# *Bekevar Wind Energy Project*
## Environmental Impact Statement

Prepared for:
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NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

# *Bekevar Wind Energy Project*
# Environmental Impact Statement

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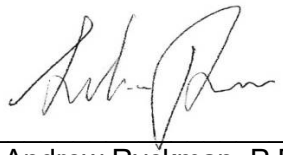

Andrew Ryckman, P.Biol.
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# Executive Summary

The Bekevar Wind Energy Project (the "Project") is a 200MW project being proposed by Bekevar Wind L.P. (the "Proponent"), a limited partnership between Renewable Energy Systems Canada Inc. (RES Canada) and Awasis Nehiyawewini Energy Development (ANEDC), a Cowessess First Nation entity.

The Project was selected by SaskPower under their 2020 wind energy Request for Proposals (RFP) and subsequently entered into a 25-year power purchase agreement with SaskPower in 2021. The Proponent is planning to start construction in summer 2022 with a target commercial operations date (COD) of December 2023. A detailed schedule of Project activities is provided later in this document.

This report has been authored by Natural Resource Solutions Inc. (NRSI) on behalf of the Proponent. To ensure comprehensive assessment of the variety of environmental considerations, NRSI has worked closely with other local and technical specialists, specifically relying on considerable technical input from Vista Environmental Services, DNV, and Canada North Environmental Services (CanNorth).

## ***Regulatory Overview***

The activities proposed in this submission are subject to the review and considerations as outlined in *The Environmental Assessment Act* (Government of Saskatchewan 1980). Typically, this approach would begin with the submission of a Technical Project Proposal (TPP) that would provide an overview of the Project activities and compare Project specifics to the criteria used by the Saskatchewan Ministry of Environment (MOE) to identify whether the proposed activities meet the definition of a 'development'. Projects that are considered to be a 'development' must then submit an Environmental Impact Statement (EIS) in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a).

Although Project siting has fully avoided siting within native prairie, has minimized potential effects to other native habitats, and with few sensitive species detections, a decision has been made by the Proponent to self-declare as a 'development' in an effort to expedite the overall review process. Following this approach, this comprehensive EIS has been proactively prepared for submission to the MOE's Environmental Assessment Branch.

In addition to following the provincial regulatory approval process, the Project Area contains three quarter sections of Cowessess First Nation reserve land, which are regulated by federal legislation, review, and approval. The applicable federal review and approval, specific to these lands, is being undertaken concurrently to this provincial submission. These lands, and associated Project infrastructure and activities, remain included within this provincial submission to allow for a complete and comprehensive

review of Project infrastructure and activities, and to allow for synergy in regulatory review, as appropriate.

***Project Description***

The Project Area comprises approximately 13,000 acres of private lands in the Rural Municipalities (RMs) of Hazelwood and Kingsley, as well as three quarter sections of Cowessess First Nation reserve lands. It is located southeast of the Town of Kipling and spans on approximately 100km$^2$. As wind projects require a very small amount of land, only a very small fraction of the Project Area will be used for the Project's construction and operation activities.

The general Project Area was initially identified due to its wind regime, connectivity to the provincial electricity grid, preliminary community support, and full avoidance of Wind Turbine Avoidance Zones (WTAZs) and other environmentally sensitive areas. Further Project siting efforts included refinements to fully avoid native grassland and shrubland habitats, and to adhere to anthropogenic setbacks (e.g. municipal roads, lot lines, residences, etc.). Final siting decisions were based on a combination of landowner input and to further minimize potential effects to non-agricultural habitats (e.g. wetlands and forest). This purposeful approach to Project siting has resulted in an optimal siting design that can utilize a viable wind resource, with overwhelming local support, and while avoiding, or minimizing, effects to potentially sensitive natural features.

The Project layout submitted as part of this application is based on a total installed nameplate capacity of 202.8MW for a delivery of net 200MW to the SaskPower provincial grid. The current layout contemplates 39 wind turbines, each with a generating capacity of 5.2MW. The Project also includes the installation of access roads, a Project substation, underground collector lines, an operations and maintenance building (located adjacent to the Project substation), and one permanent meteorological (MET) tower.

***Consultation***

Local consultation and engagement first began in 2016 when the Project was first conceived. Initial consultation focused primarily on engaging with potential landowner partners and with local RMs to determine the level of community support.

After submitting the Project into the SaskPower RFP in early 2020, consultation began expanding to additional stakeholders, and more formal consultation and engagement efforts were initiated. These efforts included multiple mail-outs to identified stakeholders, door-to-door campaigns, a public open house meeting on November 10, 2021, regulatory discussions, and several meetings with RM councils. Engagement with several Indigenous communities was also undertaken.

Through extensive consultation and engagement carried out to-date, the Proponent has received several questions about the process, location of infrastructure, landowner participation, and environmental considerations, but is not aware of any material concerns or complaints that have been raised relating to the proposed development of the Project. The Project also received formal support from the RMs of Hazelwood and Kingsley.

***Environmental Assessment Approach***

In accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a), this EIS has been structured to consider, assess, and describe the potential effects relating to important environmental components. This process follows a well-defined process of identifying these environmental components and assessing them relative to Project activities to determine whether there are expected to be any significant effects on the environment.

The selection of Valued Components (VCs) that were considered within the EIS is based on a fulsome consideration of potential impacts on important components of the biophysical, socio-economic, and cultural environment that exists in the areas proposed for Project activities. The selection of VCs has been informed through the consideration of ecological importance, societal value, and general sensitivity of the components, and in consideration of expected and potential impacts that may be experienced as a result of this particular type of activity(ies). This consideration has determined that eight VCs require a comprehensive consideration of potential effects, as follows:

- Biophysical VCs
    - Flora
    - Wetlands and Watercourses
    - Wildlife and Wildlife Habitat
    - Acoustic Environment
- Socio-Economic and Cultural VCs
    - Indigenous Land Use
    - Heritage Resources
    - Land Use
    - Socio-economic Considerations

For each of the VCs identified above, a detailed consideration of baseline conditions, potential effects, proposed mitigation measures, and resulting residual and cumulative effects (if applicable) have been detailed within this assessment.

Following applicable guidelines and reference documents, including the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a), the detailed consideration of each VC was based on defined spatial and temporal boundaries to

identify potential effects, which inform the development of site-specific avoidance, minimization, mitigation, and monitoring measures that are necessary.

In consideration of the potential effects and detailed mitigation strategy, the potential for residual effects (i.e. effects that have the potential to persist after mitigation measures have been applied) is determined, and any potential residual effects are characterized using a series of standardized criteria and definitions, including a determination of significance.

If any residual effects are identified, cumulative effects are considered, in the context of the contribution of the predicted Project effects relative to other activities within the region that may be resulting in similar effects, and therefore resulting in a combined (i.e. cumulative) effect that is larger than the effect of either individual activity. These potential effects, if present, are then characterized for each VC.

***Existing Environment***

The Project is located within the Aspen Parkland ecoregion of Saskatchewan, and within the broader Prairie ecozone. This ecoregion is characterized by a mix of aspen tree stands and fescue grasslands. Continuous aspen cover is found in the northern areas and on lower, moist, north-facing slopes, while grasslands are generally more prevalent in the south, and occupy upper, drier, south-facing slopes. The slopes within this ecoregion are characteristic of the glacial till landscape, with steep hills and numerous undrained depressions that provide habitat for waterfowl. Most of the land in this ecoregion is cultivated due to the fertile, loamy, black soils (SKCDC 2014).

Throughout the development and design of the Project, since its inception in 2016, the siting of the Project has incorporated numerous infrastructure iterations that continue to adapt to new information on the site characteristics. As a result of comprehensive field surveys in 2021, several revisions to the Project design were made, including, but not limited to:

- Re-location of several turbines that were originally placed in the south-central portion of the Project Area due to higher proportions of non-agricultural habitat;
- Realignment of infrastructure in several locations to avoid patches of native grassland and shrubland that were not shown in desktop mapping;
- Realignment of infrastructure to increase distances to detections of species of conservation concern; and
- Realignment of infrastructure to fully avoid numerous wetlands, particularly wetlands that were not-cultivated and that had moderate to high water permanency (i.e. Class III-V);

The efforts taken by the Proponent to incorporate biophysical results into the Project design have resulted in an optimal design that largely avoids potentially sensitive habitats, including full avoidance of native grassland and shrubland habitats.

In consideration of the CDA, the vast majority (i.e. more than 98%) has been purposefully placed in previously altered habitats, including cultivation and pasture/forage. Similarly, the Operational Footprint is almost entirely comprised of previously alternated habitats which combine to account for nearly 99% of the footprint. The Operational Footprint is only proposed to overlap with 0.1ha each of wetland and forest.

In addition to land cover assessments, comprehensive wildlife and rare vascular plant surveys were undertaken within the Project Area following all applicable provincial guidelines, Species Detection Survey Protocol (SDSP), or other best practices for monitoring effort.

Few rare plant populations were documented, and Project design was able to avoid the populations, and the corresponding 30m setback recommended by provincial guidelines (MOE 2017).

Wildlife monitoring results did not identify any areas of wildlife concentration, relative to expected wildlife use in southern Saskatchewan, and no significant staging areas, migration corridors, or foraging areas were documented during the wildlife surveys. Further, relatively few species of conservation concern were detected within the Project Area, all of which are typical of agricultural landscapes in southern Saskatchewan.

***Biophysical Effects Assessment***

A detailed effects assessment of the identified biophysical VCs considered the proposed Project activities, existing conditions, and a strong understanding of the potential effect pathways and effective mitigation measures for the construction and operation of a wind energy generating facility, as gained through considerable experience with similar developments, both in Saskatchewan and also in similar landscape settings in adjacent provinces.

Potential effects to flora considered changes to habitat quantity and quality, as well as the potential introduction of invasive species. The CDA is overwhelmingly dominated by cultivation (95%), as is the surrounding landscape, and the CDA has been purposefully designed to fully avoid areas of native prairie and shrubland, with small overlaps with wetland and forest. In consideration of the small areas of potential habitat loss and the implementation of effective mitigation measures that are effective in minimizing indirect effects, the predicted residual effects are low in magnitude and fully reversible through reclamation activities and/or natural processes, and have therefore been determined to result in non-significant residual effects.

Potential effects to wetlands and watercourses considered changes to wetland area and function, as well as the associated water balance. The CDA has been sited to minimize potential overlap with wetlands, resulting in short-term temporary loss of 2.33ha; however only 0.1ha of wetland will be overlapped by long-term Project infrastructure.

Further, the potential indirect effects are extremely localized, with most natural features within the Project Area being closer to existing cultivation than to Project activities. In consideration of the very small area of long-term habitat loss and the implementation of effective mitigation measures, the predicted residual effects have been determined to be low in magnitude, localized, and fully reversible, and have therefore been determined to result in non-significant residual effects.

Potential effects to wildlife and wildlife habitat considered changes in habitat quantity, quality, and use, as well as the potential for a change in mortality risk as a result of Project activities. Consideration of wildlife habitat are already minimized through optimal siting of the Project activities, with approximately 95% of the CDA occurring within agricultural habitat. The operation of the Project has the potential to result in an estimated 2.15 bird mortalities/turbine/year, 0.11 raptors/turbine/year, and 6.33 bats/turbine/year (BSC et al 2018), in absence of mitigation measures. Despite a higher potential level of effect to bats, if left unmitigated, there are proven mitigation measures that can be implemented to reduce bat mortality levels if they are determined to be higher than provincially defined management triggers. Bird and bat species that are most likely to be affected by operating turbines are generally common species with secure populations, such as Horned Lark (*Eremophila alpestris*) which might represent more than 28% of all bird mortalities, and Hoary Bat and Silver-haired Bat which are predicted to account for an estimated 94% of bat mortalities at the Project (BSC et al 2018). Species of conservation concern, and specifically those that have been detected within the Project Area are very unlikely to be affected by the Project, according to available data on species that are most commonly affected (BSC et al 2018). In consideration of the low levels of predicted bird mortality, relative to other anthropogenic mortality sources, and the available mitigation measures that can be implemented for bats, as necessary, the predicted residual effects are considered to be low, reversible, and ultimately have been determined to be non-significant.

The Project has been designed to be fully compliant with Alberta's noise guideline (AUC Rule 012 (2021)), which is considered to be a best practice for wind energy developments in Canada, and was applied in absence of specific noise regulation in Saskatchewan.

***Socio-economic Effects Assessment***

A detailed effects assessment of socio-economic VCs has determined that changes in land use has the potential to reduce the overall amount of land used for agricultural production, both in general and on Cowessess First Nations reserve land, however the small Operational Footprint of wind energy developments is very compatible with agricultural activity and typically results in a long-term reduction of less than 1% of the agricultural land availability.

Other socio-economic effects are largely positive, as the Project will result in positive contributions to the employment, economy, and community services, among other positive benefits to the local community. The Project is also expected to result is significant socio-economic benefits to Cowessess First Nation through their equity participation in the project, as well as revenue from rent, employment, contracting, training and capacity building.

***Cumulative Effects***

A cumulative effects assessment was carried out for all biophysical VCs that were identified as having residual effects. Through the consideration of past, present, and reasonably likely projects, or other regional activities, it was determined that the contribution, if any, of Project effects to the overall cumulative effects were negligible and would not contribute significantly to any regional cumulative effects that were different than the characterization of the residual Project effects themselves.

***Summary***

This EIS has been prepared in accordance with applicable provincial guidelines, namely the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a). The EIS has relied upon comprehensive site-specific monitoring, studies, and engagement to characterize existing conditions, and to inform a detailed the environmental effects assessment which is presented within this submission.

In consideration of the detailed environmental effects assessment, including characterization of predicted residual effects, it has been concluded that the Project design, site-specific mitigation strategy, and follow-up monitoring programs result in an acceptable, and non-significant, level of residual effects, while generating significant positive benefit to the local community, Cowessess First Nation and other Indigenous Groups.

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# 1.0 Introduction

This Bekevar Wind Energy Project: Environment Impact Statement has been prepared following a self-declaration that the proposed activities shall be considered a development, as defined by *The Environmental Assessment Act* (Government of Saskatchewan 1980). The submission has been prepared, in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a), to provide a comprehensive overview of the environmental considerations including, but not limited to, an overview of proposed activities, summary of consultation, detailed description of existing conditions, and a comprehensive assessment of potential effects to the environment.

## 1.1 Project Overview

The Bekevar Wind Energy Project (the "Project") is a 200MW project being proposed by Bekevar Wind L.P. (the "Proponent"), a limited partnership between Renewable Energy Systems Canada Inc. (RES Canada) and Awasis Nehiyawewini Energy Development (ANEDC), a Cowessess First Nation entity.

The Project was selected by SaskPower under their 2020 wind energy Request for Proposals (RFP) and subsequently entered into a 25-year power purchase agreement with SaskPower in 2021. The Proponent is planning to start construction in summer 2022 with a target commercial operations date (COD) of December 2023. A detailed schedule of Project activities is provided later in this document.

RES originally initiated the Project in 2016 by undertaking a wind monitoring campaign, exploratory interconnection studies, desktop-level environmental and land use studies, as well as local landowner and local engagement with Rural Municipalities (RMs).

The Project Area, defined as the combination of the land parcels used for the Project that ere under a development agreement with the Proponent, comprises approximately 13,000 acres of private lands in the RMs of Hazelwood and Kingsley, as well as three quarter sections of Cowessess First Nation reserve lands. It is located southeast of the Town of Kipling, and spans a general area of approximately 100km$^2$. As wind projects require a very small amount of land, only a very small fraction of the Project Area will be used for the Project's construction and operational activities. An overview of the Project Area can be seen in Map 1.

The proposed Project includes the installation of 39 turbines, each with a generation capacity of 5.2MW, a 145m rotor diameter, and a 102.5m hub height, for a total tip height of 175m. The total installed capacity of the Project is 202.8MW which results in a maximum net capacity at the Project substation of just under 200MW. The Project also includes access roads within the Project Area, a 34.5kV 3-phase collector system, a

substation, an operations and maintenance building, as well as a temporary laydown area and one planned permanent wind monitoring towers.

The Project will produce enough clean electricity to power approximately 100,000 Saskatchewan homes.

## 1.2 Project Proponent

The Project is being proposed and managed by Bekevar Wind L.P., a partnership between RES Canada and ANEDC. Each of the partnered entities are introduced in more detail in the following sections.

### 1.2.1 Renewable Energy Systems Canada Inc.

Renewable Energy Systems Canada Inc. (RES Canada) is part of the RES group, a family-owned renewable energy company that was established in 1983. RES is dedicated to a low-carbon future and our focus is solely on renewables (wind, solar, storage). RES Canada has initiated, developed or built nearly 3000 MW of wind projects across Canada, namely in Alberta, Ontario and Québec, representing over 20% of installed wind capacity in Canada. RES has built more than 10% of all wind projects in the United States.

RES has worked and partnered with several local communities and Indigenous communities, and encourages an open, collaborative and transparent approach to working with our local partners and our hosts on the land to ensure wind projects that maximize local benefits while minimizing social and environmental impact.

RES is responsible for the development, construction and operations of the Bekevar Wind Energy Project. More information can be found on their website (www.res-group.com).

### 1.2.2 Awasis Nehiyawewini Energy Development / Cowessess First Nation

ANEDC is owned by Cowessess Ventures Ltd, the economic development corporation which oversees the business assets of the Cowessess First Nation. ANEDC was incorporated in 2010 and has been actively pursuing utility scale wind projects in Saskatchewan since that time. More recently, ANEDC has become active in solar and currently holds a 20-year power purchase agreement with SaskPower for 10MW of solar generation which is being developed by Awasis Solar Limited Partnership. Within the Cowessess portfolio of renewable energy, the community is also pleased to own a 1MW wind, solar and lithium-ion battery facility, as well as on-reserve solar net metering of five community owned buildings. More information can be found on their website (www.cowessessventures.com).

Cowessess First Nation is located in south east Saskatchewan and has 4,300 members, 950 of which live on the home reserve. The First Nation is focused on four foundational pillars: A) Cultural Rejuvenation B) Political Sovereignty, C) Effective and Efficient Administration and D) Economic Self Sustainability. Cowessess is a Treaty Land Entitlement First Nation and over the years has amassed over 120,000 acres of agriculture and urban land holdings. The primary purpose for the land acquisitions was future sustainability and economic viability. More information can be found on their website (www.cowessessfn.com).

## 1.3 Contributing Personnel

This report has been authored by Natural Resource Solutions Inc. (NRSI) on behalf of the Proponent. To ensure comprehensive assessment of the variety of environmental considerations, NRSI has worked closely with other local and technical specialists, specifically relying on considerable technical input from Vista Environmental Services, DNV, and Canada North Environmental Services (CanNorth). This collection of technical specialists providing input into the report shall be collectively referred to as the Consulting Team.

In order to inform the determinations made within this EIS, the Consulting Team has also relied on the detailed input from the Proponent, specifically relating to Project infrastructure, schedules, stakeholder consultation, and Indigenous engagement.

### 1.3.1 Natural Resource Solutions Inc.

NRSI is an environmental consulting firm founded in 1998 with offices located across Canada, including in Calgary, Saskatoon, and Waterloo. NRSI staff have particular expertise in monitoring, impact assessment, and development of mitigation strategies related to wildlife, wildlife habitats, and significant and sensitive biological communities including wetlands, woodlands, and aquatic habitats. NRSI focuses on working in multi-disciplinary consulting teams, providing innovative and practical solutions to biological issues for clients.

NRSI has extensive monitoring experience with wind power projects in all stages of development. Since 2004, NRSI biologists have been involved in more than 150 wind projects across Canada, totaling well over 12,000MW of proposed power and ranging in project size from <2MW to 300MW. NRSI biologists have been involved in pre-construction monitoring for wind energy facilities in Saskatchewan since 2010, and since then have carried out environmental monitoring and assessments of more than 20 proposed wind energy facilities throughout the province.

NRSI biologists routinely conduct the full suite of biological assessments for wind energy facilities, including avian studies, acoustic bat monitoring, vegetation community mapping, wetland assessments, rare plant inventories, other species-specific wildlife

surveys (e.g., reptiles and amphibians), and Species at Risk monitoring. Many staff maintain professional designations and technical certifications, including those relating to wetland classifications, acoustic bat monitoring, vegetation community assessments, and environmental construction monitoring. Several NRSI staff are provincially and/or federally recognized technical specialists and have been retained to complete status report assessments, monitoring protocol, and recovery strategies for Species at Risk.

### 1.3.2 Vista Environmental Services

Vista Environmental Services (Vista Environmental) is a Canadian-owned and -operated ecological consulting company based in Regina, Saskatchewan. Vista Environmental specializes in wildlife and wildlife habitat assessment, monitoring, and mitigation. Vista Environmental primarily services Western Canada, and has provided technical advisory, field, and reporting support for multi-scale projects including, but not limited to, wind and solar energy, transmission and distribution, mining, pipelines, and transportation projects.

### 1.3.3 DNV

Driven by a purpose of safeguarding life, property and the environment, DNV enables organizations to advance the safety and sustainability of their business. Combining leading technical and operational expertise, risk methodology and in-depth industry knowledge, DNV empowers its customers' decisions and actions with trust and confidence. DNV continuously invests in research and collaborative innovation to provide customers and society with operational and technological foresight.

DNV's 2,300 energy experts in wind, solar, grids, storage, and energy management deliver independent insights based on facts and data. DNV is dedicated to helping customers make the world safer, smarter and greener through delivering world-renowned testing, certification, and advisory services to the energy value chain.

DNV has over 12 years of experience supporting more than 30 proposed wind energy projects in Saskatchewan. This work has included site prospecting, layout design, environmental field survey and reporting, noise modelling, stakeholder engagement, heritage sensitivity assessments, and radiocommunication studies.

DNV is an industry leader and expert in conducting decommissioning studies and has completed more than 7GW of decommissioning studies for wind projects throughout North America, including than 1.1GW of decommissioning studies for wind projects in Canada. DNV's decommissioning studies are based on a wealth of experience and the methodology used to calculate estimate decommissioning costs is continually being refined and updated to ensure that the cost estimates are accurate and reliable. As a result, DNV regularly receives positive feedback from wind farm developers, lenders, and regulatory agencies about the high quality and overall robustness of its decommissioning studies.

### 1.3.4 Canada North Environmental Services

Canada North Environmental Services (CanNorth) is a 100% Indigenous-owned firm that has been providing a wide range of environmental consulting services to industry, government agencies, First Nations, and other client types for more than 35 years. CanNorth's head office is located in Saskatoon, Saskatchewan, with other regional office locations in Markham, Ontario and Yellowknife, Northwest Territories.

CanNorth's Heritage Division programs are delivered with the same high-quality commitment to service and excellence that have made CanNorth a proven leader in environmental programs and consulting since 1981. The Heritage Division consists of a group of skilled and dedicated archaeologists who specialize in the Northern Plains and Subarctic boreal forest culture areas of Saskatchewan, Manitoba, and Alberta. The experience and expertise of this division has led to the successful completion of more than 200 heritage assessments since its inception in 2011, producing high-quality, comprehensive reports that meet and exceed the requirements of the heritage regulators and clients.

## 1.4 Regulatory Overview

The consideration of regulatory authority, legislative requirements, and permitting submissions is a function, in part, of the proposed activities, geographic location (i.e. Municipal jurisdiction), and land ownership of the areas being considered for Project activities. The Project activities discussed in this submission are primarily subject to *The Environmental Assessment Act*, but since several parcels of land are owned by Cowessess First Nation, a portion of the Project activities will be subject to a federal review and approval. In addition, the Project spans two Rural Municipalities (RMs), the RMs of Kingsley and Hazelwood, which each have specific land-use by-laws pertaining to wind energy projects. The following sections provide a summarized overview of the regulatory processes that have, or will be, addressed by this Project.

### 1.4.1 Provincial Environmental Assessment Approval

The activities proposed in this submission are subject to the review and considerations as outlined in *The Environmental Assessment Act* (Government of Saskatchewan, 1980). Typically, this approach would begin with the submission of a Technical Project Proposal (TPP) that would provide an overview of the Project activities and compare Project specifics to the criteria used by the Saskatchewan Ministry of Environment (MOE) to identify whether the proposed activities meet the definition of a 'development'. Projects that are considered to be a 'development' must then submit an Environmental Impact Statement (EIS) in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a).

Although Project siting has fully avoided siting within native prairie, with minimal potential effects to other native habitats, and with few sensitive species detections, a decision has

been made by the Proponent to self-declare as a 'development' in an effort to expedite the overall review process. Following this approach, a TPP is no longer required as an initial submission and the Project has prepared this comprehensive EIS for submission to the MOE's Environmental Assessment Branch.

In preparation for ecological monitoring, a species detection permit was obtained (21SD019; Appendix I) which provided an overview of proposed ecological monitoring, including acknowledgement that surveys would follow Species Detection Survey Protocols (SDSPs), where applicable.

Following EIS submission, the MOE coordinates an interdepartmental review through the Saskatchewan Environmental Assessment Review Panel (SEARP), which undertakes a technical review of the environmental and socioeconomic considerations of the Project activities. If the SEARP identifies any areas that lack information or clarity, or statements that the SEARP disagrees with, technical comments and suggestions will be provided to the Proponent, and their consulting team, for consideration in a revised submission. When a final submission is prepared, MOE will post the document on the government's website to initiate a public review and commenting period.

A final decision on the Project will be made by the Minister of the Environment, which will consider the content of the EIS, technical comments made by the SEARP, and any public submissions made during the commenting period. At the time of approval, if applicable, the approval will be subject to terms and conditions that the Proponent must agree to comply with while carrying out the specified activities.

A list of applicable provincial legislation has been included in Table 1.

### 1.4.2 Federal Assessment

The Project Area contains three quarter sections of Cowessess First Nation reserve land, and thus are regulated by federal legislation, review, and approval. The applicable federal review and approval, specific to these lands, is being undertaken concurrently to this provincial submission. These lands, and associated Project infrastructure and activities, remain included within this provincial submission to allow for a complete and comprehensive review of Project infrastructure and activities.

A list of applicable federal legislation has been included in Table 1.

### 1.4.3 Overview of Applicable Legislation

Although the *The Environmental Assessment Act* (Government of Saskatchewan 1980) is the primary regulatory submission associated with the review and approval of the proposed Project infrastructure and activities, several other provincial, federal, and municipal regulations and legislature will inform numerous aspects of Project design and development, and will result in numerous other approvals and development permits

associated with the proposed activities. Table 1 provides an overview of all applicable legislation that have been, and/or will be, considered through the full permitting and approval phase of the Project.

**Table 1. Overview of Applicable Legislation and Regulatory Authorities**

| Legislation | Regulating Authority | Project Considerations |
|---|---|---|
| **Federal** | | |
| *Species at Risk Act* (SARA) | Environment and Climate Change Canada (ECCC) | It is prohibited to kill, hard, or harass species listed as Extirpated, Endangered or Threatened. Similarly, SARA also protects the residence and/or critical habitats of the same species from damage or destruction.<br><br>The Project will address considerations relating to SARA, specific to the portion of the Project that occurs on First Nation land, and is subject to federal review. In addition, this EIS has considered SARA-protected species as species of conservation concern, and have considered their occurrences and any associated potential effects of the Project. |
| *Migratory Birds Convention Act* (MBCA) | ECCC | The MBCA prohibits any activity that may disrupt active migratory bird nests or result in killing, harming, or harassing migratory birds, their eggs or nests in all lands where migratory birds breed and nest unless permitted.<br><br>The Project has considered potential effects to migratory birds, including the application of appropriate mitigation measures and best management practices for minimizing impacts to migratory birds, as well as monitoring of operational effects for the purpose of determining whether adaptive management is necessary. |
| *Fisheries Act* | Fisheries and Oceans Canada (DFO) | The Fisheries Act applies to any project that has the potential to impact waterbodies and watercourses that support commercial, recreational and Indigenous fisheries.<br><br>Project activities do not occur in areas that have the potential harm any fish-bearing watercourses. |
| *Aeronautical Act*<br><br>(R.S.C. 1985, c. A-2)<br><br>Canadian Aviation Regulations (CARs) Standard 621, Chap. 12 | Transport Canada | Transport Canada assesses any structure that may be considered an obstruction to air navigation under the CARs, and regulates the lighting requirements for wind turbines.<br><br>The Project will file an Aeronautical Assessment Form for Obstruction Marking and Lighting with the final Project layout to obtain the Aeronautical Obstruction Clearance letter. |
| Land Use Program | NAV CANADA | NAV CANADA assesses all proposed structures near airports and air navigation infrastructure to ensure navigation safety.<br><br>The Proponent has filed a Land Use Proposal Submission Form on November 25, 2021 |
| **Provincial** | | |
| Saskatchewan Environmental Assessment Act | MOE | The Saskatchewan Environmental Assessment Act regulates, and oversees, the assessment of new developments, and their potential effect on the environment.<br><br>This EIS has been prepared, and is being submitted, under jurisdiction |

| Legislation | Regulating Authority | Project Considerations |
|---|---|---|
| | | of the Saskatchewan Environmental Assessment Act. |
| Water Security Agency Act | Water Security Agency | The Water Security Agency Act is responsible for the management of provincial water supply, and quality, within Saskatchewan.<br><br>The Project activities are not expected to alter, or create, any watercourses. If, during the construction phase, Project activities require the collection and/or use any surface water to support Project activities (e.g. cement mixing, dust suppression, etc.), any applicable authorizations will be discussed and obtained, as necessary. |
| Heritage Property Act | Saskatchewan Ministry for Parks, Culture and Sports (MPCS) | The Heritage Property Act protects and conserves provincial heritage resources, and regulates activities that may be harmful to heritage resources.<br><br>A request for a heritage review was submitted to the Heritage Conservation Branch (HCB) prior to submitting this EIS. The response from HCB will be provided when available. |
| *Weed Control Act* | Saskatchewan Ministry of Agriculture (MOA) | The Weed Control Act classifies weeds into categories that relate to their level of concern, and regulates the control weeds in the province, with a goal of early detection and eradication of weeds.<br><br>An assessment of existing, and potential, weeds has been included within this EIS, including detailed mitigation measures and post-construction monitoring that has been designed to minimizing the potential spread of weeds and to take corrective actions if management problems exist after reclamation. |
| *The Wildlife Act* | MOE | The Wildlife Act protects sensitive plant and animal species, including their residences, from any harmful action, including killing, harming, disturbance, and collection.<br><br>This EIS has considered the presence of, and potential effects to, species of conservation concern that have been confirmed, or are likely present, within the Project Area. |
| *The Wildlife Habitat Protection Act (WHPA)* | MOE | The WHPA protects wildlife habitat on Crown land.<br><br>The Project is not proposed to occur on any Crown land, and is therefore not subject to the WHPA. |
| *The Environmental Management and Protection Act* | MOE | The Environmental Management and Protection Act protects aquatic habitat, including wetlands, watercourses, and waterbodies from development or alterations.<br><br>The Project, as currently proposed, anticipates obtaining an Aquatic Habitat Protection Permit (AHPP) to permit Project activities that have the potential to affect wetlands and watercourses. |
| *Pest Control Act* | MOA | The Pest Control Act regulates the prevention, control, and destruction of certain pests (animals, insects or diseases), as defined by the MOA.<br><br>The Project will comply with the Pest Control Act, as necessary, including the reporting and control of any observed pests. |
| *The Highways and Transportation Act* | Saskatchewan Ministry of Highways and Infrastructure (MHI) | The Act regulates the transportation of loads on provincial roads that exceed typically permitted conditions (e.g. over-sized, overweight, etc.)<br><br>The Project will obtain the necessary permits required for the transportation of heavy machinery (e.g. cranes) and Project components (e.g. turbine blades, tower segments, etc.). Utility Permits, Approach Permits and Roadside Development Permits will also be requested, as necessary.<br><br>On May 14, 2021, MHI issued a letter to the Proponent indicating that |

| Legislation | Regulating Authority | Project Considerations |
|---|---|---|
| | | the Project was eligible to receive such permits. |
| *The Dangerous Goods Transportation Act* | MHI | The Dangerous Goods Transportation Act regulates the transportation of designated dangerous goods.<br><br>The Project is not currently anticipating a need to transport any dangerous goods, however an Exemption Permit will be obtained if transportation of dangerous goods is deemed necessary. |
| *The Saskatchewan Farm Security Act* | Farm Land Security Board | The Saskatchewan Farm Security Act states that a non-Canadian-owned entity must receive an exemption order from the Farm Land Security Board to legally hold, or acquire, an aggregate land holding exceeding 10 acres.<br><br>The Project received its exemption from the Board on May 1, 2021. |
| *The Power Corporation* | Saskatchewan Power Corporation (SaskPower) | SaskPower has the exclusive right to supply, transmit, distribute, and sell electrical energy within Saskatchewan.<br><br>The Proponent has entered into a Power Purchase Agreement with SaskPower, including an Exclusive Franchise Waiver Agreement which provides confirmation that SaskPower has waived its exclusive franchise rights. |
| *The Electrical Inspection Act* | Various | Various regulations and requirements exist relating to the supply of electricity, wiring, and/or connection to an existing distribution system.<br><br>The Project will obtain all necessary authorizations and permits associated with the Electrical Inspection Act. |
| **Municipal** | | |
| *The Planning and Development Act* | Rural Municipalities (RMs) | The Planning and Development Act allows RMs to regulate development and control land use within their community(ies).<br><br>The Proponent has consulted with the RMs of Kingsley and Hazelwood, and will be applying for development permits in accordance with provisions in the applicable land-use by-laws. |
| *The Municipalities Act* | RMs | The Municipalities Act regulates, in part, the use of municipal roads and may determine that a Road Use Agreement is required, based on the proposed Project activities.<br><br>The Proponent has consulted with the RMs of Kingsley and Hazelwood and will be implementing a Road Use Agreement for the Project. |

# 2.0 Project Description

The overall description of the Project includes a comprehensive overview of the Project specifics, infrastructure details, and overview Project phases, all of which provides an overview of the proposed activities and informs the consideration of potential environmental effects. A detailed description has been provided in the following sections.

## 2.1 Project Need, Rationale and Benefits

The Government of Saskatchewan, along with SaskPower, have developed policy to reduce greenhouse gas emissions (GHGs), including reducing the GHGs from the electricity sector. A phase-out of coal-fired electricity by 2030 was implemented as a target by the government, which would be mainly be replaced by renewable sources. Given the strong wind resource in Saskatchewan, SaskPower launched RFPs in 2017 and in 2019 for 200MW and 300MW of wind energy respectively.

This Project was proposed under the 2019 RFP by SaskPower and subsequently was awarded a Power Purchase Agreement (PPA) for 200MW, to be in service by December 2023.

This Project is thus an integral part of the provincial strategy to reduce GHGs, and in turn is also proposing an electricity source that is now considered the most affordable type of power generation, when considered across all sources.

Further to these significant benefits to ratepayers, the Project will generate significant local socio-economic benefits to Cowessess First Nation, as a partner in this Project, as well to the local communities of the RMs of Hazelwood, Kingsley, the Town of Kipling, and to numerous local businesses and individuals in local and regional areas surrounding the Project. These include contracting opportunities during construction and operations, employment, training opportunities in wind energy, property and school tax revenues, leasing revenues, and various types of indirect economic benefits from the Project's presence in the area (need for various services in town, lodging, restaurants, supplies, etc.).

## 2.2 Project Location

The Project Area, defined as the combination of all land parcels used for the Project and that are under a development agreement with the Proponent, comprises approximately 13,000 acres of private lands in the RMs of Hazelwood and Kingsley, as well as three quarter sections of Cowessess First Nation reserve lands. It is located southeast of the Town of Kipling and spans on approximately 100km$^2$. As wind projects require a very small amount of land, only a very small fraction of the Project Area will be used for the Project's construction and operation activities. The overall Project Area is shown on Map 1.

## 2.3 Project Components

The Project layout submitted as part of this application is based on a total installed nameplate capacity of 202.8MW for a delivery of net 200MW to the SaskPower provincial grid. The current layout contemplates 39 wind turbines, each with a generating capacity of 5.2MW.

The Project also includes the installation of access roads, a Project substation, underground collector lines, an operations and maintenance building (located adjacent to the Project substation), a temporary laydown area, and one permanent meteorological (MET) tower, as described in the following sections and shown on Map Set 2.

### 2.3.1 Turbines

The technical specifications of the base-case turbine for this Project, the SG 5.2-145 Siemens Gamesa wind turbine, are provided in Table 3. This model includes a three-bladed upwind rotor system and nacelle, which houses the generator and gearbox. The UTM coordinates of the 39 turbine locations are provided in Table 2.

**Table 2. Turbine Locations**

| Turbine ID | UTM Coordinates (13U) | | Turbine ID | UTM Coordinates (13U) | |
|---|---|---|---|---|---|
| | Easting | Northing | | Easting | Northing |
| T1 | 674367 | 5542530 | T21 | 673714 | 5540880 |
| T2 | 682821 | 5544660 | T22 | 677983 | 5543400 |
| T3 | 672930 | 5545130 | T23 | 675625 | 5545540 |
| T4 | 680827 | 5544650 | T24 | 676251 | 5546680 |
| T5 | 674032 | 5539550 | T25 | 681154 | 5542990 |
| T6 | 683827 | 5546840 | T26 | 672953 | 5539550 |
| T7 | 674511 | 5541430 | T27 | 681522 | 5545700 |
| T8 | 668963 | 5548020 | T28 | 670973 | 5537880 |
| T9 | 681522 | 5548160 | T29 | 671061 | 5547640 |
| T10 | 669746 | 5537820 | T30 | 680352 | 5546310 |
| T11 | 678927 | 5547350 | T31 | 670091 | 5538560 |
| T12 | 669614 | 5539450 | T32 | 672427 | 5541660 |
| T13 | 674188 | 5545710 | T34 | 675849 | 5543920 |
| T14 | 675674 | 5541800 | T35 | 679024 | 5545540 |
| T15 | 674441 | 5548730 | T36 | 673130 | 5541920 |
| T16 | 672496 | 5538770 | T38 | 674013 | 5546980 |
| T17 | 677598 | 5540730 | T39 | 677526 | 5539440 |
| T18 | 674647 | 5543280 | T40 | 671259 | 5538300 |
| T19 | 669664 | 5546750 | T41 | 672426 | 5540720 |
| T20 | 677569 | 5544850 | | | |

Each turbine includes a tower foundation, tower, three rotor blades, a hub/nacelle and a built-in transformer. During construction, each turbine location, including its associated temporary workspace, will have a maximum disturbed area of approximately 1.6ha. The turbine sites have been designed with a temporary turn-around loop for construction vehicles to pull around the turbine site. Turbine foundations will consist of an appropriately sized concrete spread-footing foundation with re-bar reinforcement, subsurface preparation and a concrete pedestal where the turbine tower connects to the foundation. The spread-footing foundation will be approximately 20m in diameter at its widest point and approximately 3m deep. The excavation for construction of the foundation will be approximately 40m in diameter and will be backfilled after the concrete pour of the foundation and pedestal is completed. It is expected to take two to three weeks to excavate, construct, and backfill each turbine foundation.

In addition to the preferred 39 turbine locations, the Project is considering eight alternate turbine locations (Map Set 2). Since these locations are being presented as alternate locations, they have not been assigned a specific Construction Disturbance Area (CDA) in order to avoid overstating the total size, or environmental footprint, of the Project activities. Instead, these locations have been considered generally, in relation to their relative effects on the environment in comparison to the preferred turbine locations. These proposed alternate locations have been included in public consultation to-date.

**Table 3. Siemens Gamesa 5.2 MW Turbine Technical Specifications**

| Specification | Detail |
|---|---|
| Cut-in wind speed | 3m/s |
| Cut-out wind speed | 27m/s |
| Rated wind speed | 11.2m/s (steady wind turbulence) |
| Number of blades | 3 |
| Rotor diameter | 145m |
| Rotor swept area | 16,513 $m^2$/turbine |
| Rotor power regulation | Pitch and torque regulation with variable speed |
| Rotor tilt | 6 degrees |
| Tower (hub) height | 102.5m |
| Gearbox | 3 stages high speed type (2 planetary and 1 parallel) |
| Generator | Doubly-fed asynchronous three phase generator with a wound rotor, connected to a frequency PWM converter |
| Aerodynamic brake | Full span pitching; active, hydraulic. |
| Mechanical brake | Hydraulic disc brake |
| Yaw system | A cast bed frame connects the drive train to the tower. The yaw bearing is an externally geared ring with a friction and sliding plain bearing. A series of electric planetary gear motors drives the yawing |
| Tower design | Tapered tubular steel |

Note: m/s = metres per second; m = metres; $m^2$ = metres squared.

### 2.3.2 Underground Collector System

Power generated by the turbines will be conveyed to the Project substation through an underground collection system, which will consist of 34.5kV standard utility cable and a fibre optic communication cable buried to a minimum depth of approximately 1m as per the Canadian Electrical Code. The preferred method of installation for the underground cables will be the ploughing technique using a single cut tooth that splits the earth apart and allows the cables and sand bedding along with warning tape to be installed. Alternatively, in some cases industry standard trenching methods will be used. The topsoil and upper subsoil would be removed from the trench and will be placed adjacent to the trench separately to prevent mixing. A backhoe or small bobcat will be used to push the subsoil, followed by the topsoil back into place, and to re-compact and re-contour the disturbed area. The total length of the collection system is approximately 70km. The disturbance footprint of the collection system has been conservatively assumed to be within a work area of approximately 10m in width. Buried cables will be registered with SASK One-Call, as required by Saskatchewan regulations, once construction is complete and the final as-built locations of the cables are known. Above-ground junction boxes to connect segments of the underground collection line system are required, and have been minimized to the greatest extent possible. The underground collection system will be mostly located on private lands, and outside of the RM road allowances, with a few exceptions where RM road allowances need to be used to connect certain turbines to the substation.

During decommissioning, underground cables will be terminated and capped at connection points and left in place at a depth of 1m or more, as per best practice. A caveat will be kept on title to advise future land title searchers of the location of the abandoned buried cable. The abandoned cable is a typical metal wire cable and is coated in a non-biodegradable synthetic casing, thus making the capped cable essentially impenetrable to moisture for hundreds if not thousands of years. The cables go through many heating and cooling cycles during operation, so would not be affected by ranges in temperature. Finally, the safety tape applied over top the buried wires will notify anyone digging that they are close to a buried cable on the land.

### 2.3.3 Project Substation and Operations & Maintenance Building

The Project substation will be located in the southwest quarter section of Section 29, Township 12, Range 4 along Bekevar Road, in the RM of Hazelwood, and will occupy an area of approximately 175m by 100m (1.75ha; Map Set 2). The Project substation will be fenced to prevent unauthorized access. The general location of the Project substation (i.e. centrally located) was chosen to optimize Project energy yield production and minimize electrical losses, while the specific location was chosen to minimize potential effects to land use and natural features. The Substation area includes the construction limits of disturbance and is directly adjacent to Bekevar Road; however, the Substation fence line will be sited at least 40m from the road allowance to fully comply with the current RM land-use by-law.

The operations and maintenance building will be located within the same footprint as has been identified for the substation. No additional area, relative to the substation footprint, is required for the operations and maintenance building. Both Project components will be present for the permitted life of the Project.

### 2.3.4 Access Roads

The Project will generally utilize existing public roads to access the Project Area, however a few public roads may require upgrades to enable safe transportation of turbine sections and other Project equipment and components. New access roads on private land will be required to reach each of the turbine locations. A total of approximately 20km of new access roads will be required to access the turbine locations (Map Set 2).

Turbine access roads will be approximately 30m wide during construction, but will be reduced to an operational width of 5m following construction. The reasons that wider access roads are required during construction are to move the assembled crane from between turbine locations and to deliver turbine components, construction materials, and equipment to each turbine location. Temporary crane paths will, for the most part, follow the existing public roads, access roads or collection system right-of-way, or will be moved overland in areas of cultivation, and under dry ground conditions, and therefore not expected to result in ground disturbance.

### 2.3.5 Temporary Laydown Area

One temporary laydown area will be required to provide a secure location for managing and storing materials, tools, and equipment during construction, and to accommodate the temporary contractor site office trailers. The temporary laydown area will be up to approximately 8 acres in size, located on cultivated lands in the northeast quarter of Section 19, Township 12, Range 4 (Map Set 2). This laydown area will no longer been needed following the construction phase of the Project, and will be returned to cultivation.

### 2.3.6 Temporary Concrete Batch Plant

It is likely that a temporary on-site batch plant will be required and, if so, would be placed within the temporary laydown area so would have no additional footprint. The third-party concrete supply contractor will comply with applicable regulatory requirements as well as follow best management practices for concrete batch plants with respect to soil and groundwater protection.

### 2.3.7 Permanent Meteorological Tower

The Project will require the construction of one permanent MET tower to collect wind and weather data during the operations phase of the Project. The disturbed area for the

MET tower will be less than 0.1ha in size. The location of the MET tower is currently unknown and will be finalized in discussions with the turbine manufacturer. The MET tower will be sited entirely within in cultivated lands within the Project Area and will fully avoid environmentally sensitive features, including all native habitats, plus any applicable setbacks. The disturbance during construction is primarily associated with excavation for a concrete foundation at the MET tower base and for guy wire anchors, if a guyed MET tower is used, although guy wire anchors are not currently anticipated.

## 2.4 Project Activities

### 2.4.1 Construction

Typical construction equipment to be used for the erection of the wind turbines, and construction of the access roads, Project substation and operation and maintenance building, laydown yard and underground collector lines, includes tracked bulldozers, excavators, cranes and assorted trucks. Various large truck and trailer combinations will be used to transport the turbine components to the site and ready-mix concrete trucks will haul concrete from either a batch plant or local ready-mix facility in the area to the turbine foundation locations. Typically, two to three cranes will be used to erect each turbine. Additional vehicles will be used for personnel and small equipment transport to, from, and within the Project Area.

Following the construction of permanent facilities, areas not containing permanent facilities or operational access roads will be returned to cultivated, tame pasture or hay land cover types.

Table 4 provides a description of the construction phase by component and construction activity.

**Table 4. Description of Project Construction Activities**

| Component / Activity | Description |
|---|---|
| Access Road Construction | The Project will utilize existing public roads to reach the individual private lands that are hosting turbines, and will build new turbine access roads on private lands. The turbine access roads will have a CDA width of 30m.<br><br>During operations, the turbine access roads will be approximately 5m wide. The operational roads will consist of a combination of all-weather graveled and seasonal, cleared and compacted access roads that will be maintained for use during Project operations, while maintaining a low profile to enable farming and minimize disturbance. Culverts may be required to maintain drainage in ditches at junctions with existing roads.<br><br>Access roads will be built using tracked bulldozers and graders to strip topsoil and upper subsoil, as required, to create an even travel surface. Proper soil handling and management will be incorporated into the construction of the permanent access roads and temporary construction roads to facilitate site reclamation. Where necessary, existing vegetation will be cleared and grubbed with the topsoil, which will be conserved and stockpiled separately from upper subsoil (a two-lift procedure) and stabilized as necessary to prevent erosion. When Project construction is complete, stripped upper subsoil and |

| Component / Activity | Description |
|---|---|
| | topsoil will be replaced.<br><br>The turbine sites have been designed with a temporary turn-around loop for construction vehicles to pull around the turbine site. The primary purpose for the temporary turnaround loops will be to move the assembled crane from turbine to turbine and to avoid additional crane breakdowns and travel on public roads. The turnaround loops will also be used for the delivery of wind turbine components, construction materials, and equipment to the wind turbine locations. Temporary turnaround loops may not be stripped of soil unless grading is required where a two-lift procedure will then take place similar to the permanent roads. Movement of cranes will be restricted to dry or frozen conditions, where possible. The temporary turn-around loops have been preferentially sited on cultivated land. In these disturbed areas, soil will be tilled or harrowed during reclamation to reduce soil compaction. |
| Delivery of Equipment | Equipment will be delivered by truck and trailer as needed throughout the construction phase and will be stored as necessary at the temporary storage area at the site, as well as directly on each of the assessed wind turbine pads. As necessary, a traffic management plan will be developed using Saskatchewan Transportation standards to limit traffic disturbance. |
| Turbine Sites | During construction, each turbine location with its associated temporary workspace will have a maximum disturbed area of approximately 1.6ha. There will be temporary workspaces at each turbine location for tower storage and blade storage. The operational footprint at the base of each turbine that will remain disturbed after construction and reclamation of temporary disturbance (i.e., the turbine pad area that cannot be used for cultivation) will be approximately 400 $m^2$ (0.04 ha).<br><br>The turbine sites will be prepared using graders, compacters, tracked bulldozers, and hoes to strip topsoil and upper subsoil (a two-lift salvage procedure) to create an even work surface. Proper soil handling and management will be incorporated into this process to facilitate site reclamation. Where necessary, existing vegetation will be cleared and grubbed with the topsoil and stockpiled separately from stripped or excavated upper subsoil. After turbine assembly, stripped or excavated subsoil and topsoil will be replaced, as appropriate. |
| Foundations | The turbine foundation will follow a typical concrete mat or gravity footing design that is approximately 20m in diameter and approximately 3.6m deep. The excavation for construction of the foundation will be approximately 40m in diameter and will be backfilled approximately one to two weeks after the concrete foundation is poured. Excess backfill materials will be redistributed onsite, transported to other areas of the Project for use as fill (where required), or disposed of off-site and/or on-site in cooperation with, and only as directed and approved, by landowners.<br><br>No excess soils will be transported off-site or to other landowners' properties without the authorization and consent of both the source and receiving landowners. The foundations will be allowed to cure for up to several weeks prior to erection of the turbines. It is expected to take approximately three to four days to excavate and construct each turbine foundation, pending appropriate weather conditions. |
| Turbine Assembly and Installation | Turbine towers come in four sections that are assembled and erected onto the foundation by crane. The nacelle is lifted onto the tower by crane. The hub is lifted with the nacelle. Each blade is then installed separately aboveground using a crane to lift the blade to the hub.<br><br>Each turbine will be 102.5m high to the hub, with 72.5m long rotor blades (i.e. total rotor-swept diameter of 145m). This "blade-by-blade" installation is now standard with larger-rotor turbines available today, which has the benefit of reducing the construction LOD around each turbine site.<br><br>The cranes will travel between turbine sites along the new permanent public and turbine access roads, which may require some grading. Soil management will be incorporated into this process to facilitate site reclamation. The assembly of all turbines is anticipated to take approximately three to four months. |
| Project | The Project substation consists primarily of electrical equipment including one main power |

| Component / Activity | Description |
|---|---|
| Substation | transformer, high and medium voltage circuit breakers, disconnect switches, and a control building.<br><br>The Project substation site will be excavated to allow for the installation of a ground grid and the construction of concrete foundations. The final grade of the Project substation will consist of gravel or rock that provides an insulating barrier to electric shock during an electrical fault. The Project substation equipment will be mounted on the concrete and/or pile foundations and all metal components of the Project substation will be connected to the ground grid. This area will be fenced to prevent unauthorized access.<br><br>The Project substation has been sited directly adjacent to Bekevar Road to minimize disturbance on the quarter section and allow easy access from the road. Depending upon local conditions at the time of construction, it is anticipated to take four months to construct the Project substation. |
| Operations and Maintenance Building | The operation and maintenance building will mainly consist of an electrical room, workshop, supervisory control and data acquisition (SCADA) room, parts room, conference room, and office spaces. The facility will be located within the substation area. No area additional to the substation location is required for the operations and maintenance building during construction or operations. |
| Temporary Laydown Yard | One temporary laydown area will be constructed to provide a secure location for managing and storing materials, tools and equipment during construction and to accommodate the temporary contractor site office trailers. The temporary laydown area will be 8 acres or less, located on cultivated lands and will remain in place throughout the construction period. As required, the yard will also be stripped of topsoil and upper subsoil, geotextile matting applied, and a gravel base set. Temporary power may also be provided to the temporary laydown yard, as needed. Following construction of the Project, the gravel, geotextile matting, and power supplies will be removed, and the upper subsoil and topsoil replaced. |
| Collector System | The collector system will consist of eight circuits of medium-voltage (34.5kV) standard utility cable and a fibre optic communication cable buried to a minimum depth of approximately 1m as per the Canadian Electrical Code. The preferred method of install for the underground cables will be the ploughing technique using a single cut tooth that splits the earth apart and allows the cables and sand bedding along with warning tape to be installed. No backfilling or compaction is required when using the ploughing method. Alternatively, in some cases (large tracts with several circuits, for example) the cables may be installed in a trench. The topsoil and upper subsoil removed from the trench will be placed adjacent to the trench separately to prevent admixing. A backhoe or small bobcat will be used to push the subsoil, followed by the topsoil back into place, and to re-compact and re-contour the disturbed area. The CDA associated with the collection system has been conservatively assumed to be within a work area of approximately 10m in width. Above ground junction boxes to connect segments of the underground collection line system are required and will be minimized to the greatest extent possible. The underground collection system will generally be located on private lands, and will be installed at a depth that will enable farming operations to resume over the area. In one area of the Project, the underground collection system is planned to be buried within a road allowance within the RM of Kingsley (see Map Set 2). |
| Permanent Meteorological Tower | One permanent MET tower will be located on the site for the duration of the operational phase of the Project. The disturbed area for the MET tower will be less than 0.1ha. The location of the MET tower is currently undecided and will be finalized in discussions with the turbine manufacturer. The MET tower will be sited in cultivated fields near the CDA and will fully avoid environmentally sensitive features plus any associated setbacks. The disturbance during construction is primarily associated with excavation for a concrete foundation at the MET tower base and for guy wire anchors, if a guyed met tower is used, although guy wire anchors are not currently anticipated. If used, guy wires for the permanent met tower will be equipped with markers specifically designed to reduce the potential for bird collision following the marker standards provided by Power Line Sentry (Power Line Sentry 2019).<br><br>This tower is expected to be in the range of 60-100m in total height and would be installed over a period of several days. |

| Component / Activity | Description |
|---|---|
| Gates and Fencing | The turbine sites or access roads will not be fenced or gated, unless requested by landowners. The Proponent will place signs on the entrances of these roads indicating that they are on private lands and do not provide through access. The Project substation and operations and maintenance building will be fenced to limit uncontrolled access and for public safety. |
| Parking Areas | The primary construction and operations parking area will be located at the operation and maintenance building and at the laydown yard. |
| Clean-Up and Reclamation | Garbage and debris will be collected and disposed of at an approved location. All construction equipment and vehicles will be removed from the construction area following the completion of construction.<br><br>Compacted soils will be de-compacted and stripped soils will be replaced and re-contoured at the temporary workspaces and laydown yard. The non-cultivated disturbed areas (including trenches) will be re-seeded as appropriate or left in a condition specified by the landowner.<br><br>Site clean-up and reclamation will be conducted concurrently with other construction activities, as appropriate.<br><br>Site reclamation procedures will follow applicable best management practices related to soil horizon preservation and reclamation. |
| Wind Turbine Commissioning | Turbine commissioning will occur once the wind turbines have been mechanically completed and inspected and when SaskPower is ready to accept grid interconnection.<br><br>Commissioning involves testing and inspection of electrical, mechanical, communications and control function operability. A detailed set of operating instructions will be followed to connect with the electrical grid. |

### 2.4.2 Operations Phase

The wind turbine model selected for the Project operate automatically and are monitored and controlled through a remote Supervisory Control and Data Acquisition (SCADA) system. Modern wind turbines are designed to require minimal on-going maintenance. Due to the mechanical nature of the components, the changing of the oil in the gearbox and hydraulic systems, and other general maintenance, maintenance activities will be required regularly throughout the wind turbine's life span.

Preventative maintenance is likely to be carried out quarterly during the first operational year (as per manufacturers recommended "break-in" period). Other routine servicing will be completed at that time, as required. Following the "break-in" period, the regularly scheduled maintenance cycle is every six months, notwithstanding unplanned maintenance visits, as required. Used oil and other wastes will be disposed of at an approved facility following each maintenance visit.

### 2.4.3 Decommissioning and Reclamation Phase

Following any repowering activities, at the end of the useful life of the turbines, decommissioning activities would be implemented. The decommissioning and restoration process comprises the removal of above-ground structures; removal of below-ground structures to a depth of approximately 1.2m below surface, with the

exception of underground collector cabling, which will be left in place to avoid additional effects to areas that would have returned to their original stage (agricultural land, pasture) following the construction phase, which may have included re-vegetation and seeding. Reclamation will be conducted following typical industry best practices to ensure successful reclamation at the end of the Project life, and will comply with any other applicable bylaws and/or Project approval conditions relating to reclamation.

Above-ground structures include the wind turbines (including blades, nacelles, and towers), crane pads, Project substation and operations and maintenance building, MET tower, and access gates. Below-ground structures include wind turbine foundations, Project substation foundations, underground collection lines, and drainage structures.

The process of removing structures involves evaluating and categorizing all components and materials into categories of recondition and reuse, salvage, recycling, and disposal. In the interest of increased efficiency and minimal transportation effects, components and material may be stored on-site in a pre-approved location until the bulk of similar components or materials are ready for transport. The components and material will be transported to the appropriate facilities for reconditioning, salvage, recycling, and/or disposal.

When decommissioning occurs, reclamation standards at the time of decommissioning will be followed but are generally expected to require the creation of temporary workspaces and access roads, and the use of equipment similar to that used for Project construction. Soil management will be incorporated into this process to facilitate site reclamation.

The turbines will be disassembled and removed from the site. The wind turbine's concrete foundation will be removed to a depth of 1.2m below surface, and the excavation backfilled with subsoil to match the natural grade. Removal of below-ground concrete structures to a depth of approximately 1.2m is expected to provide a sufficient soil profile to allow successful revegetation and return to typical land-use practices (i.e., ploughing, seeding, harvesting, grazing croplands and/or pasture), despite the underlying remnant concrete foundation. Buried concrete is commonly associated with decommissioned industrial facilities (i.e., oil/gas wells), which have in the past been successfully reclaimed. Additional mitigation measures at turbine foundation locations include the removal of surface gravels, and soil decompaction.

Underground cables will be terminated and capped at connection points. It is anticipated that properly terminated and capped underground cables will remain in place, from a practical perspective, in perpetuity. Current farming practices do not use ploughing techniques deeper than 1m. Given that underground cables are to be buried to a depth of at least 1m, limited adverse effects to land-use are expected. Additionally, landowners will be consulted post-Project decommissioning with regard to any concerns that may arise. Gravel, where used, will be removed from the sites.

After infrastructure is removed, the turbine sites and access roads/cabling routes may be ploughed as appropriate to alleviate soil compaction and graded to restore terrain profiles. Topsoil will be replaced and prepared for seeding by the landowner(s) on cultivated areas. All waste material and equipment will be removed from the site. Turbine access roads may be left in place at the request of landowners.

## 2.5 Project Schedule

Pending receipt of the required regulatory approvals, construction of the Project is planned to start in early Q3 2022, with operations commencing as early as December 2023. The anticipated Project construction schedule is outlined in Table 5. The schedule accounts for contingency in the timeline which may result from a potential delay in equipment arrival and/or adverse weather conditions. If regulatory approval is substantially delayed, subsequent construction delays may also result, largely due to a corresponding construction start in unfavorable season and potentially poor weather conditions that would prolong construction activities.

