
FEHA18_01	Ferruginous Hawk (active)	48.40861	-102.719	No	No	2689
FEHA18_2.5	Ferruginous Hawk (probable)	48.53758	-102.746	No	No	3015
FEHA18_02	*Ferruginous Hawk (probable)*	*48.4403*	*-102.724*	*No*	*Yes*	*96*
FEHA17_01	Ferruginous Hawk (historic)	48.64213	-102.674	No	Yes	270
Great Horned Owl Nests						
GHOW18_03	Great Horned Owl (active)	48.4398	-102.869	No	No	3516
GHOW18_02	Great Horned Owl (active)	48.45686	-102.736	No	No	1788
GHOW18_04	*Great Horned Owl (active)*	*48.7477*	*-102.683*	*No*	*Yes*	*762*
GHOW17_53	*Great Horned Owl (active)*	*48.7463*	*-102.683*	*No*	*Yes*	*784*
GHOW18_01	Great Horned Owl (active)	48.42277	-102.681	No	No	2214
GHOW17_52	*Great Horned Owl (active)*	*48.6422*	*-102.674*	*No*	*Yes*	*273*
Inactive Nests						
RTHA17_82	*Red-tailed Hawk (inactive)*	*48.7268*	*-102.715*	*No*	*Yes*	*410*
RTHA17_188	*Red-tailed Hawk (inactive)*	*48.7121*	*-102.697*	*No*	*Yes*	*305*
RTHA17_79	*Red-tailed Hawk (inactive)*	*48.7046*	*-102.693*	*No*	*Yes*	*584*
RTHA17_183	*Red-tailed Hawk (inactive)*	*48.6303*	*-102.68*	*No*	*Yes*	*100*
RTHA17_184	*Red-tailed Hawk (inactive)*	*48.6682*	*-102.68*	*No*	*Yes*	*419*
UK18_11	*Unknown Raptor*	*48.4305*	*-102.763*	*No*	*Yes*	*26*
UK18_01	*Unknown Raptor*	*48.6903*	*-102.692*	*No*	*Yes*	*114*
UK18_16	*Unknown Raptor*	*48.6909*	*-102.691*	*No*	*Yes*	*83*
UK17_902	*Unknown Raptor (inactive)*	*48.7088*	*-102.698*	*No*	*Yes*	*267*
UK17_901	*Unknown Raptor (inactive)*	*48.6911*	*-102.692*	*No*	*Yes*	*166*
UK17_15	Unknown Raptor (historic)	48.61919	-102.699	No	No	--

Burke Wind Transmission Line

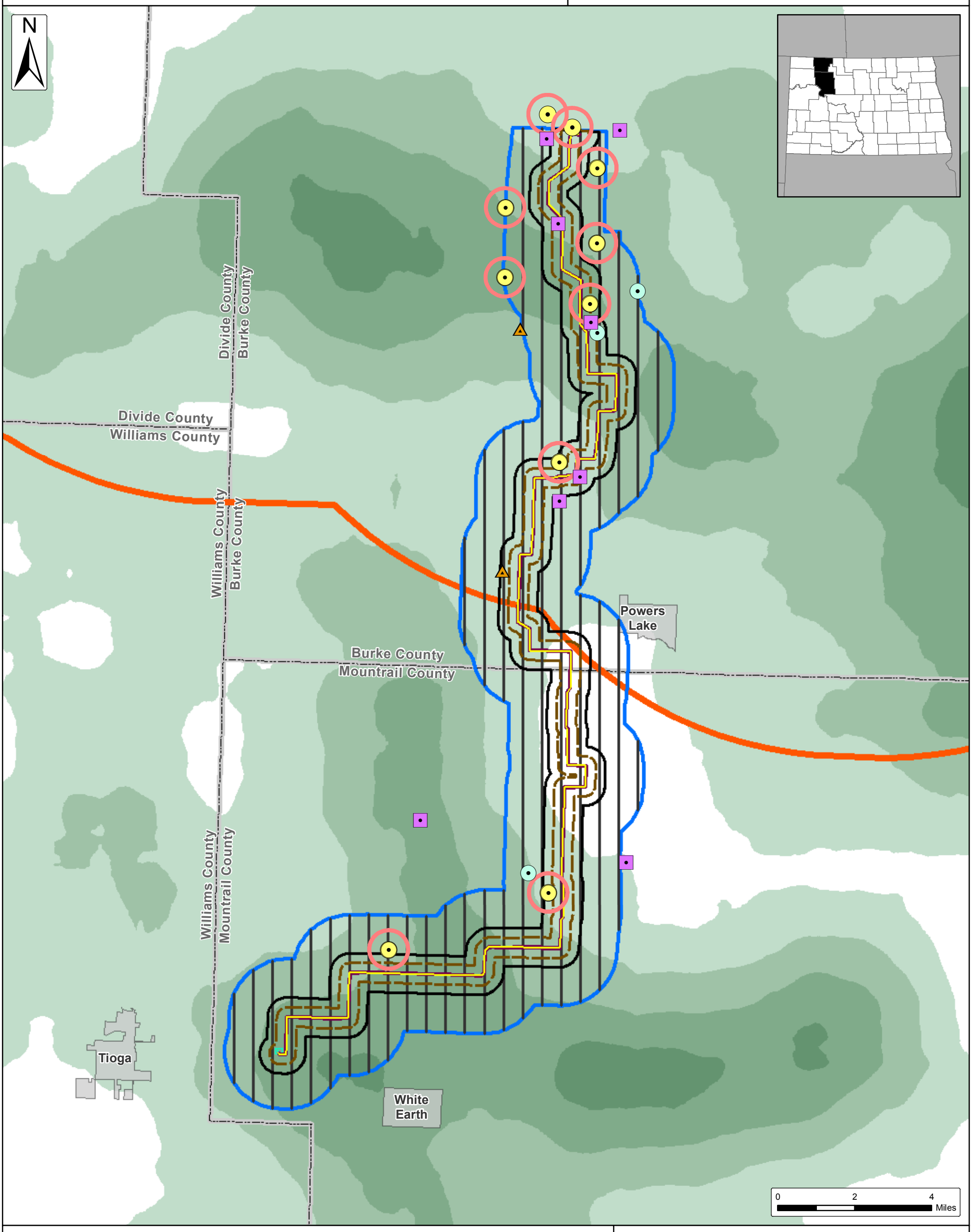
Figure 1. Sharp-tailed Grouse Lek Habitat Map

Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/18/2018

Atwell, LLC Project:
16000947



Sharp-tailed Grouse (Atwell Identified 2017/2018)
- Lone Individual
- Flushing Flock
- Confirmed Lek
- Possible Lek

- Grouse Lek 0.5 Mile Transects (±206 Miles)
- Lek 0.5 Mile Constraint Buffer
- Transmission Grouse Survey Study Area
- Transmission Line 0.25 Mile Buffer (05/14/2018)
- Eagle Nest Study Area

Native Grasslands-Macro
- 0%-20%
- 20%-40%
- 40%-60%
- 60%-80%
- 80%-100%

- Transmission Line
- Transmission Line 150 ft. Project Corridor
- Transmission Line 1 Mile Study Area
- Existing Tande Substation
- Counties

ATWELL

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Burke Wind Transmission Line

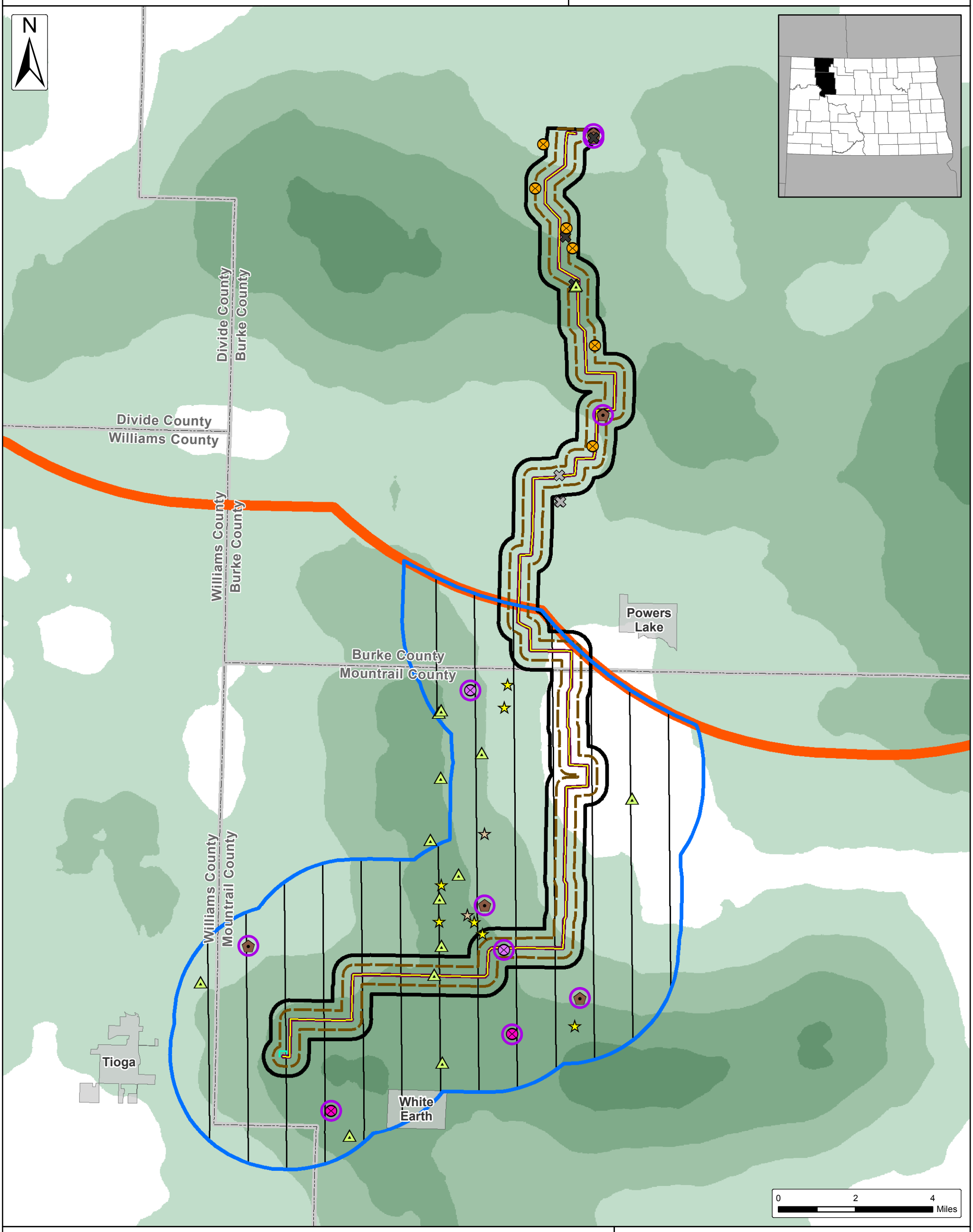
Figure 2. Raptor Nest Map

Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/18/2018

Atwell, LLC Project:
16000947



Raptor Nests (Atwell Identified April & May 2018)
- Bald Eagle (Individual)
- Golden Eagle (Individual)
- Ferruginous Hawk (Active)
- Ferruginous Hawk (Historic)
- Ferruginous Hawk (Probable)
- Great Horned Owl (Active)
- Red-tailed Hawk (Inactive)
- Unknown Raptor
- Unknown Raptor (Historic)
- Unknown Raptor (Inactive)

- Raptor Nest 1 Mile Transects (±115 Miles)
- Raptor Nests 0.25 Mile Constraint Buffer
- Transmission Raptor Nest Study Area
- Transmission Line 0.25 Mile Buffer (05/14/2018)
- Eagle Nest Study Area

Native Grasslands-Macro
- 0%-20%
- 20%-40%
- 40%-60%
- 60%-80%
- 80%-100%

- Transmission Line
- Transmission Line 150 ft. Project Corridor
- Transmission Line 1 Mile Study Area
- Existing Tande Substation
- Counties

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APPENDIX I

Detailed Map Book - Sharp-tailed Grouse Lek Locations

Burke Wind Transmission Line

Sharp-tailed Grouse Lek Habitat Map Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/15/2018

Atwell, LLC Project:
16000947



Sharp-tailed Grouse (Atwell Identified 2017/2018)
- Confirmed Lek

Grouse Lek 0.5 Mile Transects (±206 Miles)
Lek 0.5 Mile Constraint Buffer
Transmission Grouse Survey Study Area
Transmission Line 0.25 Mile Buffer (05/14/2018)
Eagle Nest Study Area

Transmission Line
Transmission Line 150 ft. Project Corridor
Transmission Line 1 Mile Study Area
Existing Tande Substation
Counties

SOURCE: USDA NAIP 2017 IMAGERY

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Burke Wind Transmission Line

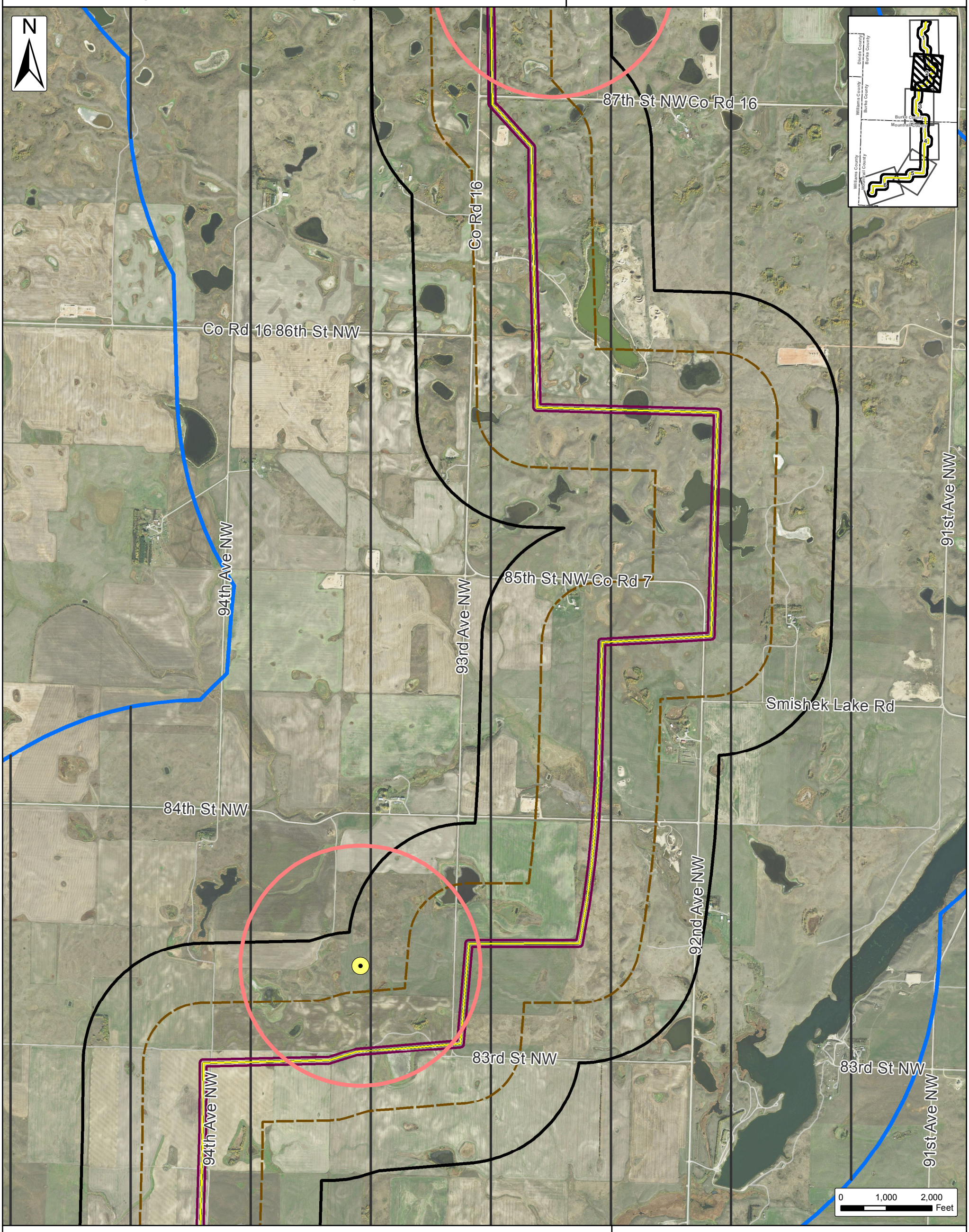
Sharp-tailed Grouse Lek Habitat Map

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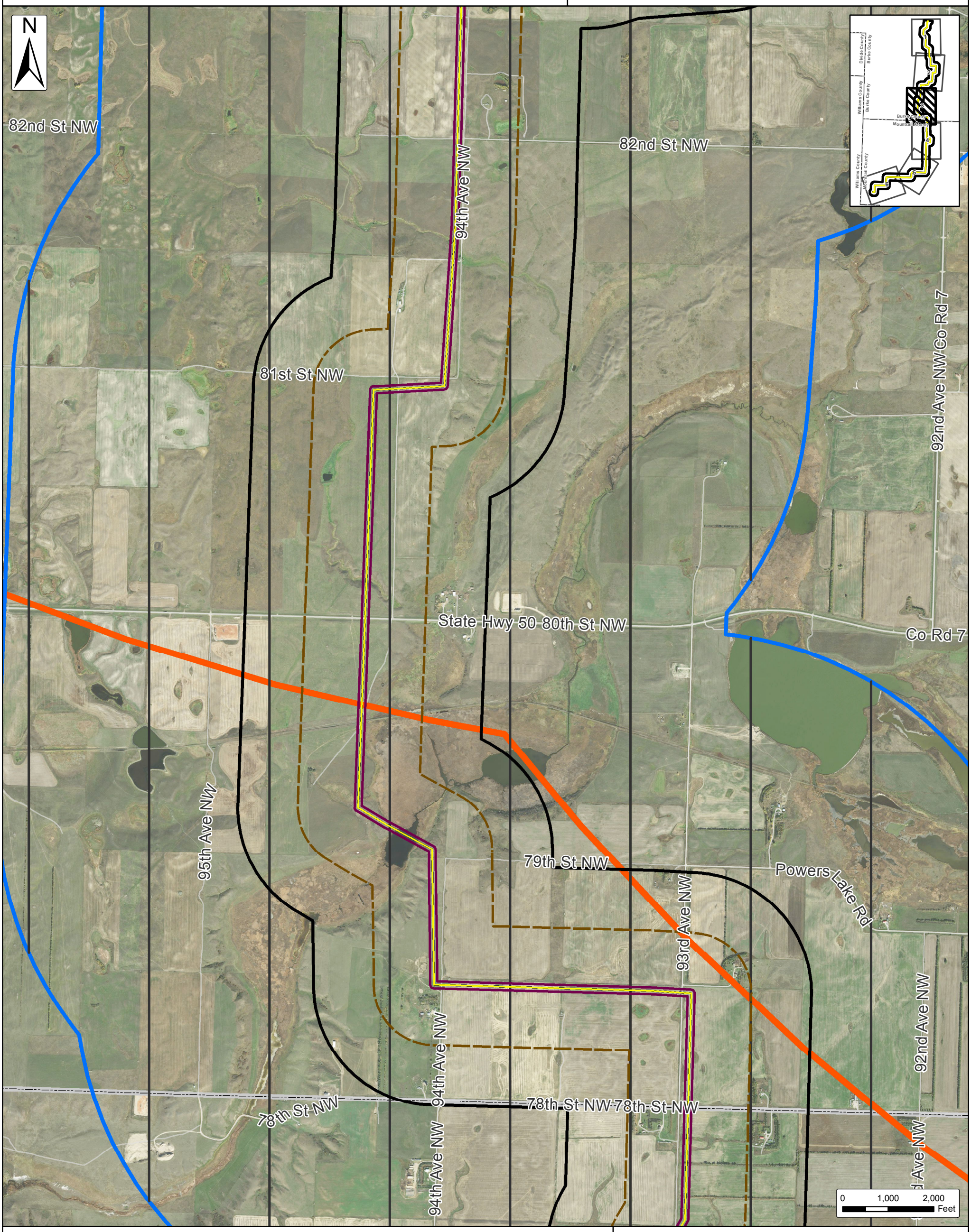
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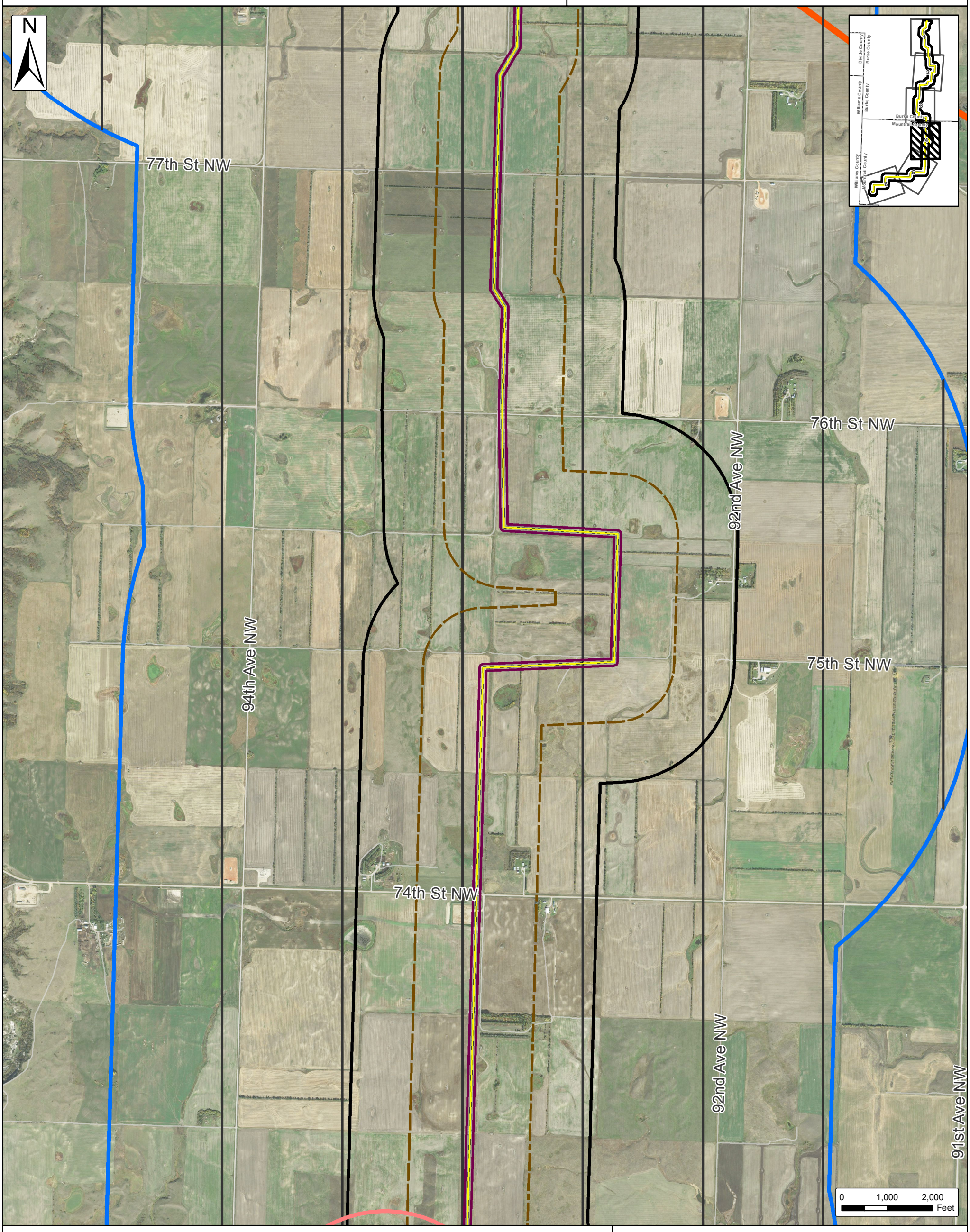
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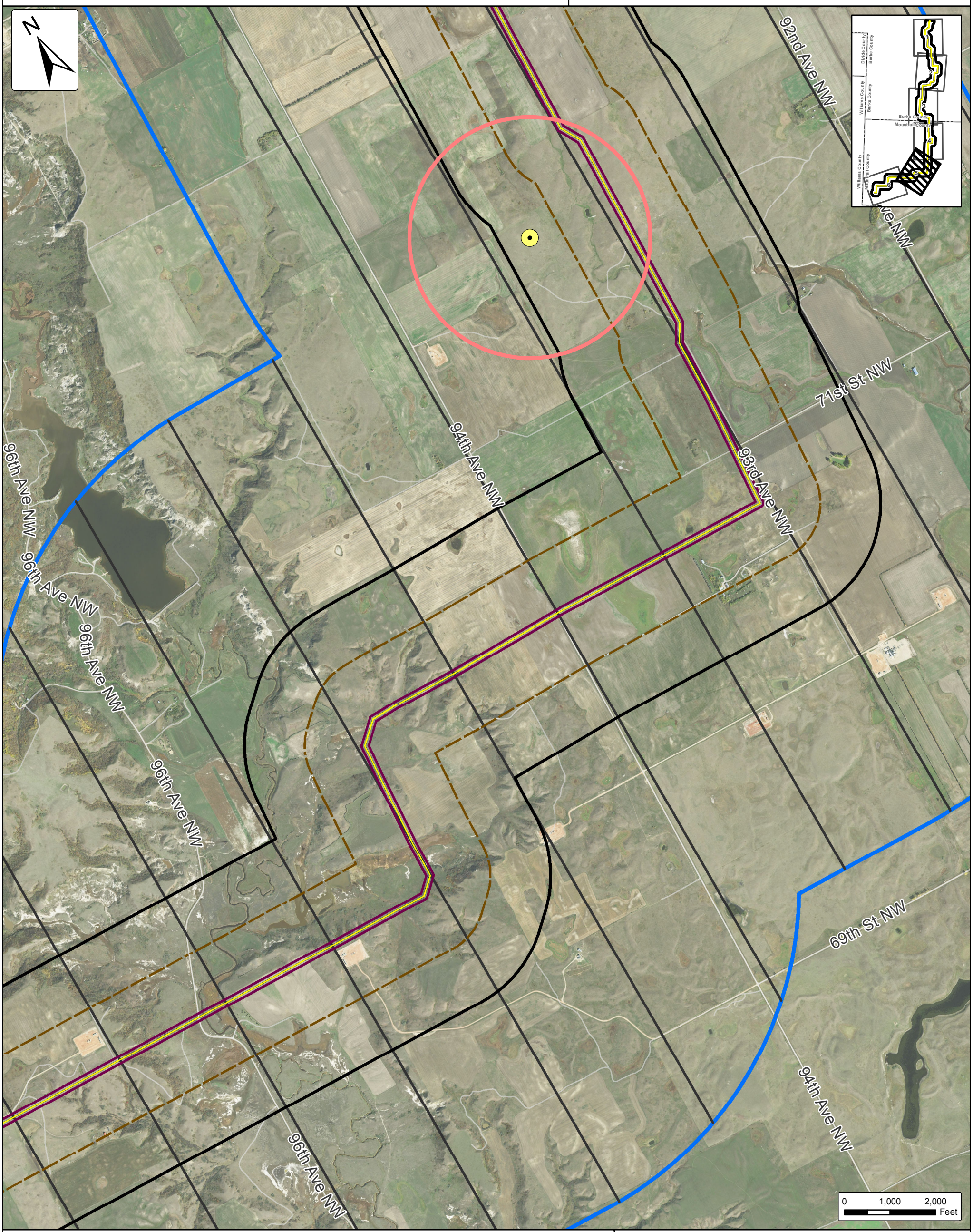
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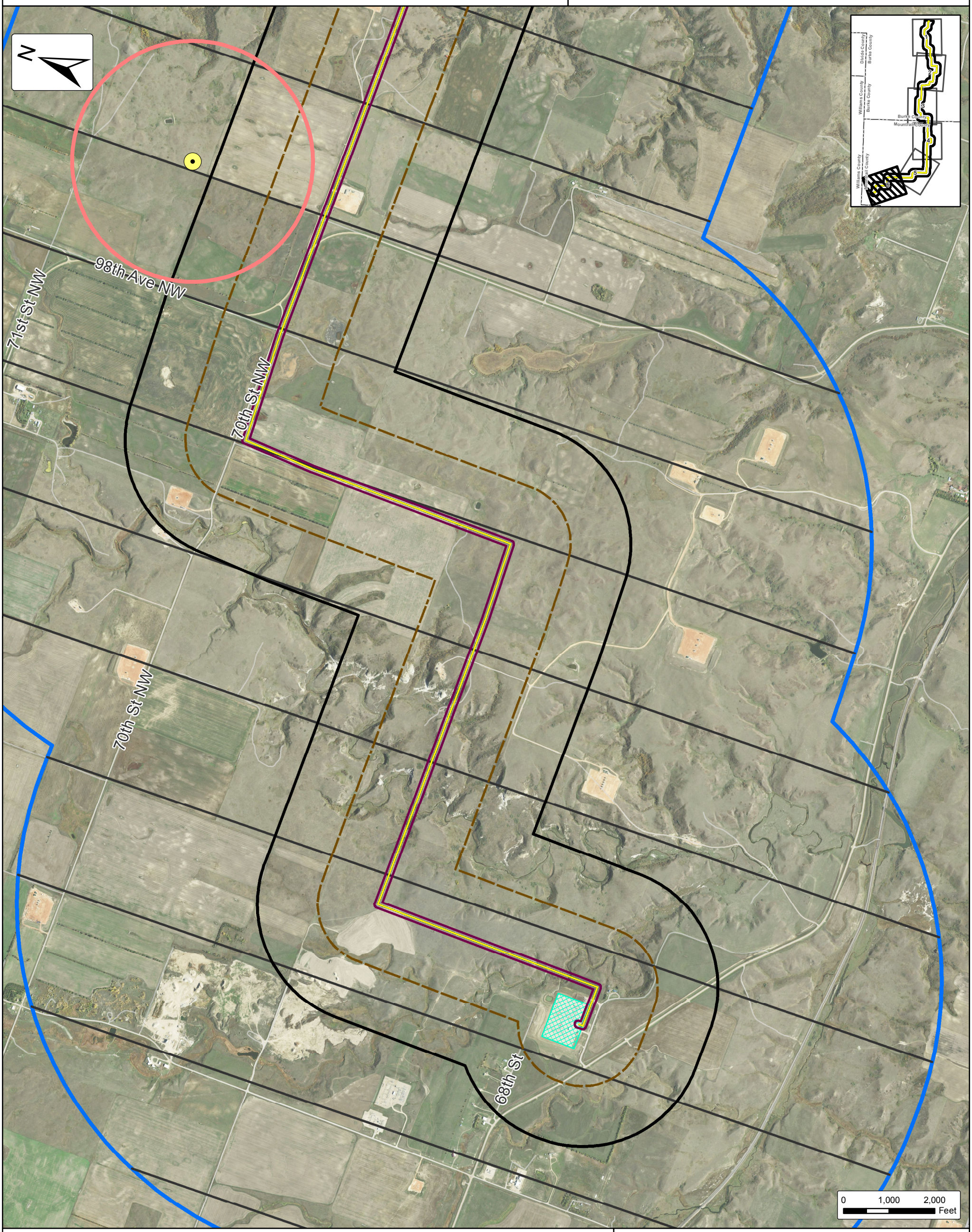
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Transmission Line 1 Mile Study Area
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APPENDIX II

Detailed Map Book - Raptor Nest Locations

Burke Wind Transmission Line

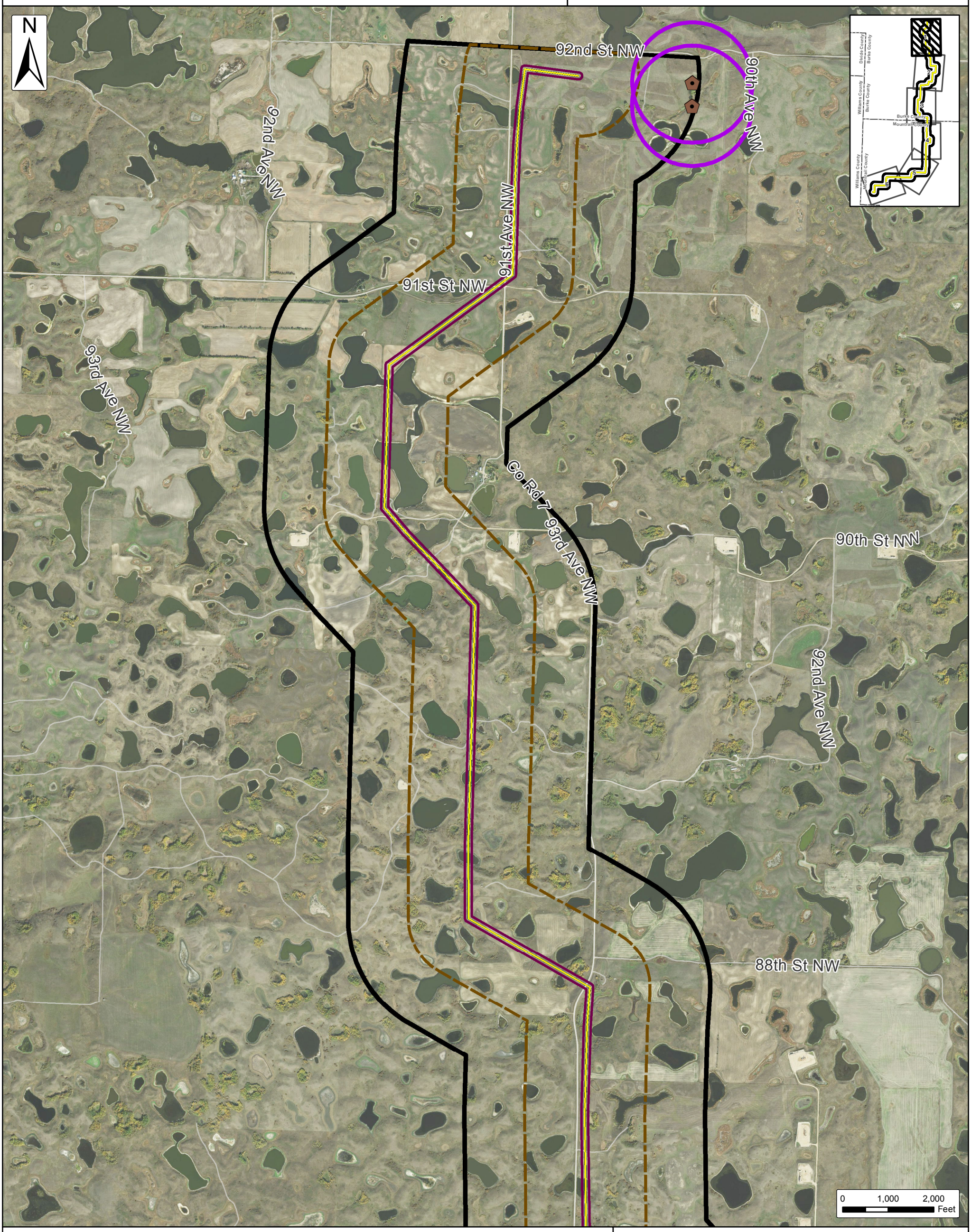
Raptor Nest Map

Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/15/2018

Atwell, LLC Project:
16000947



Raptor Nests Constraints
(Atwell Identified April & May 2018)

- Ferruginous Hawk (Active)
- Ferruginous Hawk (Probable)
- Great Horned Owl (Active)

- Raptor Nest 1 Mile Transects (±115 Miles)
- Raptor Nests 0.25 Mile Constraint Buffer
- Transmission Raptor Nest Study Area
- Transmission Line 0.25 Mile Buffer (05/14/2018)
- Eagle Nest Study Area

- Transmission Line
- Transmission Line 150 ft. Project Corridor
- Transmission Line 1 Mile Study Area
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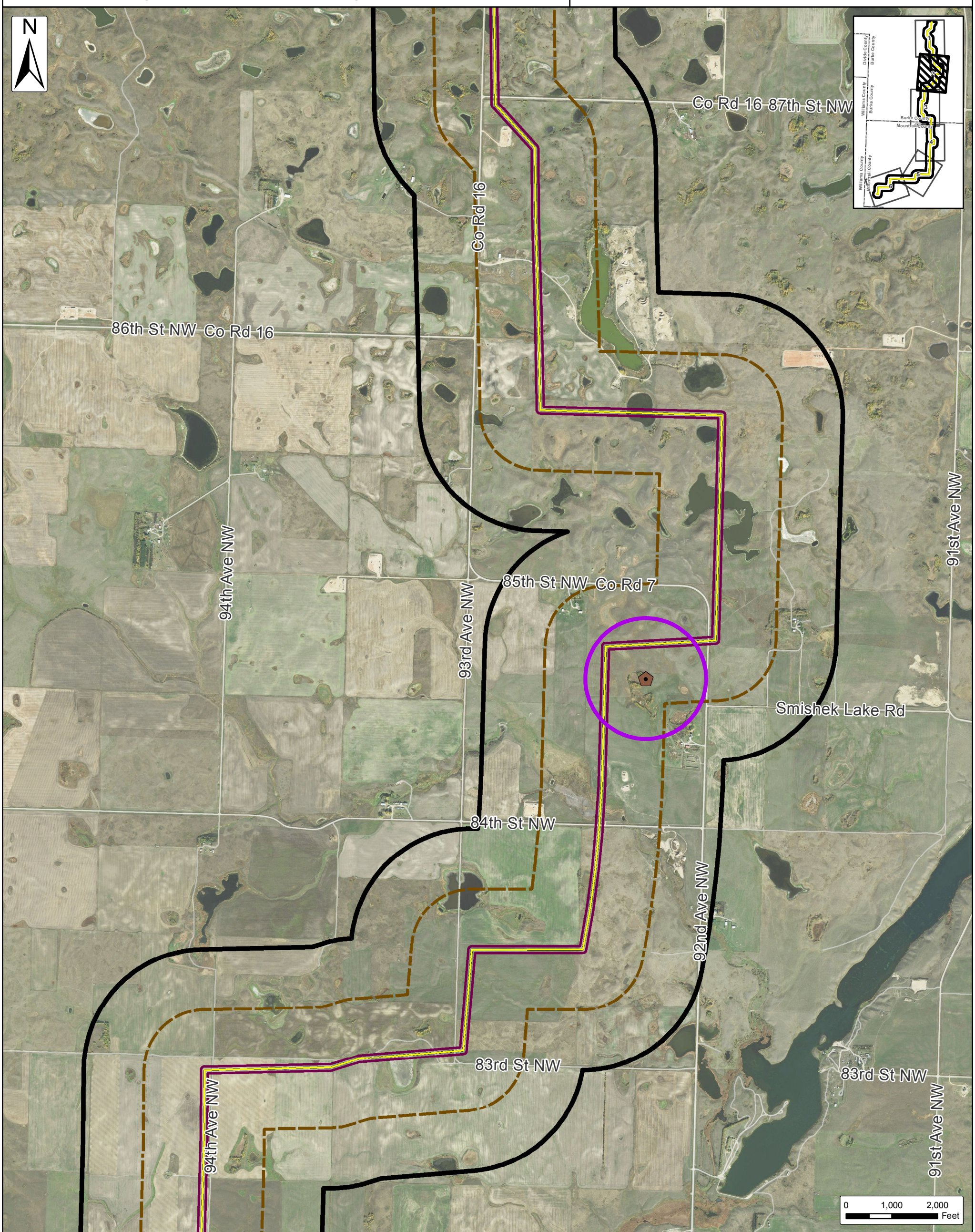
Raptor Nest Map

Burke County & Mountrail County, North Dakota

Client:
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Issue Date:
6/15/2018

Atwell, LLC Project:
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Raptor Nests Constraints
(Atwell Identified April & May 2018)

- Ferruginous Hawk (Active)
- Ferruginous Hawk (Probable)
- Great Horned Owl (Active)

- Raptor Nest 1 Mile Transects (±115 Miles)
- Raptor Nests 0.25 Mile Constraint Buffer
- Transmission Raptor Nest Study Area
- Transmission Line 0.25 Mile Buffer (05/14/2018)
- Eagle Nest Study Area

- Transmission Line
- Transmission Line 150 ft. Project Corridor
- Transmission Line 1 Mile Study Area
- Existing Tande Substation
- Counties

SOURCE: USDA NAIP 2017 IMAGERY

ATWELL

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Burke Wind Transmission Line

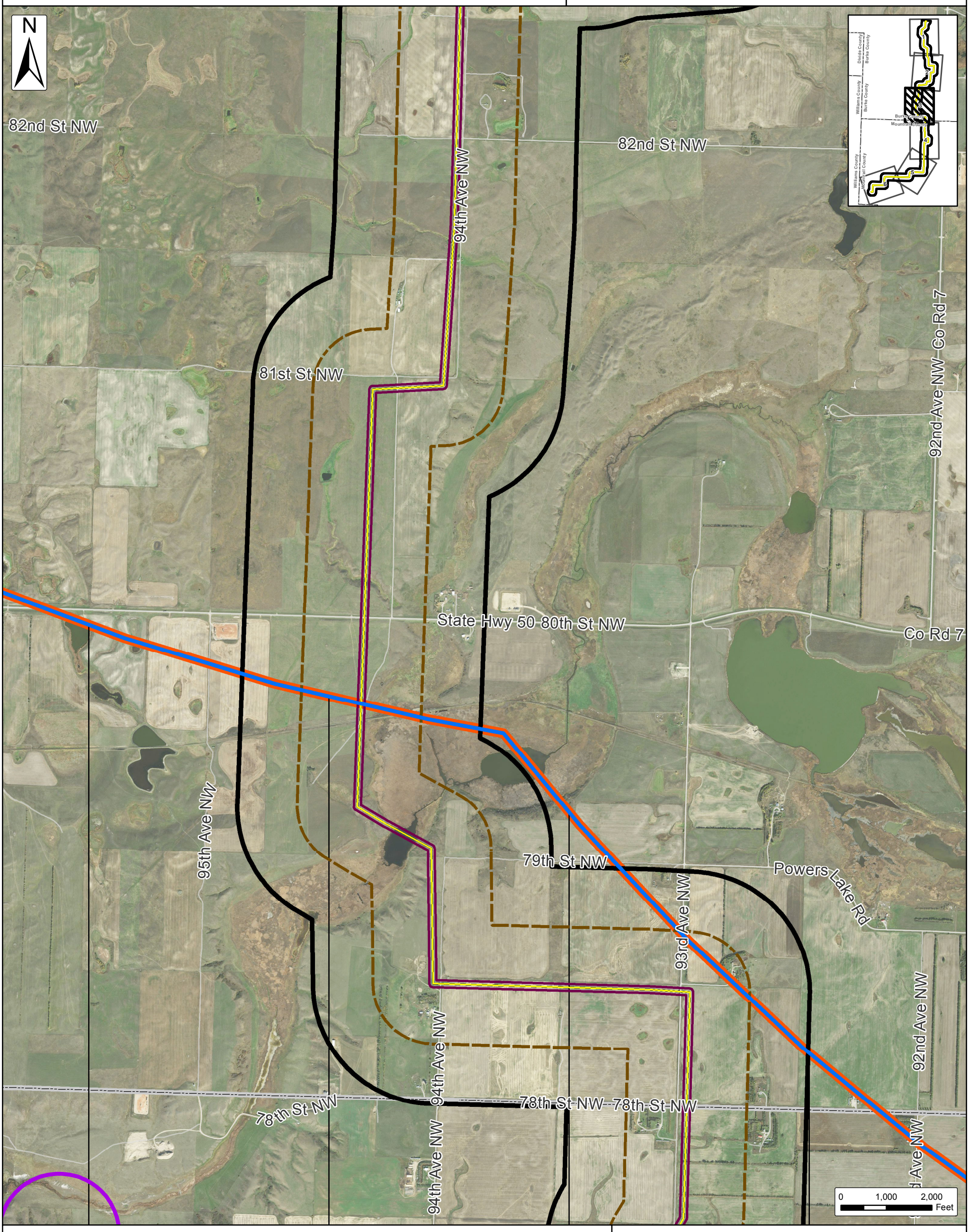
Raptor Nest Map

Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/15/2018

Atwell, LLC Project:
16000947



Raptor Nests Constraints
(Atwell Identified April & May 2018)

- Ferruginous Hawk (Active)
- Ferruginous Hawk (Probable)
- Great Horned Owl (Active)

- Raptor Nest 1 Mile Transects (±115 Miles)
- Raptor Nests 0.25 Mile Constraint Buffer
- Transmission Raptor Nest Study Area
- Transmission Line 0.25 Mile Buffer (05/14/2018)
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- Counties

SOURCE: USDA NAIP 2017 IMAGERY

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Burke Wind Transmission Line

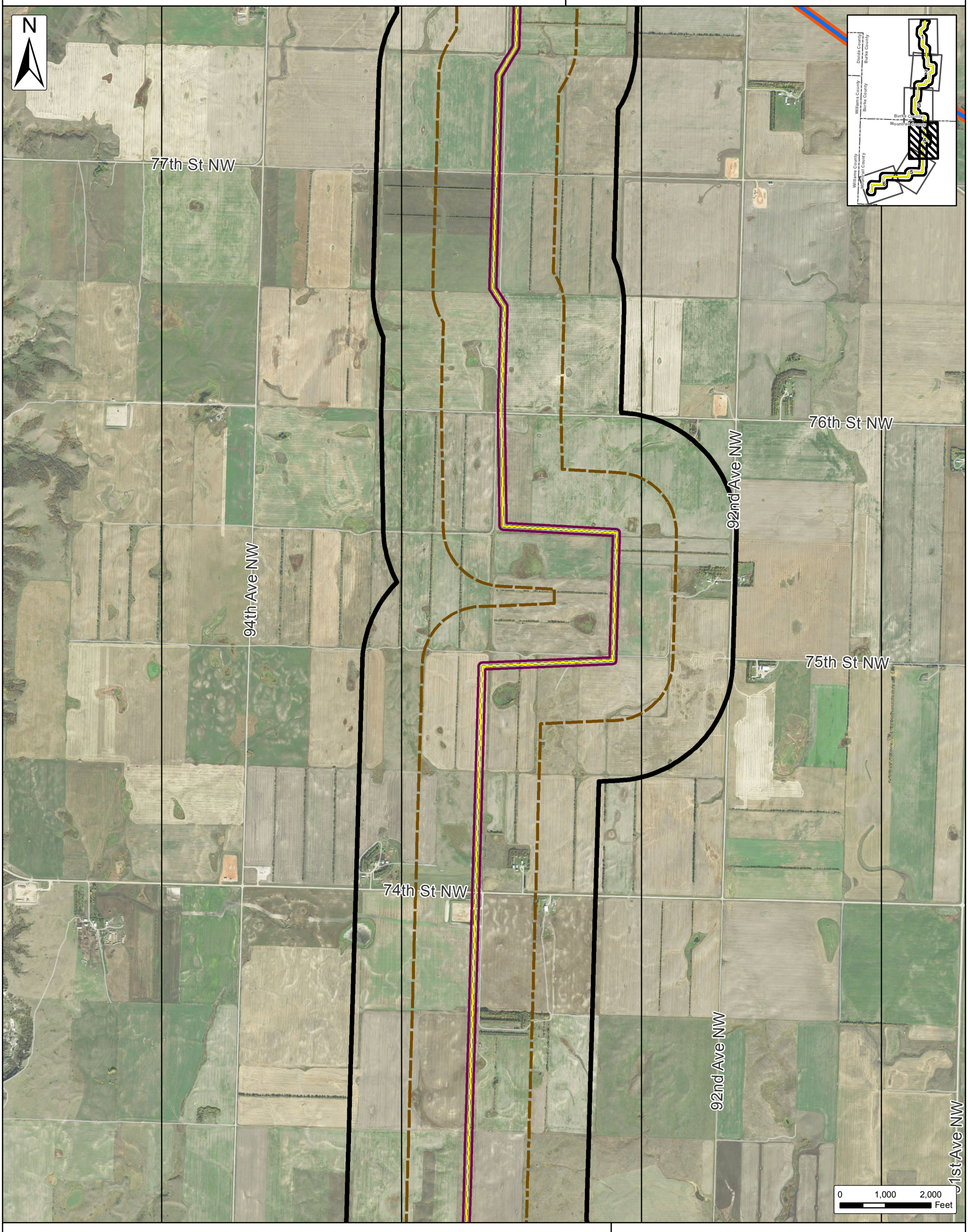
Raptor Nest Map

Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/15/2018

Atwell, LLC Project:
16000947



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SOURCE: USDA NAIP 2017 IMAGERY

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Burke Wind Transmission Line

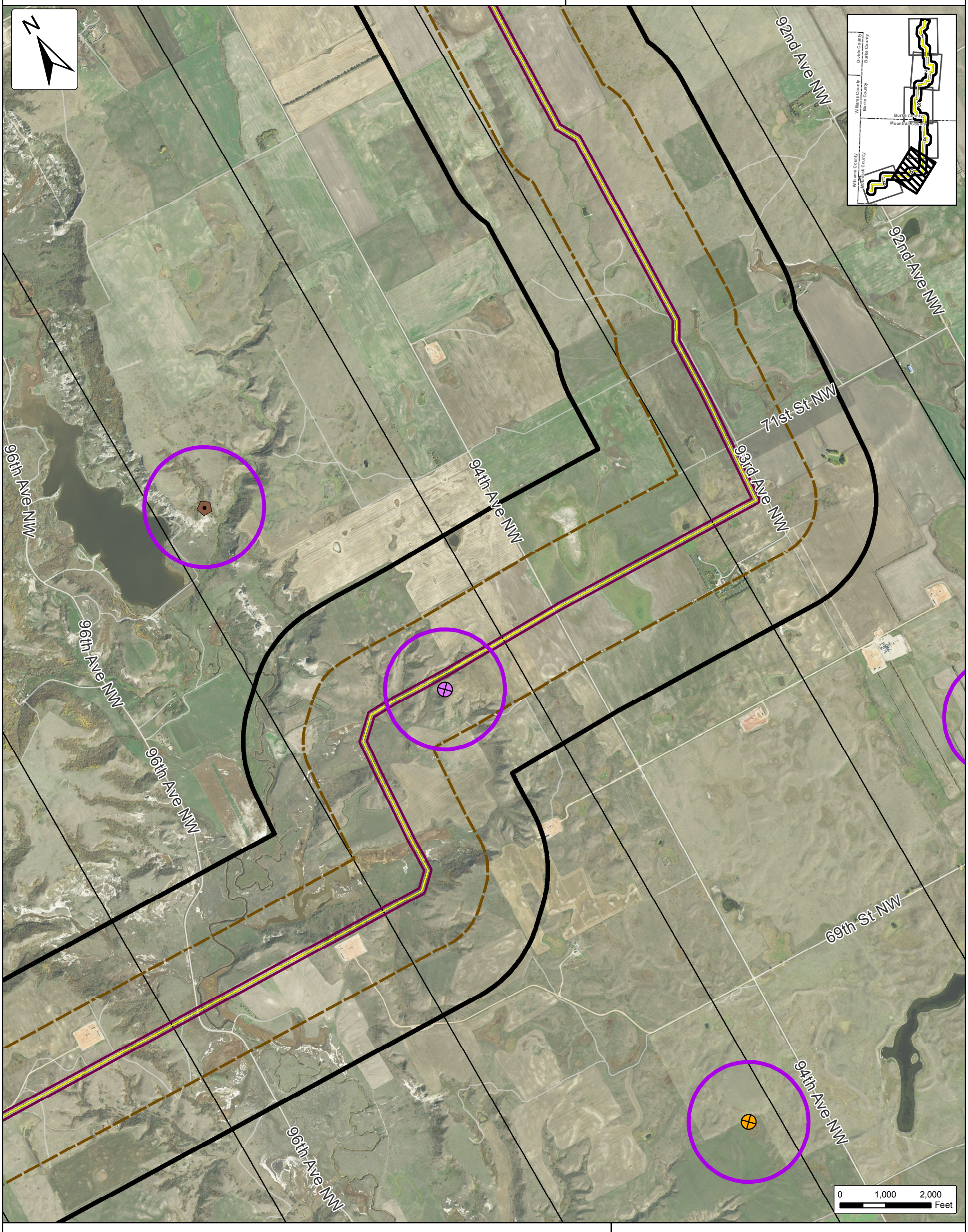
Raptor Nest Map

Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/15/2018

Atwell, LLC Project:
16000947



Raptor Nests Constraints
(Atwell Identified April & May 2018)

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- Ferruginous Hawk (Probable)
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SOURCE: USDA NAIP 2017 IMAGERY

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Burke Wind Transmission Line

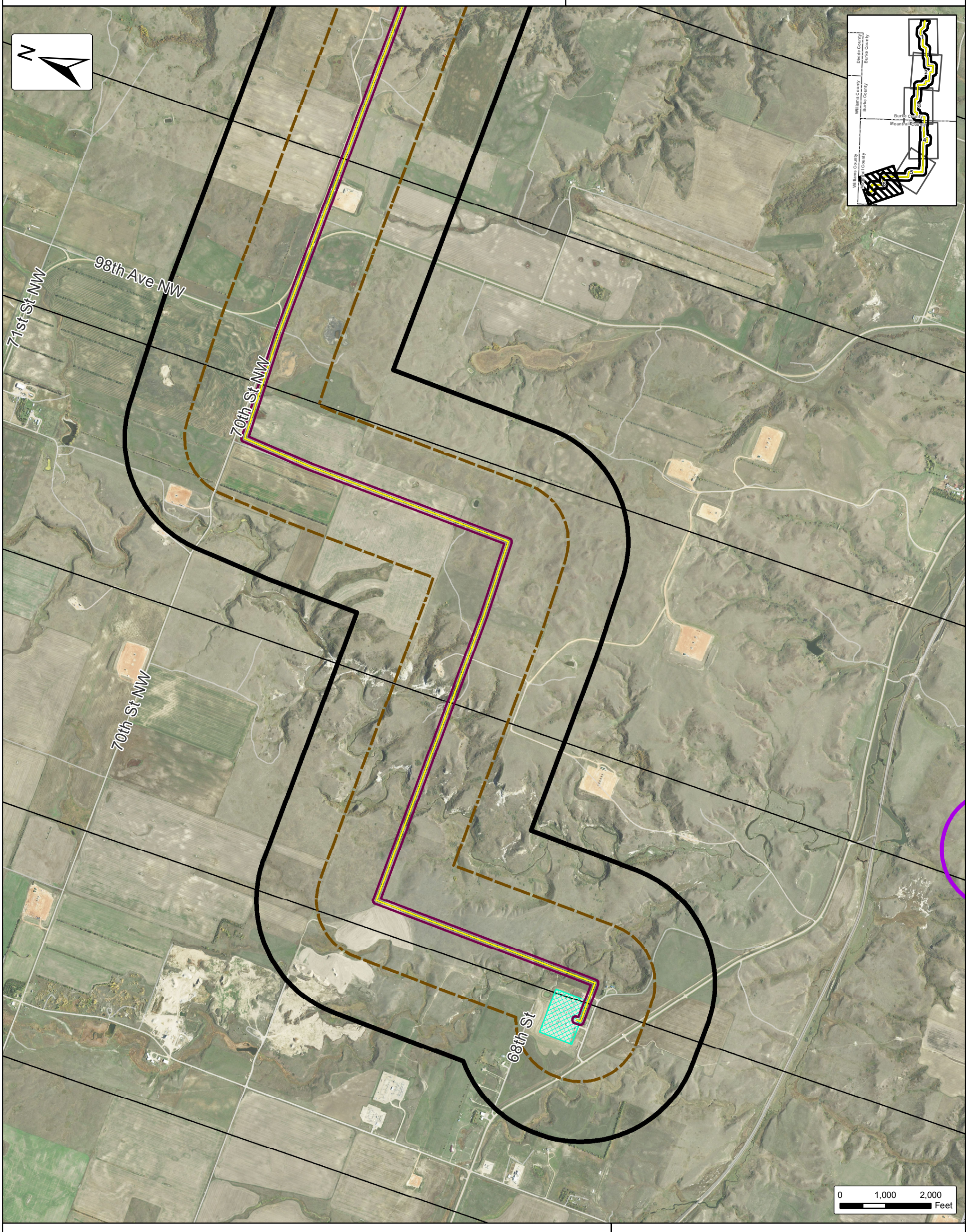
Raptor Nest Map

Burke County & Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
6/15/2018

Atwell, LLC Project:
16000947



Raptor Nests Constraints
(Atwell Identified April & May 2018)

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- Counties

SOURCE: USDA NAIP 2017 IMAGERY

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B4. Attachment 1B. Burke County Wind Energy Center – Revised Grouse Lek and Raptor Nest Survey Results for 200 MW Project Area

Technical Avian Data Summary Revision

TO: Burke Wind, LLC

FROM: Atwell, LLC

DATE: November 30, 2018

RE: Burke County Wind Energy Center – Revised Grouse Lek & Raptor Nest Survey Results for 200 MW Project Area

Burke Wind, LLC (Burke Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, is developing the Burke County Wind Energy Center (Burke WEC or Project) in Burke County, North Dakota. The Burke WEC includes a wind resource Project Area (Figure 1). Burke Wind originally proposed to construct the Burke WEC to produce 300 megawatts (MW). The area evaluated for the 300 MW version of the project is referred to in this memo as the original Project Area. Burke Wind has recently reduced the Project size to 200 MW (referred to in this memo as 200 MW Project Area), which consists of an area of approximately 22,933 acres. This resulted in the elimination of 38 wind turbines and a reduced Project Area that is fully encompassed within the original Project Area. The purpose of this memorandum is to provide a summary of findings related to Grouse Lek and Raptor Nest Survey work completed for the Project as it relates to the 200 MW Project Area. This memorandum does not include discussion of the proposed overhead high-voltage transmission line infrastructure associated with the Project as that is presented under separate cover.

Site characterization review identified the potential for Sharp-tailed Grouse (*Tympanuchus phaisanellus*) to occur in the original Project Area. Surveys were conducted within a WEC Grouse Survey Study Area, which included the original Project Area and a 0.5-mile lek assessment buffer. Survey of the WEC Grouse Survey Area including the 0.5-mile assessment buffer is based on the 2015 North Dakota State Wildlife Action Plan[1] description of Sharp-tailed Grouse hens often nesting within 0.5-mile of a lek. The original WEC Grouse Survey Study Area was assessed for Sharp-tailed Grouse lekking grounds from April 10 to April 28, 2017.

Also, the WEC Raptor Nest Study Area (which included the original Project Area and a surrounding 10-mile raptor assessment buffer) was assessed for raptor nests, particularly for Bald Eagle (*Haliaeetus leucocephalus*) nests. Aerial lek surveys were conducted from April 24 to April 28, 2017. Eagle nests surveys were conducted aerial transects within the WEC Raptor Nest Study Area, in accordance with

[1] Dyke, S., S. Johnson, and P. Isakson (2015). North Dakota State Wildlife Action Plan 2015. [Online.] Available at http://gf.nd.gov/gnf/conservation/swap-2015/docs/swap-2015.pdf.

recommendations set forth in the USFWS *Eagle Conservation Plan Guidance*[2]. These eagle nest buffer survey transects were flown only after peak grouse lekking timing in the early morning hours.

Detailed methodologies and findings as they relate to the 200 MW Project Area are discussed below.

Ground-based and Aerial Grouse Lek Survey Methodologies

On September 21, 2017, a study plan for grouse lek and raptor nest surveys was submitted to the U.S. Fish and Wildlife Service (USFWS) (Mr. Kevin Shelly) and the North Dakota Game and Fish Department (NDGFD) (Mr. Steve Dyke) in combination with other proposed avian services task methodologies. On behalf of Burke Wind, Atwell, LLC (Atwell) requested agency review of the study plan. Atwell did not receive study plan review communication from the USFWS but did receive study plan review communication from the NDGFD on November 16, 2017 (Mr. Greg Link). The NDGFD did not pose questions or suggested alterations to the raptor nest survey or grouse lek survey methodologies. In subsequent follow-up, the NDGFD upland game bird biologist did not recommend a specific lek survey approach at that time (Rodney Gross – NDGFD, pers. comm.). Atwell consequently deemed the survey protocols as sufficient and used the proposed study plan for lek surveys.

Ground-based lek surveys were conducted from April 10 to April 26, 2017 and aerial lek surveys were conducted from April 24 to April 28, 2017. These Tier 3 surveys followed pre-survey Tier 2 site characterization analysis (as defined within the USFWS's Land-based Wind Energy Guidelines)[3] that found the original Project Area to include areas of potential lekking and nesting habitat for Sharp-tailed Grouse.

Based on Sharp-tailed Grouse species biology, prior experience with lekking grouse species, and information synthesized within Johnsgard (2016),[4] confirmed leks were defined as three (3) or more birds together with at least one male displaying. Possible leks were defined as auditory detections of multiple grouse that could not be verified visually after their initial detection on a ground-based survey.

Ground-based Roadside Surveys

Roadside lek surveys were conducted from the majority of available and safely accessible public roadways that traverse the WEC Grouse Survey Study Area and that intersect grassland habitat. Grassland habitat was determined with available land cover data and desktop review of sources including geographic information system (GIS) coverage of NDGFD's Micro Native Grassland

[2] USFWS (2013). Eagle Conservation Plan Guidance: Module 1 - Land-based Wind Energy: Version 2. [Online.] Available at http://www.fws.gov/migratorybirds/Eagle_Conservation_Plan_Guidance-Module%201.pdf.

[3] USFWS (2012). U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines. [Online.] Available at http://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf.

[4] Johnsgard, Paul A. *The North American Grouse: Their Biology and Behavior*. Zea Books, 2016.

Conservation Areas[5]. Surveys were conducted within a limited window commencing 30 minutes before local sunrise and terminating between 60 and 120 minutes after sunrise, based on the suitability of survey weather conditions (e.g., wind speed, temperature,. precipitation, etc.). Biologists surveyed for lekking grouse at safe roadside pull-offs and at no greater than 0.4 mile increments[6]. Figure 2 identifies the ground based survey point locations (Sharp-tailed Grouse [STGR] Lek Survey Points).

Each ground-based survey point was surveyed for a minimum of five (5) minutes. The first round of the ground-based site visit was completed before the aerial transect survey was completed and this ground-based survey was used to help define target areas surveyed during the aerial transect surveys and second round of ground-based surveys. Ground-based surveys sites were visited twice if any of the following three criteria occurred: 1) habitat corresponded to the NDGFD macro native grassland conservation areas model (Figure 2) and habitat appeared to be consistent with grassland with elevated flat topography that could offer ideal lekking locations; 2) audio detections were made during the first visit; or 3) only a single grouse was observed during the first visit. Each ground-survey event was separated by at least 10 days between visits.

Aerial Transect Surveys

Aerial transect surveys were conducted by Atwell biologists and were flown by Double M Helicopters at low speeds (i.e., 30 – 40 knots)[7]. Survey transects were flown in 0.5-mile intervals across the WEC Grouse Survey Study Area. A 0.25-mile (400-meter [m]) visibility threshold existed on either side of the aircraft. Transect routes were oriented on a north-south axis and were flown at heights of 200 to 250 feet above the ground surface (60 – 76 m). A small number of transects were within Lostwood National Wildlife Refuge; refuge personnel and county sheriff's department personnel were contacted ahead of time to indicate that refuge airspace would be transected via helicopter. It was recommended that transects within Lostwood National Wildlife Refuge be flown at heights of roughly 500 feet (150 m). Transects began at 5-10 minutes before sunrise and ended two hours after sunrise. Two Atwell biologists surveyed simultaneously, one from each side of the aircraft.

The large majority of lek locations were plotted to a precision of 0- 50 m, and all leks were within 100-150 m of plotted coordinates. Landmarks in aerial images that were used to assist mapping precision during the survey (such as hilltops, potholes, trees, rock outcrops, or roads) were in some cases lacking in grassland-dominated lek habitats.

---

[5] North Dakota Game and Fish Department (2014). North Dakota Game and Fish Department Native Grassland - Micro. *Micro Native Grassland Conservation Areas*. [Online.] Available at https://ndgov.maps.arcgis.com/home/item.html?id=fb597cc6c2154f3fbc1f52514ef92074

[6] Hamilton, S., D. Manzer, B. K. Sandercock, K. Martin, and G. Segelbacher (2011). Estimating lek occurrence and density for sharp-tailed grouse. Ecology, conservation, and management of grouse. Studies in Avian Biology. University of California Press, Berkeley, USA:31–49.

[7] http://www.doublemhelicopters.com

Bald Eagle & Raptor Nest Survey Methodology

Pre-survey site characterization Tier 2 analysis concluded that the WEC Raptor Nest Study Area could potentially contain Bald Eagle nesting habitat[8]. As such, Tier 3 aerial raptor nest surveys were conducted. Aerial transect surveys were conducted by Atwell biologists and were flown by Double M Helicopters at low speeds (30 – 40 knots). Survey transects were conducted in 1-mile intervals across the WEC Raptor Nest Study Area as recommended by the Eagle Conservation Plan Guidance: Module 1-Land-based Wind Energy, v.2[9]. A 0.5-mile (800 m) visibility threshold existed on either side of the helicopter. Visibility constraints were minimal during surveys and deciduous leaf-out conditions never exceeded initial bud-break phase.

RESULTS

Sharp-tailed Grouse Lek Survey Results Summary

The reduced 200 MW project area now contains only six (6) confirmed leks (Figure 2). Reducing the original Project Area from the 300 MW configuration to the 200 MW Project Area resulted in six (6) leks no longer in the Project Area. Fourteen (14) confirmed leks were located outside the 200 MW Project Area but within a 0.5 mile lek assessment buffer, equaling 20 total confirmed leks found within the 200 MW Project Area and the 0.5-mile buffer. Confirmed leks found within the WEC Grouse Survey Study Area boundary averaged 12.8 individuals/lek (*Standard Deviation* = 6.7, *n* = 12).

Biologists located four (4) possible lek locations during ground-based surveys within the 200 MW Project Area. Two (2) additional possible lek locations were identified within 0.5 miles of the 200 MW Project Area. Additionally, individuals (sightings of one or two Sharp-tailed Grouse that were not linked directly to a lek) were recorded in 12 instances throughout the 200 MW Project Area and are plotted in Figure 2.

Eagle Nest Survey Results Summary

Atwell did not detect any Bald Eagle nests within the WEC Raptor Nest Study Area during April 2017 aerial surveys. Atwell also did not detect any individual eagles that were using habitats within the WEC Raptor Nest Study Area during these aerial surveys.

Other Nesting Raptor Species Results Summary

The reduced 200 MW project area now contains only six (6) active Red-tailed Hawk (*Buteo jamaicensis*) nests and five (5) active Great Horned Owl (*Bubo virginianus*) nests as located by Atwell (Figure 2). Each of these active nests was observed with either: an incubating adult, an adult defending the nest, or a nest containing eggs or nestlings. Reducing the original Project Area from the 300 MW configuration to the 200 MW Project Area resulted in eight (8) Red-tailed Hawk and two (2) Great Horned Owl nests no

[8] Johnson, S. (2009). North Dakota Bald Eagle Nest Summary. [Online.] Available at https://efotg.sc.egov.usda.gov/references/public/ND/ND_Bald_Eagle_Nest_Summary_2009.pdf.

[9] USFWS (2012). U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines. [Online.] Available at http://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf.

longer in the 200 MW Project Area. All nests within one mile of the currently proposed Project Area and a 0.25-mile raptor nest buffer are shown on Figure 3.

Four (4) of the raptor nests located within the 200 MW Project Area were associated with an unknown raptor species. These nests were described as large enough to be raptor nests (though likely too small to be eagle nests), and of recent construction (2016 or 2017, based on the condition of nesting material and nest cup structure), yet were unattended by hawks or owls at the time of observation. In addition to Red-tailed Hawks and Great Horned Owls, Ferruginous Hawks (*Buteo regalis*), Swainson's Hawks (*Buteo swainsoni*), Cooper's Hawks (*Accipiter cooperii*), and Long-eared Owls (*Asio otus*) are all potential breeders within the proposed Project Area and may use these structures later in the season[10, 11].

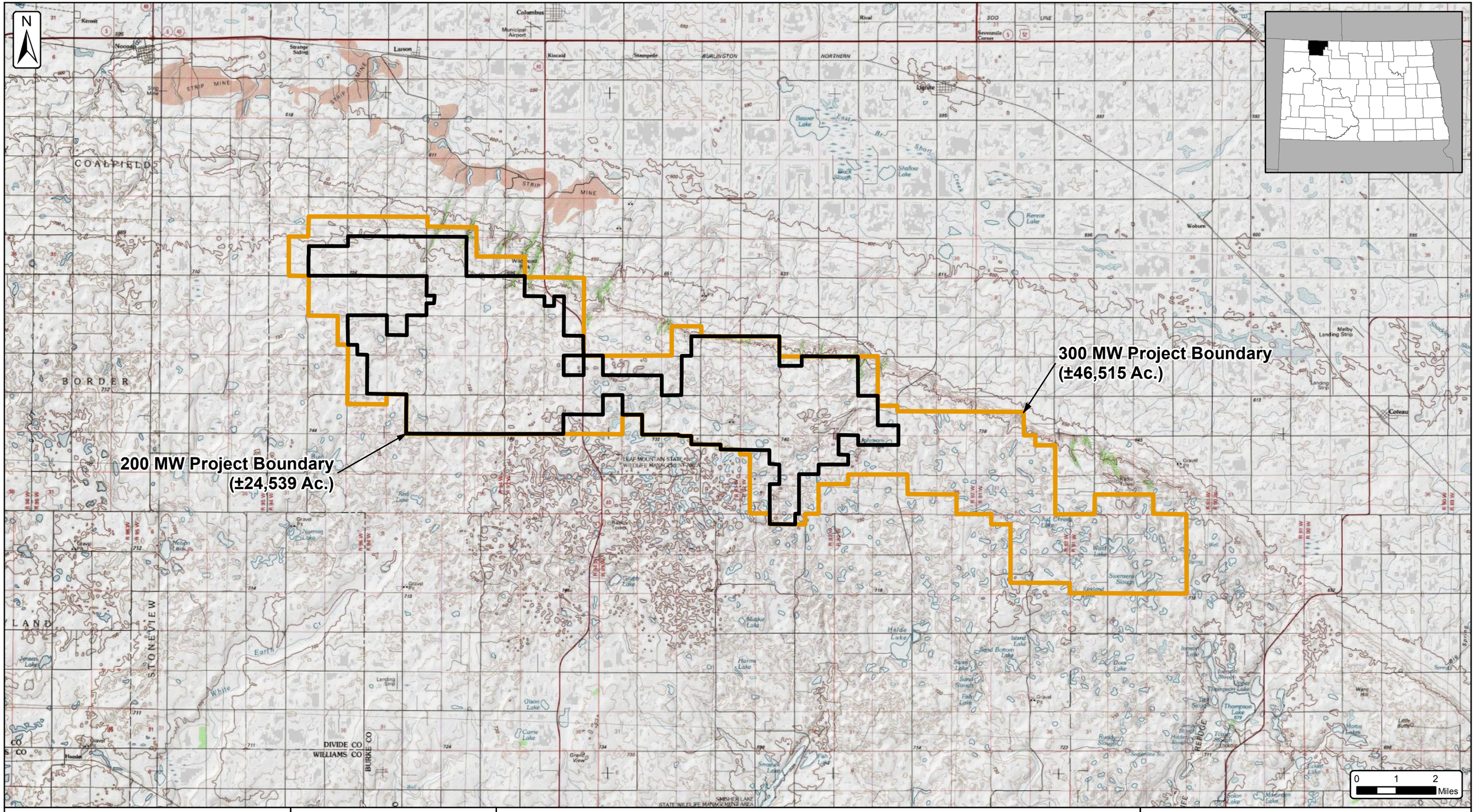
Overall nest density within the WEC Raptor Nest Study Area was approximately 9.0 nests/square-kilometer. Cursory visual assessment indicates that distribution of these nest structures was not uniform (Figure 3). Upon review of incidental raptor nest density within the 10-mile eagle nest assessment buffer, raptor nests appear to be concentrated primarily south of the 200 MW Project Area.

Large-bodied Colonial Nesting Species Results Summary

Atwell located one Double-crested Cormorant (*Phalacrocorax auritus*) rookery within the 200 MW Project Area (Figure 3). The rookery contained approximately 30 nests and was situated in standing snags in a glacial pothole in Harmonious Township, east of the corner of 94th St NW and 99th Ave NW.

[10] Atwell unpublished data.

[11] AKN (2017). Avian Knowledge Network (AKN). [Online.] Available at www.avianknowledge.net.



Burke County Wind Energy Center

Figure 1. Site Location Map

Burke County, North Dakota

Date: 11/30/2018

Client:

Burke Wind, LLC

Atwell, LLC Project:16000947

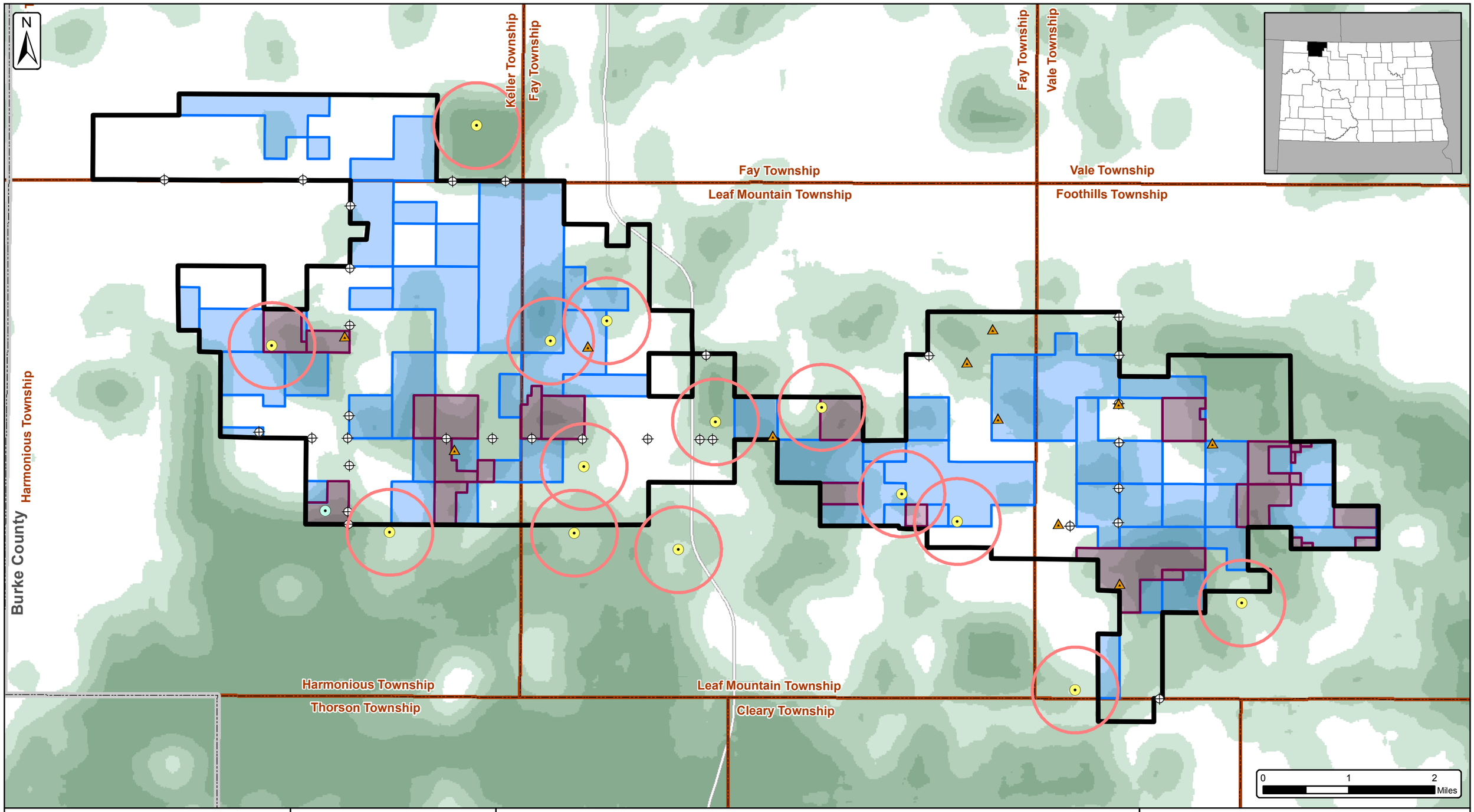
200 MW Project Area
10/16/2018 (± 24,539 Ac.)

300 MW Project Area
07/18/2018 (±46,515 Ac.)

SOURCE: USGS TOPOGRAPHIC QUADS

ATWELL

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Burke County Wind Energy Center

Figure 2. Sharp-tailed Grouse Lek Survey

Burke County, North Dakota
Date: 11/30/2018

Client:

Burke Wind, LLC

Atwell, LLC Project:16000947

STGR Lek Survey Point
Sharp Tailed Grouse
Individual
Confirmed Lek
Possible Lek
0.5 Mile Lek Constraints Buffer

Native Grasslands-Micro
0%-20%
20%-40%
40%-60%
60%-80%
80%-100%

USFWS Easements
Wetland Easement
Grassland/Wetland Easement

200 MW Project Area 10/16/2018 (± 24,539 Ac.)
Township Boundaries
County Boundaries

SOURCE: GRASSLANDS MICRO LAYER; NDGF

ATWELL

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N

40

Divide County

Burke County

0 1 2 Miles

Burke County Wind Energy Center

Figure 3. Raptor Nest Survey Map

Burke County, North Dakota

Date: 11/30/2018

Client:

Burke Wind, LLC

Atwell, LLC Project: 16000947

Raptor Nests (Atwell Identified 05/04/2017)

- Double-crested Cormorant
- Great Horned Owl
- Red-tailed Hawk
- Unknown

- Raptor Nest 0.25 Mile Buffer
- 200 MW Project Area 10/16/2018 (± 24,539 Ac.)
- County Boundaries

SOURCE: USDA NAIP IMAGERY, 2017

ATWELL

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B4. Attachment 1C. Bat Habitat Assessment for Burke County Wind Transmission Line Assessment Area, Burke and Mountrail Counties, North Dakota

BAT HABITAT ASSESSMENT

for

Burke County Wind Transmission Line Assessment Area
Burke & Mountrail Counties, North Dakota

Prepared for:

Burke Wind, LLC
700 Universe Boulevard
Juno Beach, Florida 33408

Prepared by: Atwell, LLC (#16000947)

May 4, 2018

(Revision: July 9, 2018)

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APPENDIX I

Topographic Overview Map/Site Location Map
USGS Land Cover Map
Aquatic Resources Map
Public Lands Map

APPENDIX II

Summary of Bat Species with Distribution in North Dakota

EXECUTIVE SUMMARY

Burke Wind, LLC (Burke) contracted Atwell, LLC (Atwell) to conduct a habitat assessment to identify habitats conducive to bat resources within the proposed approximately 23,312-acre Transmission Line Assessment Area (TAA) in Burke and Mountrail counties, North Dakota. This TAA is associated with the Burke County Wind Energy Center (WEC). The purpose of this report is to evaluate the potential existence of habitat for state or federally listed threatened and endangered bat species, as well as species of concern, within the TAA based on a desktop and literature review.

Data acquisition was conducted through publicly available information from a variety of sources including federal and state agencies, local government offices, GIS, and literature reviews. The information obtained during this habitat assessment will be utilized during initial desktop analysis in an effort to design project infrastructure to avoid and/or minimize impacts to potential bat habitat.

Within the TAA, grasslands, wetlands, and agricultural lands dominate the landscape. The northern part of the TAA exists as an extensive prairie wetland pothole system. Intermittent streams and forested riparian corridors are present throughout the central and southern portions of the TAA. Because of the relatively small proportion of forested landscape, the TAA has limited potential to support tree roosting bats. The White Earth River region in the southern portion of the TAA stands out as the single region within the TAA that may contain adequate habitat and resources to support roosting and migrating bat species.

Overall use of the TAA by the northern long-eared bat is unlikely because of the relatively limited amounts of forested habitat and riparian corridors. These habitats are concentrated within the southern sections of the TAA within Mountrail County. Considering the TAA distance from the officially designated white-nose syndrome (WNS) zone, Atwell does not anticipate that development of the overhead electric transmission line project within the TAA would be subject to prohibitions on incidental take for the northern long-eared bat as defined by a finalized 4(d) rule.

Three (3) additional bats species with various levels of conservation priority (big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), and western small-footed bat (*Myotis ciliolabrum)*) have been identified as having at least a possible chance of occurring within certain habitats located within the TAA. The North Dakota *State Wildlife Action Plan* (SWAP) could assist in informing design to avoid or minimize possible impacts to species of conservation priority.

1.0 INTRODUCTION

Burke Wind, LLC (Burke) contracted Atwell, LLC (Atwell) to conduct a habitat assessment for bat species within the proposed 23,312-acre Transmission Line Assessment Area (TAA) for the Burke County Wind Energy Center (WEC) within Burke and Mountrail Counties, North Dakota. Please refer to the *Site Location Map* in **Appendix I**.

Burke Wind, LLC conducted this study as part of a holistic natural resources review approach to assess potential adverse effects from development of this wind energy project on species of concern and their habitats. Results from this study will be combined with results from other natural resource studies and will aid in responsibly siting wind turbines, access roads, underground electric collection lines, an electric substation, overhead high-voltage transmission line, and other proposed infrastructure. To date, this thorough approach has enabled Burke Wind, LLC to adapt quickly during project design planning and has further minimized potential impacts to sensitive natural resources.

The purpose of this report is to evaluate the potential existence of and/or habitat availability for summer roosting bat species within the TAA, particularly for state species of conservation priority and federally listed species. Potential impacts of project development on those potential habitats need to be assessed. This document presents information regarding habitat descriptions and review of general bat natural history for those species that may utilize habitats within the TAA.

2.0 PROJECT DESCRIPTION

The approximately 23,312-acre TAA is located in northwest North Dakota in Burke and Mountrail Counties, and overlaps with the Burke County wind resource *Project Area* at the southeastern end. The TAA, approximately 15 miles southwest of Bowbells, North Dakota, runs south from the *Project Area* into Mountrail County before heading west and ending northwest of White Earth, ND and east of Tioga, ND. Refer to the *Site Location Map* in **Appendix I**. The TAA and surrounding vicinity is sparsely populated and supports a mix of grasslands and cultivated cropland/hayfields/pasturelands partially within an extensive prairie pothole wetland system. Agricultural use (cultivated crops and hay/pasture) is the primary land use within the TAA. Much of the landscape is relatively flat or with gently rolling hills; however, terrain may vary more with a greater topographical shift around the north-south oriented White Earth River in the southern portion of the TAA.

3.0 BACKGROUND RESEARCH

Data acquisition was conducted through publicly available information from a variety of sources including federal and state agencies, local government offices, GIS, and literature reviews. Sources reviewed include, but are not limited to the following:

- National Hydrography Dataset (NHD) (USGS 2017)
- United States Geological Survey (USGS) USFWS Threatened and Endangered Species (TES) Data (USFWS 2017a)
- National Wetlands Inventory (NWI) Data (USFWS 2017b)
- National Land Cover Database (NLCD) (Homer et al. 2015)
- North Dakota Game and Fish Department (NDGFD)
- North Dakota Statewide datasets available through the North Dakota Geographic Data Library's GIS Open Data Portal

The information obtained during this habitat assessment and the desktop analysis review will be utilized during initial desktop analysis in an effort to design project infrastructure to avoid and/or minimize impacts to potential bat habitat. A detailed discussion of the geologic and ecoregion characteristics and current land cover within the TAA from the USGS Land Cover Database is provided below.

*3.1 **Ecoregion Characteristics***

The TAA is located within the Level IV Northern Missouri Coteau (42d) and Glaciated Dark Brown Prairie (42i) ecoregions of the Level III Northwestern Glaciated Plains-42, as well as within the Level IV River Breaks (43c) ecoregion of the Level III Northwestern Great Plains-43 (Bryce et al. 1996). According to the EPA Ecoregion mapping data, these ecoregions are characterized by the following:

3.1.1 Northwestern Glaciated Plains

The Northwestern Glaciated Plains ecoregion-42 marks the westernmost extent of continental glaciation. The young morainal landscape has significant microtopography with high wetland concentrations throughout this region. The Northern Missouri Coteau (42d) lies in a transition zone between a more boreal climate to the north and a more arid climate to the west. Willows (*Salix* sp.), trembling aspen (*Populus tremuloides*), and southern outliers of aspen parkland may occur at wetland margins. Rough fescue (*Festuca* sp.), also a northern species, appears in grassland associations throughout this region. Wetlands in this region typically dry out earlier in the summer than on the Missouri Coteau (42d) ecoregion located to the south and east. Mixed dryland agriculture is the major land use for this region (Bryce et al. 1996). The Glaciated Dark Brown Prairie (42i) also marks a transition to drier conditions, with a well-defined drainage system and fewer wetlands compared to more recently glaciated areas to the east (Bryce et al. 1996).

3.1.2 Northwestern Great Plains

The Northwestern Great Plains ecoregion- 43 contains the Missouri Plateau portion of the Great Plains. The semiarid rolling topography is dotted with buttes and badlands. Though areas of steeper or broken topography may maintain some native grassland, the majority of grasses throughout this ecoregion have been replaced with spring wheat and alfalfa. Irregular precipitation and inadequate irrigation restricts the amount of agriculture that can occur in this ecoregion. The

River Breaks (43c) ecoregion contains broken terraces and uplands that drop down to the Missouri River and its tributaries. Habitat features such as dissected topography, forested ravines, and minimal agriculture greatly support wildlife. Some major tributaries of the Missouri River continue to sustain Cottonwood-Ash gallery forests, though impoundments along the Missouri River have significantly reduced the amount of riparian along the main channel (Bryce et al. 1996).

3.2 Land Cover Analysis

The TAA is located within a rural area with small farmsteads scattered throughout. The dominant land cover types identified throughout the TAA, according to the 2011 National Land Cover Database, are summarized in **Table 1**, below. Also, refer to the *Land Cover Map* in **Appendix I**.

Table 1. Approximate Land Cover Acreage within the TAA

Classification Type	*TAA (ac)*	*TAA %Total*
Open Water	292	1.25%
Developed, Open Space	611	2.62%
Developed, Low Intensity	76	0.32%
Barren Land	7	0.03%
Deciduous Forest	363	1.56%
Evergreen Forest	8	0.04%
Mixed Forest	28	0.12%
Shrub/Scrub	362	1.55%
Herbaceous	10,051	43.11%
Hay/Pasture	753	3.23%
Cultivated Crops	10,214	43.81%
Woody Wetlands	43	0.18%
Emergent Herbaceous Wetlands	503	2.16%
Totals:	**23,312**	**100.00%**

3.3 Grassland Habitat

Grassland habitat, which NLCD and **Table 1** refers to as “herbaceous”, is the dominant land cover within the TAA, totaling approximately 43 percent.

3.4 Agriculture

Agricultural land cover accounts for approximately 47 percent of the overall TAA (Homer et al. 2015). Agricultural lands are further broken down into cultivated crops and hay/pasture land cover types.

3.4.1 Cultivated Croplands

Cultivated croplands comprise the dominant land use within the agricultural land cover accounting for approximately 44 percent of the overall TAA. This agricultural landscape contains croplands traversed by tile drainage, and a generally grid-like network of roadways with a north-south and east-west orientation (Homer et al. 2015).

3.4.2 Hay/Pasture

Land used for hay cultivation and pasture use within the TAA, totals approximately 3 percent. Areas included in this land cover type are grasses, legumes, or mixed grass-legume for livestock and grazing and land utilized for the production of seed or hay crops, on a perennial cycle (Homer et al. 2015).

3.5 Wetland Habitat and Open Water

An aerial desktop review of current and historic aerial photographs, US Geological Survey (USGS) Topographic maps, National Wetland Inventory (NWI) maps, National Hydrography Datasets (NHD), US Department of Agriculture – National Cooperative Soil Survey (USDA-NCSS) maps, Hydrologic Unit Code (HUC) 12 Sub Watershed Boundary Dataset maps, and Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) floodplain maps was conducted to obtain broad-scale information regarding potential wetlands within the TAA. This review indicated that numerous scattered wetlands are mapped throughout the TAA. The northern half of the TAA contains a high concentration of wetlands, which are generally associated with a formerly glaciated landscape. Fewer wetlands appear to occur within the southern portion of the TAA in Mountrail County (USFWS 2017b). Refer to the *Aquatic Resources Map* in **Appendix I**.

3.6 Developed, Open Space and Disturbed Areas

Developed, Open Space, and Disturbed Areas (low, medium, high, open space, non-specific) account for approximately 687 acres (3%) of the TAA. Open space and low density development include landscapes with some constructed materials but mostly vegetation (e.g., large-plot single family housing, lawns, parks, vegetation planted in developed settings for recreation, erosion control or aesthetic purposes) and limited amounts of impervious surfaces (Homer et al. 2015). This land cover type within the TAA coincides particularly with farmsteads. Low and medium density development coincides with areas of impervious surfaces that account for approximately 50-100 percent of the total cover and minimal vegetation cover (i.e., row houses, commercial and/or industrial areas; Homer et al. 2015).

3.7 Deciduous Forest

Overall deciduous forest cover within the TAA is scarce and accounts for approximately 363 acres (1.5%). Forested habitat and riparian corridors are limited, fragmented, and occur primarily along intermittent drainages associated with the White Earth River in the southern portion of the TAA and, to a lesser extent, along a ridge located at the northeast boundary of the TAA. The NDGFD

woodland/shrubland macro habitat model also corroborates this assessment of the spatial distribution of potentially suitable woodland bat habitat throughout the TAA. Isolated tracts of woodlands associated with prairie pothole wetlands are also scattered throughout the northern portion of the TAA. Dominant forest systems appear to include aspen-oak forests and dry-mesic oak forests.

3.8 Federal and Public Lands

Burke County Waterfowl Production Areas (WPA), which are owned by the USFWS and managed to establish and protect waterfowl breeding and nesting habitat, were identified within the TAA. Additionally, there are several other federal public lands located in the vicinity of the TAA including Lostwood National Wildlife Refuge (Lostwood NWR) and several other WPAs (USFWS 2015c). The Lostwood NWR is adjacent to the eastern boundary of the TAA. Lostwood NWR is one of the largest tracts of northern mixed grass prairie that is publically owned in the United States. It is managed by the USFWS as a refuge and breeding ground for migratory birds and other wildlife (USFWS 2016a). The WPAs vary in size, are scattered within the vicinity of the TAA, and could potentially provide habitat for bat species. The Lostwood NWR and WPAs found in the vicinity of the *TAA* are depicted in the *Public Lands Map* provided in **Appendix I**.

North Dakota Department of Trust Lands School Trust Lands parcels are scattered within the TAA and the surrounding vicinity (North Dakota Department of Trust Lands 2017). The trust lands are often leased for agricultural purposes and are often open to walk-in hunting. State Wildlife Management Areas (WMAs) area also located within and in the vicinity of the TAA. WMAs are open to the public for hunting, fishing, and trapping and other compatible public uses. Private Land Open to Sportsmen (PLOTS) lands are located within and in the vicinity of the TAA (NDGFD 2016a). PLOTS are usually on private land and are open for public walk-in access for the purpose of hunting. The aforementioned managed public areas could potentially provide habitat for bat species in the vicinity of the TAA.

The USFWS land acquisition program grants wetland, grassland, and habitat easements for the purpose of protecting wetlands, grasslands, and habitat that provides nesting cover and surface habitat for waterfowl and other grassland-nesting bird species (USFWS 2008). Landowners agree to maintain the areas under easement as wildlife management areas by not draining, filling, leveling, or burning the wetland areas. Additionally, there are a variety of other protected lands and easement properties scattered throughout a majority of the TAA. These protected lands coincide with modeled woodland/shrubland habitat along the northern boundary of the TAA, but the woodland habitat corridor along the White Earth River does not appear to fall under a majority of public land or easement designations. Please refer to the *Public Lands Map* in **Appendix I**.

4.0 BAT HABITAT ASSESSMENT

4.1 Bat Species of North Dakota

According to NDGFD (NDGFD 2016b), eleven (11) species of bats are known to occur in North Dakota, of which three (3) are possibly year-round residents (Gillam et al. 2012, Nelson et al. 2015):

- Big Brown Bat (*Eptesicus fuscus*)*
- Northern Long-eared Bat (*Myotis septentrionalis*)
- Little Brown Bat (*Myotis lucifugus*)
- Long-legged Bat (*Myotis volans*)*
- Long-eared Bat (*Myotis evotis*)*
- Fringed Bat (*Myotis thysanodes*)
- Townsend's Big-eared Bat (*Corynorhinus townsendii)*
- Western Small-footed Bat (*Myotis ciliolabrum*)
- Eastern Red Bat (*Lasiurus borealis*)
- Hoary Bat (*Lasiurus cinereus*)
- Silver-haired Bat (*Lasionycteris noctivagans*)

*Possibly year-round residents in North Dakota

For a comprehensive list of North Dakota bat species and their occurrence within Burke and Mountrail counties, please refer to the *Occurrence Summary of North Dakota Bat Species and Their Distribution Assessment within the Transmission Line Assessment Area* table in **Appendix II**.

The northern long-eared bat is the only federally listed bat species (Threatened) known to occur within North Dakota. According to the North Dakota State Wildlife Action Plan (SWAP), Townsend's big-eared bat, big brown bat, little brown bat, and northern long-eared bat are categorized as Level I Species of Conservation Priority. Level I is defined as the highest level of conservation priority in the state where there is clear obligation to use State Wildlife Grant (SWG) funding to implement conservation actions that directly benefit these species (Dyke et al. 2015). The western small-footed bat, long-eared bat, and long-legged bat are listed as Level III Species of Conservation Priority, and listed as such since North Dakota lies at the edge of each species' known continental range.

4.2 North Dakota Bat Habitat & Availability Assessment

Preferred bat roosting and foraging habitat in North Dakota consists of woodlands (primarily coniferous) with a nearby water source, riparian woodland corridors, and rock crevice habitat (Gillam et al. 2012). Snags and trees with loose bark to roost under are commonly used; large cottonwood trees (>1 m diameter at breast height) tend to be a preferred tree of choice for several roosting species (Gillam et al. 2012). Some species will also utilize buildings and bridges for roosting. Preferred hibernaculum habitat includes caves, abandoned mines, rock crevices, and trees.

Within the TAA, forested habitat and riparian corridors are limited, fragmented, and occur primarily near intermittent drainages associated with the White Earth River (and including Paulsen Creek) in the southern portion of the TAA. According to the 2011 National Land Use-Land Cover Database, forests and wooded wetlands encompass less than 2.0% of the total land use/land cover mapped within the TAA (Homer et al. 2015). Nevertheless, these woodland habitat cover types may provide suitable roosting and foraging habitat for bats breeding within or migrating through the TAA.

Prairie potholes (i.e., emergent wetlands, freshwater ponds) scattered throughout the northern portion of the TAA are fringed with a variety of vegetative cover types including wooded habitat (cottonwoods and dead snags were observed within the TAA). These prairie potholes, particularly those near drainages/riparian corridors, have potential to afford bats a water source, foraging habitat, and occasional roosting habitat.

*4.3 **Previous State-wide Bat Studies***

Multiple mist netting and acoustic surveys were conducted by North Dakota and Dickinson State Universities at a total of 68 survey sites across five (5) ecological regions within North Dakota (i.e., Red River Valley- approximately 245 miles east, Pembina Gorge- approximately 206 miles east, Turtle Mountains-approximately 100 miles east/northeast, Missouri River Valley-approximately 16 miles south, and the Badlands- approximately 50 miles south/southwest of the TAA) (Nelson et al. 2015). Species presence at each location based on those surveys is summarized in Table 2.

Table 2. Presence of ND Bat Species Detected at Five Ecological Regions (Nelson et al. 2015)

Species	Badlands	Missouri River Valley	Turtle Mountains	Pembina Gorge	Red River Valley
Big Brown Bat	X	X	X	X	X
Northern Long-eared Bat	X	X			
Little Brown Bat	X	X	X		
Long-legged Bat	X	X			
Long-eared Bat	X	X			
Fringed Bat	X				
Townsend's Big-eared Bat	X	X			X
Western Small-footed Bat	X	X			
Eastern Red Bat	X	X	X		X
Hoary Bat	X	X	X	X	X
Silver-haired Bat	X	X	X	X	X

Based on these studies, 11 bat species were confirmed in the state; approximately 85% of the 333 captured bats were in the Badlands (n=143) and Missouri River Valley (n=140). The Missouri River Valley, which is the closest region to the TAA, had confirmed captures of four (4) species (i.e., big

brown, silver-haired, little brown, and northern long-eared bats) during mist-netting efforts (Nelson et al. 2015).

State-wide acoustic bat surveys conducted by North Dakota and Dickinson State Universities confirmed the presence of 10 bat species in the five (5) regions of North Dakota. Approximately 97% of the echolocation calls consisted of little brown bat, big brown, silver-haired bat, eastern red, western small-footed bat, and hoary bat. Northern long-eared bat calls were not detected in this study.

Therefore, based on this study, several regions in the state provide forested habitat needed to support foliage and tree roosting bats within the overall agricultural landscape of North Dakota, and more specifically the Missouri River Valley may provide habitat for conservation concern and listed species including little brown, big brown, and northern long-eared bats (Nelson et al. 2015).

There is little information available that focuses on species presence, distributions, and habitat use of bats in the Great Plains of North America, particularly wintering bats and hibernacula use. A study of the presence of overwintering bat species and hibernacula use in the Badlands region of North Dakota positively identified overwintering by big brown bat, silver-haired bat, little brown bat, long-eared bat, Townsend's big-eared bat, and western small-footed bat (Barnhart and Gillam 2017). However, to date no hibernacula for the northern long-eared bat have been documented in the state of North Dakota (USFWS, pers. comm. 2017).

4.4 Federally Listed Threatened and Endangered Species

Federally listed species are protected under federal law by the Endangered Species Act (ESA) of 1973 (16 U.S.C §1531-1544). The USFWS IPaC System provides information regarding federally threatened, endangered, proposed, and candidate species on a county-by-county basis. IPaC results indicate that the TAA is within the range (i.e., contains documented records and/or has the potential to harbor critical habitat) of one (1) listed bat species: northern long-eared bat (federally threatened). According to the IPaC results and other North Dakota bat studies conducted to date, the northern long-eared bat is the only federally listed bat species that may occur in the TAA. Based on previous land cover data analysis, specific habitat resources with a possibility of attracting this federally threatened species may exist in the White Earth River region in the southern portion of the TAA.

4.4.1 Northern Long-eared Bat (Federally Threatened)

The northern long-eared bat (NLEB) is a federally threatened species and considered a rare species in North Dakota (NDGFD 2016c). During late spring and summer, this species roosts and forages in forested habitats (Owen et al. 2003). The NLEB roosts under loose or peeling bark or in cavities and crevices of dead and living trees (USFWS 2015a). Their preferred tree species in North Dakota are

silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), and eastern cottonwood (*Populus deltoides*) (Gillam and Barnhart 2012).

NLEB habitat use varies depending on season. Typically, NLEB utilizes caves, crevices, and abandoned mines for hibernacula but utilizes trees as roosts during the maternal pup rearing phase. To date, no hibernacula or maternity roost trees have been identified in North Dakota (USFWS *pers. comm*. 2016).

The USFWS recognizes the NLEB as occurring in every North Dakota county (USFWS 2017c). Furthermore, NDGFD range data for the NLEB indicate that the TAA is located within the "possible range" of the species (NDGFD 2016c). Acoustic monitoring studies were conducted in 2010 at three (3) National Wildlife Refuges within approximately 85 miles east of the TAA. These studies indicated that concentrations of NLEB were highest in riparian corridors compared to agricultural lands (Coberly et al. 2011). In addition, recent bat studies in the region have documented the NLEB in forested habitat in the Turtle Mountains (approximately 100 miles east/northeast of TAA) and in the riparian corridors of the Little Missouri and Missouri Rivers (approximately 16 miles south of TAA) (Dyke et al. 2015).

Forested habitat and riparian corridors are limited, fragmented, and occur primarily in the southern portion of the TAA near drainages associated with the White Earth River. Patchily distributed riparian habitat (e.g., N48.45442°, W102.75927°) may harbor this species, but it is unlikely that they would venture far from preferred summer roosts during foraging forays (Carter and Feldhamer 2005). Furthermore, the White Earth River may serve as a migratory corridor, linking habitat in the TAA with the primary range of the NLEB (i.e., Missouri River Valley; Gillam and Barnhart 2012).

The NLEB is listed as federally threatened by the USFWS, primarily because of the threat posed by the white-nose syndrome (WNS), a fungal disease that has affected several bat populations (USFWS 2016b). The decision to list the bat as threatened with a 4(d) rule provides sufficient protection to address conservation needs of this bat species (USFWS 2016b). The major provisions of the 4(d) rule prohibit the purposeful "take" (defined under the federal ESA as harming, harassing, or killing) of this species throughout the species' range. In counties/districts that have confirmed WNS records and in U.S. counties within 150 miles of confirmed WNS records, incidental take is prohibited under the following circumstances:

1) If it occurs within a hibernacula.
2) If it results from tree removal activities and
    a. The activity occurs within 0.25-miles of a known, occupied hibernacula; or
    b. The activity cuts or destroys a known, occupied maternity roost tree or other trees within a 150-foot radius from the maternity roost tree during the pup season from June 1 through July 31(USFWS 2016b).

Overall use of the TAA by NLEB is unlikely because of the fragmented and relatively limited amounts of forested habitat and riparian corridors located primarily with the southern portion of the TAA. The TAA is approximately 245 miles west of the edge of the northern long-eared bat WNS zone, per the USFWS WNS Zone Final 4(d) Rule (05/01/2017) (USFWS 2017d). In areas not yet affected by WNS, there are no prohibitions on incidental take resulting from otherwise lawful construction activities. Although habitat may exist within the TAA, the TAA is outside of areas affected by WNS. Therefore, it is not anticipated that the TAA would be subject to prohibitions on NLEB incidental take under the final 4(d) rule.

4.5 North Dakota State Wildlife Action Plan- State Species of Conservation Priority

The SWAP is the principal document for safe guarding rare and declining species of fish and wildlife within the state. The SWAP utilizes eight (8) essential elements that focus on species of greatest conservation need:

1) information on the distribution and abundance of wildlife species, particularly low and declining populations;
2) descriptions of locations and relative condition of habitat and community types;
3) problems affecting species and priority research or survey efforts needed;
4) conservation actions needed to conserve the identified species;
5) plans for monitoring species and the effectiveness of conservation actions;
6) plans for periodic review of the SWAP;
7) plans for coordinating with federal, state, local agencies and Tribal government on the development and implementation of the plan;
8) and involves broad public participation.

The plan places an emphasis on the protection of diverse native habitats in order to maximize the preservation of native wildlife diversity. The SWAP covers 115 species, 47 birds, two (2) amphibians, nine (9) reptiles, 21 mammals, 22 fish, ten (10) freshwater mussels, and four (4) insects (Dyke et al. 2015). **Table 3** presents a list of federally TES and state species of conservation priority bat species, with their potential to occur in the area of the Project based on data from the USFWS and SWAP.

The SWAP is a NDGFD guidance tool that could assist in informing design to avoid or minimize possible impacts to state species of conservation priority on public lands. Should project development potentially impact state species of conservation priority on public lands, the SWAP could assist in providing steps to reduce or minimize these impacts.

4.6 State Listed Threatened and Endangered Species

North Dakota does not have a state threatened or endangered species list. Only those species listed by the ESA of 1973 are considered threatened or endangered (NDGFD 2015). However, North Dakota identifies state species of conservation priority through the state's SWAP, which are not

afforded regulatory protection, but are closely monitored in the state. The SWAP identifies the little brown, big brown bat, and Townsend's big-eared bat, as level I species of conservation priority. Each species is discussed in more detail in the following sections.

4.6.1 Little Brown Bat (State Species of Conservation Priority Level 1)

The little brown bat was added to the Species of Conservation Priority list during the revision of the Wildlife Action Plan in 2015 (NDGFD 2016d). Although currently secure in North Dakota, WNS threatens this species in much of its eastern range (NDGFD 2016d). The little brown bat used to be abundant throughout forested areas for much of eastern U.S. and as far north as Alaska. This bat's range extends from Alaska to Labrador and Newfoundland (Canada), south to southern California, northern Arizona, and northern New Mexico (BCI 2017a). This species is especially associated with man-made structures such as buildings, attics, barns, etc., and often form nursery colonies containing hundreds, sometimes thousands of individuals in buildings and attics (BCI 2017a). Currently, North Dakota State University is trying to identify potential roosting and hibernacula habitat in western North Dakota and developing a Bat Management/White-nose Syndrome Response plan (NDGFD 2016d). State-wide acoustic monitoring studies were completed in 2009-2012 and documented little brown bat calls in the Missouri River Valley (approximately 16 miles south of TAA), Badlands (approximately 50 miles south/southwest of TAA), and Turtle Mountains (approximately 100 miles east/northeast of TAA)(Nelson et al. 2015).

Forested habitat and riparian corridors are limited, fragmented, and occur primarily in the southern portion of the TAA near drainages of the White Earth River. These patches of habitat (e.g., N48.45442°, W102.75927°) may harbor this species. Additionally, there may be potential for this species to occur within the TAA at isolated locations since they will occasionally utilize manmade structures, such as abandoned barns (e.g., N48.71979°, W102.64795°) for roosting, especially if habitat configuration is suitable to this species' ecological requirements.

4.6.2 Big Brown Bat (State Species of Conservation Priority Level 1)

The big brown bat was added to the Species of Conservation Priority list during the revision of the Wildlife Action Plan in 2015 (NDGFD 2016e). The big brown bat is one of the most widespread mammals in North America; found in a variety of habitats ranging from timberline meadows to lowland deserts, though it is most abundant in deciduous forest areas (Agosta 2002, BCI 2017b). Big brown bats' preferred roosting areas are beneath loose bark and in small cavities of pine (*Pinus spp.),* oak (*Quercus spp*.), beech (*Fagus spp*.), and bald cypress (*Taxodium distichum*) trees. Big brown bat roosts can also be found in buildings, barns, and bridges (BCI 2017b).

NDGFD recognizes that the big brown bat's primary range encompasses every county in North Dakota (NDGFD 2016e). Based on previous study findings (i.e., (Nelson et al. 2015), it is likely that big brown bats occur within the TAA. However, overall use of the TAA by big brown bats is not expected to be widespread due to the fragmented habitat and lack of concentrated forested areas,

with the possible exception of the more forested White Earth River region in the southern portion of the TAA.

4.6.3 Townsend's Big-eared Bat (State Species of Conservation Priority Level 1)

The Townsends's big-eared bat was added to the Species of Conservation Priority list during the revision of the Wildlife Action Plan in 2015 (NDGFD 2016d). Two disjunct groups of this species occur within North Dakota, including within the Badlands of the Little Missouri River and, more recently, in the Turtle Mountains region (NDGFD 2016f).

This species is considered a habitat generalist, but most commonly is associated with forest and riparian areas during summer months. In the spring and summer, females form maternity colonies in mines, caves, or buildings, while males generally roost alone. Winter hibernacula include caves and mines throughout its range; however, hibernacula have not been documented to date in North Dakota (BCI 2014a, NDGFD 2016b).

Because of this species localized distribution in North Dakota and its specialized habitat requirements (***not likely*** present within the TAA), the Townsend's big-eared bat is unlikely to occur within the TAA.

4.7 Other Myotis species (State Species of Conservation Priority Level III)

The western small-footed bat, long-eared bat, and long-legged bat are listed as Level III Species of Conservation Priority (having a moderate level of conservation priority, but believed to be non-breeding in North Dakota and being peripheral to their overall continental range).

4.7.1 Western Small-footed bat

The western small-footed bat is considered a year-round/resident of North Dakota and has been documented in riparian corridors of the state's Little Missouri and Missouri Rivers. This species typically roosts alone or in small groups in rock crevices, cracks, and/or under tree bark (primarily coniferous trees). This species utilizes deep crevices found in rock cliffs, buttes, and/or caves for hibernacula (BCI 2014b, NDGFD 2016g).

4.7.2 Long-eared Bat

The long-eared bat is a possible year-round resident of North Dakota. This bat species utilizes caves and crevices for hibernacula and prefers broken rock outcrop and cliffs for roosting sites. The ponderosa pines (*Pinus ponderosa*) of the Badlands region are identified a as a prime area for this species within the state. However, this species is also known to utilize deciduous stands and sagebrush flats as roosting sites (NDGFD 2016h).

4.7.3 Long-legged Bat

The long-legged bat is a possible year-round resident of North Dakota, however, appears to be relatively rare throughout the state (Nelson et al. 2015). In North Dakota, this bat species typically roosts alone or in small groups in rock crevices and under tree bark. This bat is often associated with conifer stands, particularly in the ponderosa pine area of the Badlands region. In addition, this species has been documented along the Missouri River in central North Dakota (NDGFD 2016i).

4.7.4 Evaluation of Potential Occurrence of SCP Level III Species

Within the TAA, preferred habitat that may harbor species such as the western small-footed bat, long-eared bat, and long-legged bat is minimal and primarily confined to the White Earth River region in the southern portion of the TAA. Rock cliffs or rocky face substrates were identified in this area; however, deciduous forest dominated the woodland habitat throughout the TAA and very little mixed and coniferous forest types are present within the TAA (see **Table 1**). Furthermore, the known distribution for these species in North Dakota (i.e., the Badlands and Missouri River Valley regions) occurs more than 16 miles from the TAA and these species are not considered long distance migrants (NatureServe 2016).

Therefore, because of the localized distribution of these species in North Dakota and their specialized and preferred habitat requirements (minimal presence within the TAA), the western small-footed bat, long-eared bat, and long-legged bat are unlikely to occur within the TAA. Refer to **Table 3** (on page 16 of this report)**,** *Federally Listed and SWAP Listed Bat Species with the Potential to Occur within or in the Vicinity of the TAA,* for a list of state listed bat species and their potential to occur within the TAA.

4.8 Evaluation of Potential Occurrence of Non-Listed Species

Based on state-wide mist-netting studies in North Dakota, the areas with the greatest bat diversity include: the Badlands region, Missouri River Valley, Turtle Mountains, Pembino Gorge, and Red River Valley. These areas appear to provide suitable forested habitat for foliage and tree roosting bats in North Dakota's overall agricultural landscape (Nelson et al. 2015), however, the closest region (i.e., Missouri River Valley) is located approximately 16 miles southwest of the TAA.

The fringed bat is rare in North Dakota, with the first documented occurrence recorded in 2012 (Nelson et al. 2015). Roost habitats for this species include caves, mines, cliff faces, rock crevices, outcrops, abandoned buildings, bridges, snags, and other sheltered sites (Cryan et al. 2001). The TAA contains isolated, old building structures and some rock outcrops; however, based on the distribution of this species and its scarcity in North Dakota, the fringed bat is unlikely to occur within the TAA.

Three (3) additional species; the hoary bat, eastern red bat, and silver-haired bat, are known to occur throughout the entire state of North Dakota, and are likely to occur in a variety of habitats. Habitat for all three (3) migratory tree bat species consists of forested areas, including areas altered by humans (e.g., city parks, residential areas, hedgerows, etc.). Landscapes containing open habitats (e.g., grassland, cropland, old fields, etc.) with scattered woodland, drainages, and man-made structures (e.g., abandoned barns, buildings, etc.) which are present throughout the TAA, have the potential to be used by these species.

In North Dakota, silver-haired bats occur throughout the state during migration. Of additional note was the presence of the species in the Badlands region of North Dakota during pre-hibernation and winter hibernation periods (Barnhart and Gillam 2017). The other two (2) migratory bat species, the eastern red bat and hoary bat, both migrate much farther south for the winter, hibernating primarily in Mexico, southeastern states (eastern red bat) and California (hoary bat) (Cryan 2003). As such, it is Atwell's opinion that hoary bat, eastern red bat, and silver-haired bat are likely to occur within the TAA in summer and/or during migration. Refer to the *Summary of Bat Species Known to Occur in North Dakota* in **Appendix II**.

Table 3. Federally & SWAP Listed Bat Species & Occurrence Probability Assessment within or in the Vicinity of the TAA

Common Name	Scientific Name	State Conservation Priority Species Level	Federal Status	TAA Occurrence Potential	Resident/ Transient Status	Habitat Association
Northern Long-eared Bat	*Myotis septentrionalis*	Level I	FT	Unlikely	Migrant; Summer	Hibernates in caves and mines, swarming in surrounding wooded areas. Roosts and forages in forested and riparian habitats.
Big Brown Bat	*Eptesicus fuscus*	Level I	--	Likely	Year-round Resident	This species is a habitat generalist and will often utilize buildings, bridges, and dead trees as roosting habitat.
Little Brown Bat	*Myotis lucifugus*	Level I	--	Likely	Migrant; Summer	Little brown bats are generally associated with buildings which they use as roosts. Hibernacula are generally caves, mines and rock crevices.
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Level I	--	Unlikely	Migrant; Summer	Habitat generalist; commonly associated with forest and riparian areas during summer months. Winter hibernacula include caves and mines throughout its range, but none documented in North Dakota to date.
Western Small-footed Bat	*Myotis ciliolabrum*	Level III	--	Possible	Year-round Resident	Documented in the riparian corridors of the Little Missouri and Missouri Rivers. Possibly could occur in the riparian woodlands associated with the White Earth River. Roosts alone or in small groups in rock crevices and under tree bark, particularly coniferous forests. Crevices found in rock outcrops, cliffs, buttes, and/or caves are needed for hibernation.
Long-eared Bat	*Myotis evotis*	Level III	--	Unlikely	Possible year-round resident	Found in western North Dakota. Normally found in rugged terrain and coniferous forest. Hibernates in caves and abandoned mines. May migrate short distances to find suitable hibernacula in winter.
Long-legged Bat	*Myotis volans*	Level III	--	Unlikely	Possible year-round resident	Found in the Badlands region of western North Dakota and along the Missouri River. Typically roosts alone or in small groups in rock crevices and/or under tree bark, particularly coniferous trees.

FT = Federally Threatened, SCP Level I = State Conservation Priority Species Level I, SCP Level III = State Conservation Priority Species Level III

5.0 CONCLUSIONS

Bat species richness is expected to be relatively low within the TAA. According to the National Land Cover Database, approximately 87% of the landscape within the TAA is grassland and agriculture (Homer et al. 2015). Overall, minimal impact to bat habitat is expected to occur as a result of this transmission project within the TAA.

Though small, isolated woodlots and old, dilapidated structures may exist within the northern portion of the TAA, possible bat habitat impacts could be more likely to occur in the southern portion of the TAA where transmission lines would need to cross the north-south oriented White Earth River. This region likely contains the best bat habitat within the TAA, since there are numerous ravines and sheltered hills with large mature trees that could potentially support summer bat roosts and maternity colonies. The close proximity of these forests to waterbodies, as well as the presence of a few rocky outcroppings and cliffs, may also provide additional foraging and roosting opportunities in this area. The rocky, cliff-face substrate in the Mountrail County portion of the TAA could support hibernacula for some species.

Habitat characteristics within the TAA, literature review, and state-wide acoustic and mist-netting surveys indicate that it is unlikely that the northern long-eared bat will occur within the TAA during migration and summer. In addition, the bat community within the TAA is likely to include the big brown bat, little brown bat, eastern red bat, hoary bat, and silver-haired bat. The big brown bat has the potential to be a year-long resident of the TAA, most likely overwintering in the Badlands region (Barnhart and Gillam 2017). The migratory tree bats (hoary bat, eastern red bat, and silver-haired bat) may also occur in the TAA during summer and are likely to occur during migration.

It is unclear how commonly *Myotis* groups, including the northern long-eared bat, migrate through this region of North Dakota. However, it is reasonable to assume that there is an unlikely possibility of the species movement through the area during migration. Although suitable habitat for *Myotis* species may exist within the TAA, the TAA is outside of areas affected by WNS. Therefore, the Project should not be subject to prohibitions on incidental take for the northern long-eared bat under the final 4(d) rule nor will the Project impact or pose significant risk to the northern long-eared bat or habitat.

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APPENDIX I

Resource Mapping for the Burke Transmission Line Assessment Area

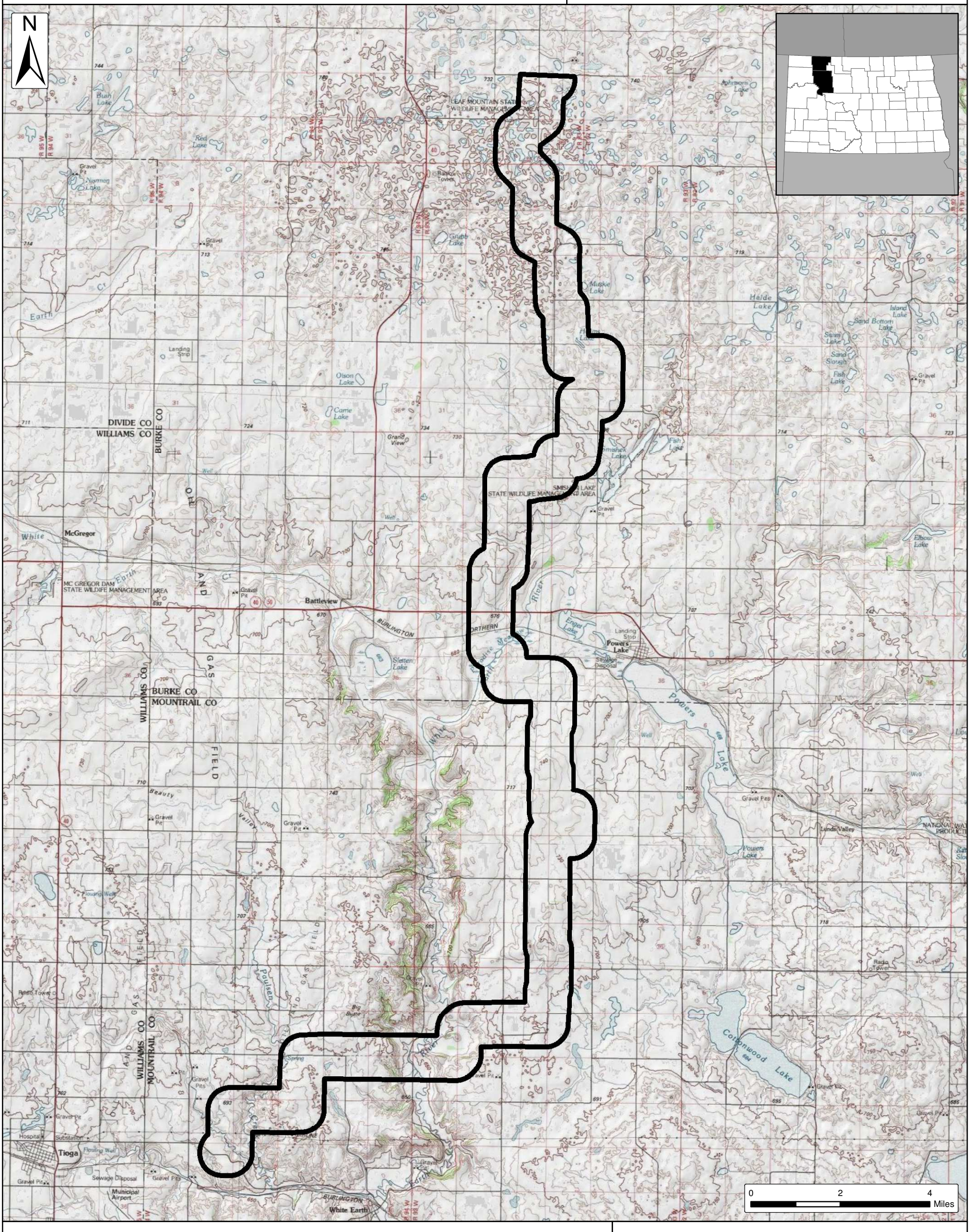
Topographic Overview Map/Site Location Map
USGS Land Cover Map
Aquatic Resources Map
Public Lands Map

Burke County
Transmission Line 1 Mile Corridor
Site Location Map
Burke County and Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
7/6/2018

Atwell, LLC Project:
16000947



Transmission Line 1 Mile Corridor (05/14/2018)

SOURCE: USGS TOPO QUADS
GRAND VIEW (1974), GRUBB LAKE (1974), HELDE LAKE (1974), BATTLEVIEW (1978), POWERS LAKE (1977), LUNDS VALLEY (1978), TIOGA (1979), WHITE EARTH (1969), ROSS NW (1969), COTTONWOOD LAKE (1981), COLUMBUS SE (1981), BEAVER LAKE (1948), RENNIE LAKE (1949)

ATWELL

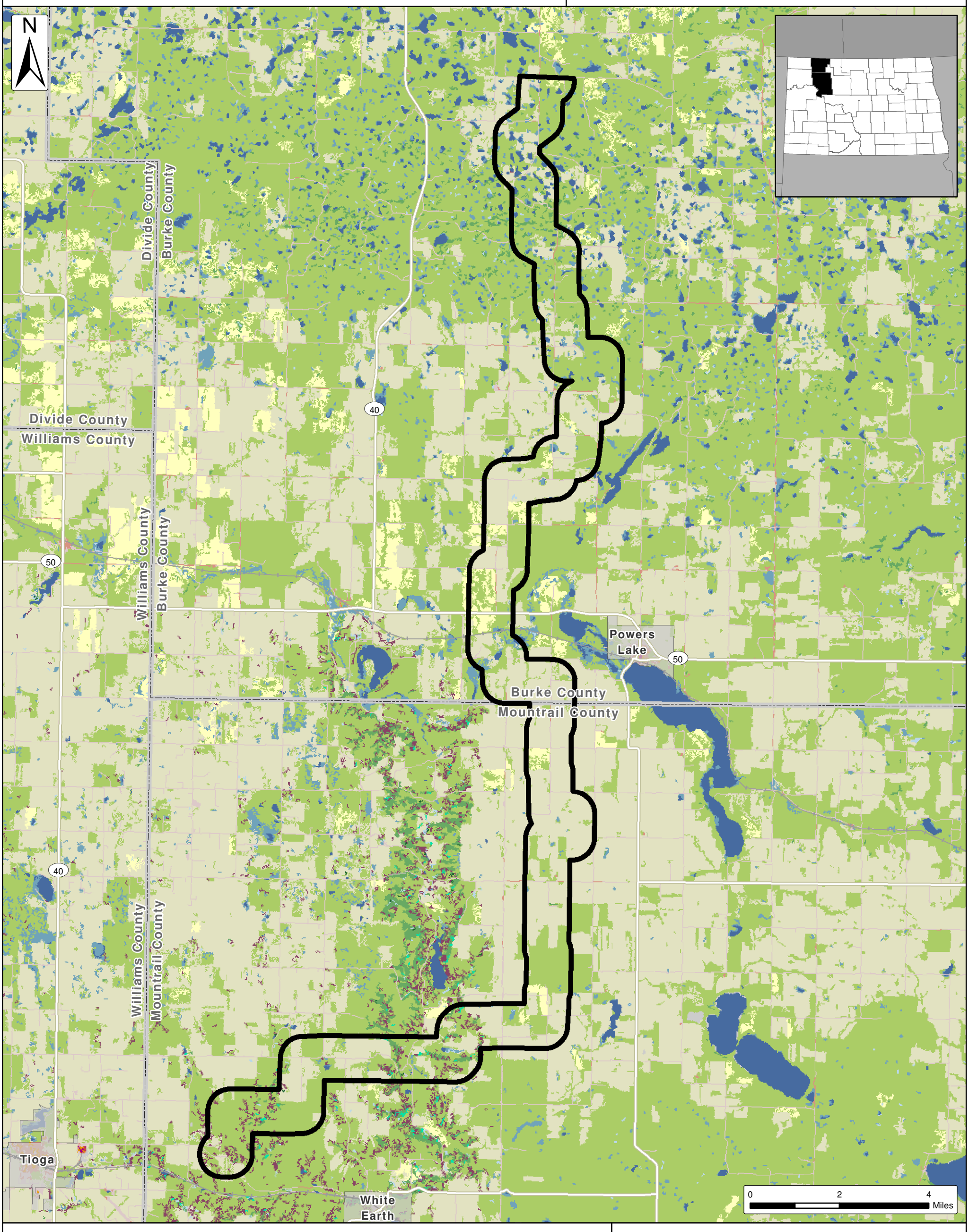
The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.

Burke Wind
Transmission Line 1 Mile Corridor
Land Cover Map
Burke County and Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
7/6/2018

Atwell, LLC Project:
16000947



Land Cover Types (NLCD 2011)
Percent of T-Line 1 Mile Corridor

- Barren Land (0.03%)
- Cultivated Crops (44.03%)
- Deciduous Forest (1.58%)
- Developed, High Intensity (0.00%)
- Developed, Low Intensity (0.33%)
- Developed, Medium Intensity (0.00%)
- Developed, Open Space (2.58%)
- Emergent Herbaceous Wetlands (2.24%)
- Evergreen Forest (0.04%)
- Hay/Pasture (3.18%)
- Herbaceous (44.71%)
- Mixed Forest (0.12%)
- Open Water (1.40%)
- Shrub/Scrub (1.59%)
- Woody Wetlands (0.18%)
- Transmission Line 1 Mile Corridor (05/14/2018)
- Cities
- Counties

SOURCE: USGS NATIONAL LAND COVER DATASET (2011)

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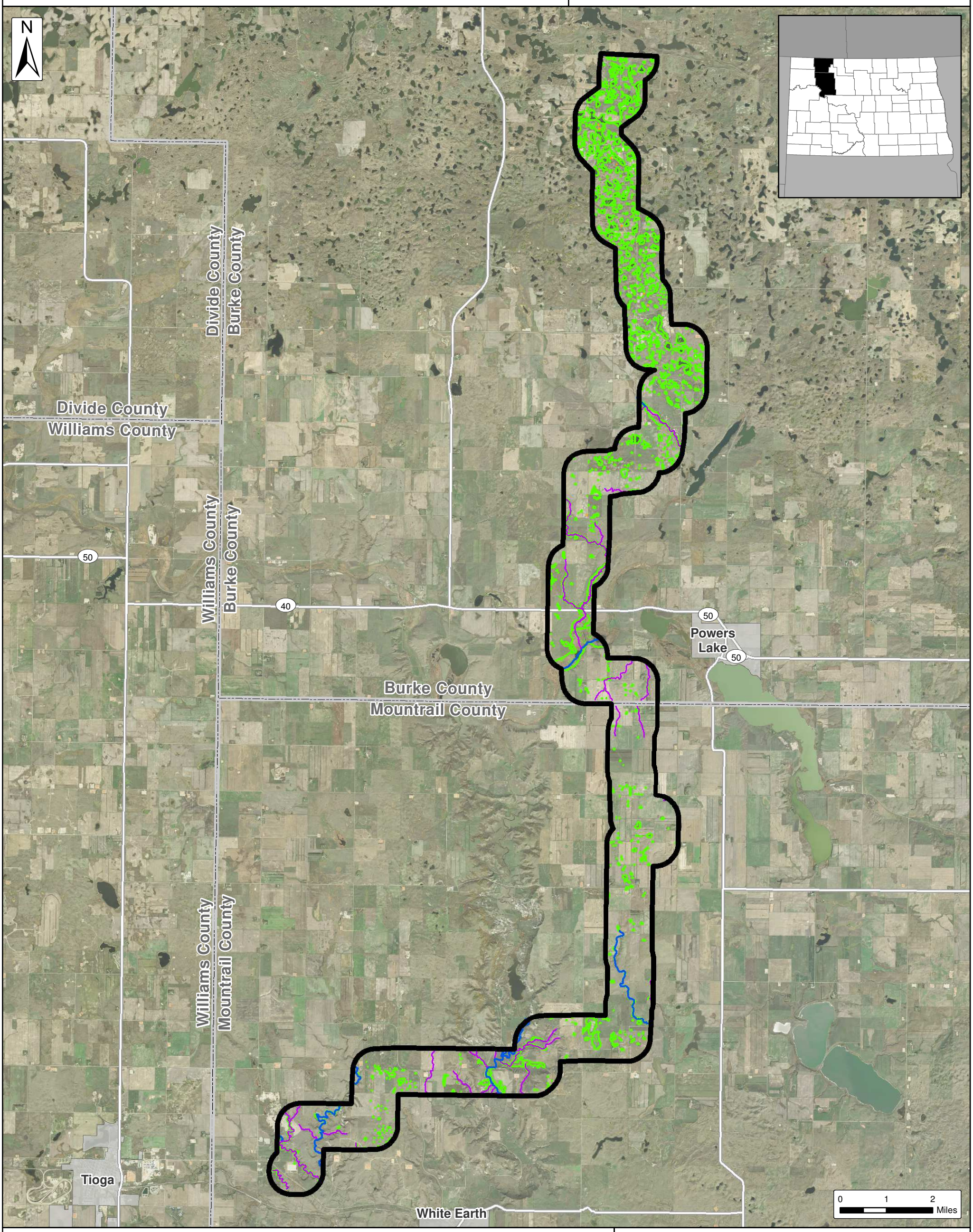
The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.

Burke Wind
Transmission Line 1 Mile Corridor
Aquatic Resources Map
Burke County and Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
7/6/2018

Atwell, LLC Project:
16000947



Watercourses (Desktop NHD and Atwell Identified)
- Intermittent
- Perennial

Wetlands Classification
- Jurisdicational
- USFWS Protected

- Transmission Line 1 Mile Corridor (05/14/2018)
- Cities
- Counties

SOURCE: USDA NAIP 2017 IMAGERY

ATWELL

The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.