**Table 5. Pre-Construction and Construction Schedule**

| Activity | Period |
|---|---|
| Consultation and Engagement | ONGOING – THROUGHOUT SCHEDULE |
| MOE and ISC Approvals<br>County development permits | Q1-Q2 2022 |
| RM Development Permits/other permitting | Q2 2022 |
| Geotechnical studies/lidar | Q4 2021 |
| Construction: | |
| Development of roads | Q3 2022 |
| Grading and installation of turbine foundations | Q3-Q4 2022 |
| Installation of underground collector system | Q2 2023 |
| Installation of wind turbine generators | Q3-Q4 2023 |
| Project substation and O&M building | Q3-Q4 2023 |
| Testing and commissioning | Q4 2023 |
| In-service date | December 2023 |
| Clean-up and reclamation of temporary disturbance areas | Q4 2023 |

## 2.6 Ancillary Projects

Ancillary projects are considered to be any additional activities that are directly, or indirectly, related to the Project that are not specifically addressed in the Project submission(s) but that may have social, economical, and/or environmental implications. Ancillary projects are often activities that are led by other proponents, such as a utility,

provincial ministry, or RM. Ancillary projects related to the Bekevar Wind Energy Project are discussed in the following sections.

### 2.6.1 SaskPower Transmission Line

The Project will require the construction of a high-voltage (230kV) transmission line that will connect the Project's substation with SaskPower's existing Kennedy substation. The line will be approximately 10km in length. SaskPower will be responsible for the permitting, and eventual construction, of the interconnection line, and will be the owner and operator of the line. As the transmission line is being permitted separately, any information requests or requirements should be directed to SaskPower. SaskPower was created a webpage to provide information on this transmission line project (https://www.saskpower.com/Our-Power-Future/Infrastructure-Projects/Construction-Projects/Current-Projects/Bekevar-Wind-Facility).

Representatives of SaskPower participated in a collaborative public consultation event that was held in the Town of Kipling, SK on November 10, 2021.

### 2.6.2 Municipal Road Upgrades

Another possible ancillary project would be the upgrade of certain segments of public road allowances, which are currently maintained by the local RMs. These activities, if necessary, may be undertaken by the Proponent directly or through an agreement with the responsible RM. Road upgrade requirements will be determined once a final investigation of road conditions has been completed, which is planned for Q2 2022. If public road allowance upgrades are determined necessary, the Proponent will follow all applicable standards and regulations and will limit Project activities to the defined CDA, which is within the existing road allowance, as to not encroach on adjacent private lands.

## 2.7 Project Design Considerations

The Project was developed over several years, since its inception in 2016, with the overall objective of maximizing energy yield while minimizing the potential effects to the environment and the local community. This optimized design process started with gathering relevant environmental and land use data on the Project Area, from provincial and federal sources, as well from available mapping from the local RMs. These included cadastral information, landownership mapping, publicly available layers with information on native prairie, wetlands, watercourses, heritage sensitive areas, oil and gas wells, communication systems, etc. Aerial imagery was also purchased to complete GIS layers. For each of these applicable site features, an activity setback was applied to ensure that turbines, or other infrastructure, would be located at an acceptable distance from each feature, as applicable. Setbacks were based on regulation (either local or provincial, as relevant) or RES Canada best practices, all with the intent of avoiding, or minimizing, potential effects. Once all applicable features and setbacks were identified,

the data was used to create “constraints mapping” that provided the base to create a layer of “buildable areas” (i.e. areas that are outside all setback areas and that can theoretically be used to locate a turbine or other infrastructure).

In order to confirm and/or refine the compiled desktop data, thorough site visits were undertaken throughout 2021. These validation exercises enabled the confirmation of areas of native prairie (and other native habitats), delineation and classification of wetlands, presence of watercourses, confirmation of inhabited dwellings or buildings, etc. The constraints mapping and buildable areas mapping was further updated to reflect the findings from the site visits (Map 3).

The overall approach to Project design has been to avoid environmentally sensitive areas to the extent possible, according to best practices and/or provincial guidelines, as well as to comply with local RM land use by-laws. Currently, both the RMs of Hazelwood and Kingsley are in the process of adopting land use by-laws, including provisions specifically for wind energy projects. The project design, as proposed in this application, takes into account the draft land use by-laws proposed by both RMs.

Table 6 provides a list of features found on site and the setback strategy applied to each of these features. In some cases, the best practice, or otherwise preferred, setbacks identified below could not be fully achieved. These instances are explained in detail within this application, along with the associated minimization and mitigation strategies to limit the potential for environmental effects, to the extent possible.

**Table 6. Project Siting Considerations and Preferred Setbacks**

| Land Feature Type | Siting Strategy (Turbines) | Siting Strategy (Roads/Collection) | Source |
|---|---|---|---|
| Native prairie and shrubland | Avoidance + blade length | Avoidance | MOE Siting Guidelines |
| Wetlands (all classes) | Avoidance | Avoidance | Best practice |
| Tree stands (forest) | Avoidance | Avoidance | Best practice |
| Sensitive species | Avoidance + Setback (Variable) | Avoidance + Setback (Variable) | Activity Restriction Guidelines |
| Dwellings | Minimum 750m (draft zoning by-law requires TH x 4 (700m)) | Avoidance | Best practice / Draft RM land-use by-law |
| Lot lines | TH x 1.1 or blade + 5m | Avoidance / crossings allowed | Draft RM land-use by-law / best practice |
| Developed/undeveloped road allowance | TH x 1.1 or blade +5m | Avoidance / crossings allowed | Draft RM land-use by-law / best practice |
| Provincial Highway | TH x 1.1 | Avoidance / crossings allowed | Applying Draft RM land-use by-law (but MOHI requires 90m) |
| Communication towers | TH + 10m | Avoidance | Best practice |
| Microwave (point-to-point) link | Avoidance including consultation corridor | N/A | Radio Advisory Board of Canada guidelines |
| Existing transmission line | TH | N/A | SaskPower and RES best practice |

The combination of applying all of these setbacks to turbine locations reduces the buildable area to approximately 35% of the full Project Area. The corresponding constraints map (Map 3) illustrates the extent of Project Area that is restricted for turbine locations and/or associated infrastructure. This mapping was presented during public consultation on November 10, 2021, to demonstrate the various restrictions and considerations that are associated with designing a feasible turbine layout that minimizes the potential for environmental effects, while ensuring energy yield remains viable.

## 2.8 Development Alternatives

RES Canada, as the originator of the Project, has been actively pursuing opportunities for wind energy development in Saskatchewan and considered several potential sites before proposing the Project in the 2019 SaskPower RFP.

A multi-criteria analysis was used to determine potential "viable" sites, which include the following key criteria:

- A viable wind resource throughout a sufficiently large project area;
- Available transmission capacity with an affordable interconnection cost at a nearby transmission line or substation on the provincial SaskPower grid;
- A supportive community of landowners interested in entering into a leasing agreement with the project proponent;
- Supportive RM(s) where the project is located;
- A sufficiently large land base that is located outside Wind Turbine Avoidance Zones per the Wildlife Siting Guidelines (MOE 2019) and with few environmentally sensitive areas.

The analysis by RES Canada, with input from numerous technical specialists that have been involved throughout the consideration of this Project, has determined that the Project Area, as presented in this submission, which is located southeast of the Town of Kipling, and adjacent to the SaskPower Kennedy substation, presented the most optimal location and met all the criteria above. As the Project has now entered into a PPA with SaskPower, no alternatives to the current Project Area are being pursued.

Following the identification of an optimal Project Area, the consideration of development alternatives continued on an infrastructure level. As described above (Section 2.7), the consideration of development alternatives relative to infrastructure placement included consideration of anthropogenic and natural siting that reflected a combination of firm restrictions and preferred and/or recommended setbacks. These design considerations were used to refine the development plan until a viable project design was achieved, as presented in this submission.

# 3.0 Stakeholder Consultation and Indigenous Engagement

Consultation and engagement are at the forefront of the Proponent's development approach. Consultation at various levels has occurred since the Project's inception in 2016, and since then, communication has occurred regularly, including updates on the Project and development status, as well as providing regular opportunity to provide comment and input. Consultation has included numerous interested, or potentially interested, stakeholders, but has largely been focused on the local community, namely local landowners and the RMs of Hazelwood and Kingsley.

As the Project was not presented with an opportunity for a SaskPower contract until the 2019 RFP, limited engagement was deemed necessary prior to 2019; however consultation and engagement resumed in 2020, and has been ongoing since the Project was selected by SaskPower in spring 2021.

All consultation activities, per the Proponent's Consultation and Engagement Program (CEP), support the application for an approval by the MOE and ISC to construct and operate the Project, as summarized within this submission.

## 3.1 Engagement Objectives

The objective of the engagement program was to build trust, credibility, and respectful relationships with all stakeholders that are potentially directly and/or adversely affected by, or interested in, the Project. More specifically, the primary objectives of engagement are as follows:

- Identify stakeholders that may be directly and/or adversely affected by, or interested in the Bekevar Wind Energy Project;
- Provide stakeholders with the information needed to understand the Project and its potential impacts and benefits;
- Provide stakeholders with opportunities to engage in meaningful dialogue;
- Identify and understand the concerns and questions of stakeholders;
- Incorporate feedback into Project development and design, where feasible; and
- Develop mitigation strategies to address the concerns of stakeholders, as appropriate.

To meet these objectives, the Proponent engaged with stakeholders throughout the development phase of the Project. The consultation and engagement program outcomes ensure that stakeholders have, at a minimum:

- Been properly, and adequately, notified about the Project;
- Been given the opportunity to ask questions, and to raise inquiries and concerns about the Project;
- Had their questions, issues, and concerns addressed, whenever possible; and
- Been able to provide input on the Project development and design.

Consultation and engagement will continue during the later stages of development and construction. The Proponent is committed to keeping an open dialogue with all stakeholders and Indigenous Groups throughout all phases of the Project.

## 3.2 Identification of Stakeholders and Indigenous Groups

When planning the CEP, stakeholder contact details were identified within the following groups:

- Occupants, residents, and landowners within 1,600m (1 mile) of the Project Area;
- Relevant federal and provincial ministries and agencies, the RMs of Hazelwood and Kingsley, the Town of Kipling;
- Indigenous Groups with land holdings or reserve land within a 50km radius of the Project Area;
- Various Non-government Organizations (NGOs) with known, or suspected, interests and/or activities in the vicinity of the Project Area; and
- Any other identified stakeholders, including self-identified stakeholders and those recommended during other consultation processes.

## 3.3 Development And Maintenance Of The Stakeholder List

Prior to initiating the CEP's activities in 2020, and prior to the Project being submitted into the SaskPower RFP, the Proponent developed an initial list of stakeholders in July 2020 by conducting a detailed review of:

- Land title searches within 1,600m (1 mile) of the original project area, which was larger than the current Project Area shown in this submission;
- Landownership maps available at the RM offices;
- Consultation with RMs; and
- Federal and provincial governmental entities.

This information created a detailed Project stakeholder list that was updated in 2021 as feedback was provided to the Proponent on other stakeholders to include, including new owners of land in the Project Area that had acquired land since the original list was developed in 2020. The stakeholder list is considered a "living" document where additions/corrections are made whenever new information arises. Project representatives continue to monitor and reach out to new stakeholders who buy, lease, rent, or occupy properties within 2,000m of the Project Area. The stakeholder mailing list will continue to be updated on an ongoing basis as the Project progresses through the regulatory review process and consultation will continue with existing, and any new, stakeholders for the life of the Project.

## 3.4 Recording Stakeholder Consultations

Stakeholder inquiries and/or concerns received in person, or by phone, were addressed directly by a Project representative, to the best of their ability, by providing, or referring to, Project specific information.

**A summary of key questions and comments, and the corresponding responses by Project representatives, can be found in**
Table 7 below.

## 3.5 Summary Of CEP Consultation – Local Landowners and Residents

### 3.5.1 Early Development Phase (2016-2017)

Early development phase activities occurred in 2016 and 2017 as RES Canada, the originator of the site, initiated contact with several landowners in the area to discuss the option of participating in the Project. The reception from local landowners was very positive, as evidenced by the execution of option agreements with landowners totaling approximately 20,000 acres of land. During this period, the RMs of Hazelwood and Kingsley were also consulted to explain RES Canada's initiative, and to give an opportunity to the RMs to provide any feedback on the potential Project.

In the second half of 2017, RES further engaged with the RM of Hazelwood, specifically as the Project was initially planned within that RM only. Three meetings with Council were held between July and December 2017. The Council adopted a support resolution at their December council meeting (see Appendix II).

In December 2017, RES Canada held a "Christmas dinner" in the Town of Kipling that was very well attended, with approximately 80 attendees. This event provided an opportunity for landowners to discuss the Project and receive updates from RES Canada.

The overall outcome of these activities in 2016 and 2017 was that the local community was strongly in favor of the Project.

### 3.5.2 Development Phase (2020-2021)

Consultation and engagement activities resumed in 2020 as SaskPower launched a new RFP for wind energy in late 2019. The following sub-sections provide details on the CEP activities during this period.

*General Mail-out to Stakeholders*
In July 2020, a consultation package was mailed out to all stakeholders per the stakeholder list. The package included the following materials:

- An information brochure that included general Project information, an overview of Project development work to-date, a summary of environmental and wildlife studies completed to-date and underway, public consultation information, general need and justification for the Project, an introduction to the Proponent, and a Project schedule;
- A Project Area map; and
- A letter signed by RES Canada providing further details on the Project and the upcoming opportunity with SaskPower.

The package can be found in Appendix III.

Following the public announcement stating that the Project had been selected by SaskPower (in June 2021), an update package was sent to all stakeholders in August 2021, per the stakeholder list. The update package included the following materials:

- An information brochure that included updates on the Project, including summaries of environmental and wildlife studies, public consultation, other studies and details on setbacks, permitting activities, and Project schedule;
- A Project Area map;
- Copies of the press releases from the Bekevar Wind L.P. and SaskPower; and
- A letter signed by Bekevar Wind L.P. notifying stakeholders of the new owner of the Project, and the respective roles of RES Canada and ANEDC.

The package can be found in Appendix IV.

*Door-to-Door Campaign*

Following the mail-out in early August 2021, Project representatives visited with residents in the vicinity of the Project Area in late August 2021. This door-to-door campaign was an opportunity to communicate directly with local residents and to receive feedback on the Project.

Several local residents were visited during a few days in August. Information leaflets and business cards were left at houses when residents were not home.

*Open House Meeting*

On November 10, 2021 the Proponent held an open house meeting in the Town of Kipling to provide an opportunity for stakeholders to meet and speak directly with Project representatives and subject matter experts, ask questions, voice any concerns, and join in the conversation with other community members. An invitation to the event was mailed out to all stakeholders on the stakeholder list, and an ad was included in the Clipper in both of the October 29th and November 5th editions. Both RMs also published the invitation on their Facebook pages.

In consideration of the pandemic, this event was scheduled to occur from 1100hrs to 2100hrs, which was purposefully designed to both allow for maximum community participation and also to minimize the potential for several individuals to arrive at the same time, which is often the case for shorter events that occur over a few hours in the

evening. During the open house, the Proponent shared information boards which included Project information and general information on wind energy. The information boards included, but were not limited to:

- General Information on RES, ANED and Cowessess First Nation;
- Project overview and details;
- Maps of the Project Area and Project constraints;
- Site plans showing proposed turbine and other infrastructure locations; and
- Information boards about local community benefits, land use, environmental and wildlife studies and noise modeling.

A total of 33 persons attended the event throughout the day. The event was also covered by the Clipper, the World Spectator and the Carlyle Observer.

A copy of the invitation, the information boards and the newspaper articles can be found in Appendix V.

*Follow-up Consultation*

Best efforts were made to contact all identified residents, landowners and occupants within the 1,600m (one mile) radius of the Project Area. In addition to the efforts listed above, phone call follow-ups and/or further attempts to meet in person were undertaken. It can be safely stated that all landowners and residents within the 1,600m (one mile) radius of the Project Area have either been contacted, talked to directly, or have otherwise been notified of the Project.

Overall, it should be noted that the Project is located in an area with large agricultural holdings, with a very low population density. As such, there are very few non-participating residences within 1,600m (one mile) of the Project's proposed turbine locations. Further, the Proponent has received overwhelmingly positive and supportive comments from local landowners and residents, with very few potential concerns noted throughout the consultation process to-date.

*Summary Of Key Questions, Concerns & Responses*

The CEP, through phone calls, the open house, and individual consultations, enabled the Proponent to understand the questions from local stakeholders, and to provide clarifications on the Project and its potential impacts. To the best of the Proponent's knowledge, no specific concerns were raised by stakeholders, but rather questions to better understand the Project and its potential impacts. As described above, consultation and engagement will remain ongoing, to ensure that any further comments or concerns are also addressed throughout the life of the Project, as appropriate. The summary of key questions and responses are outlined in Table 7 below.

**Table 7. Summary of Key Questions and Responses**

| Comment/Question | Proponent's Response |
|---|---|
| General location of turbines and substation and distance to houses | Many individuals asked about where turbines and the substation would be located, and how locations were determined. RES explained that many different factors came into the determination of these locations, namely the wind resource, land use restrictions and setbacks, environmental features and setbacks, and setbacks due to noise. Turbines also need to be spaced out from each other to maximize each turbine's individual energy output. As for the substation, its location is typically near the "centroid" of the site to minimize energy loss.<br><br>For instance, the minimum distance to occupied dwellings of 750m per RES Canada best practice is greater than the 4x total height of the turbine (700m) required in the draft land-use by-law. Further, the vast majority of occupied dwellings are much further from turbines than this minimum setback. The response seemed satisfactory to individuals that asked about turbine locations. |
| Noise from turbines and substation | Several individuals inquired about the noise emissions from turbines and the substation. The Proponent and subject matter expert at the open house explained that turbines and the substation do produce some noise, but it fades away quickly with distance, which is why the equipment is setback to residences, to limit or avoid noise impacts. In absence of noise guidelines in Saskatchewan, the Proponent explained that the Project will follow AUC rule 012 from Alberta, which is the most stringent guideline in Canada. Noise levels at this distance are well under permissible levels.<br><br>No further questions or concerns were provided to the Proponent following these clarifications. |
| Visual impact of wind turbines | A few individuals commented that wind turbines impact the visual landscape and that they would "prefer not seeing them". Project representatives commented that given these are tall structures they certainly would be visible in the landscape, which may or may not please local residents that are not accustomed to such structures. The Proponent provided some context to this, to more specifically qualify the actual visual impact from occupied residences/yards:<br><br>*Turbines are significantly spaced-out from each other, within a large Project Area of approximately 13,000 acres of land. The proposed layout shows there is no more than 1 turbine on a given quarter section (except for one instance in the southwestern portion of the Project Area), and in some instances turbines "skip a quarter"; from a given location the visual impact is thus diminished given this low turbine density in the overall Project Area.*<br><br>To illustrate turbine visibility on the landscape, a few visual simulations were prepared and shown at the open house event. These provided a simulated, yet realistic, view of the proposed wind turbines on the landscape, and were based on actual turbine dimensions and taken from a few common locations (e.g. just outside the Town of Kipling municipal limits). The visual simulations can be found in Appendix VI.<br><br>A review of aerial imagery shows that most yards near the Project Area are lined with tree stands that will fully or partially block the views towards the wind farm. Visual impact is thus limited from actual residences and yards.<br><br>No further questions or concerns were provided to RES following these clarifications. |
| Relationship to neighboring wind projects/possibility to join the Project | Several individuals inquired about joining the Bekevar Wind Energy Project, offering their lands in the vicinity of the current Project Area. Some of these landowners were also under option with a different wind energy company.<br><br>RES replied that adding new lands could be considered, on a case by case basis, but that currently the Project can be developed and built on the currently optioned lands. For landowners under option with another wind energy company, however, this would not be possible unless they would terminate their existing agreements (i.e. exclusivity |

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| | clause which is standard in all wind power agreements).<br><br>RES will continue responding to these inquiries as they arise. |
| Setback from existing SaskPower lines | One individual inquired about setback distances to high voltage lines. The Proponent responded that SaskPower has requested that a setback of at least total height of the turbine be applied, for safety.<br><br>The Proponent further explained that it is in regular communication with SaskPower regarding the transmission line to be built from the Project's substation to the Kennedy substation, as the proposed routes overlap with the Project's optioned lands and potential turbine positions. The objective from both parties is to enable an optimal line route without limiting the potential for installing turbines. |
| Presence of a bald eagle nest near Bender Lake | One attendee anecdotally made a comment about previous records of a Bald Eagle nesting at Bender Lake. The individual was not able to provide additional information on location and was not concerned about the Project and its impact to any such nest.<br><br>The subject matter expert stated that field surveys did not confirm any records of Bald Eagle near Bender Lake and didn't document any potential Bald Eagle nests anywhere else around the Project.<br><br>To ensure this comment, and potential nest, are considered in sufficient detail, this potential record has been included in the biophysical existing conditions and is considered within the biophysical effects assessment. |

*Summary of Open House Feedback Forms*

A total of 17 feedback forms were filled in by attendees of the November 10 open house. The following provides an overview of feedback received at the open house:

- "Did you find this event useful"?
  - 15 out of 17 (88%) responded "Yes, very" while two (12%) attendees responded "Yes, somewhat"
- "Were all your questions about the project answered"
  - 15 out of 17 (88%) responded "Yes, fully" while two (12%) attendees responded "Somewhat"
- "Please provide any questions or concerns you have about the project as proposed":
  - *I wish it went further south!* (**Note**: this comment was from a landowner wishing the Project would be located on their lands)
  - *Everything was answered and no further questions or concerns*
  - *Thank you for an interesting presentation, very informative*
  - *No concerns*

## 3.6 Government Agency and NGO Consultation

This section of the CEP outlines the notification and consultation undertaken with various provincial and federal agencies, as well as the RMs and NGOs. In several instances throughout the Project development phase, and when relevant, documentation on the Project was provided to keep them informed and to seek feedback. Table 8 below summarizes consultation with these stakeholders.

**Table 8. Summary of Consultation with Agencies and NGOs**

| Organization | Summary of Discussions | Outcome |
|---|---|---|
| **Government and Regulatory Authorities** | | |
| RM of Hazelwood | Since inception, the RM of Hazelwood has been regularly notified of Project updates and has been consulted on various matters, such as land-use by-law, road use policy, other regulations, and insight on local stakeholders.<br><br>Overall, RES Canada has participated in seven council meetings and had numerous conversations and office visits with the RM's Administrator. | The RM of Hazelwood has consistently voiced their support for the Project and has been helpful to the Proponent throughout the development phase. The RM is also proactively developing a wind turbine land-use by-law that will guide the development of the Project.<br><br>The Proponent will continue to engage with the RM and provide updates, as required. Several other important steps will be undertaken closer to the construction, such as entering into a road use agreement and applying for development permits. |
| RM of Kingsley | Since confirmation in 2020 that the Project Area would overlap with the RM of Kingsley, the RM has been regularly notified of Project updates and consulted on various matters, such as land-use by-law, road use policy, other regulations, and insight on local stakeholders.<br><br>Overall, RES Canada participated in three council meetings and had numerous conversations and office visits with the RM's Administrator. | The RM of Kingsley has consistently voiced their support for the Project and has been helpful to the Proponent throughout the development phase. The RM is also proactively developing a wind turbine land-use by-law that will guide the development of the Project.<br><br>The Proponent will continue to engage with the RM and provide updates, as required. Several other important steps will be undertaken closer to the construction, such as entering into a road use agreement and applying for development permits. |
| Town of Kipling | The Town of Kipling is on the stakeholder list and has been notified of Project updates and events such as the open house in Kipling in November 2021. As the Town office is also responsible for the Kipling airport, it has also been specifically consulted on this matter. The Town has also requested information on the construction phase as it wants to be prepared to welcome workers and contractors that will require various services, such as lodging, restaurants, and other services.<br><br>The Town's Mayor attended the open house in November and was able to engage with Project representatives various Project-related matters. | The Town has voiced their support for the Project and has expressed their willingness to support the construction and operations of the Project.<br><br>The Kipling airport is located more than 5km from the closest proposed turbine. The Town has not expressed any concerns with the Project. |
| Saskatchewan Ministry of the Environment (MOE) | MOE is on the stakeholder list and has been notified of Project updates and events such as the open house in Kipling in November 2021.<br><br>MOE has been consulted during the development phase to discuss Project expectations, deliverables, and timelines relating to regulatory submissions, and members of the Approvals Branch attended the open house in November. | MOE has provided insight on the approvals process and key items to consider in the application. It also recommended consultation with several NGOs which have been included below. |
| SK Ministry of Highways and Infrastructure (MOHI) | A notification was issued to the MOHI in October 2020, to confirm that the Project would be eligible to obtain permits under the *Highways and Transportation Act* and obtain information on | MOHI issued a letter to RES Canada in October 2020, and subsequently to Bekevar Wind L.P. in May 2021, confirming the Project would be eligible |

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| | applicable setbacks to highways.<br><br>A further notification was issued in May 2021 to inform MOHI that the Proponent was now Bekevar Wind L.P. | to obtain said permits.<br><br>MOHI also clarified that utility crossings or utility installation work within 30m of an RM road or 90m of a Provincial Highway would require a permit. |
| SK Heritage Conservation Branch (HCB) | A request for assessment was sent to the HCB on December 10, 2021. The Project's Site Plan and Project lands were provided. | The response from HCB will be provided to the MOE when it is obtained. |
| Moose Mountain Provincial Park (Ministry of Parks Culture and Sports) | An information package was sent to the Park Manager of the Moose Mountain Provincial Park on November 23, 2021. | The Park Manager responded on December 1, 2021, indicating they had no concerns with this Project and saw it as an opportunity for the area.<br><br>There was one question with respect to noise (i.e. whether noise from turbines would be heard from the park). The Proponent responded on December 3, 2021 that given the considerable distance between the park's boundaries and the turbines (more than 7km), the turbines would not be audible at that distance. |
| NAV CANADA | A Land Use Submission Package was submitted to NAV CANADA on November 25, 2021. | Preliminary analysis of the Project by RES Canada, and its technical consultants, indicate that there are no issues with NAV CANADA approvals, given the considerable distance to airports. The closest airport is Kipling airport located approximately 5km from the closest turbine. |
| Transport Canada | The Transport Canada clearance form will be submitted 90 days prior to construction. | N/A |
| Department of National Defence (DND) | Per Radio Advisory Board of Canada (RABC) guidelines, the Proponent sent a request for assessment to two departments of DND, to seek their feedback, on November 25, 2021. | No response has been received from DND to-date; however, no impact is anticipated as DND operations have not been identified in the vicinity of the Project. |
| Environmental Canada and Climate Change (ECCC) – Meteorological Service of Canada (MSC) | Per RABC guidelines, the Proponent sent a request for assessment to MSC to seek their feedback, on November 25, 2021. | On December 9, 2021 MSC replied with a "Minimal Impacts Letter A" and stated that they did not have objections to the Project. |
| Royal Canadian Mounted Police (RCMP) | Per RABC guidelines, the Proponent sent a request for assessment to RCMP to seek their feedback, on November 25, 2021. | RCMP responded to the notification on November 29, 2021, stating there was no impact to their operations. |
| **NGOs** | | |
| Nature Sask | An information package was sent to the Executive Director on October 22, 2021. | Nature Sask responded on October 25, 2021 indicating they had no concerns with the Project, and asked to see Project mapping. The Site Plan, as presented to the open house, was sent by the Proponent on November 25, 2021. |
| Ducks Unlimited (DU) Canada | As a landowner in the Project Area DU was identified early on as a stakeholder and has received the various information packages that were mailed out, as well as the invitation to the open house. | DU has not responded, nor have they reached out with any comments or concerns relating to the Project. |

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| Saskatchewan Wildlife Federation (SWF) | As a landowner in the Project Area SWF was identified early on as a stakeholder and has received the various information packages that were mailed out, as well as the invitation to the open house. | SWF has not responded, nor have they reached out with any comments or concerns relating to the Project. |
| Public Pasture, Public Interest (PPPI) | An information package was sent to PPPI on December 4, 2021. | PPPI has not reached out or commented on the Project. |

## 3.7 Indigenous Engagement

With the support and knowledge of the Project's Indigenous partner, seven Indigenous groups were identified for notification and, on September 10, 2021, an information package was emailed and/or mailed to these seven Nations for their review and comment. The circulated correspondence also included reference to potential construction and employment opportunities, and invited each group to contact the Proponent to discuss further. The information package was sent to the Chiefs and Councils, as leaders of their respective communities, of the following seven Indigenous groups:

- Kahkewistahaw First Nation
- Ochapowace First Nation
- White Bear First Nation
- Ceg-A-Kin (Carry the Kettle) Nakoda Nation
- Ocean Man First Nation
- Flying Dust First Nation
- Pheasant Rump Nakota Nation

The Proponent also sent an information package and a request for feedback to the Métis Nation – Saskatchewan, Eastern Region 3 on November 25, 2021. No response from this Nation has been received to-date.

RES Canada and ANEDC will continue engaging with local Indigenous groups, however it is expected that this will be related to economic opportunity.

*Meetings Held to Date*

There were five nations that expressed interest in meeting with the Proponent, following notifications (emails and calls) from Daphne Kay, Community Energy Specialist at Cowessess First Nation, who is part of the Project development team. Meetings were held with each of these between October and December 2021.

The goals of the meetings were to introduce the Project team, RES, Cowessess First Nation and ANEDC, explain details relating to the Project, and to seek feedback from the Nation. This was also an opportunity for each Nation to express any concerns relating to the Project, and their interest in potential contracting opportunities.

Meetings were held with the following Nations:

- Carry the Kettle First Nation (CTKFN)
  - A meeting was held with the Chief, several council members, and their lands officers on October 14, 2021
  - The Nation did not express any concerns with the proposed project. CTKFN owns companies that are likely to submit bids into Project contracting opportunities, once available. CTKFN is not aware of any Traditional Land Uses of their lands within, or near, the Project Area at this time

- Flying Dust First Nation (FDFN)
  - A meeting was held with the Chief and several council members on October 14, 2021
  - The Nation did not express any concerns with the proposed project. FDFN owns companies that are likely to submit bids into Project contracting opportunities, once available. FDFN is not aware of any Traditional Land Uses of their lands within, or near, the Project Area at this time

- Whitebear First Nation (WBFN)
  - A meeting was held with the Chief, several council members, and their economic adviser on October 20, 2021
  - The Nation did not express any concerns with the proposed project. There were questions relating to the Project size and turbine technology, and questions on the difference between the Formal Consultation Process with Indigenous Services Canada vs. this Information Meeting with the Project development team.
  - WBFN owns companies that are likely to submit bids into Project contracting opportunities, once available. More information on WBFN companies will be sent to the Project's development team, and the development team will provide clear procedure for obtaining sub-contracting companies/bid process to WBFN. WBFN is not aware of any Traditional Land Uses of their lands within, or near, the Project Area at this time

- Kahkewistahaw First Nation (KFN)
  - A meeting was held with the Chief and several council members November 22, 2021
  - The Nation did not express any concerns with the proposed project. KFN owns companies that are likely to submit bids into Bekevar contracting opportunities, once available.

- Ochapowace First Nation (OFN)
  - A meeting was held with the Chief and one council member on December 10, 2021
  - The Nation did not express any concerns with the proposed project. OFN owns companies that are likely to submit bids into Bekevar contracting opportunities, once available.

# 4.0 Environmental Assessment Methods

The following sections provide an overview of the approach and parameters that have been established for the purpose of identifying, assessing, and mitigating (as necessary) any potential adverse effects that may result from the proposed Project activities discussed within this submission.

The assessment has been conducted in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a) to ensure that all aspects of the environment have been given fulsome consideration relative to all phases of Project activity, including during the siting of Project infrastructure.

There are several key inputs into the scoping and design of a successful and comprehensive environmental assessment. The steps taken by this assessment have been described in more detail in the following sections.

## 4.1 Project Scope

In accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a), this environmental assessment has been structured to consider, assess, and describe the potential effects relating to the important environmental components. This process follows a well-defined process of identifying these environmental components and assessing them relative to Project activities to determine whether there are expected to be any significant effects on the environment. The following sections provide a detailed overview of the assessment methods and definitions used in this EIS.

## 4.2 Overview of Valued Component Selection

The selection of Valued Components (VCs) is based on a fulsome consideration of potential impacts on important components of the biophysical, socio-economic, and cultural environment that exists in the areas proposed for Project activities. The selection of VCs (see Table 9) has been informed through the consideration of ecological importance, societal value, and general sensitivity of the components, and in consideration of expected and potential impacts that may be experienced as a result of this particular type of activity(ies).

The following list includes all VCs that have been considered as potentially being impacted by the proposed Project activities, including a brief description of the potential for the Project to impact the VC and rationale for the decision to include or exclude the VC from further consideration in this assessment.

**Table 9. Overview of Valued Component Selection Rationale**

| Valued Component | Potential for Project Interaction with VC | Carried Forward as VC? |
|---|---|---|
| **Biophysical Environment** | | |
| Terrain and Soils | Any potential changes to terrain and soils are expected to be negligible and localized.<br><br>This determination is based on the localized Project footprint, the limited need for site grading, the implementation of industry best practices (Section 7.6), and assuming the implementation of a reclamation strategy (Section 12). | **No** |
| Flora | Proposed activities have the potential to result in the damage to and/or loss of existing vegetation communities and the associated plant species. | **Yes** |
| Wetlands and Watercourses | Wetlands of varying sizes, classifications, and overall environmental value are present throughout the general Project Area. Proposed activities have the potential to result in damage and/or removal of wetland habitat.<br><br>Although typical siting and construction practices associated with the installation of Project infrastructure, including minimal and localized grading, are unlikely to result in negative effects on surface water or hydrology, there is the potential for Project infrastructure to cross watercourses, which could result in damage or alteration. | **Yes** |
| Fish and Fish Habitat | Proposed activities are not expected to result in any adverse effects to fish and fish habitat.<br><br>This determination is based on the confirmation that no permanent watercourses, or other potential fish-bearing habitat, has been identified within the Project Area. Aquatic features that will be intersected by Proposed activities are ephemeral or intermittent, and only carry surficial flow during periods of high precipitation or snow melt. | **No** |
| Wildlife and Wildlife Habitat<br>• Birds<br>• Bats<br>• Amphibians<br>• Other Wildlife<br>• Species of Conservation Concern | Proposed activities have the potential to result in damage to, or loss of, existing wildlife habitat, and the operation of the Project has the potential to result in direct mortality to wildlife.<br><br>In consideration of the comprehensive field investigations that were completed, this VC has been sub-divided into several categories within the discussion of existing conditions (Section 5.0), to provide a robust understanding of wildlife use and available habitat, which shall inform the effects assessment. | **Yes** |
| Groundwater | Any potential changes to groundwater are expected to be negligible and localized.<br><br>This determination is based on the implementation of industry best practices (Section 7.6), and in consideration of the highly localized, and temporary, nature of Project activities which may interact with groundwater resources.<br><br>Consideration of groundwater resources, as it relates to wetland function, has been considered under the Wetlands and Watercourses VC as a potential change in water balance. | **No** |
| Geology and Geochemistry | Any potential changes to geology or geochemistry are expected to be negligible and localized.<br><br>This determination considers that site-specific geotechnical assessments will be carried out to inform the design and dimensions of the turbine foundations, and also reflects the highly localized | **No** |

| Valued Component | Potential for Project Interaction with VC | Carried Forward as VC? |
|---|---|---|
| | foundation installations, and the implementation of industry best practices (Section 7.6). | |
| Climate and Meteorology | There are no anticipated adverse effects to climate and meteorology.<br><br>One of the primary purposes of the Project is to provide clean and renewable energy to offset the current reliance on fossil fuels for energy production. The result is a clearly defined positive effects pathway for the proposed activities to have an overall benefit to the climate, which will be realized both locally and at a much larger regional scale. | **No** |
| Air Quality | Any potential changes to air quality are expected to be negligible and localized.<br><br>This determination considers the implementation of best management practices (Section 7.6), and the localized and temporary nature of Project activities, particularly in consideration of other ongoing activities (e.g. regional traffic, agricultural practices, etc.) that contribute to baseline effects to air quality. | **No** |
| Acoustic Environment | Proposed activities have the potential to result in impact to the acoustic environment, due to noise generated by vehicles and machinery during construction and decommissioning, and turbines during operations. | **Yes** |
| **Socio-Economic and Cultural Environment** | | |
| Indigenous Land Use | Proposed activities have the potential to result in impacts to Indigenous land use, but are limited to the three quarter sections of Cowessess First Nation land that are included within the Project Area. | **Yes** |
| Heritage Resources | There is potential for heritage resources to be impacted by the Project, as a result of ground disturbance. The potential for adverse effects is expected to be avoided due to the location of the Project activities; however, a request for assessment was sent to the HCB. | **Yes** |
| Land Use | Proposed activities have the potential to result in impacts to land use, although any potential effects are expected to be minimal given the small amount of land that will be used by the Project for all related Project activities. | **Yes** |
| Socio-economic Considerations<br>• Employment and Economy<br>• Community Services and Infrastructure | Proposed activities have the potential to result in positive impacts to various socio-economic considerations. In consideration of the varied considerations of socio-economic effects, this VC has been sub-divided into several categories within the discussion of existing conditions (Section 6.4), to provide a robust understanding of existing socio-economic existing condition, which shall inform the effects assessment. | **Yes** |
| Socio-economic Considerations – Indigenous Groups | Proposed activities have the potential to result in positive impacts to various Indigenous Groups, through employment and contracting opportunities, training and capacity building. | **Yes** |

As outlined in the preliminary, and conservative, assessment of potential impacts to VCs identified in Table 9, several VCs have been identified as requiring a comprehensive assessment in order to identify the potential scope and magnitude of potential impacts resulting from Project activities, including consideration given to potential cumulative effects.

For each of the VCs identified as requiring further assessment in Table 9, a detailed consideration of baseline conditions, potential impacts, proposed mitigation measures, and resulting residual and cumulative effects (if applicable) have been detailed within this assessment.

## 4.3 Project Boundaries

The identification of Project boundaries is a necessary component of a comprehensive assessment of potential impacts that may occur as a result of proposed activities. These boundaries are typically considered relative to the spatial boundary of the Project (i.e. the general area(s) for which impacts may be incurred) or the temporary boundary of the Project (i.e. the timeline and/or duration for which impacts may be incurred). Relative to the specific Project activities proposed in this submission, the spatial and temporary boundaries have been defined in the following sections.

### 4.3.1 Spatial Boundaries

A spatial boundary is established to identify the area(s) within which Project activities may result in negative effects on an identified VC. In most cases, the types of impacts can reflect direct or indirect effects, which are often experienced at different spatial scales from proposed activities. As such, several spatial boundary definitions are typically used in the assessment of negative effects that may occur as a result of Project activities. Relative to the Project activities outlined in this document, three spatial boundaries have been considered, as follows:

- **Operational Footprint (Footprint);** the area within which surficial infrastructure will be sited, and be left in place for the duration of Project activities. This includes the turbine pad (~20m radius), operational access road width, and the substation and operations and maintenance building.
- **Construction Disturbance Area (CDA)**; the area within which all project activities, including (but not limited to) site preparation, construction, operation, and decommissioning, are expected to occur. This includes the all ground-based activities, as well as the those above ground (e.g. turbine blades) and below ground (e.g. horizontal drilling).
- **Local Study Area (LSA)**; the area beyond the CDA where there is a reasonable potential to experience direct environmental effects as a result of the activities proposed by the Project. For this purpose of this report, the LSA has been considered to include all areas within 1km beyond the CDA.
- **Regional Study Area (RSA)**; the area beyond the CDA area where there is a reasonable potential to experience indirectly and/or cumulative environmental effects as a result of the activities proposed by the Project. For this purpose of this report, the RSA has been defined as 5km beyond the CDA.

### 4.3.2 Temporal Boundaries

A temporal boundary is established to identify the approximately timeline, or duration, for which a negative effect to a VC may occur. Depending on the specific Project activities, this may result in a single temporal boundary (i.e. Project life), or may warrant several temporal boundaries to clearly identify periods of potential risk if there are notable changes to the Project activities within the overall Project life. In consideration of the specific Project activities presented in this document, four temporal boundaries have been considered, as follows:

- **Project Life**; the entire duration of the Project activities is expected to be 28 years, which is largely driven by the duration of the 25-year PPA that has been signed with SaskPower.
- **Site Preparation and Construction**; the period of site preparation and construction is anticipated to last approximately 18 months.
- **Operation**; the Project is expected to be operational for a period of 25 years, per the PPA that has been signed with SaskPower. It is possible that the Project could continue operating after the defined duration of the PPA; however this possibility is not included in this analysis given the uncertainty of this possibility.
- **Decommissioning and Reclamation**; following the completion of the operation phase of the Project, a period of decommissioning and reclamation is expected to occur over a period of approximately 2 years, although the specific duration of this phase will be driven by the extent and/or success of reclamation activities.

## 4.4 Effects Assessment

The approach to this detailed effects assessment has been based largely on federal guidance (CEAA 2015), which provides detailed guidance in the determination, assessment, and qualification of potential negative effects. The approach taken by this assessment is to first identify all reasonably potential negative effects that may result from the proposed Project activities, without consideration for mitigation measures.

Following a comprehensive assessment of potential negative effects, a detailed description of mitigation and minimization measures, and any applicable Best Management Practices (BMPs), are outlined to allow for the detailed consideration of effects that are expected to persist even after the implementation of mitigation and minimization measures. The negative effects that remain possible after all reasonable mitigation measures are considered to be residual effects.

### 4.4.1 Determination of Residual Effects

Residual effects are impacts to VCs that have the potential, or are expected, to persist after all applicable mitigation measures have been applied. Following a standardized approach for assessing residual effects, each potential effect has been characterized using the definitions outlined in Table 10.

**Table 10. Residual Effect Assessment Terminology and Definitions**

| Criteria | Rating | Definition |
|---|---|---|
| Magnitude | Negligible | No detectable change is expected, relative to the documented baseline conditions. |
| | Low | The effect might be detectable but is expected to be within the range of baseline or guideline values, or natural variability range. |
| | Moderate | The effect is expected to be at or slightly exceed the limits of baseline or guideline conditions, but is unlikely to be of management concern. |
| | High | The effect is expected to exceed the limits of baseline or guideline conditions, and may pose a serious risk to the ecosystem component or be of management concern. |
| Geographic Extent | Footprint | The effect is confined to the limits of the Construction Disturbance Area |
| | Local | The effect has the potential to extend beyond the Project footprint, but will not extend beyond the Local Study Area (1km) |
| | Regional | The effect has the potential to extend beyond the Local Study Area (i.e. >1km) |
| Duration | Temporary | The effect is no longer discernible immediately after construction or decommissioning. |
| | Short-term | The effect lasts less than three years. |
| | Medium-term | The effect is expected to last more than three years, but will be resolved during the Project life. |
| | Long-term | The effect persists beyond the defined Project life. |
| Reversibility | Reversible | The effect is reversible, whether naturally or by way of active efforts to achieve reversibility. |
| | Irreversible | The effect is not reversible, and although it may diminish over time, it will not completely resolve. |
| Frequency | Once | The effect occurs once during any given Project phase. |
| | Sporadic | The effect is unpredictable, and expected to occur at irregular and infrequent intervals during any given Project phase. |
| | Intermittent | The effect is predictable and expected to occur at infrequent intervals during any given Project phase. |
| | Regular | The effect is predictable and expected to occur at known and regular intervals during any given Project phase. |
| | Continuous | The effect is expected to occur continuously, with few (if any) reductions in frequency, during any given Project phase. |
| Direction* | Positive | The effect is expected to result in a real, or potential, improvement in value or quality, relative to the known baseline conditions. |
| | Neutral | The effect is not expected to result in a measurable difference in value or quality, relative to the known baseline conditions. |
| | Negative | The effect is expected to result in a real, or potential, reduction in value or quality, relative to the known baseline conditions. |

**Only effects with a negative direction have been included in the effects assessment*

### 4.4.2 Determination of Likelihood and Significance

The significance of a potential residual effect is evaluated based on the above criteria, but also considers that each individual criterion may influence the significance decision differently depending on the ecosystem component under consideration.

Generally, the significance of the potential residual effects on the ecosystem component is defined as:

- **Not Significant**: The effect is detectable, but is not likely to result in substantial change that will alter the ecosystem component status or integrity beyond an acceptable level.
- **Significant**: The effect is measurable and results in a change to the ecosystem component that will alter its status or integrity beyond an acceptable level.

If a potential residual effect is considered significant, the likelihood of that residual effect is assessed as follows:

- **Unlikely**: the effect is not likely to occur and has only been reported rarely for similar projects;
- **Possible**: the effect may occur but is not likely, and has been reported in less the half of similar projects; and
- **Likely**: the effect is likely to occur and has been commonly reported for similar projects.

## 4.5 Cumulative Effects Assessment

In accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a), an assessment of potential cumulative effects has been considered within this submission. A cumulative effects assessment is intended to consider the effects of the Project activities on environmental and socio-economic components, specifically in relation to other past, present or future human activities which may have had, or will have, effects on similar VCs, such that an additive (i.e. cumulative) effect may be experienced beyond the effects of the Project activities alone.

Cumulative effects to a VC occur are considered to be realized, or potentially realized, if Project activities are determined to have a residual effect, and if another past, present, or future activity has a potential to result in a cumulative interaction between the residual effects of the Project and the potential effect and other identified activities within the RSA.

The cumulative effects assessment described in this submission uses the same spatial boundaries described in Section 4.3.1, and considers each of the VCs that have been specifically considered within this submission as having potentially adverse effects resulting from Project activities (Table 9). In the instance that a potential cumulative effect to a VC is identified, the risk is described, and mitigation measures are proposed to avoid, or minimize, the potential for cumulative effects.

To inform the consideration of this cumulative effects assessment, a search of publicly available information and databases was undertaken in an attempt to identify other activities that have been, or will be, undertaken within the RSA. This review focused on,

but was not limited to, SaskPower's Current Projects List (SaskPower 2021) and Saskatchewan Environmental Assessment Interactive Map Viewer (MOE 2021b).

The detailed results of the cumulative effects assessment are present in Section 9.0.

# 5.0 Biophysical Environment Existing Conditions

The following sections provide a detailed overview of the biophysical conditions of the Project Area, as assessed through a combination of desktop assessments and comprehensive site-specific monitoring. Where applicable, existing conditions are described according to the defined spatial boundaries.

## 5.1 Regional Setting

The Project is located within the Aspen Parkland ecoregion of Saskatchewan, and within the broader Prairie ecozone. This ecoregion is characterized by a mix of aspen tree stands and fescue grasslands. Continuous aspen cover is found in the northern areas and on lower, moist, north-facing slopes, while grasslands are generally more prevalent in the south, and occupy upper, drier, south-facing slopes. The slopes within this ecoregion are characteristic of the glacial till landscape, with steep hills and numerous undrained depressions that provide habitat for waterfowl. Most of the land in this ecoregion is cultivated due to the fertile, loamy, black soils (SKCDC 2014).

The most abundant land mammals within this ecoregion typically include White-tailed Deer (*Odocoileus virginianus*), Coyote (*Canis latrans*), Red Fox (*Vulpes vulpes*), and Richardson's Ground Squirrel (*Urocitellus richardsonii*). Bird species commonly found in the ecoregion include House Wren (*Troglodytes aedon*), Least Flycatcher (*Empidonax minimus*), Western Kingbird (*Tyrannus verticalis*), and Yellow Warbler (*Setophaga petechia*) (SKCDC 2014).

The majority of the Project is located within the Lower Souris Watershed, with a small portion of the Project extending into the northern limits of the Upper Souris Watershed. The water within the Project Area will therefore drain mostly towards the Pipestone Creek, which is located approximately 19km north of the Project Area. The Pipestone Creek is a low gradient stream which meanders through the Pipestone spillway, eventually ending up in the Manitoba and the Souris River System (Lower Souris Watershed Committee 2021). Pipestone creek is an important water source for communities and farms in the surrounding areas, as well as inhabiting a number of game fish, waterfowl and deer species (Lower Souris Watershed Committee 2021).

### 5.1.1 Wind Turbine Avoidance Zones

As part of the comprehensive desktop review, NRSI reviewed the available layers in the HABISask database to determine the presence of Wind Turbine Avoidance Zones (WTAZ) that may be present within the Project area. This desktop exercise was completed to ensure that all WTAZ are avoided by the Project, as required by the Wildlife Siting Guidelines for Saskatchewan Wind Energy Projects (MOE 2019), and to

generally avoid areas that are more likely to contain sensitive habitats, native vegetation communities, and/or sensitive species, to the extent possible.

Neither the Operational Footprint or CDA overlap any WTAZs.

### 5.1.2 Environmentally Sensitive Areas

NRSI also reviewed the Project area for the presence of any Environmentally Sensitive Lands, which may represent an increased potential to contain sensitive habitats, native vegetation communities, and/or sensitive species. Designations that were considered in the assessment of Environmentally Sensitive Areas, which included, but was not limited to, consideration of the following:

- National Parks;
- Migratory Bird Sanctuary;
- Species-at-Risk Critical Habitat;
- National Wildlife Areas;
- Provincial Parks, Recreation Sites, Protected Areas;
- Representative Areas Network, Ecological Reserves;
- Wildlife Habitat Protection Act;
- Conservation Easement;
- Western Hemisphere Shorebird Reserve Network; and
- Ramsar Convention Wetland Sites.

Neither the Operational Footprint or CDA overlap any Environmentally Sensitive Areas.

When considering the larger LSA and RSA, which extend 1km and 5km from the CDA, respectively, there are relatively few environmentally sensitive areas, relative to the areas covered by these larger study areas. In particular, several Conservation Easements and Wildlife Habitat Protection lands occur within both of the LSA and RSA. The 5km RSA also overlaps with the 5km WTAZ buffer that MOE applies to Provincial Parks. In this case, the Wood Mountain Provincial Park itself is approximately 7km from the CDA, and therefore well outside the RSA.

### 5.1.3 Important Bird Areas

The Project is located a considerable distance from any Important Bird Area (IBA). The closest two IBAs, Ellice-Archie and Spy Hill Community Pastures IBA and Colgate IBA, are found 80km northeast and 110km southwest, respectively, of the general Project Area (BSC 2015). At these distances, there is no expected interaction between the Project activities and the species that rely on the habitat and/or landscape features associated with these IBAs.

## 5.2 Flora

The Project is located within the Aspen Parkland Natural Ecoregion of Saskatchewan, in the Ecological Management Specialist (EMS) District 1 (Government of Saskatchewan 2021b). The parkland ecoregion in Saskatchewan is considered transitional between the boreal forest to the north and the grasslands to the south. In its native state, the landscape is typically characterized by Trembling Aspen (*Populus tremuloides*), Bur Oak groves (*Quercus macrocarpa*), mixed tall shrubs, and intermittent fescue grasslands (*Festuca* sp.). Open stands of Trembling Aspen and shrubs occur on most sites, while Bur Oak and grassland communities occupy increasingly drier sites on loamy Black Chernozemic soils. Poorly drained Gleysolic soils within the Ecoregion will typically support willows (*Salix* sp.) and sedges (*Carex* sp.) (University of Saskatchewan 2021).

### 5.2.1 Desktop Screening and Assessment

Preliminary mapping of land use, as assessed by Saskatchewan Digital Land Cover (SDLC; Government of Saskatchewan 2018), was reviewed using aerial imagery to review the land cover within the Project Area. This assessment included the review of two sets of aerial imagery, from May 2009 and July 2011, to examine land cover, with a preliminary objective of identifying areas of potential native prairie, and evaluating areas identified by desktop mapping as native prairie for clear indications of cultivation or pasture. Imagery from Google Earth and FlySask were also reviewed, where suitable resolution provided additional information.

A preliminary desktop assessment of the potential occurrence of rare vascular plants in the Project Area was made using the HabiSask mapping tool (Government of Saskatchewan 2021a). Rare vascular plants are considered to be those species listed under the Tracked Taxa List: Vascular Plants (SKCD 2021b).

### 5.2.2 Monitoring Methods

The confirmation of landcover within the Project Area began with a specific assessment of all areas within Project Area that were identified as native prairie by Saskatchewan Digital Land Cover (SDLC) and Agriculture and Agri-Food Canada (AAFC) layers. This assessment was carried out by an experienced biologist who holds a Professional Biologist designation, with experience in desktop landcover assessments in a prairie landscape. Based on various visual cues (e.g. presence of hay bales, heavy cattle usage or visible cattle, cultivation, disturbance, etc.), landcover polygons were adjusted to reflect actual or highly probable landcover classifications. This updated land use mapping, as revised using aerial imagery, maintained a conservative approach, such that any areas that could not be ruled out as native habitats were conservatively classified as potential native habitats, and were identified as requiring additional field assessments. The results of this aerial imagery assessment were used for subsequent selection of habitat strata for rare vascular plant transects, site-specific wetland delineations, and the selection of several wildlife monitoring stations.

The assessment of rare vascular plants was conducted in accordance with the *Species Detection Protocol 20.0 - Rare Vascular Plant Survey* (Government of Saskatchewan 2019) and included two seasonal field assessments, to observe plant species within both the early and late growing season to reflect differing flowering and fruiting timings to ensure plants were exhibiting identifiable characteristics during at least one of the surveys.

Using land use determinations resulting from the assessment of aerial imagery, habitats were identified into five broad classifications: Native Prairie, Native Shrubland, Pasture, Wetlands and Forest. Within each habitat type, and during each seasonal assessment, standardized transects were used as a sampling unit for the rare vascular plant survey. Although final Project layouts were not available at the time of field assessments, preliminary layout designs, and information provided by the Proponent, were used to focus transect placements in areas that were most likely to be located near proposed infrastructure. In addition, an oversampling was undertaken with the goal of reaching or exceeding the recommended transect coverage (i.e. 3-5% of the area of each suitable non-forest habitats) once the final layout was established.

Within forested habitats, the number of transects was defined based on the following formula (Government of Saskatchewan 2019):

$$y = (0.8x/z) + (40/z)$$

Where,

***y*** is the number of 100 m transects;
***z*** is the transect width for a 2-person team (m);
***x*** is the area of the forested habitat stratum (ha).

Following the approach and methods described above, Table 11 outlines the habitat stratification design and coverage for the rare vascular plant surveys. Transect locations are also shown on Map 5.

**Table 11. Overview of Rare Vascular Plant Survey Transect Methods**

| Habitat | Number of Transects | | Transect Dimensions | Habitat within CDA (ha) | Sampling Coverage[2] |
|---|---|---|---|---|---|
| | Early Survey | Late Survey[1] | | | |
| Native Grassland | 4 | 4 | 200m x 5m | n/a | n/a |
| Native Shrubland | 2 | 2 | | n/a | n/a |
| Pasture | 20 | 20+3 | | 6.62 | 30.2% |
| Wetland | 19 | 19+2 | | 2.33 | 8.1% |
| Forest | 11 | 11+4 | 100m x 8m | 0.86 | 9.9% |

[1] *As the Project design progressed, new transect locations were added for the late season assessment to cover new areas that were being considered for Project activities.*
[2] *Sampling intensity has been calculated based on the total area covered by the transects that were surveyed in both seasons (i.e. not including late transect additions), relative to the area of each habitat within the total CDA (Table 13). Although surveyed habitats were chosen based in proximity to early Project designs, the sampling intensity doesn't always specifically occur within the current CDA.*

Most transects were surveyed once during each of the early and late growing seasons, and were separated by at least eight weeks. All early season transects were repeated in the late season, however as the Project design progressed, new areas of consideration were identified. In an effort to provide coverage of all areas being considered for Project activities, nine additional transects were added to the compliment of late season transects, resulting in the completion of 56 early season and 65 late season transects.

Early season transects surveys were conducted from June 8-12, 2021, and late season transects were conducted across two separate assessments, which occurred from August 10-13 and September 7-9, 2021. The early and late season surveys were separated by more than eight weeks, and the seasonal timing is consistent with the requirements for surveying within the Prairie Terrestrial Ecozone (Government of Saskatchewan 2019). During the field visits, the surveys were conducted by a team of two people, and were therefore conducted using the corresponding transect widths recommended for two surveyors (i.e. 2.5m per surveyor, for a total of 5m wide) and covering an area of 500m$^2$ in non-forested habitats (Government of Saskatchewan 2019).

During each transect, all observed plants were identified to the lowest accepted taxonomical level (species or subspecies), using appropriate reference literature and dichotomic keys, such as Moss (1983), Harms and Leighton (2011), Kershaw et al. (2001), Vascular Flora of Alberta (2020) and Flora of North America (2012). Whenever a rare vascular plant was documented, its population was delineated using a GPS, the individual(s) was photographed, and the number of individuals was counted or approximated for larger populations.

The presence of noxious weeds, or invasive plant species, was noted during the assessment of the vegetation transects, described above, and also incidentally noted during other field surveys, such as wetland delineations and land use mapping.

### 5.2.3 Land Use

Land cover categories that were used for classifying the general land use within the Project Area were adapted from a combination of Agriculture and Agri-foods Canada (2019) and the Alberta Wetland Classification System (Government of Alberta 2015a). The adopted definitions, as used throughout this report, are presented in Table 12.

**Table 12. Landcover Definitions (adapted from Agriculture and Agri-foods Canada 2019)**

| Landcover Class | Description |
|---|---|
| Agriculture | Crops seeded and harvested annually (i.e., wheat, canola, lentils, etc). |
| Dugout | Anthropogenic wetlands. |
| Ephemeral Waterbody (Class I) | Lands where surface water are present only for a brief period after snowmelt or a heavy rainfall (Gov of Alberta 2015). |
| Wetland | Lands that are saturated with water for long enough to promote the |

| | |
|---|---|
| | development of water altered soils and the growth of water tolerant vegetation (Gov of Alberta 2013). Wetlands are typically classified further based on water permanency, as is the case in the detailed discussion of wetlands (Section 5.3). |
| Pasture/Forages | Lands that Include tame grasses and other perennial crops such as alfalfa (Medicago sativa) and sweet clover (Melilotus spp.) grown alone or as mixtures for hay, pasture or seed. This classification also includes lands that are specifically designated for livestock grazing, which may, or may not, also include occasional crop harvesting. These land uses are often rotated to minimize effects to soil and/or vegetation, and may be periodically cultivated as part of regular land use rotation. |
| Native Grassland | Habitats that consist predominantly of graminoid vegetation, and that are dominated by a minimum of 51% native species cover. |
| Shrubland | Areas that consist predominantly of woody vegetation of relatively low height (approximately 2m height) within an otherwise open habitat. |
| Transmission Corridor | Anthropogenic structures (e.g. power lines). |
| Forest | Lands that are dominated by tree cover (i.e. >2m in height). |

The Operational Footprint has a total area of 19.88ha, of which 19.15ha (96.3%) is currently used as agriculture (i.e. cultivated fields). The Operational Footprint also comprises small overlaps with pasture/forage (0.48ha; 2.4%), wetlands (0.10ha; 0.5%), forest (0.10ha; 0.5%) and ephemeral waterbody (0.05ha; 0.3%).

When considering the land use within the larger CDA (187.68ha), the area remains largely dominated by agricultural land, which accounts for 177.67ha (94.7%) of the CDA. Similar to the Operational Footprint, pasture/forage and wetland account for the next most common land use, accounting for 6.65ha (3.5%) and 2.33ha (1.2%), respectively. Small proportions of ephemeral waterbody and forest are also found within the CDA, each accounting for less than 1% of the total CDA.

When considering the broader LSA, agricultural land use continues to represent the largest proportion of land use (77.8%), with wetland (7.8%), forest (4.6%), and native grassland (4.2%) representing the next most common land uses.

A full overview of all land cover classifications, including their total area (ha), in each of the Operational Footprint, CDA, and LSA is shown in Table 13 below.