Burke Wind Transmission Line 1 Mile Corridor

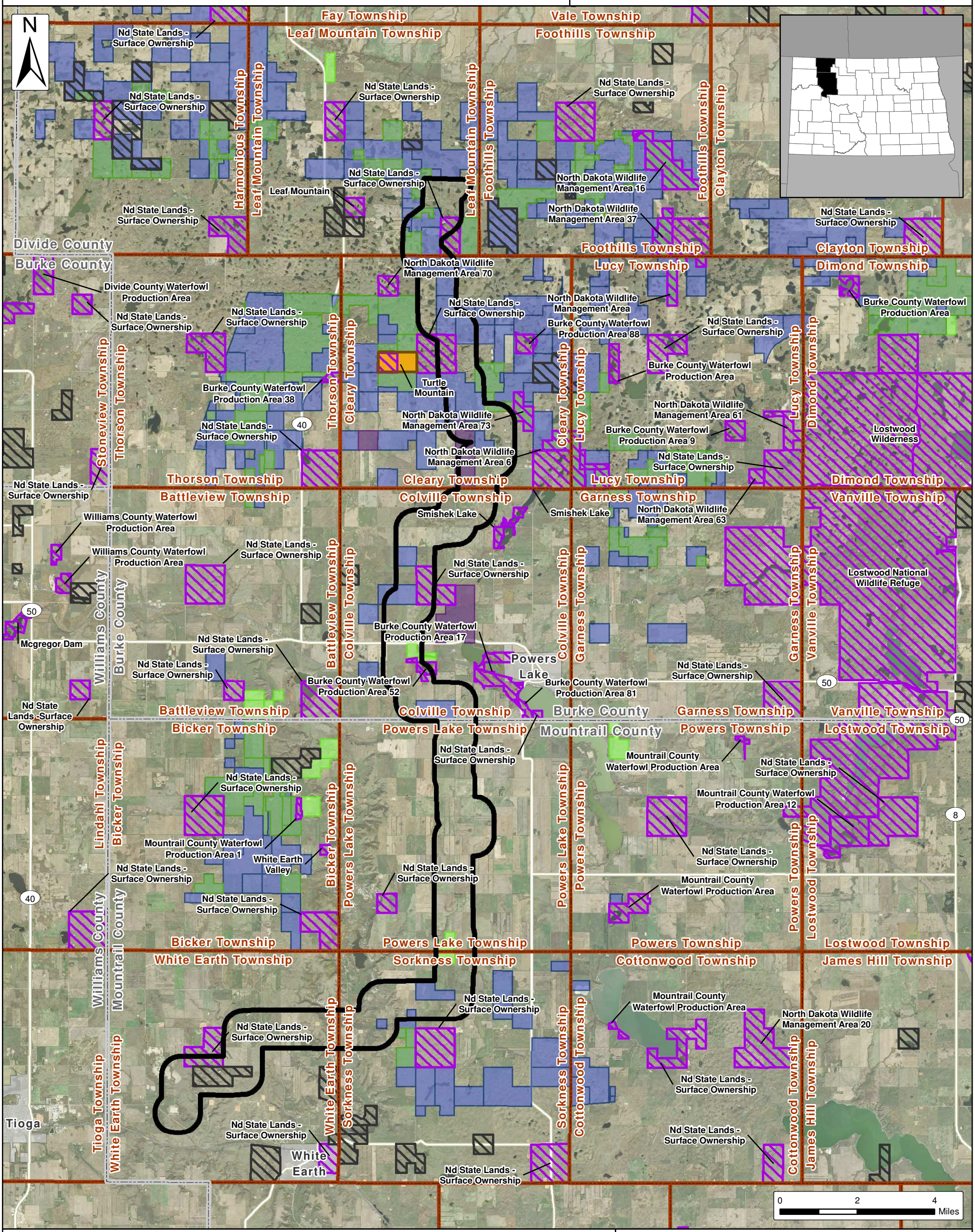
Public Lands Map

Burke County and Mountrail County, North Dakota

Client:
Burke Wind, LLC

Issue Date:
7/6/2018

Atwell, LLC Project:
16000947



- Tribal Trust Lands (USDA)
- PLOTS (Private Lands Open to Sportsmen, ND Game & Fish Dep.)
- Protected Lands (USGS)

USFWS Easements*

- Grassland Easement
- Wetland Easement
- Wetland/Grassland Easement
- Farm Service Agency Easement

- Transmission Line 1 Mile Corridor (05/14/2018)
- Cities
- Townships
- Counties

*The USFWS makes no claim as to the accuracy or completeness of the displayed information. Shaded areas depicting the location of USFWS WPA fee lands and limited interest easements are for illustrative purposes only and do not represent legal boundaries. For more detailed information, please contact one of the USFWS Realty Offices located in Bismarck and Minot,North Dakota, Sand Lake and Huron, South Dakota, or Great Falls, Montana.

The USFWS easement layer is current through October 2015. Please contact the appropriate Wetland Management District for any newly acquired easements.

SOURCE: USDA NAIP 2017 IMAGERY

ATWELL

The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.

APPENDIX II

Occurrence Summary of North Dakota Bat Species and Their Distribution Assessment within the Transmission Line Assessment Area

Appendix II -- Occurrence Summary of North Dakota Bat Species and Their Distribution Assessment within the Transmission Line Assessment Area

Common Name (Scientific Name) *	Habitat	Behavior	Foraging Habitat & Foraging Distance	Summer Colony Size	Summer Roosts	Migrant	North Dakota Distribution **	Listed Status	Does BCI range include northwestern North Dakota? ***	Occurrence within TLA
Big Brown Bat (*Eptesicus fuscus*)	Wooded, semi-open habitats, urban; caves, mines and buildings for hibernation	Sedentary (moves 80 km between summer and winter roosts); nocturnal	1-3 km (0.5-2 mi); generalist in habitat and diet	20-100 (in attics, barns; occasionally tree cavities)	Buildings, hollow trees, rock crevices	No	Statewide	SCP Level 1	Yes (Statewide)	Likely
Northern Long-eared Bat* (*Myotis septentrionalis*)	Riparian corridors, interior deciduous and coniferous woodland, caves or mines (winter)	Seasonal movement, nocturnal	2km (1.25 mi); ponds, forest clearings and edges; opportunistic	2 to 30	Hollow trees, exfoliating bark, occasionally old buildings	Yes (not long distance)	Statewide; primary range along Missouri River and tributaries, Turtle Mountains	FT, SCP Level 1	No (Eastern 2/3 of State)	Unlikely; potential habitat likely confined to far southern region of TLA
Little Brown Bat (*Myotis lucifugus*)	Woodland, wetland, riparian, grassland, old field, urban, shrubland/chaparral	Nocturnal	9.5 km (6 mi) woodlands near water, edge habitat; generalist	50-2500 (average 400)	Buildings, hollow trees, caves	Yes (no hibernacula known from North Dakota)	Statewide	SCP Level 1	Yes (Statewide)	Likely
Long-legged Bat (*Myotis volan* s)	Coniferous forests edges, wooded, coniferous, riarian and desert habitats; caves and mines (winter)	Nocturnal	5 km (3.1 mi); ponds, streams, water tanks, and forest clearings.	Solitary or small groups	Standing snag/hollow tree, rock crevices	No (possibly migrates short distances in winter)	Found in the badlands of western North Dakota and along the Missouri River and possibly into southern Mountrail	SCP Level 3	Yes (Western 1/4)	Unlikely

Appendix II -- Occurrence Summary of North Dakota Bat Species and Their Distribution Assessment within the Transmission Line Assessment Area

Common Name (Scientific Name) *	Habitat	Behavior	Foraging Habitat & Foraging Distance	Summer Colony Size	Summer Roosts	Migrant	North Dakota Distribution **	Listed Status	Does BCI range include northwestern North Dakota? ***	Occurrence within TLA
Long-eared bat (*Myotis evotis*)	Coniferous forests, rugged terrein; caves, mines (winter hibernacula)	Nocturnal	N/A; waterbodies, wetlands, and ponds	Maternity Colonies (<30 adults); Roosting females singly or in small groups (2-3)	Standing snag/hollow tree, rock crevices, buildings	No (possibly migrates short distances in winter)	Found in extreme western North Dakota	SCP Level 3	Yes (Far Western)	Unlikely
Fringed Bat (*Myotis thysanodes*)	Riparian, cliff, desert, bar rock/talus, suburban/orchard, woodland (conifer & mixed)	Nocturnal	N/A; waterbodies, wetlands, and ponds	Colony size ranges up to several hundred	Standing snag/hollow tree, rock crevices, buildings	No (possibly migrates short distances in winter)	This species not physically captured/confirmed in North Dakota until 2012 (Nelson, Barnhart, and Gillam 2015)	--	No	Unlikely
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Riparian, deserts, old field, grassland, savanna, shrubland, woodland; caves and mines	Sedentary, solitary or small groups, nocturnal	Varies 3.6-10.5 km (2.25-6 mi); near foliage of trees and shrubs, moth specialist	Solitary -small groups but up to 100 (west) 1,000 (east)	Caves and mines; sometimes buildings or cave-like bridges	No	Primary state range: from southwest corner of the State (western Bowman County through Dunn County), and in north-central Bottineau and Rolette Counties (Turtle Mountains)	SCP Level 1	Yes (Southwest corner)	Unlikely
Western Small-footed Myotis (*Myotis ciliolabrum*)	Desert, badlands, semiarid habitats, grasslands, mountainous wooded areas, riparian	Nocturnal	N/A; over waterbodies	Solitary or small groups (2-6)	Rock crevices in bluffs and badlands, abandoned houses, barns	Yes	Documented in the riparian corridors of the Little Missouri and Missouri rivers.	SCP Level 3	Yes (Southwest)	Possible

Appendix II -- Occurrence Summary of North Dakota Bat Species and Their Distribution Assessment within the Transmission Line Assessment Area

Common Name (Scientific Name) *	Habitat	Behavior	Foraging Habitat & Foraging Distance	Summer Colony Size	Summer Roosts	Migrant	North Dakota Distribution **	Listed Status	Does BCI range include northwestern North Dakota? ***	Occurrence within TLA
Eastern Red Bat (*Lasiurus borealis*)	Woodland, riparian, suburban	Solitary; nocturnal; active and feeds throughout the year (when temperatures above 9C)	Variable distances; forages near canopy, edge habitat, and along streams; generalist	Solitary	Tree foliage	Yes	Statewide during summer and migration where suitable habitat is present		Yes (statewide)	Likely
Hoary Bat (*Lasiurus cinereus*)	Woodland (deciduous and conifer), riparian, arid deserts in the southwest	Solitary; nocturnal	2 km (1 mi); mainly moths; clearings, along streams or lake edges, around lights; at high elevation	Solitary	Tree foliage	Yes	Statewide during summer and migration where suitable habitat is present		Yes (statewide)	Likely
Silver-haired Bat (*Lasionycteris noctivagans*)	Woodland (deciduous and conifer) adjacent to lakes or riparian habitats	Solitary or small groups, nocturnal	Variable long distances; forest edges, open fields, above canopy	3-6	Tree foliage, cavities, exfoliating bark, sometimes buildings	Yes	Statewide, more commonly in southwestern counties		Yes (statewide)	Likely

Sources: North Dakota Game & Fish Department (NDGFD), Nelson et al 2012, Gillam et al 2015, NatureServe 2017

* State and/or Federal listed

Status Legend: FT = Federally Threatened, SCP = State Conservation Priority Species (Levels 1, 2, & 3)

** Nelson et al. 2012, and Gillam et al 2015; NDGFD 2017 North Dakota Bats website; Accessed here: https://gf.nd.gov/wildlife/id/bats

*** Bat Conservation International: http://www.batcon.org/resources/media-education/species-profiles

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B4. Attachment 1D. Burke County Wind Energy Center – Bat Habitat Assessment Addendum

Report Addendum

TO: Burke Wind, LLC

FROM: Atwell, LLC

DATE: November 27, 2018

RE: Burke County Wind Energy Center – Bat Habitat Assessment Addendum

Burke Wind, LLC (Burke Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, contracted Atwell, LLC (Atwell) to conduct a habitat assessment for bat species for the proposed Burke County Wind Energy Center (Project). This addendum provides an update to the Bat Habitat Assessment[1] report dated May 15, 2018, revised July 24, 2018, and submitted under Docket PU-18-344 on September 14, 2018. The Project was originally designed to produce up to 300 megawatts (MW) of renewable wind energy. Burke Wind has recently reduced the Project size from 300 MW to 200 MW. This has resulted in a reduced Project Area and the elimination of 38 wind turbine generators (WTGs) from the proposed Project. As revised, the Project will consist of the construction and operation of up to 68 General Electric (GE) 2.72 MW and eight (8) GE 1.715 MW WTGs (total of 76 WTGs). The GE 2.72-MW WTGs will have a 295-foot (90-meter) hub height and a 381-foot (116-meter) rotor diameter; and the GE 1.715-MW WTGs will have a 262-foot (80-meter) hub height and a 337-foot (103-meter) rotor diameter.

The reduced 200 MW Project Area covers 23,933 acres and remains fully within the former 300 MW Project Area. As the reduced Project Area is encompassed within the area evaluated in the Bat Habitat Assessment report, the discussion and results of the report are still reflective of the reduced Project Area and therefore, information contained within the original report is still applicable.

Within the 200 MW Project Area, forested habitat and riparian corridors are limited, fragmented, and occur primarily along the northern boundary of the Project Area near intermittent drainages. According to the 2011 National Land Cover Dataset[2], deciduous forest comprises approximately 332 acres or 1.6 percent of the participating landowner parcels within the reduced Project Area. Wooded wetlands comprise 40.6 acres or 0.2 percent of the participating parcels within the reduced Project Area. Together, deciduous forest and wooded wetlands encompass roughly 1.8 percent of the total land use/land cover mapped within the participating landowner parcels of the reduced Project Area.

As stated in the Bat Habitat Assessment dated July 24, 2018, minimal impact to bat habitat is expected to occur as a result of the Project.

[1] Atwell, "Bat Habitat Assessment for Burke County Wind Energy Center, Burke County, North Dakota, Prepared for Burke Wind, LLC" (Atwell, LLC, July 2018).

[2] CG Homer et al., "Completion of the 2011 National Land Cover Database for the Conterminous United States-Representing a Decade of Land Cover Change Information," *Photogrammetric Engineering & Remote Sensing* 81, no. 5 (2015): 345–54.

B4. Attachment 1E. Northern Long-Eared Bat Desktop Habitat Assessment, Northern Divide Wind Energy Center, Burke County, North Dakota

Northern Long-Eared Bat Desktop Habitat Assessment Northern Divide Wind Energy Center, Burke County, North Dakota

Final Report

Prepared for:

Northern Divide Wind, LLC

Prepared by:

Clayton Derby, Terri Thorn, and Sofia Agudelo

Western EcoSystems Technology, Inc.
4007 State Street, Suite 109
Bismarck, North Dakota 58503

November 2019

STUDY PARTICIPANTS

Western EcoSystems Technology, Inc.

Clayton Derby	Project Manager
Terri Thorn	GIS Specialist/Report Writer
Sofia Agudelo	Reviewer, Technical Editor

REPORT REFERENCE

Derby, C., T. Thorn, and S. Agudelo. 2019. Northern Long-Eared Bat Desktop Habitat Assessment, Northern Divide Wind Energy Center, Burke County, North Dakota. Prepared for Northern Divide Wind, LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. October 29, 2019.

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Figure 1. Potential northern long-eared bat habitat within and 2.5 miles (mi) from the proposed Northern Divide Wind Energy Center Project Area in Burke County, North Dakota. 5

INTRODUCTION

Northern Divide Wind, LLC (Northern Divide Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, is considering the development of the Northern Divide Wind Energy Center (Project) in west-central Burke County, North Dakota. To evaluate potential northern long-eared bat (NLEB; *Myotis septentrionalis*) habitat and use within the proposed 10,897-acre (ac) Project (Project Area), and to address past recommendations from the US Fish and Wildlife Service (USFWS) and North Dakota Game and Fish Department, Northern Divide Wind requested that Western Ecosystems Technology, Inc. (WEST) evaluate potential habitat for NLEB within the Project Area during the summer months.

This report describes the results of the NLEB desktop habitat assessment completed for the Project by WEST, which was done following the Phase 1 survey recommendations found in the USFWS' *Northern Long-Eared Bat Interim Conference and Planning Guidance* (Guidance; USFWS 2014) and *2016 Range-Wide Indiana Bat Summer Survey Guidelines* (Guidelines; USFWS 2016).

Northern Long-eared Bat Summer Habitat Requirements

The NLEB is a federally threatened species throughout its range listed under the Endangered Species Act (1973), but take due to operation of wind projects is exempt under a 4(d) rule (81 Federal Register 9: 1900–1922 2016). The NLEB is a forest-dependent species that tends to avoid open habitats, generally relying on forest features for both foraging and roosting during the summer months (Owen et al. 2003, USFWS 2017), and requiring forest interior habitat with adequate canopy closure for both roost and foraging (Lausen 2009). Abundance of NLEB prey items, particularly beetles and moths, are typically higher in more closed forest stands than in forest openings, and wing morphology makes this bat species ideally suited for the high maneuverability required for gleaning-type foraging within a cluttered forest interior (Henderson and Broders 2008). Additionally, riparian areas are considered critical resource areas for many species of bats because they support higher concentrations of prey, provide drinking areas, and act as unobstructed commuting corridors (Grindal et al. 1999).

It is unlikely that NLEB would cross over large open areas (i.e., land lacking suitable habitat) to search for foraging and roosting habitats. Henderson and Broders (2008) found that NLEB did not travel more than 255 feet (ft) from the edge of intact forest structure; however, they also have been documented to occur in agricultural settings where forest habitats have been highly fragmented. A study of nine female NLEB using an intensively managed forest in West Virginia found this species forages in areas with forest patch sizes between 114–161 acres (ac; Owen et al. 2003), while studies in landscapes dominated by agricultural activities found NLEB used woodlots and riparian zones with as little as 15–50 ac of forest cover (Foster and Kurta 1999, Henderson and Broders 2008).

During the summer months, NLEB roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees (USFWS 2014). In general, NLEB seem opportunistic in

selecting roosts, using tree species that retain bark or provide cavities or crevices. Rarely, NLEB have also been found roosting in structures like barns and sheds (USFWS 2015); however, any structures that may be used as roosts would be expected to be located relatively close to wooded habitat that would be used for foraging. Cooler roost locations such as caves and mines may be used by non-reproductive females and males (Bat Conservation International 2019). While coal strip or surface mines are in the Project Area vicinity, no caves or underground mines that could serve as hibernacula are known to occur within the Project Area or 2.5-mile (mi) buffer.

PROJECT AREA

The analysis was completed based on the Project Area provided by Northern Divide Wind in October 2019. The Project is located in northwest Burke County, North Dakota about 5 mi southeast of the City of Noonan. The landscape area is generally rolling to flat. Elevations range from 2,118–2,483 ft above sea level with higher elevations in the southern part of the Project (US Geological Survey 2019). The region where the Project is located has been largely converted to agricultural use with crop production (mainly corn, soybeans, sunflowers, canola, and alfalfa) the primary land use, and livestock grazing a secondary use (Griffith 2010, Sayler 2016). Trees and shrubs can be found around farmsteads, within planted shelter belts, and along/within drainages; wetlands and prairie potholes are present throughout the Project Area and surrounding areas.

METHODS

The NLEB Guidance provides an estimate of the average maximum movement distance of 1.5 mi for NLEB and 2.5 mi for Indiana bats (*Myotis sodalis*). Using US Department of Agriculture's (USDA) 2018 National Agricultural Imagery Program imagery (USDA 2018) and 2016 National Land Cover Database (NLCD; Yang et al. 2018, Multi-Resolution Land Characteristics 2019) data, WEST digitized trees, considered potential NLEB summer habitat, within the Project Area and selected those areas identified as deciduous forest, evergreen forest, mixed-forest, or shrub/scrub in the NLCD within a 2.5 mi buffer around the Project Area. The larger 2.5 mi buffer was used to provide a conservative estimate of the potential foraging range of NLEB and to depict any potential corridors of connected habitat in the vicinity of the Project.

Habitat Assessment

WEST conducted a habitat analysis to assess connectivity of suitable foraging (i.e., woodlots, forested riparian corridors, and areas adjacent to these habitats), roosting, or commuting (i.e., shelterbelts/tree-lines, wooded hedgerows) habitats. Given that NLEB have similar habitat requirements as Indiana bats, the approach used in this habitat evaluation followed recommendations for habitat assessment included in the USFWS' *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects* (USFWS 2011). This guidance assesses the potential for bats to use the Project Area based on presence of travel/commuting corridors and connectivity to foraging or roosting habitat within a 2.5 mi buffer of the Project. Connectivity is defined in the Indiana bat guidance as commuting habitat within 1,000 ft and connected to roosting or foraging habitat within 2.5 mi of the Project boundary (USFWS 2011). The 1,000 ft distance is

based on studies of Indiana bat and NLEB behavior using telemetry data on foraging activity, which indicated that isolated trees or small patches might only be suitable as habitat when they are less than 1,000 ft from other forested/wooded habitats (USFWS 2011). Therefore, it is reasonable to conclude that these bats are unlikely to occur within areas located more than 1,000 ft from roosting/foraging habitat (USFWS 2014).

For purposes of this review, WEST categorized habitat patches as follows: less than 15 ac as potential commuting/travel corridors (generally shelterbelts or small woodlots); 15–50 ac as small roosting/foraging areas (larger woodlots or riparian forests); and greater than 50 ac as medium-large roosting/foraging areas (larger contiguous forests or riparian corridors).

RESULTS

There are parts of three 50 ac or greater and one 15–50 ac wooded areas within the Project Area (Figure 1). Additionally, one 50 ac or greater and three 15–50 ac wooded areas are within the 2.5-mi Project buffer (Figure 1). All of these wooded areas represent potential summer habitat for NLEB, but none are connected or near to more contiguous habitat (e.g., Missouri River riparian corridor and breaks) that NLEB may use for migrating along between distant and unknown hibernacula locations and summer breeding areas. All but one of these areas can be found within or along the northeast boundary of the Project; the other area is along the north-central boundary (Figure 1). Based on the imagery analysis, these potential NLEB summer habitats are associated with naturally occurring woody draws which contain a variety of tress sizes and species. Nine of the 10 potential habitat areas are interconnected (i.e., within 1,000 ft buffer) by smaller wooded areas and thus are part of a single potential foraging area (Figure 1).

CONCLUSIONS

Some believe that the range of the NLEB includes all of North Dakota. However, recent studies from North Dakota State University (NDSU) indicate that NLEB do not occur throughout North Dakota and may be limited to the western badland areas (Dr. E. Gillam, pers. comm). Although there is potential summer habitat in and around the Project Area, the lack of hibernacula in the vicinity of the Project and lack of connectivity from other potential habitat (e.g., Missouri River, badlands) may preclude the presence of NLEB from the Project Area and be consistent with conclusions drawn through the research by NDSU. Overall, impacts to bat species, including NLEB of which there have been none, are anticipated to be within the overall range of other Midwestern facilities, particularly those in North and South Dakota.

To assess level of impact, a minimum of one year of post-construction fatality monitoring will be conducted to identify wildlife species, including bats, found as fatalities and to estimate fatality rates at the Project. Fatality monitoring will begin after all the turbines have been commissioned and are fully operational, and will be consistent with general wind industry standard practices as described in the USFWS's Land-Based Wind Energy Guidelines (USFWS 2012). Additionally, Northern Divide Wind will develop a Wildlife Response and Reporting System as a proactive method of monitoring and recording wildlife impacted during Project operation. This system has

a specific set of processes, procedures, and training for monitoring, responding to, and reporting wildlife injuries and fatalities at wind turbines.

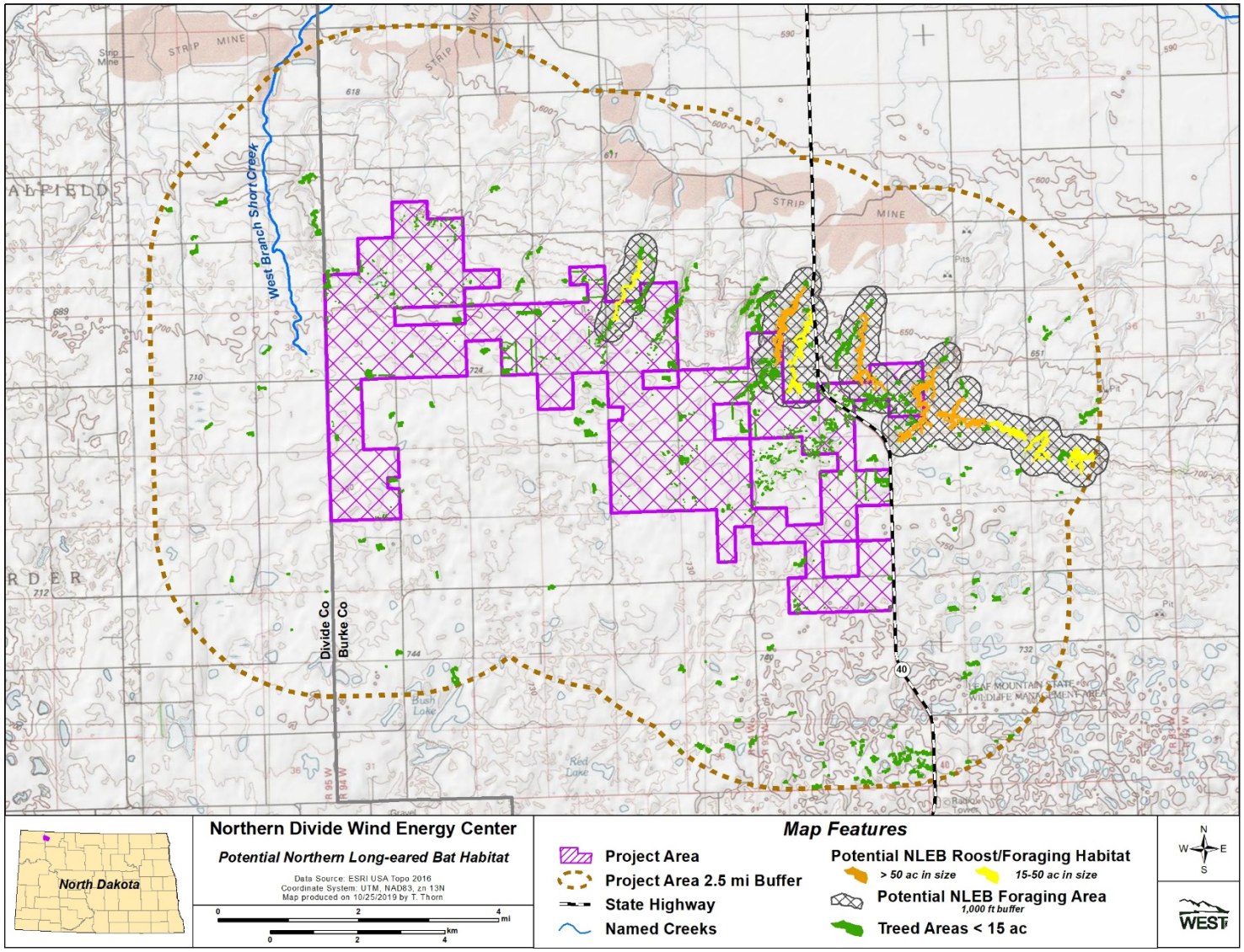


Figure 1. Potential northern long-eared bat habitat within and 2.5 miles (mi) from the proposed Northern Divide Wind Energy Center Project Area in Burke County, North Dakota.

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B4. Attachment 1F. Whooping Crane Habitat Review, Northern Divide Wind Energy Center, Burke County, North Dakota

Whooping Crane Habitat Review
Northern Divide Wind Energy Center
Burke County, North Dakota

Final Report

Prepared for:

Northern Divide Wind, LLC

Prepared by:

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LIST OF ATTACHMENTS

Attachment 1. Studies Conducted for the Previous Project

INTRODUCTION

Northern Divide Wind, LLC (Northern Divide Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC proposes to develop the Northern Divide Wind Energy Center (Project) in an area encompassing about 10,897 acres (Project Area) in northwestern Burke County, North Dakota (Figure 1). Northern Divide Wind requested that Western EcoSystems Technology, Inc. (WEST) conduct a desktop review of potential whooping crane (*Grus americana*) use within the Project Area. Historically, these reviews have consisted of a qualitative and quantitative review of potential roosting and foraging habitats (i.e., wetlands, croplands, and grasslands), wetland types and densities, disturbance features, and other factors that are known to or believed to impact use by whooping cranes. These reviews often include an analysis of a proposed project area as well as comparative areas in the vicinity of a proposed project. However, at the direction of the North Dakota Game and Fish Department and the U.S. Fish and Wildlife Service (USFWS), this review focuses on the analysis and models developed by Niemuth et al. (2018).

The Project includes a 345-kilovolt transmission line that extends into Mountrail County, North Dakota (Figure 1). Northern Divide Wind will install bird flight diverts on the entire transmission line, a practice commonly recommended by wildlife agencies and contained in the Avian Power Line Interaction Committee (APLIC) guidance in "Reducing Avian Collisions with Power Lines" (APLIC 2012). Given that the entire transmission line will be marked, as recommended, this evaluation focuses on the Project Area.

SITE DESCRIPTION

The Project Area is located in an area that has been largely converted to agricultural, with crop production the primary land use (mainly corn, soybeans, sunflowers, canola, and alfalfa; Griffith 2010, Sayler 2016). Trees and shrubs can be found around farmsteads, within planted shelterbelts, and along/within drainages; natural wetlands are present and scattered throughout the region (Bryce et al. 1996). Topography is generally rolling to flat; elevations range from approximately 2,118–2,483 feet (ft) above sea level and generally decrease from south to north (U.S. Geological Survey [USGS] 2019).

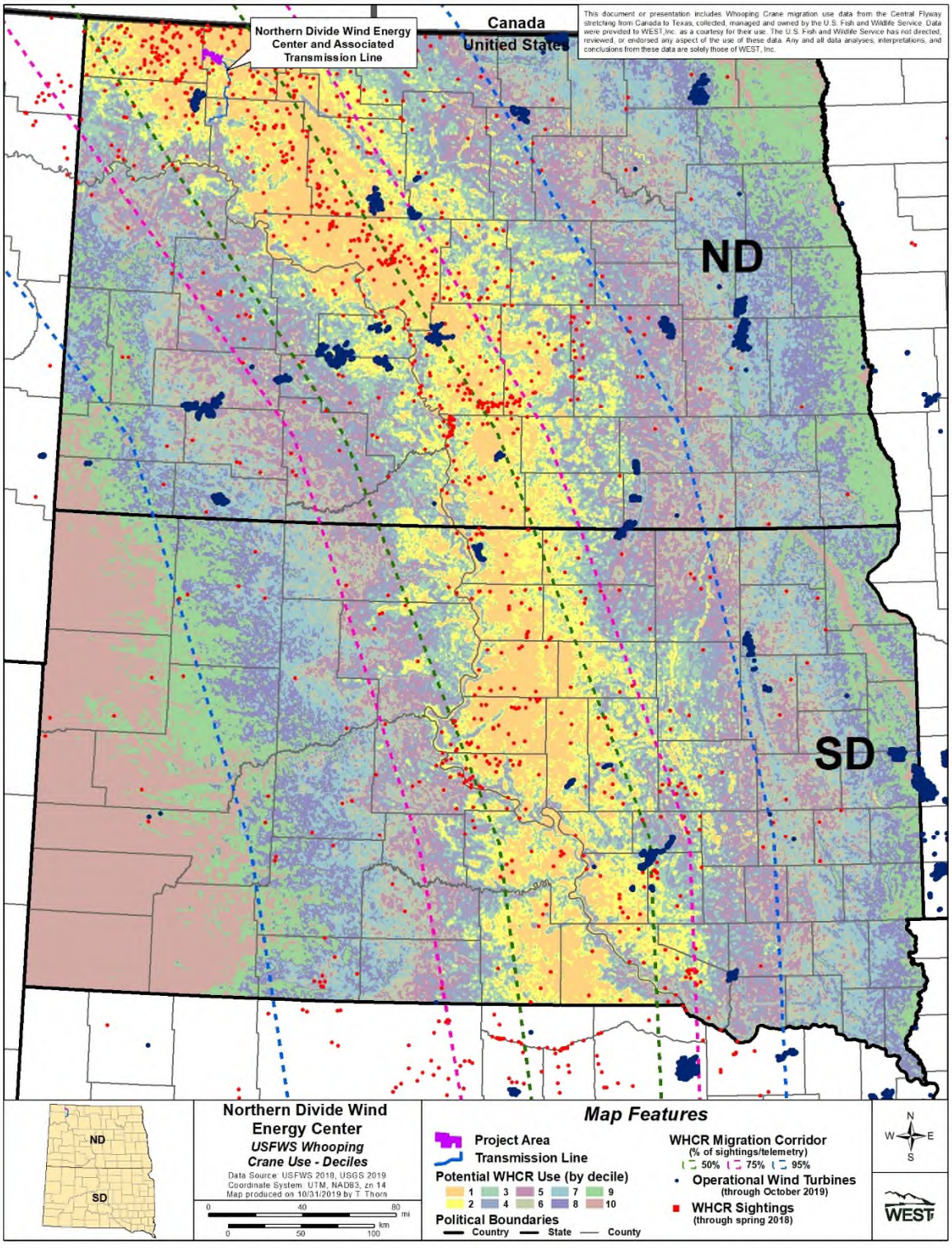


Figure 1. Location of the Northern Divide Wind Energy Center Project Area in Burke County, North Dakota, in relation to other wind energy projects within the whooping crane migration corridor, confirmed sightings through spring 2018, and potential whooping crane use deciles (Source: Niemuth et al. 2018).

METHODS

WEST completed the desktop review using ArcGIS, ArcMap 10.5.1 software (ArcMap 2017), 2016 National Land Cover Database (NLCD) information (Yang et al. 2018, Multi-Resolution Land Characteristics 2019), National Wetland Inventory (NWI) data (NWI 2018), model outputs from Niemuth et al. (2018), and the current Project Area provided by Northern Divide in October 2019. The desktop analysis included a summary of land cover/land use types to help describe conditions specific to the Project Area, as well as an assessment of the suitability of whooping crane habitat within the Project Area and four reference areas of the same dimensions located adjacent (based on the Project's boundary extent) to the Project in the four cardinal directions; this assessment was conducted using the habitat suitability model from Niemuth et al. (2018).

The Niemuth et al. (2018) model includes two different outputs related to potential whooping crane use. The first output evaluates potential use throughout North and South Dakota by breaking modeled potential use into deciles, with each decile containing the same total acres (Figure 1). This output is useful for evaluating potential use across broad geographic areas (e.g., an area in Burke County compared to an area in Barnes County compared to an area in Cass County, North Dakota). In essence, the decile map corresponds closely with the whooping crane migratory corridor (i.e., all areas of higher deciles are within the whooping crane migratory corridor, Figure 1) as one of the main factors in the model relates to historic whooping crane use. The second output evaluates relative probability of use within a range of low to high (probability 0–1). This output, which is useful for evaluating potential use within more defined locations or between locations in close proximity, can be used to assess whether the relative probability of use within the Project Area is higher, lower, or similar to adjacent areas.

RESULTS

According to the NLCD (Yang et al 2018, Multi-Resolution Land Characteristics 2019), the Project Area is composed of approximately 64% cultivated cropland, 21% grassland/herbaceous lands (including pasture/hay lands), and 10% wetland/open water (Table 1). The remaining 5% is mostly developed and woody lands (forests or scrub/shrub). Compared to the coarser NLCD data, results from finer scale desktop and field analyses (data provided by AECOM), indicate the Project Area is about 64% croplands/developed, 15% wetland/open water, 10% broken grasslands, 7% unbroken grasslands, and 4% forest/shrub land.

Table 1. Area (acres) and percent total cover (%) of 2016 National Land Cover Database (NLCD)[1] land use/land cover types in the Northern Divide Wind Energy Center Project Area in Burke County, North Dakota.

Land Use/Land Cover Types	Acres	Percent Cover (%)
Cultivated crops	7,021	64.4
Herbaceous/Grassland	2,079	19.1
Wetland/Open water	1,092	10.0
Developed	349	3.2
Hay/Pasture	191	1.7
Forest	155	1.4
Barren land	10	0.1
Shrub/Scrub	<1	<0.1
Total[2]	**10,897**	**100**

1. NLCD data used for comparisons. Finer scale analyses (data provided by AECOM) show acres/percentages of unbroken grass being 7% within the Project Area, a lower value than the NLCD herbaceous/grassland classification.

2. Values might not add up to totals due to rounding.

Sources: Yang et al. 2018, Multi-Resolution Land Characteristics 2019.

The Project Area is within the central 50% of the whooping crane sightings corridor (Figure 1). This entire corridor area includes a swath of the central U.S.; in North Dakota, it extends from southcentral North Dakota along the Missouri River to northwest North Dakota through Burke County. The width of the 50% corridor is approximately 50–60 miles. Based on Niemuth et al. (2018), the majority of the Project Area is within the highest potential use decile compared to acreages across the entire state of North Dakota, including areas outside of the 95% migration corridor width (Table 2, Figure 1).

Table 2. Potential whooping crane use, broken out by deciles, for the Northern Divide Wind Energy Center Project Area in Burke County, North Dakota, based on all acres in North Dakota.

Decile	Acres	Percent (%)
1	8,635	79.2
2	2,216	20.3
3	45	0.4
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
Total	**10,897**	**100**

Source: Niemuth et al. 2018.

Based on a finer scale analysis, the relative probability of use within the Project Area ranges from 0–0.5, with over 78% of the Project Area within the lower end (from 0–0.20) relative probability of use (Table 3, Figure 2). This is within the relative probability of use values obtained for the four

reference areas (Table 3, Figure 2). The relative probability of use within the East and South reference areas is lower and ranges from 0–0.3, with most (77%) of the South reference area within the 0–0.1 relative probability of use (Table 3). Relative probability of use within the North and West reference areas ranges from 0–0.7 and 0–0.6, respectively (Table 3), with most of these reference areas within the 0–0.3 probability of use.

No whooping cranes sightings have been reported within the Project Area based the USFWS whooping crane database (USFWS 2018, Figure 2). During avian use surveys conducted in 2017, one group of three whooping cranes was observed flying over the Project Area, but no use was observed on the ground (Atwell 2019; Attachment 1).

Table 3. Relative probability of use for whooping cranes within the Northern Divide Wind Energy Center Project Area in Burke County, North Dakota, and the North, East, South, and West reference areas[1].

Relative Probability Ranges	Project		North		East		South		West	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
0-0.1	4,649	42.7	901	8.3	4,376	40.2	8,387	77.0	531	4.9
0.1-0.2	3,861	35.4	4,531	41.6	5,927	54.4	2,184	20.0	5,116	47.0
0.2-0.3	1,730	15.9	4,750	43.6	594	5.4	325	3.0	3,812	35.0
0.3-0.4	526	4.8	589	5.4	0	0	0	0	1,198	11.0
0.4-0.5	131	1.2	92	0.8	0	0	0	0	139	1.3
0.5-0.6	0	0	26	0.2	0	0	0	0	100	0.9
0.6-0.7	0	0	8	0.1	0	0	0	0	0	0
0.7-0.8	0	0	0	0	0	0	0	0	0	0
0.8-0.9	0	0	0	0	0	0	0	0	0	0
0.9-1	0	0	0	0	0	0	0	0	0	0
Total[2]	**10,897**	**100**	**10,897**	**100**	**10,897**	**100**	**10,897**	**100**	**10,897**	**100**

1. Acres and percent (%) total area within each relative probability range are shown.

2. Sums may not total values shown due to rounding.

Source: Niemuth et al.2018.

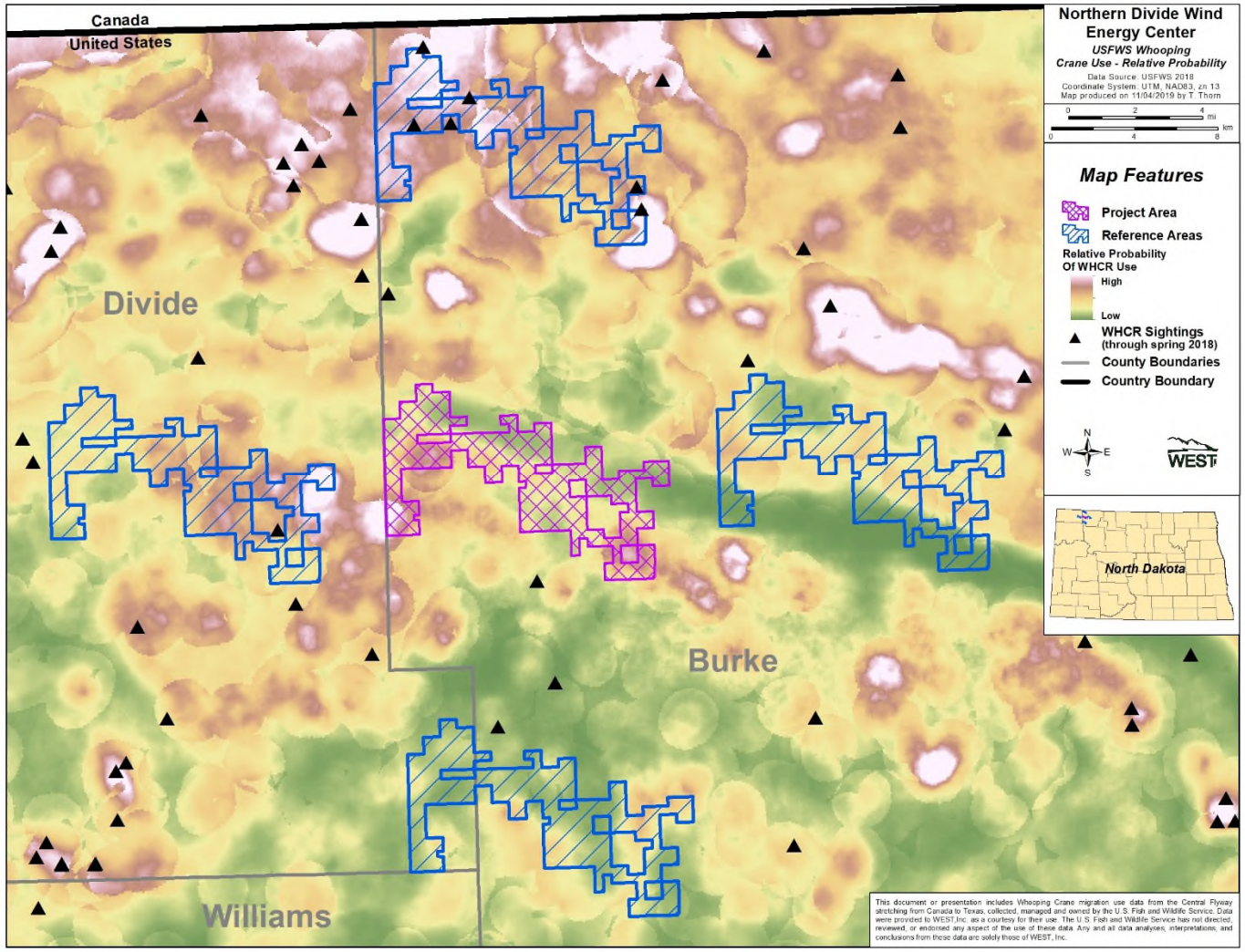


Figure 2. Whooping crane relative probability of use[1] for the Northern Divide Wind Energy Center Project Area in Burke County, North Dakota, and four reference areas (Source: Niemuth et al. 2018).

[1.] Relative probability of use ranges from 0–1 (low–high); probability of use within the Project Area ranges from 0–0.5 (Table 3).

DISCUSSION

The Endangered Species Act (32 Federal Register [FR] 48: 4001 1967) currently lists whooping cranes as endangered except where nonessential experimental populations exist (62 FR 139: 38932–38939 1997; 66 FR 123: 33903–33917 2001, and 58 FR 13: 5647–5658 1993). The 2018 – 2019 winter population of whooping cranes within the primary wintering grounds was estimated at 504 birds (412–660, 95.0% confidence interval); there were another estimated 12 whooping cranes thought to be outside of the primary wintering grounds when systematic surveys were conducted (USFWS 2019). Whooping cranes typically migrate from their breeding grounds in Wood Buffalo National Park, Canada to their wintering areas in Aransas National Wildlife Refuge, Texas; during the migration, most birds pass through central North Dakota (USFWS 2013).

Whooping cranes travel as singles, pairs, or in flocks, sometimes joining with sandhill cranes for a portion of the migration (Urbanek and Lewis 2015). From Texas to North Dakota, there are approximately 10,627 turbines in the whooping crane corridor with 1,389 turbines in the Dakotas (Figure 1; USGS et al. 2019). A review of whooping crane literature reveals no whooping or sandhill cranes (*Antigone canadensis*) have been reported as killed or injured by wind turbines in North or South Dakota, and no whooping crane at any project. One sandhill crane mortality was reported at the Altamont wind energy facility in California (Smallwood and Karas 2009); it is unclear if this was a result of turbine collision or collision with a power line. Two sandhill cranes did collide with turbines at two wind facilities in the Texas Panhandle during a study of wintering cranes in Texas (Navarrete and Griffis-Kyle 2011). No sandhill cranes or whooping cranes were found as fatalities at five wind facilities searched daily for crane mortalities during migration in North Dakota and South Dakota for up to three years (Derby et al. 2018). Data suggests that cranes are not overly susceptible to collision with turbines given that 400,000–600,000 sandhill cranes migrate twice annually through the Great Plains (Shoumatoff 2014) and none have been documented as wind turbine collision fatalities in this region during migration.

The Project Area is within the whooping crane migration corridor. In general, cropland and wetland areas within the migration corridor are depicted with a high decile rating following Niemuth et al. (2018), with local variations depending on the spatial configuration of suitable foraging and roosting habitats. The decile map separates all acres within North and South Dakota into predicted deciles of use, including areas outside of the whooping crane migration corridor. The decile ranking is useful when comparing sites across the State. For example, wildlife agencies might use deciles when making decisions on areas within a state to apply funds for whooping crane habitat conservation. While there has not been any documented use of the Project Area by whooping cranes feeding or roosting on the ground, one group of three individuals was observed flying over the Project Area in April of 2017. Given that the Project is within the migratory corridor, has higher deciles of predicted use, and contains areas of wetlands and croplands, use by the species is possible during spring or fall migration.

In analyzing the potential for significant impacts from wind development on whooping crane stopover habitat, Stehn (2007) suggests assessing whether there is “lots of suitable stopover

habitat in the general area … or is the proposed wind farm site the only suitable whooping crane stopover habitat for miles around?" This question can be informed through review of the relative probability of use. Results from the relative probability of use review indicate that there are areas within and outside the Project Area with elevated relative probability of use, but overall the Project Area has mostly areas of low (i.e., 0–0.2) relative probability of use, suggesting that suitable whooping crane habitats within the Project Area are not unique in the region.

The Project Area falls largely within the northwestern portion of an area previously proposed for a wind project in Burke County (Previous Project). A whooping crane habitat assessment for the Previous Project conducted by The Watershed Institute (2018), and subsequent addendum (Atwell 2018), found that potential suitable habitat for whooping cranes existed mostly within the central and eastern portions, while the northwestern portion, which largely corresponds to the Project Area, had limited potential habitat (Attachment 1).

In summary, the Project Area is within the whooping crane migratory corridor and whooping cranes have been observed flying over the Project Area, but none to date has been documented foraging or roosting on the ground. While migrating, whooping cranes generally fly at 1,000–6,000 ft above ground level, well above turbine height (Stehn 2007), and are unlikely to collide with turbines. As whooping cranes ascend and descend during takeoff and landing, or migrate during inclement weather, they may fly at lower altitudes, including those corresponding to the rotor swept area (generally below 657 ft). Given there is potential suitable roosting and foraging habitats (i.e., croplands and wetlands) within the Project Area and vicinity, and documented use in the region, whooping crane use on the ground during migration is possible. The relative probability of use indicates that the likelihood of use within the Project Area is low overall and within the range of values obtained for the four reference areas. Given low potential use of the Project Area in any given year, similarity in relative probability of use indicating unlikely differential use compared to adjacent areas, lack of whooping crane mortalities to date, and lack of documented sandhill crane mortality during migration, impacts to whooping cranes are unlikely.

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B4.F. Attachment 1. Studies Conducted for the Previous Project

List of Studies

A. Burke County Wind Energy Center – Desktop Whooping Crane Habitat Assessment Report Addendum (Atwell 2018)

B. Desktop Whooping Crane Habitat Assessment, Burke Wind, LLC, Burke and Mountrail County, North Dakota (The Watershed Institute 2018)

C. Pre-Construction Eagle and Avian Use Study, April 2017 through March 2018, for the Burke County Wind Project, Burke County, North Dakota (Atwell 2019)

B4.F. Attachment 1A. Burke County Wind Energy Center – Desktop Whooping Crane Habitat Assessment Report Addendum

Report Addendum

TO: Burke Wind, LLC

FROM: Atwell, LLC

DATE: November 27, 2018

RE: Burke County Wind Energy Center – Desktop Whooping Crane Habitat Assessment Addendum

Burke Wind, LLC (Burke Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, contracted The Watershed Institute, Inc. to conduct a desktop whooping crane habitat assessment for the proposed Burke County Wind Energy Center (Project). This addendum provides an update to the Desktop Whooping Crane Habitat Assessment[1] dated July, 2018 and submitted under Docket PU-18-344 on September 19, 2018. The Project was originally designed to produce up to 300 megawatts (MW) of renewable wind energy. Burke Wind has recently reduced the Project size from 300 MW to 200 MW. This has resulted in a smaller Project Area and the elimination of 38 wind turbine generators (WTGs) from the proposed Project. As revised, the Project will consist of the construction and operation of up to 68 General Electric (GE) 2.72 MW and eight (8) GE 1.715 MW WTGs (total of 76 WTGs). The GE 2.72-MW WTGs will have a 295-foot (90-meter) hub height and a 381-foot (116-meter) rotor diameter; and the GE 1.715-MW WTGs will have a 262-foot (80-meter) hub height and a 337-foot (103-meter) rotor diameter.

The reduced 200 MW Project Area remains located in Burke County, North Dakota, covers 23,933 acres, and is fully encompassed within the western half of the original 300 MW Project Area. As the reduced Project Area is encompassed within the area evaluated in the 300 MW Desktop Whooping Crane Habitat Assessment, the discussion and results of the report are reflective of the reduced Project Area. Therefore, information contained within the original report is still applicable.

The 300 MW Desktop Whooping Crane Habitat Assessment identified 277 potentially suitable wetland habitats areas for Whooping Crane stopover within the 300 MW Project Area. The reduced Project Area now contains only 40 potentially suitable wetland habitats, which has reduced the potentially suitable Whooping Crane wetland stopover habitat by 237 wetland areas.

[1] Watershed Institute, Inc., "Desktop Whooping Crane Habitat Assessment; Burke Wind, LLC, Burke and Mountrail County, North Dakota," July 2018.

B4.F. Attachment 1B. Desktop Whooping Crane Habitat Assessment, Burke Wind, LLC, Burke and Mountrail County, North Dakota

DESKTOP WHOOPING CRANE HABITAT ASSESSMENT
BURKE WIND, LLC
BURKE AND MOUNTRAIL COUNTY, NORTH DAKOTA



(*Grus americana*)

Prepared by:

WATERSHED INSTITUTE, INC.

1200 SW Executive Drive

Topeka, Kansas 66615

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APPENDIX B

Desktop Assessment Scores

July 2018

1.0 INTRODUCTION

Burke Wind, LLC (Burke Wind) tasked the Watershed Institute, Inc. (TWI) to complete a desktop habitat suitability assessment (desktop assessment) for the endangered whooping crane (*Grus americana*). The desktop assessment is for proposed windfarm and transmission line development (Project) in Burke and Mountrail Counties, North Dakota (Appendix A, Figure 1). Burke Wind conducted this study as part of a holistic natural resources review approach to assess potential adverse effects from development of this Project on species of concern and their habitats. Results from this study will be combined with results from other natural resource studies and will aid in responsibly siting wind turbines, access roads, underground electric collection lines, an electric substation, overhead high-voltage transmission line, and other proposed infrastructure.

For the desktop assessment, TWI examined 2016 aerial photographs and reviewed wetland habitats, elevation data, North Dakota infrastructure data (i.e. highways, roads, powerlines) and landuse data. Burke Wind provided TWI delineated wetland habitats, elevation data, and land use data in electronic format for use with ArcGIS Desktop software (ESRI 1999-2017). TWI also solicited known location records of whooping cranes and the whooping crane migratory corridor from U.S. Fish and Wildlife Service (USFWS). This report provides Project background information, outlines TWI's habitat assessment methodology (TWI 2013), and presents desktop assessment findings. Report figures are provided in Appendix A and the desktop assessment scoring summary in Appendix B.

2.0 SITE DESCRIPTION

The Project is in Burke and Mountrail Counties, North Dakota, and includes a proposed 72.7-square mile windfarm development area and a 195.0-square mile transmission line development area (Appendix A, Figure 1). The Project is found in the USFWS-defined 75-percent whooping crane migratory sighting corridor (Appendix A, Figure 2). The 75-percentile whooping crane migratory sighting corridor refers to the area encompassing 75-percent of confirmed sightings.

The Project encompasses portions of the Northern Dark Brown Prairie, Northern Missouri Coteau, Missouri Coteau Slope, and River Breaks ecoregions (Appendix A, Figure 3). The Northern Dark

Brown Prairie is part of the northern glaciated plains that is generally flat with some undulating topography (Bryce et al. 1996). This ecoregion contains high concentrations of temporary and seasonal wetlands. The Northern Missouri Coteau is part of the northwestern glaciated plains with a hummocky, rolling terrain (Bryce et al. 1996). There are numerous prairie pothole wetlands in this ecoregion. The Missouri Coteau Slope ecoregion is also in the northwestern glaciated plains and is a gently rolling plain sloping to the Missouri River (Bryce et al. 1996). The River Breaks is unglaciated and part of the northwestern great plains (Bryce et al. 1996). This ecoregion is highly dissected and borders major rivers and associated alluvial plains (Bryce et al. 1996). Overall, the Missouri Coteau Slope and River Breaks have fewer wetlands than the Northern Dark Brown Prairie and Northern Missouri Coteau.

Using landcover data from the 2011 GAP Analysis Program (GAP), cultivated land is the most common Project landuse covering 41.2-percent. Other significant Project landuses are shrublands at 22.6-percent, mixed-grass prairies at 20.6-percent, and wetlands/open water at 4.4-percent. A landuse map is shown in Appendix A, Figure 4.

3.0 HABITAT ASSESSMENT METHODOLOGY

Habitat assessment methods followed protocols recommended by the USFWS Aransas National Wildlife Refuge Complex (Tom Stehn *pers. comm.*), Manhattan, Kansas USFWS Ecological Services Office (Dan Mulhern *pers. comm.*), Region 6 Guidelines for Minimizing Effects from Power Line Projects within the Whooping Crane Mitigation Corridor (USFWS 2010), and habitat evaluation scientific literature. TWI's goal is to provide a reproducible methodology that provides clients with the appropriate information to make decisions that provide ecological value and protection. First, TWI developed an unsuitability screening process to eliminate wetlands that did not meet criteria based on wetland size, visual obstruction, and disturbance obstructions. After the unsuitability screening, TWI assessed remaining wetlands to determine habitat suitability based on water regime, distance to food, wetland size, wetland type (natural or created), and wetland density.

3.1 Unsuitability Habitat Screening

TWI assessed wetland habitats for potentially suitable habitat. TWI's approach was to screen the wetland habitats based on unsuitable habitat conditions (Tom Stehn *pers. comm.*).

First, TWI screened wetland habitats that were near human disturbances (i.e. highways, roads, railroads, and residential/commercial properties etc.). TWI generated buffers using distances in TWI's (2013) habitat assessment guideline around digital highway data (North Dakota Department of Transportation [NDDOT] 2017a), digital county road data (NDDOT 2017b), digital railroad data (Applied Data Consultants 2017), incorporated areas (NDDOT 2017c), digital transmission line data, and residential and commercial properties. TWI then clipped the buffered information to the Project extent and spatially analyzed the wetland habitats and human disturbance buffers. TWI selected wetland habitats located completely within the human disturbance buffers and removed the wetland habitats from the desktop assessment.

Next, TWI selected and eliminated wetland habitats equal to or less than 0.25 acres. These wetland features are deemed too small to designate as potentially suitable habitat (Tom Stehn *pers. comm.*).

For remaining wetland features, TWI visually inspected each wetland feature using the 2016 aerial photographs for tall, visual obstructions. If tall, visual obstructions were within 100 meters of a wetland habitat, TWI did not consider the wetland habitat as potentially suitable habitat.

Finally, TWI visually inspected all remaining wetland habitats using elevation data. TWI calculated a percent slope raster map and created a 1-meter topographic surface to inspect wetland habitat side-slopes. Visibility obstructions can be any feature, including topography, greater than 1.4 meters, the height at crane eye level (Armbruster 1990). TWI eliminated wetland habitats from the habitat quality assessment if side slopes, within 100-meters, were greater than 1.5-percent, a visibility obstruction for a whooping crane's open line of sight.

3.2 Habitat Suitability Assessment

TWI assessed remaining wetland habitats to rate habitat quality by assigning values to habitat criteria deemed important to migrating whooping cranes.

The first criterion was water regime. Since water is the primary attractant to whooping cranes, TWI scored wetlands with more permanent water higher as they would be a more consistent and likely stopover habitats from year to year (Table 1).

Table 1: Water Regime Habitat Score

Water Regime*	Score
Permanent (H)	5
Intermittently Exposed (G)	4
Semi-Permanent (F)	3
Seasonally Flooded (C)	2
Intermittent/Temporarily Flooded (J/A)	1

* Nontidal Water Regime from Cowardin et al. 1979

Distance to food was the second criterion. The literature states preferred roosting habitat is near food. The longest distance TWI found that a whooping crane would likely fly to food is 1.5 kilometers (Armbruster 1990). Table 2 shows the habitat scores based on distance from roosting sites and food.

Table 2: Distance to Food Habitat Score

Distance to Food	Score
Within or Adjacent to Cropfield	5
< 0.5 km	4
0.6-1.0 km	3
1.1-1.5 km	2
> 1.5 km	1

Wetland size was the third criterion. Whooping crane sighting records show them using a variety of wetland sizes from visual observations and radio collar data. The literature suggests that cranes will use small wetlands, but larger wetlands are preferable. Table 3 shows the habitat scores based on wetland size.

Table 3: Wetland Size Habitat Score

Wetland Size	Score
> 7 acres	5
5-6.9 acres	4
3-4.9 acres	3
1-2.9 acres	2

< 1 acre	1

TWI then scored the wetlands based on whether they are natural or created. Natural wetlands received a higher score as they are assumed to have shallower water. Whooping cranes prefer wetlands that are shallow. Studies have stated that cranes prefer water depths less than 30 centimeters (Armbruster 1990, Faanes et al. 1992). Table 4 shows the scoring.

Table 4: Natural Wetland Habitat Score

Wetland Type	Score
Natural	2
Created	0

The last criterion TWI evaluated was wetland density. Literature suggests whooping cranes prefer areas that have a wetland mosaic. TWI considered a wetland mosaic to be 5 or more wetlands within a one-quarter section and no visual obstructions between the wetlands habitats. Table 5 shows the scoring.

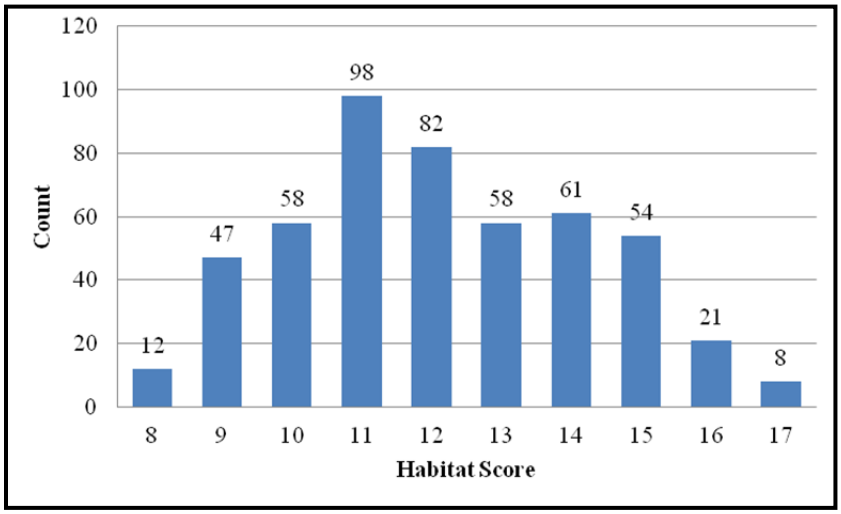
Table 5: Wetland Density Habitat Score

Wetland Mosaic	Score
Yes	3
No	0

After TWI scored the criteria, TWI added the scores to develop an overall habitat quality score. To determine a habitat quality score that constitutes potentially suitable habitat, TWI determined the habitat quality of national wetland inventory (NWI) wetlands at Quivira National Wildlife Refuge (NWR). Quivira NWR is a traditional migratory stopover location and is considered critical habitat for migrating whooping cranes. TWI analyzed the habitat quality as described in TWI's (2013) methodology for Quivira NWR wetlands. After completing the unsuitability habitat screening process, TWI evaluated 499 Quivira NWR NWI wetland habitats. Wetland habitat scores ranged from 8 to 17 with an average score of 12.1 (Figure 5). Using the Quivira NWR average habitat score as a benchmark, TWI considers a habitat score of 12 or higher as

potential suitable habitat when assessing whooping crane wetland habitats within the USFWS migratory sighting corridor.

Figure 5: *Distribution of Habitat Scores from Quivira NWR*



4.0 HABITAT ASSESSMENT FINDINGS

TWI identified a total of 10,673 wetland habitats in or intersecting the Project (Appendix A, Figure 6). The dominant wetland habitat type was palustrine emergent (PEM) wetlands. Other wetlands habitat types TWI found were lacustrine (L), palustrine aquatic bed (PAB), and riverine (R).

Using the unsuitability habitat screening process, TWI eliminated 9,768 wetland habitats. Of the 9,768 wetland habitats, 4,923 wetland habitats were completely within disturbance area buffers, 1,551 wetland habitats were less than 0.25 acres, and 3,294 wetland habitats were within 100-meters of visibility obstructions or adjacent to steep side-slopes. TWI evaluated the remaining 905 wetland habitats for habitat suitability (Appendix A, Figure 7). Appendix B lists the wetland habitat and their habitat suitability score. TWI scored 277 wetland habitats a 12 or higher, considered potentially suitable habitat (Appendix A, Figure 8). For the riverine channels, TWI did not consider as potential suitable habitat as they did not meet the 100-meter width defined by Faanes et al. (1992).

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APPENDIX A

FIGURES

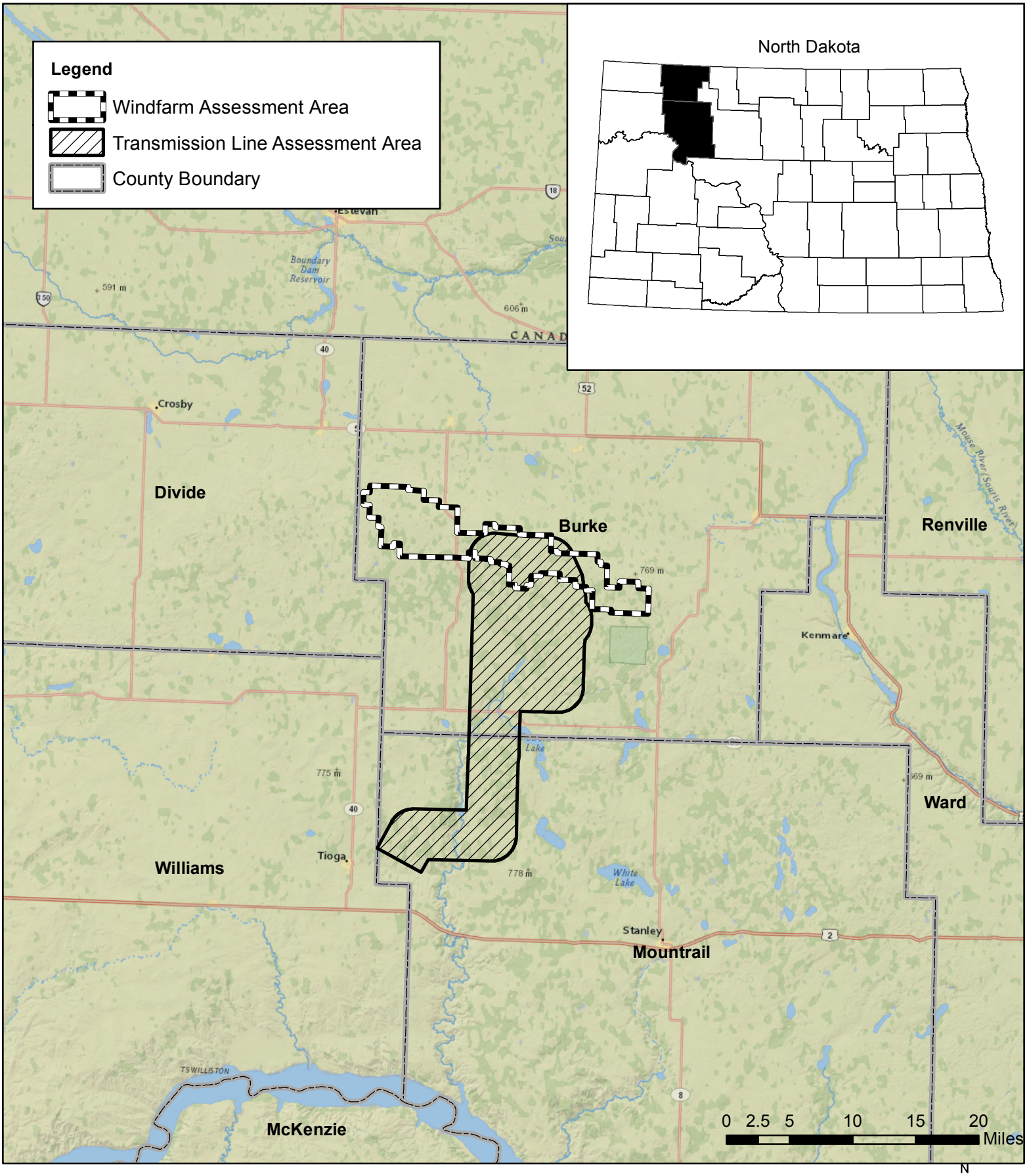
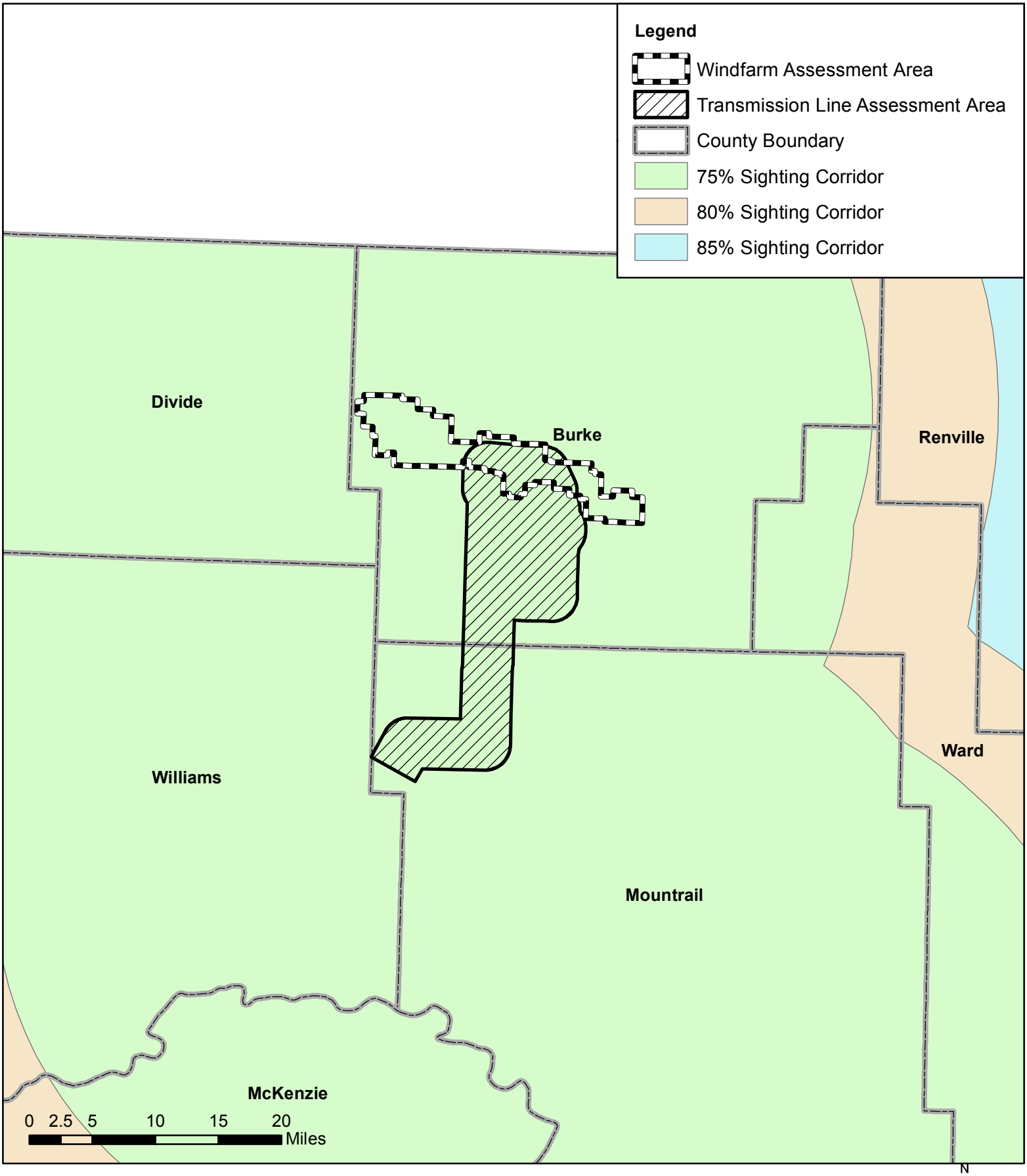


Figure 1
Location Map

Desktop Whooping Crane Habitat Assessment
Burke Wind, LLC Windfarm

Date: July 2018

Source: http://services.arcgisonline.com/arcgis/services, https://gishubdata.nd.gov/

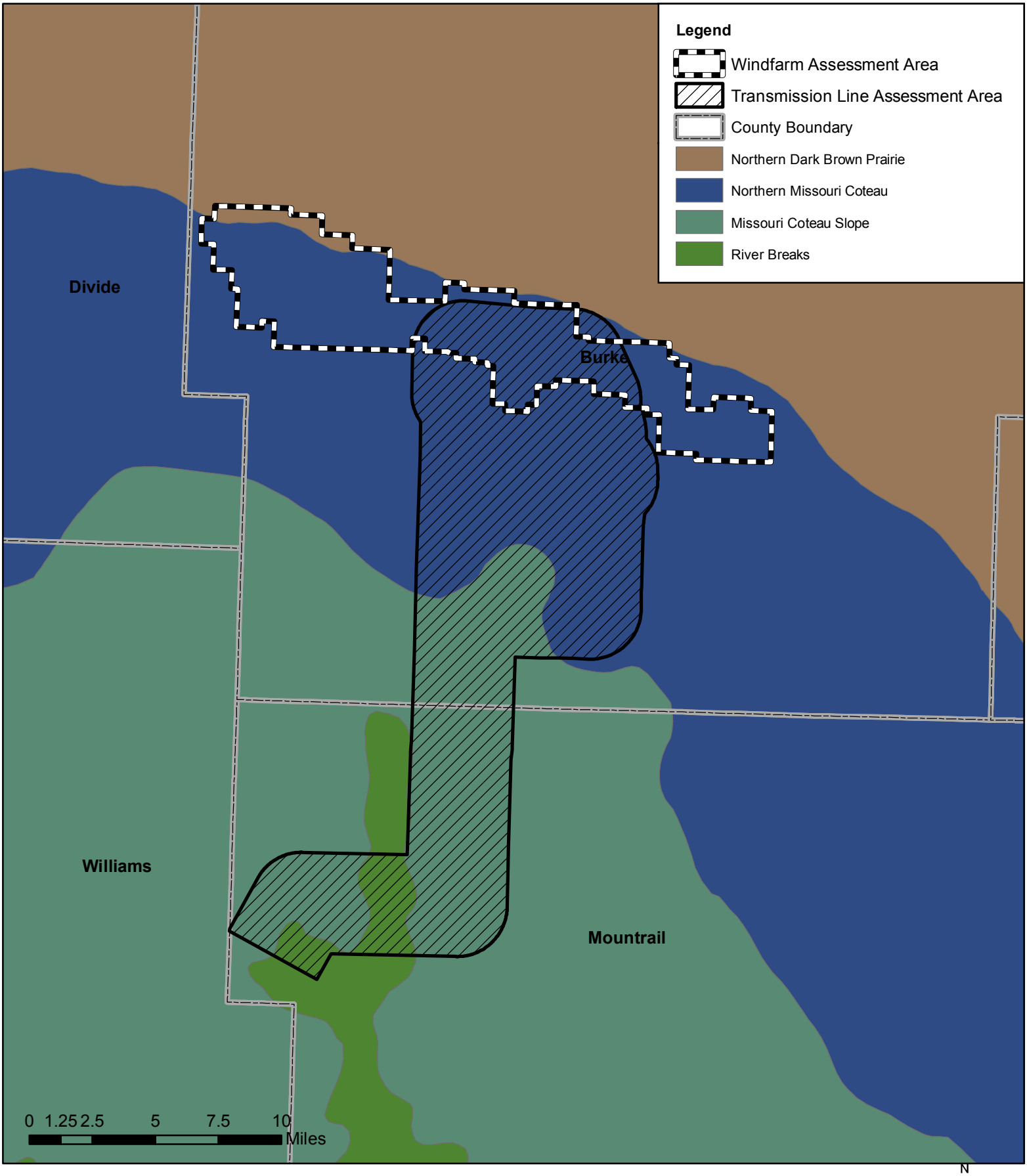


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Figure 2
U.S. Migratory Sighting Corridor Map
Desktop Whooping Crane Habitat Assessment
North Dakota

Date: July 2018

Source: https://gishubdata.nd.gov/, U.S. Fish and Wildlife Service

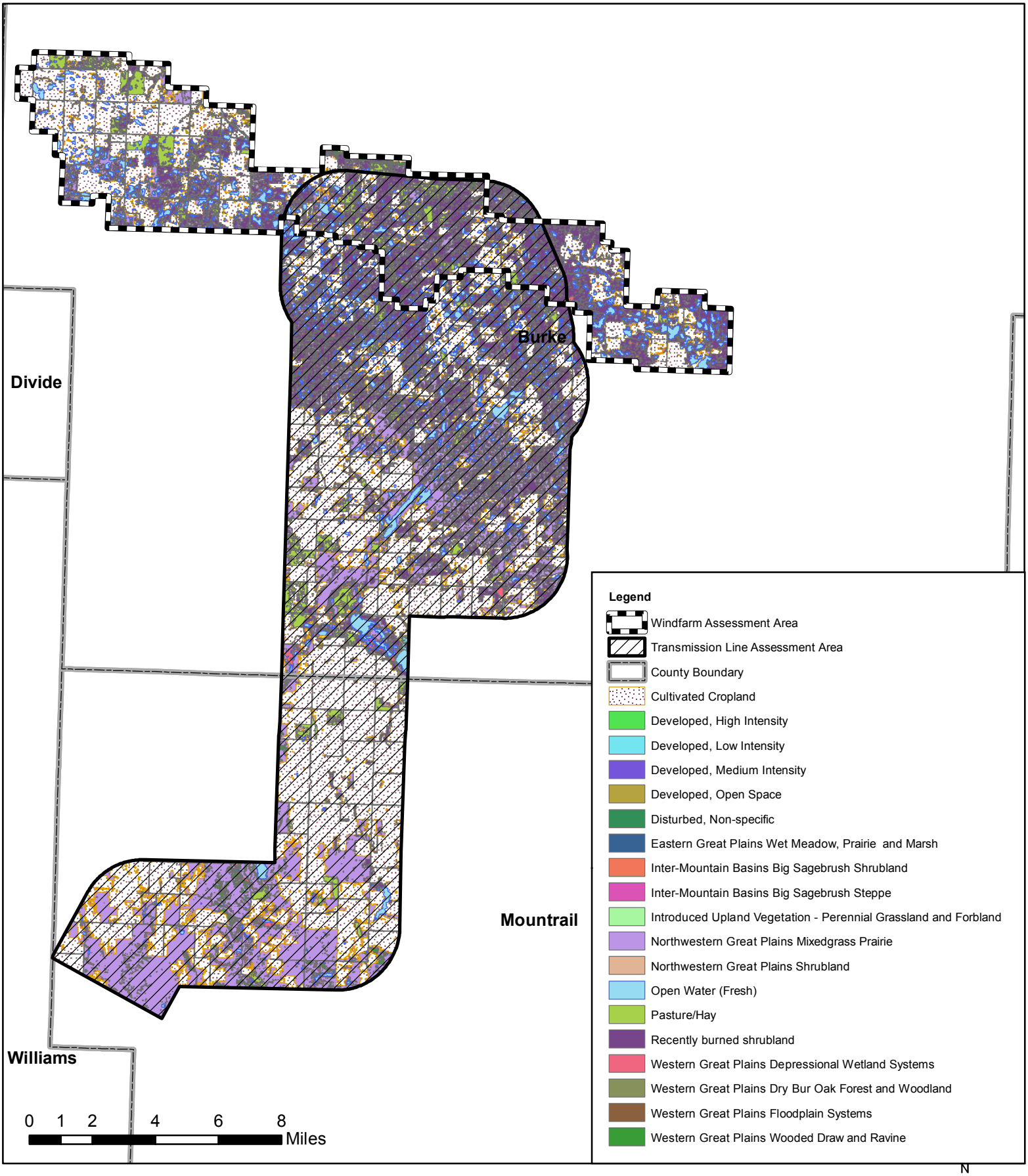


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Figure 3
Ecoregions Map
Desktop Whooping Crane Habitat Assessment
North Dakota

Date: July 2018

Source: https://gishubdata.nd.gov/, ftp://ftp.epa.gov/wed/ecoregions/nd/nd_eco_l4.zip



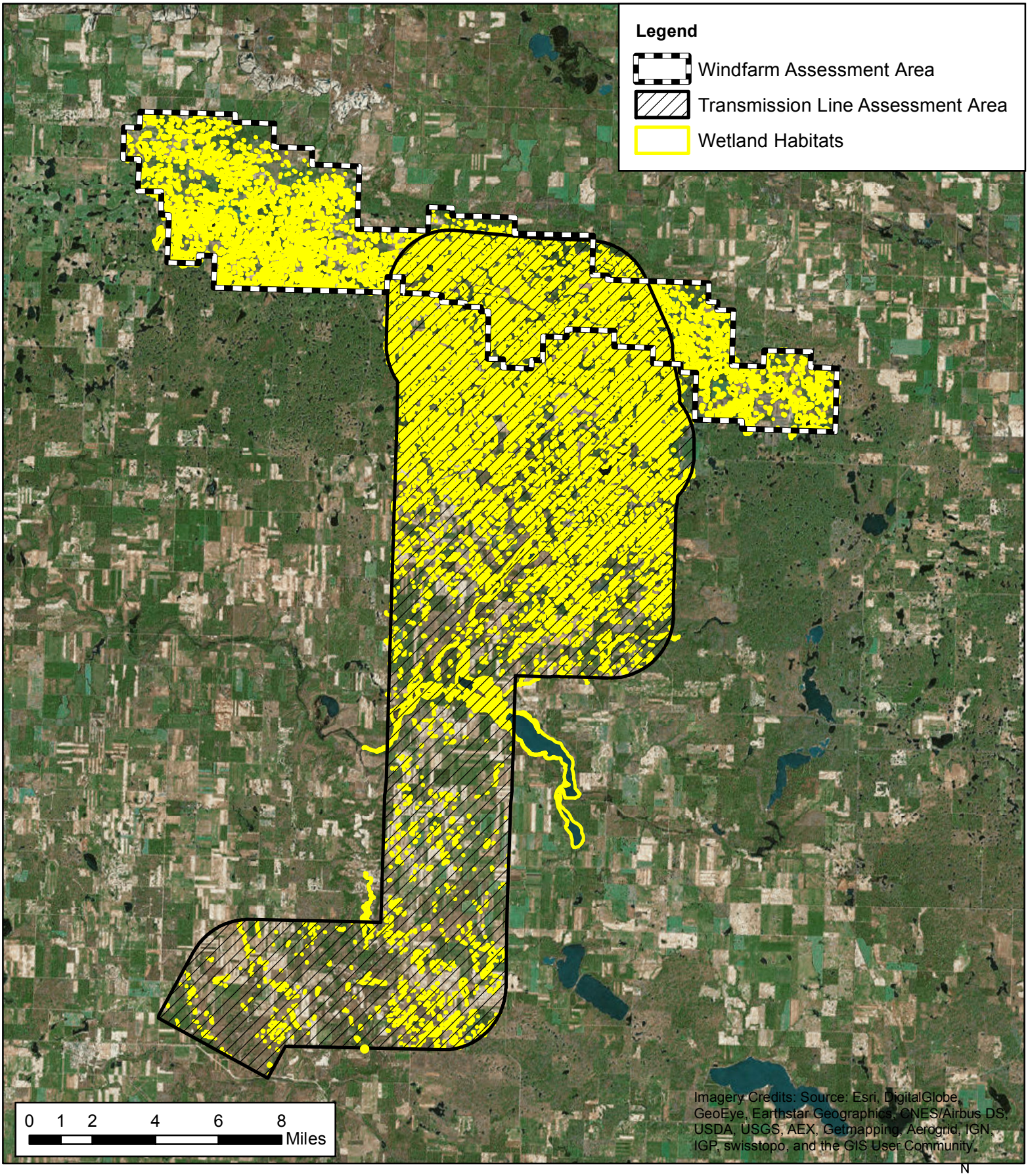
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Figure 4
Landuse Map
Desktop Whooping Crane Habitat Assessment
North Dakota

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Date: July 2018

Source: https://gishubdata.nd.gov/

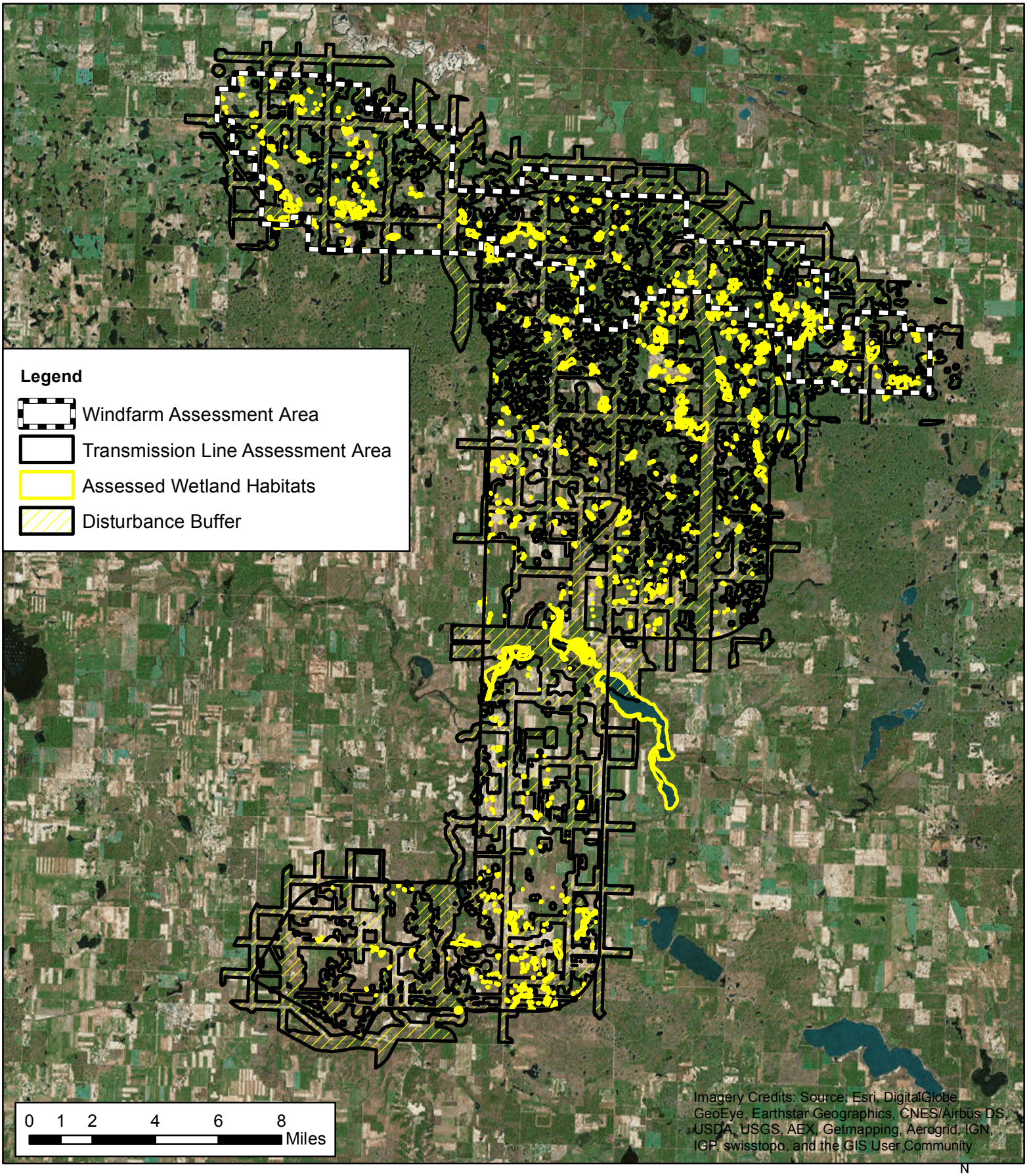


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Figure 6
Identified Wetland Habitats Map

Desktop Whooping Crane Habitat Assessment
North Dakota

Date: July 2018

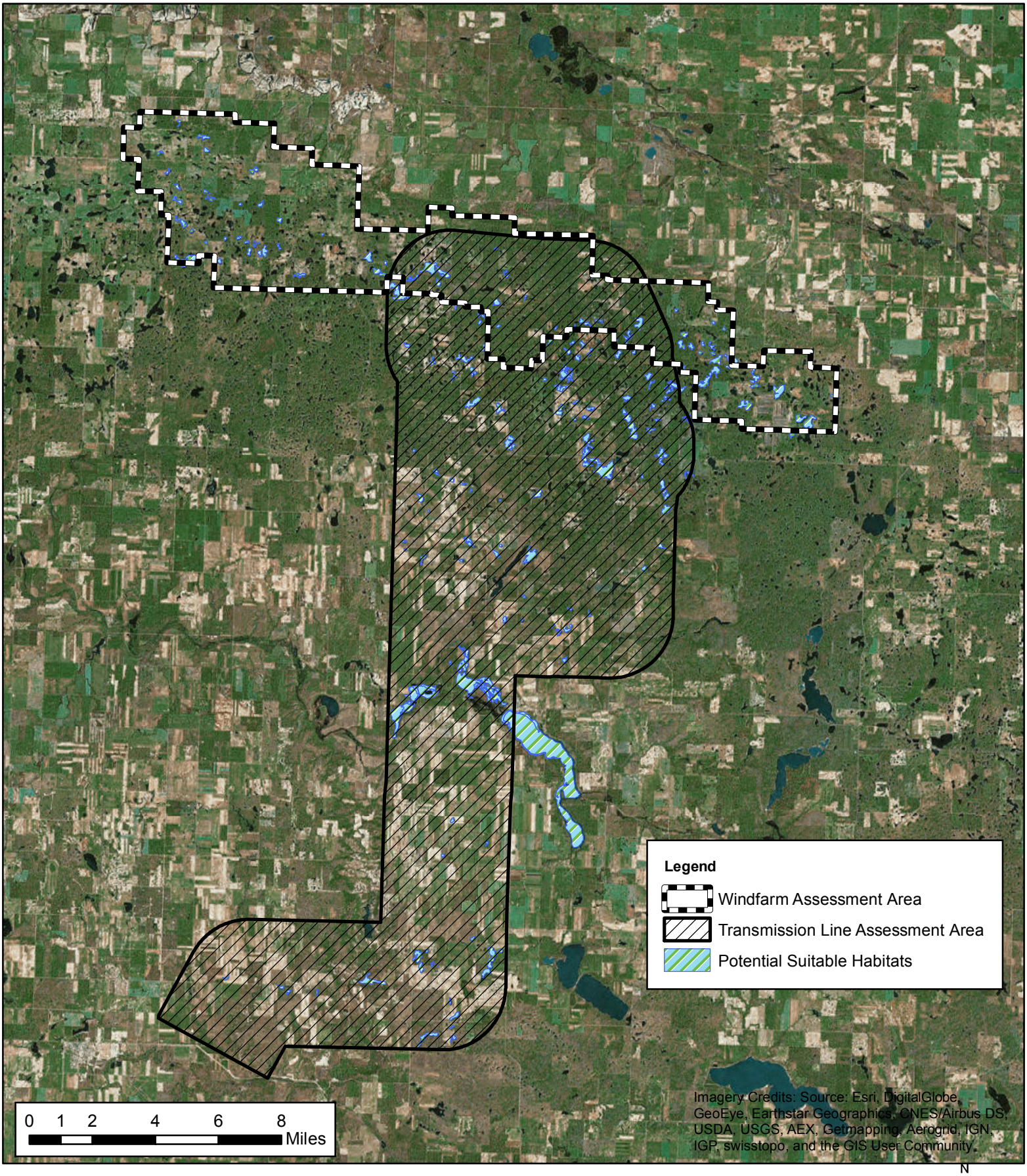


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Figure 7
Assessed Wetland Habitats Map

Desktop Whooping Crane Habitat Assessment
Burke Wind, LLC Transmission Line

Date: July 2018



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Figure 8
Potential Suitable Habitats Map

Desktop Whooping Crane Habitat Assessment
North Dakota

Date: July 2018

APPENDIX B

HABITAT SUITABILITY ASSESSMENT SCORES

Habitat Suitablility Assessment Scores

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
1	L1UBGh	1401.15	4	4	5	0	0	13
2	L2UBGh	106.36	4	5	5	0	0	14
3	PEM1A	6.84	1	4	4	2	0	11
4	PEM1A	0.67	1	5	1	2	0	9
5	PEM1A	4.37	1	5	3	2	0	11
6	PEM1A	1.62	1	4	2	2	0	9
7	PEM1C	1.28	2	4	2	2	0	10
8	PEM1C	0.77	2	5	1	2	0	10
9	PEM1C	1.87	2	5	2	2	0	11
10	PEM1C	1.02	2	4	2	2	0	10
11	PEM1C	0.31	2	5	1	2	0	10
12	PEM1C	0.66	2	5	1	2	0	10
13	PEM1C	0.52	2	5	1	2	0	10
14	PEM1C	0.97	2	4	1	2	0	9
15	PEM1Cd	0.29	2	5	1	0	0	8
16	PEM1Ch	0.30	2	4	1	0	0	7
17	PEM1C	2.20	2	5	2	2	0	11
23	PEM1Cd	17.42	2	5	5	0	0	12
26	PEMA	0.34	1	5	1	2	0	9
27	PEMC	0.66	2	5	1	2	0	10
28	PEMC	5.86	2	5	4	2	0	13
29	PEMC	3.25	2	4	3	2	0	11
30	PEMC	1.12	2	4	2	2	0	10
31	PEMC	3.76	2	5	3	2	0	12
32	PEMC	0.72	2	5	1	2	0	10
35	PEMC	0.28	2	4	1	2	0	9
36	PEMC	1.51	2	5	2	2	0	11
37	PEMC	2.19	2	5	2	2	3	14
38	L2ABG	81.28	4	5	5	2	0	16
39	PEMC	2.97	2	4	2	2	0	10
40	PEMA	0.56	1	5	1	2	0	9
41	PEMC	0.30	2	4	1	2	0	9
42	PEMC	10.71	2	4	5	2	0	13
43	PEMC	0.27	2	4	1	2	3	12
44	PEMC	1.04	2	5	2	2	0	11
45	PEMC	0.37	2	5	1	2	0	10
46	PEMC	0.86	2	5	1	2	0	10
47	PEMC	1.32	2	5	2	2	0	11
48	PEMC	5.54	2	4	4	2	0	12
49	PEMCd	1.12	2	5	2	0	0	9
50	PEMC	2.13	2	5	2	2	0	11
51	PEMA	0.42	1	5	1	2	0	9
52	PEMC	0.90	2	5	1	2	0	10

Habitat Suitablility Assessment Scores

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
53	L2ABG	106.30	4	5	5	2	0	16
54	PEMAd	1.35	1	5	2	0	0	8
55	PEMC	1.08	2	4	2	2	0	10
56	PEMC	3.68	2	5	3	2	0	12
57	PEMCd	2.11	2	5	2	0	0	9
59	PEMC	4.68	2	5	3	2	0	12
60	PEMC	0.33	2	4	1	2	0	9
61	PEMC	0.39	2	5	1	2	0	10
62	PEMC	0.45	2	5	1	2	0	10
63	PEMCd	3.44	2	5	3	0	0	10
64	PEMC	2.36	2	4	2	2	0	10
66	PEMC	0.36	2	4	1	2	0	9
67	PEMC	9.65	2	4	5	2	0	13
68	PEMC	0.34	2	4	1	2	0	9
69	PEMC	15.48	2	5	5	2	0	14
70	PEMC	4.68	2	4	3	2	3	14
71	PEMC	0.35	2	5	1	2	0	10
72	PEMC	8.64	2	5	5	2	0	14
73	PEMC	0.80	2	4	1	2	3	12
74	PEMC	0.89	2	5	1	2	3	13
75	PEMA	0.27	1	3	1	2	0	7
76	PEMF	4.87	3	4	3	2	0	12
77	PEMC	2.18	2	4	2	2	0	10
78	PEMC	9.90	2	5	5	2	0	14
79	PEMF	2.66	3	4	2	2	3	14
80	PEMC	2.65	2	4	2	2	0	10
81	PEMC	0.38	2	4	1	2	0	9
82	PEMC	0.77	2	4	1	2	0	9
83	PEMFd	2.01	3	5	2	0	0	10
84	PEMC	0.48	2	4	1	2	3	12
85	PEMCd	5.72	2	5	4	0	0	11
86	PEMCd	0.70	2	5	1	0	3	11
87	PEMC	1.97	2	4	2	2	0	10
88	PEMC	0.32	2	4	1	2	0	9
90	PEMF	3.35	3	5	3	2	0	13
91	PEMC	0.47	2	5	1	2	0	10
92	PEMC	7.61	2	5	5	2	0	14
93	PEMF	2.72	3	5	2	2	0	12
95	PEMC	0.94	2	5	1	2	0	10
96	PEMC	0.36	2	5	1	2	0	10
97	L2ABG	52.09	4	5	5	2	0	16
100	PEMC	0.53	2	4	1	2	3	12
101	PEMC	0.29	2	4	1	2	3	12

Habitat Suitablility Assessment Scores

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
102	PEMA	1.40	1	5	2	2	0	10
105	PEMC	20.85	2	4	5	2	0	13
107	PEMC	0.43	2	4	1	2	3	12
109	PABF	21.09	3	5	5	2	3	18
110	PABF	16.57	3	5	5	2	3	18
111	PEMC	6.65	2	4	4	2	3	15
112	PEMC	1.31	2	5	2	2	0	11
113	PEMCd	12.39	2	4	5	0	0	11
114	PABF	23.42	3	5	5	2	0	15
115	PEMC	3.74	2	4	3	2	0	11
117	PEMC	0.41	2	4	1	2	0	9
118	PEMC	1.75	2	4	2	2	3	13
119	PEMC	2.04	2	4	2	2	0	10
120	PEMC	5.21	2	4	4	2	3	15
121	PEMC	0.40	2	4	1	2	0	9
123	PABF	45.51	3	4	5	2	0	14
124	PEMC	0.83	2	4	1	2	0	9
126	PEMC	0.44	2	4	1	2	0	9
128	PEMC	0.72	2	4	1	2	0	9
129	PEMC	7.48	2	3	5	2	0	12
131	PEMC	0.63	2	5	1	2	0	10
132	PEMC	0.33	2	4	1	2	0	9
134	PEMC	1.60	2	4	2	2	3	13
136	PEMC	1.35	2	4	2	2	0	10
137	PEMC	2.97	2	5	2	2	0	11
138	L2ABG	48.08	4	4	5	2	0	15
140	PEMC	1.00	2	4	2	2	3	13
143	PEMC	6.80	2	5	4	2	0	13
144	PEMC	2.90	2	4	2	2	0	10
145	L2ABG	30.65	4	4	5	2	0	15
147	PEMC	1.29	2	5	2	2	0	11
148	PEMC	2.54	2	3	2	2	0	9
149	PEMC	3.04	2	3	3	2	0	10
152	PEMC	5.14	2	5	4	2	0	13
154	PEMA	6.51	1	4	4	2	0	11
156	PEMCd	29.90	2	5	5	0	0	12
157	PEMC	0.65	2	4	1	2	3	12
158	PABF	21.77	3	5	5	2	0	15
161	PEMC	0.66	2	5	1	2	0	10
162	PABF	12.88	3	5	5	2	3	18
165	PEMC	0.89	2	4	1	2	0	9
167	PEMC	1.49	2	4	2	2	3	13
169	PABF	11.07	3	5	5	2	0	15

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
171	PEMA	0.28	1	5	1	2	0	9
175	L2ABG	57.18	4	5	5	2	0	16
178	PEMC	0.40	2	4	1	2	3	12
183	PEMC	10.87	2	5	5	2	0	14
184	PEMC	0.37	2	5	1	2	0	10
185	PEMC	1.00	2	4	1	2	3	12
190	PEMC	0.75	2	4	1	2	0	9
192	PEMCd	0.98	2	5	1	0	0	8
197	PEMC	0.69	2	5	1	2	0	10
198	PEMC	0.91	2	4	1	2	0	9
200	PEMC	1.12	2	4	2	2	0	10
201	PEMC	1.48	2	5	2	2	0	11
202	PEMC	1.75	2	5	2	2	0	11
203	PEMC	4.75	2	5	3	2	0	12
204	PEMC	0.87	2	4	1	2	0	9
205	PEMC	0.83	2	4	1	2	0	9
206	PEMC	9.52	2	5	5	2	0	14
207	PEMCd	0.32	2	5	1	0	3	11
208	PEMC	1.30	2	4	2	2	0	10
209	PEMAd	46.05	1	5	5	0	0	11
210	PEMF	1.44	3	4	2	2	3	14
211	PEMC	2.32	2	4	2	2	0	10
212	PEMCd	0.85	2	5	1	0	0	8
213	PEMC	3.27	2	5	3	2	0	12
214	PEMC	3.35	2	4	3	2	0	11
215	PEMC	1.51	2	5	2	2	0	11
217	PEMC	7.72	2	5	5	2	0	14
218	PEMC	3.85	2	4	3	2	0	11
219	PEMAd	2.30	1	5	2	0	0	8
220	PEMC	23.21	2	4	5	2	0	13
221	PEMAd	0.65	1	5	1	0	0	7
222	PEMC	1.88	2	5	2	2	0	11
224	PEMC	0.63	2	4	1	2	0	9
225	PEMC	13.49	2	4	5	2	0	13
226	PEMC	0.58	2	5	1	2	3	13
227	PEMC	1.24	2	4	2	2	0	10
228	PEMA	0.46	1	5	1	2	0	9
229	PEMA	0.28	1	5	1	2	0	9
230	PEMCd	0.89	2	5	1	0	3	11
231	PEMA	8.77	1	5	5	2	0	13
232	PEMA	0.26	1	5	1	2	0	9
233	PEMF	4.40	3	4	3	2	0	12
234	PEMC	2.67	2	5	2	2	0	11

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
235	PEMCd	3.81	2	5	3	0	0	10
236	PEMC	7.72	2	5	5	2	3	17
237	PEMA	0.44	1	5	1	2	0	9
238	PEMC	10.08	2	5	5	2	0	14
239	PABF	7.35	3	5	5	2	0	15
240	PEMC	0.84	2	4	1	2	0	9
242	PEMC	2.06	2	5	2	2	0	11
243	PEMC	0.60	2	4	1	2	0	9
244	PEMC	7.18	2	4	5	2	3	16
245	PEMC	0.31	2	3	1	2	0	8
246	PEMC	2.42	2	5	2	2	0	11
247	PEMC	0.32	2	5	1	2	0	10
248	PEMC	0.40	2	5	1	2	0	10
249	PEMC	0.51	2	5	1	2	0	10
250	PEMC	0.85	2	4	1	2	0	9
251	PABF	10.90	3	5	5	2	0	15
252	PEMC	0.40	2	4	1	2	0	9
253	PEMC	0.39	2	4	1	2	3	12
254	PEMC	1.97	2	4	2	2	0	10
255	PEMA	0.69	1	5	1	2	0	9
256	PEMAd	0.68	1	5	1	0	0	7
258	PEMCd	0.50	2	4	1	0	0	7
259	PEMC	4.25	2	5	3	2	0	12
260	PEMFd	4.78	3	5	3	0	0	11
261	PEMF	1.26	3	4	2	2	0	11
262	PEMC	1.42	2	5	2	2	0	11
263	PEMC	4.23	2	4	3	2	0	11
264	PEMC	1.99	2	5	2	2	0	11
265	PEMC	80.36	2	5	5	2	3	17
266	PEMC	0.35	2	4	1	2	0	9
267	PEMC	0.34	2	4	1	2	0	9
268	PEMC	16.33	2	4	5	2	0	13
269	PABF	11.26	3	5	5	2	0	15
270	PEMCd	8.26	2	5	5	0	0	12
271	PEMC	0.32	2	4	1	2	0	9
272	PEMAd	0.72	1	5	1	0	0	7
273	PEMC	0.40	2	5	1	2	0	10
274	PEMCd	7.34	2	5	5	0	0	12
275	PEMC	0.65	2	5	1	2	0	10
276	PEMC	6.73	2	5	4	2	0	13
278	PEMC	0.29	2	4	1	2	0	9
280	PEMCd	0.55	2	5	1	0	0	8
281	PEMA	0.38	1	5	1	2	0	9

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
282	PEMC	9.83	2	5	5	2	0	14
283	PEMAd	0.65	1	5	1	0	0	7
284	PEMAd	0.82	1	5	1	0	0	7
286	PEMC	0.75	2	4	1	2	0	9
287	PEMC	1.76	2	5	2	2	0	11
288	PEMC	0.56	2	5	1	2	0	10
289	PEMC	1.10	2	4	2	2	0	10
290	PEMC	0.38	2	4	1	2	0	9
291	PEMC	4.44	2	5	3	2	0	12
292	PEMA	0.26	1	5	1	2	0	9
293	PEMC	0.58	2	4	1	2	0	9
294	PEMC	0.56	2	5	1	2	0	10
295	PEMC	1.16	2	4	2	2	3	13
296	PEMF	5.78	3	4	4	2	0	13
297	PEMF	10.60	3	4	5	2	0	14
298	PEMCd	0.77	2	5	1	0	0	8
299	PEMC	0.45	2	4	1	2	0	9
300	PABF	10.02	3	4	5	2	0	14
301	PEMA	2.99	1	4	2	2	0	9
302	PEMC	0.36	2	4	1	2	0	9
303	PEMC	0.27	2	4	1	2	0	9
304	PEMC	0.83	2	4	1	2	0	9
305	PEMF	0.79	3	4	1	2	0	10
306	PEMC	1.27	2	5	2	2	0	11
307	PEMC	5.22	2	4	4	2	0	12
308	PEMC	1.43	2	5	2	2	0	11
309	PEMC	0.34	2	5	1	2	0	10
310	L2ABG	28.43	4	4	5	2	0	15
312	PEMAd	0.28	1	5	1	0	0	7
313	PEMC	14.45	2	5	5	2	0	14
314	PEMC	0.57	2	4	1	2	3	12
316	PEMC	1.14	2	4	2	2	3	13
317	PEMC	2.38	2	4	2	2	0	10
318	PEMC	0.32	2	4	1	2	0	9
319	PEMC	6.16	2	5	4	2	0	13
321	PEMC	0.32	2	4	1	2	3	12
322	PEMC	0.31	2	4	1	2	0	9
323	PEMA	0.47	1	4	1	2	0	8
324	PEMC	0.72	2	5	1	2	0	10
325	PEMC	0.53	2	4	1	2	0	9
326	PEMC	0.89	2	4	1	2	0	9
327	PEMC	0.69	2	4	1	2	0	9
328	PEMC	0.53	2	5	1	2	0	10

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
329	PEMC	1.22	2	4	2	2	0	10
330	PEMAd	0.26	1	5	1	0	0	7
331	PEMC	0.50	2	5	1	2	0	10
332	PEMC	3.61	2	5	3	2	0	12
333	PEMC	11.36	2	5	5	2	0	14
334	PEMC	1.11	2	4	2	2	0	10
335	PEMC	0.43	2	5	1	2	0	10
336	PEMF	4.44	3	5	3	2	0	13
337	PEMC	6.00	2	5	4	2	3	16
338	PEMC	0.38	2	5	1	2	0	10
339	PEMC	0.50	2	5	1	2	0	10
340	PEMC	3.88	2	4	3	2	0	11
341	PEMC	1.08	2	4	2	2	0	10
342	PEMC	1.02	2	5	2	2	0	11
344	PABF	19.43	3	5	5	2	0	15
345	PABF	12.77	3	4	5	2	0	14
346	PEMC	0.27	2	5	1	2	0	10
347	PEMC	0.27	2	5	1	2	0	10
348	PABF	9.73	3	5	5	2	0	15
350	PEMC	1.02	2	5	2	2	0	11
351	PEMC	0.87	2	5	1	2	0	10
352	PEMC	1.17	2	5	2	2	0	11
353	PEMC	1.27	2	5	2	2	0	11
354	PEMC	0.69	2	5	1	2	0	10
355	PEMC	0.80	2	5	1	2	0	10
356	PEMA	0.27	1	5	1	2	0	9
357	PEMF	12.17	3	5	5	2	0	15
359	PEMC	1.10	2	5	2	2	0	11
360	PEMC	5.54	2	5	4	2	0	13
362	PEMC	0.42	2	4	1	2	0	9
363	PEMAd	0.35	1	5	1	0	0	7
364	PABF	18.81	3	5	5	2	0	15
365	PEMC	0.50	2	4	1	2	0	9
366	PEMC	3.77	2	5	3	2	0	12
367	PEMF	3.01	3	5	3	2	0	13
368	PEMC	3.25	2	4	3	2	0	11
369	PEMC	25.75	2	5	5	2	0	14
371	PEMC	0.31	2	5	1	2	3	13
372	PEMC	0.28	2	4	1	2	0	9
373	PEMC	1.75	2	4	2	2	3	13
374	PEMAd	0.89	1	5	1	0	0	7
375	PEMC	3.39	2	5	3	2	0	12
376	PEMC	0.47	2	5	1	2	0	10

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
377	PEMC	3.16	2	5	3	2	0	12
378	PEMCd	4.05	2	4	3	0	0	9
379	PEMA	0.38	1	5	1	2	0	9
380	PEMC	0.27	2	4	1	2	0	9
381	PEMA	1.03	1	4	2	2	0	9
382	PEMCd	0.35	2	5	1	0	0	8
383	PEMAd	0.54	1	5	1	0	0	7
384	PEMC	0.35	2	4	1	2	0	9
386	PEMC	0.67	2	5	1	2	0	10
387	PABFx	0.28	3	4	1	0	0	8
390	PEMC	5.44	2	5	4	2	0	13
391	PEMC	0.35	2	4	1	2	0	9
392	PEMC	3.79	2	5	3	2	0	12
396	PEMC	8.02	2	5	5	2	0	14
402	PEMC	3.31	2	3	3	2	0	10
404	PEMC	1.91	2	4	2	2	0	10
405	PEMC	0.33	2	4	1	2	0	9
406	PEMC	13.35	2	4	5	2	0	13
407	PEMC	1.53	2	3	2	2	0	9
408	PEMC	0.73	2	4	1	2	0	9
409	PEMC	3.13	2	4	3	2	0	11
410	PEMC	10.92	2	5	5	2	0	14
411	PEMF	5.07	3	5	4	2	0	14
412	PEMF	3.15	3	5	3	2	0	13
413	PEMC	1.24	2	4	2	2	0	10
414	PEMC	3.75	2	4	3	2	0	11
415	PEMC	1.42	2	5	2	2	0	11
416	PEMC	3.27	2	4	3	2	0	11
417	PEMC	0.78	2	4	1	2	0	9
418	PEMC	6.44	2	5	4	2	0	13
419	PEMC	1.86	2	5	2	2	0	11
420	PEMC	0.36	2	4	1	2	0	9
421	PEMC	0.55	2	5	1	2	0	10
422	PEMC	0.32	2	5	1	2	0	10
423	PEMC	10.66	2	5	5	2	0	14
424	PEMC	2.66	2	4	2	2	0	10
425	PEMC	0.75	2	5	1	2	0	10
426	PEMC	0.37	2	4	1	2	0	9
427	PEMC	9.61	2	4	5	2	0	13
428	PEMF	13.06	3	4	5	2	0	14
429	PEMC	5.77	2	5	4	2	0	13
430	PEMA	4.05	1	5	3	2	0	11
431	PEMC	0.43	2	5	1	2	0	10

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
432	PEMC	5.90	2	5	4	2	0	13
433	PEMC	0.42	2	5	1	2	0	10
434	PEMC	1.36	2	4	2	2	0	10
435	PEMC	2.15	2	5	2	2	0	11
436	PABF	15.93	3	5	5	2	0	15
437	PEMC	2.82	2	5	2	2	0	11
438	PEMC	4.78	2	4	3	2	0	11
439	PEMC	4.80	2	5	3	2	0	12
440	PEMC	1.17	2	5	2	2	0	11
441	PEMC	1.94	2	5	2	2	0	11
442	PEMC	2.65	2	5	2	2	0	11
443	PEMC	1.02	2	3	2	2	0	9
444	L2ABG	36.55	4	4	5	2	0	15
445	L2ABG	21.83	4	4	5	2	0	15
446	PEMC	0.70	2	4	1	2	0	9
447	PEMC	0.99	2	4	1	2	0	9
448	PEMC	1.07	2	4	2	2	0	10
449	PABF	15.93	3	4	5	2	0	14
450	PEMC	4.94	2	5	3	2	0	12
451	PEMC	1.62	2	4	2	2	0	10
452	PEMC	8.09	2	5	5	2	0	14
453	PEMC	4.55	2	4	3	2	0	11
454	PEMC	7.54	2	5	5	2	0	14
455	L2ABG	34.09	4	5	5	2	0	16
457	PEMC	0.27	2	5	1	2	0	10
458	PEMC	0.50	2	4	1	2	0	9
459	PEMC	0.29	2	4	1	2	0	9
460	PABF	2.87	3	5	2	2	0	12
462	PEMC	1.39	2	5	2	2	0	11
464	PEMC	2.47	2	5	2	2	0	11
466	PEMC	1.05	2	5	2	2	0	11
468	PEMC	0.70	2	4	1	2	0	9
469	PEMC	0.34	2	5	1	2	0	10
470	PEMAd	0.35	1	5	1	0	0	7
471	PEMAd	2.93	1	5	2	0	0	8
473	PEMC	0.38	2	5	1	2	0	10
474	L2ABG	36.96	4	4	5	2	0	15
475	L2ABG	80.10	4	5	5	2	0	16
476	L2ABG	168.16	4	4	5	2	3	18
477	L2ABG	65.05	4	4	5	2	0	15
478	L2ABG	23.58	4	4	5	2	0	15
479	L2ABG	20.08	4	5	5	2	0	16
480	L2ABG	23.83	4	5	5	2	3	19

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
481	L2ABG	48.96	4	5	5	2	0	16
482	L2ABG	24.98	4	5	5	2	0	16
483	L2ABG	42.29	4	5	5	2	0	16
484	L2ABG	29.18	4	5	5	2	3	19
485	PABF	3.76	3	4	3	2	3	15
486	PABF	0.27	3	4	1	2	0	10
487	PABF	1.98	3	4	2	2	3	14
488	PABF	19.21	3	4	5	2	3	17
489	PABF	0.60	3	4	1	2	0	10
490	PABF	11.84	3	5	5	2	3	18
491	PABF	3.65	3	4	3	2	0	12
492	PABF	10.59	3	5	5	2	0	15
493	PABF	6.77	3	4	4	2	0	13
494	PABF	5.71	3	5	4	2	0	14
495	PABF	22.72	3	5	5	2	0	15
496	PABF	2.11	3	4	2	2	0	11
497	PABFh	1.47	3	4	2	0	3	12
498	PABFx	0.65	3	3	1	0	0	7
499	PABFx	0.36	3	3	1	0	0	7
500	PABFx	0.49	3	5	1	0	0	9
501	PEM1C	1.06	2	5	2	2	0	11
502	PEM1C	1.03	2	4	2	2	0	10
503	PEM1C	2.82	2	4	2	2	0	10
504	PEM1/ABF	6.78	1	4	4	2	0	11
505	PEM1/ABF	2.73	1	3	2	2	0	8
506	PEM1/ABF	1.83	1	4	2	2	0	9
507	PEM1/ABFd	49.60	1	5	5	0	0	11
508	PEM1A	0.35	1	4	1	2	0	8
509	PEM1A	0.32	1	4	1	2	0	8
510	PEM1A	0.48	1	5	1	2	0	9
511	PEM1A	0.30	1	5	1	2	0	9
512	PEM1A	0.28	1	5	1	2	0	9
513	PEM1A	1.07	1	4	2	2	0	9
514	PEM1A	0.37	1	5	1	2	0	9
515	PEM1A	0.41	1	5	1	2	0	9
516	PEM1A	2.16	1	5	2	2	0	10
517	PEM1A	0.78	1	4	1	2	0	8
518	PEM1A	1.00	1	5	1	2	0	9
519	PEM1A	0.30	1	4	1	2	0	8
520	PEM1A	0.83	1	5	1	2	0	9
521	PEM1A	0.42	1	5	1	2	0	9
522	PEM1A	1.06	1	5	2	2	0	10
523	PEM1A	0.41	1	5	1	2	0	9

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
524	PEM1A	0.27	1	4	1	2	0	8
525	PEM1C	4.56	2	4	3	2	3	14
526	PEM1A	0.47	1	5	1	2	0	9
527	PEM1A	0.48	1	5	1	2	0	9
528	PEM1A	1.06	1	5	2	2	0	10
529	PEM1A	7.32	1	5	5	2	3	16
530	PEM1A	56.25	1	5	5	2	3	16
531	PEM1A	0.27	1	5	1	2	0	9
532	PEM1A	121.32	1	5	5	2	3	16
533	PEM1C	6.58	2	5	4	2	0	13
534	PEM1A	0.56	1	5	1	2	0	9
535	PEM1A	0.98	1	4	1	2	0	8
536	PEM1A	0.41	1	5	1	2	0	9
537	PEM1A	0.26	1	5	1	2	0	9
538	PEM1A	0.38	1	5	1	2	0	9
539	PEM1A	1.37	1	4	2	2	3	12
540	PEM1A	0.30	1	4	1	2	0	8
541	PEM1A	0.28	1	5	1	2	0	9
542	PEM1A	0.48	1	4	1	2	0	8
543	PEM1A	0.34	1	4	1	2	0	8
544	PEM1A	0.39	1	4	1	2	0	8
545	PEM1A	1.14	1	4	2	2	0	9
546	PEM1A	0.37	1	4	1	2	0	8
547	PEM1A	1.72	1	5	2	2	0	10
548	PEM1A	0.29	1	4	1	2	0	8
549	PEM1A	0.27	1	4	1	2	0	8
550	PEM1A	1.14	1	4	2	2	0	9
551	PEM1A	0.46	1	5	1	2	0	9
552	PEM1C	0.61	2	4	1	2	0	9
553	PEM1A	0.39	1	5	1	2	0	9
554	PEM1A	15.33	1	5	5	2	0	13
555	PEM1A	11.61	1	5	5	2	0	13
556	PEM1A	0.30	1	5	1	2	0	9
557	PEM1A	1.35	1	5	2	2	0	10
558	PEM1A	0.33	1	5	1	2	0	9
559	PEM1A	0.85	1	5	1	2	0	9
560	PEM1Ad	22.07	1	5	5	0	3	14
561	PEM1C	3.44	2	4	3	2	0	11
562	PEM1C	1.10	2	5	2	2	0	11
563	PEM1C	1.61	2	4	2	2	0	10
564	PEM1C	2.85	2	4	2	2	0	10
565	PEM1C	10.37	2	5	5	2	0	14
566	PEM1C	0.78	2	4	1	2	0	9

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
567	PEM1C	0.80	2	4	1	2	0	9
568	PEM1C	1.09	2	4	2	2	0	10
569	PEM1C	0.28	2	4	1	2	0	9
570	PEM1C	1.94	2	5	2	2	0	11
571	PEM1C	0.92	2	3	1	2	0	8
572	PEM1C	0.30	2	3	1	2	0	8
573	PEM1C	2.59	2	4	2	2	0	10
574	PEM1C	0.39	2	4	1	2	0	9
575	PEM1C	0.35	2	3	1	2	0	8
576	PEM1C	0.29	2	5	1	2	0	10
577	PEM1C	0.57	2	4	1	2	0	9
578	PEM1C	0.49	2	3	1	2	0	8
579	PEM1C	3.58	2	5	3	2	0	12
580	PEM1C	0.31	2	3	1	2	0	8
581	PEM1C	0.49	2	5	1	2	0	10
582	PEM1C	1.34	2	4	2	2	0	10
583	PEM1C	0.29	2	3	1	2	0	8
584	PEM1C	0.92	2	4	1	2	0	9
585	PEM1C	1.34	2	3	2	2	0	9
586	PEM1C	6.06	2	3	4	2	0	11
587	PEM1C	1.73	2	3	2	2	0	9
588	PEM1C	1.29	2	4	2	2	0	10
589	PEM1C	0.60	2	4	1	2	0	9
590	PEM1C	2.28	2	4	2	2	0	10
591	PEM1C	1.81	2	4	2	2	0	10
592	PEM1C	0.45	2	3	1	2	0	8
593	PEM1C	0.36	2	4	1	2	0	9
594	PEM1C	0.60	2	5	1	2	0	10
595	PEM1C	0.28	2	4	1	2	0	9
596	PEM1C	0.64	2	4	1	2	0	9
597	PEM1C	0.60	2	4	1	2	0	9
598	PEM1C	0.42	2	3	1	2	0	8
599	PEM1C	0.84	2	3	1	2	0	8
600	PEM1C	0.89	2	5	1	2	0	10
601	PEM1C	2.04	2	4	2	2	0	10
602	PEM1C	0.28	2	4	1	2	0	9
603	PEM1C	1.27	2	3	2	2	0	9
604	PEM1C	2.47	2	5	2	2	0	11
605	PEM1C	1.12	2	4	2	2	0	10
606	PEM1C	0.65	2	4	1	2	0	9
607	PEM1C	0.43	2	3	1	2	0	8
608	PEM1C	0.32	2	4	1	2	0	9
609	PEM1C	0.43	2	4	1	2	0	9

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
610	PEM1C	0.71	2	5	1	2	0	10
611	PEM1C	1.14	2	4	2	2	0	10
612	PEM1C	5.70	2	5	4	2	0	13
613	PEM1C	4.99	2	4	3	2	0	11
614	PEM1C	1.43	2	4	2	2	0	10
615	PEM1C	0.28	2	4	1	2	0	9
616	PEM1C	0.51	2	4	1	2	0	9
617	PEM1C	0.50	2	4	1	2	0	9
618	PEM1C	2.91	2	4	2	2	0	10
619	PEM1C	2.70	2	4	2	2	0	10
620	PEM1C	0.69	2	5	1	2	0	10
621	PEM1C	0.62	2	5	1	2	0	10
622	PEM1C	0.42	2	5	1	2	0	10
623	PEM1C	3.82	2	5	3	2	0	12
624	PEM1C	1.72	2	5	2	2	0	11
625	PEM1C	0.68	2	5	1	2	0	10
626	PEM1C	0.30	2	5	1	2	0	10
627	PEM1C	1.29	2	5	2	2	0	11
628	PEM1C	0.59	2	4	1	2	0	9
629	PEM1C	6.16	2	5	4	2	0	13
630	PEM1C	1.51	2	5	2	2	3	14
631	PEM1C	0.40	2	4	1	2	3	12
632	PEM1C	0.52	2	5	1	2	0	10
633	PEM1C	0.32	2	4	1	2	0	9
634	PEM1C	0.42	2	5	1	2	3	13
635	PEM1C	0.44	2	5	1	2	0	10
636	PEM1C	0.41	2	5	1	2	0	10
637	PEM1C	0.38	2	5	1	2	0	10
638	PEM1C	0.44	2	5	1	2	0	10
639	PEM1C	6.82	2	5	4	2	0	13
640	PEM1C	39.20	2	5	5	2	0	14
641	PEM1C	3.29	2	4	3	2	0	11
642	PEM1C	3.71	2	5	3	2	0	12
643	PEM1C	1.28	2	5	2	2	0	11
644	PEM1C	1.79	2	5	2	2	0	11
645	PEM1C	7.26	2	4	5	2	0	13
646	PEM1C	0.36	2	5	1	2	0	10
647	PEM1C	2.38	2	4	2	2	0	10
648	PEM1C	1.87	2	5	2	2	0	11
649	PEM1C	2.50	2	4	2	2	0	10
650	PEM1C	1.50	2	4	2	2	0	10
651	PEM1C	0.71	2	4	1	2	0	9
652	PEM1C	0.50	2	5	1	2	0	10

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
653	PEM1C	0.26	2	4	1	2	0	9
654	PEM1C	0.45	2	4	1	2	0	9
655	PEM1C	1.73	2	5	2	2	0	11
656	PEM1C	0.41	2	5	1	2	0	10
657	PEM1C	2.36	2	4	2	2	0	10
658	PEM1C	0.57	2	5	1	2	0	10
659	PEM1C	0.32	2	4	1	2	0	9
660	PEM1C	0.49	2	4	1	2	0	9
661	PEM1C	0.54	2	5	1	2	0	10
662	PEM1C	1.64	2	5	2	2	0	11
663	PEM1C	0.62	2	5	1	2	0	10
664	PEM1C	4.57	2	5	3	2	0	12
665	PEM1C	0.72	2	4	1	2	0	9
666	PEM1C	0.57	2	5	1	2	0	10
667	PEM1C	0.37	2	5	1	2	0	10
668	PEM1C	0.34	2	5	1	2	0	10
669	PEM1C	0.43	2	5	1	2	0	10
670	PEM1C	0.86	2	5	1	2	0	10
671	PEM1C	3.88	2	5	3	2	0	12
672	PEM1C	0.91	2	5	1	2	0	10
673	PEM1C	0.33	2	5	1	2	0	10
674	PEM1C	1.12	2	4	2	2	0	10
675	PEM1C	0.26	2	5	1	2	0	10
676	PEM1C	0.88	2	5	1	2	0	10
677	PEM1C	0.65	2	5	1	2	0	10
678	PEM1C	1.42	2	5	2	2	0	11
679	PEM1C	6.97	2	5	4	2	0	13
680	PEM1C	2.50	2	5	2	2	0	11
681	PEM1C	1.08	2	5	2	2	0	11
682	PEM1C	0.68	2	5	1	2	0	10
683	PEM1C	0.27	2	5	1	2	0	10
684	PEM1C	0.66	2	5	1	2	0	10
685	PEM1C	0.49	2	5	1	2	0	10
686	PEM1C	1.92	2	5	2	2	0	11
687	PEM1C	0.35	2	5	1	2	0	10
688	PEM1C	0.38	2	5	1	2	0	10
689	PEM1C	1.38	2	5	2	2	0	11
690	PEM1C	25.14	2	5	5	2	0	14
691	PEM1C	2.69	2	4	2	2	3	13
692	PEM1C	4.16	2	4	3	2	3	14
693	PEM1C	0.28	2	5	1	2	0	10
694	PEM1C	0.43	2	5	1	2	0	10
695	PEM1C	1.31	2	5	2	2	0	11

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
696	PEM1C	1.38	2	5	2	2	0	11
697	PEM1C	0.73	2	5	1	2	0	10
698	PEM1C	0.30	2	5	1	2	0	10
699	PEM1C	1.03	2	5	2	2	0	11
700	PEM1C	6.29	2	5	4	2	3	16
701	PEM1C	7.25	2	5	5	2	0	14
702	PEM1C	4.18	2	5	3	2	0	12
703	PEM1C	0.59	2	5	1	2	0	10
704	PEM1C	0.34	2	5	1	2	0	10
705	PEM1C	0.65	2	5	1	2	0	10
706	PEM1C	0.35	2	5	1	2	0	10
707	PEM1C	1.32	2	5	2	2	0	11
708	PEM1C	1.18	2	4	2	2	3	13
709	PEM1C	0.61	2	5	1	2	0	10
710	PEM1C	2.32	2	5	2	2	0	11
711	PEM1C	2.70	2	5	2	2	3	14
712	PEM1C	2.16	2	5	2	2	0	11
713	PEM1A	1.60	1	5	2	2	0	10
714	PEM1C	1.99	2	5	2	2	0	11
715	PEM1C	0.44	2	4	1	2	0	9
716	PEM1C	1.98	2	4	2	2	0	10
717	PEM1C	1.04	2	4	2	2	0	10
718	PEM1C	0.76	2	4	1	2	0	9
719	PEM1C	0.33	2	5	1	2	0	10
720	PEM1C	0.26	2	4	1	2	0	9
721	PEM1C	0.53	2	4	1	2	0	9
722	PEM1C	4.32	2	4	3	2	0	11
723	PEM1C	6.47	2	5	4	2	3	16
724	PEM1C	1.70	2	5	2	2	3	14
725	PEM1C	0.66	2	4	1	2	0	9
726	PEM1C	0.75	2	4	1	2	0	9
727	PEM1C	0.49	2	4	1	2	3	12
728	PEM1C	13.38	2	5	5	2	0	14
729	PEM1C	0.81	2	4	1	2	0	9
730	PEM1C	3.08	2	5	3	2	0	12
731	PEM1C	0.37	2	4	1	2	0	9
732	PEM1C	1.29	2	4	2	2	3	13
733	PEM1C	0.95	2	5	1	2	0	10
734	PEM1C	0.97	2	4	1	2	0	9
735	PEM1C	0.36	2	5	1	2	0	10
736	PEM1C	0.28	2	4	1	2	0	9
737	PEM1C	0.29	2	4	1	2	0	9
738	PEM1C	2.05	2	5	2	2	0	11

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
739	PEM1C	4.63	2	5	3	2	0	12
740	PEM1C	4.11	2	5	3	2	0	12
741	PEM1C	0.31	2	5	1	2	0	10
742	PEM1C	0.81	2	5	1	2	0	10
743	PEM1C	0.52	2	5	1	2	0	10
744	PEM1C	0.77	2	4	1	2	0	9
745	PEM1C	1.69	2	4	2	2	0	10
746	PEM1C	0.89	2	4	1	2	0	9
747	PEM1C	0.61	2	4	1	2	0	9
748	PEM1C	2.08	2	5	2	2	0	11
749	PEM1C	0.82	2	4	1	2	0	9
750	PEM1C	1.64	2	4	2	2	0	10
751	PEM1C	3.72	2	5	3	2	0	12
752	PEM1A	1.55	1	5	2	2	0	10
753	PEM1C	0.37	2	5	1	2	0	10
754	PEM1C	0.71	2	5	1	2	0	10
755	PEM1C	1.54	2	5	2	2	0	11
756	PEM1C	2.61	2	5	2	2	0	11
757	PEM1C	0.43	2	4	1	2	0	9
758	PEM1C	0.61	2	5	1	2	0	10
759	PEM1C	0.36	2	5	1	2	0	10
760	PEM1C	0.33	2	5	1	2	0	10
761	PEM1C	1.56	2	4	2	2	0	10
762	PEM1C	0.29	2	4	1	2	0	9
763	PEM1C	0.33	2	5	1	2	0	10
764	PEM1C	1.71	2	4	2	2	0	10
765	PEM1C	0.96	2	4	1	2	0	9
766	PEM1C	1.56	2	5	2	2	0	11
767	PEM1C	2.23	2	5	2	2	0	11
768	PEM1C	0.36	2	4	1	2	0	9
769	PEM1C	0.57	2	4	1	2	0	9
770	PEM1C	0.71	2	4	1	2	0	9
771	PEM1C	2.71	2	5	2	2	0	11
772	PEM1C	0.53	2	5	1	2	0	10
773	PEM1C	0.36	2	4	1	2	0	9
774	PEM1C	0.55	2	5	1	2	0	10
775	PEM1C	2.09	2	5	2	2	0	11
776	PEM1C	0.48	2	4	1	2	0	9
777	PEM1C	3.49	2	5	3	2	0	12
778	PEM1C	0.61	2	5	1	2	0	10
779	PEM1C	0.71	2	5	1	2	0	10
780	PEM1C	0.38	2	5	1	2	0	10
781	PEM1C	0.58	2	5	1	2	0	10

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
782	PEM1C	0.97	2	5	1	2	0	10
783	PEM1C	0.31	2	5	1	2	0	10
784	PEM1C	0.78	2	5	1	2	0	10
785	PEM1C	1.05	2	5	2	2	0	11
786	PEM1C	3.47	2	5	3	2	0	12
787	PEM1C	2.72	2	5	2	2	0	11
788	PEM1C	0.91	2	4	1	2	0	9
789	PEM1C	2.28	2	4	2	2	0	10
790	PEM1C	0.46	2	4	1	2	0	9
791	PEM1C	3.22	2	5	3	2	0	12
792	PEM1C	3.08	2	4	3	2	0	11
793	PEM1C	1.97	2	4	2	2	0	10
794	PEM1C	0.60	2	5	1	2	0	10
795	PEM1C	0.64	2	5	1	2	0	10
796	PEM1C	2.39	2	4	2	2	0	10
797	PEM1C	3.02	2	4	3	2	0	11
798	PEM1C	1.74	2	5	2	2	0	11
799	PEM1C	2.57	2	4	2	2	0	10
800	PEM1C	0.37	2	5	1	2	0	10
801	PEM1C	0.45	2	5	1	2	0	10
802	PEM1C	0.37	2	5	1	2	0	10
803	PEM1C	1.58	2	4	2	2	0	10
804	PEM1C	1.15	2	4	2	2	0	10
805	PEM1C	0.33	2	4	1	2	0	9
806	PEM1C	0.38	2	4	1	2	0	9
807	PEM1C	1.60	2	4	2	2	0	10
808	PEM1C	4.62	2	3	3	2	0	10
809	PEM1C	0.27	2	4	1	2	0	9
810	PEM1C	2.69	2	5	2	2	0	11
811	PEM1C	0.77	2	3	1	2	0	8
812	PEM1C	3.74	2	5	3	2	0	12
813	PEM1C	1.11	2	5	2	2	0	11
814	PEM1C	1.12	2	4	2	2	0	10
815	PEM1C	0.91	2	4	1	2	0	9
816	PEM1C	0.77	2	5	1	2	0	10
817	PEM1C	0.49	2	5	1	2	0	10
818	PEM1C	0.26	2	5	1	2	0	10
819	PEM1C	0.87	2	5	1	2	0	10
820	PEM1C	0.97	2	5	1	2	0	10
821	PEM1C	0.53	2	5	1	2	0	10
822	PEM1C	0.81	2	5	1	2	0	10
823	PEM1C	0.37	2	5	1	2	0	10
824	PEM1C	0.39	2	5	1	2	0	10