**Table 13. Summary of Land Cover and Use within Different Project Area Extents**

| Land Cover Class | Operational Footprint | | CDA | | LSA | |
|---|---|---|---|---|---|---|
| | Area (ha) | % | Area (ha) | % | Area (ha) | % |
| Agriculture | 19.15 | 96.3 | 177.67 | 94.7 | 9,366.02 | 77.8 |
| Pasture/Forage | 0.48 | 2.4 | 6.65 | 3.5 | 347.30 | 2.9 |
| Dugout Pond | 0.00 | --- | 0.00 | --- | 0.95 | <0.1 |
| Ephemeral Waterbody (Class I) | 0.05 | 0.3 | 0.17 | 0.1 | 3.55 | <0.1 |
| Wetland | 0.10 | 0.5 | 2.33 | 1.2 | 940.03 | 7.8 |
| Native Grassland | 0.00 | --- | 0.00 | --- | 502.47 | 4.2 |
| Shrubland | 0.00 | --- | 0.00 | --- | 321.13 | 2.7 |
| Forest | 0.10 | 0.5 | 0.86 | 0.5 | 559.23 | 4.6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Transmission Corridor | 0.00 | --- | 0.00 | --- | 5.24 | <0.1 |
| **TOTAL** | **19.88** | | **187.68** | | **12,045.93** | |

This difference in land cover proportion of both the Operational Footprint or CDA, when compared to the LSA, demonstrates the deliberate choices of the Proponent to avoid environmentally sensitive and/or native habitats on the landscape, to the extent possible. This is particularly apparent when considering that native grassland and shrubland account for 4.2% and 2.7%, respectively, of the LSA, while both have been fully avoided by the CDA. Similarly, wetlands and forest only account for 1.2% and 0.5% of the CDA, respectively, compared to 7.8% and 4.6%, respectively, of the larger LSA.

### 5.2.4 Rare Vascular Plants

The completion of multi-season surveys at 56 transects (and 9 additional single-season transects) has resulted in the detection of 211 vascular plant species, across all habitat strata. Of the 211 plant species, 144 were forb species, 35 were graminoid species (including grasses, sedges, rushes, and bulrushes), and the remaining 32 were species of trees and shrubs.

One species of a rare (S3) provincially tracked orchid species, Small Yellow Lady's Slipper (*Cypripedium parviflorum* var. *makasin*) was detected during these assessments. Two separate populations of this species were noted during the defined transects. The populations were first confirmed during the early survey, but remained identifiable during the late survey. Details of each detection of a rare vascular plant within the Project area are found in Table 14 below.

**Table 14. Rare vascular plant species documented at the Project**

| Detection ID # | Common Name | Scientific Name | UTM Coordinates (13U) | | No. of Individuals | Approx. Area ($m^2$) |
|---|---|---|---|---|---|---|
| | | | Easting | Northing | | |
| 1 | Small Yellow Lady's Slipper | *Cypripedium parviflorum* var. *makasin* | 681284 | 5547963 | 2 | 44 |
| 2 | Small Yellow Lady's Slipper | *Cypripedium parviflorum* var. *makasin* | 673589 | 5545841 | 105 | 463 |

The Small Yellow Lady's Slipper is an orchid that will typically grow in rich, moist, semi-open woods, as well as along the outer, drier, fringes of peatlands and moist to wet meadows. In Saskatchewan, this species can be found in the mixed grass Prairies, Aspen Parkland, the eastern part of the Southern Boreal Forest and in Cypress Hills, while largely remaining absent in the driest grassland regions (Harms and Leighton 2011). This species' provincial S-Rank (S3) indicates that the species is at moderate risk of extinction or extirpation due to a restricted range, relatively few populations, recent and widespread declines, threats, or other factors (SKCD 2021c).

The location and delineation of the local populations of rare vascular plants is shown on Map 5. Both local populations are present within the larger LSA, but occur more than 30m from the CDA. A complete list of the plant species observed during rare plant surveys is presented in Appendix VII.

### 5.2.5 Noxious Weeds and Invasive Species

During the comprehensive vascular plant surveys carried out within the Project Area, 42 exotic species (introduced and/or invasive) were identified. Of these species, seven are considered to be noxious weeds, according to the Weed Control Act (Government of Saskatchewan 2010; see Table 15). Canada Thistle (*Cirsium arvense*) and Perennial Sow-thistle (*Sonchus arvensis* ssp. *uliginosus*), both noxious weeds, were most commonly observed and were present in disturbed wetlands, located within cultivated fields. The remaining noxious species identified were present within cultivated fields, pastures, and/or along wetland edges, but were generally less prevalent on the landscape.

**Table 15. Noxious Weed Species Observed Within the Project Area as listed under the Weed Control Act**

| Common Name | Scientific Name | Relative Abundance |
|---|---|---|
| Common Burdock | *Arctium minus* | Occasional |
| Absinthe | *Artemisia absinthium* | Common in pasture fields |
| Canada Thistle | *Cirsium arvense* | Common |
| Annual Hawksbeard | *Crepis tectorum* | Common along cultivated field edges |
| Prickly Lettuce | *Lactuca serriola* | Occasional |
| Night-flowering Catchfly | *Silene noctiflora* | Common along cultivated field edges |
| Perennial Sow-thistle | *Sonchus arvensis* ssp. uliginosus | Common |

In addition to the noxious weeds, listed above, the only non-native nuisance species, according to the Weed Control Act, that was observed during the vegetation assessments was the Common Dandelion (*Taraxacum officinale*). This species was relatively common within the Project Area, particularly along existing roadways and the edges of cultivated fields.

The prevalence and abundance of invasive species is variable throughout the Project Area. In general, invasive and/or introduced species tend to be more prevalent along cultivated fields edges, within tamed pasture areas, and often within seasonal and temporary wetlands that are present within cultivated fields and pastures. Larger permanent and semi-permanent wetland edges and native habitats were observed to have a considerably lower presence of invasive and/or introduced species.

## 5.3 Wetlands and Watercourses

Wetlands are lands that are saturated with water for long enough to promote the development of water altered soils and the growth of water tolerant vegetation. Wetlands are diverse and productive ecosystems that are important on the landscape and support watershed health by protecting water quality, providing water storage and infiltration, creating barriers that promote flood energy dissipation, and providing habitat for numerous species of wildlife, fish, and plants.

Many wetlands on the site are hydrologically connected via ephemeral draws or intermittent watercourses. These features flow almost exclusively during periods of snowmelt or heavy precipitation. No permanent watercourses were observed within the general Project Area.

As Saskatchewan does not have established wetland delineation standards, wetland identification methods were adapted from the Alberta Wetland Identification and Delineation Directive (Government of Alberta 2015b). As air photo and satellite images of reasonable quality are available for the Project Area, an approach was taken to first undertake desktop delineations of wetlands and watercourses, followed by site-specific field verification.

### 5.3.1 Desktop Screening and Assessment

A preliminary identification of the potential wetlands and watercourses within the Project Area, including their approximate delineation, was carried out through analysis of air photos, satellite imagery and reference GIS layers. While many of the local wetlands experience recurring disturbance from ongoing agricultural activities, most also have relatively clear ecological boundaries and obvious wetland indicators.

The desktop wetland assessment and delineation relied on a combination of FlySask2 photos (May 2014) and available Google Earth imagery, along with the AAFC annual crop inventory and the Saskatchewan Digital Land Cover (SDLC) layers for reference. A conservative approach was taken while carrying out desktop wetland delineations, in which all potential wetlands or marginal habitat were initially mapped as wetlands, such that the number of desktop wetlands were more likely to be overestimated than underestimated, when compared to field observations. This approach was adopted to maximize the likelihood of documenting, delineating, and assessing all actual wetlands within the Project Area.

Desktop screening of watercourses was undertaken using a combination of CanVec and FlySask2 aerial imagery (May 2014).

Following this initial assessment, selected wetlands and watercourses were visited for verification of their identification, classification, and delineation. The following sections

detail the desktop and field methods employed for wetlands and watercourse assessment.

### 5.3.2 Monitoring Methods

Currently, there is no wetland classification system that is specifically designed for use in Saskatchewan. Therefore, the Alberta Wetland Classification System (AWCS; Government of Alberta 2015a) was adopted as a suitable classification system, and was used during the field assessments. The AWCS is in part based on the Steward and Kantrud Wetland Classification System (Stewart and Kantrud 1971), which identifies wetland class based on the zone located in the deepest portion of the wetland (must be at least 5% of wetland area).

Wetland field assessments were completed, in part, through targeted field investigations of a sub-sample of the wetlands that were identified during the desktop assessment, to verify ecological boundaries and to assign a classification. The field wetland assessment was designed to validate 100% of the wetlands that appeared to overlap with the Project Footprint, and to assess a minimum of 10% of the wetlands that occur within 100m of, but that do not overlap, the Project Footprint. Based on some adjustments in Project infrastructure following the completion of field assessments, including infrastructure adjustments to reflect the results of wetland field assessments and ultimately minimize the potential effects on wetlands, a relatively small number of potential wetlands overlapping the CDA could not been field validated.

Wetland field assessments were conducted during the growing season, from September 10-25, 2021. During the field assessments, hydrologic, topographic and vegetation characteristics, such as the presence and distribution of water tolerant vegetation species, were used as the main indicators of wetland conditions and boundaries, as described in the Alberta Wetland Identification and Delineation Directive. If a wetland identified in the desktop assessment was confirmed to be present, the desktop wetland delineation was compared to the observed field boundaries with a handheld GPS unit, and either accepted or adjusted based on the actual delineation. Any revised wetland boundaries were incorporated into the updated wetland inventory. Each feature was assigned a unique identifier and photographed.

The wetlands within the Project Area can be classified as Marshes (M), Swamps (S) and Shallow Open Water (W). As described in the AWCS, wetlands were also classified in terms of their water permanency as Temporary (Class II), Seasonal (Class III), Semi-permanent (Class IV) and Permanent (Class V). Ephemeral waterbodies (Class I) were not included as wetlands.

According to the AWCS, temporary wetlands (Class II) are characterized by having surface water present for a short period of time after snowmelt or a heavy rainfall. Within seasonal wetlands (Class III), surface water is present throughout the majority of

the growing season but is typically dry by the end of summer. Semi-permanent wetlands (Class IV) present surface water for most or all of the year, except in periods of drought, while in Permanent wetlands (Class V), surface water is present throughout the year even during periods of drought.

Depending on the predominant vegetation form present within each feature, the wetlands were also classified as Graminoid (G), Shrubby (S), Wooded deciduous (Wd) and Aquatic vegetation (A). Due to the known difficulty and challenges associated with evaluating water permanency of swamps (Government of Alberta 2015b), wetlands with swamp classifications were only classified in relation to their predominant vegetation form. The classification system used for the wetlands in the Project Area is summarized in Table 16.

**Table 16. Adopted wetland classification system (adapted from AWCS 2015)**

| Wetland Class | Form | Water Permanence Class |
|---|---|---|
| Marsh (M) | Graminoid [G] | Temporary [II] |
| | | Seasonal [III] |
| | | Semi-permanent [IV] |
| Shallow Open Water (W) | Submersed and/or floating aquatic vegetation [A] or bare [B] | Seasonal [III] |
| | | Semi-permanent [IV] |
| | | Permanent [V] |
| Swamp (S) | Wooded, coniferous [Wc]<br>Wooded, mixedwood [Wm]<br>Wooded, deciduous [Wd]<br>Shrubby [S] | Temporary [II] |
| | | Seasonal [III] |

Watercourses were assessed in the field concurrently with the wetland and land use assessments. For each identified watercourse, the features were classified in one of three categories:

- Ephemeral draw; no defined bed or banks with seasonal surface water;
- Intermittent watercourse; defined streambed and/or banks with seasonal surface water; or
- Permanent watercourse; defined streambed and/or banks with permanent surface water.

### 5.3.3 Wetlands

The comprehensive desktop assessment resulted in the identification of over 1,000 potential wetlands within 100m of the CDA, including 152 potential wetlands overlapping the CDA.

Following the field validation methods described above, a subsample of 471 potential wetlands were assessed, delineated, and classified in the field. This sampling effort is

equivalent to a field validation of well over 30% of the potential wetlands that occur within 100m of the CDA.

The resulting field verification confirmed the presence of 379 wetlands and 63 ephemeral waterbodies. The remaining 29 features identified during the desktop assessment were combined and/or complexed with other nearby wetlands (n=19) or were confirmed to be upland habitat (n=10).

Table 17 summarizes the results of the wetland field assessment. Map 5 shows the locations of all wetlands in the Project Area, to the finest classification level available (i.e. desktop classification or field validated).

**Table 17. Summary of the Field Verified Potential Wetlands within the Project Area**

| Wetland Class | Water Permanence Class | Wetland Classification | Number |
|---|---|---|---|
| *Ephemeral Waterbody* | *Class I* | *Non-wetland* | *63* |
| Temporary Marsh | Class II | MGII | 101 |
| Shrubby Swamp | Class II-III | SSII-III | 20 |
| Seasonal Marsh | Class III | MGIII | 161 |
| Seasonal Shallow Open Water | Class III | WAIII | 1 |
| Semi-permanent Marsh | Class IV | MGIV | 69 |
| Semi-permanent Shallow Open Water | Class IV | WAIV | 14 |
| Permanent Shallow Open Water | Class V | WAV | 5 |
| Wooded Deciduous Swamp | n/a | SWd | 4 |
| Wetland Complexes | various | various | 4 |
| **Field Verified Wetlands (excluding Ephemeral Water Bodies)** | | | **379** |

For the features that were not field verified, a conservative approach was taken through a desktop assessment, which included review of multiple air photos. Table 18, below, provides an overview of all wetlands and ephemeral waterbodies, as identified through field delineation and/or desktop assessment, that are currently overlapping the Operational Footprint or the CDA.

**Table 18. Wetlands Overlapping the Operational Footprint and CDA**

| Wetland Class | Operational Footprint | | CDA | |
|---|---|---|---|---|
| | Number of Features | Overlap Area (ha) | Number of Features | Overlap Area (ha) |
| Temporary (Class II) | 5 | 0.07 | 24 | 1.08 |
| Temporary/Seasonal (Class II-III) | 1 | 0.01 | 6 | 0.27 |
| Seasonal (Class III) | 2 | 0.02 | 17 | 0.60 |
| Semi-Permanent (Class IV) | 0 | 0.00 | 7 | 0.38[1] |
| Permanent (Class V) | 0 | 0.00 | 0 | 0.00 |
| **Total** | **8** | **0.10** | **54** | **2.33** |

[1] *Most of this area of overlap reflects features that occur along unopened municipal road allowances that will be used, and therefore provide limited flexibility to avoid.*

### 5.3.4 Watercourses

The detailed desktop assessment of watercourses within the Project Area resulted in the identification of 80 potential watercourses. Field validation of potential watercourses that intersect with the CDA confirmed the presence of nine ephemeral features and two intermittent watercourses. No permanent watercourses were identified as overlapping the Project Footprint, nor were any permanent watercourses anecdotally observed within the general Project Area during any field assessments. All ephemeral features and intermittent watercourses are shown on Map 5.

## 5.4 Birds

The dominance of agricultural land within the LSA provides limited potential habitat for birds, and furthermore, the Project CDA has fully avoided all native grassland and shrubland, which may support breeding for locally sensitive species. The general presence of small, and fragmented, habitats on the landscape have the potential to provide suitable habitat for local and migratory bird species that are using the LSA. This section provides a detailed overview of the bird surveys that were conducted during the pre-construction surveys and of the bird species detected within the Project Area, including an overview of species of conservation concern.

### 5.4.1 Desktop Screening and Assessment

Publicly available information relating to previously confirmed bird records and bird activity was reviewed from provincial and federal databases, publicly maintained databases, and literature sources. In addition, satellite imagery and habitat availability were considered in relation to the potential for congregational activity within the Project area. The following is a non-inclusive list of data sources that were reviewed:

- SKCDC wildlife database (SKCDC 2019)
- COSEWIC status reports (COSEWIC 2010, COSEWIC 2011, COSEWIC 2018).
- Species at Risk Public Registry recovery strategies and action plans

An initial search of the SKCDC database that was conducted for an area of at least 1km surrounding the original Project Area returned four bird species of conservation concern with confirmed historical records from within the Project Area. Two of these species, Barn Swallow (*Hirundo rustica*) and Bobolink (*Dilochonxy orizivorus*), are considered federally Threatened species. The other two confirmed species of conservation concern records, Cooper's Hawk (*Accipiter cooperii*) and Turkey Vulture (*Cathartes aura*), are both considered provincial species of conservation concern.

A refined search of the SKCDC database using the LSA returned fewer results, with only the Barn Swallow and Turkey Vulture being confirmed within this area (Map 4). However, to take a conservative approach in the consideration of species of conservation concern, Table 19 includes the results of the area of 1km around the Project Area.

In addition to confirmed records, 10 species of conservation concern have been identified as being expected to occur within this geographic region of the province (SKCDC 2019), despite no confirmed records in the SKCDC database (Table 19).

**Table 19. Historical and Expected Bird Species of Conservation Concern within 1km of the Project Area**

| Common Name | Scientific Name | S-Rank[1] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| **Historical Species** | | | | |
| Barn Swallow | *Hirundo rustica* | S4B,S4M | Threatened | Threatened |
| Bobolink | *Dilochonxy orizivorus* | S4B,S4M | Threatened | Threatened |
| Cooper's Hawk | *Accipiter cooperii* | S4B,S2N, S2M | Not at risk | - |
| Turkey Vulture | *Cathartes aura* | S3B,S3M | - | - |
| **Expected Species** | | | | |
| Baird's Sparrow | *Centronyx bairdii* | S4B | Special Concern | Special Concern |
| Bank Swallow | *Riparia riparia* | S4B,S5M | Threatened | Threatened |
| Burrowing Owl | *Athene cunicularia* | S2B,S2M | Endangered | Endangered |
| Common Nighthawk | *Chordeiles minor* | S4B,S4M | Special Concern | Threatened |
| Horned Grebe | *Podiceps auritus* | S5B,S5M | Special Concern | Special Concern |
| Loggerhead Shrike | *Lanius ludovicianus excubitorides* | S2B,S2M | Threatened | Threatened |
| Prairie Falcon | *Falco mexicanus* | S3B,S3N,S3M | Not at Risk | - |
| Red Knot | *Calidris canutus rufa* | S2M | Endangered | Endangered |
| Short-eared Owl | *Asio flammeus* | S3B,S2N,S3M | Special Concern | Special Concern |
| Sprague's Pipit | *Anthus spragueii* | S3B,S3M | Threatened | Threatened |

[1] SKCDC 2021

No SAR critical habitat has been identified within the Project Area.

### 5.4.2 Monitoring Methods

In order to characterize the existing conditions relating to bird activity, including breeding, migration, nesting, and other general use of the Project Area, land use mapping was completed to identify potentially important habitat features and any areas of preferred breeding habitat. Comprehensive three-season avian use studies were then completed throughout the general Project Area, with particular emphasis on the Project Footprint and native habitats that have the potential to overlap, or occur in close proximity to, the proposed activities. Where applicable, all studies followed provincial guidelines established, or otherwise relied upon, by the Government of Saskatchewan. Detailed monitoring methods have been outlined below.

#### 5.4.2.1 Bird Migration

Bird migration surveys were conducted within the Project area to document relative habitat use, species diversity, and general abundance of migratory birds that are using the general Project area as a migratory pathway and/or as a stopover habitat during migration. Since no specific provincial protocol exists for migratory bird surveys in Saskatchewan, surveys were designed to follow the protocol described in the *Wildlife Directive for Alberta Wind Energy Projects* (AEP 2018) and Alberta's *Bird Migration Survey Protocol* (AEP 2020).

NRSI completed spring and fall migratory bird surveys at 24 monitoring stations, which included 10 point count stations and 14 stopover stations (See Map 6). Point count surveys were designed to assess potential migratory movement within the Project area, and therefore were focused on time periods that are likely to be most active for migratory movements. Point count stations were surveyed for 20 minutes during each of the dawn (sunrise to 4hrs after sunrise) and dusk (4hrs prior to sunset) periods on each of three survey windows (i.e. early, mid, late), totaling three dawn and three dusk surveys per station during each of the spring and fall migration periods. Seasonal bird migration survey windows have been generally defined as:

- Spring Bird Migration
    - Early; March 1 to April 15
    - Mid; April 1 to April 30
    - Late; April 15 to May 15
- Fall Bird Migration
    - Early; August 15 to September 30
    - Mid; September 15 to October 30
    - Late; October 15 to November 30

Point count surveys were conducted using a fixed distance radius of 1km. Any birds, or flocks, observed beyond 1km were still recorded as incidental observations, but were not included in the formal calculations of bird activity rates.

Stopover count surveys were designed to assess other habitats within the general Project area that might support migratory activity, such as important stopover or foraging areas within the Project area. Stopover count stations were surveyed for five minutes once during each of the early, mid, and late migration periods during both the spring and fall migration periods, totaling three surveys at each station during each of the spring and fall migration periods.

Survey locations were selected in consideration of numerous variables, including, but not limited to, geographic distribution and presence of notable landforms or habitats that may influence migratory activity. Specifically, several monitoring locations were selected based on their proximity to wetlands, or other open water, to observe activity at the best staging habitat for waterfowl and waterbirds, relative to the habitats found within the

general vicinity of the Project. In addition, monitoring locations were selected to also reflect a variety of representative habitats that might provide suitable stopover habitat (e.g. treed or shrubland) and within agricultural habitats (e.g. cultivation, hay fields, pasture) which is the dominant land use within the Project area. Station location and habitat descriptions have been provided in Table 20 below.

**Table 20. Spring and Fall Migration Bird Survey Locations and Habitat Descriptions**

| Station ID | UTM Coordinates (13U) | | Habitat Description |
|---|---|---|---|
| | Easting | Northing | |
| **Point Count Stations** | | | |
| BMM-01 | 670680 | 5546589 | Cultivated upland, large temporary wetland |
| BMM-02 | 675210 | 5547983 | Wooded wetland, cultivated upland |
| BMM-03 | 675307 | 5544692 | Cultivated upland, wooded wetland |
| BMM-04 | 680152 | 5546166 | Cultivated upland, hay field/non-native grassland, temporary wetland |
| BMM-05 | 680265 | 5542824 | Large permanent wetland |
| BMM-06 | 673750 | 5541955 | Cultivated upland, temporary wetland |
| BMM-07 | 677215 | 5539664 | Non-cultivated upland, two ephemeral wetlands |
| BMM-08 | 675505 | 5538737 | Pasture, cultivated upland |
| BMM-09 | 672240 | 5538920 | Non-cultivated upland, large ephemeral wetland, small temporary wetland |
| BMM-10 | 669141 | 5536796 | Large ephemeral wetland |
| **Stopover Count Stations** | | | |
| BMM-11 | 670590 | 5538638 | Cultivated upland, small temporary wetlands |
| BMM-12 | 672531 | 5536930 | Wooded land, large permanent wetland |
| BMM-13 | 674387 | 5537100 | Large temporary wetland |
| BMM-14 | 677179 | 5537811 | Cultivated upland, patches of wooded land, ephemeral wetlands |
| BMM-15 | 673774 | 5540198 | Cultivated and non-cultivated upland, temporary wetland |
| BMM-16 | 678683 | 5541565 | Large permanent wetland, small ephemeral wetland, cultivated upland |
| BMM-17 | 682366 | 5543746 | Cultivated upland, non-cultivated upland, temporary and ephemeral wetlands |
| BMM-18 | 683586 | 5547008 | Cultivated upland, large permanent and ephemeral wetlands |
| BMM-19 | 668693 | 5547509 | Cultivated upland |
| BMM-20 | 673600 | 5546713 | Cultivated upland, temporary wetland |
| BMM-21 | 683575 | 5541442 | Non-cultivated upland, large ephemeral wetland |
| BMM-22 | 671269 | 5543345 | Cultivated upland |
| BMM-23 | 670694 | 5535472 | Non-cultivated upland, three large ephemeral wetlands |
| BMM-24 | 670691 | 5535575 | Non-cultivated and cultivated upland, large and small ephemeral wetlands |

During all point count and stopover count surveys, all applicable field data was recorded, including species, number of birds (i.e. flock size), direction of flight, direction from observer, and approximate distance from observer.

In an effort to document periods of high activity, surveys were conducted within suitable weather conditions, to the extent possible, including during periods of high visibility, light to no precipitation, and relatively low wind speeds (AEP 2020). Despite these preferred conditions, areas that are good wind resources often have consistently windy conditions. As such, field work was conducted in conditions that were determined to reflect low wind speeds relative to typical conditions for the Project area.

#### 5.4.2.2 Sharp-tailed Grouse

In consideration of the Project location, which occurs within the general range of Sharp-tailed Grouse (*Tympanuchus phasianellus*), and with suitable habitat present within the surrounding landscape, targeted surveys were conducted to identify the presence of any potential lek sites within the Project area. Surveys were conducted in accordance with the *Species Detection Survey Protocol* for Sharp-tailed Grouse (MOE 2020c) during suitable weather conditions such as relatively low winds and no precipitation.

Area searches were first carried out throughout the Project area to identify areas of suitable habitat to conduct targeted surveys. Suitable habitat for Sharp-tailed Grouse was considered to include open, non-cultivated, areas such as ungrazed and lightly grazed pastures, native or tame grasslands, and open shrublands (MOE 2020c). Within, or adjacent to, any identified suitable habitat, point count surveys were conducted during two survey periods corresponding to the anticipated lekking period of Sharp-tailed Grouse from mid-March through May. Based on site-specific habitat conditions, 16 point count locations were established within the Project area (See Map 7). Each survey was conducted for 15 minutes during the early morning (i.e. 30 minutes before sunrise to 2 hours after sunrise). During each survey, biologists recorded the number of male and female Sharp-tailed Grouse observed, any evidence of lekking behavior, lek location, distance from the observer, and any additional habitat characteristics within 500m of the lek. Although these surveys were focused on identifying potential Sharp-tailed Grouse lekking locations, all other wildlife observations were also noted.

#### 5.4.2.3 Grassland Breeding Birds

Grassland breeding bird surveys were conducted to assess the relative abundance of locally breeding species using habitats present within the Project Area. Although the focus of these surveys is to identify species that rely on grassland habitats, as they may be more susceptible to habitat loss and/or disturbance from proposed activities, monitoring stations were selected to provide coverage of all available habitat types. Grassland breeding bird surveys were conducted in accordance with the *Grassland Bird Survey Protocols* (MOE 2014) and the *Plant and Wildlife Pre-construction Surveys for Renewable Energy Projects* (MOE 2018b).

Following applicable protocols, two rounds of breeding bird surveys were conducted at 17 stations (Map 7). Monitoring visits occurred at least 10 days to ensure a

representative sampling of both the early and late breeding periods. The 17 stations were chosen based on several criteria, including, but not limited to, geographic distribution, representation of dominant land use, and coverage of any native and/or unique habitat types within the Project area. Station location and habitat descriptions have been provided in Table 21 below.

**Table 21. Grassland Breeding Bird Survey Locations and Habitat Descriptions**

| Station ID | UTM Coordinates (13U) | | Habitat Description |
|---|---|---|---|
| | Easting | Northing | |
| GBB-01 | 670221 | 5546948 | Cultivated upland, temporary wetland |
| GBB-02 | 680952 | 5547079 | Potential native prairie, wooded temporary wetland |
| GBB-03 | 681523 | 5543716 | Cultivated upland, wooded land, ephemeral wetland |
| GBB-04 | 677057 | 5544253 | Large permanent wetland |
| GBB-05 | 675635 | 5543596 | Cultivated upland, forested temporary wetland |
| GBB-06 | 673644 | 5541355 | Pasture, small ephemeral wetlands |
| GBB-07 | 677139 | 5540525 | Temporary and permanent wetland, potential native prairie |
| GBB-08 | 677225 | 5538959 | Wooded land, permanent and unclassified wetlands, hay field |
| GBB-09 | 675537 | 5537691 | Permanent, wooded wetland |
| GBB-10 | 675123 | 5537024 | Large temporary wetland, pasture |
| GBB-11 | 673584 | 5537099 | Hay field |
| GBB-12 | 672707 | 5536770 | Wooded land, temporary wetland, pasture |
| GBB-13 | 672280 | 5537599 | Hay field |
| GBB-14 | 671772 | 5536912 | Cultivated upland, wooded land, permanent and temporary wetlands |
| GBB-15 | 670948 | 5536967 | Hay field, wooded, temporary wetland |
| GBB-16 | 668786 | 5537267 | Wooded land, potential native prairie, hay field, temporary wetland |
| GBB-17 | 668970 | 5538904 | Large, temporary wetland, pasture |

Surveys were carried out during dawn (i.e. sunrise to 4hrs after sunrise), and each survey began with a brief period of silence, followed by a five-minute point count survey. During each survey, the abundance and diversity of all bird observations were recorded by scanning the area and documenting any visual and auditory indications of bird activity, with emphasis on the documentation of behavior that suggests breeding activity (e.g. singing, territorial behavior, collection of nest materials, etc.). All observations were recorded based on the general distance from the observer. Distance categories of 0-50m, 50-100m, and greater than 100m were used.

To the extent possible, surveys were not conducted when temperatures were below 7°C, when there was light or heavy precipitation, or when there were moderate to high winds (MOE 2014). Despite these preferred conditions, areas that are good wind resources often have consistently windy conditions. As such, field work was designed to occur in conditions that reflected low wind speeds relative to typical conditions for the Project area.

#### 5.4.2.4 Burrowing Owl

Call playback surveys were conducted to document the presence of Burrowing Owls (*Athene cunicularia*) including the targeted detection of any potential active burrows within the Project area. Surveys were carried out in accordance with the *Species Detection Survey Protocol for* Burrowing Owls (MOE 2020b).

Three rounds of call playback surveys were conducted from late May to mid-June at eight stations conducted in the morning or evening (i.e. sunrise to 1000hrs or 1800hrs to sunset). Stations were located at least 800m apart to minimize the potential of survey overlap, and were conducted within, or adjacent to, suitable habitat (See Map 7). Suitable habitat for Burrowing Owl was considered to be all areas of native or tame grassland or lightly used pasture (MOE 2020b). Each survey began with a brief period of silence, followed by a three-minute recording of primary Burrowing Owl vocalizations played at 80dB from a speaker, and ended with an additional one-minute silent auditory survey of the area. During each survey, biologists scanned the area for the presence of Burrowing Owls and other species, for a total duration of seven minutes. For any detections that were made, relevant information was documented, including species, direction from observer, and approximate distance from observer, in order to identify any potential burrow sites for further investigation. Playback surveys were conducted under suitable conditions such as winds below 20 km/h and no precipitation, to the extent possible. Areas that are good wind resources often have consistently windy conditions. As such, field work was designed to occur in conditions that reflected low wind speeds relative to typical conditions for the Project Area.

#### 5.4.2.5 Short-eared Owl

Targeted surveys for Short-eared Owl (*Asio flammeus*) were conducted to identify any potential areas of species use within the Project area, including to identify any potential nest sites and estimate the number of individuals, if any. Surveys were conducted in accordance with the *Species Detection Survey Protocol* for Short-eared Owl (MOE 2020d).

Three rounds of point count surveys were carried out from mid-May to mid-June at eight stations that provided representative coverage of suitable habitat such as native prairie and tame pasture (See Map 7). Each survey consisted of a three-minute point count conducted in the evening (i.e. one hour before sunset to 30 minutes after sunset). A formal survey radius of 400m was used during the surveys; however, all records from beyond the 400m radius were still recorded as incidental observations to ensure comprehensive characterization of avian use. Point count surveys were carried out under suitable weather conditions such as winds below 20 km/h and no precipitation, to the extent possible. Areas that are good wind resources often have consistently windy conditions. As such, field work was designed to occur in conditions that reflected low wind speeds relative to typical conditions for the Project Area.

#### 5.4.2.6 Common Nighthawk

Call playback surveys were conducted to identify the potential presence of Common Nighthawk (*Chordeiles minor*) within the Project area following the *Species Detection Survey Protocol* for Common Nighthawk (MOE 2020e).

Call playback surveys were conducted at eight stations that were located within, or adjacent to, suitable habitat, which was considered to include areas of pasture, prairie/grassland, and open forest. (See Map 7), with each station surveyed on two nights during the peak vocalization period, from late May to late June. Each survey lasted a total of six minutes and alternated between 30 seconds of vocalization playback and 30 seconds of quiet listening, and were conducted in the evening (i.e. one hour before sunset to 30 minutes after sunset). Surveys were conducted in suitable conditions, including no precipitation, relatively low winds, and temperatures above 7°C. Observers documented all Common Nighthawks detections, as well as the approximate distance from the observer. Although Common Nighthawk was the target species, all wildlife detected by the observer was documented as incidental records.

#### 5.4.2.7 Prairie Raptors

Area searches were conducted in late May, during daylight hours, to document the presence of raptor nests or raptor activity that might suggest the presence of nearby nesting. These area searches were conducted within 1km of the Project Footprint by undertaking driving transects and stopping frequently to scan the area for suitable trees and potential nesting locations. In addition to formally conducted raptor nest searches, biologists recorded any potential raptor nest sites during all other surveys, which allowed for frequent and comprehensive assessments of the Project area during different times of year and from different vantage points.

For all potential nest sites that were identified, the raptor species and the number of adults and young were recorded, if visible, and nest status was assessed based on the behavior observations (e.g. area swooping, calling, displaying, nest occupancy, aggression, etc.) or other visible indications of nest use (e.g. white wash, eggshell pieces, down feathers, young, prey items, etc.).

Surveys were conducted in relatively low wind conditions and during periods of no precipitation. Further, additional care was taken to minimize the potential for disturbance to any active raptor nests by keeping an appropriate distance while making observations.

### 5.4.3 Bird Migration Results

Bird migration surveys were conducted to assess the early, mid, and late migration periods in each of the spring and fall. Accordingly, spring surveys were conducted on

April 6-7, April 23-24, and May 4-5, 2021 and fall surveys were conducted on September 3-5, September 21-23, and October 17-19, 2021.

During the spring monitoring, 12,200 individual birds, representing 62 different species, were detected, which resulted in an overall observation rate of 8.8 birds/minute. In comparison, fall monitoring resulted in the detection of 8,821 individual birds, representing 70 species, which resulted in an overall observation rate of 6.2 birds/minute.

Total bird abundance, richness, and observation rates (birds/minute), separated by station and season, is provided in Table 22 below.

**Table 22. Abundance and Richness of Migratory Birds by Point Count and Stopover Count Station**

| Station ID | Spring 2021 | | | Fall 2021 | | |
|---|---|---|---|---|---|---|
| | Abundance (# Flocks) | Birds per Minute | Richness | Abundance (# Flocks) | Birds per Minute | Richness |
| **Point Count Stations** | | | | | | |
| BMM-01 | 980(33) | 8.2 | 16 | 601(16) | 5 | 15 |
| BMM-02 | 1,873(45) | 15.6 | 20 | 588(22) | 4.9 | 25 |
| BMM-03 | 761(27) | 7.6 | 17 | 1,636(19) | 13.6 | 16 |
| BMM-04 | 374(20) | 3.1 | 13 | 687(17) | 5.7 | 17 |
| BMM-05 | 658(36) | 5.5 | 24 | 1,790(21) | 14.9 | 16 |
| BMM-06 | 608(21) | 5.1 | 20 | 206(20) | 1.7 | 19 |
| BMM-07 | 1,044(39) | 8.7 | 22 | 1,687(23) | 14.1 | 18 |
| BMM-08 | 1,053(20) | 8.8 | 18 | 169(22) | 1.2 | 23 |
| BMM-09 | 477(26) | 4 | 22 | 346(25) | 2.9 | 21 |
| BMM-10 | 50(17) | 0.42 | 14 | 338(15) | 2.8 | 23 |
| **Point Count Total** | **7,878(284)** | **6.7** | **54** | **8,048(200)** | **6.6** | **59** |
| **Stopover Count Stations** | | | | | | |
| BMM-11 | 702(18) | 46.8 | 12 | 22(7) | 1.5 | 8 |
| BMM-12 | 20(5) | 1.3 | 8 | 36(9) | 2.4 | 13 |
| BMM-13 | 331(10) | 22.1 | 12 | 74(13) | 4.9 | 16 |
| BMM-14 | 287(9) | 19.1 | 12 | 46(7) | 3.1 | 9 |
| BMM-15 | 252(9) | 16.8 | 12 | 97(5) | 6.5 | 10 |
| BMM-16 | 340(7) | 22.7 | 8 | 17(5) | 1.1 | 7 |
| BMM-17 | 619(7) | 41.3 | 6 | 12(3) | 0.8 | 4 |
| BMM-18 | 225(22) | 15 | 15 | 7(0) | 0.5 | 6 |
| BMM-19 | 320(10) | 21.3 | 10 | 10(3) | 0.7 | 4 |
| BMM-20 | 36(5) | 2.4 | 6 | 51(6) | 3.4 | 8 |
| BMM-21 | 31(5) | 2.1 | 9 | 87(3) | 5.8 | 6 |
| BMM-22 | 951(11) | 63.4 | 6 | 28(3) | 1.9 | 7 |
| BMM-23 | 183(8) | 12.2 | 10 | 58(11) | 3.9 | 15 |
| BMM-24 | 25(6) | 1.7 | 6 | 228(5) | 15.2 | 8 |
| **Stopover Count Total** | **4,322(132)** | **20.6** | **49** | **773(80)** | **3.7** | **50** |
| **Overall Total** | **12,200 (416)** | **8.8** | **62** | **8,821(280)** | **6.2** | **70** |

During the spring monitoring, approximately 65% of the total observations were recorded during the point count surveys. Similarly, approximately 91% of the fall observations were recorded during the point count surveys. Despite the greater abundance at point count stations in the spring, considerably higher observation rates (birds/minute) were documented during the stopover count stations. These results are likely a direct result of the difference in survey effort between these survey types, and may also be indicative of stopover count stations being selectively placed in areas with a greater perceived likelihood of bird activity. Despite the same stations being surveyed in the fall migration period, the same pattern of increased detection rates at stopover counts was not observed during the fall monitoring.

During the spring surveys, of all point count stations, BMM-02 had the greatest number of flocks (n=45) and the highest abundance of birds detected (n=1,873). The station is located near several wooded wetlands and is the closest station to a large lake (Bender Lake), which has the potential to provide stopover habitat for waterfowl and passerines. Documented observations included flocks of 1,000 Greater White-fronted Geese (*Anser albifrons*), 561 Snow Geese (*Anser caerulescens),* and 192 Red-winged Blackbirds (*Agelaius phoeniceus*). In contrast, point count station BMM-10, which is located near a large ephemeral wetland, had the lowest total abundance in the spring (n=50) and also the least number of flocks (n=17) of any point count station surveyed during the spring surveys.

During the fall monitoring period, of all point count stations, BMM-05 had the highest abundance of birds detected (n=1,790). Observations included 1,152 Canada Geese (*Branta canadensis*) and 550 Snow Geese. This station is generally surrounded by cultivated fields with small, permanent, wooded wetlands nearby that could be used for staging waterfowl. In contrast, point count station BMM-08 had the lowest total abundance of birds recorded (n=169 ) during the fall monitoring. This station is located within an area surrounded by areas of pasture and tree stands.

Of all the stopover count stations surveyed during the spring, BMM-22 yielded the highest abundance of migratory birds (n=951), which included 775 Snow Geese and 150 Sandhill Cranes (*Antigone canadensis*). This station is surrounded by agricultural fields. Other stopover count stations with relatively high bird activity in the spring were BMM-11 (n=702) and BMM-17 (n=619), both of which are similarly located in a cultivated setting, with small temporary wetlands located nearby.

Among all the stopover stations, station BMM-24 had the highest recorded abundance of birds during fall migration surveys (n=228) including a flock of 200 Greater White-fronted Geese. The station is surrounded by numerous large, ephemeral wetlands. The stopover station with the lowest abundance was BMM-18, with only eight individual birds and zero flocks detected across all three fall stopover surveys.

Table 23 provides the abundance, observation rate, and percent composition of the major avian guilds detected during the migratory surveys. For the purpose of this classification, species have been classified into the following guilds: passerines, birds of prey, grouse and allies, waterfowl (including obligate waterbirds), waterbirds (including shorebirds), and other, which includes crows, jays, magpies, pigeons, doves, etc.

**Table 23. Number of Individuals Observed by Guild During Spring and Fall Migratory Surveys**

| Bird Guild | Spring 2021 | | | Fall 2021 | | |
|---|---|---|---|---|---|---|
| | Abundance (# Flocks) | Birds per Minute | % of Total Birds Observed | Abundance (# Flocks) | Birds per Minute | % of Total Birds Observed |
| **Point Count Stations** | | | | | | |
| Passerines | 936(124) | 0.79 | 11.9% | 1,107(120) | 0.91 | 13.8% |
| Birds of Prey | 18(3) | 0.02 | 0.2% | 28(2) | 0.02 | 0.3% |
| Grouse and Allies | 10(3) | 0.008 | 0.1% | 17(3) | 0.01 | 0.2% |
| Waterfowl | 5,900(116) | 5 | 74.9% | 6,683(55) | 5.5 | 83% |
| Waterbirds | 972(32) | 0.8 | 12.3% | 127(4) | 0.1 | 1.6% |
| Other | 42(6) | 0.04 | 0.5% | 86(16) | 0.07 | 1.1% |
| **Point Count Total** | **7,878(284)** | **6.7** | **100%** | **8,048(200)** | **6.6** | **100%** |
| **Stopover Count Stations** | | | | | | |
| Passerines | 469(51) | 2.2 | 10.9% | 220(39) | 1 | 28.5% |
| Birds of Prey | 6(0) | 0.03 | 0.1% | 21(2) | 0.1 | 2.7% |
| Grouse and Allies | 21(2) | 0.1 | 0.5% | 35(2) | 0.17 | 4.5% |
| Waterfowl | 3,421(66) | 16.3 | 79.2% | 356(20) | 1.7 | 46.1% |
| Waterbirds | 384(8) | 1.8 | 8.9% | 45(6) | 0.2 | 5.8% |
| Other | 21(5) | 0.1 | 0.5% | 96(11) | 0.5 | 12.4% |
| **Stopover Count Total** | **4,322(132)** | **20.6** | **100%** | **773(80)** | **3.7** | **100%** |

The most commonly observed bird guild was waterfowl, which was consistent across seasons and survey type, and consistently accounted for between 46.1% and 83% of species composition. These observations were largely driven by large flocks of Snow Geese and Greater White-fronted Geese during the spring migration surveys, and by large flocks of Canada Geese and Snow Geese observed during fall migration. Waterfowl were detected at a higher observation rate than other bird guilds during both the spring and fall surveys. In addition to being attributed to their relative abundance at the Project area, the high detection rates may also be influenced by their large size (relative to smaller passerine species) and their regular use of open cultivated fields as stopover habitats during migration, both of which may result in the individuals being more easily observed by surveyors, thus resulting in higher detection rates than other

bird guilds, particularly those of smaller size and/or those that are less conspicuous in the stopover and staging habitat.

In the spring, passerines and waterbirds had comparable abundances of 936 and 972 individuals, respectively at point count stations, whereas, in the fall, there were notably more passerines (n=1,107) than waterbirds (n=127) observed. Red-winged Blackbirds accounted for the majority of passerines surveyed with a total of 1,023 individuals (117 flocks) across both point count and stopover surveys, including observations at 23 of the 24 stations surveyed in the spring. The most commonly observed passerine species during the fall migration surveys was American Goldfinch (*Spinus tristis*) with 272 individuals (18 flocks) observed, and which were detected at eight separate monitoring stations.

In contrast, grouse and allies and birds of prey were all documented at low detection rates for each of the point count and stopover surveys, and during both the spring and fall.

The most abundant species throughout spring migratory surveys was the Snow Goose, with 5,350 individuals (30 flocks) observed, and which was detected at 16 different stations. Greater White-fronted Goose was also abundantly observed during spring surveys, with 2,968 individuals documented. Canada Goose, with an abundance of 3,937 individuals (38 flocks) observed was the most abundant species during fall migratory bird surveys. Snow Goose was the second most abundant species during fall surveys, accounting for 1,845 individuals (9 flocks). Table 24 lists the five most abundant bird species that were observed during each of the spring and fall migration surveys, as combined across the point count and stopover surveys.

**Table 24. Most Abundant Bird Species Observed during Spring and Fall Migration Surveys**

| Spring 2021 | | | Fall 2021 | | |
|---|---|---|---|---|---|
| **Species** | **Total Abundance** | **% of Total** | **Species** | **Total Abundance** | **% of Total** |
| Snow Goose | 5,350 | 43.8% | Canada Goose | 3,937 | 44.6% |
| Greater White-fronted Goose | 2,968 | 24.3% | Snow Goose | 1,845 | 20.9% |
| Sandhill Crane | 1,193 | 9.8% | Greater White-fronted Goose | 1,100 | 12.5% |
| Red-winged Blackbird | 1,023 | 8.4% | American Goldfinch | 272 | 3.1% |
| Canada Goose | 512 | 4.2% | Sandhill Crane | 123 | 1.4% |

The presence, or potential presence, of species protected under provincial or federal legislation as “species of conservation concern”. This includes species that are listed as Endangered, Threatened, or Special Concern under *Schedule 1* of SARA or under COSEWIC, species listed as Endangered, Threatened, or Vulnerable under the *Wildlife Act* (Government of Saskatchewan 1998), species with breeding populations ranked S3 or lower by The Saskatchewan Conservation Data Centre (SKCDC 2021c), or species

protected by the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* (Government of Saskatchewan 2017).

During migration surveys, all detected species in the Project Area had secure, or apparently secure, breeding populations, in Saskatchewan (i.e. breeding S-ranks of SB4 or higher). One species, Barn Swallow, is listed on *Schedule 1* of SARA and was observed in small numbers at stations BMM-06 and BMM-23, during the fall migration surveys. Two flocks, totaling 12 individuals, of Lesser Yellowlegs (*Tringa flavipes*), a species federally listed as Threatened by COSEWIC, were detected during spring monitoring at station BMM-09, foraging at a large ephemeral wetland. Two additional flocks of Lesser Yellowlegs were observed foraging at station BMM-13 during the fall migration surveys. Two Olive-sided Flycatchers (*Contopus cooperi*), a species federally listed as Threatened on *Schedule 1* of SARA, were observed at station BMM-02. Species with defined activity restrictions were documented during surveys, including Double-crested Cormorant (*Phalacrocorax auritus*) during spring surveys, Sharp-tailed Grouse during spring and fall surveys, Olive-sided Flycatcher in the fall, Bald Eagle (*Haliaeetus leucocephalus*) in the fall, and Great Blue Heron (*Ardea herodias*) during fall monitoring. These species of conservation concern are listed in Table 25 below, and are addressed in more detail in Section 5.8.1.

All species observed during spring and fall migration monitoring have provincial S-ranks that indicate they are secure/common (S5) or apparently secure (S4) within the province. Species that meet the criteria for being a species of conservation concern, as defined in Section 5.8, are listed in Table 25 below, but are addressed in detail in Section 5.8.

**Table 25. Species of Conservation Concern Observed during Bird Migration Surveys**

| Common Name | S-Rank[1] | Activity Restrictions[2] | COSEWIC Status | SARA Schedule 1 | Abundance | |
|---|---|---|---|---|---|---|
| | | | | | Spring | Fall |
| Bald Eagle | S5B, S5N, S4M | Yes | Not at Risk | - | - | 2 |
| Barn Swallow | S4B, S4M | - | Special Concern | Threatened | - | 11 |
| Double-crested Cormorant | S5B, S5M | Yes | - | - | 8 | - |
| Great Blue Heron | S5B, S5M | Yes | - | - | - | 1 |
| Lesser Yellowlegs | S4B, S4M | - | Threatened | - | 12 | 12 |
| Olive-sided Flycatcher | S4B, S4M | Yes | Special Concern | Threatened | - | 2 |
| Sharp-tailed Grouse | S5 | Yes | - | - | 27 | 1 |

[1] SKCDC 2021
[2] MOE 2017

Detailed results of bird migration monitoring are provided in Appendix VIII.

### 5.4.4 Sharp-tailed Grouse Results

Targeted surveys for Sharp-tailed Grouse were carried undertaken from May 1-2 and again from May 8-9, 2021. During these surveys, at least 27 Sharp-tailed Grouse were identified, with observations occurring at five of the 16 (n=31%) monitoring stations established within the Project area. Most of the observations of Sharp-tailed Grouse were single individuals with no evidence of lekking behaviour; however, a suspected active lek of an estimated 22 Sharp-tailed Grouse were observed at station STG-16 on May 8, 2021, as seen in Table 26. At least 18 males were confirmed during this observation, with several additional individuals heard.

**Table 26. Sharp-tailed Grouse Monitoring Stations with Species Observations at the Project**

| Station | Species observations | Lekking Behaviour Observed |
|---|---|---|
| STG-01 | May 2, 2021: 0<br>May 8, 2021: 1 individual | No |
| STG-02 | May 2, 2021: 0<br>May 8, 2021: 1 individual | No |
| STG-03 | May 2, 2021: 0<br>May 8, 2021: 0 | No |
| STG-04 | May 1, 2021: 0<br>May 8, 2021: 1 individual | No |
| STG-05 | May 1, 2021: 0<br>May 9, 2021: 0 | No |
| STG-06 | May 1, 2021: 0<br>May 9, 2021: 0 | No |
| STG-07 | May 1, 2021: 0<br>May 8, 2021: 0 | No |
| STG-08 | May 1, 2021: 0<br>May 9, 2021: 0 | No |
| STG-09 | May 1, 2021: 0<br>May 9, 2021: 0 | No |
| STG-10 | May 1, 2021: 1 individual<br>May 9, 2021: 0 | No |
| STG-11 | May 1, 2021: 0<br>May 9, 2021: 0 | No |
| STG-12 | May 1, 2021: 0<br>May 9, 2021: 0 | No |
| STG-13 | May 1, 2021: 0<br>May 8, 2021: 0 | No |
| STG-14 | May 2, 2021: 0<br>May 8, 2021: 0 | No |
| STG-15 | May 2, 2021: 0<br>May 8, 2021: 0 | No |
| STG-16 | May 2, 2021: >1 individual<br>May 8, 2021: 22 individuals | **Yes**<br>The approximate location of the lek has been identified as 13 N 673182 5546385 |

In addition to Sharp-tailed Grouse individuals that were specifically observed during targeted surveys, an additional 14 individuals were recorded as incidental observations, including 12 adults displaying at a lek, in the spring. Moreover, 30 individuals were recorded during migration surveys and five of these adults were recorded displaying at a lek located in proximity to station BMM-20, in the spring.

### 5.4.5 Grassland Breeding Birds Results

Grassland breeding bird surveys were conducted at 17 stations, consisting of an early visit (May 30-31, 2021) and a late visit (June 13 and July 2, 2021) at each station to document the use of available habitat types for bird breeding activity. The summarized survey results, including total bird abundance, richness, and observation rates (birds/minute), as presented by monitoring station is provided in Table 27.

**Table 27. Abundance and Richness of Grassland Breeding Birds by Station**

| Survey Location | Abundance | Birds per Minute | Richness |
|---|---|---|---|
| GBB-01 | 29 | 2.9 | 8 |
| GBB-02 | 40 | 4.0 | 16 |
| GBB-03 | 21 | 2.1 | 11 |
| GBB-04 | 44 | 4.4 | 15 |
| GBB-05 | 22 | 2.2 | 11 |
| GBB-06 | 42 | 4.2 | 13 |
| GBB-07 | 27 | 2.7 | 12 |
| GBB-08 | 37 | 3.7 | 23 |
| GBB-09 | 75 | 7.5 | 24 |
| GBB-10 | 41 | 4.1 | 16 |
| GBB-11 | 19 | 1.9 | 10 |
| GBB-12 | 34 | 3.4 | 15 |
| GBB-13 | 29 | 2.9 | 18 |
| GBB-14 | 37 | 3.7 | 15 |
| GBB-15 | 26 | 2.6 | 12 |
| GBB-16 | 27 | 2.7 | 16 |
| GBB-17 | 45 | 4.5 | 21 |
| **Total** | **595** | **3.5** | **89** |

A total of 595 individual birds were observed across all survey stations, representing 89 confirmed species. Station GBB-09 had the highest recorded abundance of birds (n=75) and also had the highest diversity of species detected for any individual station (n=24). This station is located near a large, permanent wetland and a large treed habitat, which combine to provide a habitat complex that is able to support a wide diversity of waterfowl, passerines, and shorebirds. Stations GBB-17, GBB-04, GBB-06, GBB-10, and GBB-02 had similarly high reported abundances of birds observed ranging from 40 to 45 individuals, at each station. Generally, these stations were situated near temporary or permanent wetlands.

In consideration of all bird species, regardless of habitat preference or breeding evidence, the most commonly observed species during the breeding bird surveys were

Red-winged Blackbird (n=61), Clay-colored Sparrow (*Spizella pallida*; n=41), and Yellow Warbler (n=29). Of these species, only Clay-colored Sparrow represents a species that typically relies upon open upland habitat, such as grasslands, for breeding. Both of the other species typically breed within, or near, wetlands.

In addition to the Clay-colored Sparrow, other commonly observed species that rely on open upland habitat, such as grasslands, for breeding include Vesper Sparrow (*Pooecetes gramineus*; n=18), Savannah Sparrow (*Passerculus sandwichensis*; n=14), and Bobolink (n=14). Although none of these four species were specifically confirmed to be breeding within the Project Area, all were considered to be a probable breeding species based on observations of territorial behaviour.

Only two species were confirmed to be breeding within the Project Area, as demonstrated by evidence observed during the grassland breeding bird species. Spotted Sandpiper (*Actitis macularius*) and Ring-billed Gull (*Larus delawarensis*) were both observed with fledged young. Both of these species would typically rely on shorelines of large open aquatic habitat or wetlands with water permanency and densely vegetated edges.

During the standardized grassland breeding bird surveys, three species of conservation concern were documented in the Project Area, including Great Blue Heron, Bobolink, and Barn Swallow. Species of conservation concern have been included in Table 28, and are briefly discussed below.

**Table 28. Species of Conservation Concern Observed during Grassland Breeding Bird Surveys**

| Common Name | S-Rank[1] | Activity Restrictions[2] | COSEWIC Status | SARA Schedule 1 | Abundance and Highest Breeding Evidence |
|---|---|---|---|---|---|
| Barn Swallow | S4B, S4M | - | Special Concern | Threatened | 12<br>Possible |
| Bobolink | S4B, S4M | - | Threatened | Threatened | 14<br>Probable |
| Great Blue Heron | S5B, S5M | Yes | - | - | 4<br>Possible |

[1] SKCDC 2021
[2] MOE 2017

A single Great Blue Heron was observed at each of stations GBB-17 and GBB-16. These observations were made in suitable nesting habitat, but no evidence of nesting, or nesting colonies, was observed during any of the surveys, therefore, no specific setbacks are warranted (Government of Saskatchewan 2017). The remaining two observations of Great Blue Herons were not observed within suitable habitat.

Fourteen Bobolinks, an open upland habitat species that is federally Threatened (COSEWIC 2010), were observed at station GBB-14, during grassland breeding bird surveys across two survey dates. Due to the observation of probably breeding activity

and the presence of suitable habitat, it's possible the species could be breeding in the Project Area.

Twelve Barn Swallows were documented in suitable nesting habitat during breeding bird surveys. These observations occurred at stations GBB-09 and GBB-10, and on two separate monitoring dates.

Additional discussion of species of conservation concern is included in Section 5.9.1.

### 5.4.6 Burrowing Owl Results

No Burrowing Owls were observed during audio playback surveys conducted at any of the eight monitoring stations during any of the three targeted surveys, which were undertaken on May 31, June 6, and June 13, 2021.

There were no incidental observations of this species documented during any other monitoring completed within the Project area.

### 5.4.7 Short-eared Owl Results

No Short-eared Owls were detected during the targeted point count surveys that were conducted at any of the eight monitoring stations during any of the three targeted surveys, which were undertaken on May 18, May 30, and June 12, 2021.

There were no incidental observations of this species documented during any other monitoring completed within the Project area.

### 5.4.8 Common Nighthawk Results

Targeted surveys for Common Nighthawk were conducted at the eight monitoring stations on two survey dates, May 30 and June 12, 2021. During these surveys, a single Common Nighthawk was observed west of station CONI-08 during call playback surveys on May 30, 2021.

The individual was observed to be aerially foraging above an ephemeral wetland. Based on the timing of this observation in late May, which coincides with the species' breeding period (late May to early August) and migration period (early May to early June) (COSEWIC 2018a), it is possible that this individual could be a locally breeding individual or a late migrant. The proximity of station CONI-08 to open habitats such as hay fields and cropland, as well as wetlands, suggests that suitable nesting habitat for this individual may be present. Moreover, Common Nighthawks have been reported to depend on wetlands to provide flying insect prey during the breeding season and during migration (COSEWIC 2018a). Due to this being the sole observation of a Common Nighthawk in the Project area early on in the breeding season, it is unlikely that this individual is breeding in the Project area and is likely a late migrant.

No incidental observations of this species were documented during any other monitoring completed within the Project area.

As a species of conservation concern, this observation is also addressed in detail in Section 5.8.1.

### 5.4.9 Prairie Raptors Results

Standardized prairie raptor surveys were conducted on May 19, 2021. During these surveys, four confirmed raptor species were observed, including 20 Red-tailed Hawks (*Buteo jamaicensis*), two Turkey Vultures, three Great-horned Owls (*Bubo virginianus*), and six Swainson's Hawks (*Buteo swainsoni*). In addition, five observations were made of raptors that could not be identified to the species level.

During the standardized raptor nest searches, three active nests were documented, including two Red-tailed Hawk nests and one Great-horned Owl nest, which was confirmed to be occupied by at least two owlets. Two additional nests were considered to be likely active nests of Red-tailed Hawk, as determined by behavioural observations. Two additional nests were observed, but were determined to be inactive.

In addition to the standardized searches for raptor nests, field ecologists continued to document any confirmed or potential raptors nests that were documented during other field monitoring surveys. This resulted in several additional observations, particularly in habitats that were not readily visible from the roadside and locations that became more visible during late fall migration surveys after leaf-off. These incidental observations resulted in an additional 26 potential raptor nest observations, including six active Red-tailed Hawk nests, one active Swainson's Hawk nest, one active Great Horned Owl nest, and two active nests of species that could not be identified. The remaining 16 potential raptor nest locations had no associated raptor activity or behaviour that would indicate that the nest was active, or potentially active.

A complete list of the 13 confirmed, or likely, active raptor nests documented within the general Project Area are listed in Table 29 below.

**Table 29. Confirmed or Likely Active Raptor Nest Locations within the Project Area**

| Nest ID | Species | UTM Coordinates (13U) | | Observation Details (location, habitat, success, etc.) |
|---|---|---|---|---|
| | | Easting | Northing | |
| RTHA-01 | Red-tailed Hawk | 673821 | 5540362 | • **Active nest**<br>• Two adults observed |
| RTHA-02 | Red-tailed Hawk | 682037 | 5547085 | • *Likely active nest*<br>• Actual nest not visible due to foliage<br>• Two adults observed |
| RTHA-03 | Red-tailed Hawk | 675336 | 5540060 | • *Likely active nest*<br>• Foliage obstructing view<br>• One adult flying near stick nest |
| GHOW-01 | Great-horned Owl | 675484 | 5549106 | • **Active nest** |

| | | | | |
|---|---|---|---|---|
| | | | | • Two young observed |
| RTHA-04 | Red-tailed Hawk | 677370 | 5540524 | • **Active nest**<br>• Nest partially visible<br>• Two adults observed |
| RTHA-07 | Red-tailed Hawk | 678260 | 5542754 | • **Active nest**<br>• One adult observed |
| UNKN-01 | Unknown species | 678299 | 5546125 | • **Active nest**<br>• One adult observed |
| RTHA-08 | Red-tailed Hawk | 677173 | 5539083 | • **Active nest**<br>• One adult on nest, one adult nearby |
| RTHA-09 | Red-tailed Hawk | 677998 | 5546639 | • **Active nest**<br>• One adult on nest |
| SWHA-01 | Swainson's Hawk | 675321 | 5545930 | • **Active nest**<br>• Two adults alarm calling |
| RTHA-10 | Red-tailed Hawk | 668861 | 5538461 | • **Active nest**<br>• One adult on nest, one adult alarm calling |
| GHOW-02 | Great Horned Owl | 670936 | 5537467 | • **Active nest**<br>• Two young in nest |
| UNKN-02 | Unknown species | 683586 | 5547009 | • **Active nest**<br>• One adult on nest |

All of the raptor species that were observed to be actively breeding, or potentially breeding, within the Project area have secure (S5B) or apparently secure (S4B) breeding populations in Saskatchewan. Similarly, none of the confirmed or potentially active raptor nests observed within the Project Area are included in the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* (Government of Saskatchewan 2017).