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
825	PEM1C	0.41	2	5	1	2	0	10
826	PEM1C	2.03	2	5	2	2	0	11
827	PEM1C	0.99	2	5	1	2	0	10
828	PEM1C	2.20	2	5	2	2	0	11
829	PEM1C	1.72	2	4	2	2	0	10
830	PEM1C	3.15	2	5	3	2	0	12
831	PEM1C	2.01	2	5	2	2	0	11
832	PEM1C	1.03	2	4	2	2	0	10
833	PEM1C	0.76	2	4	1	2	0	9
834	PEM1C	3.74	2	4	3	2	0	11
835	PEM1C	4.10	2	4	3	2	0	11
836	PEM1C	0.41	2	4	1	2	0	9
837	PEM1C	0.38	2	4	1	2	0	9
838	PEM1C	5.93	2	5	4	2	3	16
839	PEM1C	3.34	2	5	3	2	0	12
840	PEM1C	1.18	2	4	2	2	0	10
841	PEM1C	1.62	2	5	2	2	0	11
842	PEM1C	0.35	2	4	1	2	0	9
843	PEM1C	0.43	2	5	1	2	0	10
844	PEM1C	4.19	2	5	3	2	0	12
845	PEM1C	0.32	2	5	1	2	0	10
846	PEM1C	0.62	2	4	1	2	0	9
847	PEM1C	1.67	2	5	2	2	0	11
848	PEM1C	10.73	2	4	5	2	0	13
849	PEM1C	2.92	2	5	2	2	0	11
850	PEM1C	1.18	2	4	2	2	0	10
851	PEM1C	6.90	2	5	4	2	0	13
852	PEM1C	0.77	2	5	1	2	0	10
853	PEM1C	0.39	2	5	1	2	3	13
854	PEM1C	11.36	2	5	5	2	3	17
855	PEM1C	3.26	2	5	3	2	3	15
856	PEM1C	7.46	2	5	5	2	3	17
857	PEM1C	5.00	2	5	4	2	3	16
858	PEM1C	1.65	2	5	2	2	0	11
859	PEM1C	2.08	2	5	2	2	3	14
860	PEM1C	5.35	2	5	4	2	3	16
861	PEM1Cd	0.61	2	4	1	0	0	7
862	PEM1Cd	0.82	2	4	1	0	0	7
863	PEM1Cd	16.47	2	5	5	0	0	12
864	PEM1Cd	18.54	2	5	5	0	0	12
865	PEM1Cd	0.50	2	4	1	0	0	7
866	PEM1Cd	0.55	2	4	1	0	0	7
867	PEM1Cd	1.36	2	5	2	0	0	9

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
868	PEM1Cd	11.33	2	4	5	0	0	11
869	PEM1Cd	3.99	2	4	3	0	0	9
870	PEM1F	7.75	3	4	5	2	0	14
871	PEM1F	0.37	3	4	1	2	3	13
872	PEM1F	1.60	3	4	2	2	3	14
873	PEM1F	37.80	3	5	5	2	3	18
874	PEM1F	182.04	3	5	5	2	3	18
875	PEM1F	44.47	3	4	5	2	3	17
876	PEM1F	37.12	3	4	5	2	3	17
877	PEM1F	41.86	3	5	5	2	3	18
878	PEM1F	15.27	3	5	5	2	3	18
879	PEM1F	0.51	3	5	1	2	0	11
880	PEM1F	0.45	3	5	1	2	0	11
881	PEM1F	13.42	3	5	5	2	0	15
882	PEM1F	14.81	3	5	5	2	0	15
883	PEM1F	2.48	3	5	2	2	0	12
884	PEM1F	2.53	3	4	2	2	0	11
885	PEM1F	1.88	3	5	2	2	0	12
886	PEM1F	1.76	3	5	2	2	0	12
887	PEM1F	2.40	3	5	2	2	0	12
888	PEM1F	1.38	3	4	2	2	0	11
889	PEM1F	4.51	3	5	3	2	0	13
890	PEM1F	7.23	3	5	5	2	0	15
891	PEM1F	6.45	3	5	4	2	3	17
892	PEM1F	28.17	3	5	5	2	3	18
893	PEM1F	0.99	3	4	1	2	0	10
894	PEM1F	1.70	3	5	2	2	3	15
895	PEM1F	2.45	3	5	2	2	3	15
896	PEM1F	2.34	3	5	2	2	3	15
897	PEM1F	2.68	3	4	2	2	0	11
898	PEM1F	26.95	3	5	5	2	3	18
899	PEM1F	5.36	3	4	4	2	0	13
900	PEM1F	25.35	3	5	5	2	3	18
901	PEM1F	0.74	3	4	1	2	0	10
902	L2ABG	33.00	4	4	5	2	0	15
903	L2ABG	16.43	4	4	5	2	0	15
904	PABF	9.45	3	5	5	2	0	15
905	PABF	10.78	3	4	5	2	0	14
906	PABF	36.69	3	5	5	2	0	15
907	PABF	13.06	3	5	5	2	0	15
908	PABF	56.95	3	5	5	2	0	15
909	PABF	32.98	3	4	5	2	0	14
910	PABFd	19.79	3	4	5	0	0	12

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
911	PEM1A	0.76	1	5	1	2	0	9
912	PEM1A	0.29	1	4	1	2	0	8
913	PEM1A	0.47	1	5	1	2	0	9
914	PEM1A	0.74	1	5	1	2	0	9
915	PEM1Ad	0.49	1	5	1	0	0	7
916	PEM1C	0.65	2	5	1	2	0	10
917	PEM1C	0.28	2	5	1	2	0	10
918	PEM1C	0.82	2	5	1	2	0	10
919	PEM1C	0.74	2	5	1	2	0	10
920	PEM1C	0.63	2	5	1	2	0	10
921	PEM1C	1.60	2	5	2	2	0	11
922	PEM1C	0.69	2	5	1	2	0	10
923	PEM1C	4.81	2	4	3	2	0	11
924	PEM1C	0.65	2	4	1	2	0	9
925	PEM1C	2.03	2	5	2	2	0	11
926	PEM1C	1.80	2	4	2	2	0	10
927	PEM1C	0.65	2	5	1	2	0	10
928	PEM1C	0.55	2	3	1	2	0	8
929	PEM1C	2.34	2	3	2	2	0	9
930	PEM1C	1.01	2	3	2	2	0	9
931	PEM1C	0.37	2	5	1	2	0	10
932	PEM1C	1.04	2	5	2	2	0	11
933	PEM1C	1.36	2	5	2	2	0	11
934	PEM1C	0.85	2	5	1	2	0	10
935	PEM1C	0.55	2	4	1	2	0	9
936	PEM1C	9.92	2	5	5	2	0	14
937	PEM1C	1.34	2	4	2	2	0	10
938	PEM1C	2.10	2	5	2	2	0	11
939	PEM1C	0.97	2	5	1	2	0	10
940	PEM1C	5.63	2	5	4	2	0	13
941	PEM1C	3.43	2	4	3	2	0	11
942	PEM1C	0.58	2	4	1	2	0	9
943	PEM1C	0.39	2	4	1	2	0	9
944	PEM1C	9.94	2	4	5	2	0	13
945	PEM1C	2.05	2	4	2	2	0	10
946	PEM1C	2.29	2	5	2	2	3	14
947	PEM1C	18.36	2	4	5	2	0	13
948	PEM1C	8.74	2	5	5	2	0	14
949	PEM1C	4.20	2	4	3	2	0	11
950	PEM1Cd	4.64	2	5	3	0	0	10
951	PEM1F	3.82	3	5	3	2	0	13
952	L2ABG	120.44	4	5	5	2	3	19
953	PEM1C	16.08	2	4	5	2	0	13

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
954	PEM1C	2.11	2	5	2	2	3	14
955	PEM1C	0.37	2	4	1	2	0	9
956	PEM1C	0.33	2	3	1	2	3	11
957	PEM1C	0.37	2	5	1	2	0	10
958	PEM1C	1.81	2	4	2	2	0	10
959	PEM1C	0.74	2	5	1	2	0	10
960	PEM1C	3.54	2	5	3	2	3	15
961	PEM1C	3.57	2	4	3	2	0	11
962	PEM1C	1.03	2	4	2	2	3	13
963	PEM1C	0.53	2	5	1	2	0	10
964	PABF	11.12	3	5	5	2	0	15
965	PEM1C	1.24	2	5	2	2	0	11
966	PEM1C	0.72	2	5	1	2	0	10
967	PABF	7.86	3	5	5	2	0	15
968	PEM1C	6.91	2	5	4	2	0	13
969	PEM1C	3.04	2	5	3	2	0	12
970	PEM1C	5.57	2	5	4	2	0	13
971	PEM1F	3.55	3	4	3	2	0	12
972	PABF	32.71	3	5	5	2	0	15
973	PEM1Cd	1.37	2	4	2	0	0	8
974	PEM1F	3.38	3	5	3	2	0	13
975	PEM1F	4.38	3	4	3	2	0	12
976	PEM1F	4.35	3	5	3	2	0	13
977	PEM1A	0.29	1	5	1	2	0	9
978	PEM1C	0.32	2	4	1	2	0	9
979	PEM1C	0.33	2	4	1	2	0	9
980	PEM1C	3.20	2	5	3	2	0	12
981	PEM1C	1.81	2	4	2	2	0	10
982	PEM1C	4.46	2	5	3	2	0	12
983	PABF	8.83	3	5	5	2	0	15
984	PEM1C	1.58	2	4	2	2	0	10
985	PEM1C	7.92	2	4	5	2	0	13
986	PEM1C	5.98	2	5	4	2	3	16
987	PEM1C	5.15	2	5	4	2	0	13
988	PABF	8.52	3	5	5	2	0	15
989	PEM1C	1.66	2	5	2	2	0	11
990	PEM1C	0.49	2	4	1	2	0	9
991	PEM1C	2.25	2	4	2	2	0	10
992	PEM1C	0.30	2	4	1	2	0	9
993	PEM1C	0.45	2	4	1	2	0	9
994	PEM1C	5.98	2	4	4	2	0	12
995	PEM1C	1.11	2	4	2	2	0	10
996	PEM1C	2.20	2	5	2	2	0	11

Habitat Suitablility Assessment Scores

OBJECTID	ATTRIBUTE	ACRES	REGIME	FOOD	SIZE	TYPE	DENSITY	TOTAL
997	PEM1A	3.33	1	5	3	2	0	11
998	PABF	58.26	3	5	5	2	0	15

B4.F. Attachment 1C. Pre-Construction Eagle and Avian Use Study, April 2017 through March 2018, for the Burke County Wind Project, Burke County, North Dakota

Pre-Construction Eagle and Avian Use Study
April 2017 through March 2018

for the

BURKE COUNTY WIND PROJECT
Burke County, North Dakota

Prepared for

Burke Wind, LLC
700 Universe Boulevard
Juno Beach, FL 33408

Submitted by Atwell LLC—Atwell Project No. 16000947

January 31, 2019

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Appendix III. Species Observed during Standardized Avian Use Surveys

ABBREVIATIONS AND ACRONYMS

Atwell	Atwell, LLC
ECPG	*Eagle Conservation Plan Guidance, Module 1 – Land-based Wind Energy, Version 2*
MW	megawatt
NDGFD	North Dakota Game and Fish Department
RSZ	rotor-swept zone
SCP	Species of Conservation Priority
SD	standard deviation

EXECUTIVE SUMMARY

This report summarizes one year of pre-construction eagle and avian use surveys conducted by Atwell, LLC on behalf of Burke Wind, LLC, a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC, at the proposed Burke County Wind Project (the Project) in Burke County, North Dakota. Eagle and raptor use surveys were conducted biweekly from April 2017 through March 2018. Avian use surveys were conducted biweekly during the spring migration period (April through May 2017) and the fall migration period (mid-August through November 2017). All surveys were conducted within the Avian Use Study Area, defined as the original 300-megawatt (MW) Project plus a 1-mile (1.6 km) boundary area. In late 2018, the Project was reduced in size to 200 MW, and all subsequent references to the Project refer to this 200 MW configuration. Results of the eagle use and avian use studies are presented in this report for both the Avian Use Study Area (300 MW configuration plus boundary area) and the Project (200 MW configuration).

The 2012 *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* recommend various studies to document avian use. This information can also be used to assess potential risk to avian species from wind energy development. One year of eagle and raptor use studies and spring and fall avian use surveys were completed to document vertical and horizontal use of the Project and Avian Use Study Area. Specific focus was directed on documenting avian activity within the 115 to 492 ft (35 to 150 m) rotor-swept zone (RSZ). Eagle and raptor use surveys were also conducted in accordance with recommendations provided by the 2013 U.S. Fish and Wildlife Service *Eagle Conservation Plan Guidance, Module 1 – Land-based Wind Energy, Version 2.*

Key Results

- Twenty-four Bald Eagle detections were recorded as part of standardized eagle use surveys in the Avian Use Study Area. An additional 26 Bald Eagle detections were recorded incidental to the surveys. Of the 24 standardized Bald Eagle detections, six occurred at points within the Project. Of the 26 incidental detections, seven occurred within the Project.
- Bald Eagle mean use rates were higher in the fall than the spring. Bald Eagles were not observed during standardized surveys in the summer or winter.
- No Bald Eagle concentration areas were found within the Avian Use Study Area, including the Project. There was also no evidence from the pattern of observations of eagles that physiographic features such as ridgelines were concentrating eagle use within specific areas of the Project. This lack of a spatial pattern in the spring and fall suggests that Bald Eagles migrate through the Avian Use Study Area in a broad front.
- Two Golden Eagle detections occurred during standardized eagle use surveys. An additional six Golden Eagles were detected incidental to the surveys. Of the two standardized detections, one occurred within the Project. Of the six incidental detections, three occurred within the Project.

- No federal threatened/endangered avian species were observed using habitat in the Avian Use Study Area during standardized avian use point count surveys. Three Whooping Cranes were incidentally observed flying over the Project, well above the RSZ, during northbound spring migration (early April 2017).
- With some exceptions, avian use rates tended to be higher in the fall than in the spring, an expected pattern in North America. Seasonal use rates for Sandhill Cranes were lower within the Project than across the larger Avian Use Study Area, and observations of the highest Sandhill Crane concentrations occurred east of the current 200 MW turbine configuration. Mean use rates for grassland species such as the Bobolink and Western Meadowlark were also lower within the Project than across the Avian Use Study Area.

1.0 INTRODUCTION

Atwell was contracted in 2017 by Burke Wind, LLC, a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC, to conduct pre-construction eagle use and avian use studies for the proposed Burke County Wind Project (the Project) in Burke County, North Dakota. All surveys were conducted within the Avian Use Study Area, defined as the original 300-megawatt (MW) Project plus an additional 1-mile (1.6 km) boundary area. In late 2018, the Project was reduced in size to 200 MW, and all subsequent references to the Project refer to this 200 MW configuration. In Figure 1 (**Appendix I**), the Avian Use Study Area is shown with a dashed line around the 200 MW Project, which is delineated with a solid black line.

The objective of the studies summarized in this report was to document eagle and avian use within the proposed Project. Survey protocols described herein were designed to adhere to Tier 3 of the *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* (USFWS 2012) and Stage 2 assessments described in the *Eagle Conservation Plan Guidance, Module 1 – Land-based Wind Energy, Version 2* (ECPG) (USFWS 2013). These two documents provide wind energy developers and operators guidance for adhering to the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, respectively. Additionally, Atwell utilized industry standard approaches for avian use studies as promoted by the National Wind Wildlife Collaborative (e.g., Strickland et al. 2011).

2.0 METHODS

The avian resource survey methods summarized in this section were originally described in an avian resources study plan (Atwell 2017b) submitted to the North Dakota Game and Fish Department (NDGFD) and the U.S. Fish and Wildlife Service for review and comment on October 11, 2017. Feedback on the plan was received from NDGFD on November 16, 2017; the comments referenced breeding bird assessment protocols described in Atwell (2018) and did not address eagle/raptor use or the avian use study design and protocols described in this report.

This report adheres to taxonomy outlined in the American Ornithological Society's online *Checklist of North and Middle American Birds*, 59th supplement (Chesser et al. 2018).

2.1 Project Setting

The Project is situated on approximately 22,933 acres (9,281 hectares) in Burke County, northwest North Dakota (Figure 1, **Appendix I**). The Project land area is predominantly agricultural cropland and grassland within a regional prairie pothole wetland system. The general topography of the Project slopes along a ridgeline that is oriented southeast-northwest. Elevations within the Project range from approximately 2,159 to 2,502 ft (658 to 762 m) above mean sea level.

According to the 2011 National Land Cover Database – Land Use Land Cover data set, approximately 54.1% of the Project land area is grassland-type habitat (approximately 12,400 acres [5,018 hectares] of herbaceous and hay/pasture land cover types), and 32.0% is classified as cultivated crops (7,346 acres [2,973 hectares]) (Homer et al. 2015). Additional cover classifications found within the Project include open water (4.7%), emergent herbaceous wetlands (4.1%), aggregated development classifications (3.4%), deciduous forest (1.5%), and woody wetlands (0.2%).

2.2 Eagle Use Surveys

Eagle use surveys followed a fixed-point protocol to document activity and behavior of individual eagle detections (e.g., minutes of flight within a cylindrical air-space plot). The surveys were conducted in accordance with the ECPG (USFWS 2013), a protocol based on a 2,625 ft (800 m) fixed-radius circular plot approach (Strickland et al. 2011). Eagle surveys were conducted year-round during the spring (March through May), summer (June through July), fall (August through November), and winter (December through February). The survey period began in April 2017 and continued through March 2018. Raptor species detections were also recorded during eagle use surveys.

The study plan established 34 roadside point count stations across the Avian Use Study Area, with the goal of having survey coverage for 30% of the originally planned 300 MW configuration (Figure 1*,* **Appendix I**). At the time when the original point count station locations were established, the project layout was in the early stages of development, and it was anticipated to evolve over time. Therefore, the objective for establishing point count station locations was to achieve as much

coverage of the 300 MW area as possible, given land access restrictions. Locations were selected so the 2,625 ft (800 m)–radius survey cylinder for each station had the greatest possible extent of overlap with the Avian Use Study Area. Point count stations were located along roads with low traffic levels and where reasonable survey vantages of the surrounding landscape were obtainable. Because land acquisition was in the early stages at the time of study plan development, point count stations were restricted to roadside locations.

The only way to obtain survey coverage of some portions of the Avian Use Study Area and/or have adequate visibility was to locate point count stations outside of, but adjacent to, the originally planned 300 MW area. As much as possible of each point count station's survey area coincided with the 300 MW configuration. Ground-truthing for these factors in April 2017 shifted eight of the 34 point count stations to locations that did not fully overlap with the 300 MW area but did provide sufficient visibility.

The collective survey area coverage for the original 34 point count station locations comprised 16.55% (11,373 acres [4,602 hectares]) of the Avian Use Study Area. In June 2017, six additional point count stations (stations #50–55 in Figure 1, **Appendix I**) were added to increase sampling effort and spatial coverage during the summer survey period. These six stations were placed following the guidelines described above, on unimproved roadways in portions of the Project that lacked year-round accessibility (Atwell 2017b). The addition of these six points increased the sampling size to 40 and increased survey coverage of the Avian Use Study Area to 20.79% (14,285 acres [5,781 hectares]).

In late 2018, the Project was reconfigured to 200 MW (Figure 1, **Appendix I**). Fifteen of the original 34 point count stations' 2,625 ft (800 m)–radius survey cylinders intersect the 200 MW Project, covering 19.87% (4,557 acres [1,844 hectares]). Twelve of these 15 points are within the current Project (Table 1); the remaining three are located outside the Project but have survey areas that overlap the Project.

The ECPG recommends obtaining 30% coverage of an area that encompasses all wind turbines plus a 3,281 ft (1 km) buffer around each wind turbine. However, it is not uncommon for the 30% goal to not be achieved for final project layouts because of land access restrictions, inadequate visibility, and changes to project layout during the development period, which can result in significant changes. In this case, the coverage achieved for eagle use surveys, calculated for the current 200 MW Project, was 20.97% (5,511 acres [2,230 hectares]), including the wind turbine 3,281 ft (1 km) buffer area.

The 34 point count stations initially surveyed in accordance with the study plan were divided into two subgroups of 17 each; the two subgroups were surveyed on alternating weeks. Each point count station was surveyed for 60 minutes twice monthly over a one-year period. The six additional point count stations (stations #50–55; Figure 1, **Appendix I**) added in June 2017, increased the

sampling effort and spatial coverage during the summer. Surveys were conducted between dawn and dusk. The eagle use survey effort at each point count station is summarized by season in Table 1.

Table 1. Total Standardized Survey Effort by Point Count Station, April 2017 through March 2018—Burke County Wind Project (Burke County, North Dakota)

	Eagle Use Survey Standardized Effort (hours)					Avian Use Survey Effort (hours)		
Point Count Station	Winter	Spring	Summer	Fall	Total Hours	Spring	Fall	Total Hours
10	6	6	4	8	24	2	2.67	4.67
11*	6	6	4	8	24	2	2.67	4.67
12**	6	6	4	8	24	2	2.67	4.67
13*	6	6	4	8	24	2	2.67	4.67
14*	6	6	4	8	24	2	2.67	4.67
15*	6	7^	4	8	25	2.33^	2.67	5
16*	6	6	4	8	24	2	2.67	4.67
17*	6	5^	4	8	23	1.67^	2.67	4.33
18**	6	6	4	8	24	2	2.67	4.67
19*	6	6	4	8	24	2	2.67	4.67
20	6	6	4	8	24	2	2.67	4.67
21	6	6	4	8	24	2	2.67	4.67
22*	6	6	4	8	24	2	2.67	4.67
23*	6	6	4	8	24	2	2.67	4.67
24	6	6	4	8	24	2	2.67	4.67
25*	6	6	4	8	24	2	2.67	4.67
26*	6	6	4	8	24	2	2.67	4.67
27**	6	6	4	8	24	2	2.67	4.67
28	6	6	4	8	24	2	2.67	4.67
29	6	6	4	8	24	2	2.67	4.67
31*	6	6	4	8	24	2	2.67	4.67
32	6	6	4	8	24	2	2.67	4.67
33	6	6	4	8	24	2	2.67	4.67
34	6	6	4	8	24	2	2.67	4.67
35	6	6	4	8	24	2	2.67	4.67

Table 1. Total Standardized Survey Effort by Point Count Station, April 2017 through March 2018—Burke County Wind Project (Burke County, North Dakota)

	Eagle Use Survey Standardized Effort (hours)					Avian Use Survey Effort (hours)		
Point Count Station	Winter	Spring	Summer	Fall	Total Hours	Spring	Fall	Total Hours
36	6	6	4	8	24	2	2.67	4.67
39	6	6	4	8	24	2	2.67	4.67
40	6	6	4	8	24	2	2.67	4.67
41	6	6	4	8	24	2	2.67	4.67
42	6	6	4	8	24	2	2.67	4.67
43	6	6	4	8	24	2	2.67	4.67
44	6	6	4	8	24	2	2.67	4.67
45	6	6	4	8	24	2	2.67	4.67
46	6	6	4	8	24	2	2.67	4.67
50	0	0	4	0	4	0	0	0
51	0	0	4	0	4	0	0	0
52	0	0	4	0	4	0	0	0
53	0	0	4	0	4	0	0	0
54	0	0	4	0	4	0	0	0
55	0	0	4	0	4	0	0	0
Grand Total	**204**	**204**	**160**	**272**	**840**	**68**	**90.67**	**158.67**

All point count stations in this table coincided with the original 300 MW project configuration.
* Point count survey area coincides with the 200 MW Project (using layout dated December 2018).
** Point count survey area coincides with the 200 MW Project (using layout dated December 2018), but survey station outside of 200 MW Project.
^ Point #17 was inaccessible on March 7, 2018 due to inclement weather. Following winter storm protocols described in Atwell (2017b), point #15 was surveyed in point #17's place.
Points #50–55 were added to the sample in June 2017 and were only surveyed during the summer period because of seasonal accessibility (see Section 2.2).
Point numbering began at #10 to avoid single-digit identifiers.

A total of 840 standardized eagle use survey hours were completed as part the one-year eagle use survey (Table 1) for the Avian Use Study Area. A total of 360 standardized eagle use survey hours were completed at 15 points within 2,625 ft (800 m) of the 200 MW Project, and 288 standardized eagle use survey hours were completed at 12 points within the Project boundary.

For each raptor observation, including eagles, the following information was recorded:

- Raptor species
- Age
- Times at first and final observation
- Duration of the raptor observation (rounded to the nearest minute)
- Behavior
- Height of flight at first detection, and minimum and maximum flight height during observation within the standardized survey cylinder.

Additional data were recorded for each eagle observed during the standardized surveys, including the distance to initial eagle detection, closest distance to the detection, time of detection, duration of flight within the rotor-swept zone (RSZ) to the nearest 0.1 minute, and duration of flight within the 2,625 ft (800 m)–radius, 656 ft (200 m)–high survey cylinder to the nearest full minute, rounded upward for fractions of a minute (e.g., eagle-minutes; USFWS 2013). Eagle flight paths were also mapped to document eagles' directional movements within the survey area. While not part of the standardized survey protocol, these data were also recorded for incidental eagle observations where feasible.

At the conclusion of each eagle survey event, biologists confirmed that the data sheet was complete and legible and then proceeded to the next survey station.

2.3 Avian Use Surveys

Point count methodologies adhered to typical industry standard recommendations (National Wind Coordinating Committee 1999, Strickland et al. 2011) and those targeted specifically at providing collision risk due diligence. The same point count stations that were established for eagle use surveys were also used for the avian use surveys. However, the avian use surveys were conducted during the spring (March to May) and fall (August to November) migration periods. Avian point count surveys during the spring migration period were conducted between April 1 and May 31, 2017, and between March 1 and March 31, 2018. The fall migration avian point count surveys were conducted between August 1 and November 30, 2017. As with the timing of eagle use surveys (Section 2.2), points were divided into two subgroups; each subgroup was surveyed on alternating weeks, and each point was visited twice per month.

These survey periods coincide with the periods of highest expected avian use during the year. Point count methodology followed the ECPG but with minor adaptations to accommodate the capture of baseline avian use data for a wider array of avian taxa.

The point count protocol was designed to document diurnal horizontal and vertical bird movements through the Avian Use Study Area. For each point count station monitoring event, biologists conducted a 20-minute point count, recording all avian species detected during that period. Large-bodied birds detected within a 2,625 ft (800 m)–radius survey cylinder (0.77 square miles [2 km^2]) and small-bodied birds detected within a 984 ft (300 m)–radius survey cylinder (0.11 square miles [0.28 km^2]) were recorded. Small-bodied species include the passerine group (perching birds except large-bodied crows and ravens) and most non-passerine species (woodpeckers, doves, hummingbirds, swifts). Large-bodied species include all waterfowl, waterbirds (gulls, terns, cormorants, pelicans), wading birds (herons, cranes, ibises), shorebirds, upland gamebirds (pheasants, grouse, partridges), and some non-passerines and passerines (nightjars, Rock Pigeons *[Columba livia],* Pileated Woodpeckers *[Dryocopus pileatus],* and large-bodied corvids such as crows and ravens).

In total, avian use surveys were conducted over 68 cumulative hours during the spring survey periods in 2017 and 2018 and over 90.7 cumulative hours during the fall survey period in 2017. The surveys occurred over 30 cumulative hours during the spring survey periods in 2017 and 2018 at 15 points within 2,625 ft (800 m) of the Project, and over 24 cumulative hours at 12 points within the Project boundary. Avian use surveys occurred over 40 cumulative hours during the 2017 fall survey period at 15 points within 2,625 ft (800 m) of the Project, and over 32 cumulative hours during the fall 2017 survey period at 12 points within the Project boundary. Avian use survey effort for each point is summarized in Table 1.

The start and end times of the 20-minute observation period were recorded for each survey event. Surveys were conducted between dawn and dusk. For each bird observation (visual and auditory), biologists recorded the following information:

- Species
- Time at which the bird was first observed
- Number of associated individuals (where birds are observed as part of a pair or flock)
- Behavior
- Height of flight
- Distance from observer
- Habitat in which the bird was first observed.

At the conclusion of each 20-minute observation period/survey event, biologists confirmed that the data sheet was complete and legible and then proceeded to the next survey station.

2.4 Incidental Observations

Outside of standardized surveys, incidental avian data were recorded for raptors, eagles, and bird species of concern that were observed within the Avian Use Study Area. Attention was given to habitats that may act as local concentration points for a variety of avian taxa and potential habitat for bird species of concern. All observation locations were marked with a global positioning system (i.e., GPS), and species, number of individuals, and behaviors were recorded. Incidental detections included observations recorded while en route to surveys, birds observed outside the 2,625 ft (800 m)–radius, 656 ft (200 m)–high standardized survey cylinder during point count surveys, birds observed immediately outside the beginning and end of the point count survey's duration, and birds observed during nonstandardized breeding bird surveys.

2.5 Data Management

The survey protocols described above were performed by five avian biologists over the course of the study. All completed data forms were proofread and photocopied, with data subsequently entered into an electronic database and proofread as part of a quality assurance/quality control program.

2.6 Data Analysis

2.6.1 Eagle Use Surveys

Eagle and avian use survey data were organized and analyzed with Microsoft Excel and Program R (R Core Team 2018). The following metrics were recorded in the field or calculated later using data collected from the eagle use surveys:

- *Seasonal mean use rate* for eagles and other raptors is the total number of individuals detected during standardized surveys per 2,625 ft (800 m)–radius plot per 20-minute survey segment. All three consecutive 20-minute segments of each point visit's 60-minute count were used to calculate mean use rates. Reported as detections/800 m plot/20-minute point count segment, seasonal mean use rates are summarized for each individual point count station and averaged across all point count stations. Data were summarized in 20-minute segments rather than for the entire 60-minute visit for ease of data management and to allow comparison with avian use data that were also collected over 20-minute segments, if desired.
- *Raptor occurrence frequency* is the number of 20-minute survey segments during which a species was detected, divided by the total number of 20-minute survey segments conducted. Occurrence frequency is summarized by month and season. All three 20-minute

segments of each point visit's 60-minute count were used to calculate occurrence frequencies. Incidental detections are not included in occurrence frequency calculations.

- *Flight time* was recorded to the nearest 0.1 minute for duration of bird flight within the RSZ and less than 2,625 ft (800 m) from the survey point for all raptors. Following ECPG (USFWS 2013), eagle-minutes were also recorded for all Bald Eagle *(Haliaeetus leucocephalus)* and Golden Eagle *(Aquila chrysaetos)* detections. Eagle-minutes represent the duration of flight (to the nearest minute, rounded up for fractions) within the 2,625 ft (800 m)–radius, 656 ft (200 m)–high survey cylinder.
- *Direction of movement* was recorded during the surveys to analyze seasonal patterns in movement. All Bald Eagle and Golden Eagle detections within the survey cylinder were also plotted on 328 x 328 ft (100 x 100 m) gridded maps to document flight paths through the survey cylinder.
- *Raptor species percent composition* is the total number of observed individuals of the taxon divided by the total number of raptors observed during the survey period. Incidental detections are not included in percent composition calculations.

2.6.2 Avian Use Surveys

For data collected during the avian use surveys, the seasonal mean use rate represents the total number of individuals detected during standardized surveys per 2,625 ft (800 m)–radius plot per 20-minute survey for large-bodied species, and the total number of individuals detected per 984 ft (300 m)–radius plot per 20-minute survey for small-bodied species. Reported as detections/800 m plot/20-minute count segment for large-bodied species and detections/300 m plot/20-minute count segment for small-bodied species, seasonal mean use rates are summarized for each individual point count station and averaged across all point count stations. Flight heights are likewise reported for flights recorded within the 2,625 ft (800 m)–radius plot for large-bodied species and within the 984 ft (300 m)–radius plot for small-bodied species.

2.6.3 North Dakota Species of Conservation Priority

The North Dakota State Wildlife Action Plan (Dyke et al. 2015) lists Species of Conservation Priority (SCP), including avian SCP species. Under this plan, species are classified according to their conservation priority. Level I species have a high conservation priority because of declining status in North Dakota or across their range, or because North Dakota represents a core segment of their breeding range. Level II species have moderate conservation priority or may hold a high conservation priority, but a substantial level of non–State Wildlife Grant funding may be available for their conservation. Level III species have moderate conservation priority but are peripheral or nonbreeding in North Dakota.

3.0 RESULTS AND DISCUSSION

Eagle use survey results, along with discussion regarding annual and seasonal patterns, spatial distribution (where sample size allowed), directional movements, and flight heights are presented in Sections 3.1 and 3.2. Monthly occurrences, frequencies, and flight heights for all spring and fall avian use are discussed in Section 3.3. All survey results are presented for the 200 MW Project as well as for the entire Avian Use Study Area.

3.1 Bald Eagle Use

3.1.1 Overall Detections

Across the Avian Use Study Area, 24 Bald Eagles were detected over 840 hours of standardized eagle use survey effort (Table 2). This total includes several detections that were the same individual counted twice in concurrent 20-minute count segments. Accounting for this potential duplication, 21 discrete Bald Eagle observations that occurred within the standardized survey cylinder during point count surveys are mapped on Figure 2 (**Appendix I**). While these totals only include eagles observed within the 2,625 ft (800 m)–radius, 656 ft (200 m)–high survey cylinder, an additional 26 incidental detections were documented across the Avian Use Study Area during the one-year survey period, including detections outside the survey cylinder during point count surveys and detections recorded while en route to point count stations.

Six of the 24 standardized Bald Eagle detections occurred over 360 hours of standardized eagle use survey effort at the 15 point count stations with survey cylinders that intersected the Project (Table 3). Seven incidental Bald Eagle detections occurred within the Project. Bald Eagle totals are depicted by season, separated by detection type (standardized survey or incidental) within the Project and the Avian Use Study Area, in Figure 3 (**Appendix I**).

3.1.2 Seasonality

Bald Eagles were only recorded as standardized detections during the spring and fall surveys. Surveyors did not observe Bald Eagles during summer surveys, and Bald Eagles were only recorded as incidental detections during winter surveys. Within the Avian Use Study Area, standardized mean use was 0.013 Bald Eagle detections/800 m plot/20-minute survey segment (standard deviation [SD] = 0.114) during the spring survey period and 0.020 Bald Eagle detections/800 m plot/20-minute survey segment (SD = 0.170) during the fall period (Table 2). Within the Project, spring standardized mean use was 0.016 Bald Eagle detections/800 m plot/20-minute survey segment (SD = 0.105) and fall standardized mean use was 0.010 Bald Eagle detections/800 m plot/20-minute count segment (Table 3). Monthly species-specific occurrence frequencies, depicted in Figure 4 (**Appendix I**), provide additional seasonal context for raptor use of the Avian Use Study Area by charting frequency of occurrence for the most common raptor species across the year.

Accounting for the total eagle use survey effort across the Avian Use Study Area during the spring survey period, the equivalent of one Bald Eagle was detected for every 25.6 hours of standardized eagle use survey effort. During the fall survey period, the equivalent of one Bald Eagle was detected for every 16.7 hours of standardized eagle use survey effort.

Accounting for total eagle use survey effort across the Project (15 points with survey cylinders intersecting the Project, 90 spring survey hours, and 120 fall hours) one Bald Eagle was detected within the Project for every 30 hours of standardized eagle use survey effort during the spring. One Bald Eagle was detected within the Project for every 40 hours of standardized eagle use surveys during the fall.

3.1.3 Other Raptor Use

Observed Bald Eagle seasonal use patterns indicated slightly higher eagle use in the fall than the spring and low levels of eagle use in the summer and winter. These use patterns generally paralleled the seasonal use patterns for the raptor guild (hawks, eagles, falcons, and owls) (Tables 2 and 3). Mean raptor use was:

- *highest* during the fall period (Project: 0.861 raptors/800 m plot/20-minute survey segment; Avian Use Study Area: mean use = 0.787 raptors/800 m plot/20-minute survey segment; SD = 1.451),
- *similar* during the spring (Project: 0.700 raptors/800 m plot/20-minute survey segment; Avian Use Study Area: mean use = 0.760 raptors/800 m plot/20-minute survey segment; SD = 1.266),
- *low* in the summer (Project: 0.411 raptors/800 m plot/20-minute survey segment; Avian Use Study Area: mean use = 0.452 raptors/800 m plot/20-minute survey segment; SD = 0.803), and
- *very low* during the winter period (Project: 0.56 raptors/800 m plot/20-minute survey segment; Avian Use Study Area: mean use = 0.039 raptors/800 m plot/20-minute survey segment; SD = 0.203).

A total of 24 raptors were observed over 204 hours of standardized eagle use surveys across the Avian Use Study Area during the winter.

Among the raptor guild as a whole, Red-tailed Hawks *(Buteo jamaicencis)* and Northern Harriers *(Circus cyaneus)* comprised much of the raptor use during the spring and fall (Tables 2 and 3). Swainson's Hawks (*Buteo swainsoni)*, which arrived in migration later in the spring, comprised much of the summer raptor use. Rough-legged Hawks *(Buteo lagopus),* which arrived in fall migration, comprised much of the winter use. Winter raptor use of the Project was minimal once wintering Rough-legged Hawks moved south of the Project, during the coldest part of the season.

3.1.4 Spatial Distribution of Detections

Bald Eagle mean use rates were uniformly low across the Avian Use Study Area and the 200 MW Project. There was not a clear spatial pattern to eagle detections within the spring or fall, the seasons in which they were detected during standardized surveys. There was no evidence from the pattern of observations of eagles that physiographic features such as ridgelines were concentrating eagle use within specific areas of the Project; this lack of a spatial pattern in the spring and fall suggests that Bald Eagles migrate through the Avian Use Study Area in a broad front. Bald Eagle mean use in the spring and fall is graphically depicted in the Bald Eagle Mean Use Map (Figure 5a, **Appendix I**).

For additional context, a review of the raptor guild's larger sample size shows that raptors as a whole did not exhibit strong inter-seasonal patterns of spatial use within the Avian Use Study Area that might suggest local concentrations of use. However, point count stations with the highest spring and summer raptor use rates tended to be in the portion of the Avian Use Study Area to the east of the Project (Figure 5b, **Appendix I**). In contrast, the four point count stations (stations #25, 16, 11, and 27) with the highest observed mean use rates during the fall were within the western portion of the Avian Use Study Area, within or adjacent to the Project.

Table 2. Raptor Survey Seasonal Use Summary Statistics within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Summer					Fall					Winter				
Species Group/ Species Name	Total Std. Detections	Comp.	Mean Use (birds/ 800 m plot /20 min)	SD.	Occur. Freq.	Total Std. Detections	Comp.	Mean Use (birds/ 800 m plot /20 min)	SD	Occur. Freq.	Total Std. Detections	Comp.	Mean Use (birds/ 800 m plot /20 min)	SD	Occur. Freq.	Total Std. Detections	Comp.	Mean Use (birds/ 800 m plot/ 20 min)	SD	Occur. Freq.
American Kestrel [b]	10	0.022	0.016	0.127	0.016	2	0.009	0.004	0.064	0.004	14	0.022	0.017	0.148	0.015	-	-	-	-	-
Bald Eagle [b]	8	0.017	0.013	0.114	0.013	-	-	-	-	-	16	0.025	0.020	0.170	0.015	-	-	-	-	-
Broad-winged Hawk	1	0.002	0.002	0.040	0.002	-	-	-	-	-	25	0.039	0.031	0.584	0.007	-	-	-	-	-
Cooper's Hawk	5	0.011	0.008	0.090	0.008	4	0.018	0.008	0.091	0.008	12	0.019	0.015	0.130	0.013	-	-	-	-	-
Ferruginous Hawk [a]	-	-	-	-	-	-	-	-	-	-	4	0.006	0.005	0.070	0.005	-	-	-	-	-
Golden Eagle [b]	-	-	-	-	-	-	-	-	-	-	1	0.002	0.001	0.035	0.001	1	0.042	0.002	0.040	0.002
Great Horned Owl	5	0.011	0.008	0.090	0.008	1	0.005	0.002	0.046	0.002	3	0.005	0.004	0.078	0.002	-	-	-	-	-
Merlin	4	0.009	0.007	0.081	0.007	-	-	-	-	-	6	0.009	0.007	0.085	0.007	-	-	-	-	-
Northern Goshawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.042	0.002	0.040	0.002
Northern Harrier [b]	171	0.368	0.279	0.686	0.186	26	0.120	0.054	0.236	0.052	154	0.240	0.189	0.484	0.158	-	-	-	-	-
Osprey	1	0.002	0.002	0.040	0.002	-	-	-	-	-	1	0.002	0.001	0.035	0.001	-	-	-	-	-
Peregrine Falcon [c]	3	0.006	0.005	0.070	0.005	1	0.005	0.002	0.046	0.002	-	-	-	-	-	-	-	-	-	-
Prairie Falcon [b]	-	-	-	-	-	-	-	-	-	-	1	0.002	0.001	0.035	0.001	-	-	-	-	-
Red-tailed Hawk	201	0.432	0.328	0.808	0.203	136	0.627	0.283	0.655	0.219	296	0.461	0.363	0.802	0.234	-	-	-	-	-
Rough-legged Hawk	2	0.004	0.003	0.057	0.003	-	-	-	-	-	54	0.084	0.066	0.344	0.047	11	0.458	0.018	0.145	0.016
Sharp-shinned Hawk	6	0.013	0.010	0.099	0.010	-	-	-	-	-	15	0.023	0.018	0.152	0.016	-	-	-	-	-
Short-eared Owl [b]	1	0.002	0.002	0.040	0.002	-	-	-	-	-	-	-	-	-	-	3	0.125	0.005	0.070	0.005
Snowy Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	0.167	0.007	0.081	0.007
Swainson's Hawk [a]	34	0.073	0.056	0.263	0.049	44	0.203	0.092	0.329	0.079	28	0.044	0.034	0.235	0.025	-	-	-	-	-
Turkey Vulture	10	0.022	0.016	0.161	0.011	3	0.014	0.006	0.079	0.006	10	0.016	0.012	0.140	0.009	-	-	-	-	-
Unknown Accipiter	-	-	-	-	-	-	-	-	-	-	1	0.002	0.001	0.035	0.001	-	-	-	-	-
Unknown Eagle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0.125	0.005	0.070	0.005
Unknown Falcon	-	-	-	-	-	-	-	-	-	-	1	0.002	0.001	0.035	0.001	1	0.042	0.002	0.040	0.002
Unknown Owl Species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unknown Raptor	3	0.006	0.005	0.070	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
All Raptors	**465**	**1.000**	**0.760**	**1.266**	**0.389**	**217**	**1.000**	**0.452**	**0.803**	**0.327**	**642**	**1.000**	**0.787**	**1.451**	**0.420**	**24**	**1.000**	**0.039**	**0.203**	**0.038**

Seasonal mean use statistics by species

- *Total Standard Detections* = total number of detections occurring within the 800 m–radius survey cylinder during standardized use surveys
- Detection totals are cumulative and occasionally may double-count individuals observed across concurrent 20-minute segments at the point.
- *Composition* = fraction of species composition using total standardized detections
- *Mean Use* = total standardized detections divided by number of point count segments conducted within the season, with standard deviation (SD)
- *Occurrence Frequency* = the number of segments at which the taxon was detected divided by the total number of segments conducted during that season
- North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table 3. Raptor Survey Seasonal Use Summary Statistics within the Burke County Wind Project (Burke County, North Dakota)

	Spring					Summer					Fall					Winter				
Species Group/Species Name	Total Std. Detections	Comp.	Mean Use (birds/ 800 m plot /20 min)	SD	Occur. Freq.	Total Std. Detections	Comp.	Mean Use (birds/ 800 m plot /20-min)	SD	Occur. Freq.	Total Std. Detections	Comp.	Mean Use (birds/ 800 m plot /20 min)	SD	Occur. Freq.	Total Std. Detections	%Comp.	Mean Use (birds/ 800 m plot /20 min)	SD	Occur. Freq.
American Kestrel b	2	0.011	0.007	0.086	0.007	-	-	-	-	-	7	0.023	0.019	0.157	0.017	-	-	-	-	-
Bald Eagle b	3	0.016	0.011	0.105	0.011	-	-	-	-	-	3	0.010	0.008	0.118	0.006	-	-	-	-	-
Broad-winged Hawk	-	-	-	-	-	-	-	-	-	-	18	0.058	0.050	0.846	0.008	-	-	-	-	-
Cooper's Hawk	3	0.016	0.011	0.105	0.011	2	0.027	0.011	0.105	0.011	7	0.023	0.019	0.157	0.017	-	-	-	-	-
Ferruginous Hawk a	-	-	-	-	-	-	-	-	-	-	2	0.006	0.006	0.074	0.006	-	-	-	-	-
Golden Eagle b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.067	0.004	0.061	0.004
Great Horned Owl	2	0.011	0.007	0.086	0.007	-	-	-	-	-	3	0.010	0.008	0.118	0.006	-	-	-	-	-
Merlin	1	0.005	0.004	0.061	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern Goshawk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.067	0.004	0.061	0.004
Northern Harrier b	69	0.365	0.256	0.683	0.174	8	0.108	0.044	0.232	0.039	76	0.245	0.211	0.528	0.175	-	-	-	-	-
Osprey	-	-	-	-	-	-	-	-	-	-	1	0.003	0.003	0.053	0.003	-	-	-	-	-
Peregrine Falcon c	1	0.005	0.004	0.061	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rough-legged Hawk	2	0.011	0.007	0.086	0.007	-	-	-	-	-	26	0.084	0.072	0.395	0.047	6	0.400	0.022	0.148	0.022
Red-tailed Hawk	82	0.434	0.304	0.779	0.189	53	0.716	0.294	0.536	0.256	135	0.435	0.375	0.773	0.247	-	-	-	-	-
Sharp-shinned Hawk	4	0.021	0.015	0.121	0.015	-	-	-	-	-	8	0.026	0.022	0.181	0.017	-	-	-	-	-
Short-eared Owl b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.133	0.007	0.086	0.007
Snowy Owl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	0.267	0.015	0.121	0.015
Swainson's Hawk a	16	0.085	0.059	0.266	0.052	11	0.149	0.061	0.262	0.056	19	0.061	0.053	0.308	0.033	-	-	-	-	-
Turkey Vulture	4	0.021	0.015	0.149	0.011	-	-	-	-	-	5	0.016	0.014	0.158	0.008	-	-	-	-	-
Falcon sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.067	0.004	0.061	0.004
All Raptors	**189**	**-**	**0.700**	**1.205**	**0.378**	**74**	**--**	**0.411**	**0.641**	**0.333**	**310**	**-**	**0.861**	**1.730**	**0.444**	**15**	**-**	**0.056**	**0.229**	**0.056**

Seasonal mean use statistics by species

- *Total Standard Detections* = total number of detections occurring within the 800 m–radius survey cylinder during standardized use surveys
- Detection totals are cumulative and occasionally may double-count individuals observed across concurrent 20-minute segments at the point.
- *Composition* = fraction of species composition using total standardized detections
- *Mean Use* = total standardized detections divided by number of point count segments conducted within the season, with standard deviation (SD)
- *Occurrence Frequency* = the number of segments at which the taxon was detected divided by the total number of segments conducted during that season
- North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

3.1.5 Directional Movements

Rose plots provide a broad-scale view of directional movement patterns throughout the Avian Use Study Area (Figures 6a and 6b [**Appendix I**]). These figures plot frequencies of directional movement among eagles observed during standardized surveys by season. Green-shaded 'petals' provide an illustrated assessment of each cardinal direction's relative dominance among movements captured in the sample. The strongest trends were for Bald Eagle movements—north-northwestward in the spring and southward in the fall. These patterns are expected for individuals encountered during their migrations, suggesting that the Bald Eagles observed during the standardized surveys were migratory, not wintering or breeding within or near the Avian Use Study Area. Directional movement plots are only provided for the Avian Use Study Area because of low sample sizes recorded within the 200 MW Project.

3.1.6 Flight Heights

Tables 4 and 5 summarize the mean distributions of minimum and maximum flight heights for raptor species with the largest sample sizes detected during standardized eagle use surveys. These two tables detail seasonal flight heights within the Avian Use Study Area and at 15 points with survey cylinders that intersect the Project, respectively. The following is a summary of flight height results.

- Spring – Mean flight heights within the Project and the larger Avian Use Study Area were highest during the spring survey period for Bald Eagles and most other raptor species (Tables 4 and 5). Bald Eagle mean minimum and maximum flight heights were within the RSZ during the spring period, within both the Project and the larger Avian Use Study Area. Within the Project, minimum and maximum mean flight heights were within the RSZ for Cooper's Hawk *(Accipiter cooperii),* the Red-tailed Hawk, and the Rough-legged Hawk. Mean maximum flight height was within the RSZ for the Swainson's Hawk. Mean minimum and maximum flight heights were below the RSZ for the American Kestrel *(Falco sparverius)* and Northern Harrier.
- Summer – Bald Eagles were not recorded during standardized surveys in the summer. Within the Project, both minimum and maximum mean flight heights were within the RSZ for Swainson's Hawk (Table 5). Swainson's Hawk flight heights were lower across the greater Avian Use Study Area (Table 4), and mean minimum flight height was below the RSZ. Mean maximum flight height was within the RSZ for the Red-tailed Hawk in both the Project and the Avian Use Study Area. Mean flight heights were below the RSZ for Cooper's Hawk and the Northern Harrier.
- Fall – Within the Project, Bald Eagle minimum and maximum mean flight heights were below the RSZ. Mean minimum and maximum flight heights were within the RSZ for the Broad-winged Hawk *(Buteo platypterus),* and mean maximum flight height was within the

RSZ for the Red-tailed Hawk and Cooper's Hawk. Mean minimum and maximum flight heights were below the RSZ for the American Kestrel, Ferruginous Hawk *(Buteo regalis),* Northern Harrier, and Rough-legged Hawk. A lone Golden Eagle that was observed during standardized surveys outside the Project but within the Avian Use Study Area was recorded within the RSZ.

- Winter – There were no standardized detections of Bald Eagles during the winter period. Mean maximum flight heights were within the RSZ for the Golden Eagle and Rough-legged Hawk within both the Project and the greater Avian Use Study Area.
- Within the Project, Bald Eagle mean maximum flight height was 191.37 ft (58.33 m). Bald Eagle mean minimum flight height was 76.02 ft (23.17 m). Within the Avian Use Study Area, Bald Eagle mean maximum flight height was 201.15 ft (61.31 m). Bald Eagle mean minimum flight height was 91.57 ft (27.91 m).

Table 4. Raptor Mean Flight Heights within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

		Spring					Summer					Fall					Winter					Year				
Species	Flight Height	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95 %CI Bound	Lower 95% CI Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95 %CI Bound	Lower 95% CI Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95 %CI Bound	Lower 95% CI Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95 %CI Bound	Lower 95% CI Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95 %CI Bound	Lower 95% CI Bound
American Kestrel[b]	Min	3	10.00	8.66	-11.51	31.51	1	2.00	-	2.00	2.00	8	17.13	29.72	-7.71	41.97	-	-	-	-	-	12	14.08	24.50	-1.49	29.65
	Max	10	13.20	3.16	10.94	15.46	2	6.00	-	6.00	6.00	14	16.93	22.98	3.66	30.20	-	-	-	-	-	26	14.65	16.97	7.79	21.51
Bald Eagle[b]	Min	8	51.25	29.97	26.19	77.44	-	-	-	-	-	14	14.57	15.40	5.68	23.46	-	-	-	-	-	22	27.91	27.79	15.59	40.23
	Max	8	110.63	64.72	45.91	164.74	-	-	-	-	-	15	35.00	22.07	22.78	47.22	-	-	-	-	-	23	61.31	54.76	37.63	84.99
Broad-winged Hawk	Min	-	-	-	-	-	-	-	-	-	-	9	53.89	48.78	16.39	91.39	-	-	-	-	-	9	53.89	48.78	16.39	91.39
	Max	1	12.00	-	12.00	12.00	-	-	-	-	-	9	73.89	63.82	24.83	122.95	-	-	-	-	-	10	67.70	63.28	22.43	112.97
Cooper's Hawk	Min	5	54.40	69.47	-15.07	140.66	4	15.00	14.63	-8.28	38.28	12	45.75	82.51	-6.68	98.18	-	-	-	-	-	21	41.95	70.25	9.97	73.93
	Max	5	69.20	61.48	7.72	145.53	4	23.00	19.70	-8.34	54.34	12	57.33	81.04	5.84	108.82	-	-	-	-	-	21	53.62	68.43	22.47	84.77
Ferruginous Hawk[a]	Min	-	-	-	-	-	-	-	-	-	-	4	15.75	16.30	-10.18	41.68	-	-	-	-	-	4	15.75	16.30	-10.18	41.68
	Max	-	-	-	-	-	-	-	-	-	-	4	31.25	16.52	4.97	57.53	-	-	-	-	-	4	31.25	16.52	4.97	57.53
Golden Eagle[b]	Min	-	-	-	-	-	-	-	-	-	-	1	45.00	0.00	45.00	45.00	1	15.00	-	15.00	15.00	2	30.00	21.21	-160.59	220.59
	Max	-	-	-	-	-	-	-	-	-	-	1	80.00	0.00	80.00	80.00	1	60.00	-	60.00	60.00	2	70.00	14.14	-57.06	197.06
Northern Harrier[b]	Min	149	11.34	25.08	7.28	15.40	24	4.54	7.84	1.23	7.85	145	4.55	17.81	1.63	7.47	-	-	-	-	-	318	7.73	21.30	5.38	10.08
	Max	170	23.04	35.81	17.62	28.46	26	10.92	11.56	6.25	15.59	153	10.35	23.76	6.55	14.15	-	-	-	-	-	349	16.58	30.31	13.39	19.77
Red-tailed Hawk	Min	162	40.85	47.71	33.45	48.25	91	25.65	22.92	20.88	30.42	230	33.04	40.40	27.79	38.29	-	-	-	-	-	483	34.27	40.78	30.62	37.92
	Max	186	55.95	54.69	48.04	63.86	113	36.40	24.43	31.85	40.95	279	41.42	41.24	36.56	46.28	-	-	-	-	-	578	45.11	44.20	41.50	48.72
Rough-legged Hawk	Min	2	67.50	60.10	-472.51	607.51	-	-	-	-	-	39	14.23	10.93	10.69	17.77	4	26.25	18.87	-3.78	56.28	45	17.67	18.43	12.14	23.20
	Max	2	90.00	70.71	-545.30	725.30	-	-	-	-	-	51	28.41	13.75	24.54	32.28	7	45.00	22.91	23.81	66.19	60	32.40	21.06	26.96	37.84
Swainson's Hawk[a]	Min	32	27.00	24.56	35.86	18.14	36	27.17	30.73	37.57	16.77	22	28.64	30.28	22.07	42.07	-	-	-	-	-	90	27.47	28.25	33.39	21.55
	Max	34	45.50	28.62	55.49	35.51	41	39.54	35.66	50.79	28.29	25	57.40	65.36	84.20	30.60	-	-	-	-	-	100	46.03	43.27	54.62	37.44

Seasonal mean flight height statistics by raptor species. Flight heights recorded within the 800 m–radius survey cylinder during standardized use surveys. Zero-value heights (i.e., perched) not included in calculation of means; a bird perched throughout the count period would have both minimum and maximum flight heights of 0 m. Sample size totals are cumulative and occasionally may double-count individuals observed across concurrent 20-minute segments at the point. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.
CI = confidence interval; SD = standard deviation

Table 5. Raptor Mean Flight Heights within the Burke County Wind Project (Burke County, North Dakota)

		Spring					Summer					Fall					Winter					Year				
Species	Flight Height	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95% CI Bound	Lower 95% CI Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95% CI Bound	Lower 95% CI Bound	Sam-ple Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95% CI Bound	Lower 95% CI Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95% CI Bound	Lower 95% CI Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	Upper 95% CI Bound	Lower 95% CI Bound
American Kestrel[b]	Min	2	12.50	10.61	107.80	-82.80	-	-	-	-	-	5	26.00	35.78	70.42	-18.42	-	-	-	-	-	7	22.14	30.26	50.13	-5.84
	Max	2	17.50	3.54	49.27	-14.27	-	-	-	-	-	7	26.29	30.52	54.51	-1.94	-	-	-	-	-	9	24.33	26.74	44.89	3.78
Bald Eagle[b]	Min	3	41.67	2.89	48.84	34.50	-	-	-	-	-	3	4.67	4.73	16.41	-7.07	-	-	-	-	-	6	23.17	20.57	44.75	1.58
	Max	3	93.33	83.86	301.67	-115.00	-	-	-	-	-	3	23.33	2.89	30.50	16.16	-	-	-	-	-	6	58.33	65.47	127.04	-10.38
Broad-winged Hawk	Min	-	-	-	-	-	-	-	-	-	-	4	86.25	49.56	165.11	7.39	-	-	-	-	-	4	86.25	49.56	165.11	7.39
	Max	-	-	-	-	-	-	-	-	-	-	4	117.50	71.36	231.04	3.96	-	-	-	-	-	4	117.50	71.36	231.04	3.96
Cooper's Hawk	Min	3	47.33	80.25	246.69	-152.02	2	13.00	16.97	165.47	-139.47	7	28.14	21.57	48.10	8.19	-	-	-	-	-	12	30.42	39.84	55.73	5.10
	Max	3	52.00	76.32	241.58	-137.58	2	22.00	25.46	250.71	-206.71	7	38.43	29.11	65.35	11.50	-	-	-	-	-	12	39.08	40.98	65.12	13.05
Ferruginous Hawk[a]	Min	-	-	-	-	-	-	-	-	-	-	2	25.00	21.21	215.59	-165.59	-	-	-	-	-	2	25.00	21.21	215.59	-165.59
	Max	-	-	-	-	-	-	-	-	-	-	2	32.50	24.75	254.86	-189.86	-	-	-	-	-	2	32.50	24.75	254.86	-189.86
Golden Eagle[b]	Min	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	15.00	-	15.00	15.00	1	15.00	-	15.00	15.00
	Max	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	60.00	-	60.00	60.00	1	60.00	-	60.00	60.00
Northern Harrier[b]	Min	59	9.00	11.60	12.02	5.98	8	1.13	0.35	1.42	0.83	71	6.37	25.00	12.28	0.45	-	-	-	-	-	138	7.19	19.50	10.47	3.91
	Max	69	26.52	34.67	34.85	18.19	8	6.63	3.02	9.15	4.10	76	11.88	31.95	19.18	4.58	-	-	-	-	-	153	18.21	33.17	23.51	12.91
Red-tailed Hawk	Min	73	37.42	35.12	45.62	29.23	35	29.91	26.21	38.92	20.91	103	34.61	36.40	41.73	27.50	-	-	-	-	-	211	34.81	34.41	39.48	30.14
	Max	80	58.36	46.67	68.75	47.98	44	41.27	27.65	49.68	32.87	126	43.63	39.88	50.67	36.60	-	-	-	-	-	250	47.93	40.91	53.03	42.84
Rough-legged Hawk	Min	2	67.50	60.10	607.51	-472.51	-	-	-	-	-	16	15.44	14.06	22.93	7.94	3	33.33	15.28	71.28	-4.61	21	22.95	24.74	34.21	11.69
	Max	2	90.00	70.71	725.31	-545.31	-	-	-	-	-	24	28.75	14.55	34.89	22.61	5	50.00	25.50	81.66	18.34	31	36.13	26.17	45.73	26.53
Swainson's Hawk[a]	Min	16	28.75	23.27	41.15	16.35	11	45.91	37.20	70.90	20.92	14	33.93	34.98	54.13	13.73	-	-	-	-	-	41	35.12	31.55	45.08	25.16
	Max	16	49.50	28.57	64.72	34.28	11	61.36	44.11	91.00	31.73	17	66.47	77.69	106.41	26.53	-	-	-	-	-	44	59.02	55.13	75.79	42.26

Seasonal mean flight height statistics by raptor species. Flight heights recorded within 800 m–radius survey cylinder during standardized use surveys. Zero-value heights (i.e., perched) not included in calculation of means; a bird perched throughout the count period would have both minimum and maximum flight heights of 0 m. Sample size totals are cumulative and occasionally may double-count individuals across concurrent 20-minute segments at the point. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.
CI = confidence interval; SD = standard deviation

3.2 Golden Eagles

Overall, two Golden Eagles were detected during 840 hours of eagle use surveys within the Avian Use Study Area, and one was observed during 360 hours of eagle use surveys at 15 points within or immediately adjacent to the Project (Figure 2, **Appendix I**). Within the Avian Use Study Area, standardized mean use was 0.001 Golden Eagles/800 m plot/20-minute count segment (SD = 0.035) during the fall and 0.002 Golden Eagles/800 m plot/20-minute count segment (SD = 0.040) during the winter. Within the Project, mean use was 0.004 Golden Eagles/800 m plot/20-minute count segment during the winter, the only season they were encountered within the Project on standardized surveys. The single Golden Eagle observed during the fall spent 2.4 minutes within the RSZ, and the Golden Eagle observed during the winter spent 2.1 minutes within the RSZ. An additional six Golden Eagles were incidentally detected within the Avian Use Study Area. Four of these incidental detections were recorded within the Project or immediately adjacent to the Project boundary (Figure 2, **Appendix I**).

The following is a summary of seasonal Golden Eagle observations, as depicted in Figure 2:

- Spring – Three Golden Eagles were observed during the spring survey period; however, each Golden Eagle was observed incidental to standardized use surveys, either outside the 2,625 ft (800 m)–radius survey cylinders or recorded while en route to survey locations within the Avian Use Study Area. One of these incidental spring detections was recorded near the Project boundary—an adult flying northward in May.
- Summer – No Golden Eagles were observed during the summer.
- Fall – Four Golden Eagles were detected during the fall migration survey period. One immature individual was observed during standardized eagle use surveys outside the Project, heading northward. The other three individuals were observed incidentally within the Project; the observations were made either outside the 2,625 ft (800 m)–radius survey cylinders or recorded while en route between point count stations.
- One adult Golden Eagle was observed during the winter period, during standardized eagle use surveys within the Project.

In total, two adults, two immatures, and four unaged Golden Eagles were observed within the Avian Use Study Area. Two adults, one immature, and two unaged individuals were observed within the Project. In contrast to Bald Eagles, Golden Eagles observed during the study period did not generally follow expected directional movements (e.g., northbound in the spring and southbound in the fall [Atwell data]). While sample sizes are small, this pattern suggests that the Golden Eagles seen during the study period were not migrating at the time of observation.

3.3 Avian Use

The following sections summarize the results of the avian use studies.

3.3.1 Federally Listed Threatened and Endangered Species

Standardized spring and fall avian use surveys did not detect the presence of any federal threatened/endangered species using Project habitats during migration. An incidental observation of three Whooping Cranes (*Grus americana*) migrating northbound over the Project occurred on April 10, 2017, in Leaf Mountain Township, Burke County (Atwell 2017a). These cranes were not observed flying through the RSZ, nor were they observed as a standing flock within Project stopover habitat.

3.3.2 General Avian Use

Standardized mean use and avian point count data for all 142 species observed during 20-minute avian use point count surveys in the spring and fall are presented in **Appendix II.** A list of all species observed during the avian use studies is included in **Appendix III**. Data are grouped into four broad groups: waterfowl; waterbirds (pelicans, grebes, waders, coots and rails, cranes, shorebirds, gulls); raptors (hawks, eagles, vultures, owls, falcons); and land birds (upland gamebirds, non-passerines such as kingfishers and woodpeckers, and passerines).

The following is a summary of observed avian use:

- Avian use tended to be higher during the fall season than during the spring, an expected pattern in North America (Dokter et al. 2018). Exceptions included the Laughing Gull *(Leucophaeus pipixcan)* and Black Tern *(Chlidonias niger)*.
- During the spring migration avian use surveys, 7,798 total individuals were detected across the Avian Use Study Area, at a rate of approximately 38.2 birds/800 m plot/20-minute count segment. Across the Project, 3,831 total individuals were detected, at a rate of approximately 42.6 birds/800 m plot/20-minute point count segment. This does not include the raptor guild, discussed in Section 3.1.3.
- During the fall migration avian use surveys, 15,149 total individuals were detected, at a rate of approximately 55.7 birds/800 m plot/20-minute count segment. Across the Project, 8,711 total individuals were detected at a rate of 72.59 birds/800 m plot/20-minute point count segment. This does not include the raptor guild, discussed in Section 3.1.3.

Comparing avian mean use rates drawn from the Project area with the larger Avian Use Study Area, mean use rates for pothole and wetland-associated species (groups including waterfowl, wading birds such as herons and cranes, shorebirds, and other waterbirds such as gulls, coots, and cormorants) were generally similar across the Project and the Avian Use Study Area in the spring and fall, suggesting that pothole and wetland habitat availability was similar within the Project in comparison to the larger Avian Use Study Area. Sandhill Crane *(Grus canadensis)* mean use rates

were notably lower outside the Project. The 10 largest observed congregations of cranes (21–170 individuals) were migrating flocks observed in flight from point count station #31 on the edge of the Project and eastward.

Sharp-tailed Grouse *(Tympanuchus phasianellus;* SCP) were rarely seen during avian use surveys and were observed at similar rates within the Project and the Avian Use Study Area. Among other SCP associated with grassland habitats, mean use rates tended to be lower in the Project than in the Avian Use Study Area, suggesting that the Project is avoiding higher-quality grassland habitats found within the larger Avian Use Study Area. Sprague's Pipits *(Anthus spragueii)* were only observed within the Avian Use Study Area and not within the Project during avian use surveys, and Western Meadowlarks *(Sturnella neglecta)* and Bobolinks *(Dolichonyx oryzivorus)* were observed at lower rates in the Project than in the Avian Use Study Area (Appendix II).