## 5.5 Bats

The dominance of agricultural land within the LSA provides limited potential habitat for bats, and furthermore, the Project CDA only overlaps 0.86ha of treed habitat, resulting in a negligible reduction in potentially available habitat, relative to the surrounding LSA. The general presence of small treed habitats on the landscape has the potential to provide suitable habitat for local and migratory bat species within the LSA. This section provides a detailed overview of the bat surveys that were conducted during the pre-construction surveys and of the bat species detected within the Project Area, including an overview of species of conservation concern.

### 5.5.1 Desktop Screening and Assessment

Publicly available information relating to previously confirmed records of bat observations or known habitat, was reviewed from provincial and federal databases, publicly maintained databases, and literature sources. In addition, satellite imagery and habitat availability were considered in relation to the potential for congregational activity within the Project Area. The following is a non-inclusive list of data sources that were reviewed:

- SKCDC wildlife database (SKCDC 2019)
- COSEWIC status reports (COSEWIC 2013)
- Species at Risk Public Registry recovery strategies and action plans

A search of the SKCDC database returned no known records of bat species of conservation concern from within the Project Area.

Although there are no known records of bat species of conservation concern, the COSEWIC Assessment and Status Report relating to the Little Brown Myotis (*Myotis lucifugus*), as well as two other bat SAR, indicates that the Little Brown Myotis has an expected range that overlaps with the Project Area (COSEWIC 2013). As such, it seems likely that this species, considered federally Endangered, has the potential to occur within the Project Area. Table 30 includes the provincial and federal status for the bat species of conservation concern that have the potential to occur within the Project Area.

**Table 30. Bat Species of Conservation Concern within the Project Area**

| Common Name | Scientific Name | S-Rank[1] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| Little Brown Myotis | *Myotis lucifugus* | S4B,S4N | Endangered | Endangered |

[1] SKCDC 2021

No known, or expected, critical habitat for any bat species of conservation concern, including SAR, is present within the Project Area.

### 5.5.2 Monitoring Methods

Bat surveys were conducted in accordance with the Wildlife Directive for Alberta Wind Energy Projects (AEP 2018), as referenced by the Plant and Wildlife Pre-Construction Surveys for Renewable Energy Projects (REPs) (MOE 2018b). Following these guidelines, NRSI carried out acoustic bat monitoring during the periods of spring migration (May 1 to May 31) and summer/fall migration (July 15 to October 15) in 2021.

During the monitoring period, six Wildlife Acoustic Song Meter SM4 Acoustic Recording Units (ARUs) were set up to detect bat activity at five unique locations within the Project Area (See Map 8). One of these locations was at an existing meteorological (MET) tower, and included a paired set-up of ground-based (3m) and elevated (30m) detectors to allow for a direct comparison of bat activity at ground level with what would be expected in the potential turbine rotor area (BAT-01G and BAT-01E), which can allow for a reasonable extrapolation of monitoring data from other ground-level stations to what might be expected at higher altitudes. The remaining four stations were all ground-level stations that were placed in consideration of geographic and habitat representation of the Project Area. The same six ARU placements were used in each of the spring and summer/fall survey periods.

The locations of the ARUs were chosen to reflect the geographic area and dominant habitat types in the project area, including representation of cultivated fields, pasture, and wetlands that account for the majority of landcover within the Project Area. Location information and brief habitat descriptions have been provided in Table 31 below.

**Table 31. Spring and Fall Bat Migration Survey Locations and Habitat Descriptions**

| Station ID | UTM Coordinates (13U) | | Habitat Description |
|---|---|---|---|
| | Easting | Northing | |
| BAT-01E | 672747 | 5538861 | Pasture |
| BAT-01G | 672748 | 5538865 | Pasture |
| BAT-02G | 670528 | 5538209 | Temporary wetland, adjacent to a cultivated field |
| BAT-03G | 673741 | 5541745 | Wetland and upland, adjacent to a cultivated field |
| BAT-04G | 671169 | 5546654 | Cultivated field, some pasture |
| BAT-05G | 680164 | 5546022 | Cultivated field and temporary wetland |

Each ARU were equipped with an omni-directional SMM Acoustic weatherproof microphone that is capable of collecting calls in all directions, regardless of microphone direction. The ARUs were battery powered and equipped with multiple data cards to ensure that all data would be recorded.

The ARUs were programmed to collect data on a nightly basis, from one half-hour after sunset until one half-hour before sunrise, as per Alberta protocols referenced by the Plant and Wildlife Pre-Construction Surveys for Renewable Energy Projects (REPs) (MOE 2018b, ASRD 2002, AESRD 2013, AEP 2018). The ARUs were checked approximately every two weeks, to change SD cards and download data, replace the batteries, and to ensure that the ARUs were all functioning throughout the migratory seasons.

**Table 32. Date ranges recorded for ARUs, including interruptions in data recording**

| Station ID | Start Date (2021) | End Date | Missing Date(s) | Reason for Data Interruption |
|---|---|---|---|---|
| **Spring Season** | | | | |
| BAT-01E | April 28 | May 27 | May 27-31 | Uncertain; loss of battery power suspected |
| BAT-01G | April 28 | June 5 | N/A | N/A |
| BAT-02G | April 28 | June 5 | N/A | N/A |
| BAT-03G | April 28 | June 5 | N/A | N/A |
| BAT-04G | April 28 | June 5 | N/A | N/A |
| BAT-05G | April 28 | June 5 | N/A | N/A |
| **Summer/Fall Season** | | | | |
| BAT-01E | July 14 | October 18 | September 20-27 | Uncertain; loss of battery power suspected |
| BAT-01G | July 14 | October 18 | July 25-26<br>September 27 | Technical malfunction |

| Station ID | Start Date (2021) | End Date | Missing Date(s) | Reason for Data Interruption |
|---|---|---|---|---|
| BAT-02G | July 14 | October 18 | N/A | N/A |
| BAT-03G | July 14 | October 18 | N/A | N/A |
| BAT-04G | July 14 | October 18 | N/A | N/A |
| BAT-05G | July 14 | October 18 | N/A | N/A |

Data was processed with an auto-classification function in SonoBat 4.2.2 (SonoBat 2018), using the regional classifier DK Black Hills, which is the most applicable regional classifier for the geography of the Project Area. Analysis of bat data always relies on some degree of call grouping, which is used for calls that cannot be identified to species-level, due to similarities in call characteristics between several different species or other environmental factors that affect call quality, such as distance from microphone or wind or insect interference. Acoustic data were reported as total number of bat passes and bat passes per detector night at each station for each species/species-group and migratory/resident bat species, as well as a total number of bat passes and bat passes per detector night across the Project Area. Percent species/species-group composition was examined, as well as an analysis of activity at ground-level relative to the elevated detectors.

### 5.5.3 Bat Monitoring Results

Acoustic bat monitoring conducted within the Project Area confirmed the presence of five different bat species, including two year-round resident species, Big Brown Bat (*Eptesicus fuscus*) and Little Brown Myotis, and three migratory species, Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), and Eastern Red Bat (*Lasiurus borealis*). In addition, it is typical that a portion of the total calls cannot be assigned to a particular species, but instead are classified or grouped to the lowest possible level. Specifically, these groupings, and their potential species associations, include:

- High Frequency (Little Brown Myotis, Northern Myotis [*Myotis septentrionalis*], Long-eared Myotis [*Myotis evotis*] or Eastern Red Bat);
- Low Frequency (Big Brown Bat, Silver-haired Bat or Hoary Bat); and
- High/Low Frequency (any bat).

Based on the relative abundance of bat calls that have been identified to the species level, general assumptions can be made about the relative abundance of species within each of the call groupings identified above. For example, a reasonable assumption would be that most High Frequency calls in the spring are of Little Brown Myotis since no other species in the classification group was confirmed during spring monitoring (Table 33). In contrast, in the fall monitoring, Eastern Red Bat was more abundant than Little Brown Myotis, so it's more likely that High Frequency calls in the fall are of Eastern Red Bat. It is also likely that Silver-haired Bat, the most commonly recorded bat species,

comprises the majority of both the Low Frequency and High/Low Frequency call groupings. Species call abundance and composition has been presented in Table 33 below.

**Table 33. Overview of Bat Species Composition During Spring and Fall Acoustic Bat Monitoring**

| Species or Call Group[1] | Spring 2021 | | Fall 2021 | | Full Monitoring Year | |
|---|---|---|---|---|---|---|
| | Total Calls | % of Calls | Total Calls | % of Calls | Total Calls | % of Calls |
| EPFU | 6 | *1.6* | 139 | *1.6* | 145 | *1.6* |
| LABO | - | - | 333 | *3.9* | 333 | *3.7* |
| LACI | 1 | *0.3* | 284 | *3.3* | 285 | *3.2* |
| LANO | 142 | *38.5* | 2,543 | *29.6* | 2,685 | *29.9* |
| MYLU | 8 | *2.2* | 67 | *0.8* | 75 | *0.8* |
| HiF | 13 | *3.5* | 1,192 | *13.9* | 1,205 | *13.4* |
| LoF | 198 | *53.7* | 3,910 | *45.5* | 4,108 | *45.8* |
| HiF/LoF | 1 | *0.3* | 131 | *1.5* | 132 | *1.5* |
| **TOTAL** | 369 | ***100%*** | 8,599 | ***100%*** | 8,968 | ***100%*** |
| *Total Resident[2]* | 27 | *7%* | 206 | *2%* | 233 | *2.6%* |
| *Total Migratory[3]* | 342 | *93%* | 8,393 | *98%* | 8,735 | *97.4%* |

*[1] EPFU (Big Brown Bat), LABO (Eastern Red Bat), LACI (Hoary Bat), LANO (Silver-haired Bat), MYLU (Little Brown Myotis), HiF (Eastern Red Bat, Little Brown Myotis, or Northern Myotis), LoF (Big Brown Bat, Hoary Bat, or Silver-haired Bat), HiF/LoF (any bat)*
*[2] Resident species includes EPFU, MYLU, and a proportion of HiF, LoF, and HiF/LoF that equates to the proportion of confirmed calls of these species relative to others that might constitute each call grouping*
*[3] Migratory species includes LABO, LACI, LANO, and a proportion of the HiF, LoF, and HiF/LoF that equates to the proportion of confirmed calls of these species relative to others that might constitute each call grouping*

The most common bat species, or species group, documented during the spring monitoring period were Low Frequency calls (53.7%), which could include Big Brown Bat, Silver-haired Bat and/or Hoary Bat, and calls that were identified as Silver-haired Bat (38.5%), which is generally consistent with the expected species composition during the spring season. Similarly, in the fall monitoring period, the most common bat species or species group were Low Frequency calls (45.5%), calls identified as Silver-haired Bat (29.6%), and High Frequency calls (13.9%), which could include Little Brown Myotis, Northern Myotis, Long-eared Myotis, and/or Eastern Red Bat.

One species of conservation concern was detected, Little Brown Myotis, which has a provincial S-rank S4B, S4N, and is considered to be federally Endangered. This species was recorded in relatively low passes rates, accounting for 75 calls (0.8 %) that were identified to the species level, and an assumed 13 additional calls when considering call groupings that could include Little Brown Myotis (i.e. HiF and HiF/LoF). As a species of conservation concern, this species is discussed in more detail in Section 5.8.1.

During the spring, 369 bat passes were recorded in a combined 182 detector nights, resulting in a seasonal bat passage rate of 2.03 bat passes/detector night. Of these bat passes, 342 (92.7%) were confirmed, or likely, to be migratory bat passes, resulting in a passage rate of 1.88 migratory bat passes/detector night, and ranging from 0.68 (BAT-04G) to 3.06 (BAT-01G) migratory bat passes/detector night. In contrast, resident bat passes accounted for 7.3% of recorded bat calls, and ranged in passage rage from 0.00 (BAT-01E) to 0.55 (BAT-02G) resident bat passes/detector night.

During the fall, 8,599 bat passes were recorded in 547 detector nights, resulting in a seasonal bat passage rate of 15.72 bat passes/detector night. The majority of these bat passes (n=8,393; 97.6%) were confirmed, or likely, to be migratory bat passes, resulting in a migratory bat passage rate of 15.34 migratory bat passes/detector night, and ranging from 5.42 (BAT-04G) to 26.14 (BAT-02G) migratory bat passes/detector night. In contrast, resident bat passes accounted for 2.4% of recorded bat calls, and ranged in passage rate from 0.19 (BAT-01E) to 0.89 (BAT-02G) resident bat passes/detector night.

A summary of the acoustic bat monitoring passage rates, by monitoring station and season, is provided in Table 34.

**Table 34. Summary of Acoustic Bat Monitoring Results by Station and Season**

| Station ID | Total Bat Passes | Total Bat Passes/ Detector Night | Total Migratory Bat Passes | Total Migratory Bat Passes/ Detector Night | Total Resident Bat Passes | Total Resident Bat Passes/ Detector Night |
|---|---|---|---|---|---|---|
| **Spring Season** | | | | | | |
| BAT-01E | 29 | 1.07 | 29 | 1.07 | 0 | 0.00 |
| BAT-01G | 100 | 3.23 | 95 | 3.06 | 5 | 0.16 |
| BAT-02G | 102 | 3.29 | 85 | 2.74 | 17 | 0.55 |
| BAT-03G | 76 | 2.45 | 73 | 2.35 | 3 | 0.10 |
| BAT-04G | 22 | 0.71 | 21 | 0.68 | 1 | 0.03 |
| BAT-05G | 40 | 1.29 | 39 | 1.26 | 1 | 0.03 |
| **Total** | **369** | **2.03** | **342** | **1.88** | **27** | **0.15** |
| **Fall Season** | | | | | | |
| BAT-01E | 1716 | 20.19 | 1700 | 20.00 | 16 | 0.19 |
| BAT-01G | 1668 | 18.53 | 1647 | 18.30 | 21 | 0.23 |
| BAT-02G | 2514 | 27.03 | 2431 | 26.14 | 83 | 0.89 |
| BAT-03G | 1460 | 15.70 | 1414 | 15.20 | 46 | 0.49 |
| BAT-04G | 520 | 5.59 | 504 | 5.42 | 16 | 0.17 |
| BAT-05G | 721 | 7.75 | 697 | 7.49 | 24 | 0.26 |
| **Total** | **8599** | **15.72** | **8393** | **15.34** | **206** | **0.38** |

In consideration of seasonal activity, spring bat activity was consistently low, with minimal variation between stations, and a notably higher proportion of migratory bat calls, relative to resident bat calls. In comparison, fall bat activity ranged from low to moderate levels, with some variation between station, but still maintaining a notably higher proportion of migratory bat calls relative to resident bat calls. Migratory bat activity was higher overall in the fall (15.34 bat passes/detector night) compared with the spring (1.88 bat passes/detector night), which is consistent with other studies that also detected higher bat activity in the fall compared with the summer (Stantec 2017, Dillon 2021). A spring passage rate of 2.03 total bat passes/detector night appears to be relatively consistent with similar studies (Dillon 2021). The average total bat passage rate in the fall, 15.72 bat passes/detector night, is higher than other similar publicly available studies, but considerably lower than other studies, which documented rates of 77.2 total bat passes/detector night (Wood 2019).

Considering geographic distribution of bat activity, BAT-02G consistently had the highest bat activity, in both the spring and fall and for both the migratory bats and resident bats. BAT-02G was placed near a large vegetated wetland, adjacent to a cultivated field, within a landscape that has a higher proportion of treed habitat. The wetland had water present all year, and the combination of suitable habitat types has likely provided a suitable mix of habitat for bats. In contrast, monitoring stations BAT-04G and BAT-05G had consistently low passage rates, relative to the other ground-based monitoring locations. These stations were both surrounded by cultivated fields or pasture on all sides, without nearby treed areas or vegetated wetlands. These locations were likely less suitable for foraging for bats, compared with the other stations that had higher activity.

In consideration of monitoring stations BAT-01E and BAT-01G, which were paired in the same geographic location but installed at 5m above ground (BAT-01G) and 30m above ground (BAT-01E) using an existing MET tower, the elevated monitoring station had a considerably lower overall passage rate in the spring, relative to the ground-based station. In the fall, the ground and elevated bat activity was relatively comparable between stations, with slightly higher migratory bat activity and slightly lower resident bat activity recorded at the elevated station, relative to the ground station in the same location.

When considering bat acoustic detections, it is important to consider that each detection represents a bat ‘pass’ near the microphone, which may or may not be unique individuals. This is particularly important when considering monitoring locations that are placed in close proximity to suitable foraging habitats or movement corridors (e.g. gaps between tree stands), where higher passages rates may reflect numerous passes by a small number of bats. Although this can sometimes be a good proxy for identifying relatively abundance between stations, a higher passage rate does not always mean a higher local population.

## 5.6 Amphibians

Amphibians require wetlands for breeding and overwintering, with some species using grassland habitats for foraging. The Project Area is dominated by agricultural lands, and many of the wetlands that do exist on the landscape are actively cultivated. However, there are several wetlands present within the general Project Area, including some that have high water permanency and have the potential to support local amphibian breeding and/or overwintering. This section provides a detailed overview of the amphibian surveys that were conducted during the pre-construction surveys and of the amphibian species that were detected within the Project Area, including any species of conservation concern.

### 5.6.1 Desktop Screening and Assessment

Publicly available information relating to previously confirmed records of amphibian observations or known habitat, was reviewed from provincial and federal databases, publicly maintained databases, and literature sources. In addition, satellite imagery and habitat availability were considered in relation to the potential for congregational activity within the Project Area. The following is a non-inclusive list of data sources that were reviewed:

- SKCDC wildlife database (SKCDC 2019)
- COSEWIC status reports (COSEWIC 2009, COSEWIC 2012b)
- Species at Risk Public Registry recovery strategies and action plans

A search of the SKCDC database returned one confirmed historical record of an amphibian species of conservation concern, Western Tiger Salamander Prairie/Boreal population (*Ambystoma mavortium*), from the Project Area. This species is considered a federal species of Special Concern (COSEWIC 2012b) (Table 35).

In addition, one other species of conservation concern has been identified as being expected to occur within this geographic region of the province (SKCDC 2019), despite no confirmed records in the SKCDC database. This species, Northern Leopard Frog (*Lithobates pipiens*), is considered to be a species of Special Concern federally (COSEWIC 2009).

**Table 35. Historical and Expected Amphibian Species of Conservation Concern within the Project Area**

| Common Name | Scientific Name | S-Rank[1] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| **Historical Species** | | | | |
| Western Tiger Salamander | *Ambystoma mavortium* | S4 | Special Concern | Special Concern |
| **Expected Species** | | | | |
| Northern Leopard Frog | *Lithobates pipiens* | S3 | Special Concern | Special Concern |

[1] SKCDC 2021

No critical habitat was identified within the Project Area for any amphibian species of conservation concern.

### 5.6.2 Monitoring Methods

Amphibian habitat assessment and call surveys were conducted within the Project to identify important habitats or landscape features that are being used by local amphibian populations, with a specific emphasis on identifying sensitive amphibian species. Habitat assessments and amphibian survey protocol followed the *Species Detection Survey Protocol* for Amphibian Auditory Surveys (MOE 2020a).

Amphibian habitat characterization began with a detailed desktop assessment of wetlands within the Project area, including a consideration of water permanency, wetland size, and overall suitability to support breeding amphibians.

Based on the detailed habitat assessment of the Project area, amphibian call surveys were carried out at 23 stations that were identified as having suitable habitat for breeding amphibians (Map 8). Specific survey locations and associated habitat type(s) are listed in Table 36 below.

**Table 36. Auditory Amphibian Monitoring Locations and Habitat Descriptions**

| Station ID | UTM Coordinates (13U) | | Habitat Description |
|---|---|---|---|
| | Easting | Northing | |
| ANR-01 | 668686 | 5547031 | Semi-permanent Marsh |
| ANR-02 | 670309 | 5547709 | Permanent Wetland |
| ANR-03 | 675235 | 5548128 | Temporary Wetland, Wooded |
| ANR-04 | 673675 | 5545347 | Temporary Wetland, Wooded |
| ANR-05 | 675364 | 5544058 | Temporary Wetland |
| ANR-06 | 678576 | 5546057 | Temporary Wetland |
| ANR-07 | 680258 | 5544577 | Watercourse |
| ANR-08 | 683980 | 5546599 | Wetland in a cultivated field |
| ANR-09 | 682505 | 5543796 | Ephemeral Wetland |
| ANR-10 | 683626 | 5540882 | Ephemeral Wetland |
| ANR-11 | 678719 | 5541641 | Permanent and Ephemeral Wetlands |
| ANR-12 | 675455 | 5541155 | Permanent and Ephemeral Wetlands |
| ANR-13 | 673717 | 5542862 | Permanent and Temporary Wetlands |
| ANR-14 | 672778 | 5540263 | Temporary Wetland |
| ANR-15 | 675466 | 5539148 | Permanent Wetland, Wooded |
| ANR-16 | 677210 | 5538560 | Wetlands (unclassified) |
| ANR-17 | 676246 | 5537209 | Ephemeral Wetland |
| ANR-18 | 673734 | 5537037 | Temporary Wetland |
| ANR-19 | 672269 | 5537009 | Permanent Wetland, Wooded |
| ANR-20 | 670611 | 5538229 | Permanent and Temporary Wetlands, Wooded |

| | | | |
|---|---|---|---|
| ANR-21 | 670518 | 5536778 | Ephemeral Wetland |
| ANR-22 | 668856 | 5536832 | Permanent Wetland, Wooded |
| ANR-23 | 677055 | 5542743 | Permanent Wetland |

Surveys were conducted during three surveys that spanned the entire calling season for the species expected to be present within the Project area. The specific seasonality of the field assessments was based on expected species, local weather, and site conditions experienced in early spring 2021. Based on these factors, surveys were conducted in early May, late May, and early June, 2021. Following a brief period of silence, each call survey lasted for three minutes, and occurred no earlier than 30 minutes after sunset and ended prior to 0100hrs.

Some deviations to preferred weather conditions occurred during the amphibian monitoring surveys. These included some relatively minor deviations to recommended minimum temperatures for surveying. This decision was made based on a combination of the known importance of covering seasonal breeding windows for different species (MOE 2020a) and incidental detections that were occurring during other concurrent survey types. Similarly, the recommended wind speed parameter of surveying in wind speeds no higher than a Beaufort level 3 (MOE 2020a), could not always be met. Areas that are good wind resources often have consistently windy conditions, and therefore field work was designed to occur in conditions that reflected low wind speeds relative to typical conditions for the Project area.

### 5.6.3 Amphibian Monitoring Results

Amphibian auditory surveys resulted in the detection of amphibians at 17 of the 23 (n=74%) monitoring stations, and confirmed the presence of three amphibian species within the Project area, including Boreal Chorus Frog (*Pseudacris maculate*), Wood Frog (*Lithobates sylvaticus*), and Northern Leopard Frog.

The most commonly detected amphibians were the Boreal Chorus Frog and Wood Frog, both of which are considered common with secure populations within Saskatchewan. Both species are commonly encountered within this region of Saskatchewan and often occur within wetlands in agricultural settings, similar to that of the Project area.

One Northern Leopard Frog, a species of conservation concern, was detected at station ANR-14. Station ANR-14 is located along an existing municipal road in the western half of the Project Area, at a temporary wetland adjacent to cultivated fields, and in close proximity to several other temporary and ephemeral wetlands, as well as a tree stand. As a species of conservation concern, this species is discussed in more detail in Section 5.8.1

**Table 37. Species and Number of Individuals Observed During Amphibian Call Surveys**

| Station ID | First Survey May 8-9, 2021 | Second Survey May 27-28, 2021 | Third Survey June 5-7, 2021 |
|---|---|---|---|
| ANR-01 | Wood Frog (2) | *None detected* | *None detected* |
| ANR-02 | *None detected* | *None detected* | *None detected* |
| ANR-03 | *None detected* | *None detected* | *None detected* |
| ANR-04 | Wood Frog (3)<br>Boreal Chorus Frog (2) | Boreal Chorus Frog (5) | *None detected* |
| ANR-05 | Wood Frog (2)<br>Boreal Chorus Frog (5) | Wood Frog (2)<br>Boreal Chorus Frog (6) | *None detected* |
| ANR-06 | *None detected* | Wood Frog (5)<br>Boreal Chorus Frog (2) | Boreal Chorus Frog (3) |
| ANR-07 | *None detected* | Boreal Chorus Frog (4) | *None detected* |
| ANR-08 | *None detected* | Wood Frog (1)<br>Boreal Chorus Frog (3) | *None detected* |
| ANR-09 | *None detected* | Wood Frog (2)<br>Boreal Chorus Frog (7) | *None detected* |
| ANR-10 | Wood Frog (2) | Wood Frog (2)<br>Boreal Chorus Frog (2) | Boreal Chorus Frog (4) |
| ANR-11 | *None detected* | *None detected* | *None detected* |
| ANR-12 | Wood Frog (2) | Wood Frog (3)<br>Boreal Chorus Frog (3) | Boreal Chorus Frog (4) |
| ANR-13 | Wood Frog (3)<br>Boreal Chorus Frog (3) | Wood Frog (2)<br>Boreal Chorus Frog (8) | Boreal Chorus Frog (2) |
| ANR-14 | Wood Frog (2) | Wood Frog (1)<br>Boreal Chorus Frog (3) | Northern Leopard Frog (1) |
| ANR-15 | Wood Frog (1) | *None detected* | Wood Frog (2) |
| ANR-16 | Wood Frog (3) | Wood Frog (2)<br>Boreal Chorus Frog (2) | *None detected* |
| ANR-17 | Wood Frog (4)<br>Boreal Chorus Frog (1) | Boreal Chorus Frog (6) | Boreal Chorus Frog (4) |
| ANR-18 | *None detected* | Boreal Chorus Frog (2) | *None detected* |
| ANR-19 | *None detected* | *None detected* | *None detected* |
| ANR-20 | Wood Frog (6)<br>Boreal Chorus Frog (2) | *None detected* | *None detected* |
| ANR-21 | *None detected* | *None detected* | *None detected* |
| ANR-22 | *None detected* | *None detected* | *None detected* |
| ANR-23 | Wood Frog (4)<br>Boreal Chorus Frog (3) | Boreal Chorus Frog (3) | Boreal Chorus Frog (6) |

In addition to the results of targeted amphibian surveys, two avian species, Sora (*Porzana carolina*) and Virginia Rail (*Rallus limicola*), were identified at station ANR-16 during the second survey on May 28, 2021. Neither of these species are considered species of conservation concern.

## 5.7 Other Wildlife

The dominance of agricultural land within the LSA provides limited potential habitat for other wildlife groups that aren't specifically discussed above. Furthermore, the Project CDA has fully avoided all native grassland and shrubland, and only overlaps with very small portions of wetland and treed habitat, further minimizing the potential for Project activities to overlap with areas used by other wildlife. This section provides an overview of other wildlife that was identified during comprehensive baseline monitoring within the Project Area, with emphasis on species of conservation concern.

### 5.7.1 Desktop Screening and Assessment

Publicly available information relating to previously confirmed records of other wildlife groups was reviewed from provincial and federal databases, publicly maintained databases, and literature sources. In addition, satellite imagery and habitat availability were considered in relation to the potential for congregational activity within the Project Area. The following is a non-inclusive list of data sources that were reviewed:

- SKCDC wildlife database (SKCDC 2019)
- COSEWIC status reports (COSEWIC 2012a, COSEWIC 2016)
- Species at Risk Public Registry recovery strategies and action plans

A search of the SKCDC database returned one confirmed record of a mammal species of conservation concern, American Badger (*Taxidea taxus taxus*), from the Project Area. This species is considered a species of Special Concern federally (COSEWIC 2012a) (Table 38).

**Table 38. Other Species of Conservation Concern within the Project Area**

| Common Name | Scientific Name | S-Rank[1] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| American Badger | *Taxidea taxus taxus* | S3 | Special Concern | Special Concern |

[1] SKCDC 2021

No other known species of conservation concern were identified (HABISask 2021), and no critical habitat for species of conservation concern is known, or expected, to occur within the Project Area.

### 5.7.2 Incidental Wildlife Results

While conducting the comprehensive surveys targeting a wide variety of wildlife that have the potential to utilize the Project Area, all incidental wildlife observations were recorded to ensure a fulsome consideration of wildlife use of the Project Area. These incidental observations include two species of conservation concern, American Badger (n=1) and Monarch (*Danaus plexippus plexippus*) (n=4), each of which is discussed in more detail in Section 5.8.1.

## 5.8 Species of Conservation Concern

The presence of species of conservation concern is an important consideration relative to proposed activities, since these species often represent species that have low, or declining, populations, are particularly susceptible to certain types of disturbances, and/or are an indicator of sensitive or otherwise important habitat features.

For the purpose of this report, species of conservation concern are briefly summarized as those species meeting at least one of the following criteria:

- Federal Species at Risk (i.e. Endangered, Threatened, or Special Concern);
- Provincial species listed as Endangered, Threatened, or Vulnerable (Government of Saskatchewan 1998);
- Species with a provincial breeding status of S3 or lower (SKCDC 2021c); and/or
- Species listed in the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* (Government of Saskatchewan 2017).

The results of historical observations or expected presence, based on desktop analysis, has been considered under each of the applicable subsections above (e.g. Flora, Birds, etc.). Based on the comprehensive completion of site-specific, three-season, wildlife and vegetation surveys, the consideration of species of conservation concern has been refined to those that have been specifically observed during site-specific assessments. Although other species, particularly mobile species (e.g. migratory birds), may still be present for brief periods of time, the comprehensive surveys are expected to provide a thorough overview of species that are using the Project Area for breeding, nesting, or for other critical life cycle functions.

### 5.8.1 Species of Conservation Concern Results

A comprehensive list of species of conservation concern that have been detected within the general Project Area are presented in Table 39, with species-specific discussions below.

**Table 39. Species of Conservation Concern Observed within the Project Area**

| Common Name | S-Rank[1] | Activity Restrictions[2] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| **Flora** | | | | |
| Small Yellow Lady's Slipper | S3 | Yes | --- | --- |
| **Birds** | | | | |
| Bald Eagle | S5B, S5N, S4M | Yes | Not at Risk | --- |
| Barn Swallow | S4B, S4M | --- | Special Concern | Threatened |
| Black Tern | S5B, S5M | Yes | Not at Risk | --- |
| Bobolink | S4B, S4M | --- | Threatened | Threatened |
| Common Nighthawk | S4B, S4M | Yes | Special Concern | Threatened |

| Common Name | S-Rank[1] | Activity Restrictions[2] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| Double-crested Cormorant | S5B, S5M | Yes | --- | --- |
| Great Blue Heron | S5B, S5M | Yes | --- | --- |
| Lesser Yellowlegs | S4B, S4M | --- | Threatened | --- |
| Olive-sided Flycatcher | S4B, S4M | Yes | Special Concern | Threatened |
| Sharp-tailed Grouse | S5 | Yes | ---<br>- | ---<br>- |
| Turkey Vulture | S3B, S3M | --- | --- | --- |
| **Bats** | | | | |
| Little Brown Myotis | S4B, S4N | --- | Endangered | Endangered |
| **Amphibians** | | | | |
| Northern Leopard Frog | S4 | Yes | Special Concern | Special Concern |
| **Other Wildlife** | | | | |
| American Badger | S3 | --- | Special Concern | Special Concern |
| Monarch | S2B, SNRM | --- | Endangered | Special Concern |

[1] SKCDC 2021
[2] MOE 2017

*Small Yellow Lady's Slipper*

Two localized populations of Small Yellow Lady's Slipper were detected within the general Project Area. This species typically grows in rich, moist, semi-open woods, as well as along the outer, drier, fringes of peatlands and moist to wet meadows.

As a vascular plant species of conservation concern, it is recommended that receive a buffer of 30m from proposed activities (Government of Saskatchewan 2017).

*Bald Eagle*

One Bald Eagle was observed at each of stations BMM-13 and BMM-15 during fall migration surveys. Provincial guidelines recommend a nest setback of 1,000m from a Bald Eagle nest at sensitive times of year (March 15 to July 15; Government of Saskatchewan 2017). Since these observations were made during the expected migration season for this species, and no evidence of breeding was documented, no specific activity restrictions or setbacks are warranted for these observations.

During public consultation (November 2021), anecdotal information was received about Bald Eagle historically nesting in the vicinity of Bender Lake, which is located to the north of the Project. This information has been considered, relative to comprehensive surveys conducted in that general Project Area, and in consideration of targeted searches for raptor nests, and although no evidence of Bald Eagle nesting was observed, it remains possible that Bender Lake supports Bald Eagle nesting activity. Since no specific nest has been confirmed, nor was a specific location provided during public consultation, no specific activity restrictions are warranted.

*Barn Swallow*

Twelve Barn Swallows were documented in suitable nesting habitat during breeding bird surveys. These observations occurred at stations GBB-09 and GBB-10, and were made over two separate monitoring dates. This species is considered Special Concern by COSEWIC, is listed as Threatened on Schedule 1 of SARA, and do not have any specifically defined activity restrictions (Government of Saskatchewan 2017). Provincially, Barn Swallows have secure breeding populations as evidenced by its provincial S-Rank of S4B (i.e. apparently secure). Barn Swallows have also been reported to be increasing in numbers in Saskatchewan in recent years (COSEWIC 2011).

*Black Tern*

Eleven Black Terns (*Chlidonias niger*) were detected as incidental observations on July 2 and July 10, 2021. They were foraging above nearby wetlands, with observed behaviour that suggested there was a nearby colony.

*Bobolink*

Fourteen Bobolinks, an open upland habitat species that is federally Threatened (COSEWIC 2010), were observed during grassland breeding bird surveys. This species nests primarily in pastures, abandoned crop fields, and hay fields, and is a common breeding species in Saskatchewan (S-Rank S4B). All of the observations were made at station GBB-14, and were made over two separate survey dates, resulting in a determination of probable breeding activity due to territorial behavior. The habitat immediately surrounding monitoring station GBB-14 was in cultivation. Although monoculture habitat is not typically preferred for breeding (COSEWIC 2010), it's still possible the species could be breeding within cultivated fields.

*Common Nighthawk*

A single Common Nighthawk was observed west of station CONI-08 during call playback surveys on May 30, 2021. The individual was observed to be aerially foraging above an ephemeral waterbody. Based on the timing of this observation in late May, which overlaps with both of the species' breeding period (late May to early August) and spring migration period (early May to early June) (COSEWIC 2018a), it is possible that this individual could be a locally breeding individual or a late migrant. The proximity of station CONI-08 to open habitats such as hay fields and cropland, as well as wetlands, suggests that suitable nesting habitat for this individual may be present. However, since a single sole observation of a Common Nighthawk was made on the first (of three) surveys, with no subsequent observations later in the breeding period, it seems unlikely that this individual is breeding in the Project Area, and was likely a late spring migrant.

*Double-crested Cormorant*

Eight Double-crested Cormorants, a common/secure species within Saskatchewan, were observed flying near monitoring station BMM-02. This species has a defined activity restriction relating to documented nesting colonies (Government of Saskatchewan 2017). The observations of this species occurred during the spring

migration monitoring, and no specific evidence of a nesting colony was observed or documented. As such, no specific activity restrictions or setbacks are warranted.

*Great Blue Heron*

A single Great Blue Heron was observed at each of stations GBB-17 and GBB-16. These observations were made in suitable nesting habitat, but no evidence of nesting, or nesting colonies, was observed during any of the surveys. Since activity restrictions are based on the presence of nesting colonies (Government of Saskatchewan 2017), no specific setbacks have been applied to these individual observations. Two additional observations of Great Blue Herons were not associated with suitable habitat and similarly warrant no specific setbacks.

*Lesser Yellowlegs*

Twelve Lesser Yellowlegs were observed to use an ephemeral waterbodies for foraging during spring migration surveys, likely during a brief stopover during their migration. An additional twelve Lesser Yellowlegs were detected during fall migration surveys. This species typically uses breeding grounds well north of the Project area, and the small numbers of individuals observed during spring and fall migratory surveys do not suggest that the Project area supports any significant congregations of migratory or staging individuals.

Lesser Yellowlegs, a species considered Threatened federally but not currently listed on Schedule 1 of the *Species at Risk Act*, is a relatively common migrant through this region of Saskatchewan, as indicated by its provincial status of S4M (i.e. apparently secure migrant), and does not warrant any specific setbacks or activity restrictions in Saskatchewan (Government of Saskatchewan 2017).

*Olive-sided Flycatcher*

Two Olive-sided Flycatchers, a species federally listed as Threatened on Schedule 1 of SARA, were observed perched at station BMM-02 during fall migration surveys over two separate visits. This species is a relatively common migrant throughout Saskatchewan with a provincial status of S4M and it was observed in suitable foraging habitat including forest edges in proximity to wetlands (COSEWIC 2018b). Setbacks and activity restrictions are recommended for breeding bird observations (Government of Saskatchewan 2017); however the timing of these observations indicates they were likely late migrants and as they were detected well outside the expected breeding season. As such, activity restrictions are not applicable to these observations.

*Sharp-tailed Grouse*

Sharp-tailed Grouse have defined activity restrictions relating to known lek locations (Government of Saskatchewan 2017), but otherwise have a secure/common status within the province (i.e. S5). Two confirmed leks were documented during targeted Sharp-tailed Grouse surveys, both located on the same quarter section. In addition, 27 individuals were also observed during spring bird migrations surveys, across four monitoring stations (BMM-07, BMM-02, BMM-20, and BMM-06), with one individual

documented at station BMM-06 in the fall. As the Sharp-tailed Grouse is not a migratory species, these observations are known to be local individuals of this species. Recommended activity restrictions and setbacks suggest that a buffer of up to 400m be applied to known lek locations, depending on the type of activity being carried out.

*Turkey Vulture*

Two Turkey Vultures were observed flying in suitable breeding habitat on two visits in the general Project Area during raptor nest searches. No nests were detected of this species. Migratory and breeding Turkey Vulture populations in Saskatchewan are vulnerable with a provincial S-Rank of S3, however the species is not listed federally, nor does it have any recommended activity restrictions (Government of Saskatchewan 2017).

*Little Brown Myotis*

Seventy-five calls of Little Brown Myotis, a species federally listed as Endangered on Schedule 1 of SARA, were recorded during spring and fall acoustic surveys. The relative proportion of this species, relative to other bat calls, was extremely low, with the documented 75 calls accounting for less than 1% of all bat calls recorded during the acoustic monitoring. In addition, breeding populations of this species are ranked as apparently secure (i.e. S4B) in Saskatchewan and no activity restrictions apply to this species, in this province (Government of Saskatchewan 2017).

*Northern Leopard Frog*

One Northern Leopard Frog, a species listed as Special Concern on Schedule 1 of SARA, was detected at station ANR-14 calling. Northern Leopard Frog breeding sites can be up to 1.6km from overwintering sites, which are usually deeper, and more permanent, water bodies (Environment Canada 2013), suggesting that the individual may be overwintering at more permanent aquatic features, which could occur at considerable distance from the temporary wetland associated with this monitoring station. The *Saskatchewan Activity Restriction Guidelines for Sensitive Species* recommends activity setbacks of 500m year-round for high disturbance activities (Government of Saskatchewan 2017).

*American Badger*

One individual American Badger observation was made in the general Project Area, as was a nearby burrow that was likely to have been used recently. These observations were made in relatively close proximity to each other, along the roadside edge of a cultivated field. In addition, a cluster of five potential burrows with evidence of recent use were also identified within the general Project Area, located in the northeastern portion of the Project Area, along the roadside edge of a cultivated field, near an ephemeral wetland and a temporary wetland. The American Badger has a provincial S-Rank of S3 (SKCDC 2021a) and is federally listed as Special Concern under COSEWIC (COSEWIC 2012), but does not have any recommended activity restrictions (Government of Saskatchewan 2017).

*Monarch*

Four Monarch butterflies were observed in the Project Area at two separate locations. One location was along the southern limits of the Project Area, along the roadside edges of pasture. The second location was within the northeastern portion of the Project Area, along the roadside edges of cultivated fields and pasture. Monarch butterflies are relatively common within open habitats, including roadside edges along cultivated fields, pastures, and other open habitats. This species has a provincial status of S2B, SNRM (SKCDC 2021d) and is federally listed as Endangered (COSEWIC 2016), but is listed as Special Concern on Schedule 1 of SARA and does not have any recommended activity restrictions (Government of Saskatchewan 2017).

## 5.9 Acoustic Environment

The Project activities have the potential to affect the acoustic environment, specifically as it relates to construction and installation activities, as well as around turbine and substation locations during operations. This section provides an overview of the existing acoustic environment in proximity to the Project Area, as well as the applicable regulatory context.

### 5.9.1 Desktop Screening and Assessment

While the MOE has not formally issued a guideline for assessing noise impacts of wind energy projects, recent applications in Saskatchewan have typically followed the Alberta Utilities Commission (AUC) Rule 012: Noise Control (AUC 2021). This guideline is used widely in Alberta, which has a similar acoustic environment, terrain, land uses, human population distribution, and general demographics as Saskatchewan. It is also one of the most stringent noise guidelines in North America as it relates to wind energy projects.

### 5.9.2 Acoustic Setting

Based on information obtained from publicly available sources and from site visits, the RSA is sparsely populated, with dwellings interspersed within and around the Project Area. Ambient sound levels within the Project Area, and on adjacent lands, are typical of rural agricultural settings, with sounds originating from residential activities, agricultural activities (e.g. tractors and other machinery), livestock, vehicle traffic, and natural ambient noise (e.g. wind through vegetation, birds, etc.). Points of Reception (PoR) in, and around, the Project Area were validated on-site by the Proponent as occupied dwellings, or as other notable structures, such as churches.

The Project Area is considered a Category 1 region per AUC Rule 012, characterized by dwelling(s) distances that are typically more than, or equal to, 500m from heavily

travelled roads or rail lines and that are not subject to frequent aircraft flyovers. Additionally, there are fewer than eight dwellings per quarter section of land.

Based on this Category 1 determination, an Ambient Sound Level (ASL) of 35dBA and 45dBA for night and day, respectively, were selected to represent the existing ambient acoustic conditions at all PoR. This determination influences the applicable Permissible Sound Level (PSL) that can be applied to the PoR. The existing acoustic baseline, as reflected by the determined ASL values, is typical of a calm rural environment. These concepts are explained in more detail in Section 3 of the Noise Impact Assessment report (Appendix IX).

# 6.0 Socio-Economic and Cultural Setting

The following sections provide a detailed overview of the socio-economic and cultural conditions of the Project Area, as assessed through a combination of desktop assessments and through consultation and engagement activities

## 6.1 Land Use

The land within the Project Area is mainly used by large agricultural holdings dedicated to growing cereal crops and hay, and/or to raising cattle. As such, agriculture is an overwhelmingly predominant land use within all spatial boundaries of the Project. The LSA is mainly divided in quarter sections with a few sub-divisions for the purpose of constructing additional residences; however, most quarter sections are either uninhabited or are occupied by the owner of land. In general, the Project Area and LSA are considered to be sparsely populated.

Other land uses within the Project Area and the LSA are as follows:

- Oil and gas: several wells are present on the Project Area and in the LSA, specifically in the RM of Hazelwood;
- Transmission infrastructure: SaskPower owns and operates a 230kV transmission line that overlaps with the eastern portion of the Project Area, as well as the Kennedy substation, which is located on a land parcel directly adjacent to the Project Area, along Highway 48;
- Conservation lands: several quarter sections of land within the LSA have a registered conservation easement; however, these do not overlap with the Project Area, per MOE Siting Guidelines (MOE 2019); Ducks Unlimited also owns a quarter section directly adjacent to, and not overlapping, the Project Area;
- Parkland Gun Club: this shooting range is located on SW 24-12-4 along the Bekevar Road. The range is on a quarter section that is adjacent to, and not overlapping, the Project Area.

## 6.2 Indigenous Land Use

As detailed in Sections 1.0 and 2.0, the Project Area includes three quarter sections of Cowessess First Nation (CFN) reserve land. Although the land is designated as reserve land, these quarter sections are not inhabited, nor are they used for traditional, recreational or ceremonial activities. These quarter sections are used for agricultural activities and are currently leased to local farmers.

The LSA includes two additional quarter sections of CFN reserve land, located northwest of the Project Area, which is similarly used for agriculture, and three land parcels owned by Kahkewistahaw First Nation (KFN), which are located directly north of the Project

Area, adjacent to Bender Lake. This land is also not inhabited nor is it used for traditional activities.

## 6.3 Archaeology and Heritage Resources

The Proponent retained the services of CanNorth to conduct an assessment of potential impacts to heritage resources. According to publicly available databases, the Project Area is overlapping with areas of heritage sensitivity; however, the CDA is located almost exclusively in agricultural fields, which are considered to be previously disturbed areas, and would therefore limit the potential to impact heritage resources.

Following the regulatory process in Saskatchewan, a request for review was submitted to HCB on December 10, 2021. A site plan, along with the associated shapefiles were submitted with the request. The response from HCB, and any further assessment of impact to heritage resources, will be provided to MOE under separate cover when available.

One notable heritage resource in the vicinity of the Project Area is the Bekevar Presbyterian Church. Bekevar Church is a Municipal Heritage Property located within the Rural Municipality of Hazelwood No. 94, on Bekevar Road. The property features a large, wood-frame church with twin spires, built in 1911, an iron gate adorning the property's entranceway, and a cemetery.

According to Canada's Historic Places website, the heritage value of the Bekevar Church lies in its architecture. Representative of the Hungarians who settled in the area, the property follows traditional church design, incorporating Gothic Revival-inspired towers and pointed-arch windows in the building. These elements complement an interior layout, inspired by the Great Church in Debrecen, Hungary, features a sharply truncated nave and an unusually large transept comprising the main body of the church. Built between 1911 and 1912, the Bekevar Church is the last remaining building from the Hungarian settlement of Bekevar.

The church does not currently offer mass but is open during the summer period for tours and gatherings.

## 6.4 Socio-economic Setting

Project activities will occur within a small area, but as with most large development projects, some socio-economic effects may be experienced at a regional scale. As such, the socio-economic assessment has considered slightly different spatial boundaries to best reflect the corresponding geography of potential effects. For the purpose of this section, the LSA shall include the RMs of Hazelwood and Kingsley, within which the Project is located, and the nearby Town of Kipling. The RSA will be defined by the combination of Canadian census economic regions of Census Division

(CD) No. 1, and the CD No. 5. Finally, for comparison purposes, socio-economic considerations are also described for the Province of Saskatchewan, as a whole.

VCs associated with the socio-economic setting are the following: 1) Employment and Economy and 2) Community Services and Infrastructure. A discussion of potential impacts to these VCs is presented in Section 8.0 below.

### 6.4.1 Desktop Screening and Assessment

Information for the description of socio-economic considerations was obtained from publicly available sources, such as business and government directories, and Statistics Canada census data (Statistics Canada, 2016a; 2016b; 2016c, 2016d). Most Statistics Canada data were available for 2016, and exceptions area described in tables below. Data from the 2021 census were not available at the time of writing this EIS.

### 6.4.2 Socio-economic Results

#### 6.4.2.1 Population and Education

The estimated population of the RM of Hazelwood decreased between 2011 and 2016, totaling less than 1% of the population of the RSA. While the estimated populations of the RM of Kingsley and the Town of Kipling increased during the same period, they each accounted for less than 1% of the population of the RSA.

The combined populations of the RM of Hazelwood and the RM of Kingsley, including the Town of Kipling, accounted for a negligible fraction of the population in Saskatchewan. The population of RSA accounted for 5.8% of the population of Saskatchewan.

The rate of high school graduates in the RM of Hazelwood and the RM of Kingsley was similar to the rate within the RSA, and also to the overall provincial rate. The rate of high school graduates in the Town of Kipling was somewhat higher than the average rate of the RSA, and of Saskatchewan.

The higher education rates in the RM of Hazelwood, the RM of Kingsley, and the Town of Kipling were similar, and slightly higher than within the RSA, but were lower than the provincial rate.

No Indigenous population was present in the RM of Hazelwood in 2016. Approximately 2.3% of the population in the RM of Kingsley and 5.2% of the population of the Town of Kipling identified as Indigenous. People of Indigenous identity represented 8.8% of the population of the RSA, which was substantially lower than the provincial rate of 15.9%.

Demographics of the populations in the assessed area are summarized in Table 40.

**Table 40. Demographics of the Assessed Administrative Boundaries (2016)[1]**

| Characteristic | LSA | | | RSA | Saskatchewan |
|---|---|---|---|---|---|
| | RM of Hazelwood | RM of Kingsley | Town of Kipling | | |
| Population (total) | 230 | 444 | 1,074 | 63,516 | 1,098,352 |
| Population change since 2011 | -6.5% | 5.5% | 2.2% | -2.8% | 6.3% |
| Population with High school + (age ≥ 15 years) | 76.1% | 77.5% | 82.8% | 73.8% | 76.2% |
| Population with Bachelor's degree + (age ≥ 15 years) | 10.9% | 11.3% | 10.2% | 7.8% | 14.1% |
| Indigenous Population[2] | 0 | 10 | 60 | 5,620 | 175,020 |

1. Adapted from Statistics Canada, 2016 Census.
2. Indigenous identity' includes persons who are First Nations (North American Indian), Métis or Inuk (Inuit) and/or those who are Registered or Treaty Indians, and/or those who have membership in a First Nation or Indian band.

#### 6.4.2.2 Employment and Economy

In 2016, approximately 85% of the population of the RM of Hazelwood aged 15 years and above were part of the labor force, a rate similar to that of the RM of Kingsley (81.7%). These rates were substantially higher than those of the Town of Kipling (61.9%) or of the RSA (69.4%), which were both more similar to the provincial rate (68.3%).

The employment rates in the RM of Hazelwood (78.8%) and the RM of Kingsley (77.5%) were similar to one another, and substantially higher than for the Town of Kipling (55.5%), the RSA (64.7%) and Saskatchewan (63.5%).

The unemployment rate was similar in the RM of Hazelwood (7.1%), the RSA (6.7%) and Saskatchewan as a whole (7.1%). The unemployment rate in the RM of Kingsley (3.4%) was the lowest of the group, while the unemployment rate in the Town of Kipling (10.4%) was the highest.

The average individual total income was similar for the RM of Kingsley, the RSA, and the province. The average individual total income in the Town of Kipling was approximately twice that of the others in the group. The average individual income was not available for the RM of Hazelwood.

The most recent data for each parameter is summarized in Table 41.

**Table 41. Employment in the Assessed Administrative Boundaries (2016)[1]**

| Characteristic | RM of Hazelwood | RM of Kingsley | Town of Kipling | RSA | Saskatchewan |
|---|---|---|---|---|---|
| Population aged > 15 years | 165 | 355 | 775 | 50290 | 857,295 |
| Population in the labor force | 140 | 290 | 480 | 34765 | 585,540 |
| Participation rate | 84.8% | 81.7% | 61.9% | 69.4% | 68.3% |
| Employment rate | 78.8% | 77.5% | 55.5% | 64.7% | 63.5% |
| Unemployment rate | 7.1% | 3.4% | 10.4% | 6.7% | 7.1 % |
| Average individual total income (year 2015) | Not available | $53,498 | $100,174 | $53,558 | $49,409 |

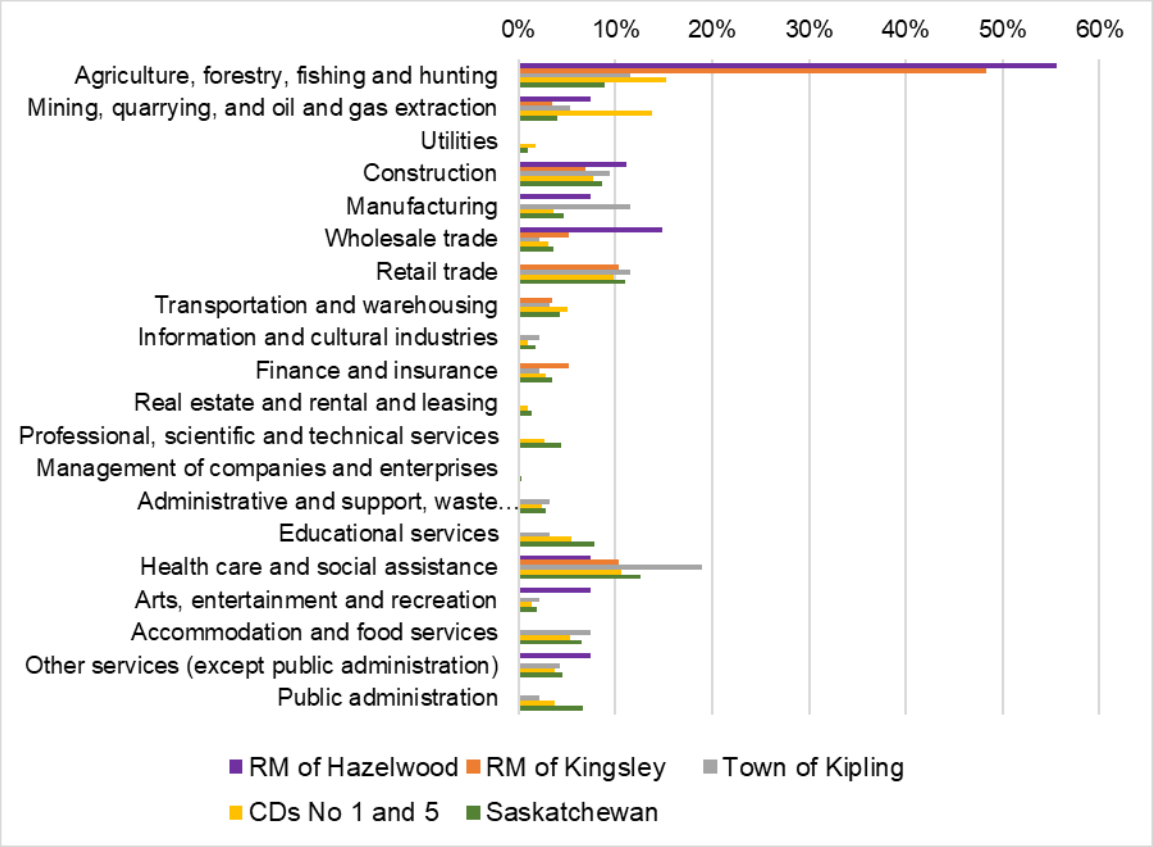
1. Adapted from Statistics Canada, 2016 Census.

In 2016, three industries employed over 80% of the labor force participants in the RM of Hazelwood: “Agriculture, forestry, fishing and hunting”, “Wholesale trade” and “Construction”. “Agriculture, forestry, fishing and hunting” alone accounted for 56% of the labor force, compared with 15% within the RSA.

In the RM of Kingsley, “Agriculture, forestry, fishing and hunting” was also the industry employing the largest portion of the participating labor force (48%), followed by “Retail trade” and “Health care and social assistance”. Together, these three industries employed 70% of the labor force.

The labor force in the Town of Kipling was more diverse, with “Health care and social assistance” accounting for the largest sector (18.9%), followed by “Agriculture, forestry, fishing and hunting”, “Manufacturing” and “Retail trade”, each accounting for 11.6% of employment.

Within the RSA as a whole, employment by sector was also more diverse, but “Agriculture, forestry, fishing and hunting” was the largest sector (15.2%), followed by “Mining, quarrying, and oil and gas extraction” (13.8%) and “Health care and social assistance” (10.6%).




Source: Adapted from Statistics Canada, 2016 Census.

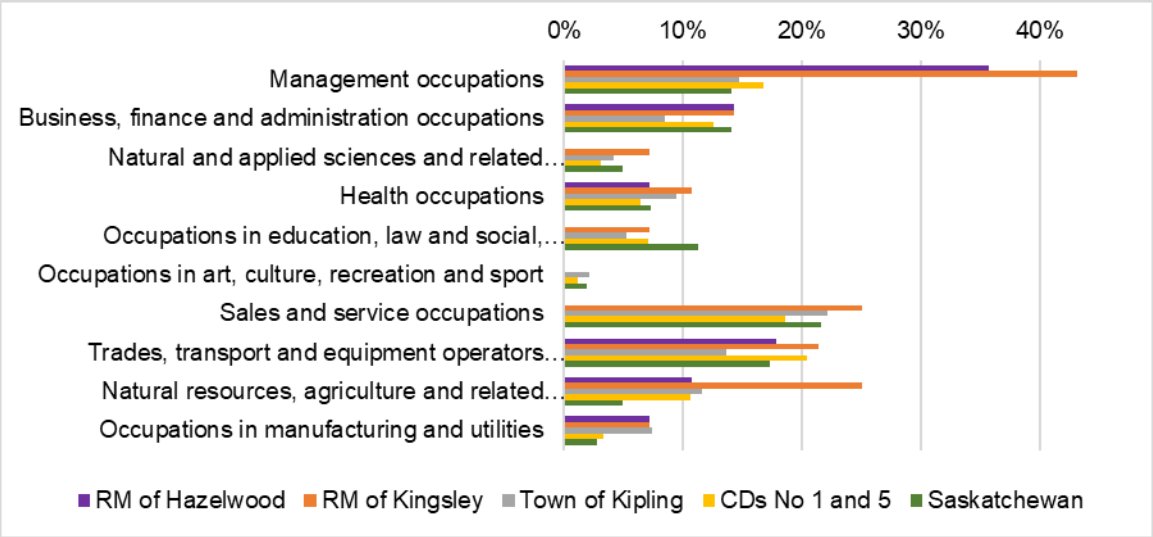
**Figure 1. Regional Employment by Industry**

In 2016, “Management occupations” accounted for the highest percentage of employment (36%) in the RM of Hazelwood, followed by “Trades, transport and equipment operators and related occupations”, “Natural and applied sciences and related occupations”, and “Business, finance and administration occupations”, which together accounted for 43% of occupations.

Occupation types were more diverse in the RM of Kingsley, but “Management occupations” also accounted for the highest percentage of employment (43%) with “Sales and service occupations” and “Natural resources, agriculture and related production occupations” accounting together for 50% of occupations.

In the Town of Kipling, “Sales and service occupations” (22%) were the highest occupation of the labor force, followed be “Management occupations” (15%), and “Trades, transport and equipment operators and related occupations” (14%).

Occupations types were even more diverse within the RSA, and in Saskatchewan as a whole. “Trades, transport and equipment operators and related occupations” and “Sales and service occupations” accounted for the greatest percentage of employment.




Source: Adapted from Statistics Canada, 2016 Census.