Passerine mean use rates were higher in the Project than the larger Avian Use Study Area, particularly in the fall. Large concentrations of common passerine species (e.g., Common Grackle *[Quiscalus quiscula]* and Red-winged Blackbirds *[Agelaius phoeniceus]*) observed near or in agricultural habitats within the Project accounted for much of this difference.

The waterfowl and passerine guilds comprised the largest proportions of non-raptor detections in the spring and fall. Within the Project, passerines accounted for 50.6% of all non-raptor detections in the spring and 60.3% in the fall. Within the Avian Use Study Area, passerines accounted for 44.5% of all non-raptor detections in the spring and 45.5% during the fall. Within the Project, waterfowl accounted for 30.1% of all non-raptor detections during the fall and 26.4% during the spring. Within the Avian Use Study Area, waterfowl accounted for 33.1% of all non-raptor detections during the spring and 36.3% during the fall.

The following guild summaries describe mean use statistics, also presented in Tables A through H (**Appendix II**).

Large-Bodied Corvids

Large-bodied corvid (i.e., crows and ravens) mean use rates within the Avian Use Study Area were similar between the spring (0.377 detections/800 m plot/20-minute count segment) and the fall (0.294 detections/800 m plot/20-minute count segment). Large-bodied corvid mean use rates were lower within the Project (0.289 detections/800 m plot/20-minute count segment during the spring and 0.108 detections/800 m plot/20-minute count segment in the fall). This guild represented 1.0% of all non-raptor spring detections and 0.6% of all non-raptor fall detections in the Avian Use Study Area and 0.7% of all non-raptor spring detections and 0.1% of all non-raptor fall detections within the Project. Most corvid detections (Project: 80.8% of spring corvid detections and 61.5% of fall corvid detections; Avian Use Study Area: 86.8% of spring corvid detections and 70.9% of fall corvid detections) were American Crows (*Corvus brachyrhynchos*).

Non-Passerines

Non-passerines include woodpeckers, doves, pigeons, and swifts. Rock Pigeons (*Columba livia*) were classified as large-bodied passerines and detections were recorded to 800 m from the point count station. Other non-passerine species were classified as small-bodied, with detections recorded up to 300 m from the point count station. Rock Pigeon mean use detection rates were higher in the fall (Project: 0.850 detections/800 m plot/20-minute count segment; Avian Use Study Area: 0.787 detections/800 m plot/20-minute count segment) than in the spring (Project: 0.589 detections/800 m plot/20-minute count segment; Avian Use Study Area: 0.417 detections/800 m plot/20-minute count segment). Non-passerines represented 1.6% of spring non-raptor detections and 2.2% of fall non-raptor detections. Most non-passerine detections (66.4% of spring non-passerine detections and 62.9% of fall non-passerine detections) were Rock Pigeons.

Passerines Including Small-Bodied Corvids

Small-bodied passerine species (perching birds) accounted for a large portion of non-raptor detections both in the spring (Project: 50.6%; Avian Use Study Area: 44.5%) and in the fall (Project: 60.3%; Avian Use Study Area: 45.5%). Observers recorded mean use rates of 21.544 small-bodied passerines/800 m plot/20- minute count segment during the spring and 43.742 small-bodied passerines/800 m plot/20-minute count segment in the fall within the Project. Within the Avian Use Study Area, observers recorded mean use rates of 17.020 small-bodied passerines/800 m plot/20-minute count segment in the spring and 25.324 small-bodied passerines/800 m plot/20-minute count segment in the fall.

Sixty small-bodied passerine species were recorded during standardized avian use surveys. Common Grackles (Project: 8.5% of spring passerine detections and 51.5% of fall passerine detections; Avian Use Study Area: 7.8% of spring passerine detections and 43.4% of fall passerine detections) and Red-winged Blackbirds (Project: 19.5% of spring passerine detections and 19.6% of fall passerine detections; Avian Use Study Area: 22.1% of spring passerine detections and 20.8% of fall passerine detections) accounted for large proportions of passerine detections in the spring and fall.

Large congregations of Common Grackles, Red-winged Blackbirds, and longspurs played an important role in an observed pattern of higher passerine mean use rates within the Project relative to the Avian Use Study Area, particularly during the fall season. In September 2017, 2,500 Common Grackles were recorded during one visit at point #31, and 325 Red-winged Blackbirds were recorded during one visit at point #27. In October, a flock of 600 longspurs (observed at distance and only assessed to the generic level rather than species) were recorded during one visit at point #11. These three survey events combined to represent 65% of the cumulative total all fall passerine detections within the Project.

Shorebirds

Shorebirds were observed at similar mean use rates in the spring (Project: 1.600 spring detections/800 m plot/20-minute count segment; Avian Use Study Area: 1.475 spring detections/800 m plot/20-minute count segment) and in the fall (Project: 2.392 fall detections/800 m plot/20-minute count segment; Avian Use Study Area: 1.574 spring detections/20-minute count segment). Shorebirds accounted for 7.4% of non-raptor detections within the Project in the spring and 5.5% in the fall, and 3.9% of non-raptor detections within the Avian Use Study Area in the spring and 2.8% in the fall.

Upland Gamebirds

Upland gamebirds were uncommon during avian use surveys, with observed mean use rates of 0.178 detections/800 m plot/20-minute count segment in the spring and 0.075 detections/800 m plot/20-minute count segment in the fall within the Project, and 0.113 detections/800 m plot/20-minute count segment in the spring and 0.107 detections/800 m plot/20-minute count segment in the fall within the Avian Use Study Area. Ring-necked Pheasants *(Phasianus colchicus)* accounted for the majority (Project: 87.5%; Avian Use Study Area: 82.6%) of upland gamebird detections in the spring, and Sharp-tailed Grouse accounted for the majority (Project: 77.8%; Avian Use Study Area: 55.2%) of upland gamebird detections in the fall. The Sharp-tailed Grouse is a Level II SCP in North Dakota (Dyke et al. 2015).

Waders

Waders include herons and cranes. Waders were detected much more frequently in the fall (mean use rate in the Project: 2.717 detections/800 m plot/20-minute count segment; Avian Use Study Area: 3.493 detections/800 m plot/20-minute count segment) than in the spring (mean use rate in the Project: 0.500 detections/800 m plot/20-minute count segment; Avian Use Study Area: 0.917 detections/800 m plot/20-minute count segment). Waders accounted for 2.3% of all non-raptor detections in the spring and 6.2% in the fall within the Project, and within the Avian Use Study Area, 2.4% of all non-raptor detections in the spring and 6.3% in the fall. The large majority of fall wader detections were the Sandhill Crane and White-faced Ibis (*Plegadis chihi*).

Waterbirds

The waterbird group includes loons, grebes, cormorants, and gulls. Waterbirds represented 11.4% of spring non-raptor detections and 4.2% of all fall non-raptor detections within the Project, and 13.2% of all spring non-raptor detections and 6.1% of all fall non-raptor detections within the Avian Use Study Area. Spring mean use for the waterbird guild was 4.856 detections/800 m plot/20-minute count segment within the Project and 5.064 detections/800 m plot/20-minute count segment within the Avian Use Study Area. This use rate was mainly influenced by Franklin's Gulls, which accounted for 76.2% of spring waterbird detections within the Project and 74.3% within the Avian Use Study Area. Waterbird mean use rates were lower during fall migration (Project: 3.058 detections/800 m plot/20-minute count segment; Avian Use Study Area: 3.412

detections/800 m plot/20-minute count segment) and was again influenced by Franklin's Gull detections (28.1% of all fall waterbird detections within the Project, 35.7% of fall waterbird detections within the Avian Use Study Area). Franklin's Gull is a Level I North Dakota SCP (Dyke et al. 2015).

Waterfowl

Waterfowl mean use rates were higher in the fall (Project: 19.200 detections/800 m plot/20-minute count segment; Avian Use Study Area: 20.221 detections/800 m plot/20-minute count segment) than in the spring (Project: 12.811/800 m plot/20-minute count segment; Avian Use Study Area: 12.637 detections/800 m plot/20-minute count segment). In the spring, the Lesser Scaup *(Aythya affinis),* Mallard (*Anas platyrhynchos*), and Canada Goose *(Branta canadensis)* accounted for 26.6%, 19.9%, and 8.8% of spring waterfowl detections, respectively within the Project, and accounted for 24.5%, 20.4%, 17.0% of spring waterfowl detections, respectively within the Avian Use Study Area. In the fall, the Mallard (18.5% Project, 28.2% Avian Use Study Area), Canada Goose (20.3% Project, 12.5% Avian Use Study Area), and Gadwall *(Anas strepera)* (11.4% Project, 10.7% Avian Use Study Area) accounted for the most relative detections among the waterfowl guild. The Lesser Scaup is a Level II North Dakota SCP (Dyke et al. 2015).

3.3.3 Mean Flight Heights during Spring and Fall Migration

Tables 6 and 7 detail the mean flight height statistics for the non-raptor guilds detected during avian use surveys within the Avian Use Study Area (Table 6) and at the 15 points either within the Project or with survey cylinders intersecting the Project (Table 7). Mean minimum and maximum flight heights are summarized for the spring survey period, the fall survey period, and for spring and fall observations combined. Mean flight heights were within the RSZ for the waders group and below the RSZ for all other guilds consistently across the Project and across the large Avian Use Study Area.

Table 6. Mean Flight Heights during Spring and Fall Migration within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

		Spring						Fall						Spring and Fall Migration Combined					
Species Guild	Flight Height	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	95% CI	Upper Bound	Lower Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	95% CI	Upper Bound	Lower Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	95% CI	Upper Bound	Lower Bound
	Min	28	17.86	29.67	11.50	6.36	29.36	22	14.55	29.72	24.84	-10.29	39.39	50	16.40	24.20	6.88	9.52	23.28
Corvids	Max	39	21.64	25.64	8.31	13.33	29.95	30	19.23	16.70	6.23	13.00	25.46	69	20.59	22.09	5.31	15.28	25.90
	Min	12	8.25	5.51	3.50	4.75	11.75	24	14.71	12.77	5.39	9.31	20.10	36	12.56	11.24	3.80	8.75	16.36
Non-Passerines (Large)	Max	22	15.27	8.89	3.94	11.33	19.22	35	18.51	10.86	3.73	14.78	22.25	57	17.26	10.19	2.70	14.56	19.97
	Min	14	3.21	2.67	1.54	1.68	4.75	18	3.67	2.33	1.16	2.51	4.82	32	3.47	2.45	0.88	2.59	4.35
Non-Passerines (Small)	Max	29	5.41	3.05	1.16	4.25	6.58	41	6.56	3.70	1.17	5.39	7.73	70	6.09	3.47	0.83	5.26	6.91
	Min	301	8.88	11.72	1.33	7.55	10.21	342	11.43	12.16	1.29	10.13	12.72	643	10.23	12.01	0.93	9.30	11.16
Passerines	Max	980	7.42	9.24	0.58	6.84	7.99	696	10.63	10.47	0.78	9.85	11.41	1676	8.75	9.89	0.47	8.27	9.22
	Min	37	14.49	14.48	4.83	9.66	19.32	55	14.95	14.61	3.95	11.00	18.90	21	41.95	70.25	31.98	9.97	73.93
Shorebirds	Max	128	13.71	14.62	2.56	11.15	16.27	87	15.55	13.39	2.85	12.70	18.40	92	14.77	14.48	3.00	11.77	17.77
	Min	1	2.00	0.00	0.00	2.00	2.00	-	-	-	-	-	-	1	2.00	0.00	0.00	2.00	2.00
Upland Gamebird	Max	3	16.67	10.41	25.86	-9.19	42.53	7	5.00	3.56	3.29	1.71	8.29	10	8.50	8.02	5.74	2.76	14.24
	Min	13	110.15	73.46	44.39	65.76	154.54	39	83.10	142.64	46.24	36.86	129.34	52	89.87	128.73	35.84	54.03	125.71
Waders	Max	13	132.69	76.09	45.98	86.71	178.67	45	89.20	136.22	40.93	48.27	130.13	58	98.95	126.01	33.13	65.82	132.08
	Min	148	21.11	22.37	3.63	17.48	24.74	121	24.69	43.73	7.81	16.88	32.50	269	22.72	33.47	4.02	18.70	26.74
Waterbirds	Max	172	27.88	23.32	3.51	24.37	31.39	156	27.36	38.84	6.14	21.22	33.50	328	27.63	31.62	3.43	24.20	31.06
	Min	168	14.46	14.34	2.18	12.28	16.64	206	30.94	35.71	4.91	26.03	35.85	374	23.54	29.33	2.98	20.56	26.52
Waterfowl	Max	399	18.65	15.94	1.57	17.08	20.22	263	35.71	32.96	4.00	31.71	39.71	662	25.43	25.56	1.95	23.48	27.38

Seasonal migration and total migration mean flight height statistics by species guild. Flight heights recorded within the 300 m–radius survey cylinder for small-bodied detections and within the 800 m–radius survey cylinder for large-bodied detections during standardized use surveys. Zero-value heights (i.e., perched) not included in calculation of means; a bird perched throughout the count period would have both minimum and maximum flight heights of 0 m. Some guilds have mean maximum heights that are slightly lower than mean minimum heights. This occurs due to large numbers of low-flying, occasionally perching birds (e.g., sparrows or blackbirds) with minimum heights (0 m) not included in calculation of the mean. Raptor guild flight heights are presented in Table 4.
CI = confidence interval; SD = standard deviation

Table 7. Mean Flight Heights during Spring and Fall Migration within the Burke County Wind Project (Burke County, North Dakota)

		Spring						Fall						Spring and Fall Migration Combined					
Species Guild	Flight Height	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	95% CI	Upper Bound	Lower Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	95% CI	Upper Bound	Lower Bound	Sample Size	Mean Minimum or Maximum Flight Height (m)	SD	95% CI	Upper Bound	Lower Bound
	Min	14	14.50	11.14	6.43	20.93	8.07	5	10.00	8.34	10.35	20.35	-0.35	19	13.32	10.45	5.04	18.35	8.28
Corvids	Max	19	21.37	13.83	6.67	28.03	14.70	7	15.00	7.35	6.80	21.80	8.20	26	19.65	12.61	5.09	24.75	14.56
	Min	10	8.30	6.09	4.36	12.66	3.94	13	15.77	14.48	8.75	24.52	7.02	23	12.52	11.99	5.19	17.71	7.34
Non-Passerines (Large)	Max	14	15.29	8.44	4.88	20.16	10.41	18	19.17	12.59	6.26	25.43	12.90	32	17.47	10.99	3.96	21.43	13.51
	Min	7	4.86	2.91	2.69	2.16	7.55	12	2.75	1.29	0.82	1.93	3.57	19	3.53	2.22	1.07	2.46	4.60
Non-Passerines (Small)	Max	14	5.79	3.58	2.07	3.72	7.85	22	6.00	3.21	1.42	4.58	7.42	36	5.92	3.31	1.12	4.80	7.04
	Min	125	8.26	9.48	1.68	6.59	9.94	150	13.15	15.47	2.50	10.65	15.64	275	10.93	13.29	1.58	9.35	12.51
Passerines	Max	449	6.89	8.86	0.82	6.07	7.71	315	11.60	12.52	1.39	10.22	12.99	764	8.83	10.77	0.76	8.07	9.60
	Min	17	11.47	13.47	6.92	18.40	4.55	29	14.90	12.12	4.61	19.51	10.29	46	13.63	12.60	3.74	17.37	9.89
Shorebirds	Max	54	14.09	13.46	3.67	17.77	10.42	48	15.25	12.41	3.60	18.85	11.65	102	14.64	12.92	2.54	17.18	12.10
	Min	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upland Gamebird	Max	1	5.00	-	-	5.00	5.00	3	3.33	1.53	3.79	7.13	-0.46	4	3.75	1.50	2.39	6.14	1.36
	Min	6	102.00	86.58	90.86	192.86	11.14	17	48.41	33.70	17.32	65.74	31.09	23	62.39	55.75	24.11	86.50	38.28
Waders	Max	6	120.83	92.06	96.61	217.44	24.23	20	52.35	35.47	16.60	68.95	35.75	26	68.15	59.30	23.95	92.11	44.20
	Min	65	25.06	26.12	6.47	31.53	18.59	50	22.66	32.01	9.10	31.76	13.56	115	24.02	28.72	5.31	29.32	18.71
Waterbirds	Max	74	31.42	26.82	6.21	37.63	25.21	63	27.27	30.97	7.80	35.07	19.47	137	29.51	28.77	4.86	34.37	24.65
	Min	92	15.74	15.66	3.24	18.98	12.50	103	28.97	21.97	4.29	33.26	24.68	195	22.73	20.32	2.87	25.60	19.86
Waterfowl	Max	209	18.75	16.24	2.21	20.97	16.54	130	34.38	21.97	3.81	38.20	30.57	339	24.75	20.11	2.15	26.89	22.60

Seasonal migration and total migration mean flight height statistics by species guild. Flight heights recorded within the 300 m–radius survey cylinder for small-bodied detections and within the 800 m–radius survey cylinder for large-bodied detections during standardized use surveys. Zero-value heights (i.e., perched) not included in calculation of means; a bird perched throughout the count period would have both minimum and maximum flight heights of 0 m. Some guilds have mean maximum heights that are slightly lower than mean minimum heights. This occurs due to large numbers of low-flying, occasionally perching birds (e.g., sparrows or blackbirds) with minimum heights (0 m) not included in calculation of the mean. Raptor guild flight heights are presented in Table 5.
CI = confidence interval; SD = standard deviation

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APPENDIX I

Report Figures

Burke County Wind Project

Figure 1. Avian and Raptor Use Point Count Schematic

Burke County, North Dakota

Date: 1/30/2019

Client:

Burke Wind, LLC

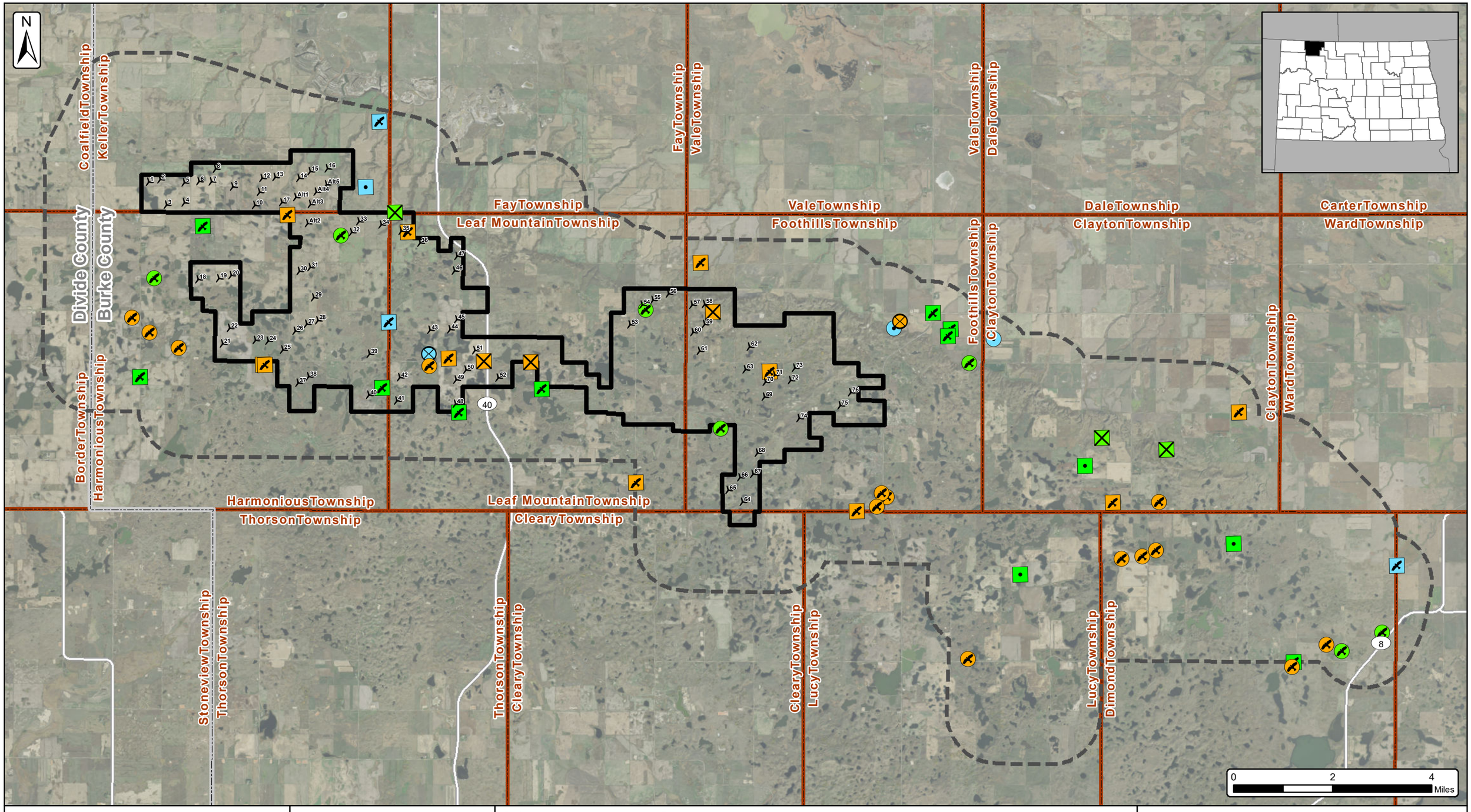
Atwell, LLC Project: 16000947

- Turbine Layout (10/08/2018)
- Avian Study Points
- 800 m Study Point Buffer (±19,797 Ac.)
- Project 10/23/2018 (±22,933 Ac.)
- Avian Use Study Area (01/25/2017)
- Townships
- Counties

SOURCE: USDA NAIP 2017 IMAGERY

ATWELL

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Burke County Wind Project

Figure 2. Eagle Observation Map April 2017 through March 2018

Burke County, North Dakota

Date: 1/8/2019

Client:

Burke Wind, LLC

Atwell, LLC Project:16000947

Species

- Bald Eagle - Standardized
- Bald Eagle - Incidental
- Golden Eagle - Standardized
- Golden Eagle - Incidental
- Unknown Eagle Species - Standardized
- Unknown Eagle Species - Incidental

Season

- Fall
- Spring
- Winter

- Turbine Layout (10/08/2018)
- Project 10/23/2018 (±22,933 Ac.)
- Avian Use Study Area (01/25/2017)
- Townships
- Counties

SOURCE: USDA NAIP 2017 IMAGERY

ATWELL

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Figure 3. Seasonal Bald Eagle Detection Totals within the Burke County Wind Project and the Avian Use Study Area – Burke County Wind Project (Burke County, North Dakota)

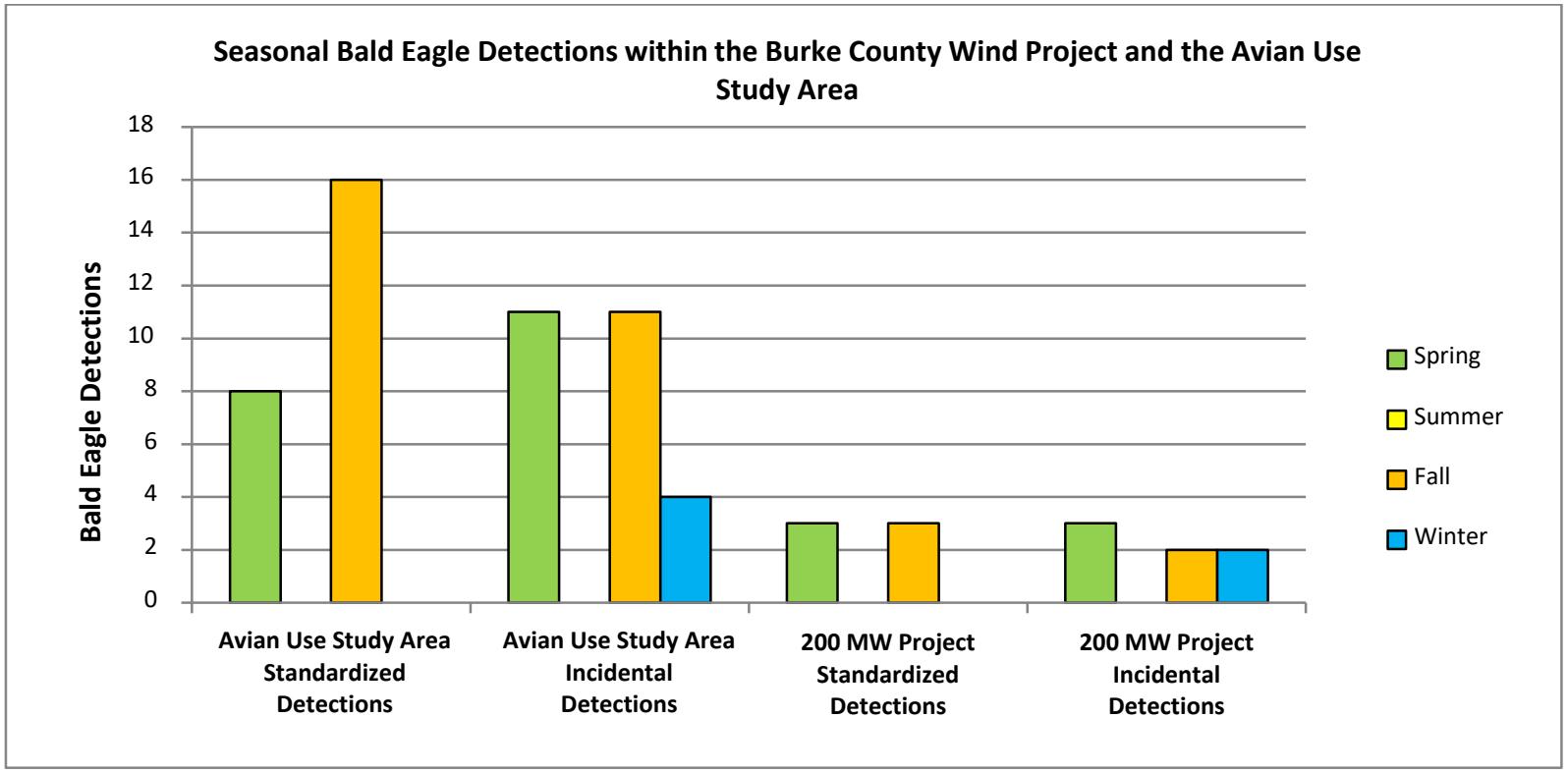
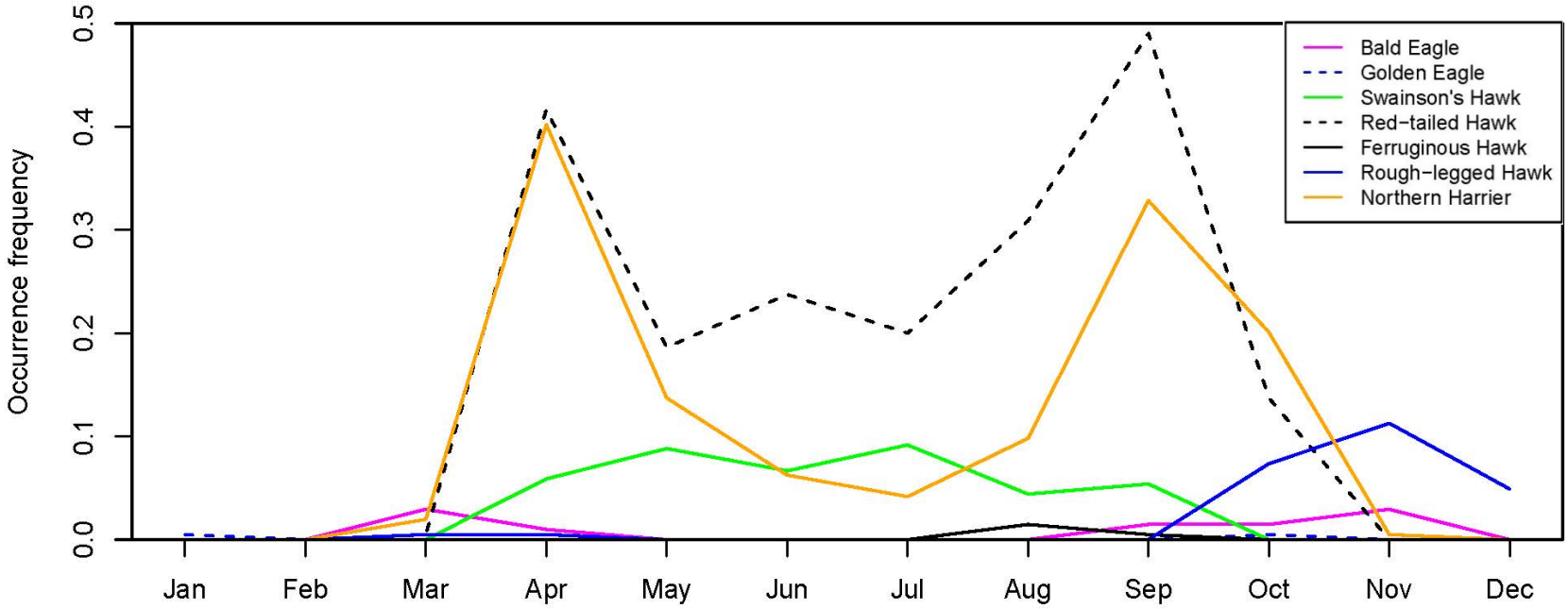
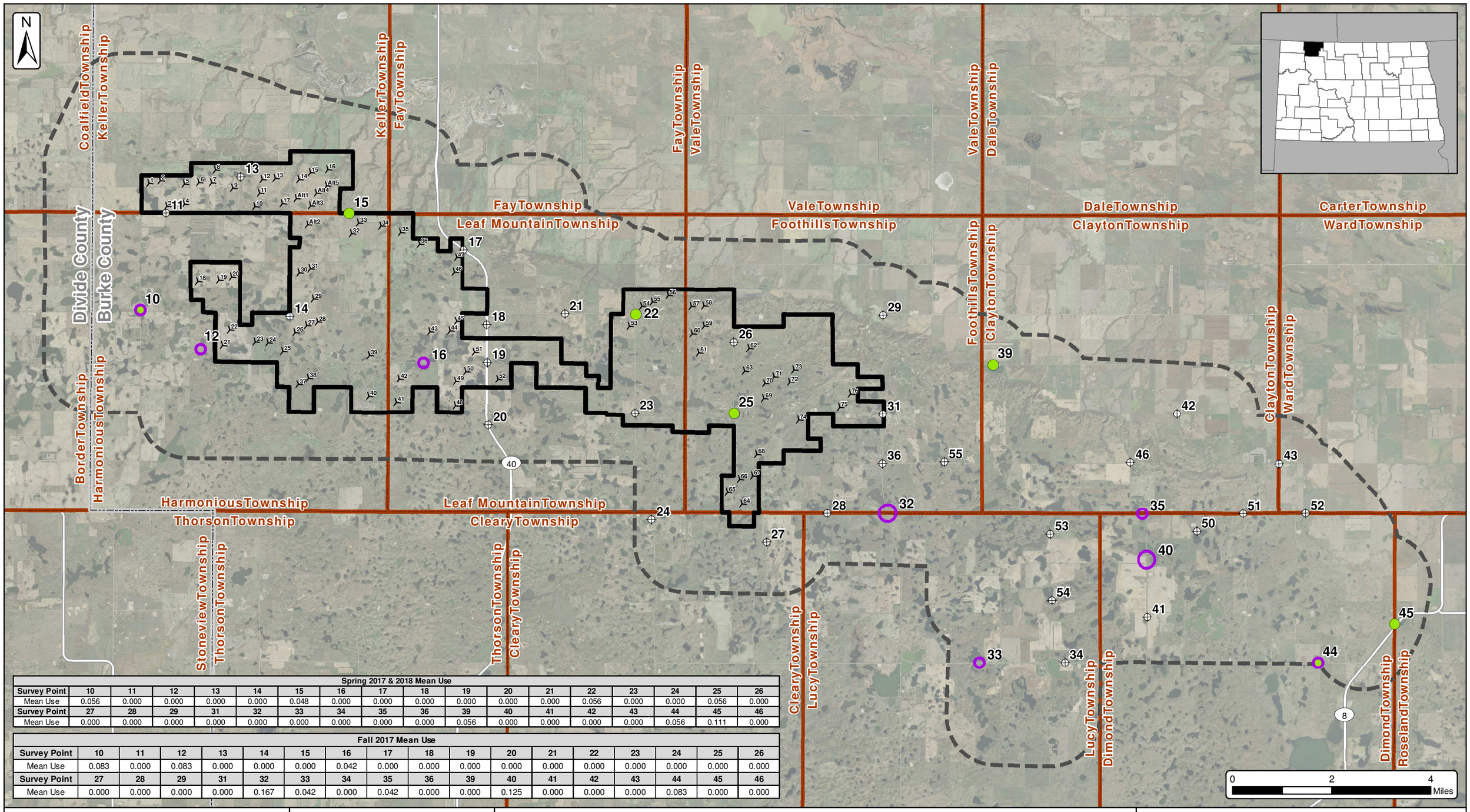


Figure 4. Raptor Species Monthly Occurrence Frequency – Burke County Wind Project (Burke County, North Dakota)





Spring 2017 & 2018 Mean Use

Survey Point	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Mean Use	0.056	0.000	0.000	0.000	0.000	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.056	0.000	0.000	0.056	0.000
Survey Point	**27**	**28**	**29**	**31**	**32**	**33**	**34**	**35**	**36**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**
Mean Use	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.056	0.000	0.000	0.000	0.000	0.056	0.111	0.000

Fall 2017 Mean Use

Survey Point	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Mean Use	0.083	0.000	0.083	0.000	0.000	0.000	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Survey Point	**27**	**28**	**29**	**31**	**32**	**33**	**34**	**35**	**36**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**
Mean Use	0.000	0.000	0.000	0.000	0.167	0.042	0.000	0.042	0.000	0.000	0.125	0.000	0.000	0.000	0.083	0.000	0.000

Burke County Wind Project

Figure 5a. Seasonal Bald Eagle Mean Use April 2017 through March 2018

Spring and fall only, no standardized detections during winter and summer periods

Burke County, North Dakota

Date: 1/14/2019

Client:

Burke Wind, LLC

Atwell, LLC Project: 16000947

Turbine Layout (10/08/2018)

Project 10/23/2018 (±22,933 Ac.)

Avian Use Study Area (01/25/2017)

Townships

Counties

No Point Data

Bald Eagle Mean Use - Spring
Detections/800 m Plot/20-minute Count Segment

1.168 - 1.611
0.723 - 1.167
0.445 - 0.722
0.112 - 0.444
0.001 - 0.111

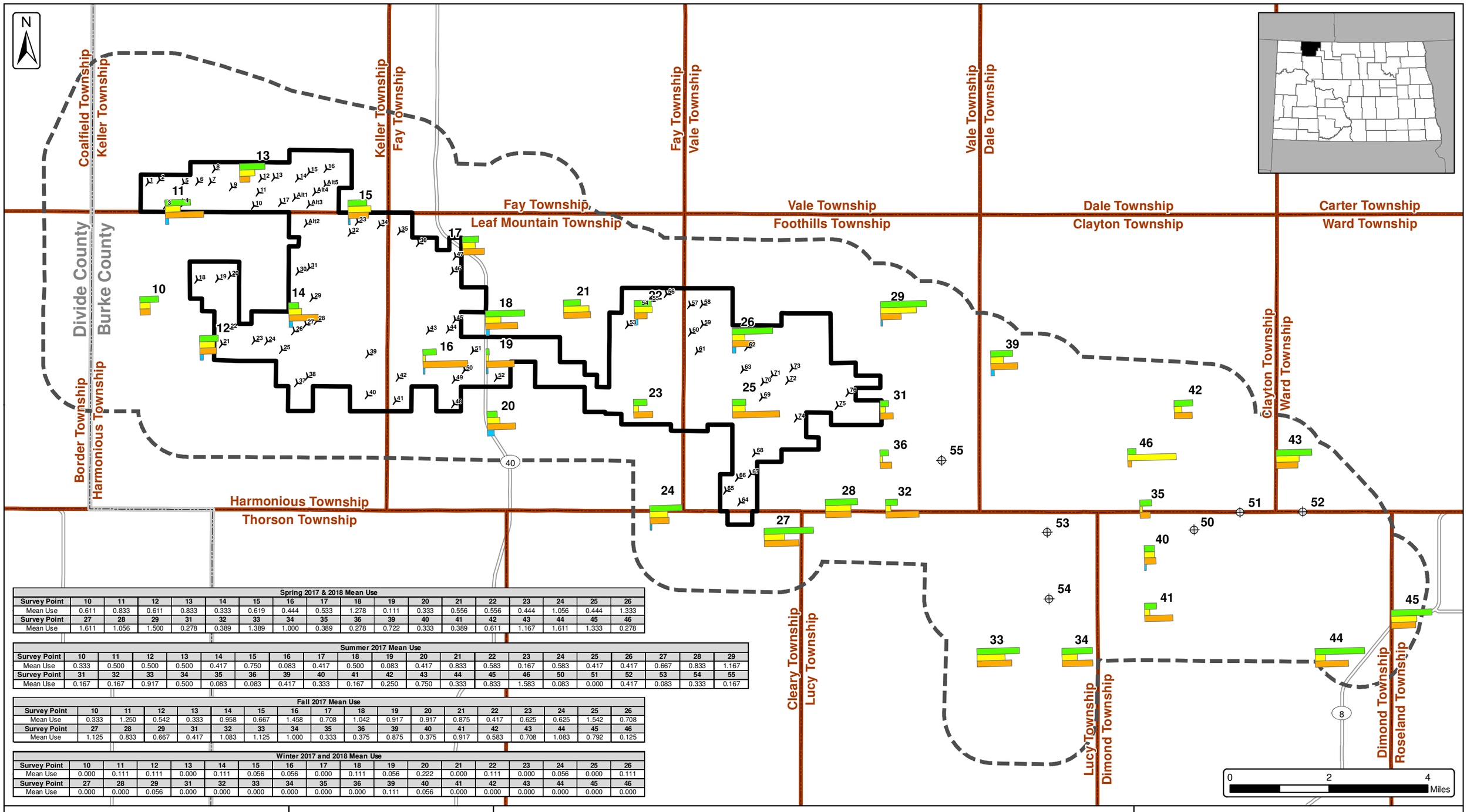
Bald Eagle Mean Use - Fall
Detections/800 m Plot/20-minute Count Segment

1.168 - 1.611
0.723 - 1.167
0.445 - 0.722
0.112 - 0.444
0.001 - 0.111

SOURCE: USDA NAIP 2017 IMAGERY

ATWELL

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Spring 2017 & 2018 Mean Use

Survey Point	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Mean Use	0.611	0.833	0.611	0.833	0.333	0.619	0.444	0.533	1.278	0.111	0.333	0.556	0.556	0.444	1.056	0.444	1.333
Survey Point	**27**	**28**	**29**	**31**	**32**	**33**	**34**	**35**	**36**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**
Mean Use	1.611	1.056	1.500	0.278	0.389	1.389	1.000	0.389	0.278	0.722	0.333	0.389	0.611	1.167	1.611	1.333	0.278

Summer 2017 Mean Use

Survey Point	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Mean Use	0.333	0.500	0.500	0.500	0.417	0.750	0.083	0.417	0.500	0.083	0.417	0.833	0.583	0.167	0.583	0.417	0.417	0.667	0.833	1.167
Survey Point	**31**	**32**	**33**	**34**	**35**	**36**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**50**	**51**	**52**	**53**	**54**	**55**
Mean Use	0.167	0.167	0.917	0.500	0.083	0.083	0.417	0.333	0.167	0.250	0.750	0.333	0.833	1.583	0.083	0.000	0.417	0.083	0.333	0.167

Fall 2017 Mean Use

Survey Point	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Mean Use	0.333	1.250	0.542	0.333	0.958	0.667	1.458	0.708	1.042	0.917	0.917	0.875	0.417	0.625	0.625	1.542	0.708
Survey Point	**27**	**28**	**29**	**31**	**32**	**33**	**34**	**35**	**36**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**
Mean Use	1.125	0.833	0.667	0.417	1.083	1.125	1.000	0.333	0.375	0.875	0.375	0.917	0.583	0.708	1.083	0.792	0.125

Winter 2017 and 2018 Mean Use

Survey Point	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Mean Use	0.000	0.111	0.111	0.000	0.111	0.056	0.056	0.000	0.111	0.056	0.222	0.000	0.111	0.000	0.056	0.000	0.111
Survey Point	**27**	**28**	**29**	**31**	**32**	**33**	**34**	**35**	**36**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**
Mean Use	0.000	0.000	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.111	0.056	0.000	0.000	0.000	0.000	0.000	0.000

Burke County Wind Project

Figure 5b. Seasonal Raptor Mean Use
All Raptor Species
April 2017 through March 2018

Burke County, North Dakota

Date: 1/14/2019

Client:

Burke Wind, LLC

Atwell, LLC Project: 16000947

Turbine Layout (10/08/2018)

Project 10/23/2018 (±22,933 Ac.)

Avian Use Study Area (01/25/2017)

Townships

Counties

Raptor Mean Use- Detections/800 m Plot/20-minute Count Segment

Spring Mean

Summer Mean

Fall Mean

Winter Mean

Points Surveyed during Summer Period Only

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Figure 6a. Bald Eagle Flight Direction Rose Plot for Spring Migration Observations – Burke County Wind Project (Burke County, North Dakota)

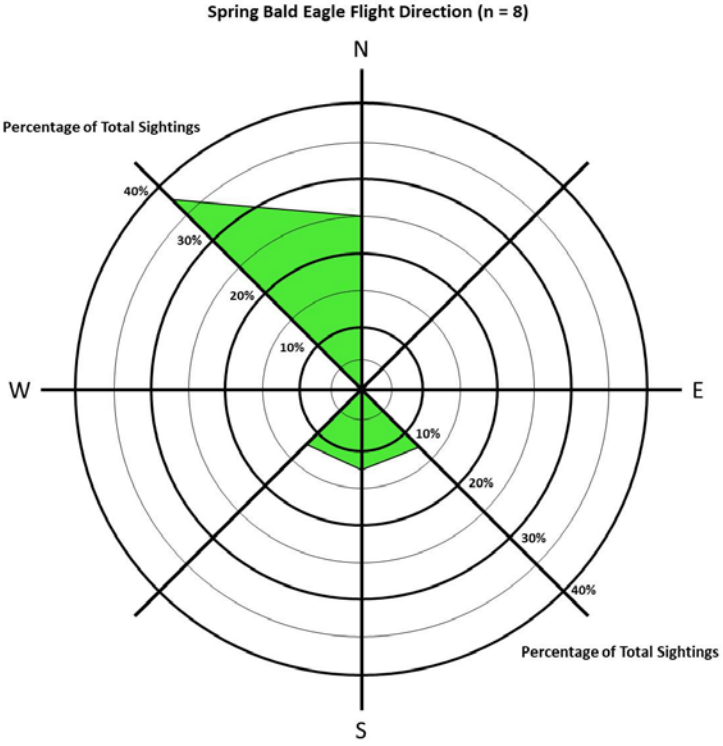
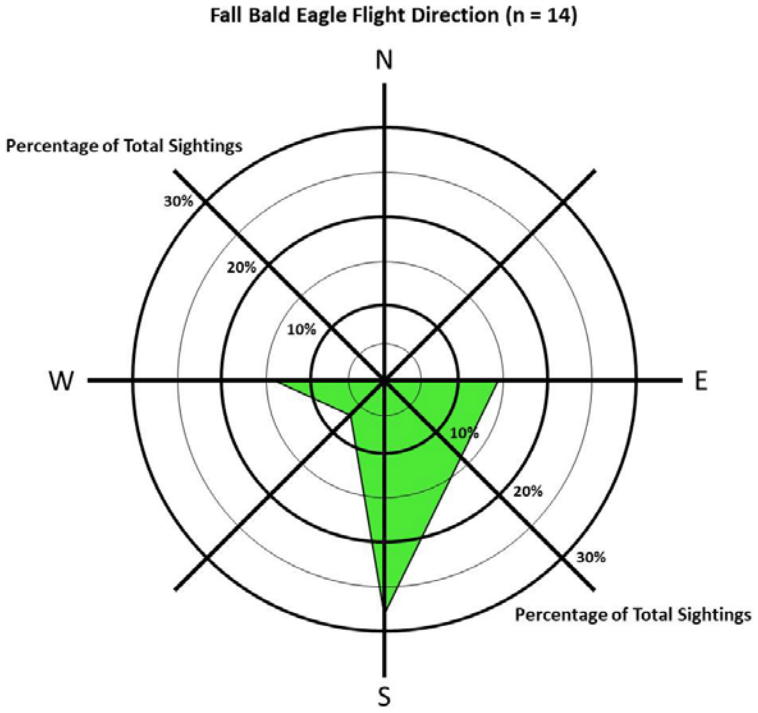


Figure 6b. Bald Eagle Flight Direction Rose Plot for Fall Migration Observations – Burke County Wind Project (Burke County, North Dakota)



APPENDIX II

Spring and Fall Avian Use Survey – Summary Statistics Tables

Table A. Seasonal Use Summary Statistics for Waterfowl within the Burke County Wind Project (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
American Wigeon	58	27	0.644	1.275	0.267	53	17	0.442	1.823	0.100
Blue-winged Teal	117	42	1.300	2.429	0.344	308	52	2.567	6.509	0.233
Bufflehead	2	1	0.022	0.211	0.011	-	-	-	-	-
Cackling Goose	1	1	0.011	0.105	0.011	68	7	0.567	3.023	0.058
Canada Goose	102	43	1.133	2.876	0.367	467	30	3.892	16.336	0.167
Canvasback (b)	16	11	0.178	0.532	0.122	9	2	0.075	0.663	0.017
Gadwall	85	38	0.944	1.826	0.300	262	33	2.183	11.953	0.217
Green-winged Teal	18	9	0.200	0.674	0.100	10	2	0.083	0.751	0.017
Lesser Scaup (b)	307	59	3.411	8.250	0.333	56	8	0.467	2.351	0.050
Mallard	230	104	2.556	3.592	0.556	427	57	3.558	10.120	0.308
Northern Pintail (b)	35	16	0.389	1.013	0.167	73	8	0.608	3.628	0.058
Northern Shoveler	119	47	1.322	3.082	0.333	64	14	0.533	2.021	0.100
Redhead	36	10	0.400	1.889	0.100	21	3	0.175	1.591	0.017
Ring-necked Duck	25	6	0.278	1.290	0.056	38	4	0.317	2.867	0.025
Ross's Goose	-	-	-	-	-	49	2	0.408	3.736	0.017
Ruddy Duck	2	1	0.022	0.211	0.011	7	2	0.058	0.555	0.017
Snow Goose	-	-	-	-	-	35	1	0.292	3.195	0.008
Unknown Duck	-	-	-	-	-	115	7	0.958	6.412	0.050
Unknown Goose	-	-	-	-	-	242	7	2.017	11.317	0.042
Waterfowl	**1153**	**415**	**12.811**	**17.315**	**0.700**	**2304**	**256**	**19.200**	**39.496**	**0.558**

Seasonal mean use statistics by species within the Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 800 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table B. Seasonal Use Summary Statistics for Waterfowl within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	Total Std. Detections	Total Flocks	Mean Use (birds/800 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/800 m plot/20 min)	Stan. Dev.	Occur. Freq.
American Wigeon	109	50	0.534	1.237	0.211	70	22	0.257	1.350	0.059
Blue-winged Teal	224	95	1.098	2.300	0.279	833	117	3.063	9.348	0.188
Bufflehead	5	3	0.025	0.209	0.015	-	-	-	-	-
Cackling Goose	6	2	0.029	0.357	0.010	90	9	0.331	2.326	0.033
Canada Goose	437	100	2.142	15.372	0.353	688	60	2.529	11.747	0.158
Canvasback (b)	75	28	0.368	1.838	0.127	14	3	0.051	0.534	0.011
Common Merganser	1	1	0.005	0.070	0.005	-	-	-	-	-
Gadwall	181	81	0.887	1.961	0.289	587	71	2.158	10.398	0.176
Greater White-fronted Goose	-	-	-	-	-	35	2	0.129	1.599	0.007
Green-winged Teal	35	19	0.172	0.677	0.078	12	4	0.044	0.506	0.015
Hooded Merganser	1	1	0.005	0.070	0.005	-	-	-	-	-
Lesser Scaup (b)	631	126	3.093	10.202	0.284	252	19	0.926	8.017	0.051
Mallard	525	225	2.574	3.557	0.554	1552	163	5.706	20.608	0.316
Northern Pintail (b)	71	33	0.348	1.065	0.127	78	10	0.287	2.434	0.033
Northern Shoveler	181	74	0.887	2.422	0.230	129	23	0.474	2.311	0.074
Redhead	52	16	0.255	1.359	0.074	38	8	0.140	1.201	0.026
Ring-necked Duck	34	12	0.167	0.927	0.044	131	11	0.482	3.694	0.033
Ross's Goose	-	-	-	-	-	52	3	0.191	2.490	0.011
Ruddy Duck	2	1	0.010	0.140	0.005	11	4	0.040	0.405	0.015
Snow Goose	-	-	-	-	-	261	4	0.960	9.554	0.015
Tundra Swan	-	-	-	-	-	2	1	0.007	0.121	0.004

Table B. Seasonal Use Summary Statistics for Waterfowl within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
Unknown Duck	8	1	0.039	0.560	0.005	359	14	1.320	11.058	0.048
Unknown Goose	-	-	-	-	-	306	9	1.125	8.303	0.026
Waterfowl	**2578**	**868**	**12.637**	**23.227**	**0.662**	**5500**	**557**	**20.221**	**44.057**	**0.518**

Seasonal mean use statistics by species within the Burke County Wind Project's Avian Use Study Area. The Avian Use Study Area described a 1-mile boundary around the original 300 MW Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 800 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table C. Seasonal Use Summary Statistics for Shorebirds, Waders, and Waterbirds (Shorebirds, Cranes, Herons, Pelicans, Grebes, Coots, Gulls, Terns) within the Burke County Wind Project (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	Total Std. Detections	Total Flocks	Mean Use (birds/800 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/800 m plot/20 min)	Stan. Dev.	Occur. Freq.
American Avocet (b)	3	2	0.033	0.235	0.022	4	1	0.033	0.365	0.008
American Coot	12	8	0.133	0.455	0.089	120	13	1.000	6.954	0.083
American White Pelican (b)	-	-	-	-	-	39	2	0.325	3.381	0.017
Black-crowned Night-Heron	4	4	0.044	0.207	0.044	-	-	-	-	-
Black Tern (a)	49	6	0.544	2.418	0.067	33	7	0.275	1.749	0.042
California Gull	1	1	0.011	0.105	0.011	-	-	-	-	-
Double-crested Cormorant	7	6	0.078	0.308	0.067	22	17	0.183	0.565	0.117
Franklin's Gull (a)	333	51	3.700	8.090	0.400	103	23	0.858	3.136	0.125
Great Blue Heron	-	-	-	-	-	2	2	0.017	0.129	0.017
Greater Yellowlegs	1	1	0.011	0.105	0.011	82	18	0.683	3.945	0.117
Horned Grebe (a)	1	1	0.011	0.105	0.011	-	-	-	-	-
Killdeer	34	25	0.378	0.680	0.267	64	34	0.533	1.639	0.258
Least Sandpiper	2	1	0.022	0.211	0.011	-	-	-	-	-
Lesser Yellowlegs	35	7	0.389	2.520	0.056	31	12	0.258	1.041	0.083
Long-billed Dowitcher	-	-	-	-	-	92	5	0.767	6.135	0.042
Pectoral Sandpiper	-	-	-	-	-	4	2	0.033	0.365	0.008
Pied-billed Grebe	3	3	0.033	0.235	0.022	25	12	0.208	0.961	0.092
Red-necked Grebe	-	-	-	-	-	1	1	0.008	0.091	0.008
Ring-billed Gull	18	10	0.200	0.722	0.089	24	19	0.200	0.528	0.150
Sandhill Crane	41	4	0.456	3.226	0.033	105	5	0.875	8.346	0.025
Solitary Sandpiper	1	1	0.011	0.105	0.011	-	-	-	-	-
Sora	12	12	0.133	0.455	0.100	-	-	-	-	-

Table C. Seasonal Use Summary Statistics for Shorebirds, Waders, and Waterbirds (Shorebirds, Cranes, Herons, Pelicans, Grebes, Coots, Gulls, Terns) within the Burke County Wind Project (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
Spotted Sandpiper	-	-	-	-	-	2	2	0.017	0.129	0.017
Unknown Shorebird	4	1	0.044	0.422	0.011	7	2	0.058	0.455	0.017
Upland Sandpiper (b)	11	8	0.122	0.419	0.089	-	-	-	-	-
Virginia Rail	1	1	0.011	0.105	0.011	-	-	-	-	-
White-faced Ibis	-	-	-	-	-	219	15	1.825	14.163	0.067
Willet (b)	10	8	0.111	0.381	0.089	-	-	-	-	-
Wilson's Phalarope (a)	30	7	0.333	1.543	0.078	1	1	0.008	0.091	0.008
Wilson's Snipe	13	12	0.144	0.439	0.111	-	-	-	-	-
Shorebird	**144**	**73**	**1.600**	**3.280**	**0.467**	**287**	**77**	**2.392**	**10.613**	**0.350**
Wader	**45**	**8**	**0.500**	**3.226**	**0.078**	**326**	**22**	**2.717**	**16.340**	**0.100**
Waterbird	**437**	**99**	**4.856**	**9.577**	**0.522**	**367**	**94**	**3.058**	**9.226**	**0.350**

Seasonal mean use statistics by species within the Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 800 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table D. Seasonal Use Summary Statistics for Shorebirds, Waders, and Waterbirds (Shorebirds, Cranes, Herons, Pelicans, Grebes, Coots, Gulls, Terns) within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	Total Std. Detections	Total Flocks	Mean Use (birds/800 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/800 m plot/20 min)	Stan. Dev.	Occur. Freq.
American Avocet (b)	3	2	0.015	0.156	0.010	4	1	0.015	0.243	0.004
American Coot	14	10	0.069	0.322	0.049	138	16	0.507	4.719	0.048
American White Pelican (b)	23	2	0.113	1.610	0.005	74	6	0.272	2.666	0.018
Baird's Sandpiper (a)	2	1	0.010	0.140	0.005	-	-	-	-	-
Black Tern (a)	79	17	0.387	1.879	0.064	57	15	0.210	1.567	0.037
Black-crowned Night-Heron	5	5	0.025	0.155	0.025	3	3	0.011	0.135	0.007
Buff-breasted Sandpiper	1	1	0.005	0.070	0.005	-	-	-	-	-
California Gull	3	3	0.015	0.121	0.015	-	-	-	-	-
Double-crested Cormorant	39	12	0.191	1.660	0.059	159	48	0.585	3.897	0.129
Forster's Tern	5	3	0.025	0.231	0.015	-	-	-	-	-
Franklin's Gull (a)	769	102	3.770	9.432	0.338	331	43	1.217	7.426	0.110
Great Blue Heron	-	-	-	-	-	8	8	0.029	0.169	0.029
Greater Yellowlegs	2	2	0.010	0.099	0.010	99	29	0.364	2.658	0.088
Horned Grebe (a)	1	1	0.005	0.070	0.005	-	-	-	-	-
Killdeer	83	65	0.407	0.747	0.284	109	63	0.401	1.302	0.195
Least Sandpiper	2	1	0.010	0.140	0.005	-	-	-	-	-
Lesser Yellowlegs	56	11	0.275	1.913	0.044	62	22	0.228	0.979	0.074
Long-billed Dowitcher	-	-	-	-	-	120	9	0.441	4.176	0.033
Pectoral Sandpiper	-	-	-	-	-	11	7	0.040	0.357	0.018
Pied-billed Grebe	7	6	0.034	0.230	0.025	38	24	0.140	0.689	0.077
Red-necked Grebe	3	2	0.015	0.156	0.010	1	1	0.004	0.061	0.004
Red-necked Phalarope	-	-	-	-	-	4	1	0.015	0.243	0.004

Table D. Seasonal Use Summary Statistics for Shorebirds, Waders, and Waterbirds (Shorebirds, Cranes, Herons, Pelicans, Grebes, Coots, Gulls, Terns) within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
Ring-billed Gull	70	34	0.343	1.346	0.113	123	57	0.452	2.829	0.180
Sandhill Crane	182	10	0.892	6.011	0.039	606	17	2.228	15.204	0.048
Semipalmated Plover	-	-	-	-	-	1	1	0.004	0.061	0.004
Solitary Sandpiper	2	2	0.010	0.099	0.010	1	1	0.004	0.061	0.004
Sora	17	17	0.083	0.341	0.069	-	-	-	-	-
Spotted Sandpiper	2	2	0.010	0.099	0.010	4	4	0.015	0.121	0.015
Unknown Gull	2	1	0.010	0.140	0.005	5	1	0.018	0.303	0.004
Unknown Shorebird	39	4	0.191	2.265	0.015	9	4	0.033	0.314	0.015
Upland Sandpiper (b)	22	18	0.108	0.369	0.088	-	-	-	-	-
Virginia Rail	1	1	0.005	0.070	0.005	1	1	0.004	0.061	0.004
Western Grebe	-	-	-	-	-	1	1	0.004	0.061	0.004
White-faced Ibis	-	-	-	-	-	333	29	1.224	10.203	0.059
Willet (b)	18	14	0.088	0.347	0.069	-	-	-	-	-
Wilson's Phalarope (a)	45	14	0.221	1.125	0.064	1	1	0.004	0.061	0.004
Wilson's Snipe	24	23	0.118	0.379	0.098	3	2	0.011	0.135	0.007
Shorebird	**301**	**160**	**1.475**	**3.539**	**0.446**	**428**	**145**	**1.574**	**7.318**	**0.287**
Wader	**187**	**15**	**0.917**	**6.009**	**0.064**	**950**	**57**	**3.493**	**18.167**	**0.136**
Waterbird	**1033**	**211**	**5.064**	**10.631**	**0.475**	**928**	**213**	**3.412**	**10.982**	**0.346**

Seasonal mean use statistics by species within the Burke County Wind Project's Avian Use Study Area. The Avian Use Study Area described a 1-mile boundary around the original 300 MW Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 800 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table E. Seasonal Use Summary Statistics for Large-Bodied Corvids, Large-Bodied Non-Passerines, and Upland Gamebirds within the Burke County Wind Project (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
American Crow	21	16	0.233	0.654	0.144	8	5	0.067	0.361	0.042
Common Raven	2	2	0.022	0.148	0.022	5	4	0.042	0.239	0.033
Gray Partridge	1	1	0.011	0.105	0.011	-	-	-	-	-
Ring-necked Pheasant	14	12	0.156	0.447	0.122	2	1	0.017	0.183	0.008
Rock Pigeon	53	14	0.589	2.883	0.111	102	19	0.850	3.180	0.117
Sharp-tailed Grouse (b)	1	1	0.011	0.105	0.011	7	3	0.058	0.395	0.025
Unknown Corvid	3	2	0.033	0.316	0.011	-	-	-	-	-
Large-Bodied Corvid	**26**	**20**	**0.289**	**0.890**	**0.167**	**13**	**9**	**0.108**	**0.426**	**0.075**
Large-Bodied Non-Passerines	**53**	**14**	**0.589**	**2.883**	**0.111**	**102**	**19**	**0.850**	**3.180**	**0.117**
Upland Game	**16**	**14**	**0.178**	**0.464**	**0.144**	**9**	**4**	**0.075**	**0.433**	**0.033**

Seasonal mean use statistics by species within the Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 800 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table F. Seasonal Use Summary Statistics for Large-Bodied Corvids, Large-Bodied Non-Passerines, and Upland Gamebirds within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/800 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
American Crow	66	34	0.324	1.265	0.142	61	11	0.224	2.746	0.040
Common Raven	7	7	0.034	0.182	0.034	19	17	0.070	0.296	0.059
Gray Partridge	1	1	0.005	0.070	0.005	9	1	0.033	0.546	0.004
Ring-necked Pheasant	19	17	0.093	0.338	0.078	4	3	0.015	0.148	0.011
Rock Pigeon	85	22	0.417	2.302	0.078	214	36	0.787	3.205	0.103
Sharp-tailed Grouse (b)	3	3	0.015	0.121	0.015	16	7	0.059	0.408	0.026
Unknown Corvid	4	3	0.020	0.221	0.010	-	-	-	-	-
Large-Bodied Corvid	**77**	**44**	**0.377**	**1.335**	**0.176**	**80**	**28**	**0.294**	**2.763**	**0.103**
Large-Bodied Non-Passerines	**85**	**22**	**0.417**	**2.302**	**0.078**	**214**	**36**	**0.787**	**3.205**	**0.103**
Upland Gamebird	**23**	**21**	**0.113**	**0.361**	**0.098**	**29**	**11**	**0.107**	**0.692**	**0.040**

Seasonal mean use statistics by species within the Burke County Wind Project's Avian Use Study Area. The Avian Use Study Area described a 1-mile boundary around the original 300 MW Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 2,625 ft. (800 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 800 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table G. Seasonal Use Summary Statistics for Small-Bodied Non-Passerines (Woodpeckers and Doves) and Passerines (Including Small-Bodied Corvids such as Jays and Magpies) within the Burke County Wind Project (Burke County, North Dakota)

Species Group/Species Name	Spring					Fall				
	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.
American Goldfinch	7	5	0.078	0.343	0.056	64	40	0.533	1.100	0.267
American Pipit	-	-	-	-	-	1	1	0.008	0.091	0.008
American Robin	20	16	0.222	0.632	0.144	44	16	0.367	2.204	0.100
American Tree Sparrow	1	1	0.011	0.105	0.011	-	-	-	-	-
Baltimore Oriole	2	1	0.022	0.211	0.011	-	-	-	-	-
Bank Swallow	-	-	-	-	-	3	2	0.025	0.203	0.017
Barn Swallow	27	14	0.300	0.800	0.156	96	24	0.800	2.595	0.183
Black-billed Magpie	-	-	-	-	-	3	3	0.025	0.157	0.025
Bobolink (b)	11	9	0.122	0.470	0.078	1	1	0.008	0.091	0.008
Brewer's Blackbird	58	15	0.644	2.842	0.156	5	1	0.042	0.456	0.008
Brown Thrasher	1	1	0.011	0.105	0.011	-	-	-	-	-
Brown-headed Cowbird	80	29	0.889	1.969	0.278	7	2	0.058	0.490	0.017
Cedar Waxwing	-	-	-	-	-	17	11	0.142	0.569	0.075
Chestnut-collared Longspur (a)	1	1	0.011	0.105	0.011	6	1	0.050	0.548	0.008
Chipping Sparrow	1	1	0.011	0.105	0.011	1	1	0.008	0.091	0.008
Clay-colored Sparrow	26	24	0.289	0.546	0.244	29	9	0.242	1.438	0.075
Cliff Swallow	13	3	0.144	0.919	0.033	19	6	0.158	0.879	0.050
Common Grackle	164	22	1.822	8.774	0.200	2703	19	22.525	228.869	0.092
Common Redpoll	53	4	0.589	3.711	0.044	53	5	0.442	2.418	0.042
Common Yellowthroat	4	4	0.044	0.207	0.044	5	5	0.042	0.239	0.033
Downy Woodpecker	1	1	0.011	0.105	0.011	-	-	-	-	-
Eastern Kingbird	8	8	0.089	0.286	0.089	24	17	0.200	0.544	0.142

Table G. Seasonal Use Summary Statistics for Small-Bodied Non-Passerines (Woodpeckers and Doves) and Passerines (Including Small-Bodied Corvids such as Jays and Magpies) within the Burke County Wind Project (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.
European Startling	16	4	0.178	1.045	0.044	26	4	0.217	1.769	0.033
Gray Catbird	-	-	-	-	-	4	4	0.033	0.180	0.033
Harris's Sparrow	-	-	-	-	-	2	1	0.017	0.183	0.008
Horned Lark	125	57	1.389	3.354	0.344	75	19	0.625	2.603	0.150
Lapland Longspur	637	12	7.078	34.128	0.122	111	7	0.925	4.981	0.042
Lark Sparrow	1	1	0.011	0.105	0.011	1	1	0.008	0.091	0.008
Least Flycatcher	2	2	0.022	0.148	0.022	2	1	0.017	0.183	0.008
Marsh Wren	3	3	0.033	0.181	0.033	3	3	0.025	0.157	0.025
Mountain Bluebird	-	-	-	-	-	2	1	0.017	0.183	0.008
Mourning Dove	15	13	0.167	0.431	0.144	52	25	0.433	1.419	0.175
Northern Flicker	2	2	0.022	0.148	0.022	2	2	0.017	0.129	0.017
Northern Rough-winged Swallow	1	1	0.011	0.105	0.011	-	-	-	-	-
Orchard Oriole	-	-	-	-	-	2	2	0.017	0.129	0.017
Red-winged Blackbird	378	173	4.200	8.995	0.611	1031	68	8.592	35.429	0.308
Rusty Blackbird	-	-	-	-	-	8	2	0.067	0.576	0.017
Savannah Sparrow	16	14	0.178	0.488	0.133	18	8	0.150	0.644	0.067
Smith's Longspur	-	-	-	-	-	10	1	0.083	0.913	0.008
Snow Bunting	48	4	0.533	4.106	0.033	34	4	0.283	1.701	0.033
Song Sparrow	32	32	0.356	0.659	0.278	15	15	0.125	0.401	0.108
Tennessee Warbler	1	1	0.011	0.105	0.011	-	-	-	-	-
Tree Swallow	22	11	0.244	0.708	0.122	3	2	0.025	0.203	0.017
Unknown Longspur	-	-	-	-	-	655	2	5.458	54.960	0.017
Unknown Passerine	2	2	0.022	0.148	0.022	2	2	0.017	0.129	0.017

Table G. Seasonal Use Summary Statistics for Small-Bodied Non-Passerines (Woodpeckers and Doves) and Passerines (Including Small-Bodied Corvids such as Jays and Magpies) within the Burke County Wind Project (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/300 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/300 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
Unknown Sparrow	-	-	-	-	-	4	4	0.033	0.180	0.033
Vesper Sparrow	4	4	0.044	0.207	0.044	14	11	0.117	0.471	0.083
Western Kingbird	2	2	0.022	0.148	0.022	1	1	0.008	0.091	0.008
Western Meadowlark (b)	36	36	0.400	0.700	0.300	13	11	0.108	0.384	0.083
Yellow Warbler	5	5	0.056	0.230	0.056	4	3	0.033	0.222	0.025
Yellow-headed Blackbird	131	57	1.456	6.521	0.278	123	9	1.025	7.568	0.067
Yellow-rumped Warbler	-	-	-	-	-	5	3	0.042	0.272	0.025
Small-Bodied Non-Passerines	**18**	**16**	**0.200**	**0.479**	**0.167**	**54**	**27**	**0.450**	**1.419**	**0.192**
Passerines and Small-Bodied Corvids	**1939**	**579**	**21.544**	**40.112**	**0.878**	**5249**	**353**	**43.742**	**238.218**	**0.775**

Seasonal mean use statistics by species within the Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 984 ft. (300 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 984 ft. (300 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 300 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

Table H. Seasonal Use Summary Statistics for Small-Bodied Non-Passerines (Woodpeckers and Doves) and Passerines (Including Small-Bodied Corvids such as Jays and Magpies) within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.
Alder Flycatcher	1	1	0.005	0.070	0.005	-	-	-	-	-
American Goldfinch	31	14	0.152	0.789	0.059	155	95	0.570	1.147	0.257
American Pipit	-	-	-	-	-	1	1	0.004	0.061	0.004
American Robin	45	35	0.221	0.624	0.147	63	28	0.232	1.518	0.081
American Tree Sparrow	3	2	0.015	0.156	0.010	12	3	0.044	0.514	0.011
Baltimore Oriole	3	2	0.015	0.156	0.010	-	-	-	-	-
Bank Swallow	5	2	0.025	0.252	0.010	4	3	0.015	0.148	0.011
Barn Swallow	53	26	0.260	0.891	0.127	253	61	0.930	2.876	0.202
Belted Kingfisher	-	-	-	-	-	1	1	0.004	0.061	0.004
Black-billed Magpie	-	-	-	-	-	6	6	0.022	0.170	0.018
Blackpoll Warbler	-	-	-	-	-	1	1	0.004	0.061	0.004
Bobolink (b)	34	23	0.167	0.703	0.088	4	4	0.015	0.121	0.015
Bohemian Waxwing	-	-	-	-	-	14	1	0.051	0.849	0.004
Brewer's Blackbird	134	40	0.657	2.475	0.181	25	4	0.092	1.043	0.011
Brown Thrasher	2	2	0.010	0.099	0.010	-	-	-	-	-
Brown-headed Cowbird	188	66	0.922	2.529	0.275	7	2	0.026	0.326	0.007
Cedar Waxwing	-	-	-	-	-	54	24	0.199	0.853	0.081
Chestnut-collared Longspur (a)	1	1	0.005	0.070	0.005	6	1	0.022	0.364	0.004
Chipping Sparrow	1	1	0.005	0.070	0.005	1	1	0.004	0.061	0.004
Clay-colored Sparrow	48	43	0.235	0.510	0.196	38	15	0.140	0.996	0.055
Cliff Swallow	40	12	0.196	0.921	0.059	44	13	0.162	0.911	0.044
Common Grackle	270	51	1.324	6.239	0.186	2992	42	11.000	152.597	0.110

Table H. Seasonal Use Summary Statistics for Small-Bodied Non-Passerines (Woodpeckers and Doves) and Passerines (Including Small-Bodied Corvids such as Jays and Magpies) within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.
Common Redpoll	76	11	0.373	2.613	0.044	118	15	0.434	2.490	0.051
Common Yellowthroat	5	5	0.025	0.155	0.025	7	7	0.026	0.180	0.022
Downy Woodpecker	1	1	0.005	0.070	0.005	1	1	0.004	0.061	0.004
Eastern Bluebird	-	-	-	-	-	9	1	0.033	0.546	0.004
Eastern Kingbird	12	11	0.059	0.256	0.054	65	43	0.239	0.707	0.140
European Starling	56	14	0.275	1.691	0.064	48	10	0.176	1.371	0.037
Gray Catbird	-	-	-	-	-	10	10	0.037	0.189	0.037
Harris's Sparrow	1	1	0.005	0.070	0.005	2	1	0.007	0.121	0.004
Horned Lark	264	135	1.294	3.034	0.368	158	51	0.581	2.078	0.162
House Sparrow	1	1	0.005	0.070	0.005	6	3	0.022	0.309	0.007
House Wren	1	1	0.005	0.070	0.005	1	1	0.004	0.061	0.004
Lapland Longspur	863	26	4.230	23.733	0.118	161	14	0.592	3.618	0.044
Lark Sparrow	2	2	0.010	0.099	0.010	1	1	0.004	0.061	0.004
Least Flycatcher	5	5	0.025	0.155	0.025	3	2	0.011	0.135	0.007
Marsh Wren	3	3	0.015	0.121	0.015	3	3	0.011	0.105	0.011
Mountain Bluebird	-	-	-	-	-	2	1	0.007	0.121	0.004
Mourning Dove	38	29	0.186	0.520	0.142	119	44	0.438	2.128	0.136
Northern Flicker	4	4	0.020	0.139	0.020	5	4	0.018	0.201	0.011
Northern Rough-winged Swallow	1	1	0.005	0.070	0.005	-	-	-	-	-
Orange-crowned Warbler	-	-	-	-	-	2	2	0.007	0.086	0.007
Orchard Oriole	-	-	-	-	-	2	2	0.007	0.086	0.007
Purple Martin	1	1	0.005	0.070	0.005	-	-	-	-	-
Red-eyed Vireo	-	-	-	-	-	1	1	0.004	0.061	0.004

Table H. Seasonal Use Summary Statistics for Small-Bodied Non-Passerines (Woodpeckers and Doves) and Passerines (Including Small-Bodied Corvids such as Jays and Magpies) within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.	Total Std. Detections	Total Flocks	Mean Use (birds/300 m plot/20 min)	Stan. Dev.	Occur. Freq.
Red-winged Blackbird	768	338	3.765	7.824	0.569	1430	132	5.257	24.436	0.272
Rusty Blackbird	-	-	-	-	-	51	4	0.188	2.574	0.015
Savannah Sparrow	40	30	0.196	0.620	0.132	38	25	0.140	0.552	0.077
Smith's Longspur	-	-	-	-	-	10	1	0.037	0.606	0.004
Snow Bunting	88	10	0.431	3.659	0.044	45	6	0.165	1.226	0.022
Song Sparrow	54	54	0.265	0.569	0.211	29	29	0.107	0.374	0.092
Sprague's Pipit (a)	2	2	0.010	0.099	0.010	1	1	0.004	0.061	0.004
Tennessee Warbler	1	1	0.005	0.070	0.005	-	-	-	-	-
Tree Swallow	51	27	0.250	0.674	0.132	11	4	0.040	0.405	0.015
Unknown Blackbird	-	-	-	-	-	4	1	0.015	0.243	0.004
Unknown Longspur	-	-	-	-	-	667	3	2.452	36.525	0.011
Unknown Passerine	12	5	0.059	0.576	0.025	34	6	0.125	1.168	0.022
Unknown Sparrow	-	-	-	-	-	8	7	0.029	0.190	0.026
Unknown Swallow	2	1	0.010	0.140	0.005	4	1	0.015	0.243	0.004
Unknown Warbler	-	-	-	-	-	1	1	0.004	0.061	0.004
Vesper Sparrow	18	15	0.088	0.347	0.074	25	20	0.092	0.406	0.066
Warbling Vireo	1	1	0.005	0.070	0.005	2	2	0.007	0.086	0.007
Western Kingbird	4	4	0.020	0.139	0.020	3	2	0.011	0.135	0.007
Western Meadowlark (b)	101	98	0.495	0.772	0.368	59	40	0.217	0.889	0.107
White-breasted Nuthatch	-	-	-	-	-	1	1	0.004	0.061	0.004
White-crowned Sparrow	4	2	0.020	0.198	0.010	-	-	-	-	-
Yellow Warbler	10	10	0.049	0.216	0.049	7	6	0.026	0.180	0.022

Table H. Seasonal Use Summary Statistics for Small-Bodied Non-Passerines (Woodpeckers and Doves) and Passerines (Including Small-Bodied Corvids such as Jays and Magpies) within the Burke County Wind Project Avian Use Study Area (Burke County, North Dakota)

	Spring					Fall				
Species Group/Species Name	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/300 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**	**Total Std. Detections**	**Total Flocks**	**Mean Use (birds/300 m plot/20 min)**	**Stan. Dev.**	**Occur. Freq.**
Yellow-headed Blackbird	166	83	0.814	4.387	0.230	179	15	0.658	5.732	0.048
Yellow-rumped Warbler	-	-	-	-	-	6	4	0.022	0.191	0.015
Small-Bodied Non-Passerines	**43**	**34**	**0.211**	**0.552**	**0.157**	**128**	**52**	**0.471**	**2.137**	**0.158**
Passerines and Small-Bodied Corvids	**3473**	**1222**	**17.025**	**29.592**	**0.877**	**6897**	**787**	**25.357**	**159.592**	**0.772**

Seasonal mean use statistics by species within the Burke County Wind Project's Avian Use Study Area. The Avian Use Study Area described a 1-mile boundary around the original 300 MW Burke County Wind Project. *Total Std. Detections* = Total number of detections occurring within the 984 ft. (300 m)-radius survey cylinder during standardized use surveys; *Total Flocks* = total number of flocks occurring within the 984 ft. (300 m)-radius survey cylinder during standardized use surveys; *Mean Use* = Mean detections per 300 m plot/20 minute count segment, with standard deviation; *Occur. Freq.* = occurrence frequency, the number of segments at which the taxon was detected divided by the total number of segments conducted during that season. North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) denoted by subscripted letters after species name: (a) = Level I; (b) = Level II; (c) = Level III.

APPENDIX III

Species Observed during Standardized Avian Use Surveys

Appendix III. Species Observed during Standardized Avian Use Surveys—Burke County Wind Project (Burke County, North Dakota)

Common Name	Scientific Name	Season				Conservation Listing Status	
		Spring	Summer	Fall	Winter	State Status	Federal Status
Alder Flycatcher	*Empidonax alnorum*	X*	N/A	-	N/A		
American Avocet	*Recurvirostra americana*	X	N/A	X	N/A	SCP II	
American Coot	*Fulica americana*	X	N/A	X	N/A		
American Crow	*Corvus brachyrhynchos*	X	N/A	X	N/A		
American Goldfinch	*Spinus tristis*	X	N/A	X	N/A		
American Kestrel	*Falco sparverius*	X	X*	X	-	SCP II	
American Pipit	*Anthus rubescens*	-	N/A	X	N/A		
American Robin	*Turdus migratorius*	X	N/A	X	N/A		
American Tree Sparrow	*Spizelloides arborea*	X	N/A	X*	N/A		
American White Pelican	*Pelecanus erythrorhynchos*	X*	N/A	X	N/A	SCP II	
American Wigeon	*Mareca americana*	X	N/A	X	N/A		
Baird's Sandpiper	*Calidris bairdii*	X*	N/A	-	N/A	SCP I	
Bald Eagle	*Haliaeetus leucocephalus*	X	-	X	-	SCP II	BGEPA
Baltimore Oriole	*Icterus galbula*	X	N/A	-	N/A		
Bank Swallow	*Riparia riparia*	X*	N/A	X	N/A		
Barn Swallow	*Hirundo rustica*	X	N/A	X	N/A		
Belted Kingfisher	*Megaceryle alcyon*	-	N/A	X*	N/A		
Black Tern	*Chlidonias niger*	X	N/A	X	N/A	SCP I	
Black-billed Magpie	*Pica hudsonia*	-	N/A	X	N/A		
Black-crowned Night-Heron	*Nycticorax nycticorax*	X	N/A	X*	N/A		
Blackpoll Warbler	*Setophaga striata*	-	N/A	X*	N/A		
Blue-winged Teal	*Spatula discors*	X	N/A	X	N/A		
Bobolink	*Dolichonyx oryzivorus*	X	N/A	X	N/A	SCP II	
Bohemian Waxwing	*Bombycilla garrulus*	-	N/A	X*	N/A		

Common Name	Scientific Name	Season				Conservation Listing Status	
		Spring	Summer	Fall	Winter	State Status	Federal Status
Brewer's Blackbird	*Euphagus cyanocephalus*	X	N/A	X	N/A		
Broad-winged Hawk	*Buteo platypterus*	X*	-	X	-		
Brown Thrasher	*Toxostoma rufum*	X	N/A	-	N/A		
Brown-headed Cowbird	*Molothrus ater*	X	N/A	X	N/A		
Buff-breasted Sandpiper	*Calidris subruficollis*	X*	N/A	-	N/A		
Bufflehead	*Bucephala albeola*	X	N/A	-	N/A		
Cackling Goose	*Branta hutchinsii*	X	N/A	X	N/A		
California Gull	*Larus californicus*	X	N/A	-	N/A		
Canada Goose	*Branta canadensis*	X	N/A	X	N/A		
Canvasback	*Aythya valisineria*	X	N/A	X	N/A	SCP II	
Cedar Waxwing	*Bombycilla cedrorum*	-	N/A	X	N/A		
Chestnut-collared Longspur	*Calcarius ornatus*	X	N/A	X	N/A	SCP I	
Chipping Sparrow	*Spizella passerina*	X	N/A	X	N/A		
Clay-colored Sparrow	*Spizella pallida*	X	N/A	X	N/A		
Cliff Swallow	*Petrochelidon pyrrhonota*	X	N/A	X	N/A		
Common Grackle	*Quiscalus quiscula*	X	N/A	X	N/A		
Common Merganser	*Mergus merganser*	X*	N/A	-	N/A		
Common Raven	*Corvus corax*	X	N/A	X	N/A		
Common Redpoll	*Acanthis flammea*	X	N/A	X	N/A		
Common Yellowthroat	*Geothlypis trichas*	X	N/A	X	N/A		
Cooper's Hawk	*Accipiter cooperii*	X	X	X	-		
Double-crested Cormorant	*Phalacrocorax auritus*	X	N/A	X	N/A		
Downy Woodpecker	*Dryobates pubescens*	X	N/A	X*	N/A		
Eastern Bluebird	*Sialia sialis*	-	N/A	X*	N/A		
Eastern Kingbird	*Tyrannus tyrannus*	X	N/A	X	N/A		
European Starling	*Sturnus vulgaris*	X	N/A	X	N/A		

Common Name	Scientific Name	Season				Conservation Listing Status	
		Spring	Summer	Fall	Winter	State Status	Federal Status
Ferruginous Hawk	*Buteo regalis*	-	-	X	-	SCP I	
Forster's Tern	*Sterna forsteri*	X*	N/A	-	N/A		
Franklin's Gull	*Leucophaeus pipixcan*	X	N/A	X	N/A	SCP I	
Gadwall	*Mareca strepera*	X	N/A	X	N/A		
Golden Eagle	*Aquila chrysaetos*	-	-	X*	X	SCP II	BGEPA
Gray Catbird	*Dumetella carolinensis*	-	N/A	X	N/A		
Gray Partridge	*Perdix perdix*	X	N/A	X*	N/A		
Great Blue Heron	*Ardea herodias*	-	N/A	X	N/A		
Great Horned Owl	*Bubo virginianus*	X	X*	X	-		
Greater White-fronted Goose	*Anser albifrons*	-	N/A	X*	N/A		
Greater Yellowlegs	*Tringa melanoleuca*	X	N/A	X	N/A		
Green-winged Teal	*Anas crecca*	X	N/A	X	N/A		
Harris's Sparrow	*Zonotrichia querula*	X*	N/A	X	N/A		
Hooded Merganser	*Lophodytes cucullatus*	X*	N/A	-	N/A		
Horned Grebe	*Podiceps auritus*	X	N/A	-	N/A	SCP I	
Horned Lark	*Eremophila alpestris*	X	N/A	X	N/A		
House Sparrow	*Passer domesticus*	X*	N/A	X*	N/A		
House Wren	*Troglodytes aedon*	X*	N/A	-	N/A		
Killdeer	*Charadrius vociferus*	X	N/A	X	N/A		
Lapland Longspur	*Calcarius lapponicus*	X	N/A	X	N/A		
Lark Sparrow	*Chondestes grammacus*	X	N/A	X	N/A		
Least Flycatcher	*Empidonax minimus*	X	N/A	X	N/A		
Least Sandpiper	*Calidris minutilla*	X	N/A	-	N/A		
Lesser Scaup	*Aythya affinis*	X	N/A	X	N/A	SCP II	
Lesser Yellowlegs	*Tringa flavipes*	X	N/A	X	N/A		
Long-billed Dowitcher	*Limnodromus scolopaceus*	-	N/A	X	N/A		

Common Name	Scientific Name	Season				Conservation Listing Status	
		Spring	Summer	Fall	Winter	State Status	Federal Status
Mallard	*Anas platyrhynchos*	X	N/A	X	N/A		
Marsh Wren	*Cistothorus palustris*	X	N/A	X	N/A		
Merlin	*Falco columbarius*	X	-	X*	-		
Mountain Bluebird	*Sialia currucoides*	-	N/A	X	N/A		
Mourning Dove	*Zenaida macroura*	X	N/A	X	N/A		
Northern Flicker	*Colaptes auratus*	X	N/A	X	N/A		
Northern Goshawk	*Accipiter gentilis*	-	-	-	X		
Northern Harrier	*Circus hudsonius*	X	X	X	-	SCP II	
Northern Pintail	*Anas acuta*	X	N/A	X	N/A	SCP II	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	N/A	-	N/A		
Northern Shoveler	*Spatula clypeata*	X	N/A	X	N/A		
Orange-crowned Warbler	*Oreothlypis celata*	-	N/A	X*	N/A		
Orchard Oriole	*Icterus spurius*	-	N/A	X	N/A		
Osprey	*Pandion haliaetus*	X*	-	X	-		
Pectoral Sandpiper	*Calidris melanotos*	-	N/A	X	N/A		
Peregrine Falcon	*Falco peregrinus*	X	X*	-	-	SCP III	
Pied-billed Grebe	*Podilymbus podiceps*	X	N/A	X	N/A		
Prairie Falcon	*Falco mexicanus*	-	-	X*	-	SCP II	
Purple Martin	*Progne subis*	X*	N/A	-	N/A		
Red-eyed Vireo	*Vireo olivaceus*	-	N/A	X*	N/A		
Redhead	*Aythya americana*	X	N/A	X	N/A		
Red-necked Grebe	*Podiceps grisegena*	X*	N/A	X	N/A		
Red-necked Phalarope	*Phalaropus lobatus*	-	N/A	X*	N/A		
Red-tailed Hawk	*Buteo jamaicensis*	X	X	X	-		
Red-winged Blackbird	*Agelaius phoeniceus*	X	N/A	X	N/A		
Ring-billed Gull	*Larus delawarensis*	X	N/A	X	N/A		

Common Name	Scientific Name	Season				Conservation Listing Status	
		Spring	Summer	Fall	Winter	State Status	Federal Status
Ring-necked Duck	*Aythya collaris*	X	N/A	X	N/A		
Ring-necked Pheasant	*Phasianus colchicus*	X	N/A	X	N/A		
Rock Pigeon	*Columba livia*	X	N/A	X	N/A		
Ross's Goose	*Anser rossii*	-	N/A	X	N/A		
Rough-legged Hawk	*Buteo lagopus*	X	-	X	X		
Ruddy Duck	*Oxyura jamaicensis*	X	N/A	X	N/A		
Rusty Blackbird	*Euphagus carolinus*	-	N/A	X	N/A		
Sandhill Crane	*Antigone canadensis*	X	N/A	X	N/A		
Savannah Sparrow	*Passerculus sandwichensis*	X	N/A	X	N/A		
Semipalmated Plover	*Charadrius semipalmatus*	-	N/A	X*	N/A		
Sharp-shinned Hawk	*Accipiter striatus*	X	-	X	-		
Sharp-tailed Grouse	*Tympanuchus phasianellus*	X	N/A	X	N/A	SCP II	
Short-eared Owl	*Asio flammeus*	X*	-	-	X	SCP II	
Smith's Longspur	*Calcarius pictus*	-	N/A	X	N/A		
Snow Bunting	*Plectrophenax nivalis*	X	N/A	X	N/A		
Snow Goose	*Anser caerulescens*	-	N/A	X	N/A		
Snowy Owl	*Bubo scandiacus*	-	-	-	X		
Solitary Sandpiper	*Tringa solitaria*	X	N/A	X*	N/A		
Song Sparrow	*Melospiza melodia*	X	N/A	X	N/A		
Sora	*Porzana carolina*	X	N/A	-	N/A		
Spotted Sandpiper	*Actitis macularius*	X*	N/A	X	N/A		
Sprague's Pipit	*Anthus spragueii*	X*	N/A	X*	N/A	SCP I	
Swainson's Hawk	*Buteo swainsoni*	X	X	X	-	SCP I	
Tennessee Warbler	*Oreothlypis peregrina*	X	N/A	-	N/A		
Tree Swallow	*Tachycineta bicolor*	X	N/A	X	N/A		
Tundra Swan	*Cygnus columbianus*	-	N/A	X*	N/A		

Common Name	Scientific Name	Season				Conservation Listing Status	
		Spring	Summer	Fall	Winter	State Status	Federal Status
Turkey Vulture	*Cathartes aura*	X	X*	X	-		
Unknown Accipiter	*Accipiter*	-	-	X*	-		
Unknown Blackbird	*Icteridae*	-	N/A	X*	N/A		
Unknown Corvid	*Corvidae*	X	N/A	-	N/A		
Unknown Duck	*Anatinae*	X*	N/A	X	N/A		
Unknown Eagle	*Aquila chrysaetos/Haliaeetus leucocephalus*	-	-	-	X*		
Unknown Falcon	*Falco*	-	-	X*	X		
Unknown Goose	*Anser/Branta*	-	N/A	X	N/A		
Unknown Gull	*Larinae sp.*	X	N/A	X	N/A		
Unknown Longspur	*Calcariidae*	-	N/A	X	N/A		
Unknown Passerine	*Passeriformes*	X	N/A	X	N/A		
Unknown Raptor	*Accipitriformes/Falconiformes*	X*	-	-	-		
Unknown Shorebird	*Charadriiformes*	X	N/A	X	N/A		
Unknown Sparrow	*Passerellidae*	-	N/A	X	N/A		
Unknown Swallow	*Hirundinidae*	X	N/A	X*	N/A		
Unknown Warbler	*Parulidae*	-	N/A	X*	N/A		
Upland Sandpiper	*Bartramia longicauda*	X	N/A	-	N/A	SCP II	
Vesper Sparrow	*Pooecetes gramineus*	X	N/A	X	N/A		
Virginia Rail	*Rallus limicola*	X	N/A	X*	N/A		
Warbling Vireo	*Vireo gilvus*	X*	N/A	X*	N/A		
Western Grebe	*Aechmophorus occidentalis*	-	N/A	X*	N/A		
Western Kingbird	*Tyrannus verticalis*	X	N/A	X	N/A		
Western Meadowlark	*Sturnella neglecta*	X	N/A	X	N/A	SCP II	
White-breasted Nuthatch	*Sitta carolinensis*	-	N/A	X*	N/A		
White-crowned Sparrow	*Zonotrichia leucophrys*	X*	N/A	-	N/A		
White-faced Ibis	*Plegadis chihi*	-	N/A	X	N/A		

Common Name	Scientific Name	Season				Conservation Listing Status	
		Spring	Summer	Fall	Winter	State Status	Federal Status
Willet	*Tringa semipalmata*	X	N/A	-	N/A	SCP II	
Wilson's Phalarope	*Phalaropus tricolor*	X	N/A	X	N/A	SCP I	
Wilson's Snipe	*Gallinago delicata*	X	N/A	X*	N/A		
Yellow Warbler	*Setophaga petechia*	X	N/A	X	N/A		
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	X	N/A	X	N/A		
Yellow-rumped Warbler	*Setophaga coronata*	-	N/A	X	N/A		

Seasons Detected: An "X" within a particular seasonal column indicates that species has been detected at least once within the Project Area over the course of field studies. An asterisk (*) indicates that the species was detected outside the Project but within the Avian Use Study Area.

State conservation listing status indicates North Dakota State Wildlife Action Plan (Dyke et al. 2015) Species of Conservation Priority (SCP) Level I, II, or III

Federal Status Codes: BGEPA=Bald and Golden Eagle Protection Act

This list only includes species detected during standardized surveys. All non-raptor species receive an "N/A" in summer and winter as standardized surveys were only conducted for raptors during these seasons.

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Appendix C

Public and Agency Correspondence

C1. Agency Notification Template

EXAMPLE AGENCY LETTER

AECOM
1000 East Calgary Ave
Bismarck, ND 58503
aecom.com

(701) 221-4148 tel
(701) 221-4155 fax

August 27, 2019

Subject: Northern Divide Wind Energy Center and 345 kV Transmission Line Project Burke and Mountrail Counties, ND

Northern Divide Wind, LLC (Northern Divide Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, is proposing to develop the Northern Divide Wind Energy Center (Wind Energy Center) and the approximately 41-mile, 345 kV transmission line (Transmission Line, and collectively with the Wind Energy Center, the "Project") in Burke and Mountrail Counties, ND. Northern Divide Wind plans to complete North Dakota Public Service Commission permitting and construction in 2020.

The Wind Energy Center will have a nameplate capacity of approximately 200 megawatts, consisting of wind turbines and associated infrastructure. The Wind Energy Center will be located entirely within Burke County, ND. The Transmission Line will connect the Wind Energy Center to the electrical grid at the Basin Electric Tande Substation in west Mountrail County. The Transmission Line will be located in Burke and Mountrail Counties, ND. Northern Divide Wind requests the consideration of the Project shown on the attached map (Figure 1). The Wind Energy Center Project Area and 1-mile wide Transmission Line Corridor encompass the following legal locations:

County	Township	Range	Sections
Burke	159 N	93 W	2-11, 16-21, 27-35
	160 N	93 W	3-5, 8-11, 14-17, 21-23, 25-28, 33-36
	161 N	92 W	19, 30, 31
	161 N	93 W	3-11, 12-29, 34-36
	161 N	94 W	1-24, 28-30
	162 N	93 W	29-34
	162 N	94 W	15-36
Mountrail	157 N	93 W	2-10, 15-20
	157 N	94 W	9-24, 27-30, 32, 33
	158 N	93 W	2-5, 8-11, 14-17, 20-23, 26-29, 32-35

To ensure that all social, economic, and environmental effects are considered and per Section 69-06-01-05 of the North Dakota Administrative Code, we are soliciting your comments on the Project. We are particularly interested in any property which your agency may own or have an interest in located within or adjacent to the Project. We would also appreciate being made aware of any proposed developments your agency may be contemplating in the areas under consideration for the Project. Any information that might help us in our siting studies and permit applications would be appreciated. We would appreciate a response within 30 days of receipt of this letter. If no reply is received by this date, it will be assumed that you have no comment on this Project.

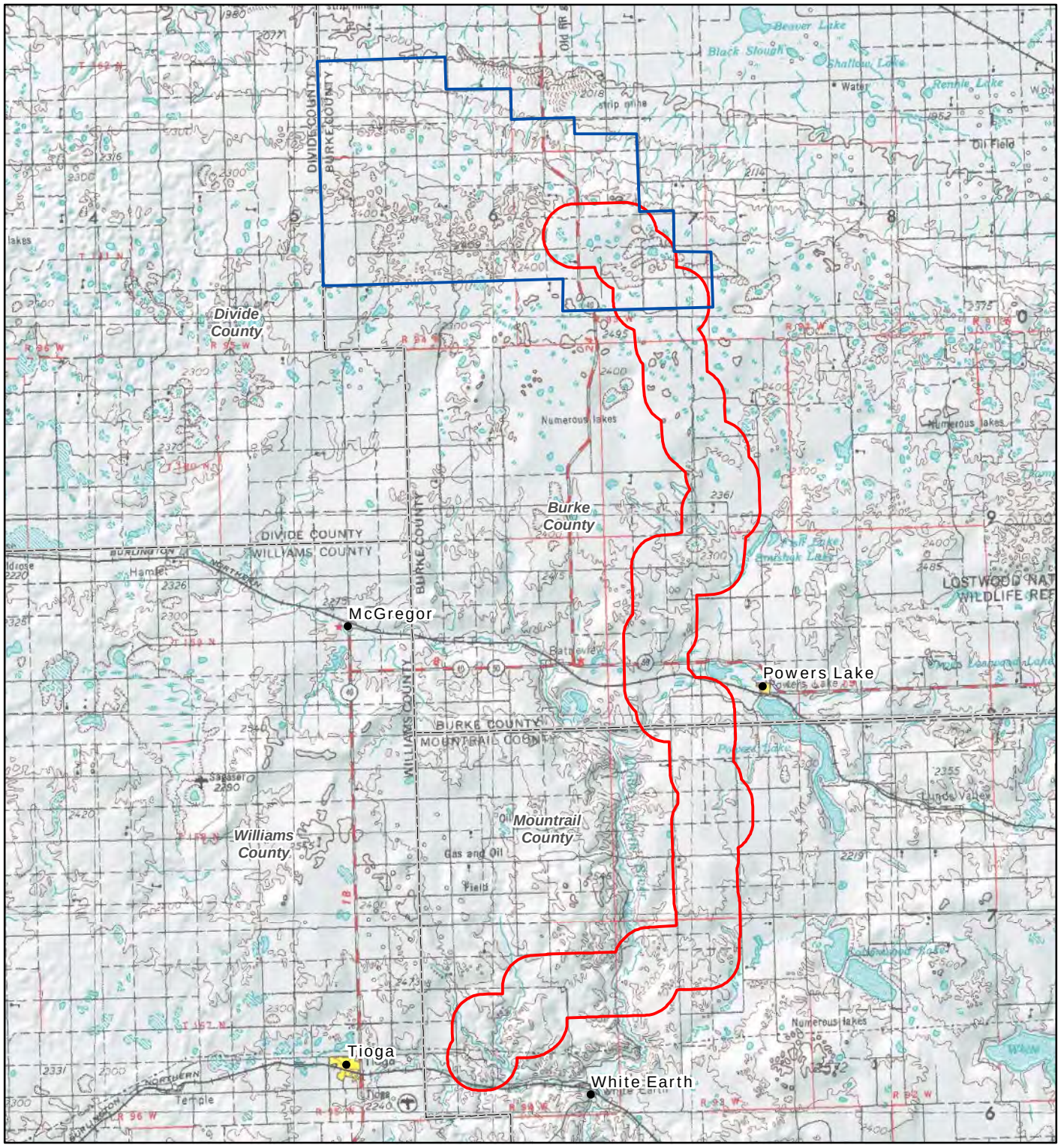
If further information is desired regarding the proposed Project, please contact Lindsey Churchill at (701) 221-4148 in Bismarck, ND, or at the email and address below.

Sincerely,



Lindsey Churchill, PhD, PWS
AECOM
Environmental Project Manager
1000 East Calgary Avenue Suite 1
Bismarck, ND 58503
lindsey.churchill@aecom.com

Enclosure:
Figure 1 - Project Location Map

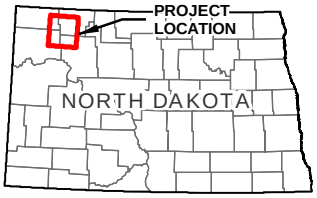


Northern Divide Wind Energy Center and 345 kV Transmission Line Burke & Mountrail Counties, North Dakota

Figure 1
Project Location

Legend

- Northern Divide Project Area
- Transmission Line Corridor
- County Boundary
- City/Town



N

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C2. Tribal Notification Template

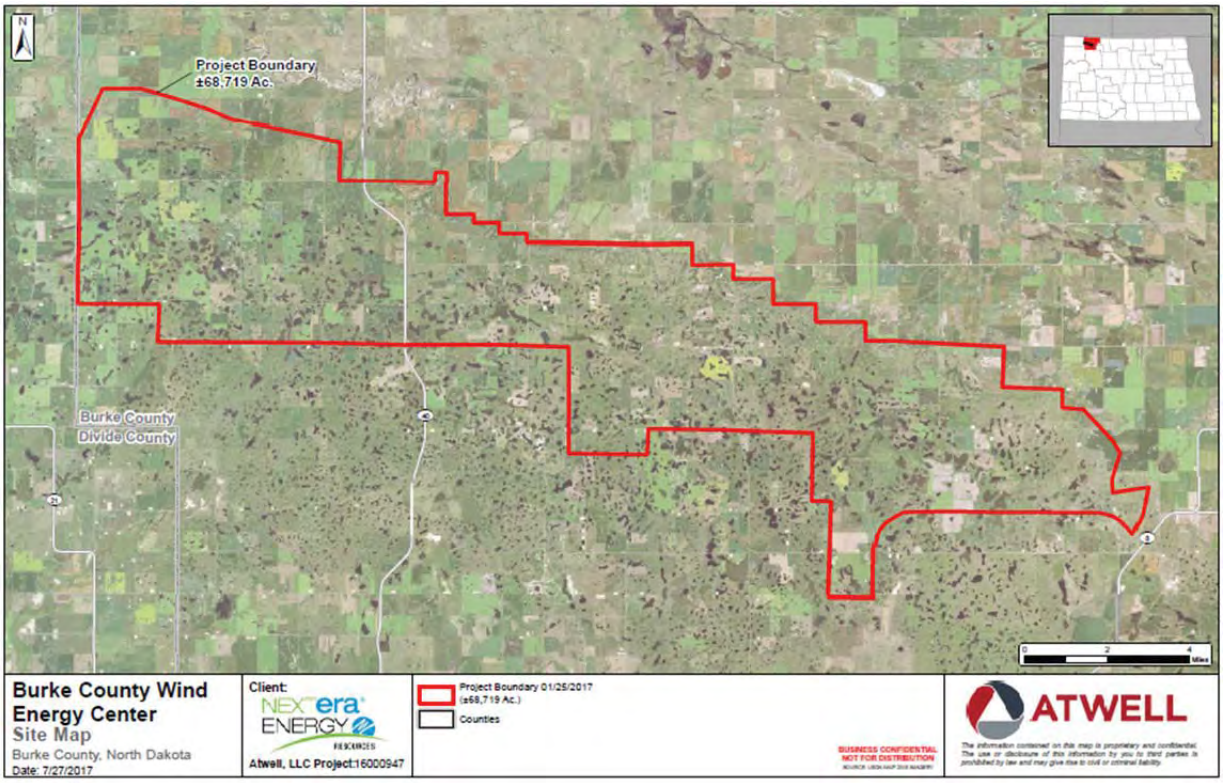
EXAMPLE TRIBAL OUTREACH LETTER

August 2, 2017

Subject: Proposed Burke Wind Energy Center in Burke County, North Dakota

Burke Wind, LLC (Burke) is an indirect, wholly-owned subsidiary of NextEra Energy Resources, LLC (NextEra) that is in the process of developing the proposed 300 MW Burke Wind Energy Center in Burke County, ND as shown below in Figure 1. The project will be located on approximately 68,719 acres of private land southwest of Bowbells, ND in Keller, Fay, Harmonious, Leaf Mountain, Foothills, Clayton, Ward, Lucy, Diamond, Roseland, Kandiyohi, Thorson, and Cleary Townships.

Figure 1



The Project would consist of up to 120 wind turbine generators, with a total nameplate capacity of up to 300 megawatts (MW). Additional facilities include access roads, electrical collection systems and cabling, a collection substation, an operation and maintenance (O&M) yard, a batch plant location, one temporary laydown yard, and meteorological (MET) towers. The Project will connect to Basin Electric Power Company's Tande substation via a 32-mile generation tie line.

Burke would like to complete cultural surveys in the late August/September timeframe prior to initial turbine micro-siting in October 2017 so that the layout of all project facilities can be relatively finalized before snow falls in the late fall of 2017. Burke anticipates initiating permitting through the North Dakota Public Service Commission in the second half of 2018, with construction scheduled to start in 2019. At this time, we are not expecting to coordinate with any Federal agencies, as no Federal permits are anticipated.

Consistent with NextEra's policy to reach out to Tribes in the area of its projects, I wanted to provide you with information about the Project and ask whether you have an interest in receiving further information and/or would like to participate in upcoming project surveys.

Project Area
The Project Area is located within a rural area situated several miles from the small communities of Columbus (approximately 6 miles north), Lignite (approximately 7 miles north) and Powers Lake (approximately 10.5 miles south). Small farmsteads are scattered throughout the Project Area. Public roads are generally situated in a grid-like arrangement.

Overall the Project Area and surrounding vicinity is sparsely populated, and supports a mix of grasslands and cultivated cropland/hayfields/pasturelands within an extensive prairie pothole wetland system. Agricultural use (cultivated crops and hay/pasture) is the primary land use within the Project Area with several oil pump jacks and batteries scattered throughout. Forested habitats and riparian corridors are limited and concentrated along the northern boundary. The topography of the region and the Project Area is generally flat but contains undulating relief, with approximate elevations between 2,100 and 2,470 feet above mean sea level (MSL).

The Project Area is located mostly within the Northern Dark Brown Prairie ecoregion of the Northern Glaciated Plains, and partially within the Northern Missouri Coteau ecoregion of the Northwestern Glaciated Plains. According to Environmental Protection Agency Ecoregion mapping data, the Northern Glaciated Plains ecoregion is characterized by a flat to gently rolling landscape composed of glacial drift. The sub-humid conditions foster a grassland transitional between the tall and shortgrass prairie. The surficial geology in the project region is primarily undulating to very steep topography with knolls, ridges, an occasional drainage-way, and some very poorly drained soils in depressions and potholes.

Proposed Project
As described above, the proposed Project would consist of an array of wind turbines, each with an associated transformer. Proposed Project facilities would include the following components:

- Up to 120 wind turbines;
- All-weather access roads to each turbine site;
- A collection substation (approximately 5 acres);
- Underground electrical collection lines and fiber optic cables from each turbine to the collection substation;
- An O&M yard (approximately 10 acres);
- A batch plant location (up to 5 additional acres);
- A temporary laydown yard (up to 15 acres);
- Up to 4 temporary and 3 permanent SCADA MET towers; and
- A generation tie-line of approximately 32 miles in length

Although the Project layout is still preliminary, based on similar projects in the region, we anticipate that no more than 5 percent of the proposed Project area would be temporarily disturbed during construction of the Project. Our typical operational facilities generally have no more than 1 percent of the area permanent impacted by infrastructure. Construction activities may temporarily disturb soils and vegetation to an extent that would require some regrading, compaction mitigation, and reseeding following completion of operations. Additionally, the areas temporarily affected could be restored to crop production or grassland, depending on landowner preferences.

Land would be graded on-site for the turbine pads with native vegetation. Access roads, operations and maintenance buildings, and temporary construction/laydown areas would be installed as necessary to fully accommodate all aspects of Project construction, operation, and maintenance.

Cultural Resources Studies

NextEra contracted Atwell, LLC (Atwell) to conduct a Class I Cultural Resources Inventory for the approximately 68,719-acre site, hereafter referred as the Project Area. For the purpose of this report, a two-mile buffer was included surrounding the Project Area (hereafter referred as Review Area).

Atwell conducted the Class I Cultural Resources Inventory through an initial file search of the North Dakota Cultural Resources Survey (NDCRS) data files maintained by the SHSND. Review of NDCRS data files included review of Archaeological, Historical, and Architectural resource forms and cultural resources survey reports available at the SHSND in Bismarck, ND within the Project Area and Review Area. Atwell also reviewed the National Register of Historic Places (NRHP) records maintained by the National Park Service to find listings of Historic Properties listed on the NRHP within the Review Area.

Approximately 87 cultural resources survey reports for compliance projects are on file in NDCRS records for projects conducted within the Review Area. Oil and gas related projects (wells, pipelines, etc.) comprise the majority of compliance reports in the Review Area (33 reports), followed by transportation related projects (17 reports), material borrow locations (10 reports), mining related projects (8 reports) and electrical transmission/distribution projects (8 reports). Atwell reviewed the location of previous cultural resources survey projects within the Project Area and determined that the majority of the Project Area has not been previously surveyed to determine if cultural resources are present. Therefore, further cultural resources investigations will likely be necessary to further evaluate the presence/absence of cultural resources within the Project Area.

In its Class I surveys, Atwell identified 17 archaeological sites within the Project Area and an additional seven archaeological sites located within two miles of the Project Area. Several of the archaeological sites within the Project Area contain stone circle and/or cairn features. Archaeological sites 32BK0001, 32BK0002, 32BK0003, 32BK0004, 32BK0005 and 32BK0006 consist of Late Prehistoric stone circle sites with multiple stone circles. Examination of the spatial distribution of archaeological sites 32BK0001, 32BK0002, 32BK0003, 32BK0004, and 32BK0005 indicates that they are possibly related and appear to be located on slightly elevated landforms interspersed by prairie potholes. Archaeological sites 32BK0001, 32BK0002, and 32BK0003 are located within the southwestern portion of the Project Area. Archaeological site 32BK0004 is bisected by the Project Area boundary in the southwest portion of the Project Area. Archaeological sites 32BK0005 and 32BK0006 are located approximately 0.25 mile and 1.8 mile south of the Project Area respectively, in the southwestern portion of the Project Area.

Archaeological site 32BK0081 consists of a single stone circle that was recorded in 2009 and is located just over 2 miles from the Project Area. Data presented in the archaeological site form for 32BK0081 indicates that this site may be associated with archaeological site 32BK0023 which is located outside of

the Review Area and consists of eight stone circles. Due to the potential association of 32BK0023 with 32BK0081, it is possible that additional unrecorded archaeological sites associated with this potential cultural landscape may be present in the vicinity of sites 32BK0023 and 32BK0081.

Archaeological site 32BK0109 consists of multiple stacked stone cairns and rock piles (dispersed stone cairns) which were recorded within the Project Area in 2011. Archaeological site 32BK0109 is located approximately 0.8 mile southwest of sites 32BK0110, 32BK0111, 32BK0112, and 32BK0113 which consist of multiple stone circles overlooking a prairie pothole that were also recorded within the Project Area in 2011. Based on the spatial distribution of archaeological sites 32BK0110, 32BK0111, 32BK0112, and 32BK0113, it is possible that these four sites are related and may indicate a cultural landscape of Native American importance rather than individual discrete archaeological site locations. The association of site 32BK0109 to the four associated sites is unclear.

Archaeological site 32BK0161 consists of two stone circles; archaeological site 32BK0162 consists of a single cairn on a high ridge; and archaeological site 32BK0163 consists of a single stone circle. Archaeological site 32BK0128 consists of multiple stone circles and cairns which were recorded in 2013 approximately 1.0 mile east of the Project Area. Archaeological site 32BK0182 is located approximately 0.8 mile southeast of site 32BK0128 and it is unclear if these two sites are related. Site 32BK0182 consists of multiple stone circles recorded in 2015 approximately 1.7 miles from the Project Area. Archaeological site 32BK0022 consists of a stone circle site recorded in 1992 that is located within the Project Area. Archaeological site 32BK0125 consists of multiple stone circles and cairns which were recorded within the Project Area in 2010.

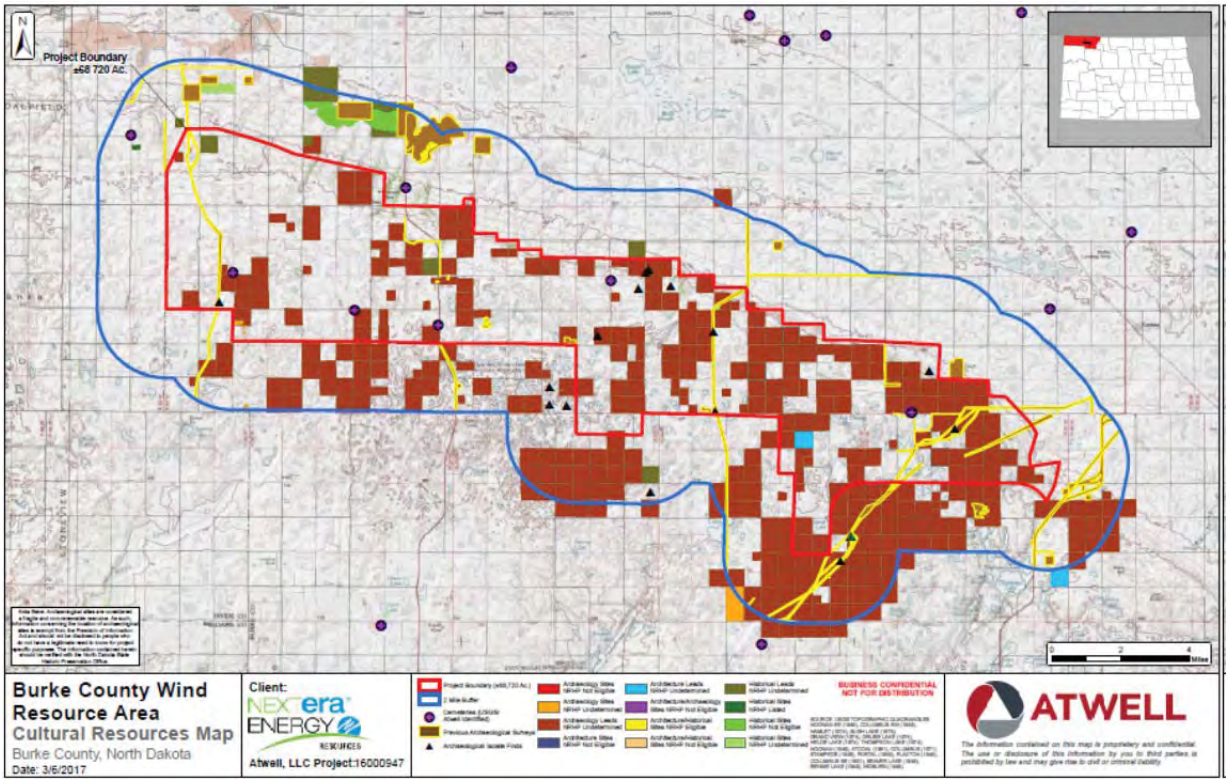
Archaeological site 32BK0170 consists of a stone circle recorded in 2014 approximately 0.4 mile west of the Project Area boundary. Archaeological sites 32BK0022, 32BK0125, and 32BK0170 do not appear to be associated with other stone circle or cairn archaeological sites.

Archaeological site 32BK0010 is cross listed as an architectural and an archaeological resource that consists of a historic mining site that was recorded in 1987 and is located approximately 1.8 miles north of the Project Area. Archaeological site 32BK0117 consists of a historic artifact scatter recorded within the Project Area in 2011. Archaeological site 32BK0176 consists of a historic stone foundation and artifact scatter that was recorded within the Project Area in 2014.

Archaeological sites 32BK0001, 32BK0002, 32BK0003, 32BK00004, 32BK00005, 32BK0006, 32BK0022, 32BK0081, 32BK0109, 32BK0110, 32BK0111, 32BK0112, 32BK0113, 32BK0128, 32BK0161, 32BK0162, 32BK0163, 32BK0170, and 32BK0182 were recommended “Undetermined” for NRHP eligibility and additional archaeological investigations would be necessary to determine NRHP eligibility. Archaeological sites 32BK0010, 32BK0117, 32BK0121, 32BK0125, and 32BK0176 were recommended “Not Eligible” for listing on the NRHP.

Atwell identified 184 site leads within the Project Area and an additional 161 site leads within two miles of the Project Area. Of these site leads, 161 are characterized as cultural material scatters, 169 are characterized as depressions, 1 is characterized as a cultural material scatter/depression, 2 are characterized as graves (32BKX0339 and 32BKX0427), and 6 are of unknown function. Archaeological site lead 32BKX0339 is located approximately 0.25 mile south of the Project Area boundary and archaeological site lead 32BKX0427 is located within the southeastern portion of the Project Area. Both have very little information available in the record and the exact location of the potential grave at each lead is unknown. The map below in Figure 2 identifies locations of identified cultural resources.

Figure 2



Emmons Logan commits to avoid any newly documented sites and the previously-documented cultural resources within the Project area. Any sites avoided during construction would be fenced to reduce the potential that they would be inadvertently disturbed.

****

I hope this information has been helpful to you. Again, as it is NextEra's policy to reach out to Tribes in the vicinity of its projects, I wanted to provide you this information about the Project. Please let me know if you have an interest in the project area and would like to be involved in further discussions, so that we can answer any questions, provide you additional information, discuss any concerns you may have about the Project location, and plan any requested tribal participation accordingly. I can be reached at (224) 251-7580 or via e-mail at Carolyn.Stewart@NextEraEnergy.com.

Regards,

Carolyn T. Stewart
Director, Tribal Relations

Cc: Clay Cameron, NextEra
Richard Estabrook, NextEra

C3. North Dakota Aeronautics Commission

From: Lund, Nels C. <nlund@nd.gov>

Sent: Friday, August 30, 2019 9:37

AM **To:** Churchill, Lindsey

Subject: Northern Divide Wind Energy Center and 345 kV Transmission Line Project

Good morning Lindsey,

We received your letter on the Northern Divide Wind Energy Center and 345 kV Transmission Line Project.**Due to the proximity to Tioga Municipal Airport we recommend you file an airspace case to the FAA**. I do not see a proposed height of transmission line or construction equipment on the letter you sent, but if the height is above 200' AGL then you need to submit a case to the FAA for review. And if the project falls into any of the category's below in FAR Part 77 then you must file a case with the FAA. You can do so on this websitehttps://oeaaa.faa.gov/oeaaa/external/portal.jsp

Below are the rules in determining whether a case needs to be filed or not. You can file a case on the above website and also find instructions on how to do so. Please let me know if you have any questions.

Who Needs to File

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference 14 CFR Part 77.9.

Please click here to use the FAA's Notice Criteria Tool to determine if you meet the requirements to file notice of your construction or alteration

OR

In accordance with 14 CFR Part 77.9, if you propose any of the following types of construction or alteration, you must file notice with the FAA at least 45 days prior to beginning construction:

- any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes:
  - 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway of each airport described in 14 CFR 77.9(d) with its longest runway more than 3,200 ft. in actual length, excluding heliports
  - 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway of each airport described in 14 CFR 77.9(d) with its longest runway no more than 3,200 ft. in actual length, excluding heliports
  - 25 to 1 for a horizontal distance of 5,000 ft. from the nearest point of the nearest landing and takeoff area of each heliport described in 14 CFR 77.9(d);
- OR any highway, railroad, waterway or other traverse way for mobile objects, of a height which, if adjusted upward as defined in 14 CFR 77.9(c) would exceed a standard of 14 CFR 77.9 (a) or (b);
- OR your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy;
- OR your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal

reception;

- OR any construction or alteration exceeding 200 feet above ground level, regardless of location;
- OR any construction or alteration located on an airport described in 14 CFR 77.9(d);
- OR filing has been requested by the FAA.

Thank you!

Nels Lund
Airport Planner
North Dakota Aeronautics Commission
PO Box 5020
Bismarck, ND 58502-5020
701-328-9655 (Office)
701-955-8280 (Cell)
https://aero.nd.gov

C4. North Dakota Department of Environmental Quality

NORTH Dakota | Environmental Quality

Be Legendary.

September 4, 2019

Lindsey Churchill, PhD
Environmental Project Manager
AECOM
100 East Calgary Avenue, Suite 1
Bismarck, ND 58503

Re: Northern Divide Wind Energy Center 345 kV Transmission Line in Burke, Mountrail Counties

Dear Ms. Churchill:

The North Dakota Department of Environmental Quality has reviewed the information concerning the above-referenced project received at the department on August 19, 2019, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.

2. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

3. Projects disturbing one or more acres are required to have a permit to discharge storm water runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Further information on the storm water permit may be obtained from the department's website or by calling the Division of Water Quality (701-328-5210). Also, cities may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local storm water management considerations are addressed.

4. The proposed construction project may include individual projects located within Burke and Mountrail counties. It is possible the project or projects may be located over defined glacial drift aquifers, defined sensitive glacial drift aquifers, or within wellhead or source water protection areas. Care should be taken to avoid spills of any materials that may have an adverse effect on groundwater quality. All spills must be immediately reported to this department and appropriate remedial actions performed.

5. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can also be minimized by ensuring that construction activities are not conducted during early morning or late evening hours.

6. All solid waste materials must be managed and transported in accordance with the state's solid and hazardous waste rules. Appropriate efforts to reduce, reuse and/or recycle waste materials are strongly encouraged. As appropriate, segregation of inert waste from non-inert waste can generally reduce the cost of waste management. Further information on waste management and recycling is available from the department's Division of Waste Management at (701) 328-5166.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

L. David Glatt, P.E., Director
North Dakota Department of Environmental Quality

LDG:dlp
Attach.

Construction and Environmental Disturbance Requirements

The following are the minimum requirements of the North Dakota Department of Environmental Quality for projects that involve construction or environmental disturbance in or near waters of the State of North Dakota. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect waters of the state. All projects must be constructed to minimize the loss of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion of soil and sediment loss using erosion and sediment controls. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, and land resources must be protected against compaction, vegetation loss, and unnecessary damage.

Surface Waters

All construction must be managed to minimize impacts to aquatic systems. Follow safe storage and handling procedures to prevent the contamination of water from fuel spills, lubricants, and chemicals. Stream bank and stream bed disturbances must be controlled to minimize slit movement, nutrient upsurges, plant dislocations, and any physical, chemicals, or biological disruption. The use of pesticides or herbicides in or near surface waters is allowed under the department's pesticide application permit with notification to the department.

Fill Material

Any fill material placed below the ordinary high-water mark must be free of topsoil, decomposable materials, and persistent synthetic organic compounds; including, but not limited to, asphalt, tires, treated lumber, and construction debris. The department may require testing of fill materials. All temporary fill must be removed. Debris and solid wastes must be properly disposed or recycled. Impacted areas must be restored to near original condition.

C5. North Dakota Department of Transportation

NORTH Dakota | Transportation
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September 20, 2019

Lindsey Churchill, PHD, PWS
AECOM
Environmental Project Manager
1000 E. Calgary Avenue, Suite 1
Bismarck, ND 58503

DEVELOP A WHOLLY-OWNED, INDIRECT SUBSIDIARY OF NEXT ERA ENERGY RESOURCES AND APPROXIMATELY 41-MILE, 345KV TRANSMISSION LINE WITH WIND ENERGY CENTER, BURKE AND MOUNTRAIL COUNTIES, NORTH DAKOTA

We have reviewed your August 16, 2019, letter.

This project should have no adverse effect on the North Dakota Department of Transportation highways.

Additionally, if because of this project any work needs to be done on highway right of way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, Joel Wilt at 701-774-2700.

CHAD M. ORN, P.E., DIRECTOR - OFFICE OF PROJECT DEVELOPMENT

57\cmo\js
c: Joel Wilt, Williston District Engineer

C6. North Dakota Game and Fish Department

GOVERNOR, Doug Burgum
DIRECTOR, Terry Steinwand
DEPUTY, Scott A. Peterson

"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT
100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

September 12, 2019

Lindsey Churchill, PhD, PWS
Environmental Project Manager
1000 East Calgary Avenue Suite 1
Bismarck, ND 58503

Dear Ms. Churchill:

RE: Northern Divide Wind Energy Center and 345 kV Transmission Line Project Burke and Mountrail Counties, ND

The North Dakota Game and Fish Department has been in discussion with NextEra Energy Inc. regarding wind energy development in Burke County since 2016. The original project proposed was sited within an area with a high degree of undisturbed native habitats, therefore extremely important to wildlife, including several Species of Conservation Priority such as the Northern Pintail, Sprague's Pipit, and Sharp-tailed Grouse. In an effort to create a more responsibility sited project, NextEra has relocated 31 of the original 78 turbines. Though the project footprint has been shifted, greatly reducing impacts, the boundary is still within an area of high sensitivity and many of our initial concerns are the same. In this letter, we will provide official comments as requested in a letter dated 8/16/2019.

Native prairie is the most endangered habitat type in North Dakota and, as a grassland state, the majority of our native wildlife species are linked to prairie. Disturbance, fragmentation, and loss of native prairie have adversely impacted a wide variety of species and these negative impacts will only continue to compound as more development takes place on the landscape. The remaining tracts of unbroken prairie are becoming more and more vital to many declining bird and pollinator species. Though just a modest portion of the new project area is composed of native, unbroken prairie, this habitat type supports 30 or more of the 115 Species of Conservation Priority identified in the North Dakota State Wildlife Action Plan (Dyke et. al 2015). Species of Conservation Priority, such as the Chestnut-collared Longspur, Baird's Sparrow, and Sprague's Pipit (all of which have declined over 80% from 1966-2015), may be further negatively impacted by the loss and fragmentation of native prairie in the project area.

The proposed project area is located within the Missouri Coteau, a landscape that not only has a considerable amount of native prairie, but an extremely high concentration of wetlands, some of the highest in North America. Prairie Pothole wetlands are the most productive wildlife habitat in

North Dakota, and they make up a moderate portion of the project area. These wetlands support 54 Species of Conservation Priority, as well as a considerable number of waterfowl, shorebirds and cranes throughout the year. Wind energy development has been shown to have detrimental impacts to wildlife within both wetland and prairie habitats, and careful micro-siting within these habitats is crucial in order to minimize impacts.

Though the Department believes the best way to protect our Species of Conservation Priority is by taking a habitat focused approach, we would be remiss to not also reiterate the following species-specific concerns.

1. The Whooping Crane's migration corridor enters North Dakota in the northwest corner of the state, angling through Burke County and directly through the proposed project area. The migration corridor then proceeds south to just north of the Van Hook Arm on Lake Sakakawea and follows just east of the Missouri River and its reservoirs until it exits the southern portion of the state. The risk of Whooping Cranes striking a turbine or transmission line will be elevated in this area as compared to the rest of the state. While no fatalities have been documented of Whooping Cranes from collision with wind turbines in the United States, collisions with transmission lines are the leading known cause of death in the wild for whooping cranes. Contact the US Fish and Wildlife Habitat and Population Evaluation Team (HAPET) in Bismarck to request the Whooping Crane model of predicted use of landscapes.

2. The project area is highly important to waterfowl production. HAPET has developed a Local Siting Decision Support Tool (DST) to estimate the number of duck pairs that are displaced based on research conducted in the Dakotas (Loesch et al. 2013, Loesch 2016). The model also produces an approximation of the number of wetlands requiring restoration that offset the displacement of these breeding pairs. We recommend NextEra contact the HAPET office to request the DST.

3. Though Bald and Golden Eagle numbers are low in the winter months, both species are likely to be common in the project area during the rest of year, specifically spring and fall.

4. A large number of Sharp-tailed Grouse were observed in the original project area. Twenty-eight leks were confirmed, averaging 11.6 grouse per lek. That is approximately 325 male birds. This does not include males that went undetected, or females. In fall, based on these estimates, the area could produce upwards of 3,500 huntable birds. And as prairie grouse generally avoid areas with human disturbance and tall structures (Leddy et al. 1999, Hagen et al. 2004, Manville 2004, Pruett et all. 2009), this project could impact the local population.

5. Despite an extremely short survey period, a number of species of conservation concern were observed in the project area, including: Sprague's Pipit, Grasshopper Sparrow, Nelson's Sparrow, Marbled Godwit, Northern Harrier, Upland Sandpiper, Bobolink, and Western Meadowlark. All of these species are sensitive to habitat loss and fragmentation and this project has the potential to further negatively impact these, already declining, species. Of particular concern is the Sprague's Pipit. Pipits were historically found

throughout much of North Dakota but the species range has contracted in the state. The Northern Divide Wind Energy Center, particularly the transmission line, overlaps with one of the few places in the state where a high concentration of pipits still persists (Lipsey et al. 2015). Male pipits conduct a flight display about 50-100 meters above the ground that last from several minutes to several hours. This project could impact the core area for pipits, including the risk of increased mortality to this skylarking (a breeding display) species.

Finally, the Department is uncertain of the protocols for creating and maintaining a transmission line. If a road needs to be created for its construction, a sizeable loss to native prairie and an increase in habitat fragmentation would result. If that road is to be maintained, it is likely that disturbance will have long lasting impacts to species of conservation concern, specifically those sensitive to habitat fragmentation. Further, the Department is concerned about what bringing new transmission to the area might mean for future development. As mentioned before, the mosaic of grasslands and wetlands in this area is extremely valuable to a high number of wildlife species and the cumulative impacts of multiple projects in the area is of tremendous concern.

As we continue to address the challenges of stemming the decline of our state's most sensitive species, we cannot endorse or consent to the disturbance, fragmentation, and loss of the remaining high value habitats essential to Species of Conservation Priority without recommending that suitable replacement or offsets be applied back onto the landscape. Ensuring these habitats remain on the landscape is the only way to stem the decline of these species and prevent listings through the Endangered Species Act, which could impact both the state and its citizens by restricting further construction of infrastructure, energy development, recreational activities, grazing, vegetation control, and land-use changes or conversion on both public and private land. The Department has stressed the importance of following the best available science in determining impacts and voluntary offsets. The best science addressing North Dakota resources are Loesch et al. 2013 and Shaffer and Buhl 2016; these papers should be used to help guide NextEra in developing a voluntary offset package.

As NextEra moves forward with this project, the Department requests to remain informed. To accurately analyze the project and provide valuable feedback to the PSC, it is important that the Department receives all documents, including wildlife surveys, spatial data, and any voluntary offsets being proposed 100 days prior to the hearing date.

Sincerely,

Greg Link
Chief, Conservation and Communications Division

Cc: Scott Larson, US Fish and Wildlife Service
ND Public Service Commission

October 1, 2019

Greg Link
Chief, Conservation and Communication Division
North Dakota Game and Fish Department
100 North Bismarck Expressway
Bismarck, ND 58501-5095

Mr. Link,

Thank you for your letter dated September 12, 2019, regarding our proposed 200-MW Northern Divide Wind Energy Center and Transmission Line (Project) in Burke and Mountrail Counties, North Dakota. In response, Northern Divide Wind, LLC (Northern Divide Wind), an indirect, wholly-owned subsidiary of NextEra Energy Resources, LLC (NextEra Energy Resources), presents this letter, which includes our proposed avoidance, minimization, and voluntarily offset measures that effectively mitigate potential environmental impacts. Since July 8, 2019, we have maintained dialogue with your Department and the U.S. Fish and Wildlife Service ("Service"), collectively the "Wildlife Agencies," throughout Project development, including our most recent meeting on September 17, 2019 and ongoing offset discussions thereafter. This dialogue has been beneficial in designing the Project to have minimal environmental impact.

Responses and Clarifications to Department Letter Dated September 12, 2019

Paragraph 1 — NextEra has relocated 31 of the original 78 turbines

Refer below to our response to Paragraph 6 where we describe relocating 44 of the original 81 turbine locations.

Paragraph 2 — Native Prairie

Per our meeting on September 17, 2019, and Attachment 1, native prairie makes up approximately 7% of the Project area (we understand through our discussions with the Department that native prairie is synonymous with "unbroken grassland"). Much of this habitat consists of small, fragmented patches and woody species encroachment is common across most of the habitat, which often results in reduced grassland bird densities. Northern Divide Wind has avoided siting permanent, above-ground wind facility infrastructure in unbroken grassland and is voluntarily offering grassland bird displacement offsets (see response to Paragraph 6 below). Per the Wildlife Agencies' request, the avoidance, minimization, and offset measures described herein effectively mitigate any potential impacts to unbroken grassland and avian use.

Paragraph 3 — Missouri Coteau

We agree that the larger geographic extent of the Missouri Coteau consists of areas with considerable wetland and grassland habitats, but per our meeting on September 17, 2019, and Attachment 1, the Project area is located in an area dominated by cropland (only 7% of Project area is unbroken or native grassland) and the Project is partially located within the Northern Missouri Coteau (20 of the proposed 78 turbine locations lie outside the boundary as defined by Bryce *et al.* 1996). The avoidance, minimization, and offset measures described herein effectively mitigate any potential impacts.

Paragraph 4.1 — Whooping Crane

Northern Divide Wind used information provided by the Wildlife Agencies in early project stages that included radio telemetry data of Whooping Crane locations from the Service that showed the project location

was in the low-use intensity area. Review of Neimuth *et al.* 2018 and our Whooping Crane Habitat Suitability Analysis indicates the project site is no more attractive than the surrounding area and suggests no reason to believe the site would be an attractant. In addition, no Whooping Crane or Sandhill Crane (a non-federally listed species) has ever been injured or killed by collision with wind turbines in the migratory corridor and Derby *et al.* 2018 shows no mortality of either species during monitoring over multiple years at multiple projects in North and South Dakota. Northern Divide Wind avoids all impacts to potentially suitable stopover roosting habitat and commits to marking the entire Project transmission line with bird flight diverters to reduce the potential for collisions following the Avian Power Line Interaction Committee Suggested Practices. Northern Divide Wind is also preparing a Whooping Crane Habitat Review report and will provide a copy to the Department.