**Figure 2. Regional Labour Force by Occupation**

### 6.4.3 Community Services

The Town of Kipling is the nearest community to the Project. With a population of 1,100 residents, it offers general amenities, including rental accommodations, restaurants, pharmacies, health care services, etc.

#### 6.4.3.1 Transportation

The Project area is intersected by one primary highway (HW48), and one main numbered road (605). The area is also serviced by a variety of seasonal and all-season gravel roads used to access local residences and the general area. These include the Bekevar Road, Inchkeith Road, and Saffordea Road.

There is no railway intersecting the Project Area. However, one railway running just north of the Project Area connects runs through the Towns of Kipling and Maryfield before heading out of the province to the east. Another railway runs southeast of the Project Area, connecting the Town of Maryfield with the City of Estevan in the south.

There are several small airports and airstrips within 50km of the Project Area. The Kipling Airport is the closest to the Project area, approximately 5km from the northern boundary of the Project Area. The closest international airport is the Regina International Airport, located approximately 150km northwest.

#### 6.4.3.2 Health and Emergency Services

The Project is located in the Sun Country Health Region, which includes many hospitals, clinics and other services throughout the region. The Town of Kipling, located less than

5km north-east of the Project area provides the closest medical facilities and services. The Towns of Wawota, Filmore, and Stoughton, all within 55km of the Project Area, also provide medical facilities and services. Most of these facilities provide Ambulance and Emergency Medical Services through 9-1-1.

Emergency Health Services are also available through Telehealth, which offers health information and guidance over the phone and direct patients to specialized services. The Project Area is also covered by the Stars Air Ambulance service, to provide rapid emergency medical transportation to acute care facilities.

The Project Area is within the jurisdiction of the RCMP Broadview detachment within offices in the Towns of Kipling and Broadview. Other nearby RCMP detachments are located in the Town of Carlyle, the Village of Fillmore, and Community of Moosomin.

The Kipling Fire Department is the closest to the Project Area. There is a small fire station in the Town of Kennedy, approximately 7km east of the Project Area, and other fire departments are located in the Towns of Wawota and Arcola, and the Village of Kisby, all of which are within 34km of the Project Area.

## 6.5 Socio-economic Setting – Indigenous Groups

Although no Indigenous Group has a home reserve located in the general vicinity of the Project, including within the RSA, several Indigenous Group have home reserves within the general region, as are two Nations having land holdings within the LSA, including CFN which has lands within the Project Area and KFN which has land holdings adjacent to the Project Area. The Proponent has engaged with these, and several other, Nations as presented and detailed in Section 3.7.

CFN, as the Nation behind the Proponent's limited partner ANEDC, has been a leader in Indigenous-led renewables projects in Saskatchewan. The Nation owns a wind/solar/storage facility near Regina, connecting to the distribution grid, which includes the 10MW Awasis Solar Energy Project. The Nation has also installed roof-top solar panels as part of a community energy initiative on their home reserve.

CFN is located in southeastern Saskatchewan, 16km north of Broadview in the Qu'Appelle Valley, and has 4,300 members, 950 of which live on the home reserve. The Nation is focused on four foundational pillars: A) Cultural Rejuvenation B) Political Sovereignty, C) Effective and Efficient Administration and D) Economic Self Sustainability. CFN is a Treaty Land Entitlement First Nation and, over the years, has amassed over 120,000 acres of agriculture and urban land holdings. The primary purpose for the land acquisitions was future sustainability and economic viability. The land holding purchase in the Kipling Area by Cowessess will now be home to one of the largest wind farms in south east Saskatchewan.

# 7.0 Biophysical Effects Assessment, Mitigation, and Monitoring

A detailed effects assessment of the identified biophysical VCs has been carried out in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a). This assessment has considered the proposed Project activities, existing conditions, and a strong understanding of the potential effect pathways and effective mitigation measures for the construction and operation of a wind energy generating facility, as gained through considerable experience with similar developments, both in Saskatchewan and also in similar landscape settings in adjacent provinces.

## 7.1 Project Siting

Environmental siting is always the first, and arguably the most important, aspect of avoiding, or minimizing, potential environmental effects. Originally conceived in 2016, the Project has gone through numerous design iterations prior to the layout presented within this submission.

Initial Project design were first established were largely based on available desktop information, participating lands, and known siting considerations (e.g. residences, municipal roads, transmission lines, etc.). Revisions to reflect biophysical conditions were made in advance the of submission to the SaskPower RFP in early 2020, including changes to the Project Area to demonstrate the Proponent's intention to avoid areas of native grassland habitat. Finally, the results of comprehensive biophysical monitoring were used to inform additional layout revisions to avoid potentially sensitive habitats or species observations.

Throughout biophysical monitoring conducted in 2021, the Project went through several design revisions including, but not limited to:

- Re-location of several turbines that were originally placed in the south-central portion of the Project Area due to higher proportions of non-agricultural habitat;
- Realignment of infrastructure in several locations to avoid patches of native grassland and shrubland that were not shown in desktop mapping;
- Realignment of infrastructure to increase distances to detections of species of conservation concern; and
- Realignment of infrastructure to fully avoid numerous wetlands, particularly wetlands that were not-cultivated and that had moderate to high water permanency (i.e. Class III-V);

The efforts taken by the Proponent to incorporate biophysical results into the Project design have resulted in an optimal design that largely avoids potentially sensitive habitats, including full avoidance of native grassland and shrubland habitats. In addition, the Operational Footprint overlaps with 0.1ha each of wetland and forest, which further

demonstrates a negligible loss of non-agricultural habitats throughout the Project life. The implementation of these avoidance and minimization measures during the design and siting phase of the Project were important steps taken to ensure potential effects were minimized, even before the application of additional mitigation measures.

The following table presents a list of preferred setbacks that have been incorporated in the Project design, based on the existing site conditions, as established through a detailed review of desktop information, comprehensive field investigations, and information received from public consultation. As with most similar projects, optimal siting efforts will still result in deviations from preferred biophysical setbacks. These deviations have also been outlined in Table 42 below.

**Table 42. Biophysical Avoidance and Siting Setbacks**

| Biophysical Feature | Siting Setback and Timing | Setback Deviation(s) |
|---|---|---|
| **Flora** | | |
| Native Prairie | Avoidance | No deviations. The CDA fully avoids native prairie/grassland. |
| Native Shrubland | Avoidance | No deviations. The CDA fully avoids native shrubland. |
| Tree Stands | Avoidance | Project activities were carefully sited to minimize impacts to treed habitat. The Operational Footprint overlaps with 0.1ha, while the CDA overlaps with 0.86ha of treed habitat. |
| Small Yellow Lady's Slipper | 30m from Occurrence Year Round | No deviations. The CDA is more than 30m from both occurrences of this species. |
| **Wetlands and Watercourses** | | |
| Temporary and Seasonal Wetlands (Class II-III) | Selective Avoidance | These features with low to moderate water permanency were selectively avoided, to the extent possible; however, since may of these features are within cultivation, preferential avoidance was given to higher quality wetlands and other biophysical considerations (e.g. native prairie, native shrubland, species of conservation concern, etc.) |
| Semi-Permanent Wetlands (Class IV) | Avoidance | Project activities were carefully sited to minimize the potential impacts to Class IV wetlands. The Operational footprint fully avoids Class IV wetlands, while there are 7 instances of CDA overlap with Class IV wetland habitat.<br><br>Most of the CDA overlaps are associated with underground collection installation, for which the actual effects can be easily and effectively minimized through low-impact installation techniques, such as working in frozen conditions, plough-in installations, and/or directional drilling. |
| Permanent Wetlands (Class V) | Avoidance | No deviations. The CDA fully avoids all Class V wetlands. |
| Intermittent Watercourses | No Defined Setback | Project activities are required to cross intermittent watercourses, and best management practices and proven mitigation measures will be implemented at these crossing locations. |
| **Wildlife and Wildlife Habitat** | | |
| Sharp-tailed Grouse | 400m from Lek | None |

| Biophysical Feature | Siting Setback and Timing | Setback Deviation(s) |
|---|---|---|
| Lek | Mar 15 – May 15 | (*Underground infrastructure is proposed within 400m, but installation will occur outside specified timing restriction*) |
| Black Tern (potential colony) | 400m from Nesting Colony May 1 – July 15 | No deviations. Project infrastructure was removed from areas suspected nesting colonies were detected. |
| Northern Leopard Frog (potential breeding habitat) | 500m from Breeding Habitat Year Round | The CDA limit associated with one nearby access road is approximately 240m from this habitat.<br><br>No deviations of this setback are expected for any turbine locations (as measured from blade tip), collection line installation, or any other Project activities. |
| American Badger (potential den) | Avoidance of Den | No deviations. Project infrastructure was re-routed to avoid CDA overlap with the potential dens. |

In addition to the preferred setbacks identified in Table 42 above, several other informal setbacks or preferred avoidances have been incorporated into the Project design, such as the avoidance of water bodies (i.e. ephemeral wetlands), to the extent possible.

## 7.2 Flora

Project design and siting efforts have resulted in the vast majority of the CDA (94.7%) being sited within existing areas of agriculture, and another 3.5% within pasture/forage habitat, which combine for more than 98% of the CDA being within areas that are not dominated by native vegetation. Further, the Project has been sited to fully avoid areas of native grassland and native shrubland within the CDA.

Despite the near optimal siting of the Project, which is largely located within non-native habitats, a small number of native habitats, primarily wetland and forest, overlap the CDA, with other native habitats present within close proximity to Project activities, without direct overlap. Vegetation surveys were conducted within these native habitats, and other potentially native habitats, resulting in 211 species of vascular flora identified within the general Project Area, with the majority of these observations (80%) being of native species. Based on the considerable differences of land use within the Project Area, these species demonstrate a highly non-uniform distribution across the Project Area, with the native species occurring in areas that are almost exclusively beyond the limits of cultivated habitat and tame pastures, which account for more than 98% of the CDA.

In addition to the native species identified within the Project Area, an incidental assessment of noxious weeds, and other invasive plants, has resulted in the identification of seven noxious weeds species, and one additional non-native nuisance species. These species varied in relative abundance within the Project Area; however many were relatively common across the agricultural landscape, particularly along the edges of cultivated fields, roadsides, and pastures where there are existing sources of disturbance.

The observations of Small Yellow Lady's Slipper, a species of conservation concern, is included in the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* (Government of Saskatchewan 2017), which recommends activity setbacks of 30m for moderate or high disturbance activities, which generally include those proposed for this Project.

### 7.2.1 Effects Assessment

The following effects assessment considers the potential effects, if left unmitigated, on rare vascular plants and land use, with specific consideration to native habitats. The results of the effects assessment are then used to inform the type, extend, and/or location of mitigative activities to ensure potential effects are effectively minimized. In consideration of the site-specific field assessments, habitat characteristics, and species observations, the following three potential effects have been considered:

- Change in Native Habitat Quantity;
- Change in Native Habitat Quality; and
- Change in Invasive Species Abundance.

Each of these potential effects has been considered relative to the three phases of Project activities: Construction, Operation, and Decommissioning, as described in the following sections.

*Change in Native Habitat Quantity*

Change in native habitat quantity has the potential to occur during the construction and decommissioning phases of the Project.

Direct removal of native vegetation for the installation of infrastructure has the potential to cause an immediate localized effect, as it reduces vegetative cover, exposes soil, disturbs plant communities, and ultimately contributes to localized loss of biodiversity. Several of these effects also have the potential to directly contribute to other negative effects, including, but not limited to, increasing the risk of soil erosion and sedimentation, generation of dust, and localized alteration of hydrological patterns. Removal of native vegetation has the potential to occur as a result of Project activities through planned activities in areas of native habitat that could not be avoided during the siting and design phase of the Project, or through accidental damage or removal of native vegetation within areas that are intended to be protected from Project activities.

Through early siting and design planning, Project activities within the CDA have been designed to fully avoid native grassland and native shrubland, and selectively minimize impacts on other non-cultivated habitats, such as treed habitats and wetlands, which have the potential to support native species. Despite full avoidance of native open upland habitats, the Project design includes the potential to directly affect up to 0.86ha of treed habitat and 2.33ha of wetland habitat.

The majority of the potential loss of native vegetation will occur during the construction phase, and again during the decommissioning phase, when the full extent of the CDA may be used for Project activities, but will be reclaimed following the respective Project phase. Only a small proportion, 0.1ha of treed habitat and 0.1ha of wetland habitat, will be considered to be long-term temporary loss as a result of the siting of surficial infrastructure (e.g. access roads, turbine pad, substation, and operations and maintenance building) within the Operational Footprint that will remain in place for the duration of Project activities.

In addition to planned loss of small areas of treed habitat and wetland, the CDA is also adjacent to several additional tree stands and wetlands, which could experience accidental damage or direct loss of native habitat if the limits of Project activities are not maintained. A single area of potential native prairie located adjacent to the CDA, but located on a quarter section that is not part of the Project Area, and therefore accidental damage is highly unlikely. The potential for accidental damage to non-adjacent habitats is unlikely. No other areas of potentially native grassland are within 20m of the CDA, and therefore accidental vegetation damage/removal to native grassland is not expected.

The observations of Small Yellow Lady's Slipper, a species of conservation concern, occur well beyond the limits of the Project activities, and have also been provided a minimum setback of 30m, in accordance with provincial activity setbacks (MOE 2017), and is therefore not expected to experience any accidental damage/removal.

*Change in Native Habitat Quality*

Changes to native habitat quality have the potential to occur as a result of activities associated with all phases of the Project, although the likelihood of habitat degradation is lowest during the operational phase of the Project.

The conservation of native grassland communities is of particular ecological importance within the prairie provinces, as they are considered to be the most altered and endangered terrestrial ecosystem on the planet (IUCN 2010). In addition to native grassland, other natural communities provide important natural conditions that have the potential to support sensitive species within a largely agricultural landscape.

Indirect effects that can cause habitat degradation have the potential to occur within habitats that are in close proximity to the CDA, and may result from Project activities that increase the potential for erosion and sedimentation, dust generation, and/or spills. If left unmitigated, these potential effects can easily transfer to adjacent, or nearby, habitats. Four areas of native, or potentially native, grassland occur within 30m of the CDA. One of these habitats is located adjacent to the CDA, but on a neighbouring quarter section that is not within the Project Area. The other three locations are all small, and relatively isolated, habitats that are located adjacent to municipal roads and are therefore located adjacent to existing sources of similar potential indirect effects (e.g.

habitat degradation), and at closer distances than those being considered from Project activities. Other native, or potentially native, habitats that may experience habitat degradation as a result of nearby Project activities include treed habitats, shrubland, and wetlands. In many instances, ongoing agricultural activities are already occurring at distances that are similar to, if not closer, than proposed Project activities. As such, although Project activities may increase the potential of these effects, these habitats already have a baseline level of habitat degradation resulting from the regular use of agricultural equipment, and the associated potential for erosion, sedimentation, and spills.

The observations of Small Yellow Lady's Slipper, a species of conservation concern, occur well beyond the limits of the Project activities, and have also been provided a minimum setback of 30m, in accordance with provincial activity setbacks (MOE 2019). In addition, these local populations are located 15m to 35m from cultivated habitat and are therefore unlikely to experience additional effects from Project activities, relative to ongoing cultivation.

*Change in Invasive Species Abundance*

Changes to invasive species abundance have the potential to occur as a result of activities associated with all phases of the Project, although the likelihood of invasive species introductions is lowest during the operational phase of the Project.

Due to their high adaptability and relative lack of natural enemies, invasive species tend to have a competitive advantage when colonizing exposed soil. This effect might become even more accentuated in the future due to the longer warm seasons induced by climate change (Mulder and Spellman 2019). Therefore, any activity that disturbs the soil or removes portions of the existing vegetation cover has the potential to introduce invasive species that can colonize the newly exposed ground from nearby seed sources and potential spread through the use of vehicles and equipment during construction and operation.

Potential effects associated with the introduction of invasive species are most likely to occur in temporary disturbance areas of where soil is exposed, either resulting from the natural seed dispersal or assisted by increased vehicle traffic. As such, the areas most likely to be affected include the 0.86ha of treed habitat and 2.33ha of wetland habitat that are overlapped by the CDA. In addition to the direct seed transfer to exposed soils, the inadvertent seed transfer during all Project phases can facilitate invasive species establishment in areas that are adjacent to, or near, the CDA.

The general landscape and current land uses associated with the Project Area are dominated by cultivation, and regular cultivation and equipment travel associated with ongoing agricultural activities has created a baseline level of invasive species presence within the Project Area. During vascular plant surveys, seven noxious weeds were documented, including five species that were considered relatively common within the

Project Area. Although existing conditions have a baseline effect contributing to the establishment of invasive species, there remains a potential for increased effects resulting from Project activities, if left unmitigated.

### 7.2.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the potential effects of the Project on flora, including native vegetation and land use. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 43. Overview of Mitigation Measures Relating to Flora**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Change in Native Habitat Quantity | • Clearly delineate all work areas that occur within 10m of, or overlapping, a native habitat/community using erosion fencing or other suitable barrier to avoid accidental damage to adjacent habitat(s).<br>• When working in native habitats, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, wherever practical.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint. | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |
| Change in Native Habitat Quality | • Install Erosion and Sediment Control (ESC) measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an Environmental Construction Monitor (ECM).<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any native habitat.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Avoid the broad application of herbicides, | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| | pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate any temporary disturbances to native habitat as soon as practical.<br>• If temporary excavation is necessary, separate topsoil and from underlying layers in different piles at least 1m apart. Replace the soil in reverse order of excavation, to preserve organic content and native seedbank. | |
| Change in Invasive Species Abundance | • Clearly delineate all work areas that occur within 10m of, or overlapping, a native habitat/community using erosion fencing or other suitable barrier to minimize seed transfer.<br>• Construction vehicles and equipment should be cleaned regularly, particularly when entering or leaving the site.<br>• Vehicle use will occur on defined access routes, and within the limits of the Construction Disturbance Area, and will occur within agricultural habitats, to the extent possible, to minimize potential seed transfer.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any native habitat.<br>• Re-vegetate non-cultivated areas of temporary disturbance as soon as practicable after construction activities are complete.<br>• Areas of temporary disturbance within non-cultivated habitat will require follow-up monitoring to assess the presence of invasive species so that adaptive management can be implemented, as necessary.<br>• Prepare and implement, as necessary, a Weed Management Plan | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |

The implementation of proven avoidance, minimization, and mitigation measures, as described above, are expected to contribute notably towards the reduction of potential negative effects to flora, including to native vegetation and existing land cover. Despite the implementation of proven and effective mitigation measures, it is possible that Project activities will still result in residual effects. The consideration of residual effects, as separated by Project phase, has been summarized in Table 44 below.

**Table 44. Residual Effects Assessment to Flora**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| **Construction** | | | | | | |
| Change in Native Habitat Quantity | L | F | MT | R | O | No |
| Change in Native Habitat Quality | L | L | ST | R | S | No |
| Change in Invasive Species Abundance | L | L | ST | R | S | No |
| **Operation** | | | | | | |
| *None expected* | *n/a* | | | | | |
| **Decommissioning** | | | | | | |
| Change in Native Habitat Quantity | L | F | ST | R | O | No |
| Change in Native Habitat Quality | L | L | ST | R | S | No |
| Change in Invasive Species Abundance | L | L | ST | R | S | No |

| *Mag; Magnitude* | *GE; Geographic Extent* | *Dur; Duration* | *Rev; Reversibility* | *Freq; Frequency* |
|---|---|---|---|---|
| *N – Negligible* | *F – Footprint* | *T – Temporary* | *R – Reversible* | *O – Once* |
| *L – Low* | *L – Local* | *ST – Short-term* | *I - Irreversible* | *S – Sporadic* |
| *M – Moderate* | *R – Regional* | *MT – Medium-term* | | *I – Intermittent* |
| *H – High* | | *LT – Long-term* | | *R – Regular* |
| | | | | *C - Continuous* |

The siting of the Project, largely within areas of existing disturbance, is an important consideration in the effects assessment and resulting residual effects, in combination with the implementation of mitigation measures that include proven techniques to avoid, mitigate, and/or minimize potential effects.

*Magnitude*

Potential effects are generally considered to be low in magnitude, as they are expected to result in detectable effects, relative to baseline conditions, but are generally within an expected range of disturbance that may be expected as a result of other ongoing activities. Specifically, the degradation of native habitats and spread of invasive species are effects that are expected as a result of ongoing agricultural practices in the area.

*Geographic Extent*

The residual effects to flora, including native habitats, are considered to be limited to the Project Footprint or to the immediately surrounding area. This is largely driven by the localized nature of the predicted residual effects and relatively localized seed transfer capabilities, such that residual effects will not contribute to any regional success of invasive species, by following the proposed mitigation measures.

*Duration*

The duration of the removal of native vegetation construction presents a moderate-term residual effect, as the habitat lost as a result of Project infrastructure will be reclaimed as part of the decommissioning phase of the Project. Other residual effects associated with flora are considered to short-tern in duration, as the effects may be detectable for a short period of time after the applicable Project phase(s).

*Reversibility*
All of the residual effects are considered to be reversible through a combination of natural processes and specific actions, such as reclamation and weed management.

*Frequency*
Removal of native vegetation is considered to be a one-time event during each Project phase, since the habitat itself can only be lost once. All other residual effects are considered to be sporadic as each identified effect is not predictable, and is expected to occur at relatively infrequent intervals due to the implementation of proven mitigation measures.

*Significance*
The overall assessment of residual effects relating to flora, including native habitats, has resulted in a determination that residual effects will be **Not Significant**. This determination considers the existing conditions, Project siting and proposed activities, effects assessment, mitigation measures, and the resulting characterization of residual effects that may be incurred as a result of Project activities.

### 7.2.3 Monitoring Program

Specific to the potential residual effects that may be experienced by flora, including to native habitats, a Qualified Professional will be retained to carry out ECM during both the construction and decommissioning phases to assess the effectiveness of the implemented mitigation measures, identify any deficiencies, and make any additional recommendations based on the observed results.

It is also recommended that regular monitoring of any reclaimed areas be carried out to confirm success of the reclamation and to monitor the potential presence and/or spread of invasive species within areas identified for reclamation.

Additional details relating to the recommended monitoring program are provided in the Environmental Management Plan (Appendix X).

## 7.3 Wetlands and Watercourses

Project design and siting efforts have resulted in the vast majority of the CDA (94.7%) being sited within existing areas of agriculture, and another 3.5% within pasture/forage habitat, which combine for more than 98% of the CDA being within areas that are not dominated by native vegetation. Despite efforts to avoid wetlands altogether, small wetland pockets are common on the landscape in southern Saskatchewan, including within cultivated fields, and as a result, small amounts of wetland habitat have been identified as being near, or overlapping, Project activities.

More than 1,000 wetlands were identified and assessed, through detailed desktop assessments and/or site-specific validations, within the general Project Area. The

majority of the wetlands were features with low to moderate water permanency (i.e. Class I [ephemeral] to Class III [seasonal]), many of which occur within cultivated fields are already subjected to regular and recurring effects associated with agricultural activities. Relatively few wetlands with high water permanency (i.e. Class IV [Semi-permanent]) were identified within the CDA.

No permanent watercourses have been identified as overlapping with the CDA, nor were any permanent watercourses anecdotally observed within the larger LSA surrounding the CDA. Nine ephemeral watercourses and two intermittent watercourses were identified overlapping the CDA. Ephemeral and intermittent watercourses are both characterized by having water present at certain times of year, but without regular flow or continuous hydrological connectivity to permanent watercourses.

### 7.3.1 Effects Assessment

The following effects assessment considers the potential effects, if left unmitigated, on wetlands and watercourses. The results of the effects assessment are then used to inform the type, extend, and/or location of mitigative activities to ensure potential effects are effectively minimized. In consideration of the Project activities relative to the site-specific field assessments and habitat characteristics, the following potential effects have been considered:

- Change in Wetland Area,
- Change to Wetland Function, and
- Changes to Water Balance.

*Change in Wetland Area*

Change in wetland area has the potential to occur during the construction and decommissioning phases of the Project.

Through early siting and design planning, Project activities have been designed to occur predominantly within agricultural habitats, which comprise more than 98% of the CDA, when considering both cultivated and pasture/forage land cover. Despite near optimal siting, change in wetland area is anticipated to occur where full avoidance was not feasible, due to technical constraints and/or the selective avoidance of other features that are considered equally, or more, sensitive. Changes to the overall wetland area has the potential to occur as a result of planned Project activities or as a result of accidental damage to adjacent features that are intended to be protected from Project activities.

Loss of wetland area is considered only when avoidance is not feasible due to technical constraints of the Project. By loosing wetland area, its ecological functions are decreased and, in some cases, locally compromised. For this reason, efforts have been made to trace a layout that avoid overlapping seasonal, semi-permanent and permanent wetlands and that will minimize the total loss of wetland function across the Project area.

The majority of the potential loss of wetland area will occur during the construction phase, and again during the decommissioning phase, when the full extent of the CDA may be used for Project activities, but will be reclaimed following the respective Project phase. During these short-term temporary effects, up to 2.33ha of wetland habitat may be affected. These effects are largely related to features that have low to moderate water permanency (i.e. Class III or below), several of which are regularly in cultivation during the growing season. Only a small amount of wetland habitat (0.1ha) will be considered to be long-term temporary loss as a result of the siting of surficial infrastructure (e.g. access roads, turbine pad, substation, and operations and maintenance building) within the Operational Footprint that will remain in place for the duration of Project activities. Long-term temporary effects will be limited to five Class II, one Class II-III, and two Class III features.

In addition to planned loss of wetland areas, the CDA is directly adjacent to several additional wetlands, which could experience accidental damage or loss if the limits of Project activities are not maintained.

*Change to Wetland Function*

Changes to wetland function have the potential to occur as a result of activities associated with all phases of the Project, although the likelihood of habitat degradation is lowest during the operational phase of the Project.

Indirect effects that can cause changes to wetland function have the potential to occur within habitats that are in close proximity to the CDA, and may result from Project activities that increase the potential for erosion and sedimentation, dust generation, and/or spills. If left unmitigated, these potential effects can easily transfer to adjacent, or nearby, habitats. In consideration of existing conditions, the general Project Area is largely dominated by agricultural land use, which likely include regular cultivation, fertilizing, spraying, and other ongoing activities that may result in similar effects to nearby wetlands. In addition, many of the identified wetlands, particularly temporary and seasonal wetlands, that occur within the CDA are located directly within areas of cultivation.

Within the larger LSA, 7.8% (~940ha) of the land cover is considered to be wetland. Similar to wetlands found within the CDA, the vast majority of these areas are either found directly within cultivated fields or are located in close proximity to cultivation, and are therefore already subjected to similar localized effects that may result from Project activities. Few wetlands within the LSA are found in large, contiguous, and/or highly naturalized settings, and the wetlands that do occur in these areas are not located in close proximity to any Project activities. As such, although Project activities may contribute to loss of wetland function, most existing wetlands already experience a baseline level of habitat degradation resulting from the regular use of agricultural equipment, and the associated potential for erosion, sedimentation, and spills.

*Change to Water Balance*

Change to water balance has the potential to occur during the construction and decommissioning phases of the Project.

Effects relating to a change in water balance have the potential to disrupt the vegetation diversity, water retention, wildlife habitat, and in extreme cases could even result in wetland loss or re-location of wetlands, if drainage patterns are substantially altered.

Changes to water balance are expected to be primarily linked to the soil compaction and/or site grading, as both have the potential to affect surface drainage patterns and/or infiltration. The movement of heavy machinery within the CDA has the potential to compact the soil, relative to existing conditions, which can disrupt water infiltration, which could result in increased overland flow, which may follow different hydrological patterns than water infiltration. Further, localized changes to grade may also affect surface water flow patterns, and could divert water to different, or new, locations.

### 7.3.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the potential effects of the Project on wetlands and watercourses. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 45. Overview of Mitigation Measures Relating to Wetlands and Watercourses**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Change in Wetland Area | • Clearly delineate all work areas that occur within 10m of, or overlapping, any wetland using erosion fencing or other suitable barrier to avoid accidental damage to adjacent habitat(s).<br>• When working within, or near wetlands, particularly those with moderate to high water permanency (i.e. Class III to V), implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, wherever practical.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• The Project will obtain, as necessary, an Aquatic Habitat Protection Permit (AHPP), and will comply with all conditions. | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |
| Change to Wetland Function | • Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near | **Yes**<br><br>Residual effects are |

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| | natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any native habitat.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate any temporary disturbances to native habitat as soon as practical. | expected during the construction and decommissioning phases. |
| Change to Water Balance | • When working within, or near wetlands, particularly those with moderate to high water permanency (i.e. Class III to V) or crossing watercourses, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, wherever practical.<br>• Cross watercourses in dry conditions.<br>• For all access road crossings of ephemeral or intermittent watercourses, the existing grade should be maintained to allow over-land flow or a suitable culvert should be installed so that existing hydrology is maintained.<br>• Limit, or avoid, taking of surface water or groundwater during periods of low flow.<br>• Control quantity and quality of stormwater discharge using best management practices, and avoid direct discharge into wetlands or watercourses.<br>• Water discharges should occur in vegetated areas with low grade, or should implement other techniques to control flow (e.g. sediment trap).<br>• Minimize the use of impervious surfaces, where practicable, such as utilizing and contouring | **No**<br><br>Following proven mitigation measures, no residual effects are expected. |

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| | permeable surface material (i.e. gravel) to increase infiltration, and reduce surface water runoff.<br>• Restrict construction equipment to designated vehicle access routes to minimize the potential for soil compaction beyond the defined footprint.<br>• Local natural drainage pattern should be restored to the best extent possible after construction, whenever a wetland or watercourse is affected.<br>• Following the construction and decommissioning phases, implement measures to de-compact soil (i.e. cultivation) within agricultural areas of the CDA.<br>• Re-vegetate any temporary disturbances to native habitat as soon as practical. | |

The implementation of proven avoidance, minimization, and mitigation measures, as described above, are expected to contribute notably towards the reduction of potential negative effects to wetlands and watercourses. Despite the implementation of proven and effective mitigation measures, it is possible that Project activities will still result in residual effects. The consideration of residual effects, as separated by Project phase, has been summarized in Table 46 below.

**Table 46. Residual Effects Assessment to Wetlands and Watercourses**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| **Construction** | | | | | | |
| Change in Wetland Area | L | F | MT | R | O | No |
| Change to Wetland Function | L | L | ST | R | S | No |
| **Operations** | | | | | | |
| *None Expected* | *n/a* | | | | | |
| **Decommissioning** | | | | | | |
| Change in Wetland Area | L | F | ST | R | O | No |
| Change to Wetland Function | L | L | ST | R | S | No |

*Mag; Magnitude*
*N – Negligible*
*L – Low*
*M – Moderate*
*H - High*

*GE; Geographic Extent*
*F – Footprint*
*L – Local*
*R - Regional*

*Dur; Duration*
*T – Temporary*
*ST – Short-term*
*MT – Medium-term*
*LT – Long-term*

*Rev; Reversibility*
*R – Reversible*
*I - Irreversible*

*Freq; Frequency*
*O – Once*
*S – Sporadic*
*I – Intermittent*
*R – Regular*
*C - Continuous*

The siting of the Project, largely within areas of existing disturbance, is an important consideration in the effects assessment and resulting residual effects, in combination with the implementation of mitigation measures that include proven techniques to avoid, mitigate, and/or minimize potential effects.

*Magnitude*
Potential effects are generally considered to be low in magnitude, as they are expected to result in detectable effects, relative to baseline conditions, but are generally within an expected range of disturbance that may be expected as a result of other ongoing activities. Most of the affected wetlands are Class II to III, which are more likely to be included within ongoing cultivation and tend to provide lower quality habitat to wildlife, when compared to Classes IV and V.

*Geographic Extent*
The residual effects to wetlands and watercourses are considered to be limited to the Project Footprint or to the immediately surrounding area. This is largely driven by the localized nature of the predicted residual effects.

*Duration*
The duration of the changes in wetland area is a medium-term residual effect since the habitat lost as a result of Project infrastructure will be reclaimed as part of the decommissioning phase of the Project, meaning the residual effects will not extend beyond the life of the Project. The change in wetland quality is generally considered to be a short-lived effect that is naturally reversed within a short-term duration.

*Reversibility*
All of the residual effects are considered to be reversible through a combination of natural processes and specific actions, such as reclamation and monitoring.

*Frequency*
Removal of wetland area is considered to be a one-time event during each Project phase, since the habitat itself can only be lost once. Residual effects relating to changes to wetland quality are considered to be sporadic as each identified effect is not predictable, and is expected to occur at relatively infrequent intervals due to the implementation of proven mitigation measures.

*Significance*
The overall assessment of residual effects relating to wetlands and watercourses has resulted in a determination that residual effects will be **Not Significant**. This determination considers the existing conditions, Project siting and proposed activities, effects assessment, mitigation measures, and the resulting characterization of residual effects that may be incurred as a result of Project activities.

### 7.3.3 Monitoring Program

Specific to the potential residual effects that may be experienced by wetlands and watercourses, it is recommended that a Qualified Professional be retained to carry out ECM during both the construction and decommissioning phases to assess the

effectiveness of the implemented mitigation measures, identify any deficiencies, and make any additional recommendations based on the observed results.

It is also recommended that regular monitoring of any reclaimed areas be carried out to confirm success of the reclamation and to monitor the potential presence and/or spread of invasive species within areas identified for reclamation. The monitoring approach will be detailed in the Weed Management Plan.

Details relating to the recommended mitigation measures relating to wetlands and watercourses are provided in the Environmental Management Plan (Appendix X).

## 7.4 Wildlife and Wildlife Habitat

The Project activities are being proposed primarily within an agricultural landscape, dominated by cultivation; however, the Project Area is interspersed with numerous wetlands, tree stands, and forage/pasture, all of which have the potential support local, or migratory, wildlife use. An abbreviated overview of the documented wildlife use of the Project Area, as summarized from Section 5.0, has been provided below.

Bird activity within the Project Area was relatively consistent with the behaviour that would be expected within a largely cultivated landscape, interspersed with habitat pockets, in southeastern Saskatchewan, and no areas of unusually concentrated activity or significant use were documented within the Project Area. Spring and fall mitigation surveys resulted in observation rates of 8.8 birds/minute and 6.2 birds/minute, respectively, with waterfowl being the most abundantly observed bird guild during migration, largely driven by the migration of several geese species that is common throughout the prairie provinces. Similarly, breeding bird surveys resulted in expected species compositions for an agricultural landscape in southeastern Saskatchewan, including confirmed leks of Sharp-tailed Grouse, and several observations of other species of conservation concern that are commonly encountered in agricultural landscapes (e.g. Bobolink, Barn Swallow). No nests, or suspected nests, of any species of conservation concern, including raptors, were documented within the Project Area.

Bat activity within the Project Area indicates a very low passage rate of 1.88 bat passes/night during the spring migration period, and a moderate rate of 15.34 bat passes/night during the fall migration. Although specific movement patterns of bats is not well understood, this pattern of low spring activity and slightly higher bat activity in the fall is a relatively common occurrence, both in the baseline monitoring assessments, but also in the operational monitoring of wind energy facilities. Species composition was largely driven by migratory species, namely Silver-haired Bat and Hoary Bat, with calls identified as Little Brown Myotis, a species of conservation concern, representing less than 1% of all recorded bat calls.

Targeted amphibian surveys within the Project Area resulted in the detection of three amphibian species, Boreal Chorus Frog, Wood Frog, and Northern Leopard Frog. The most abundantly documented species, Boreal Chorus Frog and Wood Frog are both common species in agricultural landscapes and have secure populations, both provincially and federally. A single Northern Leopard Frog, a species of conservation concern, was heard calling from a roadside station located near a temporary wetland.

While undertaking targeted surveys for birds, bats, and amphibians, field biologists recorded all other wildlife observations to ensure a comprehensive understanding of the wildlife use within the Project Area. These observations generally resulted in the documentation of several common species with secure populations, but also included documentation of two additional species of conservation concern, American Badger and Monarch.

### 7.4.1 Effects Assessment

The initial assessment of potential effects on wildlife and wildlife habitat has been considered in the absence of mitigation measures, for the purpose of informing the type, extend, and/or location of mitigative activities to ensure potential effects are effectively minimized. In consideration of the site-specific field assessments, habitat characteristics, and local wildlife use and behavioural patterns, the following potential effects have been considered, if left unmitigated:

- Change in Habitat Quantity,
- Change in Habitat Quality,
- Change in Habitat Use,
- Change in Mortality Risk (General)
- Change in Mortality Risk (Birds)
- Change in Mortality Risk (Bats).

Each of these potential effects has been considered relative to the three phases of Project activities: Construction, Operation, and Decommissioning, as described in the following sections.

*Change in Habitat Quantity*

Change in habitat quantity has the potential to occur during the construction and decommissioning phases of the Project.

Habitat loss, resulting from proposed activities, includes varying degrees of short-term and long-term temporary habitat loss based on the type and duration of the proposed activities. During the construction phase, long-term temporary habitat loss will result from the placement of surficial infrastructure (e.g. access roads, turbine pad, substation, and operations and maintenance building) within the Operational Footprint, that will remain in place for the duration of Project activities, but that will be reclaimed following the decommissioning phase. Temporary, but short-term, habitat loss will occur during

both the construction and decommissioning phases of the Project, when the full extent of the CDA may be used for the installation, or removal, Project infrastructure. Following the construction and decommissioning phases, all temporary habitat loss will be reclaimed to pre-disturbance land use.

Although the majority of the Project activities (i.e. CDA) has been sited within agricultural land cover (Table 47), small portions of pasture/forage (6.65ha; 3.5%), wetland (2.33ha; 1.2%), and forest (0.86ha; 0.5%) are present, and overlapping, the CDA. Most of these areas will be only be temporarily removed, as they will be reclaimed following the activities associated with each of the construction and decommissioning phases. The full extent of the Operational Footprint (i.e. long-term temporary habitat removal) will only occur within a faction of the CDA, resulting in the potential loss of up to 0.48ha of pasture/forage, and 0.1ha each of wetland and forest, totalling less than 0.7ha of non-cultivated habitat. In consideration of pasture/forage also representing agricultural activity, only 0.2ha of non-agricultural habitat (i.e. wetland and forest) is proposed for long-term temporary removal.

**Table 47. Summary of Land Cover and Use within Different Project Area Extents**

| Land Cover Class | Operational Footprint | | CDA | | LSA | |
|---|---|---|---|---|---|---|
| | Area (ha) | % | Area (ha) | % | Area (ha) | % |
| Agriculture | 19.15 | 96.3 | 177.67 | 94.7 | 9,366.02 | 77.8 |
| Pasture/Forage | 0.48 | 2.4 | 6.65 | 3.5 | 347.30 | 2.9 |
| Dugout Pond | 0.00 | --- | 0.00 | --- | 0.95 | <0.1 |
| Ephemeral Waterbody (Class I) | 0.05 | 0.3 | 0.17 | 0.1 | 3.55 | <0.1 |
| Wetland | 0.10 | 0.5 | 2.33 | 1.2 | 940.03 | 7.8 |
| Native Grassland | 0.00 | --- | 0.00 | --- | 502.47 | 4.2 |
| Shrubland | 0.00 | --- | 0.00 | --- | 321.13 | 2.7 |
| Forest | 0.10 | 0.5 | 0.86 | 0.5 | 559.23 | 4.6 |
| Transmission Corridor | 0.00 | --- | 0.00 | --- | 5.24 | <0.1 |
| **TOTAL** | **19.88** | | **187.68** | | **12,045.93** | |

Further, the changes in habitat quantity, either for short-term or long-term effects, are generally limited to small overlaps with several features. This is considered to be a preferred approach, relative to full removal of fewer features, as it preserves the overall habitat complex present within the LSA, and although it results in specific effects to localized portions of individual habitats, it maintains the same habitat diversity within the Project Area.

In consideration of species of conservation concern, although certain Project activities are proposed to occur within the recommended activity setbacks (Table 42), no activities are proposed with the expected habitat itself, and therefore no change in habitat quantity is expected for species of conservation concern.

*Change in Habitat Quality*

Change in habitat quality has the potential to occur as a result of activities associated with all phases of the Project, although the likelihood of habitat degradation is lowest during the operational phase of the Project.

Wildlife habitat within the Project Area have the potential to be degraded, even if they are not removed, through indirect effects from Project activities, such erosion and sedimentation, dust, and/or spills of foreign substances (e.g. oil, gasoline, lubricants, etc.). Any degradation of wildlife habitat could impact breeding, juvenile success, overwinter, and/or other important life cycle functions.

During the construction and decommissioning phases, the proposed ground disturbance and vegetation removal has the potential to result in an increase in erosion and sedimentation effects on nearby habitats, and the increased use of the Project Area by vehicles and construction equipment increases the possibility of localized chemical spills as well as increases the potential for localized dust resulting from increased travel on unpaved municipal roads, within agricultural fields, and on newly created access roads. During the operations phase, the potential for habitat degradation is reduced, compared to other Project phases, but still includes an increase in vehicle traffic relative to baseline conditions, and therefore increases the potential for habitat degradation.

In consideration of existing activities within the Project Area, the majority of land is actively cultivated, which requires occasional use of moderately heavy agricultural equipment, soil disruption, and application of chemical pesticides and herbicides, all of which contribute to a baseline condition of ongoing effects that can impact the habitat quality of features within the Project Area.

The potential effects associated with changes to habitat quality are generally localized, and although, in certain instances, they may be experienced within the LSA under certain weather conditions (e.g. strong winds, heavy precipitation), the effects are usually far more localized to areas adjacent to, or in the immediate vicinity of, Project activities (i.e. CDA). When considering the potential effects of changes in habitat quality, if left unmitigated, there are several potential wildlife habitats that occur in the immediate vicinity of the CDA, including numerous wetlands and tree stands (i.e. forest), as well as a small number of potential native grassland and shrubland habitats. One such potential native grassland is located adjacent to the CDA, but on a neighbouring quarter section. The other instances of native grassland and shrubland are small habitat patches located adjacent to existing roads, and are therefore likely to experience more effects from the unmitigated public use of these roads, than the potential effects associated with Project activities which are at greater distances than the adjacent roads.

In consideration of species of conservation concern, although certain Project activities are proposed to occur within the recommended activity setbacks (Table 42), the activities are still generally occurring at considerable distances (i.e. greater than 200m)

from detections of species of conservation concern, such that indirect effects within a predominantly cultivated landscape are not expected to increase as a result of Project activities. In one instance, a suspected active American Badger den is located approximately 15m from the CDA associated with the temporary activities to install underground collection. The den is located along an existing roadside, directly between cultivated fields and an existing dirt road. Although Project activities, if left unmitigated, have the potential to contribute to a change in habitat quality for this species of conservation concern, there exists a baseline condition of similar ongoing effects associated with agricultural activity and use of the adjacent dirt road.

*Change in Habitat Use*

Change in habitat use has the potential to occur during all phases of the Project, although the likelihood of habitat disturbance is lowest during the operational phase of the Project.

Wildlife behaviour, and resulting habitat use, has the potential to change during Project activities through increased general activity, noise, and artificial illumination, all of which have the potential to disturb local wildlife, such that it may change the ways they use habitats within the Project Area.

During the construction and decommissioning phases of the Project, there will likely be an increase, relative to baseline conditions, in noise, activity, and evening illumination. These disturbances have the potential to affect natural rhythms and behaviours of local wildlife or reduce the effectiveness of breeding calls/songs. Additional noise may also result in individuals remaining under cover for prolonged periods of time and/or may startle them into leaving cover and putting them at increased risk of predation and/or exposure to the elements. Although the full duration of the construction and decommissioning phases will extend several months, the localized effects of habitat disturbance at any individual feature will generally be experienced for brief durations (e.g. multiple days) as the construction crew(s) construct the linear access roads and install underground collections. Project activities associated with turbine erection typically result in potential disturbances for longer periods of time (e.g. multiple weeks), but since turbine locations have typically been placed further from natural features than access roads or collections, the relative effects are similarly minimized.

During operations, Project-related vehicle will occur at relatively low levels and operational turbines will produce low levels of background sound and may also result in localized increases in ambient lighting. These effects are expected to be minimal, relatively consistent with other existing activities (e.g. residential noise/lighting, agricultural activities, local traffic) and are expected to result in species acclimatization over time.

In consideration of species of conservation concern, although certain Project activities are proposed to occur within the recommended activity setbacks (Table 42), the

activities are still generally occurring at considerable distances (i.e. greater than 200m) from detections of species of conservation concern, such that potential changes in habitat use within a predominantly cultivated landscape are not expected to increase as a result of Project activities. In one instance, a suspected active American Badger den is located approximately 15m from the CDA associated with the temporary activities to install underground collection. The den is located along an existing roadside, directly between cultivated fields and an existing dirt road. Although Project activities, if left unmitigated, have the potential to contribute to a change in habitat use for this species of conservation concern, there exists a baseline condition of similar ongoing effects associated with agricultural activity and use of the adjacent dirt road.

*Change in Mortality Risk (General)*

Change in mortality risk (general) considers potential mortality risk to all wildlife, excluding birds and bats, which are specifically addressed in separate sub-sections below. Change in mortality risk (general) has the potential to occur during all phases of Project activities, although the likelihood of direct mortality is lowest during the operational phase of the Project.

During the construction and decommissioning phases of the Project, direct mortality of wildlife may occur during the site preparation activities, particularly those that are occurring within, or adjacent to, natural habitats. As discussed above, Project activities are largely confirmed to areas of agricultural land use, with relatively limited direct effects on natural habitats, which are more likely to be occupied by wildlife. Potential effects relating to mortality risk during these Project phases, if left unmitigated, are primarily associated with the vegetation removal and ground preparation within up to 6.65ha of pasture/forage, 2.33ha of wetland, and 0.86ha of forest, which are found overlapping the CDA. Additionally, the generally increased levels of machinery and vehicle traffic within the LSA have the potential to result in increased levels of road mortality.

During the operational phase, change in mortality risk may occur through interactions with Project vehicles, although the overall risk during the operational phase is quite low since the increase in vehicle traffic during operations, relative to baseline conditions, is very low.

There are few species of conservation concern that are not bird or bat species (which are discussed separately below). These species include Northern Leopard Frog, American Badger, and Monarch. Potential changes in mortality risk to American Badger and Monarch is considered to be low for both species, largely in consideration of their relative mobility, as well as the low potential for interaction between Project activities and suitable habitat. There is a potential increase in mortality risk for Northern Leopard Frog, as the species generally has limited mobility, is not readily visible, and is largely restricted to specific habitat features. In consideration of the single detection of this species, specific Project activities are located more than 230m from the species record; however the detection is found immediately adjacent to an existing road. Increased

vehicle traffic and heavy machinery presence on the existing road network has the potential to contribute to a change in mortality risk for Northern Leopard Frog, if left unmitigated.

*Change in Mortality Risk (Birds)*

Change in mortality risk (birds) has the potential to occur during all phases of Project activities, although the likelihood of direct mortality is greatest during the operational phase of the Project.

During construction and decommissioning phases of the Project, direct mortality of birds may occur as a result of site preparation activities or through interactions with increased vehicle traffic within the Project Area during these phases. In both cases, the high mobility of most bird species results in a relatively low potential for such effects, relative to baseline conditions.

During the operational phase of the Project, direct mortality can occur through direct collisions with operational turbines. There has been extensive monitoring of bird interactions with operational wind turbines, and there appear to be a variety of factors that may impact the likelihood and/or frequency of bird collisions, such as turbine lighting, local habitat features, and poor weather conditions.

In general, most nocturnal migrants fly at altitudes that are far higher than the height of operational turbines (d'Entremont et al. 2017), suggesting a relatively low risk of collision to migratory individuals. Further, most resident species spend the majority of their time relatively close to ground level, corresponding to vegetative cover and preferred foraging locations, rarely flying at heights overlapping with the rotor sweep area. The highest potential risk appears to be related to nights of poor weather conditions, forcing bird to fly at lower altitudes or to birds that are beginning or ending their migratory flight within the Project Area (i.e. ascending or descending through the rotor sweep area). Despite these various factors that may influence potential risk, bird collisions as a result of operational wind turbines are well studied and are generally considered to result in relatively low levels of mortality.

Bird populations of many species fluctuate greatly year-to-year, as do movement and behavioural patterns, and so mortality estimates cannot necessarily be extrapolated from baseline monitoring, nor can they be attributed to specific bird species or individual habitat. Instead, the potential increased risk to bird mortality is considered for birds, as a whole. Long-term mortality data is currently maintained in a centralized Wind Energy Bird and Bat Monitoring Database, which is led by Birds Canada, but is a joint initiative that also includes different provincial and federal government agencies and industry association representation. The most recent annual report (BSC et al 2018) summarizes bird mortality in regions that have a large enough sample size to summarize results, including for Alberta, Ontario, and Atlantic Canada. Operational projects in Saskatchewan are included in the larger dataset, but are not specifically summarized

since the sample size is relatively low. Based on summarized data for Alberta, which is considered to be a reasonable proxy for Saskatchewan facilities, an estimated fatality rate of 2.15 birds/turbine/year and 0.11 raptors/turbine/year is estimated. This estimated rate has already been adjusted to account for uncertainties, including searcher proficiency, scavenging activity, and the area within which the search is undertaken.

The majority of the bird mortalities are of passerine species, with Horned Lark (*Eremophila alpestris*), a common and secure species, accounting for more than 28% of all documented bird mortalities. Mallard (*Anas platyrhynchos*), a common waterfowl species with secure populations, is the next most abundantly documented mortality, accounting for 11.7% of all bird mortality. All other species each account for less than 5% of bird mortalities, suggesting that they are infrequent encounters.

Based on summarized mortality data for birds, it can be estimated that with an installation of 39 turbines could result in approximately 84 birds and 4 raptors each year in operation. These mortalities are largely expected to be of common species with secure populations, and therefore do not present any conservation concern.

In consideration of the bird species of conservation concern that have been detected within the Project Area, only the Sharp-tailed Grouse has been documented as a bird mortality at an operational wind project in Alberta, accounting for 0.34% of all bird mortalities documented (BSC et al 2018), which suggests an extremely low likelihood of collision risk. Although it is possible that any of these species of conservation concern may be directly affected by the operational turbines, available data suggests that the likelihood is extremely low for each individual species, and any effects will be chance encounters.

*Change in Mortality Risk (Bats)*

Change in mortality risk (bats) has the potential to occur during all phases of Project activities, although the likelihood of direct mortality is greatest during the operational phase of the Project.

During the construction phase of the Project, there is a potential for increased mortality risk to bats as a result of site preparation and vegetation clearing. Based on the high mobility of the species, the potential risk is limited to the removal of suitable roosting habitat (i.e. trees) at a time when they are currently inhabited by bats. Based on the relatively low amount of treed habitat overlapping the CDA (i.e. 0.86ha), the potential for Project activities to overlap with an occupied bat roost is considered to be very low.

During the operational phase of the Project, there is a potential for local and migratory bat individuals to interact with spinning turbine blades, which have the potential to result in injury or mortality. Although it has been speculated that certain attributes of the infrastructure, such as the navigation lights, mechanical warmth, or general profile of the turbine on the landscape, may attract bats to the turbines, none of these hypotheses

have been proven and it remains most likely that each mortality is an isolated encounter between the individual bat and that turbine.

There has been extensive monitoring of operational wind energy facilities across North America, resulting in a strong understanding of seasonal patterns, species most likely to be impacted, weather influences, and in some instances nightly bat activity may also be used to identify periods of mortality risk. This understanding is further supported by the summarized data of the centralized Wind Energy Bird and Bat Monitoring Database (BSC et al 2018).

Seasonal risk of bat mortality is highest during the fall migration period, and although the specific date range may vary at different geographies, slight increases in mortality risk begin in mid-July, with highest potential mortality risk occurring from early August to early September (BSC et al 2018). Mortality risk during the spring and summer are typically low, and in most geographies the mortality risk from October onwards is considered negligible (BSC et al 2018).

Typically, bat species that are most likely to be impacted by operational wind turbines are the three migratory species that are most common across Canada, Hoary Bat, Eastern Red Bat, and Silver-haired Bat. The specific mortality risk, however, does vary by species range, habitat availability, landscape features, and other environmental considerations. Although the Wind Energy Bird and Bat Monitoring Database Summary (BSC et al 2018) doesn't have enough data to summarize the species composition in Saskatchewan, the Alberta summary indicates that Hoary Bat and Silver-haired Bat combine to account for 94% of all bat mortality in this region, which is generally consistent with the species composition documented during site-specific monitoring conducted at the Project. Further, Big Brown Bat accounts for another 4.4%, while Eastern Red Bat and Little Brown Myotis combine for less than 2% of the documented bat mortalities at operational sites in Alberta.

Although the risk of bat mortality can vary considerably between Projects, the Wind Energy Bird and bat Monitoring Database Summary (BSC et al 2018) indicates an estimated bat mortality rate of approximately 6.33 bats/turbine/year in the Alberta region. This estimated rate has already been adjusted to account for uncertainties, including searcher proficiency, scavenging activity, and the area within which the search is undertaken. In absence of specific summarized results from Saskatchewan, if the Alberta region is assumed to present a similar risk profile, the 39 proposed turbines have the potential to result in 247 bat mortalities/year, if left unmitigated.

In consideration of the only bat species of conservation concern detected at the Project, Little Brown Myotis, this species typically represents a small proportion (0.46%) of bat mortalities in Alberta (BSC et al 2018). Calls of this species recorded at the site represented a similarly low proportion (0.8%) of all recorded bat calls, reinforcing the presumed low potential for this species being affected by operational turbines. By

extrapolating the estimating bat rate (6.33 bats/turbine/year) and proportion of Little Brown Myotis (0.46%), it's possible to estimate that, across all operational turbines, one mortality of Little Brown Myotis may occur each year.

### 7.4.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the potential effects of the Project on wildlife and wildlife habitat. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 48. Overview of Mitigation Measures Relating to Wildlife and Wildlife Habitat**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Change in Habitat Quantity | • Clearly delineate all work areas that occur in, or within 10m of, a wetland or forest/tree stand using erosion fencing or other suitable barrier to avoid accidental damage to adjacent wildlife habitat.<br>• When working in wetlands or forest/tree stand, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, to the extent possible.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical. | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |
| Change in Habitat Quality | • Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any non-cultivated feature, including away from pasture/forage land use.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications). | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| | • Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated feature, including away from pasture/forage habitats.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical. | |
| Change in Habitat Use | • Schedule all Project activities that occur within 400m of identified Sharp-tailed Grouse lek sites to occur outside of March 15 to May 15.<br>• Schedule construction activities to occur during daylight hours to avoid excessive noise and/or light disturbances, wherever practical.<br>• Project lighting will be minimized, down-shielded, and/or controlled by proximity or motion sensors, wherever practical. | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |
| Change in Mortality Risk (General) | • No vegetation removal or direct impacts to non-cultivated wetlands will occur from April 15 to August 16, unless approved by a Qualified Professional. This period is expected to cover breeding/nesting periods for amphibians, birds, and bats, which have the potential to be affected. Wildlife 'sweeps' by a Qualified Professional may be used during this period to confirm if wildlife are or are not, likely to be present and/or impacted by activities done during this time frame.<br>• On-site speed limits will be established, will be communicated to, and expected to be followed by, all on-site personnel.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint. | **Yes**<br><br>Residual effects are expected during the construction and decommissioning phases. |
| Change in Mortality Risk (Birds) | • Using a lighting scheme that minimizes turbine lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable Transport Canada requirements for aviation safety.<br>• Develop, and follow, and Adaptive Management Plan (AMP) in accordance with provincial guidance documents. | **Yes**<br><br>Residual effects are expected during the operational phase. |
| Change in Mortality Risk (Bats) | • Using a lighting scheme that minimizes turbine lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable Transport Canada requirements for aviation safety.<br>• Develop, and follow, an AMP in accordance with provincial guidance documents. | **Yes**<br><br>Residual effects are expected during the operational phase. |

The implementation of proven avoidance, minimization, and mitigation measures, as described above, are expected to contribute notably towards the reduction of potential negative effects to wildlife and wildlife habitat. Despite the implementation of proven and effective mitigation measures, it is expected that Project activities will still result in residual effects. The consideration of residual effects, as separated by Project phase, has been summarized in Table 49 below.

**Table 49. Residual Effects Assessment to Wildlife and Wildlife Habitat**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| **Construction** | | | | | | |
| Change in Habitat Quantity | L | F | MT | R | O | No |
| Change in Habitat Quality | L | L | ST | R | S | No |
| Change in Habitat Use | L | L | T | R | S | No |
| Change in Mortality Risk (General) | N | F | T | R | S | No |
| **Operations** | | | | | | |
| Change in Mortality Risk (Birds) | L | R | MT | R | R | No |
| Change in Mortality Risk (Bats) | L | R | MT | R | R | No |
| **Decommissioning** | | | | | | |
| Change in Habitat Quantity | L | F | ST | R | O | No |
| Change in Habitat Quality | L | L | ST | R | S | No |
| Change in Habitat Use | L | L | T | R | S | No |
| Change in Mortality Risk (General) | N | F | T | R | S | No |

*Mag; Magnitude*
*N – Negligible*
*L – Low*
*M – Moderate*
*H - High*

*GE; Geographic Extent*
*F - Footprint*
*L – Local*
*R - Regional*

*Dur; Duration*
*T – Temporary*
*ST – Short-term*
*MT – Medium-term*
*LT – Long-term*

*Rev; Reversibility*
*R – Reversible*
*I - Irreversible*

*Freq; Frequency*
*O – Once*
*S – Sporadic*
*I – Intermittent*
*R – Regular*
*C - Continuous*

The siting of the Project, largely within areas of existing disturbance, is an important consideration in the effects assessment and resulting residual effects, in combination with the implementation of mitigation measures that include proven techniques to avoid, mitigate, and/or minimize potential effects. Further, the development of an AMP, and the associated monitoring, presents an additional assurance that an adaptive strategy will be implemented during the operational phase, as necessary, to ensure that residual effects are maintained at acceptable levels.

*Magnitude*

Potential effects are generally considered to be negligible to low in magnitude, as they are expected to result in detectable effects, relative to baseline conditions, but are generally within an expected range of disturbance that may happen as a result of other ongoing activities. In consideration of the change in mortality risk to bats during the operational phase, unmitigated risks have the potential be to higher than those for birds; however there are proven mitigation measures than can be implemented, as needed, which result in a residual magnitude of low.

*Geographic Extent*
The residual effects associated with wildlife and wildlife habitat are generally limited to the Project Footprint, or in the immediately surrounding area, with the exception of the change in mortality risk to birds and bats during the operational phase, which may include mortalities of migratory species, which could, in turn, affect species composition in other geographic areas.

*Duration*
The duration of the potential effects to wildlife and wildlife habitat are variable, depending on the specific effect; however all effects are considered to have a duration of moderate-term or shorter, indicating that the effects are not expected to extend beyond the anticipated life of the Project.

*Reversibility*
All of the residual effects are considered to be reversible through a combination of natural processes and specific reclamation activities. During the reclamation activities that will be taken after the construction phase and again at the end of the Project life, specific efforts will be made to reclaim non-cultivated habitats to baseline conditions. Other residual effects, including changes to habitat quality and use, as well as changes to mortality risk, are all expected to be reversible through natural process over time.

*Frequency*
Changes to habitat quantity has been considered to be a one-time event, since the habitat itself can only be lost once. Changes in habitat quality and habitat use, as well as changes to mortality risk (excluding birds and bats) are all considered to be sporadic events as each specific effect is not predictable, and is expected to occur at relatively infrequent intervals due to the implementation of proven mitigation measures. The change in mortality risk to both birds and bats is well studied, and it is therefore known to present a relatively predictable effect that occurs during regular intervals, and at certain times of year, during the operational phase of the Project.