Paragraph 4.2 — Habitat and Population Evaluation Team (HAPET) Decision Support Tool (DST)

Northern Divide Wind developed the offset proposal described in response to Paragraph 6 with respect to the HAPET and Shaffer *et al.* 2019 DSTs, as well as coordination with Department staff.

Paragraph 4.3 — Bald and Golden Eagles

Northern Divide Wind is preparing an Avian Use report and will provide a copy to the Department.

Paragraph 4.4 — Sharp-tailed Grouse

By moving the Project area and associated turbines into a crop-dominated landscape, the impact to upland birds, including huntable upland birds, is expected to be minimal.

Paragraph 4.5 — North Dakota Species of Conservation Concern

As stated below in response to Paragraph 6 and described in Attachments 1 through 3, Northern Divide Wind has avoided siting permanent, above-ground wind facility infrastructure in unbroken grassland and is voluntarily offering grassland bird and waterfowl displacement offsets. It is recognized that these avoidance, minimization, and offsetting measures were implemented largely in response to Wildlife Agency concerns related to many of the Species of Conservation Concern.

In regards to Sprague's pipit, the Project is currently sited in an area dominated by tilled cropland and no permanent, above-ground wind facility infrastructure is sited in unbroken grasslands, avoiding further fragmentation that may negatively impact the species. The Project transmission line is also sited mostly in tilled cropland, but it is also co-located to existing roads where possible, located in areas fragmented by private roads and petrochemical infrastructure, or in grasslands with high tree and shrub densities, all of which are unsuitable habitat for the species (Jones 2010).

Paragraph 5 — Transmission Line

To construct a transmission line, Northern Divide Wind uses existing access, including public and private access to the maximum extent possible. Where existing access is unavailable, temporary access is used, but no permanent, maintained access is proposed. Temporary access is only as wide as needed and construction predominately takes place when the ground is dry and hard enough to support construction equipment with no improvements, but occasionally timber mats may be required.

Per our meeting on September 17, 2019, the Project transmission line is a private generation tie line and no other user is permitted. As Northern Divide Wind has committed below in response to Paragraph 6, we propose no further development in the Northern Missouri Coteau.

Paragraph 6 — Offsets

At the recommendation of the Wildlife Agencies on July 8, 2019, Northern Divide Wind committed to additional avoidance, minimization, and offsets. The Wildlife Agencies suggested locating turbines outside of high (>20 pairs per square mile) pintail duck density areas as this species is a key indicator for general waterfowl use in the region. The Wildlife Agencies advised Northern Divide Wind that the 11 eastern-most turbines from the previous 200-MW design previously submitted to the Public Service Commission (PSC) were the most critical to relocate, followed by any other turbines located in high pintail duck density areas. Of the 81 original turbine locations, Northern Divide Wind dropped two and relocated 44 (including the 11 eastern-most turbines, as recommended by the Wildlife Agencies). Thirty-five (35) of the original locations remain the same. The Project now has a total of 79 turbine locations. Additionally, the Project area has been reduced by approximately 52% and now lies in a mostly fragmented agricultural landscape. The result of these avoidance and minimization activities is that all permanent, above-ground wind facility infrastructure are in areas of pintail duck density less than 20 pairs per square mile and all are in tilled cropland, which has resulted in additional avoidance of grassland impacts (*i.e.*, there are no direct, permanent grassland and wetland impacts associated with the Project wind facility). The table in Attachment 1 highlights the decrease in environmental impacts from our avoidance and minimization actions, the figure in Attachment 2 compares the Project and original turbine locations in relation to pintail duck density, and Attachment 3 summarizes Project mitigation measures.

In addition to the design changes, NextEra Energy Resources commits to avoid further development in the Northern Missouri Coteau as defined by Bryce *et al.* 1996 should this Project be approved. This includes abandoning any additional Project phases and any development prospects of our Hartland project area located in the Northern Missouri Coteau near Hartland, ND.

Finally, while careful siting and coordination with the Wildlife Agencies has resulted in avoidance of direct, permanent grassland and wetland impacts associated with the Project wind facility, Northern Divide Wind commits to voluntarily offer indirect avian displacement offsets with respect to methods described in Shaffer *et al.* 2019 (a synthesis of Loesch *et al.* 2013 and Shaffer and Buhl 2016) and recommendations by the Wildlife Agencies. Per the avian displacement estimates in Attachment 1, proposed habitat offsets for waterfowl and grassland bird displacement are approximately 130 wetland-acres (65 2-acre basins) and 100 grassland-acres.

Offset providers are currently limited in North Dakota, but Northern Divide Wind has identified two "turn-key" providers to meet the offset objectives: Magnolia and Ducks Unlimited (DU). DU will provide 65 wetland-acre offsets and Magnolia will provide the remaining offsets. All offsets will take place on private lands within the Missouri Coteau with willing landowners under voluntary, non-perpetual 30-year term conservation agreements with financial incentives to landowners. Northern Divide Wind will allocate offset funds to the respective providers, not to the Wildlife Agencies, to implement the "on-the-ground" conservation, and the providers will coordinate with the Department on monitoring and success criteria. Northern Divide Wind will enter into a Memorandum of Understanding with the Department that outlines our offset commitment, assuming receipt of all certifications and permits.

Paragraph 7 — Documents

At this time, a PSC hearing date is speculative at best, but Northern Divide Wind will attempt to provide the Department sufficient time to analyze all relevant documents.

Northern Divide Wind thanks you for the consideration of this letter, including our avoidance, minimization, and offset measures.

Sincerely,

Mike Sole
Vice President of Environmental Services

CC:

Scott Larson, U.S. Fish and Wildlife Service

Attachments:

1. Table highlighting the decrease in environmental effects from avoidance and minimization measures for the Northern Divide Wind Energy Center.
2. Figure comparing the Project and original turbine locations in relation to pintail duck density.
3. Northern Divide Wind Mitigation Measures.

Literature Cited:

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

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George, T. L., A. C. Fowler, R. L. Knight, and L. C. McEwen. 1992. Impacts of a severe drought on grassland birds in western North Dakota. Ecological Applications 2(3): 275 – 284.

Jones, S. L. 2010. Sprague's Pipit (*Anthus spragueii*) conservation plan. U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C.

Loesch, C. R., J. A. Walker, R. E. Reynolds, J. S. Gleason, N. D. Niemuth, S. E. Stephens, and M. A. Erickson. 2013. Effect of wind energy development on breeding duck densities in the Prairie Pothole Region. Journal of Wildlife Management 77:587–598.

Shaffer, J. A., C. R. Loesch, and D. A. Buhl. 2019. Estimating offsets for avian displacement effects of anthropogenic impacts. Ecological Applications 00(00):e01983. 10.1002/eap.1983.

Shaffer, J. A., and D. A. Buhl. 2016. Effects of wind-energy facilities on grassland bird distributions. Conservation Biology 30:59–71.

Shaffer, J.A. and D.A. Buhl. 2015. Effects of wind-energy facilities on breeding grassland bird distributions. Conservation Biology 30(1):59-71.

ATTACHMENT 1

TABLE HIGHLIGHTING THE DECREASE IN ENVIRONMENTAL EFFECTS FROM AVOIDANCE AND MINIMIZATION MEASURES FOR THE NORTHERN DIVIDE WIND ENERGY CENTER

Table highlighting the decrease in environmental effects from avoidance and minimization measures for the Northern Divide Wind Energy Center.

Metric	Current Project Design	Original Project Design	Decrease (%)
Project Area (ac)	11,050	22,929	52
Wetland features (NWI) in Project Area (ac)	1,067	3,016	65
Wetland features (NWI) in Project Area (count)	950	2,470	62
Wetland features (NWI) percent of Project Area (%)	10	13	23
Wetland impacts: permanent or temporary (ac)	0	0	0
Wetland features (NWI) within 0.5 mile of turbines (ac)	1,261	3,664	66
Breeding duck pair estimated displacement (count)[1]	486	981	51
Breeding duck pair estimated habitat offset (ac)[1]	130	266	51
Unbroken grassland in Project Area (ac)	743	4,785	84
Unbroken grassland percent of Project Area (%)	7	21	67
Unbroken grassland impacts: permanent (ac)	0	6	100
Unbroken grassland impacts: temporary (ac)[2]	8	112	93
Unbroken grassland within 300 m of turbines (ac)	188	751	75
Grassland bird pair estimated displacement (count)[1,3]	39-116	159-478	75
Grassland bird pair estimated habitat offset (ac)[1,4]	100	398	75

[1] With respect to methods described in Shaffer *et al.* 2019 and recommendations by the North Dakota Game and Fish Department.

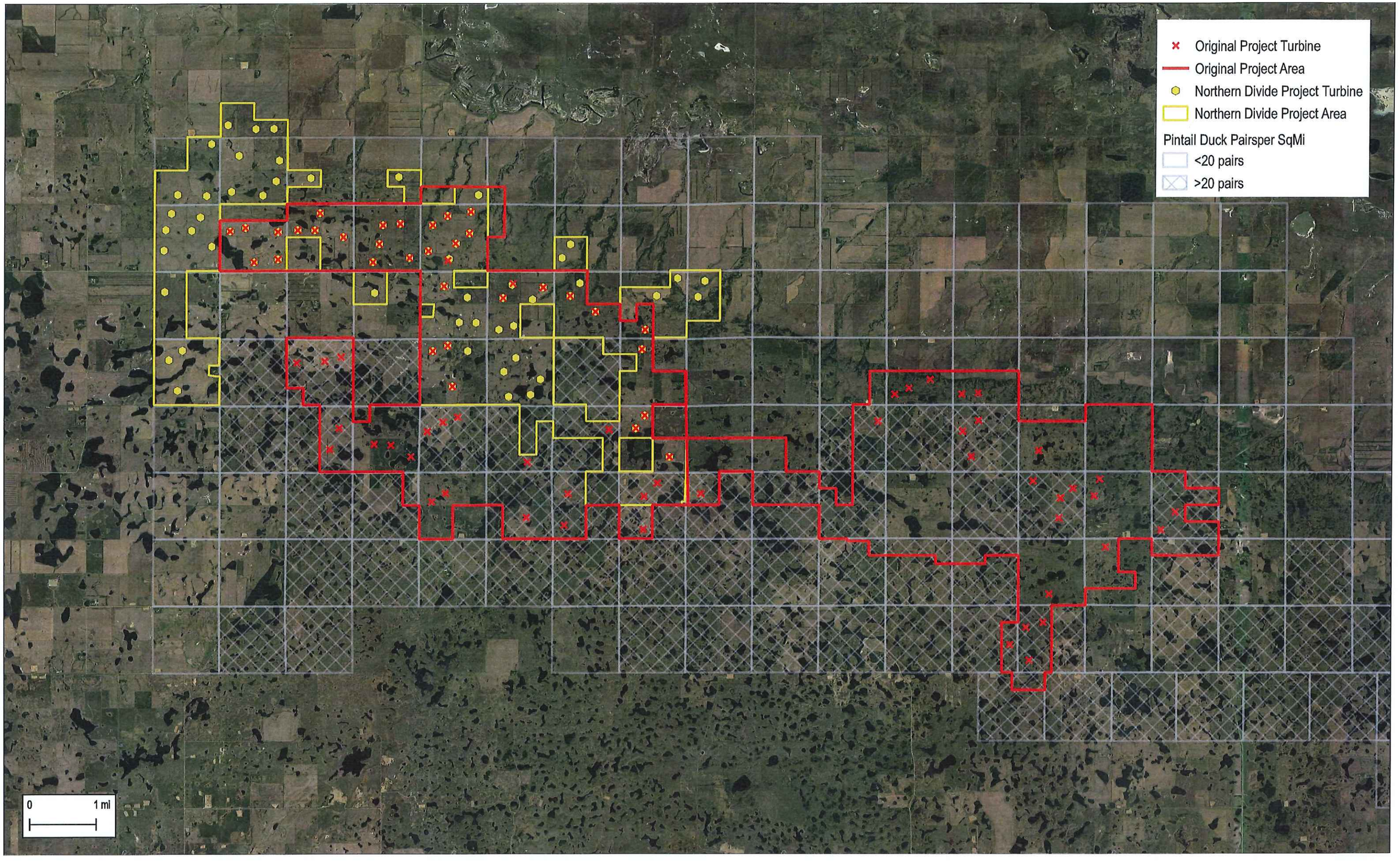
[2] Current Project impacts based off preliminary design and desktop grassland review. Project is currently being surveyed and attempts will be made to avoid or further minimize all direct impacts.

[3] Range based on 0.4 to 1.2 grassland bird pairs per acre (George et al. 1992, Shaffer and Buhl 2015) and a 53% displacement rate per Shaffer *et al.* 2019.

[4] Grassland habitat offset assumes an equivalent pre-impact and offset grassland bird density.

ATTACHMENT 2

FIGURE COMPARING THE PROJECT AND ORIGINAL TURBINE LOCATIONS IN RELATION TO PINTAIL DUCK DENSITY


Original Project Turbine
Original Project Area
Northern Divide Project Turbine
Northern Divide Project Area
Pintail Duck Pairsper SqMi
<20 pairs
>20 pairs
0
1 mi

ATTACHMENT 3

NORTHERN DIVIDE WIND MITIGATION MEASURES

Northern Divide Wind Mitigation Measures

General Environmental

1. Site turbines, access roads, and associated facilities off public recreational lands.
2. Light turbines in accordance with FAA and PSC requirements.
3. Provide contractors with static constraint maps and ensure compliance through onsite environmental construction monitoring.

Wetlands

4. Avoid all direct impacts, including temporary impacts from underground collection by boring.
5. Maintain appropriate water and soil conservation practices during construction through the implementation of best management practices (BMP). These practices include silt fencing, temporary reseeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways and sod stabilization.

Native Prairie/Unbroken Grassland

6. Avoid all direct, permanent impacts from turbines, roads, meteorological towers, and substations.
7. Coordinate with local Natural Resource Conservation Services staff to revegetate non-cropland and pasture areas temporarily disturbed during construction or operation of the wind facility with locally sourced native seed mixes appropriate to the region.
8. Coordinate with the North Dakota Department of Trust Lands on a locally sourced native seed mix for any Project impacts on their lands.
9. Reseed temporarily disturbed areas or restore to crop, based on the conditions of the area prior to construction and based on landowner preference.
10. Develop and implement a noxious weed prevention plan.

Woodlands

11. Avoid placement of turbines in previously undisturbed shrub/scrub vegetation types that may provide additional habitat for breeding birds.
12. Protect existing trees and shrubs by avoiding tree removal for turbines, access roads, and underground collector lines or if removal is necessary, replace following the PSC Tree and Shrub Mitigation Criteria.

General Wildlife

13. Conduct one (1) year of Tier 4 post-construction monitoring to better understand bird and bat impacts that are attributable to operations with reporting to be shared with both NDGFD and the USFWS.
14. Once turbine construction is completed, implement a Wildlife Response and Reporting System (WRRS). The WRRS will include reporting protocols to report and document bird and bat mortality during routine maintenance activities. If any dead or injured birds or bats are found, its location will be marked and reported to the Plant Lead/Site Supervisor. The dead or injured bird or bat will not be removed from the location it was found.
15. Prepare a voluntary Wildlife Conservation Strategy (WCS), which includes an adaptive management approach, so that information gathered during post-construction monitoring can be used to inform future management decisions at the Project.
16. Implement a 25 mph speed limit on Project roads to minimize wildlife collisions.

Avian

17. Provide voluntary offsets for indirect waterfowl and grassland bird displacement.
18. Bury collection lines from the turbines to the collection substation to avoid collision risk in accordance with the Avian Power Line Interaction Committee (APLIC) suggested practices.
19. Design utility lines according to APLIC guidelines to prevent bird collision, as practicable.

20. Implement pad-mounted transformers to reduce risk of bird electrocution.
21. Site turbines at least 0.25 mile from active raptor nests and 0.5 mile from leks.
22. Avoid construction to the extent practicable within 0.5 mile of known sharp-tailed grouse lek locations during the lekking and breeding season (April to July).
23. Avoid construction to the extent practicable with 0.25 mile of active raptor nest locations during the nesting season (March to July).
24. Construct wind turbines using tubular, monopole towers as opposed to a lattice structure, to minimize perching opportunities for raptors and other birds.
25. If any raptor nest is discovered during construction, the nest will be monitored to determine if there is a change in the nest activity status in order to avoid impacts that might have the potential to precipitate nest abandonment.

Threatened and Endangered Species (Whooping Cranes and Dakota Skipper)

26. Given the Project's location within the USFWS North American whooping crane corridor, implement NextEra Energy Resources' internal guidance document determining whooping crane curtailment triggers during migratory periods as part of the WCS. These curtailment steps include shutting down all operational turbines when a whooping crane is identified within one (1) mile of the Project Area, with the turbines remaining shut down for 15 minutes following the departure of the whooping crane or until the whooping crane is observed moving away.
27. Provide the appropriate whooping crane identification guide materials to be in all Project maintenance and operations vehicles for reference.
28. Field-verified suitable Dakota skipper habitat has been and will continue to be avoided. High visibility fencing (*e.g.*, snow fence) will be placed around field-verified suitable Dakota skipper habitat areas in close proximity to construction that are to be avoided to restrict construction equipment from disturbing these areas.
29. No construction will occur during the Dakota skipper adult flight period (between June 15 and July 18) in areas proximal to field-verified Dakota skipper dispersal or foraging habitat.
30. Provide contractors with training, spatial data and static constraints maps that identity where field-verified suitable Dakota skipper habitat is located and where construction equipment is restricted.
31. Educate construction contractors about threatened and endangered species and associated mitigative measures being implemented for each respective species.
32. Mark overhead transmission lines with bird flight diverters in keeping with the Avian Power Line Interaction Committee guidelines (APLIC 2012).

October 23, 2019

Greg Link
Chief, Conservation and Communication Division
North Dakota Game and Fish Department
100 North Bismarck Expressway
Bismarck, ND 58501-5095

Mr. Link,

On October 4, 2019, the U.S. Fish and Wildlife Service Habitat and Population Evaluation Team (HAPET) released an updated Avian Impact Offset Method Decision Support Tool (DST) to address errors identified in the previous DST (released on September 13, 2019). Upon review of the updated DST, we are revising the voluntary indirect waterfowl displacement offset offered in our response letter dated October 1, 2019. The revision increases the wetland-acre offset from approximately 130 acres (65 2-acre basins) to approximately 196 acres (98 2-acre basins). The table provided in Attachment 1 of our response letter also changes for the following metric:

Metric	Current Project Design	Original Project Design	Decrease (%)
Breeding duck pair estimated habitat offset (ac)	196	398	51

Sincerely,

Mike Sole
Vice President of Environmental Services

CC:

Scott Larson, U.S. Fish and Wildlife Service

GOVERNOR, Doug Burgum
DIRECTOR, Terry Steinwand
DEPUTY, Scott A. Peterson

"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT
100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

November 19, 2019

Michael Sole
Vice President of Environmental Services
Northern Divide Wind, LLC
700 Universe Boulevard
Juno Beach, FL 33408

SUBJECT: Northern Divide Wind Energy Center and 345 kV Transmission Line Project
Burke and Mountrail Counties, ND

Mr. Sole,

As you know, the North Dakota Game and Fish Department (Department) has been in continued discussion with NextEra Energy Resource, LLC (NextEra) since 2016, regarding wind energy development in Burke County. The original project proposed, known as Burke County Wind Energy Center (BCWEC), was sited within the Missouri Coteau, a landscape consisting of substantial amounts of intact native prairie and a tremendously high concentration of wetlands. This unique blend of native habitats makes the area extremely important to wildlife, including several of North Dakota's Species of Conservation Priority such as the Northern Pintail, Sprague's Pipit, and Sharp-tailed Grouse. Due to this area's unique nature and significance, the Department, from the onset of project consultation, expressed substantial concern regarding the BCWEC's location selection. Subsequently, the ND Public Service Commission denied BCWEC's permit application in June 2019 for these very reasons.

As a result of this denial, you and your company, initiated heightened coordination and collaboration with the Department on July 8, 2019. To develop a more responsibly sited project, Northern Divide Wind Energy Center (NDWEC) was created. During routine meetings and dialog since that time, including our meeting of September 17, 2019, we've witnessed NextEra's increased attention to our recommendations and a renewed desire, through its subsidiary Northern Divide Wind, LLC (Northern Divide Wind), to avoid, minimize, and offset measures for key native habitats. As documented in your October 1, 2019 and October 23, 2019 letters, Northern Divide Wind has taken several positive steps to reduce and defray the impact of the NDWEC project, such as shifting the project boundary; thereby, decreasing the project area by approximately 50%. As recommended, Northern Divide Wind has relocated 44 and removed 3 of the original 81 turbines. All turbines have been moved away from key Northern Pintail breeding

habitat, and most importantly, all have been relocated off and away from unbroken grassland sites. Through these efforts, the potential impacts to important wildlife resources, resulting from the new NDWEC lay-out, are considerably reduced as compared to the original BCWEC.

Although greatly improved, not all the project's potential impacts could be avoided. Similar to the originally proposed BCWEC location, the majority of the proposed NDWEC project area remains within the Northern Missouri Coteau, the same native grassland-wetland rich landscape which contains some of the highest wetland densities in North America. As presented in all our prior letters regarding the BCWEC, the unique grassland and wetland mosaic of the Missouri Coteau not only provides essential resources for many resident species, but functions as important stopover habitat to numerous migratory water birds, as well. Because of this, there is a higher degree of displacement risk associated with development in this landscape area, as compared to other areas within the state.

In our review and analysis of potential impacts to wildlife, the Department quantifies both direct habitat loss and indirect wildlife displacement associated with wind energy development. To do this, we look to the best available science, specifically research conducted in North Dakota, on avoidance and displacement of prairie avian species due to wind development: Loesch et al 2013, Shaffer et al. 2015, and follow-up Schaffer et al. 2019. In its most recently updated and published work, Schaffer et al. 2019 predicts an average rate of 18% displacement by five waterfowl species within a half mile of turbines, and an avoidance and 53% displacement rate by seven grassland bird species within 300 meters from turbines by the 5th year post-construction.

By using the parameters within these studies, the predicted indirect impacts can be estimated for both grassland birds and breeding ducks, indicator species that reflect the use of habitats for a variety of other species. As initially provided in your October 1, 2019 letter and later modified in an ensuing letter of October 23, 2019, Northern Divide Wind has taken this information, quantified predicted impacts, and committed to a voluntary offset package for restoration of the following habitat features:

- 100 native grassland-acres
- 196 wetland-acres or 98 2-acre basins.

As stated above, we acknowledge Northern Divide Wind has taken the Department's recommendations seriously, resulting in significant impact avoidance and minimization. Despite these positive efforts to alter boundary and relocate turbines for the modified NDWEC project, it was not possible to completely avoid all indirect impacts. Northern Divide Wind has, however, voluntarily committed to address these unavoidable wildlife impacts by facilitating native grassland and wetland restoration activities on private land in the Missouri Coteau. With new insight and understanding of the importance of this area to wildlife, Northern Divide Wind has also committed to avoid future wind development in the Northern Missouri Coteau.

We appreciate Northern Divide Wind's efforts to listen and address the Department's concerns. These efforts demonstrate your commitment to pursue more responsibly sited development, on

this project and in the future.

Sincerely,

Greg Link
Chief, Conservation and Communications Division

Cc: Dustin Jones, NextEra
Scott Larson, U.S. Fish and Wildlife Service

C7. North Dakota Geological Survey

North Dakota Geological Survey

Edward C. Murphy - State Geologist

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.state.nd.us/ndgs

August 30, 2019

Lindsey Churchill, PhD
AECOM
1000 East Calgary Ave, Suite 1
Bismarck, ND 58503

Re: Northern Divide Wind Energy Center and 345 kV Transmission Line Project: Burke & Mountrail Counties, ND

The North Dakota Geological Survey appreciates the notification and opportunity to review and provide comment on the proposed wind energy development project. Your comment solicitation letter of August 22, 2019 was reviewed by our office on August 30, 2019.

Based on the extent of the proposed project areas, it appears that there are some locations in the southern portion of the transmission line corridor boundaries that contain areas mapped as landslides or features that suggest slope instability. These areas can be found depicted on our 1:24,000 scale landslide maps that have been completed for the White and Ross NW quadrangles and should be included in your project area evaluations.

Also, there appears to be several areas within the proposed Northern Divide project area boundaries that contain mineable coal resources as depicted on our detailed coal maps for this area. A review of the PSC's Abandoned Mine Land (AML) locations data also shows seven AML locations just north of White Earth, N.D. that should also be noted.

Our current Areas of Landslides maps, LiDAR elevation mapping and data products, and coal maps for the 1:24,000 and 1:100,000 scale quadrangles that encompass the proposed project area can be found on our website at:

https://www.dmr.nd.gov/ndgs/landslides/

You may also contact our offices directly, with any additional questions or comments, at (701) 328-8000.

Sincerely,

North Dakota Geological Survey:

Fred Anderson
Geologist
fjanderson@nd.gov

FJA\

C8. North Dakota State Water Commission

NORTH Dakota | Water Commission

Be Legendary.™

September 9, 2019

Lindsey Churchill
AECOM
1000 East Calgary Avenue
Bismarck, ND 58503

Dear Ms. Churchill:

This is in response to your request for a review of the environmental impacts associated with the Northern Divide Wind Energy Center and 345 kV Transmission Line Project located in Burke and Mountrail Counties, ND.

The proposed project has been reviewed by State Water Commission staff, and the following comments are provided:

- Initial review indicates the project does not require a conditional or temporary permit for water appropriation. However, if surface water or groundwater will be diverted for construction of the project, a water permit will be required per North Dakota Century Code § 61-04-02. Please consult with the Water Appropriations Division of the Office of the State Engineer if you have any questions at (701) 328-2754 or waterpermits@nd.gov.

- The State Water Commission maintains a network of observation wells across the state for monitoring the water levels and quality in glacial and bedrock aquifers. These wells are often installed in road and highway rights-of-way to limit inconvenience to the adjacent landowners. State Water Commission observation wells have a yellow protective casing extending between 1 and 3 feet above ground surface, and their locations are marked with a stake. If an observation well is encountered during project activities and must be removed, please contact the Water Appropriations Division. The State Water Commission hopes to keep all observation wells, but otherwise will ensure the well is properly abandoned.

- There are no floodplains identified and/or mapped where this proposed project is to take place. No permits relative to the NFIP are required based on the current effective FIRM and State minimum standards.

Thank you for the opportunity to provide review comments. Should you have further questions, please contact me at 701-328-4970 or stevebest@nd.gov.

Sincerely,

Steven Best
Planner III

SB:dm/1570

C9. North Dakota Department of Trust Lands

1707 North 9th Street
PO Box 5523
Bismarck, ND 58506-5523
Phone: (701) 328 – 2800
Fax: (701) 328 – 3650

https://land.nd.gov

DEPARTMENT OF
ND TRUST LANDS
INVESTING FOR EDUCATION

Jodi A. Smith, Commissioner

August 28, 2019

LINDSEY CHURCHILL
ENVIRONMENTAL PROJECT MANAGER
AECOM
1000 EAST CALGARY AVE, SUITE 1
BISMARCK ND 58503

RE: North Divide Wind Energy Center and 345 kV Transmission Line Project Burke and Mountrail Counties, ND

Dear Ms. Churchill:

We received your letter dated August 16, 2019, regarding a request for information on the proposed Northern Divide Wind Energy Center and 345 kV Transmission Line Project in Burke and Mountrail Counties.

To obtain an easement across trust Lands, an on-line application form must be completed. This application can be found at: https://www.land.nd.gov/SurfaceROW/RowApplicationForm . Any proposed towers or lines would be subject to review by the surface division staff and approval by the Land Commissioner on behalf of the Board of University and School Lands.

The following items may be considered in the review of an easement application:

1. Financial benefit to the trusts;
2. Availability of alternate encumbrance site or route;
3. The least environmentally damaging site or route regardless of property ownership;
4. Physical stability of the landscape;
5. Other potential future uses for the trust lands, including urban development;
6. Potential mineral and other material development including oil, gas, coal, cement materials, sodium sulfate, sand and gravel, road material, building stone, chemical substances, metallic ores, uranium ores, or colloidal or other clays;
7. Feasibility for reclamation;
8. Maintenance of existing wetlands and water flows;
9. Any cultural, historical, archeological, and paleontological resources;
10. Federally listed threatened and endangered species;
11. Location of the proposed route or site in relation to section lines, quarter section lines and corridors;
12. Potential liability to the trusts;
13. Applicant's past encumbrances on trust lands;
14. Applicant's financial stability; and
15. Any other information relevant to the application which would assist in the determination.

There are school trust surface interests that are managed by the North Dakota Department of Trust Lands on behalf of the Board of University and School Lands which are located within or near the proposed project area. These surface interests are as follows:

County	Township	Range	Section	Subdivision
Burke	159	93	16	NW4, SE4, SW4
Burke	160	93	16	ALL
Burke	160	93	36	ALL
Burke	161	93	16	NW4, SW4
Burke	161	93	36	NW4, SW4
Burke	161	94	16	NW4, SW4
Burke	162	94	16	NE4
Burke	162	94	36	ALL
Mountrail	157	93	16	ALL
Mountrail	157	94	16	NE4, SE4, SW4
Mountrail	158	93	29	SW4

There are no active Coal Leases on school trust lands within the project area. Attached for your information is a spreadsheet of state mineral interests within the project area.

Please be advised the Board of University and School Lands will not move forward on Wind Projects until site inspection and review have been completed and all local and state approvals have been obtained.

If you have any questions, feel free to contact our office at 701-328-2800.

Sincerely,

Michael Humann

Michael Humann
Surface Division Manager

Attachment: State Mineral Interest spreadsheet

No.	County	Oil Lease	Legal	Subdv	Mineral Interest	Net Acres	Trust	Status	Acquisition
700480	BRK	OG0500023	159-93-7-NW	E2NW4, LOTS 1,2	0.5	76.02	L	A	L
700490	BRK	OG0500024	159-93-7-SW	E2SW4, LOTS 3,4	0.5	76.22	L	A	L
700500	BRK	OG1600068	159-93-8-NE	NE4	0.5	80	L	A	L
700510	BRK	OG1600070	159-93-11-SE	SE4	0.5	80	I	A	A
700520	BRK	OG1600071	159-93-11-SW	SW4SW4, LOT 4	0.5	39.6	L	A	L
706400	BRK	OG1600069	159-93-11-NW	ACCRETION ATTRIBUTABLE TO LOT4 IN SW4	0.5	0.35	L	A	L
706410	BRK	OG1600071	159-93-11-SW	ACCRETION ATTRIBUTABLE TO LOT 4 IN NW4	0.5	0.4	L	A	L
700550	BRK	OG1600073	159-93-16-NE	NE4	1	160	A	A	G
700560	BRK	OG1600074	159-93-16-NW	NW4	1	160	A	A	G
700570	BRK	OG1600075	159-93-16-SE	SE4	1	160	A	A	G
700580	BRK	OG1600076	159-93-16-SW	SW4	1	160	A	A	G
700610	BRK	OG1600078	159-93-28-NW	S2NW4	0.5	40	L	A	L
700620	BRK	OG1600314	159-93-29-NE	E2NE4	0.5	40	L	A	L
700630	BRK	OG1600336	159-93-33-SW	SW4	0.05	8	L	A	L
706480	BRK	OG1600522	159-93-35-NE	ACCRECTIONS ATTRIBUTABLE TO LOT 2 OF SECTION 36	0.5	4.43	A	A	A
701360	BRK	OG1000580	160-93-9-SE	SE4	0.5	80	L	A	L
701370	BRK	OG1000581	160-93-10-SW	S2SW4	0.5	40	L	A	L
701380	BRK	OG1000582	160-93-11-NW	S2NW4	0.5	40	L	A	L
705440	BRK	OG1000583	160-93-11-SW	N2SW4	0.5	40	L	A	L
701400	BRK	OG1000585	160-93-15-NW	N2NW4	0.5	40	L	A	L
701410	BRK	OG1000586	160-93-16-NE	NE4	1	160	A	A	G
701420	BRK	OG1000587	160-93-16-NW	NW4	1	160	A	A	G
701430	BRK	OG1000588	160-93-16-SE	SE4	1	160	A	A	G
701440	BRK	OG1000589	160-93-16-SW	SW4	1	160	A	A	G
701460	BRK	OG1000591	160-93-35-NE	NE4	0.5	80	L	A	L
701470	BRK	OG1000592	160-93-35-NW	S2NW4	0.5	40	L	A	L
701480	BRK	OG1000593	160-93-36-NE	NE4	1	160	A	A	G
701490	BRK	OG1000594	160-93-36-NW	NW4	1	160	A	A	G
701500	BRK	OG1000595	160-93-36-SE	SE4	1	160	A	A	G

701510	BRK	OG1000596	160-93-36-SW	N2SW4, SE4SW4, LOT 1	1	154.6	A	A	G
702300	BRK	OG1500727	161-93-10-NE	NE4	0.5	80	L	A	L
702310	BRK	OG1500728	161-93-10-NW	NW4	0.5	80	L	A	L
702320	BRK	OG1500729	161-93-10-SE	SE4	0.5	80	L	A	L
702330	BRK	OG1500730	161-93-16-NE	NE4	0.5	80	A	A	G
702340	BRK	OG1500731	161-93-16-NW	NW4	1	160	A	A	G
702350	BRK	OG1500732	161-93-16-SE	SE4	0.5	80	A	A	G
702360	BRK	OG1500733	161-93-16-SW	SW4	1	160	A	A	G
702370	BRK	OG1500734	161-93-19-NE	NE4	0.5	80	L	A	L
702380	BRK	OG1500735	161-93-19-SE	SE4	0.5	80	L	A	L
702390	BRK	OG1500736	161-93-19-SW	E2SW4, LOTS 3,4	0.5	79.02	L	A	L
702400	BRK	OG1500737	161-93-28-SE	SE4	1	160	L	A	L
702410	BRK	OG0500164	161-93-36-NE	NE4	1	160	A	A	G
702420	BRK	OG0500165	161-93-36-NW	NW4	1	160	A	A	G
702430	BRK	OG0500166	161-93-36-SE	SE4	1	160	A	A	G
702440	BRK	OG0500167	161-93-36-SW	SW4	1	160	A	A	G
702450	BRK	OG1100564	161-94-5-NE	S2NE4, LOTS 1,2	0.5	80.21	L	A	L
702460	BRK	OG1100565	161-94-5-NW	S2NW4, LOTS 3,4	0.5	80.31	L	A	L
702470	BRK	OG0400027	161-94-6-NE	S2NE4, LOTS 1,2	0.05	8.03	L	A	L
702480	BRK	OG0900027	161-94-8-SW	W2SW4	0.5	40	L	A	L
702490	BRK	OG0600035	161-94-16-NE	NE4	0.5	80	A	A	G
702500	BRK	OG0600036	161-94-16-NW	NW4	1	160	A	A	G
702510	BRK	OG0600037	161-94-16-SE	SE4	0.5	80	A	A	G
702520	BRK	OG0600038	161-94-16-SW	SW4	1	160	A	A	G
702530	BRK	OG1600433	161-94-24-SE	E2SE4	0.5	40	L	A	L
705260	BRK	OG1003288	161-94-28-NE	NE4	0.5	80	L	A	L
705290	BRK	OG1003289	161-94-28-NW	N2NW4	0.5	40	L	A	L
705510	BRK	OG1003290	161-94-28-SE	N2SE4	0.5	40	L	A	L
703660	BRK	OG1800020	162-94-16-NE	NE4	1	160	A	A	G
703670	BRK	OG1800021	162-94-16-NW	NW4	0.5	80	A	A	G
703680	BRK	OG1800022	162-94-16-SE	SE4	0.5	80	A	A	G
703690	BRK	OG1800023	162-94-16-SW	SW4	0.5	80	A	A	G
703700	BRK	OG1002806	162-94-23-SW	SW4	0.5	80	Y	A	A
703710	BRK	OG1600102	162-94-27-SE	SW4SE4	0.5	20	L	A	L

703720	BRK	OG1800024	162-94-27-SW	SW4	0.5	80	L	A	L
703730	BRK	OG1600439	162-94-30-NE	NE4	0.5	80	L	A	L
703740	BRK	OG1600440	162-94-36-NE	NE4	1	160	A	A	G
703750	BRK	OG1600441	162-94-36-NW	NW4	1	160	A	A	G
703760	BRK	OG1600442	162-94-36-SE	SE4	1	160	A	A	G
703770	BRK	OG1600443	162-94-36-SW	SW4	1	160	A	A	G
3109850	MOU	OG0401347	157-93-4-SE	W2SE4	0.5	40	D	A	A
3109860	MOU	OG0401348	157-93-4-SW	S2SW4	0.5	40	L	A	L
3112840	MOU	OG0401349	157-93-4-SW	N2SW4	0.5	40	D	A	A
3109870	MOU	OG1500153	157-93-9-NW	N2NW4	0.5	40	L	A	L
3109880	MOU	OG0401351	157-93-15-NE	SW4NE4	0.5	20	L	A	L
3111810	MOU	OG0401352	157-93-15-NW	SE4NW4	0.5	20	L	A	L
3111820	MOU	OG0401353	157-93-15-SE	NW4SE4	0.5	20	L	A	L
3111830	MOU	OG0401354	157-93-15-SW	NE4SW4	0.5	20	L	A	L
3109890	MOU	OG0901025	157-93-16-NE	NE4	1	160	A	A	G
3109900	MOU	OG0901026	157-93-16-NW	NW4	1	160	A	A	G
3109910	MOU	OG0901027	157-93-16-SE	SE4	1	160	A	A	G
3109920	MOU	OG0901028	157-93-16-SW	SW4	1	160	A	A	G
3110110	MOU	OG0901617	157-94-16-NE	NE4	1	160	A	A	G
3110120	MOU	OG0901618	157-94-16-NW	NW4	0.5	80	A	A	G
3110130	MOU	OG0901619	157-94-16-SE	SE4	1	160	A	A	G
3110140	MOU	OG0901620	157-94-16-SW	SW4	1	160	A	A	G
3110150	MOU	OG4900013	157-94-30-SE	N2SE4, SW4SE4	0.5	60	L	A	L
3110160	MOU	OG4900013	157-94-30-SW	SE4SW4, LOTS 3,4	0.5	58.67	L	A	L
3111130	MOU	OG0402282	158-93-3-SW	W2SW4	0.5	40	A	A	A
3111140	MOU	OG0402283	158-93-4-SE	SE4	0.5	80	A	A	A
3111160	MOU	OG1800052	158-93-11-SE	SE4	0.5	80	L	A	L
3111170	MOU	OG1500406	158-93-16-NE	NE4	0.5	80	A	A	G
3111180	MOU	OG1500407	158-93-16-NW	NW4	0.5	80	A	A	G
3111190	MOU	OG1500408	158-93-16-SE	SE4	0.5	80	A	A	G
3111200	MOU	OG1500409	158-93-16-SW	SW4	0.5	80	A	A	G
3111210	MOU	OG0402291	158-93-20-NE	E2NE4	0.5	40	D	A	A
3111220	MOU	OG1500410	158-93-21-NW	W2NW4	0.5	40	D	A	A
3111530	MOU	OG1000903	158-93-26-SW	SW4	0.5	80	L	A	L

3111230	MOU	OG1500411	158-93-29-SW	SW4	1	160	A	A	A
3111540	MOU	OG1500412	158-93-34-NE	NE4	0.5	80	L	A	L
3111550	MOU	OG1500413	158-93-34-SE	W2SE4, SE4SE4	0.5	60	L	A	L
3111560	MOU	OG1500414	158-93-34-SW	SW4	0.5	80	L	A	L

Legend: Coal Ownership

%	Trust	Acq Code	Ownership
5 & 50	L	L	Coal ownership unknown
50	A	A	Coal ownership unknown
50	A	G	Coal ownership dependent on year sold
100	A	G	State owns all coal
50	B	A	Coal ownership unknown
100	D	A	Coal ownership unknown
50	N	A	Coal ownership unknown
50	U	A	Coal ownership unknown

C10. U.S. Department of Defense

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3500 DEFENSE PENTAGON
WASHINGTON, DC 20301-3500

SUSTAINMENT

November 21, 2019

Lindsey Churchill
Environmental Project Manager, Environment
AECOM

Dear Dr. Churchill,

As requested, the Military Aviation and Installation Assurance Siting Clearinghouse coordinated within DoD an informal review of the Northern Divide Wind Energy Center and Transmission Line Project. The results of our review indicated that the dual wind and transmission project, located in Burke County, North Dakota, as proposed, will have minimal impact on military operations conducted in the area.

Please note that this informal review by the DoD Military Aviation and Installation Assurance Siting Clearinghouse does not constitute an action under 49 United States Code Section 44718 and that the DoD is not bound by the conclusion arrived at under this informal review. To expedite our review in the Obstruction Evaluation Airport Airspace Analysis (OE/AAA) process, please add the project number 2019-09-D-DEV-10 in the comments section of the filing. If you have any questions, please contact me at steven.j.sample4.civ@mail.mil or at 703-571-0076.

Sincerely,

Steven J. Sample
Deputy Director
Military Aviation and Installation
Assurance Siting Clearinghouse

C11. State Historical Society of North Dakota

August 29, 2019

Ms. Lindsey Churchill, Ph.D.
Environmental Project Manager
AECOM
1000 East Calgary Avenue Suite 1
Bismarck, ND 58503

ND SHPO Ref: 19-0574 PSC Northern Divide Wind Energy Center and 345 kV Transmission Line Project in Burke and Mountrail Counties, North Dakota

Dear Ms. Churchill,

We reviewed your preliminary information on ND SHPO Ref: 19-0574 PSC Northern Divide Wind Energy Center and 345 kV Transmission Line Project in Burke and Mountrail Counties, North Dakota. We recommend survey for cultural resources as follows:

- A current Class I (file search) to determine any additional recorded cultural resources in the project area.

- A Class II (reconnaissance) and Class III (pedestrian) survey by a permitted architectural historian for standing buildings and structures (including cemeteries) over 50 years old in the visual Area of Potential Effect (APE). This is within a two-mile radius of individual turbine locations. The purpose is to evaluate any architectural or structural features that may be eligible for nomination to the National Register of Historic Places. At least three out of the seven aspects of integrity used to evaluate historic properties could be impacted by the proposed project: the setting, feeling, and association of historic sites.

- A Class III archaeological survey of all areas of direct impact including crane paths, met towers, access roads, turbine locations and staging areas, unless the footprint has been recently surveyed for cultural resources.

Thank you for the opportunity to review this project to date. We look forward to review of the Class II/Class III surveys. Please include the ND SHPO reference number listed above in any further correspondence for this specific project. If you have any questions, please contact Lorna Meidinger at (701) 328-2089 or lbmeidinger@nd.gov.

Sincerely,

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

C12. U.S. Army Corps of Engineers

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
3319 UNIVERSITY DRIVE
BISMARCK, NORTH DAKOTA 58504-7565

August 26, 2019

NWO-2016-02466-BIS

AECOM
Attn: Ms. Lindsey Churchill
1000 East Calgary Avenue, Suite 1
Bismarck, North Dakota 58503

Dear Ms. Churchill:

This is in response to your letter dated August 16, 2019, requesting comments on the proposed Northern Divide LLC; Northern Divide Wind Energy Center and 345 kV Transmission Line project. The project is located throughout Burke and Mountrail Counties, North Dakota.

U. S. Army Corps of Engineers Regulatory Offices administer Section 10 of the Rivers and Harbors Act (Section 10) and Section 404 of the Clean Water Act (Section 404). A Section 10 permit would be required for work impacting navigable waters, this includes work over, through, or under Section 10 waters. Section 10 waters in North Dakota are the Missouri River (including Lake Sakakawea and Lake Oahe), Yellowstone River, James River (south of the railroad tracks in Jamestown, North Dakota), Bois de Sioux River, Red River of the North, and Upper Des Lacs Lake. A Section 404 permit would be required for the discharge of dredge or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in waters of the United States.

Based on the information contained in your letter, the Corps has determined that your proposed project may need a Clean Water Act Section 404 permit. The permit application and instructions for completing the application may be found at: http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit. Be sure to accurately describe all proposed work and construction methodology. Once the application is complete, mail it to the letterhead address or to the email address below.

The North Dakota Regulatory office can accept (and prefers) electronic submissions to the following email: CENWO-OD-RND@usace.army.mil.

Printed on Recycled Paper

Please refer to identification number NWO-2016-02466-BIS in any correspondence concerning this project. If you have any questions, please contact Jeremy Nygard at U.S. Army Corps of Engineers, North Dakota Regulatory Office, 3319 University Drive, Bismarck, North Dakota 58504-7565, by email at *Jeremy.S.Nygard@usace.army.mil*, or telephone at (701) 255-0015 X 2006. For more information regarding our program, please visit our website at *http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/NorthDakota.aspx*.

Sincerely,

MCQUEARY.PATRICIA.L.1369971936 Digitally signed by MCQUEARY.PATRICIA.L.1369971936 Date: 2019.08.23 15:55:52 -05'00'

Patricia L. McQueary
State Program Manager
North Dakota

Appendix D

Project Mapbook

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DIVIDE COUNTY
BURKE COUNTY
WILLIAMS COUNTY
MOUNTRAIL COUNTY
50
40
50
Powers Lake
Tioga
White Earth

Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Legend

- County Road
- State/Federal Highway
- County Boundary
- Map Series Page

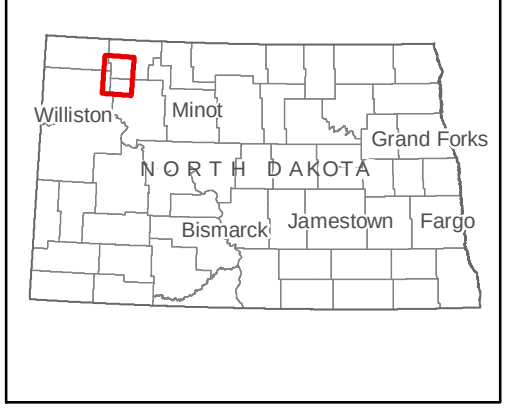
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Project Route

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AECOM



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 1 of 18



0 500 1,000 Feet

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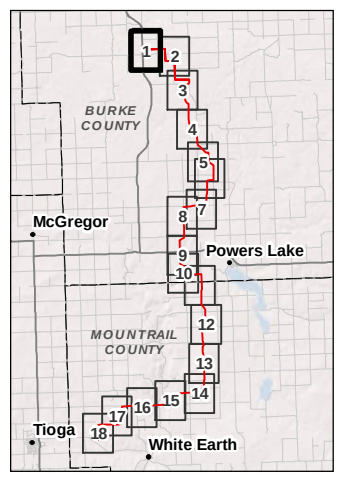
Legend

- County Road
- State/Federal Highway
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

- Delineated Wetland
- USFWS Wetland Easement
- State Trust Land
- USFWS Grassland Easement



Appendix D

Northern Divide
345-kV Transmission Line
Burke and Mountrail
Counties, North Dakota

Map 2 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement
- Private Land Open to Sportsmen
- USFWS Grassland Easement

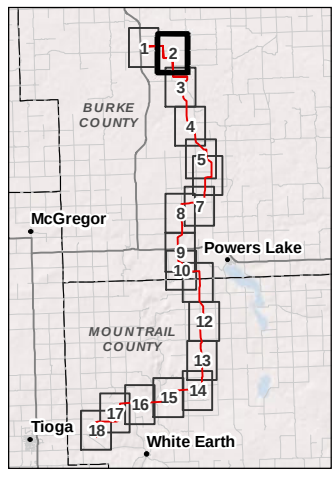
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 3 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement
- State Trust Land
- USFWS Grassland Easement

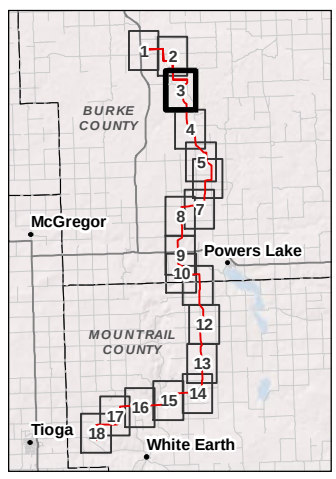
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure
- Pulling Loctation

N W E S

0 500 1,000 Feet

AECOM



Appendix D

Northern Divide 345-kV Transmission Line
Burke and Mountrail Counties, North Dakota

Map 4 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Existing Transmission Line
- Delineated Wetland
- USFWS Wetland Easement
- State Trust Land
- USFWS Grassland Easement

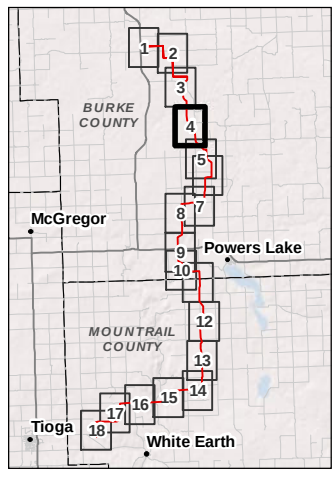
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure
- Pulling Loctation

N W E S

0 500 1,000 Feet

AECOM



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 5 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Existing Transmission Line
- Delineated Wetland
- USFWS Wetland Easement
- State Trust Land
- USFWS Grassland Easement

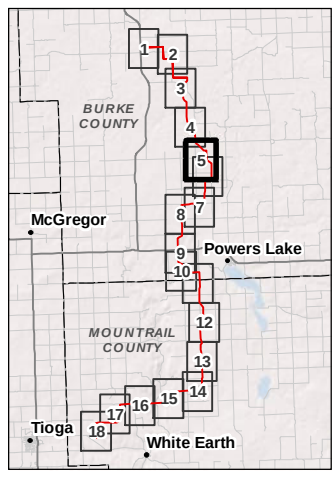
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 6 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Existing Transmission Line

Site Plan

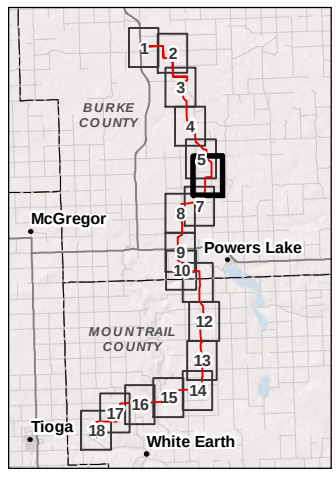
- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

- Delineated Wetland
- USFWS Wetland Easement
- USFWS Grassland Easement

N W E S

0 500 1,000 Feet

AECOM



84TH ST NW

T160N R93W

065

066

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3

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069

070

071

072

073

074

075

076

077

078

079

93RD AVE NW

92ND AVE NW

83RD ST NW

T159N R93W

9

10

15

82ND ST NW

Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 7 of 18

N W E S

0 500 1,000 Feet

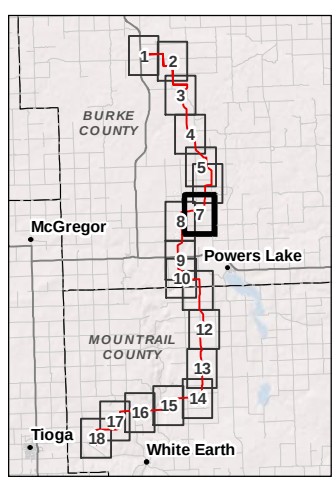
AECOM

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Existing Transmission Line

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure
- Delineated Wetland
- State Trust Land



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 8 of 18



0 500 1,000 Feet

AECOM

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement
- State Trust Land

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 9 of 18

Legend

- County Road
- State/Federal Highway
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary

Site Plan

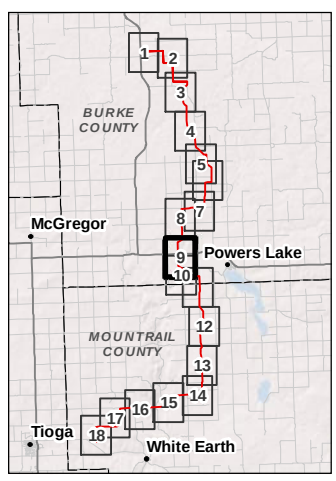
- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

- Delineated Wetland
- USFWS Wetland Easement
- Waterfowl Production Area
- State Trust Land
- USFWS Grassland Easement

N W E S

0 500 1,000 Feet

AECOM

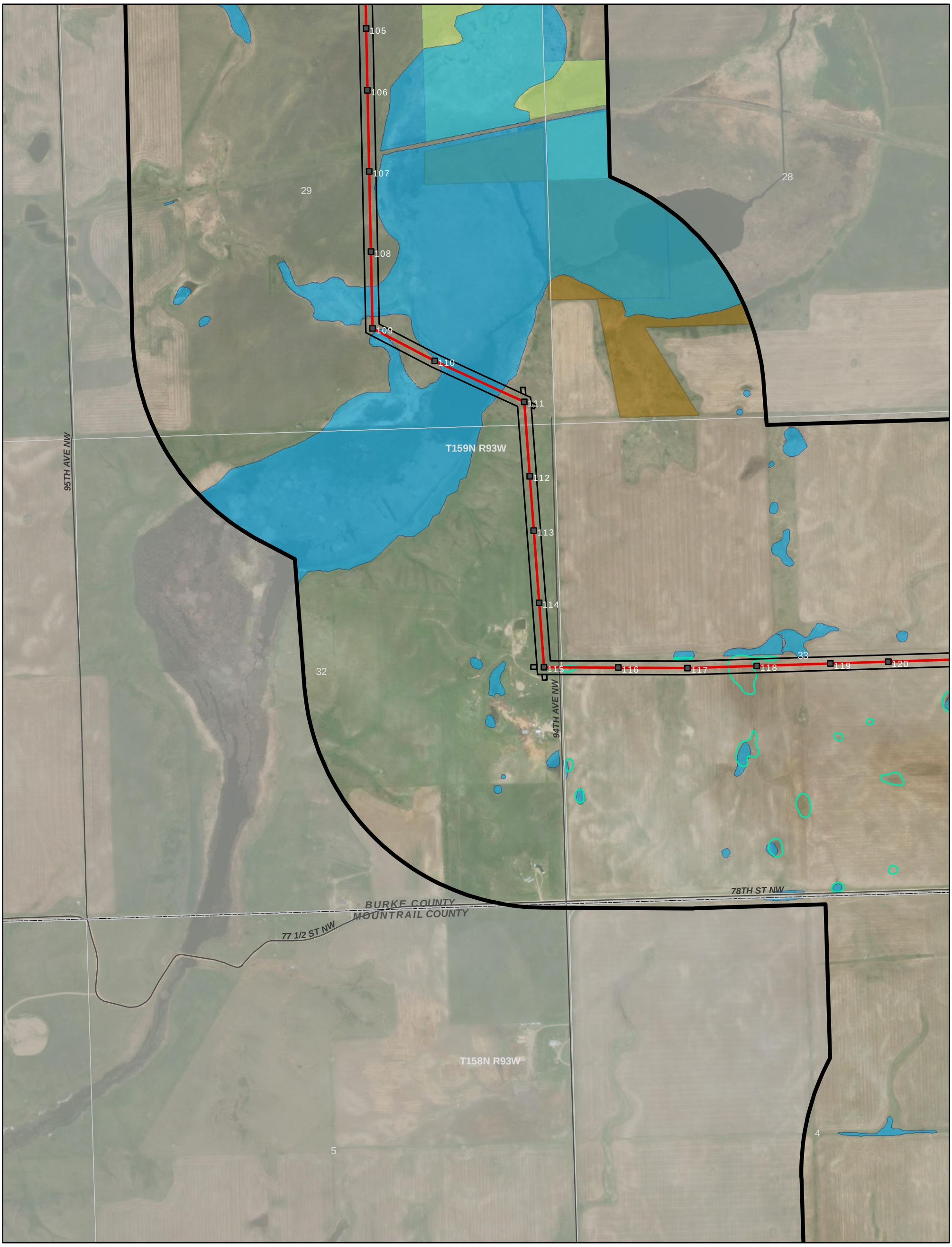


Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 10 of 18



N W E S

0 500 1,000 Feet

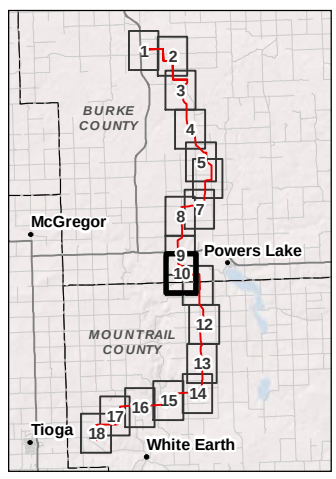
AECOM

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement
- Waterfowl Production Area
- USFWS Grassland Easement

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 11 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement
- Waterfowl Production Area

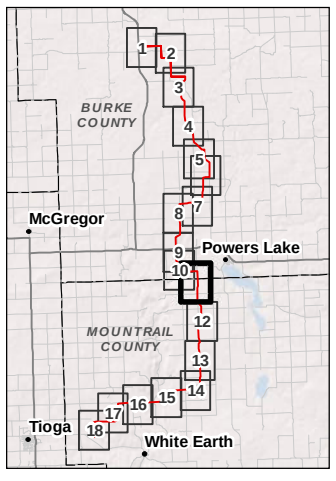
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 12 of 18



0 500 1,000 Feet

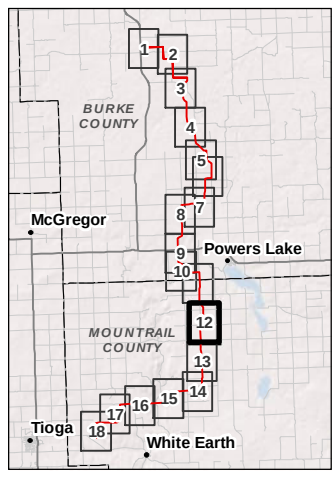
AECOM

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 13 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement

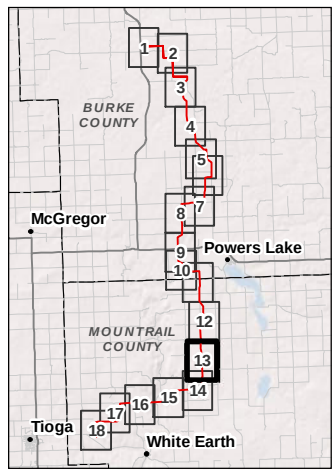
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 14 of 18



0 500 1,000 Feet

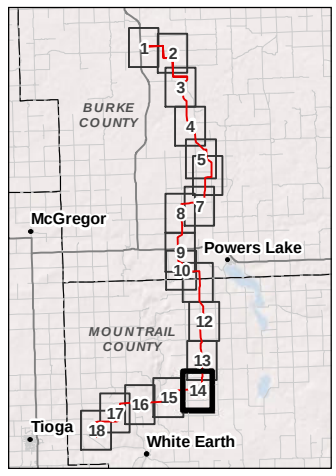
AECOM

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 15 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland
- USFWS Wetland Easement

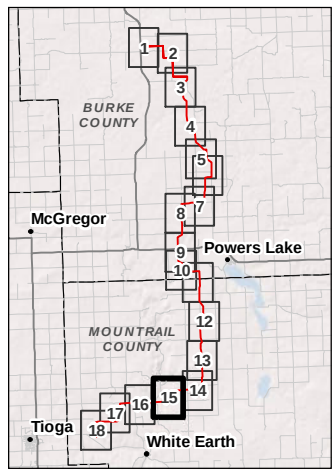
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM



71ST ST NW
98TH AVE NW
11
12
T157N R94W
70TH ST NW
222
221
220
219
218
217
216
215
14A
214
213
212
211
69 1/2 ST NW
14
13
97TH AVE NW
69TH ST NW

Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 16 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Delineated Wetland

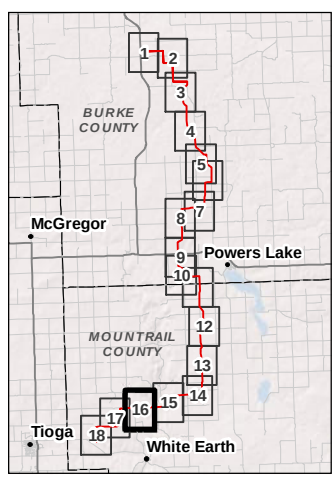
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM



Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 17 of 18

Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Existing Transmission Line
- Delineated Wetland
- Private Land Open to Sportsmen
- State Trust Land

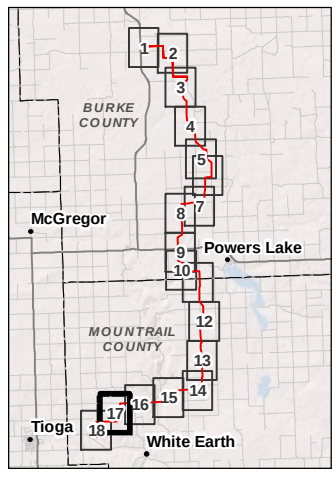
Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM

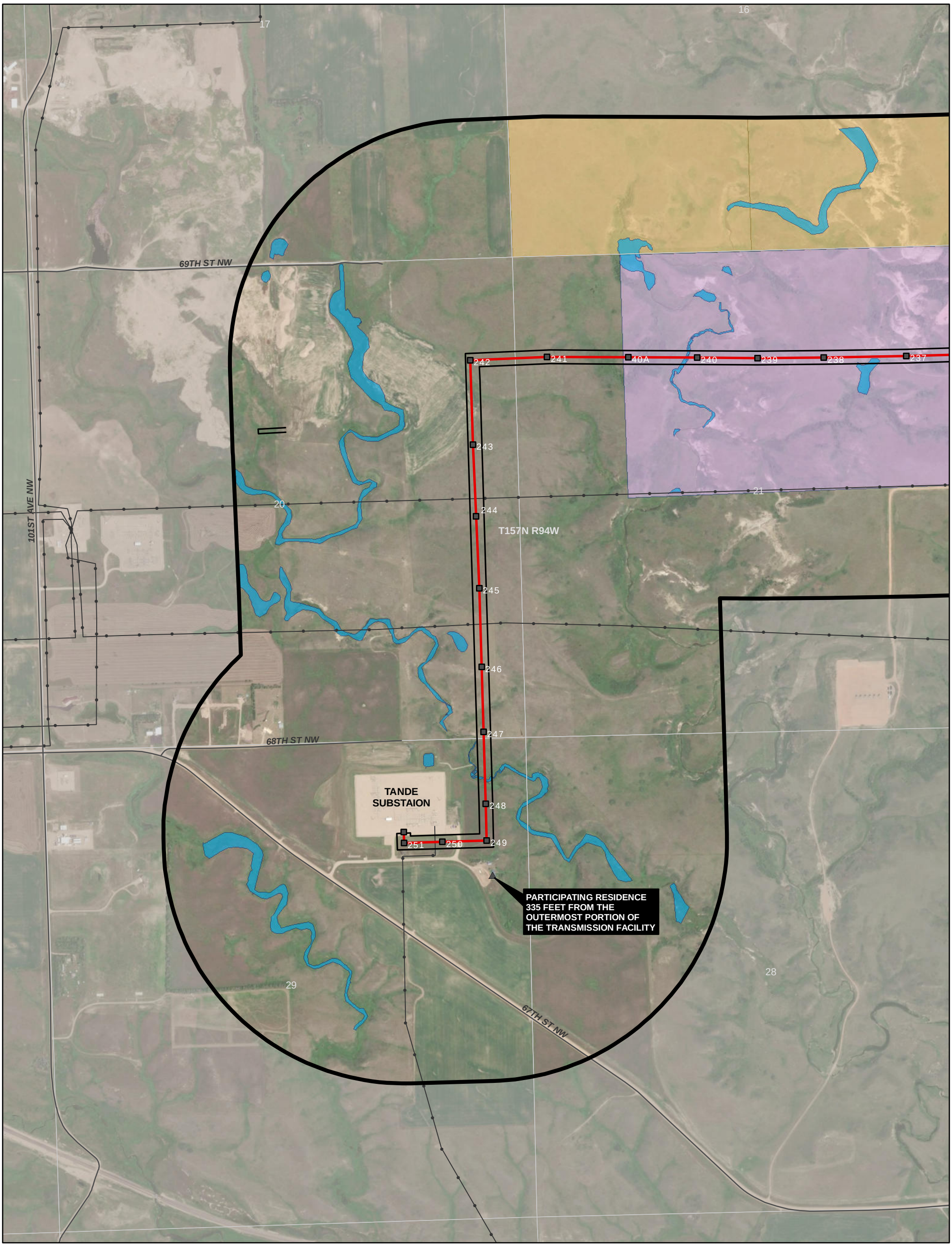


Appendix D

Northern Divide 345-kV Transmission Line

Burke and Mountrail Counties, North Dakota

Map 18 of 18



Legend

- County Road
- County Boundary
- PLSS Township Boundary
- PLSS Section Boundary
- Existing Transmission Line
- Delineated Wetland
- Private Land Open to Sportsmen
- State Trust Land

Site Plan

- Northern Divide 345-kV Transmission Line Study Corridor
- Northern Divide 345-kV Transmission Line Right-of-Way
- Northern Divide 345-kV Transmission Line Project Route
- Transmission Structure

N W E S

0 500 1,000 Feet

AECOM