*Significance*
The overall assessment of residual effects relating to wildlife and wildlife habitat has resulted in a determination that residual effects will be **Not Significant**. This determination considers the existing conditions, Project siting and proposed activities, effects assessment, mitigation measures, and the resulting characterization of residual effects that may be incurred as a result of Project activities.

### 7.4.3 Monitoring Program

Specific to the potential residual effects that may be experienced by wildlife, and wildlife habitat, it is recommended that a Qualified Professional be retained to carry out Environmental Construction Monitoring during both the construction and decommissioning phases to assess the effectiveness of the implemented mitigation

measures, identify any deficiencies, and make any additional recommendations based on the observed results.

Additional details relating to the recommended monitoring program are provided in the Environmental Management Plan (Appendix X).

In addition, at least two years of operational monitoring for bird and bat mortality should occur at the Project, in accordance with an Adaptative Management Plan (Appendix XI). This plan provides details relating to the monitoring effort, timing, and duration, and also includes an adaptive management framework to adapt Project activities should any of the bird or bat management triggers be exceeded. The development, and implementation, of this plan provides further assurance that residual effects can, and will, be maintained at acceptable levels that do not present management concerns.

## 7.5 Acoustic Environment

Typical wind farm construction and operation activities have the potential to affect the acoustic environment at the local level. The assessment of impacts is evaluated relative to the specific PoRs (i.e. local residences) that are found within 1.5km of a wind turbine or substation.

### 7.5.1 Effects Assessment

The following effects assessment considers the potential effects, if left unmitigated, on the acoustic environment. The results of the effects assessment are then used to inform the type, extent, and/or location of mitigative activities to ensure potential effects are effectively minimized. In consideration of the conditions within the LSA and specific turbine characteristics, the following two potential effects have been considered:

- Change in Environmental Noise (Construction and Decommissioning); and
- Change in Environmental Noise (Operations).

Each of these potential effects has been in more detail within the following sections.

*Change in Environmental Noise (Construction and Decommissioning)*
Project activities associated with the construction, installation, and decommissioning of Project infrastructure will generate noise through the use of heavy machinery (e.g. bulldozers, plows, cranes, etc.), by the presence of workers, and by Project-related traffic to and from the Project Area. Access road preparations, foundation construction or removal, delivery of materials, and erection and dismantling of turbines are the activities that are expected to create the most noise. The contribution to baseline noise levels will be limited to the specific work areas, and the immediate vicinity. The construction and decommissioning activities are expected to be comparable to regular construction activities and certain agricultural activities, which are already occurring

throughout the LSA. Furthermore, the potential effects associated with construction and decommissioning noise will be temporary and will occur during relatively brief periods at any given location.

*Change in Environmental Noise (Operation)*

During the operational phase, potential effects on the acoustic environment will mainly originate from the operation of the wind turbines and substation. In absence of noise regulations for wind energy projects in Saskatchewan, the Proponent elected to implement a best practice approach by ensuring compliance with Alberta's noise regulation (AUC Rule 012), which is one of the most stringent in Canada. A desktop acoustic modelling assessment was carried out according to this regulation to evaluate the potential effects of these additional noise sources on the acoustic environment and confirm that turbine and substation locations are compliant. The results are summarized below and are explained in more detail in the full Noise Impact Assessment (NIA) report presented in Appendix IX.

The analysis was carried out for all 24 validated PoRs within 1.5km of a proposed turbine or the substation transformer. The results were compared to the applicable PSL of 40dBa (nighttime) and 50dBa (daytime) at all PoRs.

It was determined that the cumulative sound pressure level (i.e. the sound level contribution of the project plus the ASL) at each PoR complies with the applicable nighttime PSL of 40dBA, provided that one turbine (T41) operates in a reduced noise mode at night (defined as 10pm to 7am in Rule 012). During daytime operations, all turbines may operate at maximum output without exceeding the daytime PSL of 50dBA. The highest modelled nighttime sound power level is 40dBA at two PoRs near the transformer, and one receptor near T41. When excluding the ASL in the cumulative noise assessment, all receptors are below 39dBA. It should be noted that the modeling of sound pressure levels uses conservative assumptions and as such is likely to overestimate noise levels calculated at PoRs.

As the Project complies with AUC Rule 012, the noise effect is expected to be low, and is not expected to cause disturbance or other adverse impact to local residents.

### 7.5.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the potential effects of the Project on the acoustic environment. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 50. Overview of Mitigation Measures Relating to Environmental Acoustic Impact**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Change in Environmental Noise (Construction and Decommissioning) | • Implement a construction and traffic management plan.<br>• Limit noise-producing construction activities to daytime and early evening hours (0700 to 1900hrs), to the extent feasible.<br>• Limit vehicle speeds on access roads to 40km/hr.<br>• Inform local residents of scheduled significant noise-producing activities.<br>• Maintain all vehicle and machinery in good working order. | **Yes**<br><br>Residual effects are predicted to occur during the construction and decommissioning phases. |
| Change in Environmental Noise (Operations) | • Perform regular maintenance on all wind turbines to ensure proper functioning and minimization of excessive mechanical noise caused by wear.<br>• One turbine (T41) will operate in a noise reduce mode at night (2200hrs to 0700hrs).<br>• Regular maintenance will be performed on all wind turbines to ensure proper functioning and minimization of excessive mechanical noise caused by wear. | **Yes**<br><br>The Project will be compliant with permissible sound levels at PoRs, but residual effects are predicted to occur during the operational phase. |

The implementation of the mitigation measures described above is expected to noticeably reduce the potential negative effects on the acoustic environment. The consideration of residual effects for construction and operation phases has been summarized in Table 51 below.

**Table 51. Residual Effects Assessment of Environmental Acoustic Impact**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| Change in Environmental Noise (Construction and Decommissioning) | L | L | T | R | S | No |
| Change in Environmental Noise (Operations) | L | L | MT | R | C | No |

*Mag; Magnitude*
*N – Negligible*
*L – Low*
*M – Moderate*
*H - High*

*GE; Geographic Extent*
*F - Footprint*
*L – Local*
*R - Regional*

*Dur; Duration*
*T – Temporary*
*ST – Short-term*
*MT – Medium-term*
*LT – Long-term*

*Rev; Reversibility*
*R – Reversible*
*I - Irreversible*

*Freq; Frequency*
*O – Once*
*S – Sporadic*
*I – Intermittent*
*R – Regular*
*C – Continuous*

*Magnitude*
Potential effects on the acoustic environment are expected to be detectable but will remain within reasonable levels during the construction and decommissioning phases and within allowable limits during the operations phase. Therefore, the magnitude of the effect is considered low for both construction and operation noise.

*Geographic Extent*
The residual effects associated acoustic effects, during all phases of the Project are considered to be local, as they are limited to the immediate vicinity of the Project.

*Duration*
The duration of effects associated with acoustic environment during construction will be temporary, as they will no longer be discernible after construction activities are completed. The duration of the effects associated with environmental noise during the operational phase is considered to be medium-term as the effect will be resolved within the Project life.

*Reversibility*
All effects associated with environmental noise are considered to be reversible. Construction noise will cease once the Project is operational, and operational noise will cease after the Project is decommissioned.

*Frequency*
Environmental noise will only occur sporadically for the duration of construction activities. During the operational phase, environmental noise will occur continuously for the duration of the Project lifetime, as long as the turbines remain operational, and when there is a sufficient resource to produce energy.

*Significance*
With the implementation of applicable mitigation measures during construction and the determination of compliance with Rule 012, residual effects associated with environmental noise are considered to be **Not Significant**.

### 7.5.3 Monitoring Program

No specific monitoring program will be implemented at the Project. During construction and operations, local residents and landowners will be kept updated of the Project status and will have full-time access to Project representatives to express any concerns with respect to noise levels. The Proponent will follow-up with these residents as needed.

## 7.6 Biophysical Best Practices

In addition to the site-specific mitigation measures that have been detailed in the various sub-sections earlier in this EIS, several of VCs that were considered for potential effects were determined to be sufficiently avoided and/or minimized through the implementation of industry best practices. These generally include standardized mitigation measures that are implemented at most similar developments, regardless of the site-specific characteristics, and which are proven to be effective at minimizing potential effects associated with similar Project activities. Best management practices that will be implemented during Project activities are summarized in Table 52 below.

**Table 52. Biophysical Best Management Practices**

| **Biophysical Best Management Practices** |
|---|
| **Construction (and Decommissioning)** |
| ***General*** |
| • If a new and/or previously identified habitat or wildlife observation is documented (or suspected), consider applicable timing windows, setbacks, and/or mitigation measures to minimize potential effects, consistent with the approach taken within this EIS.<br>• Actual areas of disturbance within the CDA, particularly those requiring vegetation removal and/or soil disturbance, shall be limited to the smallest practical area.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• Retain an ECM to monitor and advise on Project activities to ensure that mitigation measures are working efficiently and any potential deficiencies are quickly identified and corrected. The extent of ECM involvement may vary based on time of year, type of Project activities, weather conditions, etc.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM. |
| ***Soils*** |
| • Where topsoil stripping is required, separate topsoil and from underlying layers in different piles at least 1m apart. Replace the soil in reverse order of excavation, to preserve organic content and native seedbank.<br>• Soil stockpiles will be maintained at low profiles, and will be covered and/or stabilized to minimize erosion.<br>• Soil handling should not occur during high wind or high precipitation events.<br>• The ECM will regularly monitor soil handling, soil conditions, and soil stockpiles to ensure soil is not degraded and remains suitable for reclamation activities. |
| ***Flora, Wetlands, and Watercourses*** |
| • Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• When working in non-cultivated habitats, particularly those with native vegetation, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, direct plough techniques, and/or horizontal boring, to the extent possible.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any native habitat.<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland or non-agricultural habitat (e.g. tree stand, native grassland, etc.).<br>• Construction vehicles and equipment entering or leaving the site should be inspected for, and cleaned of, any soil or vegetation debris.<br>• Cross watercourses in dry conditions. |

| Biophysical Best Management Practices |
|---|
| • Develop, and implement, a Weed Management Plan. |
| ***Wildlife and Wildlife Habitat*** |
| • Clearly delineate all work areas that occur in, or within 10m of, any non-cultivated and non-pasture, using erosion fencing or other suitable barrier to avoid accidental damage to adjacent wildlife habitat.<br>• Prior to any construction activity occurring in, or within, 10m of a non-cultivated wetland between March 15 and October 31, a Qualified Professional will undertake an assessment of potential effects to amphibians and will make any additional recommendations, as appropriate.<br>• Prior to any construction activity occurring in, or within, 10m of a non-cultivated habitat (e.g. pasture, wetland, forest, etc.) between April 15 and August 16, a Qualified Professional will undertake a breeding bird nest search of the affected habitat(s) to ensure compliance with the MBCA.<br>• On-site speed limits will be established, will be communicated to, and expected to be followed by, all on-site personnel. |
| **Operations** |
| ***General*** |
| • If any Project-related activity is required to occur beyond the limits of the original CDA, a Qualified Professional should be consulted prior to initiation of the activity(ies).<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations. |
| ***Flora, Wetlands, and Watercourses*** |
| • Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated feature, including away from pasture/forage habitats.<br>• Site vehicles and equipment entering or leaving the site should be inspected for, and cleaned of, any soil or vegetation debris. |
| ***Wildlife and Wildlife Habitat*** |
| • If guy wires are required on new MET installations, use visible markers along the wires to minimize the potential for avian collisions.<br>• Lighting of ground infrastructure (i.e. non-turbine) will be minimized, down-shielded, and/or controlled by proximity or motion sensors, wherever practical.<br>• Using a turbine lighting scheme that minimizes lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable Transport Canada requirements for aviation safety.<br>• On-site personnel will be trained in how to respond if a wildlife fatality is encountered.<br>• On-site speed limits will be established, will be communicated to, and expected to be followed by, all on-site personnel.<br>• Develop, and follow, an AMP in accordance with provincial guidance documents. |
| **Reclamation** |
| ***General*** |
| • Re-vegetate all non-cultivated temporary disturbance areas as soon as practical.<br>• During reclamation, re-grade the local landscape, as necessary, to return original surface drainage patterns.<br>• In areas of topsoil replacement, spread as evenly as possible.<br>• In areas of reclamation, ESC measures shall remain in place until the ECM, or other Qualified Professional, has inspected the area(s) to confirm ESC measures are no longer necessary. |

## 7.7 Summary of Biophysical Effects Assessment

A detailed effects assessment of the identified biophysical VCs has been carried out in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a). This assessment has considered the proposed Project activities, existing conditions, and is informed by a clear and documented evidence of

the potential effect pathways and effective mitigation measures for the construction and operation of wind energy generating facilities.

The detailed effects assessment of the four biophysical VCs, flora, wetlands and watercourses, wildlife and wildlife habitat, and the acoustic environment, has identified several potential effects that would be likely, if Project activities were left unmitigated. The consideration of potential effects was used to develop a suite of site-specific mitigation measures that would be implemented during certain Project activities to avoid, minimize, or mitigate these potential effects.

In consideration of the detailed mitigation strategies, there was determined to be a reasonable potential for residual effects to exist, even after mitigation measures were applied. The detailed characterization of these residual effects generally determined that they would be relatively low in magnitude, were largely confined to the CDA or LSA, and most importantly were all considered to be reversible effects and none were considered to extend beyond the life of the Project. Despite the potential for residual effects after the implementation of mitigation, all were determined to be not significant, as the residual effects might be detectable, but are not likely to result in substantial change that will alter the VC status beyond an acceptable level.

In addition to site-specific mitigation strategies, the Project will also adhere to several industry best practice mitigation measures that are typically implemented at similar developments, and several monitoring commitments will occur within each phase of the Project to continue to monitor the realized effects and inform any necessary adaptations to continue to avoid and/or minimize potential biophysical effects.

*Consideration of Alternate Turbine Locations*

Alternate turbine locations, as presented within this submission, have relied on the same overall siting strategy as the currently proposed infrastructure, namely siting within cultivated fields. These locations also comply with the Project's demonstrated approach to applying biophysical setbacks, and are therefore expected to follow a similar effects pathway and determination of residual effects, as concluded for the currently proposed infrastructure. Further, the Project is committed to maintaining compliance with the AUC Rule 012 (AUC 2021) should any of these alternate turbines be incorporated into design revisions.

# 8.0 Socio-Economic and Cultural Environment Effects Assessment, Mitigation, and Monitoring

A detailed effects assessment of the identified socio-economic and cultural VCs has been carried out in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a). This assessment has considered the proposed Project activities, existing conditions, and a strong understanding of the potential effect pathways for the construction and operation of a wind energy generating facility, as gained through considerable experience with similar developments.

## 8.1 Land Use

Project design and siting efforts have resulted in the vast majority of the CDA (94.7%) being sited within existing areas of agriculture, and another 3.5% within pasture/forage habitat. Further, the Project design approach, as explained in previous sections, has applied setbacks to relevant infrastructure and other land uses found in the LSA, such as dwellings, lot lines, roads, oil and gas wells, and transmission lines. As such, the remaining impact of this Project on land use is essentially limited to the consideration of agricultural operations.

### 8.1.1 Effects Assessment

The following effects assessment considers the potential effects, if left unmitigated, land use, with specific consideration agricultural operations. The results of the effects assessment are then used to inform the type, extend, and/or location of mitigative activities to ensure potential effects are effectively minimized. The following potential effect has been considered:

- Reduction of Agricultural Land

This potential effect has been considered relative to the three phases of Project activities: Construction, Operation, and Decommissioning, as described in the following sections.

*Reduction of Agricultural Land*

During construction, a temporary loss of land will occur within the CDA. The total agricultural area that will be affected is estimated to be 178ha during this phase. The dimensions of the CDA were determined on the basis of the Proponent's experience designing, developing, and constructing other wind farms undertaken, and was designed to limit the overall area that would be disturbed during construction. The full extent of the CDA is considered to provide a conservative "worst-case" scenario of the potential effects to agricultural land.

During operations, and after site reclamation at the end of the construction phase, a long-term loss of land will occur on the areas required for the Project, which is equivalent to 19ha, which is approximately 10% of the agricultural land used for the CDA, and equates to approximately 0.5ha per turbine. Once again, a conservative approach was used to determine the extent of the Operational Footprint. Further, turbine pads are not fenced and permanent roads on agricultural land are built below-grade to allow for farming machinery to easily travel on these areas, which result in relatively symbiotic activities.

During decommissioning, a temporary loss of land will occur on an area comparable to the CDA, with the exception of the underground collector system footprint, as it is anticipated that the collector system will not be fully removed.

### 8.1.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the potential effects of the Project on agricultural land. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 53. Overview of Mitigation Measures Relating to Land Use**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Reduction of Agricultural Land | • The Proponent commits to not impact agricultural land in exceedance of the total CDA amounts, as depicted in this EIS.<br>• Implement site reclamation immediately following the construction phase.<br>• The Proponent commits to not impact agricultural land in exceedance of the total Operational Footprint, as depicted in this EIS.<br>• Consult with landowners on the Project location and take into account, to the extent feasible, comments on location of roads, turbines and collector system.<br>• Compensate landowners for crop damage per provisions in the ground lease.<br>• Apply decommissioning and reclamation measures at the end of the Project life. | **Yes**<br><br>Residual effects are expected during all phases of the Project. |

The implementation of proven avoidance, minimization, and mitigation measures, as described above, are expected to contribute notably towards the reduction of the effect on agricultural land use. The consideration of residual effects has been summarized in Table 54 below.

**Table 54. Residual Effects Assessment to Land Use**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| **Construction** | | | | | | |
| Reduction of Agricultural Land | L | F | ST | R | O | No |
| **Operations** | | | | | | |
| Reduction of Agricultural Land | N | F | MT | R | O | No |
| **Decommissioning** | | | | | | |
| Reduction of Agricultural Land | L | F | ST | R | O | No |

| *Mag; Magnitude* | *GE; Geographic Extent* | *Dur; Duration* | *Rev; Reversibility* | *Freq; Frequency* |
|---|---|---|---|---|
| *N – Negligible* | *F – Footprint* | *T – Temporary* | *R – Reversible* | *O – Once* |
| *L – Low* | *L – Local* | *ST – Short-term* | *I - Irreversible* | *S – Sporadic* |
| *M – Moderate* | *R – Regional* | *MT – Medium-term* | | *I – Intermittent* |
| *H – High* | | *LT – Long-term* | | *R – Regular* |
| | | | | *C - Continuous* |

*Magnitude*

Potential effects are generally considered to be low in magnitude during construction/decommissioning, as they are expected to result in detectable effects, relative to baseline conditions, but are generally within an expected range of disturbance that may be expected as a result of other ongoing activities. The magnitude during operations is considered negligible.

*Geographic Extent*

The residual effects to agricultural land use is considered to be limited to the Project Footprint.

*Duration*

The duration of the removal of agricultural land presents a moderate-term residual effect, as the land lost as a result of Project infrastructure will be reclaimed as part of the decommissioning phase of the Project.

*Reversibility*

All of the residual effects are considered to be reversible given the site reclamation strategy which will return the area to agriculture.

*Frequency*

Removal of agricultural land is considered to be a one-time event during each Project phase, since the land itself can only be lost once.

*Significance*

The overall assessment of residual effects relating to agricultural land has resulted in a determination that residual effects will be **Not Significant**. This determination considers the existing conditions, Project siting and proposed activities, effects assessment, mitigation measures, and the resulting characterization of residual effects that may be incurred as a result of Project activities.

### 8.1.3 Monitoring Program

Given the low magnitude of the residual effect, no monitoring program is planned for this component.

## 8.2 Land Use – Cowessess First Nation Reserve Land

Project design and siting efforts have resulted in the vast majority of the CDA on the CFN reserve lands being sited within existing areas of agriculture. Further, the approach to Project design, as explained in previous sections, has applied setbacks to relevant infrastructure and other land uses found in the LSA, such as dwellings, lot lines and roads. As such, the remaining impact of this Project on CFN reserve land use is essentially limited to potential effects to agricultural operations.

### 8.2.1 Effects Assessment

The following effects assessment considers the potential effects, if left unmitigated, on land use on CFN reserve lands, with specific consideration agricultural operations. The results of the effects assessment are then used to inform the type, extend, and/or location of mitigative activities to ensure potential effects are effectively minimized. The following potential effect has been considered:

- Reduction of Agricultural Land

This potential effect has been considered relative to the three phases of Project activities: Construction, Operation, and Decommissioning, as described in the following sections.

*Reduction of Agricultural Land*

During construction, a temporary loss of land will occur within the CDA. The total agricultural area that will be affected is estimated to be 5.3ha during this phase. The extent and dimensions of the CDA was determined based on the considerable experience of the Proponent with designing, developing, and constructing several other wind farms, and was designed to limit to the amount of land disturbed during construction, to the extent possible. The extent of the CDA is considered to provide a conservative “worst-case” scenario of the potential effects to agricultural land.

During operations, and after site reclamation at the end of the construction phase, a long-term loss of agricultural land will occur on the areas required for the Operational Footprint, which is equivalent to 0.46ha. This area represents approximately 8.6% of the area of agricultural land within the CDA, and less than 0.3% of the total agricultural land, as considered specifically on CFN reserve lands. Once again, a conservative approach was used to determine the extent of the Operational Footprint. Further, turbine pads are not fenced and permanent roads on agricultural land are built below-grade to allow for farming machinery to easily travel on these areas.

During decommissioning, a temporary loss of land will occur on an area comparable to the CDA, with the exception of the underground collector system footprint, as it is anticipated that the collector system will not be removed, in its entirety.

### 8.2.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the potential effects of the Project on agricultural land. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 55. Overview of Mitigation Measures Relating to Land Use**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Reduction in Agricultural Land | • The Proponent commits to not impact agricultural land in exceedance of the total CDA amounts, as depicted in this EIS.<br>• Implement site reclamation immediately following the construction phase.<br>• The Proponent commits to not impact agricultural land in exceedance of the total operations footprint, as depicted in this EIS.<br>• Consult with CFN on the Project location and take into account, to the extent feasible, comments on location of roads, turbines and collector system.<br>• Compensate CFN during construction and operations (construction phase payments, crop damage payments, annual rent) per provisions in the ground lease.<br>• Apply decommissioning and reclamation measures at the end of the Project life. | **Yes**<br><br>Residual effects are expected during all phases of the Project. |

The implementation of proven avoidance, minimization, and mitigation measures, as described above, are expected to contribute notably towards the reduction of the effect on agricultural land use. The consideration of residual effects has been summarized in Table 56 below.

**Table 56. Residual Effects Assessment to CFN Reserve Lands**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| **Construction** | | | | | | |
| Reduction in Agricultural Land | L | F | ST | R | O | No |
| **Operations** | | | | | | |
| Reduction in Agricultural Land | N | F | MT | R | O | No |
| **Decommissioning** | | | | | | |
| Reduction in Agricultural Land | L | F | ST | R | O | No |

*Mag; Magnitude* *N – Negligible*
*GE; Geographic Extent* *F – Footprint*
*Dur; Duration* *T – Temporary*
*Rev; Reversibility* *R – Reversible*
*Freq; Frequency* *O – Once*

| | | | | |
|---|---|---|---|---|
| *L – Low* | *L – Local* | *ST – Short-term* | *I - Irreversible* | *S – Sporadic* |
| *M – Moderate* | *R – Regional* | *MT – Medium-term* | | *I – Intermittent* |
| *H – High* | | *LT – Long-term* | | *R – Regular* |
| | | | | *C - Continuous* |

*Magnitude*

The potential effect is considered to be low in magnitude during construction/decommissioning, as the total decrease in agricultural land is marginal, and is expected to result in detectable effects, relative to baseline conditions, but is generally within an expected range of disturbance that may be expected as a result of other ongoing activities. The magnitude during operations is considered negligible.

*Geographic Extent*

The residual effects to agricultural land use are considered to be limited to the Project Footprint.

*Duration*

The duration of the removal of agricultural land presents a moderate-term residual effect, as the land lost as a result of Project infrastructure will be reclaimed as part of the decommissioning phase of the Project.

*Reversibility*

All of the residual effects are considered to be reversible given the site reclamation strategy which will return the area to agriculture.

*Frequency*

Removal of agricultural land is considered to be a one-time event during each Project phase, since the land itself can only be lost once.

*Significance*

The overall assessment of residual effects relating to agricultural land has resulted in a determination that residual effects will be **Not Significant**. This determination considers the existing conditions, Project siting and proposed activities, effects assessment, mitigation measures, and the resulting characterization of residual effects that may be incurred as a result of Project activities.

### 8.2.3 Monitoring Program

Given the low magnitude of the residual effect, no monitoring program is planned for this component.

## 8.3 Archaeology and Heritage Resources

Ground disturbance due to certain construction activities have the potential to affect archaeology and heritage resources should such resources be present on the CDA. Any such effects would occur during the construction phase.

As indicated in Section 6.3, a request for review to HCB was submitted on December 10, 2021, by CanNorth's Heritage department. Preliminary assessment from CanNorth suggests the Project may have limited, to no, effects to this VC as the CDA is almost exclusively located in already disturbed areas (i.e. cultivated fields). The HCB review will be provided to MOE when available.

As for the Bekevar Church, there are no turbines or infrastructure planned on the nearby grounds or on adjacent quarter sections. The closest turbine is located approximately 1,700m from the church.

## 8.4 Socio-economic Considerations

The Project may affect employment and the economy in the nearby communities, namely the Towns of Kipling, Kennedy, Broadview, Stoughton, and others, as well as within the RSA, which this VC considers to be the combined areas of CD No. 1 and CD No. 5.

The main considerations are the potential changes to the local, or regional, workforce, the economy, and community services, which were assessed relative to all phases of the Project.

### 8.4.1 Effects Assessment

The initial assessment of potential effects on socio-economic components has been done in absence of mitigation measures, in order to inform the type, extent, and/or location of mitigative activities to ensure potential effects are effectively addressed, if necessary. In consideration of the local and regional settings, the following three potential effects have been considered, in absence of mitigation:

- Change in Local and Regional Employment
- Change in the Local and Regional Economy
- Increased Need for Community Services

*Change in Local and Regional Employment*

Various trades, contractors and worker profiles will be required during all phases of the Project. The Project is expected to directly create 150 full-time equivalent (FTE) jobs over the two years of construction, as well as create indirect employment opportunities due to the anticipated needs for local services and supplies. Construction activities with the most potential for local contracting opportunity and employment will be civil works

(e.g. building of roads, excavation and concrete for turbine foundations, construction of O&M building, etc.) and electrical works (e.g. trenching and plowing, cable install, construction of substation, etc.). The construction phase will also provide job opportunities within the trades and affiliated industries, including supply of aggregates and rebar, vehicle and equipment rental, servicing and fueling, component fabrication, and worker transport.

During the operations phase, the Project will require a permanent, and local, contingent of highly-trained employees and/or contractors, namely to operate the wind farm and perform maintenance. The Project will directly create six to eight permanent jobs in turbine operations and maintenance. This phase will also require local contractors for activities such as snow removal, road maintenance and repairs, and substation maintenance.

Decommissioning activities will be similar to the construction phase but less intensive. The decommissioning of wind turbines and other structures, as well as site reclamation, would require the hiring of several workers, but fewer than during the construction phase. Transporting the dismantled equipment and material would also require the services of entrepreneurs in the region. The decommissioning work would generate short-term economic benefits in the region.

Overall, it is estimated that the Project will significantly increase local and regional employment. The increase in job opportunities will be noticed mostly during construction and decommissioning. While Project-related jobs will cease after decommissioning, the Project will have contributed to the development of technical and professional expertise within the local and regional workforce. This trained workforce could then contribute to various other regional industries or other renewables projects.

The Proponent has established a Community Benefits Plan (CBP) which highlights the commitments to local hiring and training (see Appendix XII). The Proponent is committed to local hiring and working upstream to aid in the development of a trained workforce for the operations of the Project. Additionally, a training bursary will be established for youth in the RMs and CFN members to receive training on wind turbine maintenance and operations.

In anticipation of hiring locally and the implementation of the CBP, the Proponent has reached out to the local RMs, and to known local contractors (including Indigenous contractors), to notify of these Project opportunities. Updates to the Project will continue to be regularly provided and qualified local contractors will be invited to propose their services.

*Change in the Local and Regional Economy*

The Project is expected to directly and indirectly provide benefit to local economies and industries which will be required to support the activities of the Project. During the construction and decommissioning phases, the numerous workers will require amenities

and services, such as lodging, restaurants, banks, shops, medical services, entertainment, parks, tourism, sports, gas stations, etc. Transporting equipment and material will require the services of entrepreneurs in the region, which would generate some short-term economic benefits in the region.

During the operations phase, the Project will compensate participating landowners for the use of their land, as defined in ground lease contracts, as well as the host communities through property and school tax payments. Overall, the Project is expected to provide local revenues amounting to over $40 million for 25-year life of the Project. This broadens the population base that will directly and indirectly benefit from the Project.

Periodic maintenance and repairs may require equipment, materials and supplies, and services such as provisioning and servicing, which will be sourced within the Project Area, and surrounding region, to the extent feasible. While the Project is expected to benefit local economies and industries during the operations phase, the extent of the effect will be lower than during the construction or decommissioning phases.

Overall, the Project will strengthen the regional supply chain of Project-related activities, such as vehicle and equipment operators, component inspection and repair. The Project will source equipment, materials and supplies, and services within the Project region to the extent feasible. A stakeholder engagement plan with outreach and communications mechanisms will be maintained to share information and gather input from external stakeholders, including potential supply chain partners. Effects associated with sourcing of equipment, materials, and services are anticipated to have a stimulating effect of the regional economy.

*Increased Need for Community Services*

The Project may affect the demand for lodging and other amenities in the nearby communities, as well as within the surrounding region. Some workers will already be residents of the area, but it is likely that temporary workers will reside in the Town of Kipling, due to its size, accessibility and proximity to the Project Area, but some may also reside in other nearby communities in the surrounding area.

It is expected that the influx of workers that will be temporarily relocating to the area, especially during peak construction activities, will add pressure on community services. However, the local RMs and the Town of Kipling have been kept informed of the Project and have already started planning for housing and accommodations to support Project needs.

The Project may affect local infrastructure due to the use of large, heavy transport vehicles to bring Project components and equipment to the site. The use of large equipment, such as bulldozers and cranes during construction activities may also damage local roads and their water conveyance structures (i.e., culverts and bridges). Transportation and construction may also result in traffic alteration as the large transport

vehicles require temporary road closures and traffic redirection. The Proponent will implement, with the local RMs, a Road Use Agreement (RUA) to address potential effects to roads and related infrastructure. Furthermore, the Proponent will coordinate with the RMs to develop a Traffic Management Plan.

The Project is not expected to affect other community services. Emergency services (police, fire department, health care providers) are expected to be available should the need arise. The Proponent will coordinate with these stakeholders, and the RMs of Kingsley and Hazelwood, to develop an Emergency Response Plan (ERP) to ensure that appropriate procedures are in place in case of emergencies.

### 8.4.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the negative potential effects of the Project on socio-economic these components. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 57. Overview of Mitigation Measures Relating to Socio-economic Considerations**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Change in Local and Regional Employment | • Implement the CBP, namely to encourage the hiring of skilled workers and qualified contractors from the Project region; and offer training bursary.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | **Yes**<br><br>All Project phases will have an overall **positive** effect on employment. |
| Change in the Local and Regional Economy | • Encourage the hiring of personnel from the Project region.<br>• Compensate participating landowners and host communities throughout the life of the Project.<br>• Encourage the use of local amenities and services by workforce, including lodging, restaurants, banks, shops, medical services, entertainment, parks, tourism, sports, gas stations, etc.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | **Yes**<br><br>All Project phases will have an overall **positive** effect on the economy. |
| Increased Need for Community Services | • Coordinate with emergency response stakeholders (RCMP, fire department, health care providers, RMs).<br>• Maintain regular communication with RMs, including regular Project updates.<br>• Develop an ERP.<br>• Implement a Road Use Agreement with the RMs.<br>• Develop a Traffic Management Plan. | **Yes**<br><br>Mitigation measures will minimize residual effects to expected levels. |

The implementation of proven avoidance, minimization, and mitigation measures, as described above, are expected to contribute notably towards the reduction of potential negative effects and the enhancement of positive impacts to socio-economic components. It is expected that Project activities will result in positive residual effects. The consideration of residual effects has been summarized in Table 58 below.

**Table 58. Residual Effects Assessment to Socio-economic Considerations**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| Change in Local and Regional Employment | H | R | LT | R | C | **Yes (Positive)** |
| Change in the Local and Regional Economy | H | R | LT | R | C | **Yes (Positive)** |
| Increased Need for Community Services | L | L | T | R | S | No |

*Mag; Magnitude*
*N – Negligible*
*L – Low*
*M – Moderate*
*H - High*

*GE; Geographic Extent*
*F – Footprint*
*L – Local*
*R - Regional*

*Dur; Duration*
*T – Temporary*
*ST – Short-term*
*MT – Medium-term*
*LT – Long-term*

*Rev; Reversibility*
*R – Reversible*
*I – Irreversible*

*Freq; Frequency*
*O – Once*
*S – Sporadic*
*I – Intermittent*
*R – Regular*
*C - Continuous*

*Magnitude*

Potential effects on employment are overall considered to be high in magnitude, as the increase in employment opportunity has the potential to bolster the regional employment rate and create skilled labor throughout the region. The magnitude of potential effects on the economy is considered high as the Project will generally strengthen the regional supply chain and financially contribute directly to participating landowners and the host communities.

*Geographic Extent*

The residual effects associated with socio-economic components are generally considered to be regional in nature, although some residual effects may be limited to the areas directly affected by Project activities.

*Duration*

The duration of the effects on employment is expected throughout all Project phases, although it will peak during construction and decommissioning. Effects on the economy will also occur throughout all Project phases. Any effects on community services will be temporary in nature.

*Reversibility*

All of the residual effects on socio-economic components are intrinsically reversible.

*Frequency*

Potential effects on employment and the economy will be continuous throughout the Project life and may exceed the decommissioning phase. Any effects on community services, if any, will be sporadic in nature.

*Significance*

The Project is expected to have an overall positive effect on employment and the economy, but few effects on populations and housing. Additional measures will also be taken to enhance these positive effects. Although, the employment and economic benefits will cease once the Project is fully decommissioned, these changes will be directly linked to Project activities, and therefore will be entirely predictable to those affected. Residual effects are therefore considered to be **Significant** and positive. Residual effects on community services are considered **Not Significant** due to effective minimization and mitigation measures.

### 8.4.3 Monitoring Program

No specific monitoring program will be developed for these components as the potential effects are expected to be positive.

## 8.5 Socio-Economic Considerations – Indigenous Groups

The Project has the potential to positively affect CFN, and other Indigenous Groups, namely from various employment, contracting and training opportunities associated to the Project. With regards to CFN specifically, ANEDC's equity participation in the Project will also significantly increase this Nation's experience with large-scale renewables projects, as well as generate economic returns. As Project infrastructure is located on CFN reserve land, the CFN will also receive construction-phase compensation and annual rent revenue from turbines installed on their lands. These benefits are expected to occur at all phases of the Project.

### 8.5.1 Effects Assessment

The initial assessment of potential effects on socio-economic components has been done in absence of mitigation measures, in order to inform the type, extent, and/or location of mitigative activities to ensure potential effects are effectively addressed, if necessary. In consideration of the local and regional settings, the following two potential effects have been considered, in absence of mitigation:

- Increase in Employment and Contracting Opportunities for Indigenous Groups
- Increase in Revenue Generation, Capacity Building, and Training for CFN

*Increase in Employment and Contracting Opportunities for Indigenous Groups*

Various trades, contractors, and worker profiles will be required during all phases of the Project. The Project is expected to directly create 150 full-time equivalent (FTE) jobs over the two years of construction, as well as create indirect employment due to needs for local services and supplies. Construction activities with the most potential for local contracting opportunity and employment will be civil works (e.g. building of roads, excavation and concrete for turbine foundations, construction of O&M building, etc.) and

electrical works (e.g. trenching and plowing, cable install, construction of substation, etc.). The construction phase will also provide job opportunities within the trades and affiliated industries, including supply of aggregates and rebar, vehicle and equipment rental, servicing and fueling, component fabrication, and worker transport.

During the operations phase, the Project will require a permanent and local contingent of highly-trained employees and/or contractors, namely to operate the wind farm and perform maintenance. The Project will directly create six to eight permanent jobs in turbine operations and maintenance. This phase will also require local contractors for activities such as snow removal, road maintenance and repairs, and substation maintenance.

Decommissioning activities will be similar to the construction phase, but less intensive. The decommissioning of wind turbines and other structures, as well as site reclamation, would require the hiring of several workers, but fewer than during the construction phase. Transporting the dismantled equipment and material would also require the services of entrepreneurs in the region. The decommissioning work would generate short-term economic benefits in the region.

Overall, it is estimated that the Project will significantly increase local and regional employment. The increase in job opportunities will be noticed mostly during construction and decommissioning. While Project-related jobs will cease after decommissioning, the Project will have contributed to the development of technical and professional expertise within the local and regional workforce. This trained workforce could then contribute to various other regional industries or other renewables projects.

Overall benefits to CFN, and other Indigenous Groups, are detailed in the Proponent's CBP found in Appendix XII. The Proponent is committed to encourage the hiring of personnel, workers and qualified contractors from CFN, and other Indigenous Groups, to meet the needs of the Project.

Following the CBP and the CEP, the Proponent has already reached out to CFN and several other local Indigenous Groups to notify of these Project opportunities (see Section 3.7). Updates to the Project will continue to be regularly provided and qualified Indigenous-owned contractors will be invited to propose their services.

*Increase in Revenue Generation, Capacity Building and Training for CFN*

The Project is expected to directly benefit CFN through ANEDC's equity participation in the Project, as well as the compensation for installing turbines on their reserve land. Participation as a limited partner also provides significant exposure and experience in developing and managing a large-scale wind energy project. In order to ensure meaningful participation of CFN, the Proponent has created a Project development committee which includes two ANEDC staff, and the Board of Directors of Bekevar Wind G.P. includes one CFN member.

Furthermore, as the Proponent is committed to working upstream to aid in the development of a trained workforce for the operations of the Project, a training bursary will be established for members of CFN to receive training on wind turbine maintenance and operations.

### 8.5.2 Mitigation and Residual Effects

In consideration of existing conditions, proposed activities, and the potential effects that may arise if activities are left unmitigated, the following mitigation measures will be implemented to avoid, mitigate, and/or minimize the negative potential effects of the Project on these components. These mitigation measures are considered additive to other mitigation measures presented within this document.

**Table 59. Overview of Mitigation Measures Relating to Socio-economic Considerations**

| Potential Effect | Mitigation Measures | Potential for Residual Effects |
|---|---|---|
| Increase in Employment and Contracting Opportunities for Indigenous Groups | • Implement the CBP namely with respect to Indigenous groups.<br>• Implement the CEP, namely with respect to engaging with Indigenous Groups and providing information on contracting opportunities.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | **Yes**<br><br>All Project phases will have an overall **positive** effect on employment and contracting. |
| Increase in Revenue Generation, Capacity Building and Training for CFN | • Implement the CBP.<br>• Compensate CFN per ground lease provisions.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | **Yes**<br><br>All Project phases will have an overall **positive** effect on CFN. |

The implementation of proven avoidance, minimization, and mitigation measures, as described above, are expected to contribute notably towards positive impacts to Indigenous Groups. It is expected that Project activities will result in positive residual effects. The consideration of residual effects has been summarized in Table 60 below.

**Table 60. Residual Effects Assessment on Indigenous Groups**

| Potential Effect | Mag | GE | Dur | Rev | Freq | Significance |
|---|---|---|---|---|---|---|
| Increase in Employment and Contracting Opportunities for Indigenous Groups | M | R | LT | R | C | **Yes (Positive)** |
| Increase in Revenue Generation, Capacity Building and Training for CFN | H | R | LT | R | C | **Yes (Positive)** |

*Mag; Magnitude*
*N – Negligible*
*L – Low*
*M – Moderate*
*H - High*

*GE; Geographic Extent*
*F – Footprint*
*L – Local*
*R - Regional*

*Dur; Duration*
*T – Temporary*
*ST – Short-term*
*MT – Medium-term*
*LT – Long-term*

*Rev; Reversibility*
*R – Reversible*
*I – Irreversible*

*Freq; Frequency*
*O – Once*
*S – Sporadic*
*I – Intermittent*
*R – Regular*
*C - Continuous*

*Magnitude*
The potential effects on employment are overall considered to be high in magnitude, as the potential increase in socio-economic benefits is significant for CFN, and has the potential to be significant for other Indigenous Groups.

*Geographic Extent*
The residual effects associated with socio-economic components are generally considered to be regional in nature, although some residual effects may be limited to the areas directly affected by Project activities.

*Duration*
The duration of the socio-economic effects is expected throughout all Project phases.

*Reversibility*
All of the residual effects on socio-economic components are intrinsically reversible.

*Frequency*
Potential socio-economic benefits to CFN and other Indigenous Groups will be continuous throughout the Project life and may exceed the decommissioning phase.

*Significance*
The Project is expected to have an overall positive socio-economic effect on CFN and other Indigenous Groups. Although, the employment and economic benefits will cease once the Project is fully decommissioned, these losses would be due to the nature of the Project and therefore entirely predictable. Residual effects are therefore considered generally **Significant** and positive.

### 8.5.3 Monitoring Program

No specific monitoring program will be developed for these components as the potential effects are expected to be positive.

## 8.6 Summary of Socio-economic Effects Assessment

A detailed effects assessment of the identified socio-economic VCs has been carried out in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a). This assessment has considered the proposed Project activities, available socio-economic information, and is informed by a clear and documented evidence of the potential effect pathways associated with the construction and operation of wind energy generating facilities.

In consideration of VCs relating to land use, including general land use and the specific CFN reserve lands, potentially adverse, but non-significant, residual effects have been identified. These effects are associated with minor losses in available agricultural land, particularly during the construction phase of the Project. During operations, the loss of agricultural land is expected to be less than 1% of the available agricultural land, and therefore is not expected to have a material effect on local agricultural practices.

Other socio-economic VCs, specifically to employment and economy, are expected to experience significant positive effects resulting from the Project activities. This effect is largely related to the anticipated need for employees, contractors, and other skilled workers, and the associated increase in demand for local products, services, and lodging. This benefit is also realized through compensation to local landowners, including CFN, in accordance with signed leases to install infrastructure on their lands.

Specifically considering CFN, and relative to their role in ANEDC, an equity partner in the Project, CFN will receive significant exposure and experience in developing and managing a large-scale wind energy project. ANEDC, and CFN, are also involved in the Project development committee and have representation within the Board of Directors of Bekevar Wind G.P.

*Considerations of Alternate Turbine Locations*

In regards to the alternate turbine locations proposed in this application, the effects are estimated to be similar, if not identical, to those presented within this report as these alternate locations were selected based on the same low-impact siting approach detailed in Section 2.0. All alternate locations are within the Project Area and comply with the RM draft land-use zoning by-laws in terms of setbacks to roads, lot lines, and dwellings. All locations are on agricultural land and would have a similar impact on land use, as compared to the turbines from the base-case Project layout. The request for review by HCB also included these locations, which are not expected to affect heritage resources as they are located on disturbed lands. No alternate locations are proposed any closer to the Bekevar Church, as compared to the base-case Project.

Finally, alternate locations are not proposed on the CFN reserve lands and as such do not impact CFN land use.

## 9.0 Cumulative Effects Assessment

This section describes, and characterizes, the potential for predicted residual effects from Project activities to interact cumulative with other past, present, or reasonably foreseeable or publicly known future projects. Cumulative effects are considered relative to the spatial boundaries of the RSA (i.e. 5km from the CDA).

### 9.1 Summary of Potentially Cumulative Activities

The RSA includes a series of historical, current and reasonably foreseeable future human activities that have the potential to interact cumulatively with the Project's effects. A summary of known, or expected, activities that are occurring within the RSA, as determined through a review of publicly available databases, has been outlined in Table 61. These activities are included in the cumulative effects assessment of the Project.

**Table 61. Overview of Other Activities which may Interact Cumulative with Project Effects**

| Activity | Description |
|---|---|
| Agriculture | Crops have been seeded and harvested annually, and historically, within the RSA (e.g. wheat, canola, etc). Agricultural activities also include seasonal plowing and pesticide applications. There is ongoing agricultural expansion over native habitats, including prairie, wetlands, and forests. Due to a continually growing human population and food demand, this activity is expected to expand in the foreseeable future. |
| Livestock Operations | The conversion of native habitats to tamed or untamed pasture, and the associated hay/forages production, have occurred historically within the RSA. There is ongoing expansion of lands that are dedicated to livestock grazing, particularly within native habitats, such as prairie, wetland, and open forests. Due to a continually growing human population and food demand, this activity is expected to expand in the foreseeable future. |
| Oil and Gas Operations | There is historical and ongoing oil and gas activities within the RSA. Decommissioned oil and gas structures are also present. The future expansion and continuity of these activities is largely depended on the market associated to these commodities, but it is reasonable to expect some activity will continue in the future. Orphan well reclamation activities are also likely in the foreseeable future. |
| Road and Rail Development | Road and rail maintenance and development are typically ongoing activities within any RM, and the related activities are expected to continue in the foreseeable future. |
| Residential Development | The Town of Kipling is included in the RSA. Residential development and urban expansion are ongoing activities and are expected to continue in the foreseeable future. |
| Recreational Activities | Recreational activities, such as tourism, bird watching, wild foraging, and sport hunting, are ongoing, historical, and expected to continue in the future. The RSA is located within 4km north of the Moose Mountain Provincial Park (MOE 2021), within which, current recreational activities are expected to continue in the foreseeable future. |
| Power Generation, Transmission and Distribution | Power generation and/or transmission activities, such as existing electrical transmission, are present in the RSA and are expected to continue in the future. The SaskPower list of current projects within the RSA includes the Wood Pole Maintenance Program and the Rural Infrastructure Investments (SaskPower 2021). A 230kV line is also being planned by SaskPower to connect the Project's substation to the Kennedy substation. |
| Wind Energy | No known wind energy generating facilities currently exist, or are planned to occur, |

| | |
|---|---|
| Generation | within the RSA. |
| Resources Extraction | The RSA offers potential for future exploration of helium, lithium, potash and salt resources (MOE 2021) |

## 9.2 Biophysical Cumulative Effects Assessment

Predicted residual effects have been identified as potentially affecting several biophysical VCs. Each of these VC, and their associated predicted residual effects, are discussed in the following sections, as they relate to potential contributions to cumulative effects within the RSA.

### 9.2.1 Flora

In consideration of the potential effects to flora, including land use, it has been determined that Project activities have the potential to result in three adverse, but non-significant, residual effects. Each of these is discussed in more detail below, relative to the potential contribution to regional cumulative effects.

*Change in Native Habitat Quantity*

All of the of the other activities identified within the RSA, with the exception of recreational activities, have the potential to result in changes to native habitat quantity, to varying degrees. In particular, many of the known, or potential, activities within the RSA typically require larger and/or less flexible footprints relative to the CDA of the Project.

In consideration of the Project's residual effects being low in magnitude, as a result of approximately 95% of the CDA being in cultivated lands, and the small amount of wetland and forested habitat loss activities being entirely reversible through reclamation activities at the end of the Project life, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change in Native Habitat Quality*

All of the of the other activities identified within the RSA have the potential to result in changes to native habitat quality, to varying degrees. In particular, the overwhelmingly dominant activity on the landscape, agriculture, contributes to many of the same effects as the Project activities, such as the potential for erosion, dust, and spills, all of which have the potential to cause adverse effects to nearby habitats. The extent of agricultural activity, and specifically cultivation, is predominant within the RSA and often occurs in close proximity to most native habitats on the landscape.

In consideration of the Project's residual effects being low in magnitude and localized to the areas in the immediate vicinity of the CDA, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change in Invasive Species Abundance*

Several of the other activities identified within the RSA have the potential to change the invasive species abundance, to varying degrees. The landscape, as a whole, has undergone, and continues to undergo, extensive conversion to agricultural landscape, as

evidenced by more than 77% of the LSA currently being in cultivation. Any new activity, particularly those that involve disturbance to areas of vegetation and/or soil, have the potential to create conditions that are conducive to the establishment of invasive species. Project activities are largely placed within these already cultivated fields (i.e. 95% of the CDA on agricultural land), which undergo regular disturbance and maintenance, making it more difficult for invasive species to establish. Further, there are no proposed soil disturbances in native prairie or shrubland, which can be particularly susceptible to invasive species establishments.

In consideration of the Project CDA being largely within areas where invasive species are unlikely to establish, and with no native prairie or shrubland within the CDA, the potential residual effects associated with Project activities are considered to be negligible relative to other ongoing activities in the RSA and therefore non-significant in the context of cumulative effects.

### 9.2.2 Wetlands and Watercourses

In consideration of the potential effects to wetlands and watercourses, it has been determined that Project activities have the potential to result in two adverse, but non-significant, residual effects. Each of these is discussed in more detail below, relative to the potential contribution to regional cumulative effects.

*Change in Wetland Area*

All of the of the other activities identified within the RSA, with the exception of recreational activities, have the potential to result in changes to wetland area, to varying degrees. In particular, many of the known, or potential, activities within the RSA typically require larger and/or less flexible footprints relative to the CDA of the Project.

In consideration of the Project's residual effects being low in magnitude, as a result of approximately 2.33ha of wetland within the CDA, and the effects being entirely reversible through a combination of interim and end-of-life reclamation activities, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change to Wetland Function*

All of the of the other activities identified within the RSA have the potential to result in changes to wetland function, to varying degrees. In particular, the overwhelmingly dominant activity on the landscape, agriculture, contributes to many of the same effects as the Project activities, such as the potential for erosion, dust, and spills, all of which have the potential to cause adverse effects to nearby habitats. The extent of agricultural activity, and specifically cultivation, is predominant within the RSA, and even within the Project Area, cultivation often occurs far closer to most local wetlands than the proposed Project activities.

In consideration of the Project's residual effects being low in magnitude and localized to the areas in the immediate vicinity of the CDA, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

### 9.2.3 Wildlife and Wildlife Habitat

In consideration of the potential effects to wildlife and wildlife habitat, it has been determined that Project activities have the potential to result in six adverse, but non-significant, residual effects. Each of these is discussed in more detail below, relative to the potential contribution to regional cumulative effects.

*Change in Wildlife Habitat Quantity*

All of the of the other activities identified within the RSA, with the exception of recreational activities, have the potential to result in changes to wildlife habitat quantity, to varying degrees. In particular, many of the known, or potential, activities within the RSA typically require larger and/or less flexible footprints relative to the CDA of the Project. Therefore, these other activities are less likely to avoid wildlife habitat than the careful and purposeful design of the Project activities.

In consideration of the Project's residual effects being low in magnitude, as a result of approximately 95% of the CDA being in cultivated lands, and the small amount of wildlife habitat loss being entirely reversible through reclamation activities at the end of the Project life, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change in Wildlife Habitat Quality*

All of the of the other activities identified within the RSA have the potential to result in changes to wildlife habitat quality, to varying degrees. In particular, the overwhelmingly dominant activity on the landscape, agriculture, contributes to many of the same effects as the Project activities, such as the potential for erosion, dust, and spills, all of which have the potential to cause adverse effects to nearby habitats. The extent of agricultural activity, and specifically cultivation, is predominant within the RSA, and even within the Project Area, cultivation often occurs far closer to local wildlife habitats than the proposed Project activities.

In consideration of the Project's residual effects being low in magnitude and localized to the areas in the immediate vicinity of the CDA, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change in Wildlife Habitat Use*

Several of the of the other activities identified within the RSA have the potential to result in changes in wildlife habitat use, to varying degrees, typically through disturbances, loud noises, or bright lights. In particular, the dominant activity on the landscape, agriculture, contributes to many of the same effects as the Project activities, such as the use of large machinery, loud noises, and artificial lighting. In addition, the proposed Project activities, in the context of wildlife habitat use, are consistent (or usually less impactful) than most other types of developments.

In consideration of the Project's residual effects being low in magnitude, localized, and temporary in nature, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change in Mortality Risk (General)*
Several of the of the other activities identified within the RSA have the potential to result in a change in mortality risk, in general, a result of incidental wildlife mortalities. These effects are often less predictable, and not always known for different activities, but road traffic, agricultural activities, and other development activities all have the potential to result in mortality occurrences.

In consideration of the Project's residual effects already being determined to be negligible in magnitude, localized, and temporary in nature, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change in Mortality Risk (Birds)*
Several of the of the other activities identified within the RSA have the potential to result in a change in mortality risk to birds, and wind energy is known to represent a small proportion of avian mortality relative to other sources (Zimmerling et al 2013). In particular, the potential presence of feral and domestic cats that are often associated with residential and agricultural properties are the most prevalent cause of human-related avian mortality in Canada (Calvert et al 2013). Further, transportation, power lines, and agricultural activities are all considered significant contributors to human-related avian mortality in Canada. In comparison, wind energy was estimated to account for less 0.7% of human-related avian mortality in Canada.

In consideration of the Project's residual effects already being determined to be low in magnitude, and reversible through natural process, the residual effects associated with the Project are considered to be negligible relative to other activities in the RSA and therefore non-significant in the context of cumulative effects.

*Change in Mortality Risk (Bats)*
There is little known about the potential for other activities to contribute to the potential change in mortality risk to bats, although it is likely that the greatest potential contributors to cumulative bat mortality could include other wind facilities, and developments that occur within a forested landscape, where mortality to roosting bats is expected. Based on the lack of other existing, or reasonably likely, wind farms in the RSA, and no known, or likely, activities that will result in large losses of forested habitat, the Project activities themselves have the potential to be a large influence of bat mortality within the RSA.

In consideration of the Project's commitments to implement an AMP, such that effective management responses shall be taken if bat mortality levels are above provincially-defined management triggers, the residual effects of the Project have been determined to be low and reversible. Since the Project activities, in absence of other known sources of anthropogenic bat mortality within the RSA, have the potential to be a large influence on bat mortality, and have already been determined to be non-significant, it is therefore similarly determined that their contribution to cumulative effects within the RSA will also be non-significant.

### 9.2.4 Acoustic Environment

In consideration of the potential effects to the acoustic environment, it has been determined that Project activities have the potential to result in two adverse, but non-

significant, residual effects. However, in consideration of the surrounding RSA, there are no other existing, or planned, wind energy facilities. Given the rapid dissipation of noise with distance, the area for which potential cumulative effects on the acoustic environment may be experienced has also been determined to be considerably smaller than the conservative 5km RSA that has been considered.

Further, several of the other activities have the potential to create a baseline level of ambient environmental noise, including agricultural activities, livestock, municipal road use, any other development activity, and even environmental conditions (e.g. wind).

In consideration of no other operational, or reasonably likely, wind projects within the RSA, and the existing baseline level of ambient environmental noise, any contributions of the Project activities, during any Project phase, to the cumulative effects of the acoustic environment are expected to be negligible and non-significant within the RSA.

## 9.3 Summary of Cumulative Effects

In consideration of the potential for cumulative effects within the RSA, several other past, present, or reasonably likely activities have been identified, including agriculture, oil and gas operations, road and rail development, and residential development, among others. No other operational, or planned, wind energy generation facilities are present within the RSA.

In consideration of the identified potential residual effects of the Project on the environment, an assessment of those residual effects was considered, relative to other activities within the RSA. The potential contribution to cumulative effects within the RSA was considered relative to existing conditions, locality and/or abundance of other activities, and the magnitude of the potential effect(s) of these other activities.

A review of the Project's potential contribution to cumulative effects has determined that although residual Project effects have the potential to contribute to regional cumulative effects, those contributions are all negligible and non-significant in the context of the past, present, or reasonably likely activities that are, or will, occur within the RSA.

## 10.0 Accidents and Malfunctions

This section provides an assessment of accidents and malfunctions that have the potential to occur at wind energy projects, or that could have negative environmental effects despite their low likelihood and rarity. Based on the nature of the Project, its location, and the experience of the Consulting Team, the following accidents and malfunctions are considered in this section:

- Accidental spills
- Ice throw
- Turbine equipment failure
- Fire
- Vehicle accidents

A description of each type accident and malfunction and related mitigations are presented in the next sections.

### 10.1 Accidental Spills

#### 10.1.1 Description and Assessment

During regular Project activities, in all phases of the Project life, there is a potential for chemicals, fuels, and other hazardous materials to be accidentally released into the environment. These spills can result from a variety of avoidance and unavoidable circumstances, such as improper material handling or refueling and machinery leaks, malfunctions, or failures.

Spills of hazardous materials can affect several environmental components, including, but not limited to, soil, surface water, groundwater, wildlife, and wetlands, if not properly, effectively, and efficiently contained and controlled. The environmental effects could include direct or indirect effects that are related to the spill itself or, depending on the scale or material associated with the spill, effects may be experienced during clean-up efforts. Refer to Section 10.6.4 for the procedure for spill response.

#### 10.1.2 Mitigation Measures

The following mitigation measures will be implemented to avoid, or limit potential adverse effects of accidental spills:

- Spill prevention measures will be implemented to reduce the likelihood of contamination and propagation of contaminants into the environment.
- All vehicles will be maintained in good condition and will be inspected regularly for fuel and/or oil leaks.

- All maintenance activities, vehicle refueling or washing, and chemical storage will be located at least 30m from any non-cultivated habitat.
- Refueling of all vehicles will occur at least 30m from any non-cultivated habitat, including watercourses.
- Oil trays will be placed under equipment that could present oil or fuel leaks, where applicable and relevant.
- Develop a Spill Prevention and Response Plan and train staff on appropriate procedures.
- Proper spill kits and containment booms will be kept on site and readily available for rapid cleanup of any spill which may occur.
- Hazardous material will be stored at a designated location within labeled tanks or drums equipped with secondary containment structure to prevent runoff from the designated storage area.
- Training will be provided to all workers who handle fuels or other hazardous materials to prevent spills and effectively contain and clean up spills if they occur.

An EMP has been developed for the Project, to summarize environmental minimization and mitigation measures (Appendix X).

## 10.2 Ice Dropping and Ice Throw

### 10.2.1 Description and Assessment

There are two phenomena associated with icing on a wind turbine structure. "Ice drop" refers to ice dropping from a turbine in the immediate vicinity of that turbine, and occurs when the wind turbine is idle. This phenomenon can happen under specific meteorological conditions, and is not specific to wind turbines. "Ice throw" refers to ice fragments being projected at a distance by the rotating blades of the wind turbine when ice builds up on the blades, and while the blades are moving with enough speed to create this effect.

Winter operating protocols for modern turbines seek to reduce the risk of ice fragments being "thrown" by automatically or manually stopping the wind turbine when the appropriate environmental conditions are detected. By definition, this type of operational protocol results in the reduction of risk associated with potential ice throw. Through implementation of these actions, the ice build-up thaws and slips off the blades with most of the ice dropping occurring in the immediate vicinity of the turbine (i.e. "Ice drop"), rather than being thrown.

Based on the experience of the Consulting Team, the probability of ice drop decreases sharply beyond the extent of the blade overhang.

In consideration of the more than 80,000 wind turbines that are operating in climates prone to icing, there have been no reported injuries to the public from either "Ice Drop" or "Ice Throw".

### 10.2.2 Mitigation Measures

The following mitigation measures will be implemented to limit or avoid potential adverse effects due to ice throw:

- Turbines are setback from residences, existing public roads, and other public and private infrastructure based on best management practices and the local RMs' draft land-use by-laws (see Section 2.7 for all setbacks applied in the Project design).
- Implement automatic shutdown procedures in case of ice build-up on turbine blades.
- Turbines will be equipped with systems that will detect an icing event on the rotor, and then will alert Project staff. The detection may result in an automatic shut-down and/or could warrant a visual inspection of the turbine.
- In addition to automatic shutdowns, the operator will be capable of stopping the operation of turbines if the risk of strong wind or ice rain is detected.
- If ice builds up on blades, a safety perimeter around the turbine(s) will be established until the area has been deemed safe by Project operator, or a designated representative.
- When a turbine is shut down due to icing, it will be returned to service following an inspection of the blades by the operator when the restart is considered safe.

## 10.3 Turbine Equipment Failure

### 10.3.1 Description and Assessment

This section covers for two types of failures that may occur on a turbine, blade failure and tower collapse.

The likelihood of a blade, or blade part, detaching itself from a wind turbine is minimal. The occurrence of this type of breakage can be accentuated during strong storms or other extreme weather events (tornado, ice storm, etc.).

In the 2014 Dutch Handbook on wind turbine failure risk assessment (''Handboek Risicozonering Windturbines'', DNV GL 2014), the risk of blade failure was estimated to be 0.00063 turbines per year or equivalently 1 in 1,600 years for any given turbine (Faasen and Al 2014). This failure rate was derived for situations where a blade fragment becomes detached from the main structure causing a potential risk to people or nearby infrastructure, as opposed to a failure where no parts are ejected.

Taking a conservative approach, the 2014 Dutch Handbook maintained the same recommended blade failure rates as the 2005 version, due in part to a lack of a comprehensive worldwide database, and noted a continued downward trend in the occurrence of blade failure over the last 10 years of data that it considered (2001-2010). In 2007, Garrad Hassan (now DNV) published a report discussing blade failure where it was confirmed that the 2005 Dutch Handbook projection of declining failure rates was accurate (Garrad Hassan 2017). It was further observed that the failure rate noted in the Dutch Handbook was "*particularly conservative in the context of current-day commercial*

*wind turbines as the various root-causes of blade failure had been continuously addressed through developments in best practice in design, testing, manufacture and operation*."

Large-scale wind turbines have required, since the early 2000s, a comprehensive and independent certification, which guarantees a strict evaluation of the product before marketing. A decrease in blade breakage is a trend observed due to constant improvement in blade design, manufacturing processes, installation, and maintenance. Therefore, the risks associated with a blade collapse or blade throw are extremely low.

Tower collapse is also a very rare event for modern wind turbines. Possible causes of tower collapse include inadequate fastening of the tower sections or bolt anchors, under-designed foundations, or tower buckling under extreme load events (MMI Engineering Ltd 2013). In 2014, the Dutch Handbook estimated the expected risk of tower collapse to be 0.000058 turbines per year or, equivalently, 1 in 17,000 years for any given turbine. The impact zone of a tower collapse is limited to the immediate vicinity of the turbine base within a distance equal to the hub height plus blade length.

At the time of this report, and with over 743GW of wind power capacity worldwide, DNV is not aware of any injuries to the public from a wind turbine tower collapse or blade debris.

### 10.3.2 Mitigation Measures

The following mitigation measures will be implemented to limit or avoid potential adverse effects of turbine failure:

- Turbines are setback from residences, existing public roads, and other public and private infrastructure based on best management practices and the local RMs' draft land-use by-laws (please see section 2.7 for all setbacks applied in the Project design).
- If a potential turbine failure is detected, a safety perimeter around the turbine(s) will be established until the area has been cleared by Project operators, or a designated representative.
- The Proponent will only procure turbines that are adapted to the climate conditions typical of the Project area in Saskatchewan.
- Only independently certified turbines will be used. They will be equipped with systems to detect and control the turbines during extreme weather or turbines malfunctions.
- Suitable foundation designs will be created by qualified engineers, and will be based on detailed geotechnical analysis carried out at each turbine location to verify the bearing capacity of the soil.
- A thorough inspection of each turbine will occur prior to the operation of the Project to ensure that there are no design, equipment, or construction flaws. They will also be inspected on a regular basis during the operation phase by turbine operators.
- A turbine maintenance schedule will be followed throughout the Project life.

## 10.4 Fire

### 10.4.1 Description and Assessment

During the construction phase, fires have the potential to occur at the Project due to activities involving heavy machinery and vehicles, which may result from circumstances such as hot exhaust in close proximity to very dry vegetation, accidents involving flammable material, and activities such as welding.

During the operations phase, the most common cause of turbine fires is electrical fault that can spark a fire in the nacelle or in the control cabinet at the base of the nacelle (GCube 2015). After electrical faults, the next most frequent cause is mechanical malfunction, typically caused by overheating of the gearbox or main bearing. Turbine fire is uncommon and corresponds to approximately 1 per 6,000 turbines per year in North America (GCube 2015). The risk to the public associated with fires arising in the turbines will only apply very locally, as a hazard to personnel working in, or on, the turbines, and would be managed as part of ongoing operations. To DNV's knowledge, no members of the public have been injured due to turbine fire.

Fire can arise during all phases of the Project and can affect the safety of workers and the public. It also has the potential to adversely affect vegetation, wildlife, livestock and crops.

The Project will coordinate with local services such as the fire department to ensure that adequate consultation, training, and emergency response plan are in place, and will implement an ERP (see Section 10.6)

### 10.4.2 Mitigation Measures

The following mitigation measures will be implemented to limit or avoid potential adverse effects of fires:

- Fire detection equipment will be installed, and preventive and protection systems will be integrated, in Project components and equipment to reduce the risk of fires. These include fuses and circuit breakers that will detect malfunctions and disconnect faulty electrical equipment in a timely manner, as well as fire suppressant systems in case of break-through fires.
- Regularly inspect and maintain vehicles and machinery in good condition;
- No vehicles and machinery will be parked near flammable vegetation such as grasses, bushes, trees and brush during periods of high fire risk;
- If a fire is detected at the Project, a safety perimeter will be established until the area has been cleared by Project operators.
- Control the vegetation near the buildings;
- Prohibit throwing cigarette butts on the ground;

- Ensure presence of ABC multipurpose powder and water extinguishers at several locations, including the hazardous material storage sites, the service building, the substation, and wind turbine nacelles;
- Regularly inspect the fire suppressant equipment;
- Remotely controlled turbines will be safely shut down in the event of an emergency, such as fire.
- In collaboration with local services such as the fire department, provide training to all on-site personnel in fire suppression and the emergency response.

## 10.5 Vehicle accidents

### 10.5.1 Description and Assessment

While the potential of vehicle accidents is low during all Project phases, the probability of an accident is higher during the construction phase when traffic will be at its highest. Vehicle collisions have a risk to human health and safety and to wildlife. Fuel spill or fire in relation to a vehicle accident could also negatively impact crops, vegetation, wetlands and waterbodies.

In order to minimize the risk of road accidents, all project vehicles must strictly comply with the road safety code. Non-standard vehicles subject to a special driving permit must also strictly comply with the permit issuance conditions. In certain cases, a police escort or presence from the RCMP could be requested.

Project managers, staff and workers will be made aware of risk factors for accidents, including:

- The use of psychoactive substances (e.g., alcohol, drugs, and certain medications);
- The use of cell phones (e.g., texting and driving);
- Fatigue, drowsiness and loss of vigilance;
- Speed.

### 10.5.2 Mitigation Measures

The following mitigation measures will be implemented to limit or avoid potential adverse effects of vehicle accidents:

- All project vehicles must comply with the road safety code;
- Non-standard vehicles subject to a special driving permit must comply with the permit issuance conditions;
- Speed limit will be imposed on the Project construction site and clearly marked;
- A Traffic Management Plan will be developed for the construction phase to highlight preferred routes for components transportation, construction trucks and other Project vehicles; the plan will be made public to inform local residents and other road users of areas with the potential for more traffic associated with the Project.

## 10.6 Emergency Response Plan

### 10.6.1 Emergency Response

Prior to construction, a Project-specific ERP will be developed in coordination with local emergency response services, and will be implemented throughout all phases of the Project. The purpose of the plan is to establish and maintain emergency procedures required for effectively responding to accidents and other emergency situations, as described in the section above.

In the rare instance that the Project exceeds operational parameters or in the event of an emergency, the appropriate regulatory agencies, the local fire department, first responders, the RMs of Kingsley and Hazelwood, and the Town of Kipling will be notified using the procedures outlined in Section 10.6.5. The Project operators will also notify the representatives of the Proponent.

The EPC contractor will be responsible for establishing and maintaining specific construction- and decommissioning-related emergency response procedures to be implemented during these phases. These will be integrated in the Project-specific ERP which will be created prior to construction through a collaboration between the Proponent, the EPC contractor, and the local emergency response services, such as the fire department and first responders.

The sections below provide a brief description of emergency procedures that will be detailed in the ERP.

### 10.6.2 Fire Response

Fire extinguishers will be in compliance with applicable Saskatchewan regulations and strategically located throughout the Project Area in appropriately designated places such as Project vehicles, the operations and maintenance building, and the control room located in the substation. If a fire occurs, Project personnel will attempt to extinguish it, but only if and when it is safe to do so. All Project personnel on-site during the life of the Project will be trained in fire response safety procedures including how to use an extinguisher. If there is any risk of personal injury, extinguishing the fire will not be attempted and the local fire department (and first responders, if necessary) will be called immediately. Project personnel will also notify the occupants at all adjacent properties immediately if the fire appears to be spreading beyond the Project site.

During all phases of the Project, appropriate signage will be in place that includes instructions to call 911 and the phone number of the operator or owner representative of the Project, should an emergency arise. In the event of an emergency, Project personnel on site will contact 9-1-1 and the Project Proponent. All incidents will be documented and kept on file. Documentation will include, at a minimum: date of the incident, date of

reporting, name of the reporter, description of the incident, cause of the incident, actions taken, communications to outside groups and internal personnel, and any additional follow-up actions, as required.

### 10.6.3 Personal Injury Response

The EPC contractor and the Proponent will be responsible for work during construction/decommission and operations phase, respectively, and responsible to establish their own Health and Safety programs in accordance with the Saskatchewan Employment Act and the Occupational Health and Safety Regulation (2020). If a personal injury occurs that does not require immediate ambulatory assistance, the injured worker will be taken to the local hospital. The Project field office will house first aid supplies as well as maps to the local hospital. An up-to-date list of all personnel with first aid and cardiopulmonary resuscitation (CPR) training will also be kept on display in the Project field office. Should a personal injury which requires an ambulance occur, Project personnel will call 9-1-1 and Project personnel trained in first aid and/or CPR will provide immediate assistance, if safe to do so, until the ambulance arrives. In all cases of personal injury, the Proponent and EPC contractor, if applicable, will be notified immediately and the injury will be properly documented. Documentation will include, at a minimum: date of the incident, date of reporting, name of the reporter, name of the injured, description of the incident, cause of the accident, actions taken, communications to outside groups, and internal personnel, and any additional follow-up actions, as required.

### 10.6.4 Spill Response

Spills and the types of spills that require reporting are defined in the Saskatchewan Environmental Management and Protection Act (2010) and the Saskatchewan Environmental Code.

The following actions are recommended in response to the release of pollutant:

1. Stop the Spill
    - If safe to do so, take immediate action to prevent further release of material (e.g. close valves, turn off equipment, pick-up containers, etc.)
    - Depending on the extent of the spill, or actions necessary to stop the spill, call other workers for support.
    - If safety is a concern (e.g. fire or irritant risk), proceed to immediate notification.
2. Notification and Reporting
    - Notify the Site Manager, ECM, or other person responsible for the ongoing Project activity(ies).
    - Notify fellow workers of potential risks.
    - Consider and, if necessary, initiate provincial reporting, depending on the type of material and magnitude of the spill.
3. Isolate the Spill Area

- Take action to contain the spill location to the smallest extent possible, using sandbags, trenches, absorbent pads or materials, or other similar tactics.
- Prioritize the protection of surface water, wetlands, or native vegetation to minimize the potential effects and facilitate clean-up.
- If the spill reaches open water (e.g. watercourse or wetland), consider the effectiveness of temporarily blocking water flow, particularly if the spill is large or cannot be immediately stopped.

4. Minimize Exposure and Implement Clean-Up
    - Avoid any unnecessary contact between the spill and equipment, clothing, etc.
    - Use appropriate equipment (e.g. shovels, brooms, mops, mobile equipment, etc.) to thoroughly clean affected areas.
    - If potential soil contamination has occurred, the soil, plus a conservative buffer, shall be excavated and will be stored, transported, and disposed of according to appropriate regulatory requirements for the transportation and disposal of hazardous materials.

In the event of a reportable spill, the Saskatchewan Spill Control Centre will be contacted immediately and a Spill Report Form will be submitted within 30 days. Spills that will need to be reported to the MOE include:

- Non-approved releases/discharges (including those to land, air and water);
- Discharge of fluids greater than 100L from a vehicle;
- Mineral oil releases greater than 100L from an electrical transformer or gearbox; and
- Discharges (including sediment) to water bodies.

The Saskatchewan Spill Control Centre phone number (1-800-567-4224) will be posted at the Project field office.

Any incidents of spills will be immediately documented, kept on file and sent to the MOE, as required. The documentation will include, at a minimum: location and date of the incident, date of reporting, name of the reporter, description of the incident, cause of the incident, type and amount of material spilled, surrounding land use, actions taken, method(s) of disposal taken, communications to outside groups and internal personnel, and any additional follow-up, as required.

### 10.6.5 Communications Plan

During all phases of the Project, signage at the Project Area and regular newsletters to the local community members will clearly provide contact information should anyone want to report an emergency or other issue on site. Project staff will take note of the emergency and investigate as needed.

In the event of a reportable emergency or incident, the following agencies will be contacted by the Proponent's representative by phone:

- The MOE (including the Spills Control Centre, if applicable); and
- The RMs of Kingsley and Hazelwood.

A detailed incident response report will be provided shortly following the emergency or incident. This report will include the following information, at a minimum:

- The parameter exceeded;
- The magnitude of the exceedance; and
- The mitigation measures implemented, including details of first responders (e.g., fire department, emergency medical services), if required.

Prior to commencing construction, the Proponent will distribute copies of the detailed ERP to the RMs of Kingsley and Hazelwood. The ERP will include the following information:

- Designation of facility emergency coordinators;
- Emergency services orientation and coordination;
- Process description;
- Objectives;
- Administration;
- Regulatory references;
- Training;
- Facility location information;
- Informational signage;
- Facility emergency procedure;
- Immediate site evacuation procedure;
- Delayed site evacuation procedure;
- Personnel injuries/serious health conditions;
- Fire response plan;
- Chemical/oil spills and releases; and
- Weather-related emergencies.

The ERP will include procedures applicable to the construction, operations and decommissioning phases of the Project.

## 11.0 Effects of the Environment on the Project

As part of the environmental effects assessment, it is important to look at potential impacts of the environment on the Project. Possible extreme weather events and subsequent risks have been identified based on publicly available information, and based on prior experience of the Consulting Team analyzing projects that subjected to occasional or frequent weather hazards.

A report from the Saskatchewan Research Council (SRC 2018) describes a province-wide risk analysis of natural hazards in Saskatchewan. The report identifies the following natural hazards which could have an effect on the Project:

- Flooding;
- Summer convective storms (tornadoes, high winds, heavy rain, hail);
- Wildfire; and
- Winter storms (freezing rain, high winds, snow, blizzard conditions).

These natural hazards could potentially affect the Project through:

- Damage to infrastructure (and a corresponding increase in unexpected maintenance due to storm damage);
- Interruptions to the regular operation and maintenance of wind turbines; and
- Safety risk for Project personnel.

The potential effects of each are assessed in the following sub-sections.

### 11.1 Flooding

In Saskatchewan, floods are historically associated with the spring snowmelt, most often in April. The severity of the flood relates to autumn precipitation, winter precipitation and snow redistribution, frost penetration, melt rate, and precipitation during the melt. In recent years, however, southern Saskatchewan has also experienced very significant summer rains that have led to riverine flooding (Saskatchewan Research Council 2018).

Risks to the Project because of flooding include unsafe work conditions on site and washed-out roads preventing access to the site and increased erosion.

Unsafe work conditions or lack of access to the site due to flooding could cause work delays and interruptions especially for construction or decommissioning activities requiring the use of heavy equipment such as road construction, installation of sub-surface collector lines and installation of turbine foundations. Depending on the severity of the events, operational maintenance schedules could be affected as well.

Depending on the timing, location, type and magnitude of the precipitation event, increased surface runoff could cause erosion and subsequent environmental effects on native vegetation and wildlife habitat.

## 11.2 Summer Convective Storms (tornadoes, high winds, heavy rain, hail)

Summer convective storms are the leading cause of fatalities and injuries, of all the natural hazards, within the province (Saskatchewan Research Council 2018). Every summer, most regions of the province will have between 20 and 30 thunderstorms, of varying intensity and varying levels of associated excessive rain, hail, wind and tornadoes (Environment Canada 2012). While tornadic activity is relatively rare in the province, it does occur and has had catastrophic impacts. These storms may affect the Project during all phases of the Project life by causing interruptions in Project activities. Severe storms also pose a safety risk to Project personnel and may cause damage to equipment, buildings, and infrastructure.

Lightning, often a part of severe thunderstorms, is a concern as lightning strikes on power supply systems can produce dangerous over-voltages and damage equipment. Severe storms and lightning have the potential to cause delays during construction or operation and maintenance because of safety concerns and equipment damage.

High winds may cause damage to equipment and infrastructure during storms. High winds could result in the suspension of some construction activities (e.g., erection of towers) or interruptions in the operation of wind turbines resulting in short-term loss of energy generation capacity. High winds also could cause erosion leading to soil loss and impede re-establishment of vegetation.

## 11.3 Wildfire

Grass fires are a common occurrence in the prairies and can spread quickly due to the prevalence of strong winds on the prairies. Another factor adding to the risk of grass fires is the difficulty of establishing fire breaks in areas with continuous cropping and large areas of natural grasslands (Saskatchewan Research Council 2018).

A wildfire has the potential to affect construction, operation and maintenance and decommissioning. Construction and decommissioning activities may be temporarily suspended in the event of a wildfire. During operation and maintenance, wildfires may damage infrastructure and interrupt maintenance activities due to safety concerns. Any work interruption or infrastructure damage could have socio-economic effects in terms of temporary reduction of revenue and employment. Wildfires could also have environmental effects on the biophysical environment through temporary loss of native vegetation and wildlife habitat

## 11.4 Winter Storms (freezing rain, high winds, snow, blizzard conditions)

Saskatchewan winters can last four to five months in the southern part of the province, although considerable variation occurs from year to year, and from region to region (Paul 2007). Winters tend to be dominated by cold, dry stable air (Paul 2007). Normal winter weather includes a variety of precipitation types, including snow, rain, and freezing rain, whereas winter weather extremes refer to blizzards, snowstorms, and freezing rain and can include all three events. Winter storms can result in infrastructure damage, vehicular accidents, and roads and rail lines closures. Freezing rain can cause extensive damage to vegetation and tree limb breakage and outages in electrical distribution and communication systems (Saskatchewan Research Council 2018)

Ice buildup on equipment can occur when a specific condition of temperature and humidity exist and is highly dependent on local weather conditions (e.g., melting snow, air temperatures below 0°C, high humidity in the air). In Saskatchewan, this condition is most likely to occur during the winter months and during extreme weather events (e.g., ice storms, freezing rain). These conditions can cause wind turbines to be subject to ice coating from freezing rain or interception of low clouds containing super-cooled rain. Icing events cause temporary loss of revenue while operations is stopped until there is no more ice on turbine blades.

## 11.5 Mitigation Measures

Approaches to help mitigate potential effects of the environment on the Project will be detailed in the ERP, and will include:

- Design, installation, operation and maintenance, and decommissioning will be completed according to applicable industry standards and certifications;
- Select wind turbines designed to automatically shut down when ice load on blades is detected;
- Buildings and infrastructure will comply with Saskatchewan and federal building and fire codes.
- Implement an ERP during severe weather event (see Section 10.6);
- Implement contingency plans for severe weather effects (such as installing backup power generators);
- Maintain fire prevention and response equipment on-site, including fire extinguishers;
- Provide additional personal protective equipment for workers, as appropriate;
- Develop weather monitoring plan and adjust construction schedule or reschedule maintenance and monitoring activities, as appropriate; and
- Coordination with local emergency responders, when required.

## 12.0 Conditions Management

The responsible development of the Project, including the sufficient avoidance, minimization, and/or mitigation of the potential environmental effects, is in consideration of the successful and effective implementation of the mitigation measures and monitoring programs described within this submission. Successful implementation generally relies on two important factors, concise organization of Project commitments and effective communication of the commitments to the Project team members responsible for the supervision and implementation of the Project activities.

As part of this submission, a comprehensive Commitments Register has been prepared (Appendix XIII), which details all of the minimization, mitigation, and monitoring commitments that have been included as part of this submission. This Commitments Register is considered to be an 'living' document, in the sense that it will continue to be updated as new information or new commitments are made (e.g. through additional municipal permitting. The preparation, and ongoing maintenance, of this Commitments Register provides the concise organization of the Project commitments.

In consideration of the communication, and implementation, of these commitments to responsible Project team members, the Proponent has extensive experience with the permitting, development, and/or operation of similarly-sized wind energy projects across Canada, totalling almost 3,000MW of related experience. As a very experienced, responsible, and well-respected project developer and construction contractor, the Proponent has an efficient and thorough process of internally tracking Project commitments and communicating with Project team members at several levels within the Project team to ensure as much redundancy as possible in the understanding of team members.

Based on the preparation and maintenance of a 'living' Commitments Register, and the experience of the Proponent, there is expected to be an effective process in place to communicate, implement, and monitor the various commitments associated with this EIS, and any future commitments that may arise.

## 13.0 Closure

This EIS submission has been prepared to satisfy the regulatory requirements and expectations of The Environmental Assessment Act (Government of Saskatchewan, 1980), as it pertains to the activities associated with the development of the Project, as described above. The submission has been prepared by a Consulting Team of technical experts, on behalf of an experienced and well-respected Proponent, and in accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a), and with consideration to other applicable provincial guidelines, regulations, and recommendations.

In consideration of the optimal Project siting and the detailed strategies to avoid, minimize, mitigate, and monitor potential environmental effects, throughout all Project phases, the Project has been determined to have no significant adverse effects on the environment. Therefore, the predicted effects do not present a conservation or management concern, generally fall within an acceptable range, and are considered not significant.

## 14.0 Qualified Persons Credentials

The Consulting Team that has contributed to the technical content of this EIS are considered to be experts in their respective fields and hold the necessary background, technical knowledge, and have considerable experience working on similar assessments and submissions. In accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021a), an overview of disciplinary leads, including relevant professional associations, academic qualifications, and comparable practical applications, has been provided in Table 62 below.

**Table 62. List of Disciplinary Leads Responsible for this EIS**

| Staff Name and Credentials | Project Role and Experience Biography |
|---|---|
| Andrew Ryckman, B.Sc., P.Biol.<br>Senior Biologist<br>Natural Resource Solutions Inc. | Mr. Andrew Ryckman supervised the design and collection of site-specific field data, as collected by NRSI colleagues and Vista Environmental Services, and was responsible for the technical content of the ecological existing conditions and effects assessment of this submission. He was also the lead author of this EIS, led the Consulting Team, and compiled technical input from other disciplinary leads into this report.<br><br>Mr. Ryckman has more than 16 years of experience specifically working on environmental assessments of renewable energy facilities, with focus on the ecological considerations of the proposed activities. He has worked on more than 100 wind projects across Canada, assessing ecological effects in a wide range of project landscapes and habitat types, including foothills, prairies, forested ridges, and coastal regions. He has also been involved in the operational monitoring of more than 60 wind projects, and has supported in a construction monitoring role for several projects, furthering his hands-on understanding of the potential, and realized, effects of wind energy developments on ecological components.<br><br>Mr. Ryckman has presented on the topic of wind energy and wildlife at national and international conferences, has provided technical support to several regulatory agencies on the development of guidelines specific to wind energy, and has provided expert testimony on the effects of wind energy on wildlife at several hearings. |
| Cassiano Porto, M.Sc., P.Biol.<br>Vegetation and Wetland Specialist<br>Natural Resource Solutions Inc. | Mr. Cassiano Porto was the disciplinary lead for the wetland and rare vascular plant field surveys and effects assessment for the Project. Mr. Porto is an Authenticating Professional (formerly Qualified Wetland Science Practitioner [QWSP]) in Alberta, demonstrating a level of professional experience, reliability, and competency for wetland delineations and classifications.<br><br>Mr. Porto is a vegetation ecologist with more than 11 years of experience in Canada. Mr. Porto has participated in reclamation projects as environmental inspector, performed, and led, environmental monitoring programs and vegetation surveys, and has completed numerous wetland delineations and classifications. He has extensive experience with identification of flora within western Canada, and has performed field rare plant surveys in the prairies, subalpine, alpine, and boreal biomes. He has recently defended a M.Sc. thesis in plant ecology at the University of Calgary.<br><br>Mr. Porto has participated as a technical lead in several ecological |

| Staff Name and Credentials | Project Role and Experience Biography |
|---|---|
| | studies, including extensive experience with site-specific field assessments and/or desktop assessments using aerial imagery, for the purpose of flora inventories, ecosystem mapping, rare plant survey planning and implementation, and monitoring restoration efforts. Mr. Porto has provided consulting services in a role of vegetation and wetland specialist for diverse projects and industries, including for oil and ga and, renewable energy activities, for public services, and for not-for-profit environmental advocacy organizations. |
| Jacqueline Mertler, M.Sc.<br>Senior Avian and Wildlife Ecologist<br>Vista Environmental Services | Ms. Jacqueline Mertler was the primary field technician for the collection of avian and amphibian data collected within the Project Area.<br><br>Ms. Mertler possesses more than 13 years of experience in ecological research and consulting in the public and private sectors, primarily in Saskatchewan and Alberta. She specializes in inventorying, monitoring, and mitigation for wildlife, sensitive species (e.g., Species at Risk {SAR}), and associated terrestrial habitats. Her public sector experience has focused on research and recovery for SAR, and advisement on Environmental and Impact Assessment (EA/EIA) processes and outcomes. For the private sector, Ms. Mertler has provided ecological consulting services for a wide range of construction, operations, and compensation projects across several industries (e.g., wind and solar energy, transmission and distribution, mining, pipelines, bridges, transportation).<br><br>Ms. Mertler has extensive experience managing ecological assessments, including the wildlife and wildlife habitat assessment components of EAs/EIAs. She is well-versed in designing, executing, and evaluating species detection surveys (e.g., SAR surveys, breeding bird surveys, point counts, lek surveys, raptor surveys, migration surveys, avian collision/mortality surveys, amphibian surveys), and monitoring and mitigation programs. |
| Gabriel Constantin<br>Senior Team Leader | Mr. Constantin was the lead author within DNV, overseeing and peer-reviewed all DNV work. He also completed the Accidents and Malfunctions content.<br><br>Mr. Gabriel Constantin holds a B.Sc. in Geomatics applied to the Environment and an M.Sc. in Geographical Sciences. Since joining DNV in 2012, Gabriel has been involved in more than 50 renewable energy mandates across multiple counties and provinces. From 2015 to 2021, he has been the Lead Project Manager of five environmental impact assessments for major wind projects in Canada. Mr. Constantin has also significantly contributed to the environmental due diligence of various wind and solar projects in Canada, U.S. and other international mandates. His experience and expertise includes permitting at various government levels and managing an array of consultation activities. Gabriel is bilingual and has led several public meetings over the years. |
| Frederic Gagnon<br>Senior Scientist | Mr. Gagnon provided guidance related to the EIS structure and environmental assessment methodology. He also completed the socio-economic considerations content and peer-reviewed several other sections.<br><br>Mr. Gagnon holds a B.Sc. in biology and a Master of Environment in Environmental Impact Assessment from Concordia University. Mr. Gagnon joined DNV in 2009 with 17 years of experience as a research scientist and technical writer. For the past 13 years, he has specialized in supporting renewable energy projects by addressing environmental and permitting aspects of development and environmental compliance, including by-law analysis, regulatory |

| Staff Name and Credentials | Project Role and Experience Biography |
|---|---|
| | processes, stakeholder engagement, impact analysis, cumulative impacts, mitigation strategies, post-permit compliance, monitoring, and due diligence. Mr. Gagnon has developed specific expertise in the preparation of Environmental and Social Impact Assessments in conformance with the 2020 Equator Principles, IFC Performance Standards, and World Bank EHS Environmental, Health and Safety guidelines. Mr. Gagnon has worked on hundreds of wind and solar projects in various jurisdictions within the United States, Canada and internationally, and has been called upon to testify at public hearings in Quebec on health and safety related to wind energy development, sustainable development and the environmental assessment process. |
| Aren Nercessian<br>Project Siting Engineer | Mr. Nercessian completed the noise impact modelling and the related acoustic assessment content.<br><br>Mr. Nercessian has 10 years of experience running acoustic models for renewable energy projects, has prepared over 40 reports on noise modelling of solar and wind farms and has measured and analyzed the acoustic noise levels at more than 6 sites. Mr. Nercessian has also performed layout optimizations, shadow flicker assessments, visual simulations and electromagnetic interference risk assessments on over 150 different projects under development. Mr. Nercessian is very familiar with noise regulations across jurisdictions including Alberta, British Columbia, Ontario, Illinois, Michigan, and Quebec. Mr. Nercessian has a Bachelor's degree in mechanical engineering from McGill University in Montreal, Canada. |
| Melissa Morrison<br>Team Leader | Ms. Morrison evaluated the environment's effects on the project and oversaw the preparation of the Decommissioning and Reclamation content.<br><br>Ms. Morrison is a biologist and stakeholder engagement, permitting and regulatory specialist. She has 15 years of experience in renewable, oil and gas, transmission line, industrial and municipal projects in Western Canada. She has extensive experience managing complex, multi-disciplinary projects and field programs. Her experience includes public consultation and regulatory applications under the Alberta Utilities Commission, Public Lands Act, the Wildlife Act, the Water Act, the Environmental Protection and Enhancement Act, the Species at Risk Act, and Canadian Environmental Assessment Act, and more. |

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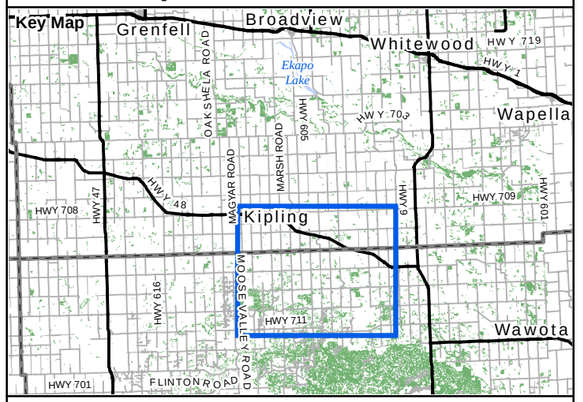
**Map 1**
Project Area and Spatial Boundaries

# Map 1

# Bekevar WEP

## Project Area and Spatial Boundaries






### Legend

- Regional Study Area (RSA; 5km)
- Local Study Area (LSA; 1km)
- Regional Municipality Boundary
- Project Area
- First Nation Lands

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Secondary Road
- Resource/Recreation Road

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:85,000**

0 1 2 3 4 5 Kilometers

N

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**Map Set 2**
Project Infrastructure

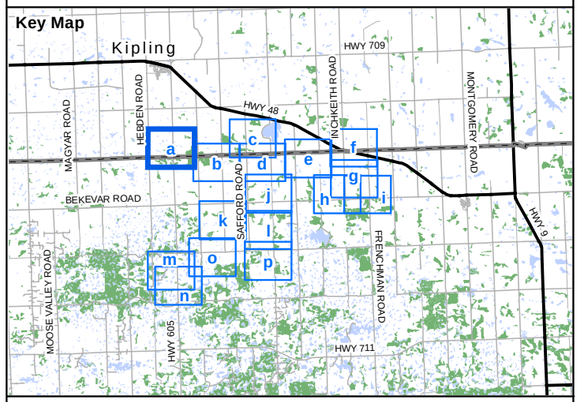
669000
670000
671000
5548000
5547000
5546000
HEBDEN ROAD
HWY 605
T8
T19
T29
04-13-05-2
03-13-05-2

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

**Map 2a**

# Bekevar WEP

## Project Infrastructure




**Legend**

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section
- Cowessess First Nation Lands

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

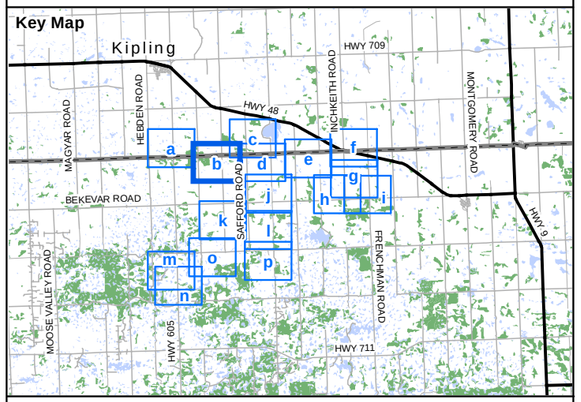
N

672000
673000
674000
5547000
5546000
5545000
T38
T13
T3
35-12-05-2
36-12-05-2

# Map 2b

# Bekevar WEP

## Project Infrastructure




**Legend**

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

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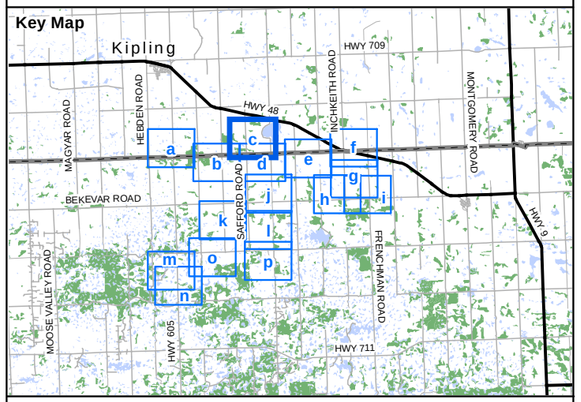
675000
676000
677000
5549000
5548000
5547000
HWY 48
T15
SAFFORD ROAD
01-13-05-2
06-13-04-2
T24

# Map 2c

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Highway
- Primary Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

N

0 100 200 300 400 500 600 Meters

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675000 676000 677000

5547000 5546000 5545000

T24 T23

SAFFORD ROAD

31-12-04-2 32-12-04-2

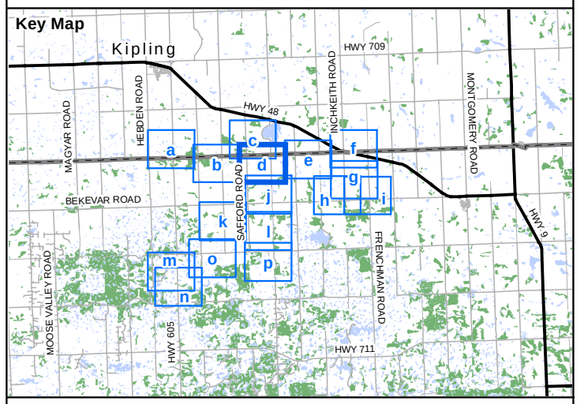
675000 676000 677000

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

**Map 2d**

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section

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| | |
|---|---|
| Project: AB0156C<br>Date: December 16, 2021 | NAD83 - UTM Zone 13<br>Size: 11x17"<br>**1:10,000** |

N

0 100 200 300 400 500 600 Meters

678000 679000 680000

5547000

5546000

04-13-04-2

33-12-04-2

T11

T30

T35

HWY 49

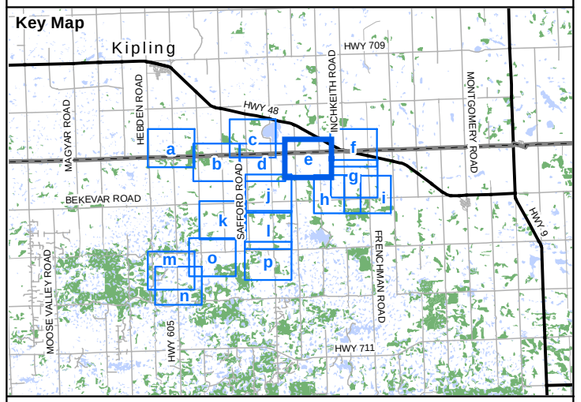
678000 679000 680000

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

**Map 2e**

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Highway
- Primary Road
- Resource/Recreation Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

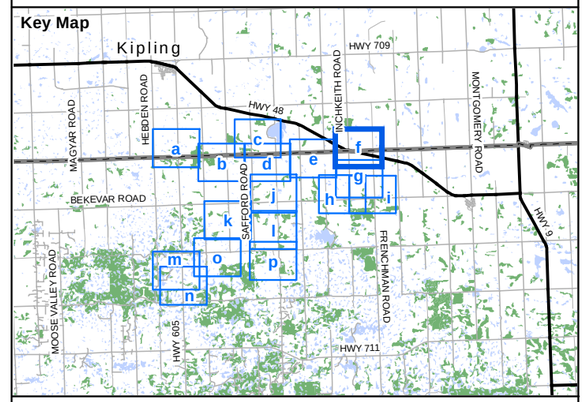
0 100 200 300 400 500 600 Meters

N

Map 2f

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Highway
- Primary Road
- Resource/Recreation Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

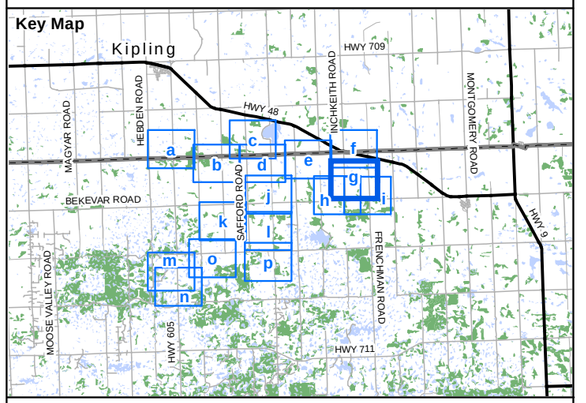
N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

Map 2g

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Primary Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

N

0 100 200 300 400 500 600 Meters

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

680000
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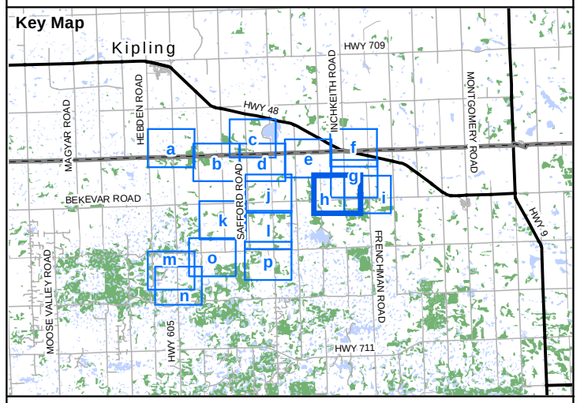
682000
5545000
5544000
5543000
T4
T2
T25
27-12-04-2
26-12-04-2
22-12-04-2
23-12-04-2
INCHKEITH ROAD

# Map 2h

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Primary Road
- Resource/Recreation Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

682000
683000
684000
5545000
5544000
5543000

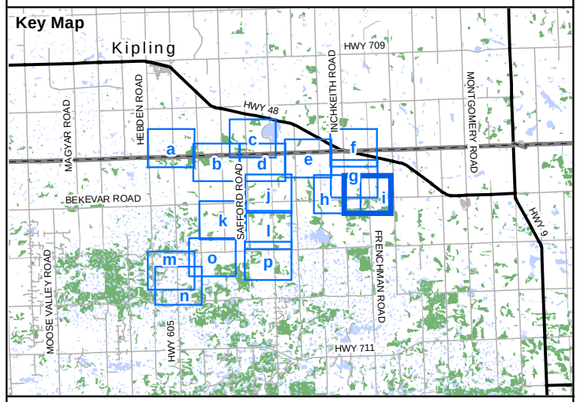
T2
26-12-04-2
25-12-04-2
23-12-04-2
24-12-04-2
INCHKEITH ROAD
FRENCHMAN ROAD
BEKEYER ROAD

# Map 2i

# Bekevar WEP

## Project Infrastructure

**Key Map**




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Primary Road
- Quarter Section

NATURAL RESOURCE SOLUTIONS INC.

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

N

0 100 200 300 400 500 600 Meters

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

Map 2j

# Bekevar WEP

## Project Infrastructure

676000 677000 678000

5545000 5544000 5543000

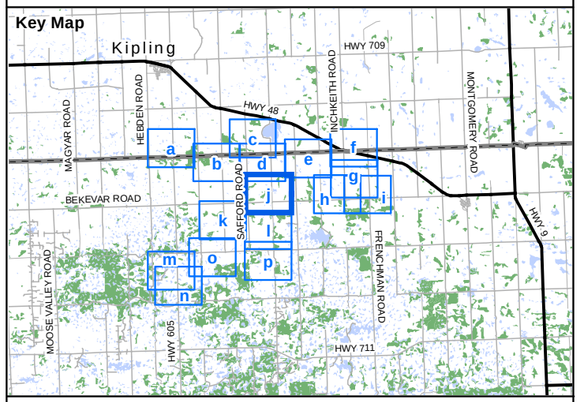
SAFFORD ROAD

BEKEVAR ROAD

30-12-04-2

29-12-04-2

T20 T34 T22




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Resource/Recreation Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

673000
674000
675000
5543000
5542000
BEKEVAR ROAD
T18
T1
T36
T32
T7
23-12-05-2
24-12-05-2
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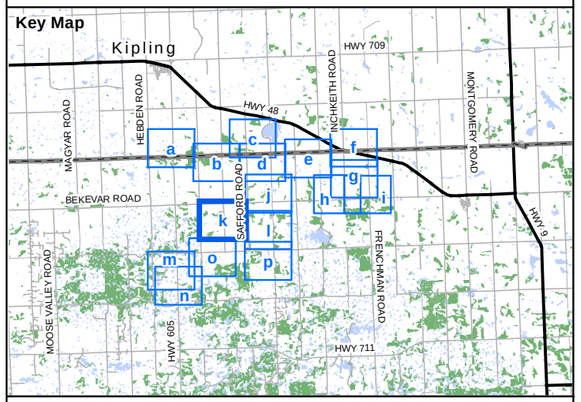
**Map 2k**

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence
- Church

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

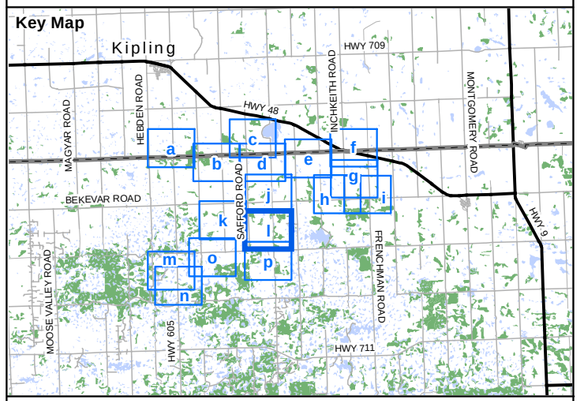
0 100 200 300 400 500 600 Meters

N

Map 2l

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Resource/Recreation Road
- Quarter Section

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| | |
|---|---|
| Project: AB0156C<br>Date: December 16, 2021 | NAD83 - UTM Zone 13<br>Size: 11x17"<br>**1:10,000** |

0 100 200 300 400 500 600 Meters

N

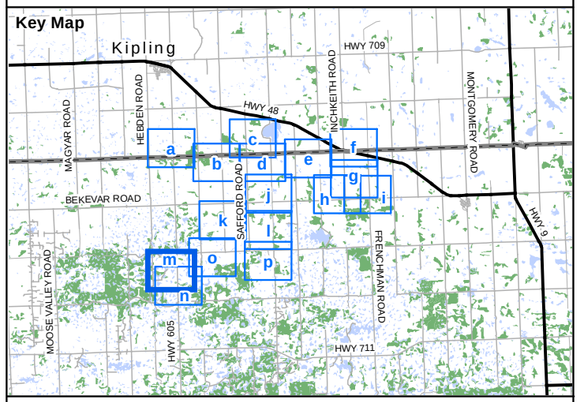
Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

669000
670000
671000
5540000
5539000
5538000
T12
T31
T10
T40
T28
09-12-05-2
10-12-05-2
03-12-05-2
HWY 605

# Map 2m

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

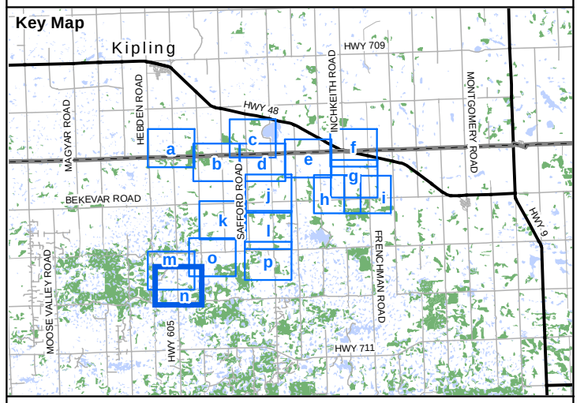
N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

# Map 2n

# Bekevar WEP

## Project Infrastructure



**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section

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| | |
|---|---|
| Project: AB0156C<br>Date: December 16, 2021 | NAD83 - UTM Zone 13<br>Size: 11x17"<br>**1:10,000** |

0 100 200 300 400 500 600 Meters

N

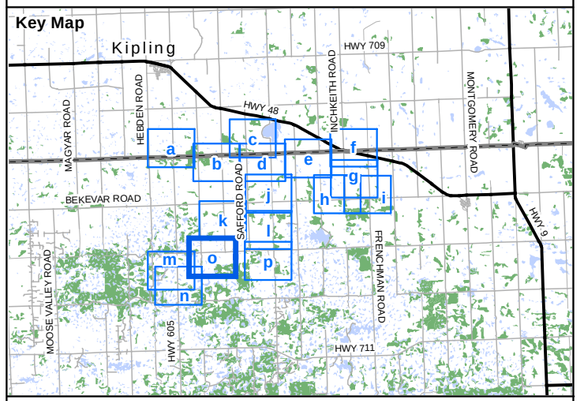
Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

672000
673000
674000
5541000
5540000
5539000
14-12-05-2
11-12-05-2
T41
T21
T26
T5
T16

# Map 2o

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

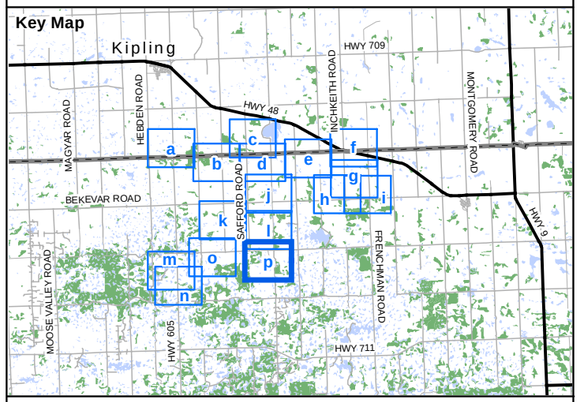
Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

676000
677000
678000
5540000
5539000
SAFFORD ROAD
SAFFORDE AROAD
T17
T39
07-12-04-2
08-12-04-2

Map 2p

# Bekevar WEP

## Project Infrastructure




**Legend**

- Occupied Residence

**Project Layout**

- Wind Turbine (L145b)
- Rotor Swept Area
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Resource/Recreation Road
- Quarter Section

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

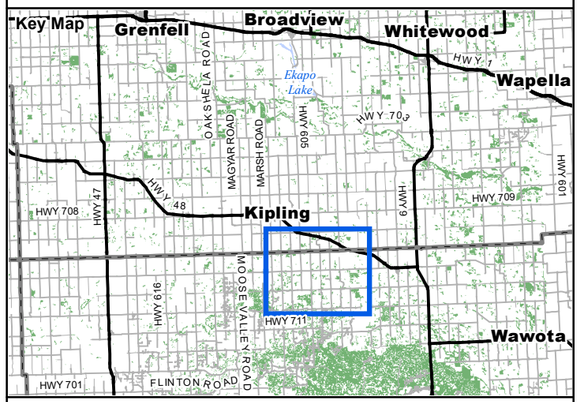
Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map2_L145b_ProjectInfrastructure_10K_2021_12_16_GCS.mxd

**Map 3**
Siting Considerations

Map 3

# Bekevar WEP

## Siting Considerations






## Legend

- Project Area

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Cowessess First Nation Lands

**Siting Considerations**

- Occupied Residence
- Church
- Other Buildnig
- Occupied Residence Buffer (750m)
- Kipling Airport Buffer (4km)
- Transmission Line Buffer (185m)
- Property Boundary Buffer (77.5m)
- Highway Buffer (192.5m)
- Road Buffer (77.5m.5m)
- Road Allowance Buffer (77.5m)
- Wetland
- Native Prairie
- Shrubland
- Wooded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Aquatic, Terrestrial and Wetland Biologists



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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:56,000**

0 1 2 3 Kilometers

N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map3_L145b_SitingConsiderations_70K_2021_12_16_GCS.mxd

**Map 4**
Desktop Assessment Results (Biophysical)

665000 670000 675000 680000 685000

5550000 5545000 5540000 5535000

RAILWAY STREET
1 STREET
MAIN STREET
4 STREET
HEBDEN ROAD
HWY 709
INCHKEITH ROAD
HWY 48
MAGYAR ROAD
HWY 605
BEKEVAR ROAD
SAFFORD ROAD
SAFFORDEA ROAD
FRENCHMAN ROAD
HWY 711
BEKEYER ROAD

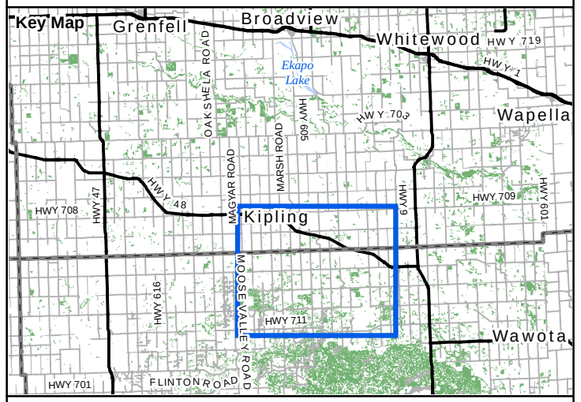
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13 T14 T15 T16 T17 T18 T19 T20 T21 T22 T23 T24 T25 T26 T27 T28 T29 T30 T31 T32 T34 T35 T36 T38 T39 T40 T41

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map4_L145b_DesktopAssessmentResults_85K_2021_12_16_GCS.mxd

**Map 4**

# Bekevar WEP

## Desktop Assessment Results




### Legend

- Regional Study Area (RSA; 5km)
- Local Study Area (LSA; 1km)

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Secondary Road
- Resource/Recreation Road

**Wind Turbine Avoidance Zone**

- Conservation Easement Lands
- Fish and Wildlife Development Fund Lands
- Provincial Parks
- Wildlife Habitat Protection Act

**Rare Species Occurrence**

*Within the LSA*

- Barn Swallow
- Small Yellow Lady's-slipper
- Turkey Vulture

*Beyond LSA*

- American Badger
- Bank Swallow
- Bobolink
- Bonneville Shootingstar
- Cooper's Hawk
- Eastern Bluebird
- Flat-head Larkspur
- Great Blue Heron
- Hall's Sedge
- Hooded Merganser
- Horned Grebe
- Loggerhead Shrike
- Monarch
- Pale Bulrush
- Plains Rough Fescue
- Prairie Dunewort
- Sharp-tailed Grouse
- Western Grebe
- Western Tiger Salamander
- Whooping Crane

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:85,000**

0 1 2 3 4 5 Kilometers

N

**Map Set 5**
Land Cover and Rare Plants

669000 670000 671000

5548000 5547000 5546000

HEBDEN ROAD

T8 T29 T19

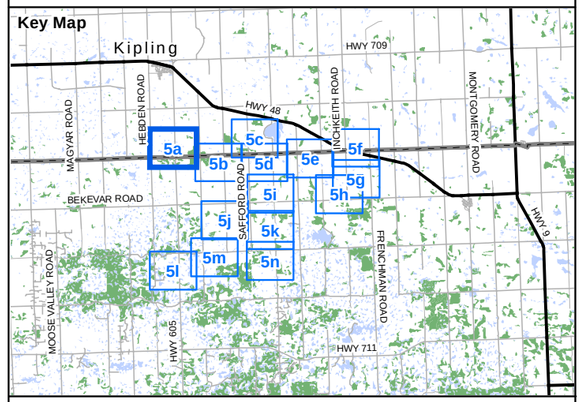
04-13-05-2 03-13-05-2

HWY 605

# Map 5a

# Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section
- Cowessess First Nation Lands

**Land Cover**

- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**

- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map5_L145b_LandCover_RarePlants_10K_2021_12_16_GCS.mxd

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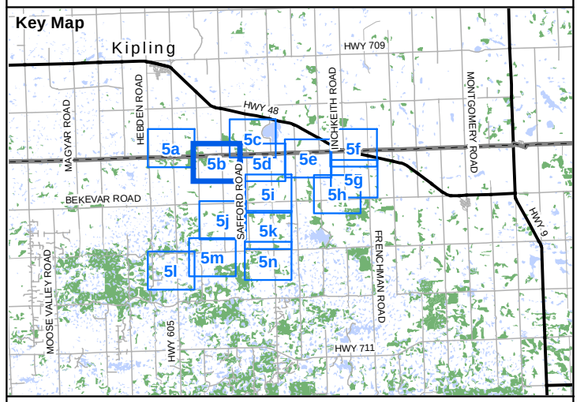
673000
674000
5547000
5546000
5545000
T38
T3
T13
VEG-002
35-12-05-2
36-12-05-2
1
2

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map5_L145b_LandCover_RarePlants_10K_2021_12_16_GCS.mxd

**Map 5b**

# Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**
- Primary Road
- Quarter Section

**Rare Vascular Plant Transects**
- Grassland
- Wetland

**Species of Conservation Concern**
- Small Yellow Lady's Slipper
- Rare Plant Location Buffer (30m)

**Land Cover**
- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**
- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

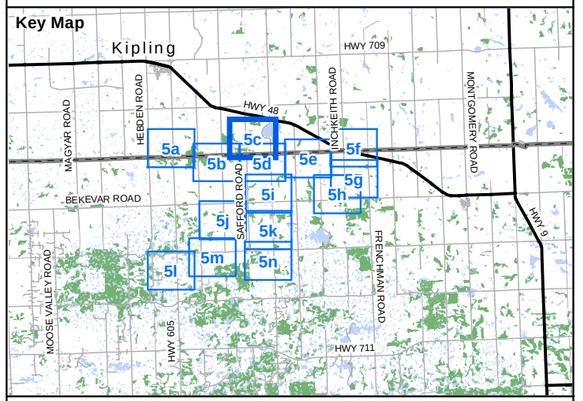
N

675000
676000
677000
5549000
5548000
5547000
HWY 48
SAFFORD ROAD
T15
T24
01-13-05-2
06-13-04-2

# Map 5c

# Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**
- Power Line
- Highway
- Primary Road
- Quarter Section

**Land Cover**
- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**
- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map5_L145b_LandCover_RarePlants_10K_2021_12_16_GCS.mxd

675000 676000 677000

5547000

5546000

5545000

SAFFORD ROAD

T24

T23

31-12-04-2

32-12-04-2

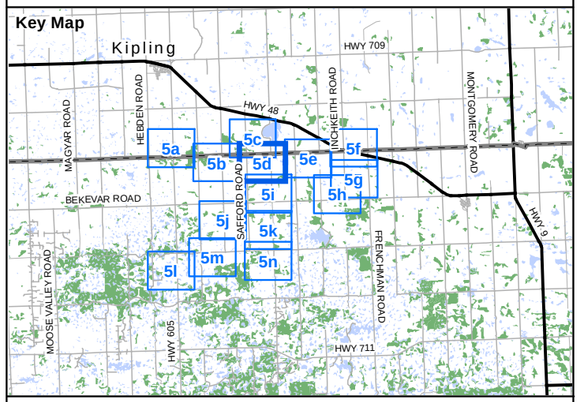
1

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map5_L145b_LandCover_RarePlants_10K_2021_12_16_GCS.mxd

# Map 5d

## Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Quarter Section

**Rare Vascular Plant Transects**

- Pasture

**Land Cover**

- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**

- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

N

0 100 200 300 400 500 600 Meters

678000 679000 680000

5547000

5546000

04-13-04-2

33-12-04-2

T11 T30 T35

HWY 48

2 3 4

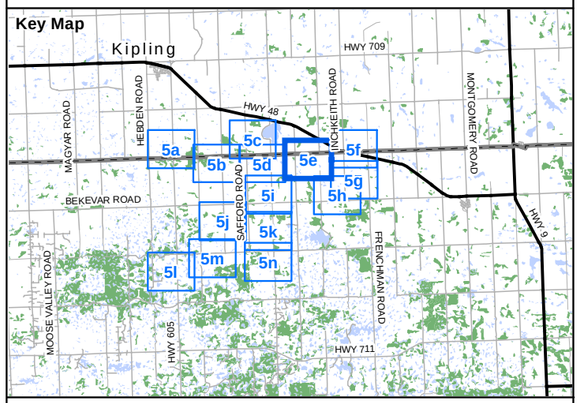
678000 679000 680000

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map5_L145b_LandCover_RarePlants_10K_2021_12_16_GCS.mxd

# Map 5e

## Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Highway
- Primary Road
- Resource/Recreation Road
- Quarter Section

**Rare Vascular Plant Transects**

- Pasture

**Land Cover**

- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**

- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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| | |
|---|---|
| Project: AB0156C<br>Date: December 16, 2021 | NAD83 - UTM Zone 13<br>Size: 11x17"<br>**1:10,000** |

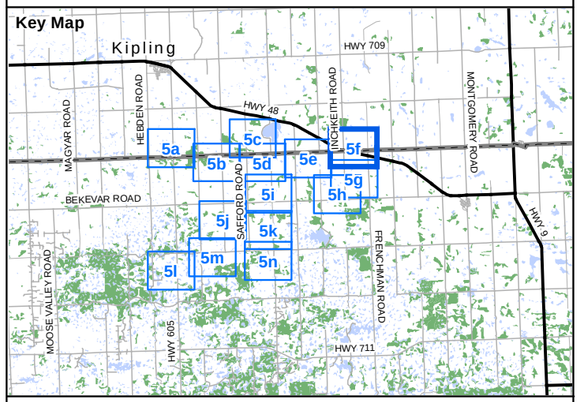
0 100 200 300 400 500 600 Meters

N

Map 5f

# Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**
- Power Line
- Highway
- Primary Road
- Resource/Recreation Road
- Quarter Section

**Rare Vascular Plant Transects**
- Grassland
- Shrub
- Pasture

**Species of Conservation Concern**
- Small Yellow Lady's Slipper
- Rare Plant Location Buffer (30m)

**Land Cover**
- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**
- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

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681000 682000 683000 684000

5546000 5545000 5544000

INCHKEITH ROAD

FRENCHMAN ROAD

35-12-04-2

26-12-04-2

27-12-04-2

T27

T2

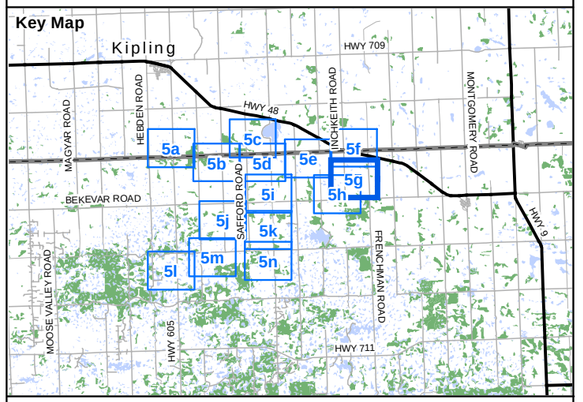
4

5

# Map 5g

# Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Power Line
- Primary Road
- Quarter Section

**Rare Vascular Plant Transects**

- Forest

**Land Cover**

- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**

- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

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680000
681000
682000
5545000
5544000
5543000

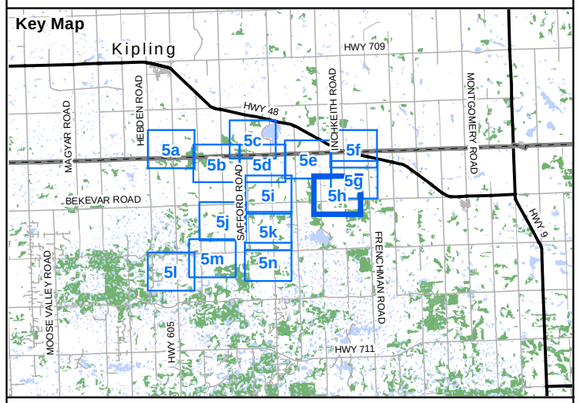
T4
T2
T25
27-12-04-2
26-12-04-2
22-12-04-2
23-12-04-2
INCHKEITH ROAD
11

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map5_L145b_LandCover_RarePlants_10K_2021_12_16_GCS.mxd

# Map 5h

## Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**
- Power Line
- Primary Road
- Resource/Recreation Road
- Quarter Section

**Rare Vascular Plant Transects**
- Pasture

**Land Cover**
- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**
- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

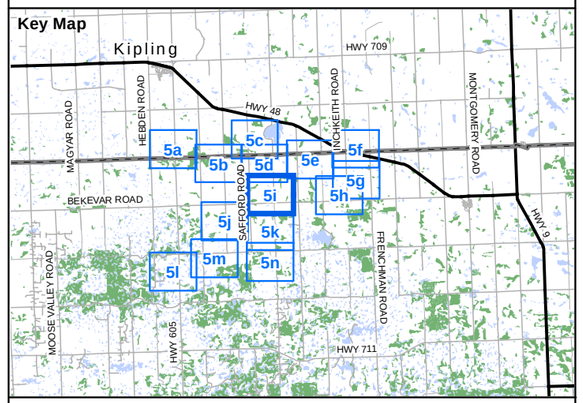
N

676000
677000
678000
5545000
5544000
5543000
SAFFORD ROAD
BEKEVAR ROAD
T20
T34
T22
30-12-04-2
29-12-04-2

Map 5j

# Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Resource/Recreation Road
- Quarter Section

**Rare Vascular Plant Transects**

- Forest

**Land Cover**

- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**

- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

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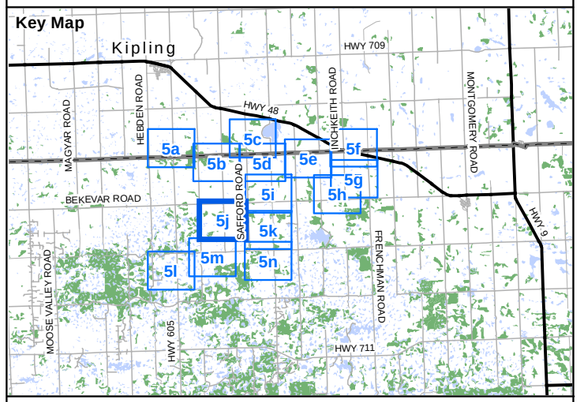
673000
674000
675000
5543000
5542000
BEKEVAR ROAD
T18
T1
T36
T32
T7
23-12-05-2
24-12-05-2
3
5
6

# Map 5k

## Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**
- Primary Road
- Quarter Section

**Rare Vascular Plant Transects**
- Wetland
- Pasture

**Land Cover**
- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**
- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

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# Map 5l

# Bekevar WEP

## Land Cover and Rare Plants

676000 677000 678000

5542000

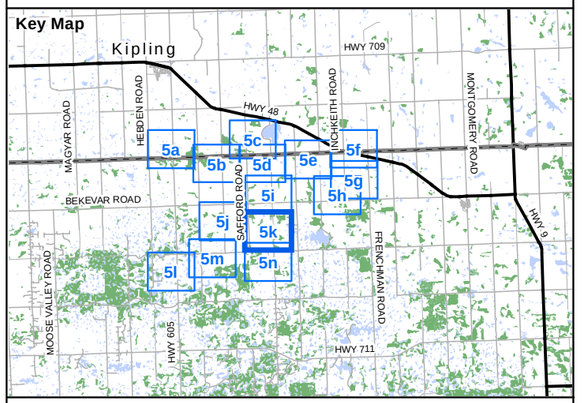
5541000

19-12-04-2 20-12-04-2 18-12-04-2 17-12-04-2

T14 T17

SAFFORD ROAD

6 7 8 9 10 2 3




### Legend

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Resource/Recreation Road
- Quarter Section

**Rare Vascular Plant Transects**

- Grassland
- Wetland
- Pasture
- Forest

**Land Cover**

- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**

- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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| | |
|---|---|
| Project: AB0156C<br>Date: December 16, 2021 | NAD83 - UTM Zone 13<br>Size: 11x17"<br>**1:10,000** |

0 100 200 300 400 500 600 Meters

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669000
670000
671000
5540000
5539000
5538000

T12
T31
T10
T40
T28
12
6
13
10
11
09-12-05-2
10-12-05-2
03-12-05-2
HWY 605

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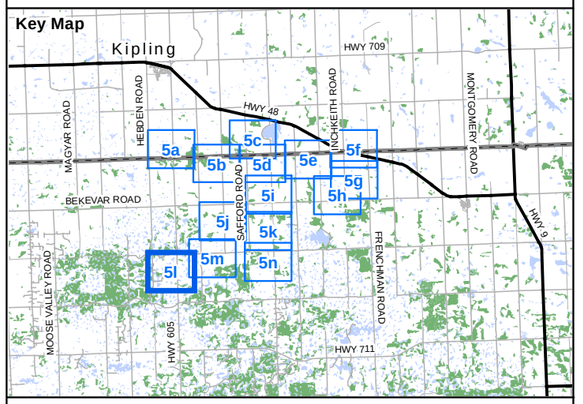
# Map 5m

## Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**
- Primary Road
- Quarter Section

**Rare Vascular Plant Transects**
- Wetland
- Pasture
- Forest

**Land Cover**
- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**
- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

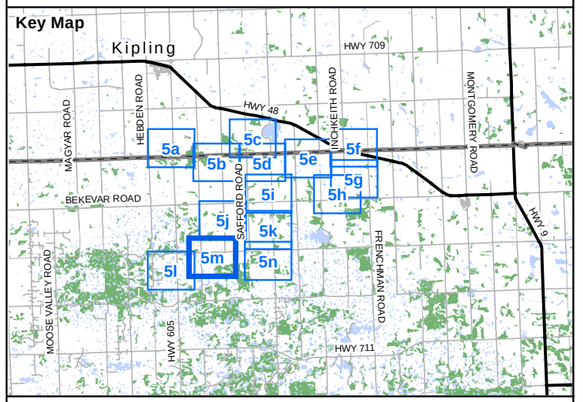
N

672000
673000
674000
5541000
5540000
5539000
14-12-05-2
11-12-05-2
T41
T21
T26
T5
T16
5
10
18

# Map 5o

# Bekevar WEP

## Land Cover and Rare Plants




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**
- Primary Road
- Quarter Section

**Rare Vascular Plant Transects**
- Wetland
- Pasture
- Forest

**Land Cover**
- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**
- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

N

0 100 200 300 400 500 600 Meters

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676000 677000 678000

5540000

5539000

SAFFORD ROAD

SAFFORDEA ROAD

T17

T39

07-12-04-2

08-12-04-2

8

9

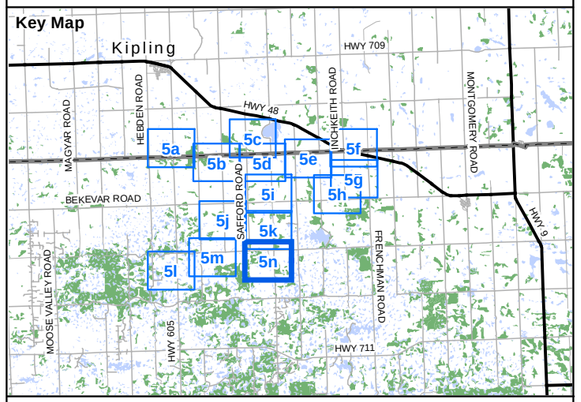
19

# Map 5p

# Bekevar WEP

## Land Cover and Rare Plants

**Key Map**




**Legend**

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Construction Disturbance Area

**Base Layers**

- Primary Road
- Resource/Recreation Road
- Quarter Section

**Rare Vascular Plant Transects**

- Grassland
- Wetland

**Land Cover**

- Agriculture
- Hay Field/Non-native Grassland
- Native Prairie
- Pasture
- Shrubland
- Transmission Corridor
- Dugout
- Wooded

**Wetland and Water Body Permanence**

- Ephemeral Waterbody (Class I)
- Temporary Wetland (Class II)
- Temporary Wetland (Class II)/Seasonal Wetland (Class III)
- Seasonal Wetland (Class III)
- Semi-Permanent Wetland (Class IV)
- Semi-Permanent Wetland (Class IV)/Permanent Wetland (Class V)
- Permanent Wetland (Class V)
- Wetland (Unclassified)
- Treed Wetland

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:10,000**

0 100 200 300 400 500 600 Meters

N

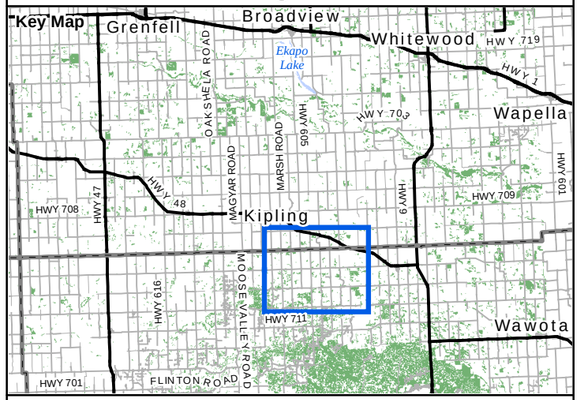
Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map5_L145b_LandCover_RarePlants_10K_2021_12_16_GCS.mxd

**Map 6**
Bird Migration Monitoring Stations

Map 6

# Bekevar Wind Project

## Bird Migration Monitoring Locations




### Legend

**Bird Migration Monitoring**

- Bird Migration Point Count Station (BMM)
- Bird Migration Stopover Count Station (BMM)

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Resource/Recreation Road

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Imagery: ESRI (2017/2018)

Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:56,000**

0 1 2 3 Kilometers

N

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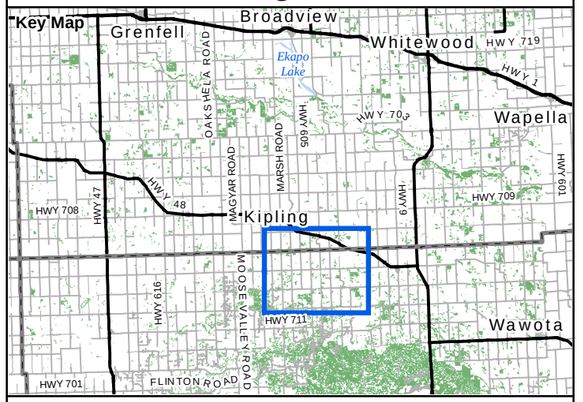
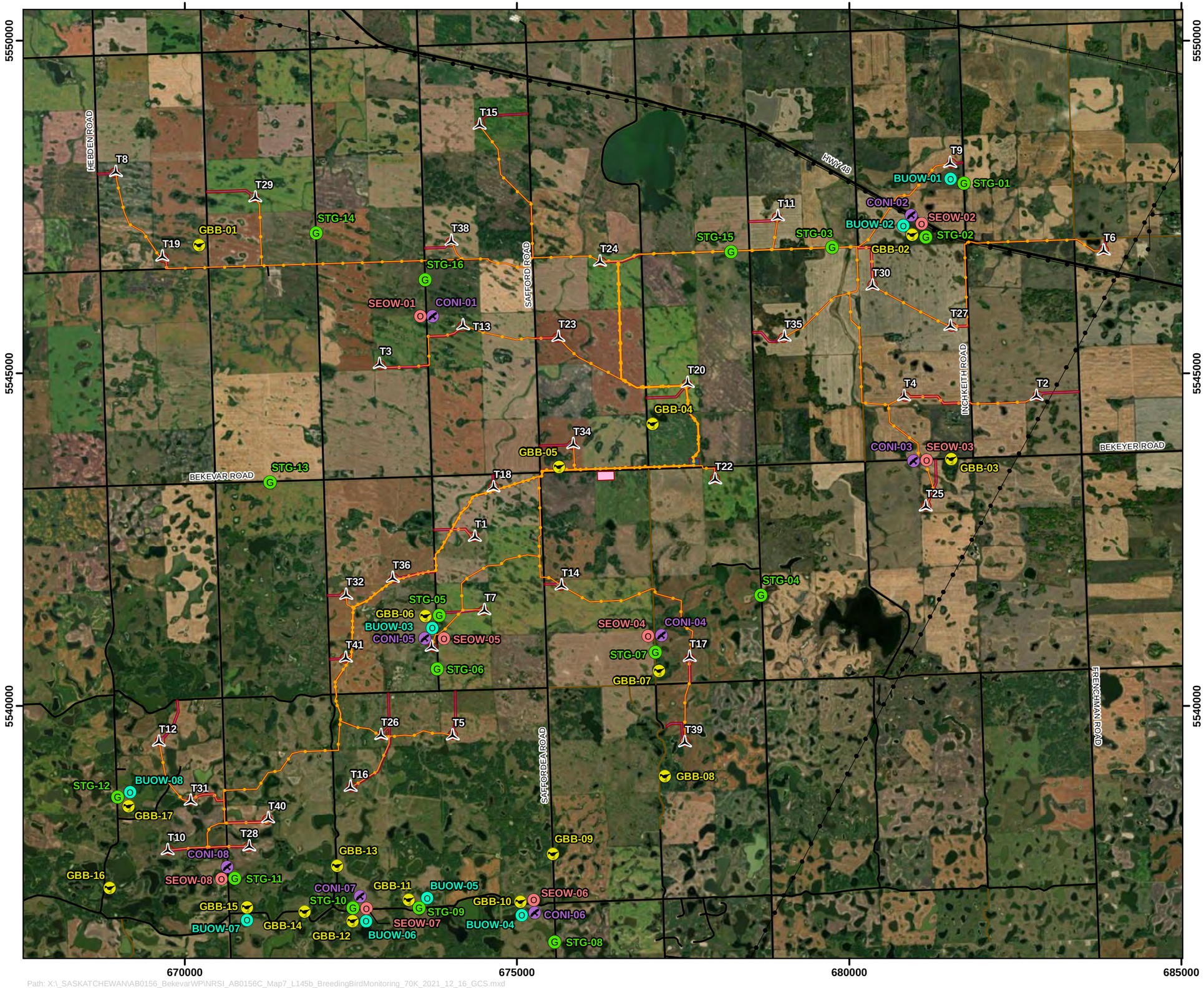
**Map 7**
Breeding Bird Monitoring Stations

Map 7

# Bekevar Wind Project

## Breeding Bird Monitoring Locations




### Legend

**Breeding Bird Monitoring**

- Burrowing Owl Survey Station (BUOW)
- Common Nighthawk Survey Station (CONI)
- Grassland Breeding Bird Survey Station (GBB)
- Sharp-tailed Grouse Survey Station (STGR)
- Short-eared Owl Survey Station (SEOW)

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Resource/Recreation Road

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
1:56,000

0 1 2 3 Kilometers

N

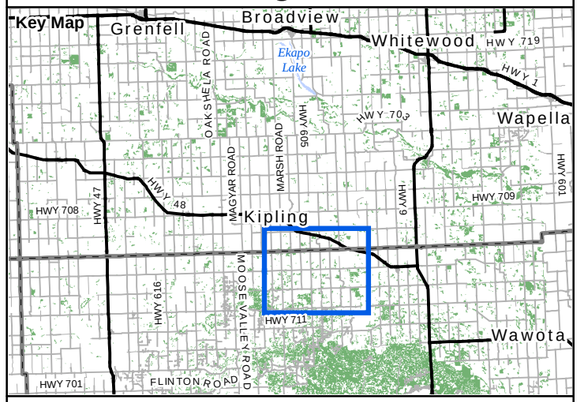
Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map7_L145b_BreedingBirdMonitoring_70K_2021_12_16_GCS.mxd

**Map 8**
Acoustic Bat and Amphibian Monitoring Stations

Map 8

# Bekevar Wind Project

## Bat and Amphibian Monitoring Locations




### Legend

**Bat and Amphibian Monitoring**

- Amphibian Call Survey Station (ANR)
- Acoustic Bat Station (BAT)

**Project Layout**

- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Resource/Recreation Road

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Imagery: ESRI (2017/2018)

Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:56,000**

0 1 2 3 Kilometers

N

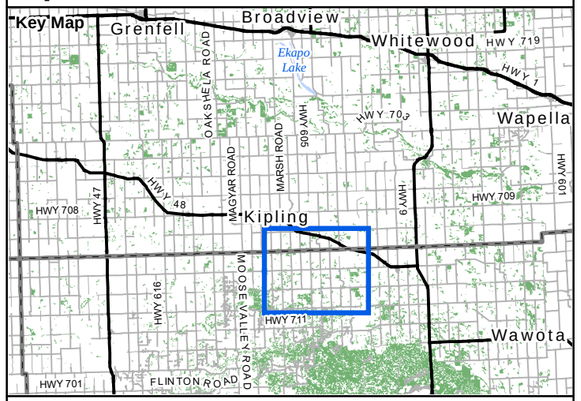
Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map8_L145b_BatandAmphibianMonitoring_70K_2021_12_16_GCS.mxd

**Map 9**
Raptor Nests and Species of Conservation Concern

Map 9

# Bekevar Wind Project

## Raptor Nests and Species of Conservation Concern




### Legend

**Project Layout**
- Wind Turbine (L145b)
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown
- Construction Disturbance

**Base Layers**
- Power Line
- Railway
- Highway
- Primary Road
- Resource/Recreation Road

**Raptor Nest Locations**
- Great-horned Owl Nest (GHOW)
- Red-tailed Hawk Nest (RTHA)
- Swainson's Hawk Nest (SWHA)
- Unknown Species Nest (UNKN)

**Species of Conservation Concern**
- Black Tern Colony (BLTE)
- Monarch Butterfly (MON)
- American Badger - Observation (AMBA)
- American Badger - Potential Den (AMBA)
- Northern Leopard Frog (NOLF)
- Sharp-Tailed Grouse (LEK)
- Small Yellow Lady's Slipper (VEG)
- Black Tern Buffer (400m)
- Northern Leopard Frog Buffer (500m)
- Sharp-Tailed Grouse Buffer (400m)
- Rare Plant Location Buffer (30m)

Natural Resource Solutions Inc.

Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by CanVec © Her Majesty the Queen in Right of Canada, Department of Natural Resources. Imagery: ESRI (2017/2018)

Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:56,000**

0 1 2 3 Kilometers

N

Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map9_L145b_RaptorNest_SCC_70K_2021_12_16_GC.mxd

**Appendix I**
Species Detection Permit

Government of Saskatchewan

# Research Permit
# Species Detection

Fish, Wildlife and Lands Branch

**21SD019**

**Dates:** Issue Date = 27-Apr-21; Active Date = 07-Apr-21; Expiry Date = 10-Nov-21

**Permittee:** Patrick Henn of RES Canada (Proponent)
5605 Gaspe Ave.
MONTREAL QC H2T 2A4

Regarding: Bekevar Wind Facility located ~7km south of Bender (centre point of Project) . Refer to the Species Detection Application Form (SDAF), attached, for additional information.

To: Authorize the Primary Technical Contact, Andrew Ryckman of Natural Resource Solutions Inc., and Secondary Contact, Jackie Mertler of Vista Environmental Services and personnel to conduct species detection surveys, according to Section 6 of the SDAF:

**8 ENV Species Detection (SD) Surveys; and**
**2 non-ministry Surveys*.**

In addition to the ***Conservation Standards Terms and Conditions: Species Detection (SD) Surveys***, the following conditions apply:

**LEGAL:**

Pursuant to Section 21 of *The Wildlife Act, 1998*, failure to comply with permit conditions may result in immediate revocation of the permit; subsequent rejection of further permit applications, and/or possible prosecution under *The Wildlife Act, 1998*.

This SD Research Permit, the SDAF and the SD Survey Protocol(s) must be carried at all times by personnel conducting the surveys. Electronic versions are acceptable.

**WILDLIFE AND RESEARCH SPECIFIC:**

*Non-ministry Survey protocols: This permit authorizes surveys to proceed according to the survey protocol(s) submitted with the SDAF. However, authorization to proceed with the survey(s) does not constitute endorsement of the survey protocol. A detailed review of the protocol will be conducted in conjunction with the review of the corresponding information submission.

**INFORMATION SUBMISSIONS:**

Review SD Survey Protocols (SDSP) and the SD Loadform (SDLf) prior to beginning surveys.

Government of Saskatchewan

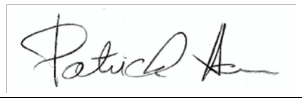
# Research Permit
# Species Detection

Fish, Wildlife and Lands Branch

**21SD019**

The permit must be signed by the permittee and a copy of the signed permit must be returned to SD.researchpermit@gov.sk.ca. Please see instructions in the cover email.

For any questions regarding permit conditions, please contact SD.researchpermit@gov.sk.ca.



**Permittee Signature (Proponent)**

Wednesday, April 28, 2021

**Date**

**Executive Director, Fish, Wildlife and Lands Branch, Ministry of Environment (or representative)**

Tuesday, April 27, 2021

**Date**

**Appendix II**
RM Letters of Support

# *Rural Municipality of Hazelwood No.94*

**OFFICE OF THE ADMINISTRATOR**
**e-mail: rm94@sasktel.net**

**PH: 306.736.8121**
**Fax: 306.736.2496**

**P.O. Box 270**
**Kipling, Saskatchewan**
**S0G 2S0**


January 12, 2018

Patrick Henn
Development Manager
Renewable Energy Systems Canada Inc.
300 Leo-Pariseau, Suite 2516
Montreal, Quebec
H2X 4B3

Dear Patrick:

**Re: Letter of Endorsement**

This is to advise that the following resolution which endorses the proposed RES wind energy project was passed at the January 11, 2018 regular council meeting for the Rural Municipality of Hazelwood No.94:

" That the Rural Municipality of Hazelwood No.94 endorses the Bekevar Wind Energy Project located in the Rural Municipality of Hazelwood No.94, and the project proponent, BHEC-RES Saskatchewan L.P., in the ongoing SaskPower Request for Proposals process for the procurement of 200 MW of new wind energy generation in Saskatchewan."

If you require any further information or clarification regarding this endorsement, please feel free to contact the Municipal Office at 306-736-8121.

Yours truly,

Gary Vargo

Gary Vargo
Administrator

# Rural Municipality of Kingsley No. 124

Box 239
Kipling, SK
S0G 2S0

Phone: 306-736-2272
Fax: 306-736-2798
E-mail: rm124@sasktel.net

December 16, 2019

Council passed the following resolution at their December, 2019 council meeting:

| | |
|---|---|
| **RES Presentation** | 168-19 – Knutson:<br>That the R.M. of Kingsley No. 124 acknowledge that RES presented on their proposed Wind Energy project and that the municipality supports their intent in principal.<br>Carried. |

A True Certified Copy
Of Resolution No. 168-19

(S E A L)

Holly Bushell
Administrator

**Appendix III**
Stakeholder Consultation Mail Package (July 2020)

5605 avenue de Gaspé, Suite 508
Montréal, Quebec H2T 2A4
Canada

514 525 2113
info.Canada@res-group.com
www.res-group.com

July 28, 2020

GENERAL DELIVERY – Kipling Area

**Re: Bekevar Wind Energy Project – PROJECT UPDATE**

Dear community member,

Please see attached for a leaflet presenting the proposed Bekevar Wind Energy Project, a project being developed by Renewable Energy Systems Canada Inc. ("RES") south of the Town of Kipling and west of Kennedy, in the RMs of Hazelwood and Kingsley. A few years ago, RES initiated this project by gathering wind data, performing environmental studies and mapping, and engaging with local landowners and with the council and staff of the RM of Hazelwood. At the time we obtained support from Council, as well as secured land agreements with local landowners.

We are now reaching out to the community at-large as the project now has an opportunity to be submitted to SaskPower, which launched earlier this year a competitive process to procure 300MW of wind energy. RES believes our **Bekevar Wind Energy Project will be a serious contender in this competition, and we hope to be selected by SaskPower early next year.** If selected RES would then engage in a thorough consultation and permitting process with the community in 2021, with the objective of starting construction in 2022.

The attached leaflet provides details on the project, the SaskPower procurement and RES. You will note that the base-case project is mainly located on privately-held lands in RM of Hazelwood, with a portion in the RM of Kingsley. Please also note that we are still in the early stages of development, and that exact turbine locations are still to be determined, following additional consultation and environmental studies. The leaflet includes details on RES' approach to siting wind turbines and minimizing impact.

Finally, although we would have liked to come out earlier this year, restrictions in relation to COVID-19 have severely limited our abilities to travel and organize public events. We are carefully monitoring this situation and will be in touch with next steps, so please stay tuned!

In the meantime, we invite you to review the attached and get in contact with either Mary Lou or myself, by email or phone should you have any questions or comments. Consultation at RES is an on-going process and we are always happy to hear from our host community members.

Kind regards,

**Patrick Henn**
Development Manager
(514) 293-9049 / patrick.henn@res-group.com

**Mary Lou Kominek**
Community Relations Coordinator
519-350-5164
marylou.kominek@res-group.com

# Bekevar Wind Energy Project

## About the Project

Renewable Energy Systems Canada Inc. (RES) is proposing to develop, construct and operate a wind power project of approximately 20 to 40 turbines to be located south of Kipling, in the RMs of Hazelwood and Kingsley. The Project would include turbines, access roads, underground cabling and a substation. The turbines would be dispersed on the windy areas of the project area, where the land is suitable and where the environmental and social impact are minimised. A project of this size can power more than 100,000 Saskatchewan homes.

### Why Are We Here?

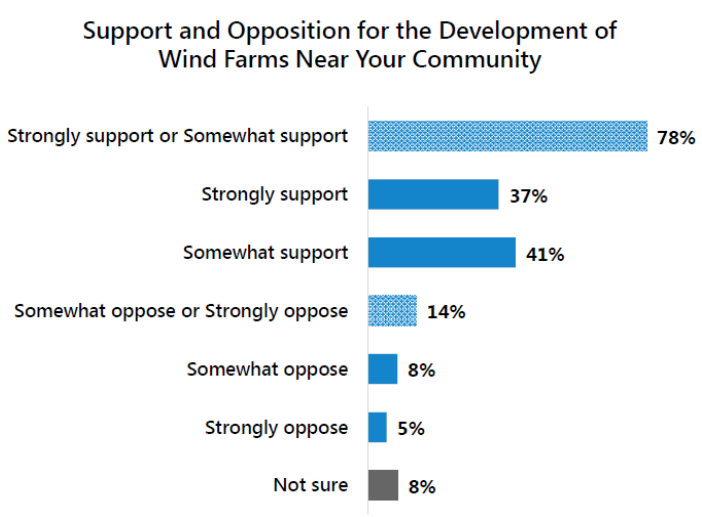
RES' development team combined with its technical experts assessed various areas of Saskatchewan and concluded that this site had an optimal combination of wind, constructability, land and transmission availability. Initial consultation with local landowners, the local community and the RM council and staff have indicated strong support for the project. While our study of the site is on-going, it is certainly considered very suitable for a wind energy development.

### Wind is "in", in Saskatchewan

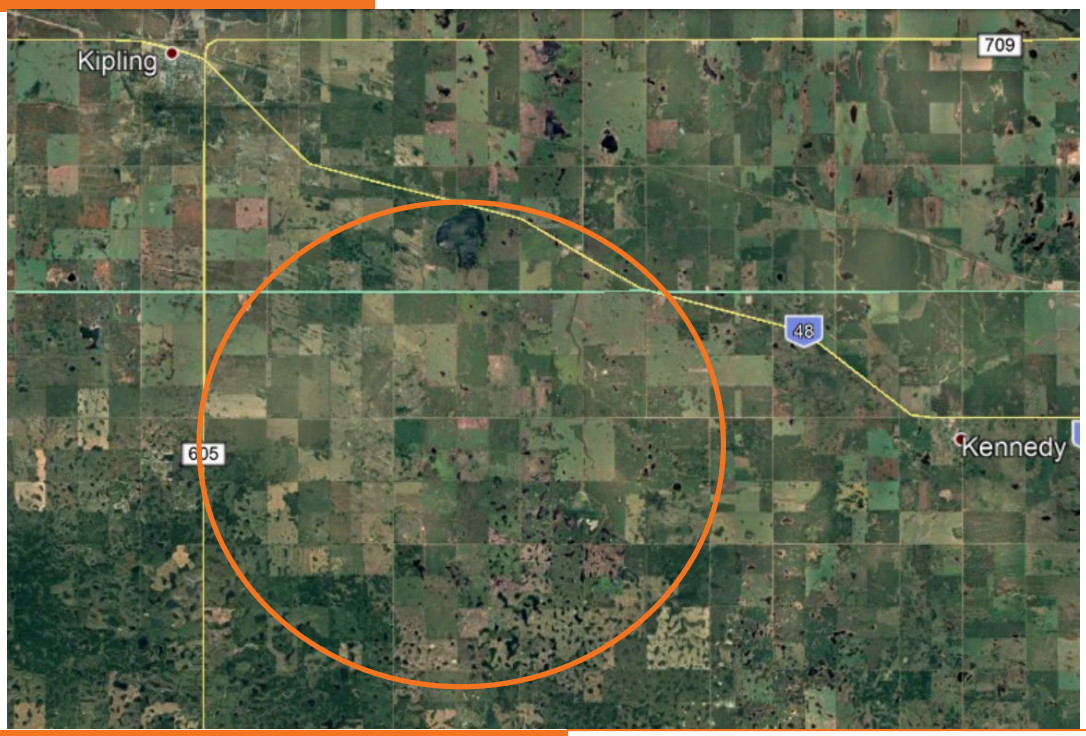
SaskPower offered a 25-year contract for a $300 million project in the southwest of SK in 2018, which is currently in construction. Many more are to come as wind replaces coal-fired electricity in the province, to meet SaskPower climate change goals.

**The price? A historic low of 3.5 cents/kWh, making wind the cheapest source of electricity in the province.**

### Saskatchewan Public Opinion Poll, Nov 2018



# Project Location




# Project Development

As of now, the Project area is large and comprises thousands of acres of contiguous land. However the project will only be located on participating lands and be dispersed on the area to maximise energy while minimising social and environmental impact.

Since this Project's initiation in 2016, RES engaged with the RM council and local landowners, entered into land agreements and undertook environmental studies and mapping of environmental and built features of the site. Careful positioning of turbines and roads is critical to a wind project, to minimise impact to the community, farmland, sensitive habitat and wildlife.

If selected by SaskPower the Project would complete its environmental studies and permitting, further engage with the local community and its stakeholders, and prepare the Project for construction by summer 2022.

RES welcomes your opinion and comments on the project, and how it could be made better.

# Opportunity with SaskPower

## Did You Know?

The government of Saskatchewan has set a target of 40% reduction of greenhouse gases from the electricity sector by 2030, namely by phasing-out all coal-fired electricity and seeking renewable energy alternatives like wind, solar and energy storage.

To this end SaskPower has launched a competitive wind energy procurement process, in which proponents like RES can propose their projects and, if selected, enter into a power purchase agreement for 25 years.

**Proposals for the current round are due in November 2020, and RES is getting ready with the Bekevar Wind Project!**

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# Wind Energy and the Environment

- **Turbines take up very little space**: Once construction is complete, a turbine only takes up approximately 1/10 of an acre of land
- Farming and cattle operations simply continue near turbines; access is **not** restricted
- Numerous wind projects are currently operating in Canada in similar settings; it is clear that cattle, moose, deer and other animals do not avoid wind turbines and are not disturbed by them.
- Careful siting of turbines and access roads are essential to minimising impact to wildlife, the land and its people: detailed field studies are being done to locate critical habitat (e.g. for birds) such as wetlands and grasslands.
- Turbines do produce some noise, but only when they are spinning under windy conditions. There is much open space on the area to locate turbines far from homes and minimise impact to local residents, as per RES' best practices on noise levels.
- The Project will undergo a thorough consultation process with the local community, as well as go through an environmental review by the Saskatchewan Ministry of Environment.

# Significant Benefits for the Local Community

At full capacity, the Project would require an investment of approximately $300M and would generate significant economic and social benefits to the local community. To name a few:

- Several hundred **full-time equivalent jobs during construction**, available to qualified local contractors and workers as per **RES' local hiring practices**
- Significant **annual lease payments and community payments** over the life of the Project for participating and adjacent landowners
- Significant **tax revenue** for the RM and the school board
- **Training opportunities** for youth, in wind turbine maintenance
- **Construction road upgrades and maintenance at zero cost** for the RM

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# Who is RES?

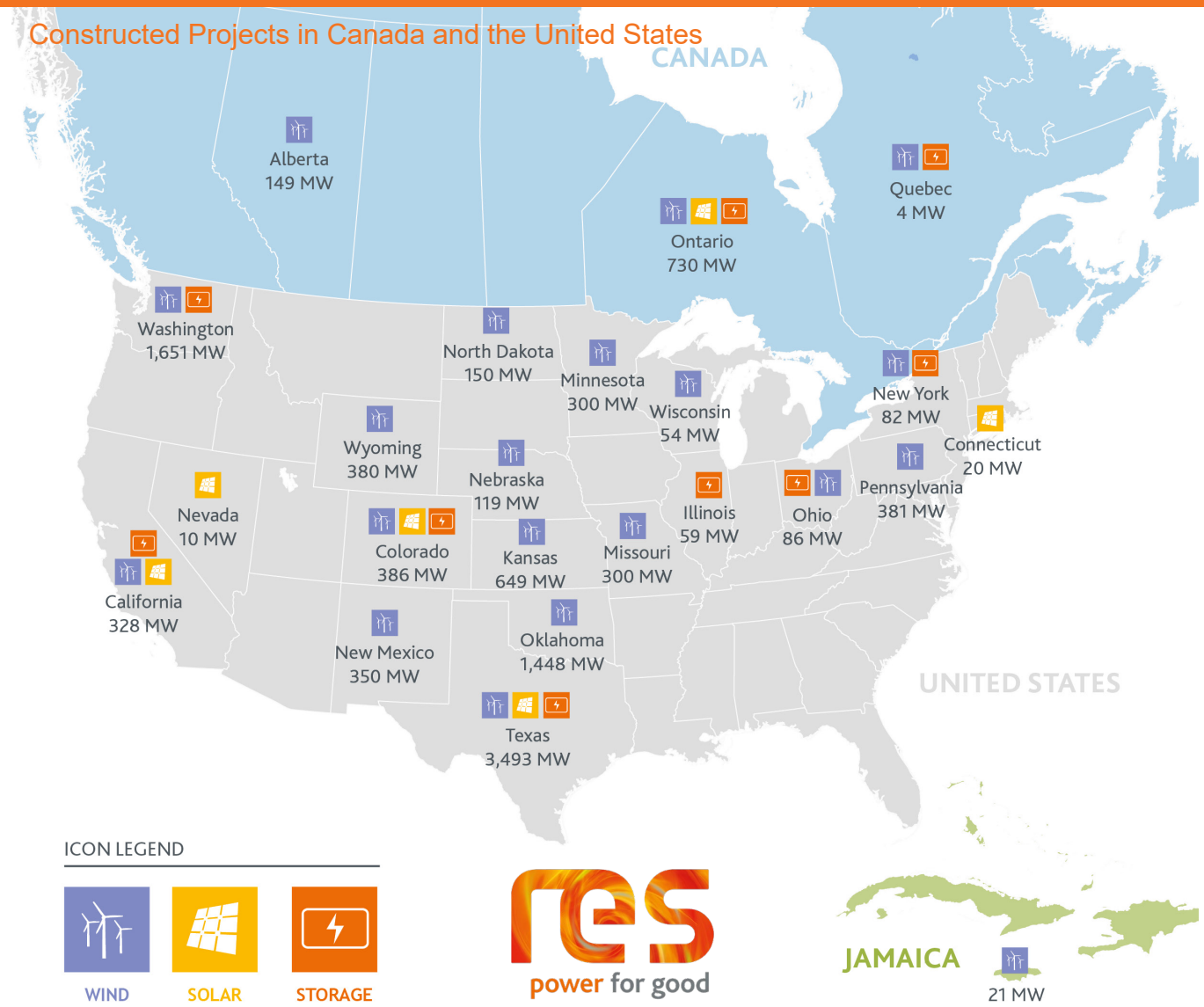
RES is a family-owned business that was established in 1983. RES is dedicated to a low-carbon future and our focus is solely on renewables (wind, solar, storage). We have initiated, developed or built **nearly 3000 MW of wind projects across Canada, namely in Alberta, Ontario and Québec, representing over 20% of installed wind capacity in Canada.** RES has built more than 10% of all wind projects in the United States.

RES has worked and partnered with several local communities and Indigenous communities. We propose an open, collaborative and transparent approach to working with our local partners and our hosts on the land to ensure wind projects that maximise local benefits while minimising social and environmental impact.

**Please contact us if you have any questions and visit us at [www.res-group.com](http://www.res-group.com)**


**Project Development Manager**
Patrick Henn
514-293-9049
patrick.henn@res-group.com

**Community Relations**
Mary Lou Kominek
519-350-5164
marylou.kominek@res-group.com

**Appendix IV**
Stakeholder Consultation Mail Package (August 2021)

5605 avenue de Gaspé, Suite 508
Montréal, Quebec H2T 2A4
Canada

514 525 2113
info.Canada@res-group.com
www.res-group.com

August 11, 2021

**Re: Bekevar Wind Energy Project – PROJECT UPDATE**

Dear community member,

About one year ago we had reached out to the local community in proximity to the proposed Bekevar Wind Energy Project, providing information on Renewable Energy Systems (RES), the Project and our intents to submit the Project in SaskPower's Request for Proposals for wind power in November 2020.

I am pleased to inform you that the **Bekevar Wind Energy Project was selected by SaskPower, and that Bekevar Wind Limited Partnership recently entered into a 25-year power purchase agreement with SaskPower.** Bekevar Wind L.P. is a limited partnership owned by Renewable Energy Systems Canada (RES) as the majority shareholder, and Awasis Nehiyawewini Energy Development Corporation (ANEDC), a Cowessess First Nation company.

We are now pursuing our consultation and engagement efforts with the local community and local stakeholders; please see attached for a project information leaflet and press releases of the power purchase agreement, for your review.

Your feedback is important to us so please do not hesitate to get in touch with us if you have any questions on this Project. **Please note that we are planning to visit the area during the week of August 23rd and do a quick tour of local residents.** We will be pleased to meet with you in person at that time, or in the near future as we conduct additional consultation activities.

Kind regards,

**Patrick Henn**
Senior Development Manager
(514) 293-9049 / patrick.henn@res-group.com

*Bekevar Wind L.P.*

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# Bekevar Wind Energy Project

## About the Project

Bekevar Wind L.P. is proposing to develop, construct and operate a wind power project of approximately 35 to 40 turbines planned to be located in the RMs of Hazelwood and Kingsley, as well as on a few parcels of Cowessess First Nation reserve land. The Project would include turbines, access roads, underground cabling and a substation. The turbines would be dispersed on the windy areas of the project area, where the land is suitable and where the environmental and social impact are minimised. A project of this size can power more than 90,000 Saskatchewan homes.

### Why Are We Here?

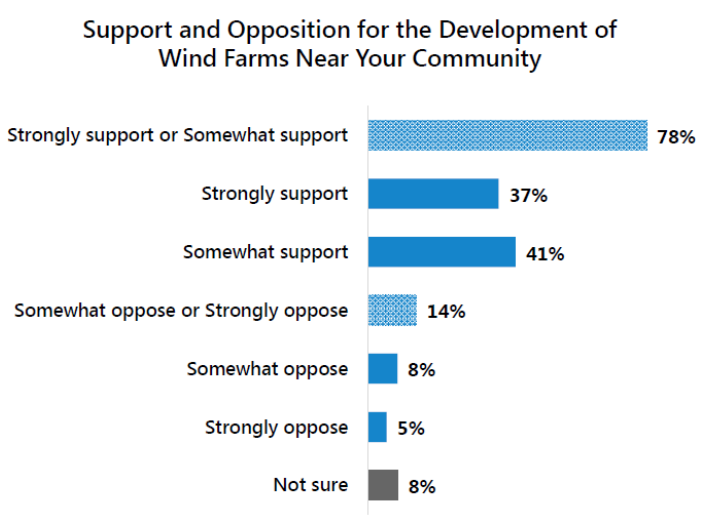
RES' development team combined with its technical experts assessed various areas of Saskatchewan and concluded that this site had an optimal combination of wind, constructability, land and transmission availability. Initial consultation with local landowners, the local community and the RM council and staff have indicated strong support for the project. While our study of the site is on-going, it is certainly considered very suitable for a wind energy development.

### Power Purchase Agreement with SaskPower

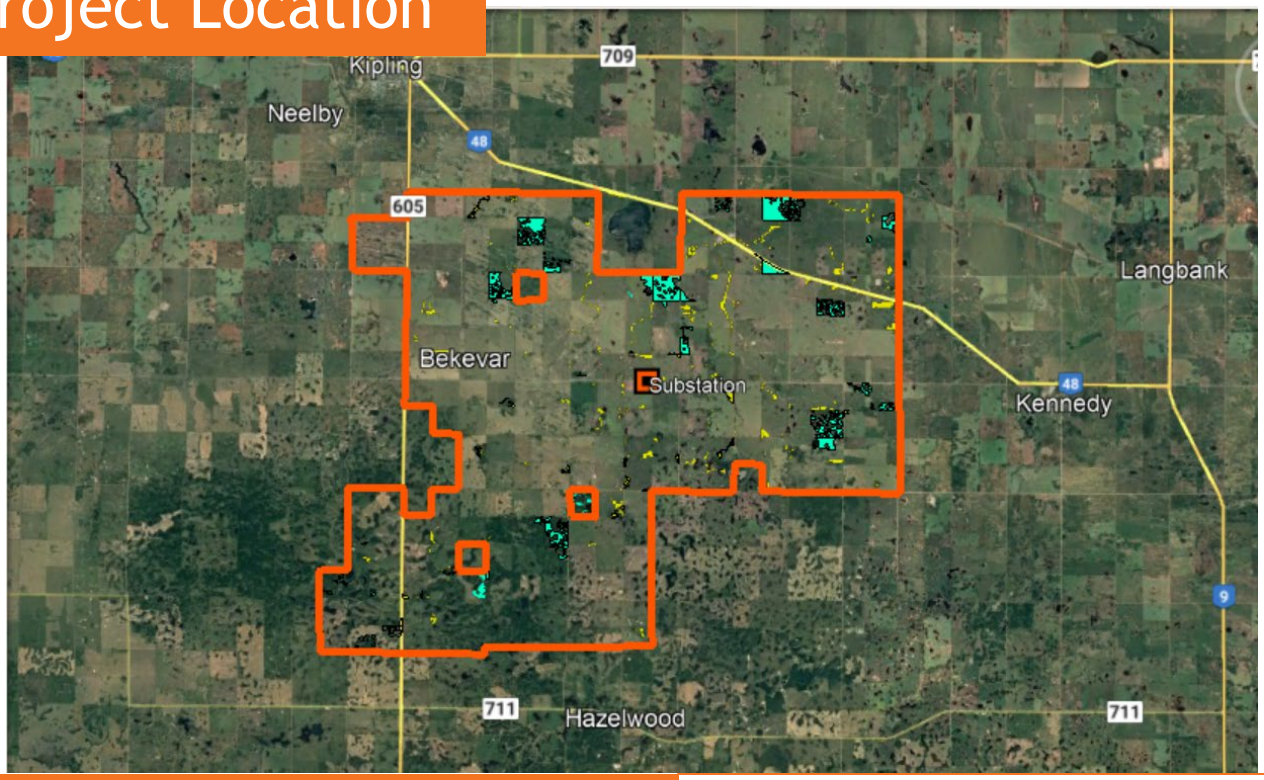
**Bekevar Wind Energy Project was selected by SaskPower in the 2020 Request for Proposals**, and Bekevar Wind L.P. signed a 25-year power purchase agreement with SaskPower.

Electricity generated at Bekevar will be purchased by SaskPower at an industry leading rate over the 25-year term of the agreement and sets a new low benchmark price for renewable energy in Saskatchewan.

### Saskatchewan Public Opinion Poll, Nov 2018



# Project Location




# Project Development

As of now, the Project area is large and comprises thousands of acres of contiguous land. However the project will only be located on participating lands and be dispersed on the area to maximise energy while minimising social and environmental impact.

Since this Project's initiation in 2016, RES engaged with the RM council and local landowners, entered into land agreements and undertook environmental studies and mapping of environmental and built features of the site. Careful positioning of turbines and roads is critical to a wind project, to minimise impact to the community, farmland, sensitive habitat and wildlife.

As the Project has now entered into a contract with SaskPower, environmental studies were initiated earlier this year and public consultation will continue throughout the rest of 2021 and in 2022.

# KEY MILESTONES

**2021**

**Environmental studies** - Underway to be completed in October

**Consultation and Engagement** – August to December

**Permitting Applications** – November-December

**2022**

**Consultation and Engagement** – January to June

**Final Site Design** – February–March

**Zoning Amendment with RMs** – March-April

**Construction Start:** June

**2023**

**Commercial Operations Date:** December

**RES welcomes your opinion and comments on the project, and how it could be made better**

# Wind Energy and the Environment

- **Turbines take up very little space**: Once construction is complete, a turbine only takes up approximately 1/10 of an acre of land
- Farming and cattle operations simply continue near turbines; access is **not** restricted
- Numerous wind projects are currently operating in Canada in similar settings; it is clear that cattle, moose, deer and other animals do not avoid wind turbines and are not disturbed by them.
- Careful siting of turbines and access roads are essential to minimising impact to wildlife, the land and its people: detailed field studies are being done to locate critical habitat (e.g. for birds) such as wetlands and grasslands.
- Turbines do produce some noise, but only when they are spinning under windy conditions. There is much open space on the area to locate turbines far from homes and minimise impact to local residents, as per RES' best practices on noise levels.
- The Project will undergo a thorough consultation process with the local community, as well as apply for approval with Saskatchewan MOE and the two local RMs.

# Socio-Economic Benefits for Local Communities

At full capacity, the Project would require an investment of approximately $300M and would generate significant opportunity for the local community and Indigenous communities:

- **Several hundred full-time equivalent jobs during construction**, available to qualified local and Indigenous contractors and workers as per RES' hiring practices
- Significant **annual lease payments and royalty payments** over the life of the Project for participating and adjacent landowners
- Significant property and school **tax revenue**
- **Training opportunities** for youth, from the local community and from Cowessess First Nation, in wind turbine maintenance
- **Project construction road upgrades and maintenance at zero cost** for the RMs

# About Renewable Energy Systems (RES)

RES is a family-owned business that was established in 1983. RES is dedicated to a low-carbon future and our focus is solely on renewables (wind, solar, storage). We have initiated, developed or built **nearly 3000 MW of wind projects across Canada, namely in Alberta, Ontario and Québec, representing over 20% of installed wind capacity in Canada.** RES has built more than 10% of all wind projects in the United States.

RES has worked and partnered with several local communities and Indigenous communities. We propose an open, collaborative and transparent approach to working with our local partners and our hosts on the land to ensure wind projects that maximise local benefits while minimising social and environmental impact.

**RES is responsible for the development, construction and operations of the Bekevar Project**.

**Please contact us if you have any questions and visit us at [www.res-group.com](http://www.res-group.com)**


**Project Development Manager**
Patrick Henn
514-293-9049
patrick.henn@res-group.com

**Community Relations**
Mary Lou Kominek
519-350-5164
marylou.kominek@res-group.com


# About Cowessess First Nation

*Awasis Nehiyawewini Energy Development (ANEDC)* is owned by Cowessess Ventures Ltd, the economic development corporation which oversees the business assets of the Cowessess First Nation. ANEDC was incorporated in 2010 and has been actively pursuing utility scale wind projects in Saskatchewan since that time. More recently, ANEDC has become active in solar and currently holds a 20 year power purchase agreement with SaskPower for 10MW of solar generation which is being developed by Awasis Solar Limited Partnership. Within the Cowessess portfolio of renewable energy the community is also please to own a 1MW wind, solar and lithium ion battery facility, as well as on reserve solar net metering of five community owned buildings. For more, visit [www.cowessessventures.com](http://www.cowessessventures.com).

*Cowessess First Nation is located in south east Saskatchewan and has 4300 members, 950 of which live on the home reserve. The First Nation is focused on four foundational pillars: a) Cultural Rejuvenation B) Political Sovereignty, C) Effective and Efficient Administration and D) Economic Self Sustainability. Cowessess is a Treaty Land Entitlement First Nation and over the years has amassed over 120,000 acres of agriculture and urban land holdings. The primary purpose for the land acquisitions was future sustainability and economic viability. For more, visit [www.cowessessfn.com](http://www.cowessessfn.com).*


Contact: Jessica Nixon - 306-731-7471 - jessica.nixon@cowessessfn.com


power for good

CVL | ANEDC AWASIS NEHIYAWEWINI ENERGY DEVELOPMENT CORP.

**NEWS RELEASE**
June 17, 2021

**RES and Cowessess First Nation to Accelerate Renewable Energy Goals in Saskatchewan**
*Bekevar Wind L.P. Partnership secures 200 MW Wind Power Purchase Agreement with SaskPower*

**REGINA, SK** - RES (Renewable Energy Systems) and partner Cowessess First Nation are pleased to announce a tender award with SaskPower for a 200 MW wind project located south of Kipling, in southeastern Saskatchewan.

The 200 MW Bekevar Wind Energy Project will consist of approximately 40 turbines, underground medium-voltage electrical collector system, access roads, a substation, two permanent meteorological towers, and an operations and maintenance building. SaskPower is expected to build a 10km long transmission line to connect the project to the provincial grid. The turbines are planned on a 20,000 acre area that overlaps with the RMs of Hazelwood and Kingsley, and about 500 acres of reserve land.

The project will produce enough electricity to power approximately 100,000 homes and plays a significant part in de-carbonizing the Saskatchewan power generation fleet by displacing coal power dispatched by SaskPower. Bekevar Wind Energy Project will help the province achieve the federal target of phasing out conventional coal generation by 2030 and help SaskPower meet its target of 50% reduction of emissions from 2005 levels by 2030.

The project benefits of the Bekevar Wind Energy Project include:

- Providing affordable, zero-carbon electricity to Saskatchewan for 25 years
- Annual property and school tax revenues
- Annual lease payments and/or royalties to participating landowners
- Construction and operational jobs and support services during construction and throughout the life of the project
- Contracting opportunities for local businesses
- Increased local spending on goods and services during project development, construction, and operational phases
- Indigenous ownership, in addition to commitment to Indigenous employment and subcontracting

The project is owned by Bekevar Wind L.P. a partnership between Renewable Energy Systems Canada Inc. (RES) and Awasis Nehiyawewini Energy Development, a wholly owned Cowessess First Nation entity. Construction on the project is expected to begin in the summer of 2022 and is slated for completion by the end of 2023.

“Saskatchewan is an ideal place to build some of the most cost-effective wind power in the world. With many world-class renewables companies qualified to bid, the tender was highly competitive and RES and its partner, Cowessess First Nation, strove to deliver best value to SaskPower,” said Peter Clibbon, RES Senior VP of Development. “We are committed to delivering a quality project on schedule and deliver significant economic benefits to the host communities.”

"Cowessess First Nation has been pursuing utility scale wind energy development since the incorporation of ANEDC in 2010. This is the third Request for Proposal in nine years Cowessess has bid into SaskPower with our partners. To be awarded the Bekevar project in collaboration with RES is a milestone for our First Nation, which helps continue to lead Indigenous renewable energy development in Saskatchewan." Said Chief Cadmus Delorme. "We look forward to utilizing what Mother Earth has granted us with, while working with RES to help Saskatchewan achieve the desired carbon reduction targets."

**About RES in Canada**

RES is the world's largest independent renewable energy company active in onshore and offshore wind, solar, energy storage, transmission and distribution. At the forefront of the industry for 39 years, RES has delivered more than 21GW of renewable energy projects across the globe and supports an operational asset portfolio exceeding 7GW worldwide for a large client base. Understanding the unique needs of corporate clients, RES has secured 1.8GW of power purchase agreements (PPAs) enabling access to energy at the lowest cost. RES employs more than 3,000 people and is active in 10 countries. For more, visit www.res-group.com.

**About Awasis Nehiyawewini Energy Development**

ANEDC is owned by Cowessess Ventures Ltd, the economic development corporation which oversees the business assets of the Cowessess First Nation. ANEDC was incorporated in 2010 and has been actively pursuing utility scale wind projects in Saskatchewan since that time. More recently, ANEDC has become active in solar and currently holds a 20 year power purchase agreement with SaskPower for 10MW of solar generation which is being developed by Awasis Solar Limited Partnership. Within the Cowessess portfolio of renewable energy the community is also please to own a 1MW wind, solar and lithium ion battery facility, as well as on reserve solar net metering of five community owned buildings. ANEDC is headquartered in Regina, Saskatchewan. For more, visit www.cowessessventures.com.

**About Cowessess First Nation**

Cowessess First Nation is located in south east Saskatchewan, 16 km north of Broadview in the picturesque Qu'Appelle Valley. Cowessess has 4300 members, 950 of which live on the home reserve. The First Nation is focused on four foundational pillars: a) Cultural Rejuvenation B) Political Sovereignty, C) Effective and Efficient Administration and D) Economic Self Sustainability. Cowessess is a Treaty Land Entitlement First Nation and over the years has amassed over 120,000 acres of agriculture and urban land holdings. The primary purpose for the land acquisitions was future sustainability and economic viability. The land holding purchase in the Kipling Area by Cowessess will now be home to one of the largest wind farms in south east Saskatchewan. For more, visit www.cowessessfn.com.

**For more information contact:**

Alicia Rivera
Director of Marketing & Communications, RES
alicia.rivera@res-group.com

Jessica Nixon
Project Director, ANEDC
jessica.nixon@cowessessfn.com

SaskPower
Powering our future®

# News Releases

## Bekevar Wind Energy Project to Generate 200 MW of Clean, Renewable Energy in SE Saskatchewan

June 17, 2021

SaskPower has awarded its next utility-scale wind facility to Renewable Energy Systems (RES) Canada and Awasis Nehiyawewini Energy Development, a wholly owned Cowessess First Nation entity.

Set to be constructed north of Moose Mountain Provincial Park in the RM of Hazelwood, the RM of Kingsley and on Cowessess First Nation reserve land, the Bekevar Wind Energy Project will supply 200 megawatts (MW) of zero-emissions power, enough to serve up to 100,000 homes.

“Reducing greenhouse gas emissions by at least 50 per cent below 2005 levels by 2030 is a priority for SaskPower,” said Mike Marsh, SaskPower President and CEO. “Incorporating wind power through projects such as Bekevar is a crucial component of our strategy to make significant reductions to emissions while ensuring SaskPower can supply reliable, sustainable, and affordable power to our customers.”

SaskPower selected RES and Awasis Nehiyawewini Energy Development’s project as part of an open competition. Evaluation of the proposals included best-value criteria such as, energy price, environmental site characteristics, Indigenous participation and community engagement plans. Electricity generated at Bekevar will be purchased by SaskPower at an industry leading rate over the 25-year term of the agreement and sets a new low benchmark price for renewable energy in Saskatchewan.

Construction on the project will begin in the summer of 2022, and the facility is expected to be complete by the end of 2023.

Saskatchewan currently has six wind facilities producing a total of 241 MW to the provincial grid. In addition to Bekevar, three wind projects are currently under construction totaling 385 MW: Riverhurst Wind Project (10 MW), Blue Hill near Herbert (175 MW), and Golden South near  Assiniboia (200 MW).

For more information, please visit saskpower.com/projects.

At a glance...

- SaskPower has awarded a 200-megawatt project to RES Canada and Cowessess FirstNation
- The Bekevar Wind Energy Project will be located southeast of Kipling
- SaskPower will add 585 MW of wind energy to the grid by the end of 2023More
- information can be found at saskpower.com/projects

**Appendix V**
Public Open House Information

*Bekevar Wind L.P.*

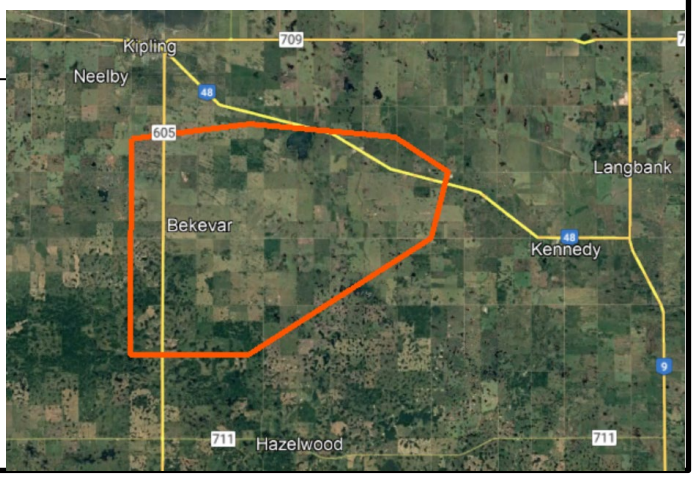
# Bekevar Wind Energy Project

## Open House Information Session

**Kipling Friendship Center -** 500, 1st street
Wednesday, **November 10**, **11:00 AM to 9:00 PM**

Bekevar Wind L.P., a partnership between Renewable Energy Systems Canada Inc. (RES) and Cowessess First Nation, is proposing to develop, construct and operate a 200 MW wind power project of approximately 30 to 40 turbines, several miles south of Kipling, in the RMs of Hazelwood and Kingsley, as well as on 500 acres of Cowessess First Nation reserve land. Bekevar Wind L.P. has entered into a 25-year PPA with SaskPower for this Project which would power approximately 90,000 Saskatchewan homes.

Members of the Project team, as well as subject matter experts will be present to answer your questions. Mapping and information panels will also be displayed. **This is an "open house" format so please come at your convenience during this period.** We have set up an extended period for this event due to COVID, to avoid larger gatherings, and applicable Saskatchewan sanitary measures will be respected. *If possible please come earlier in the day.*




**Your feedback is important to us and we hope to see you there!**

For information, please contact:
**Patrick Henn**, Project Manager
(514) 293-9049 / patrick.henn@res-group.com

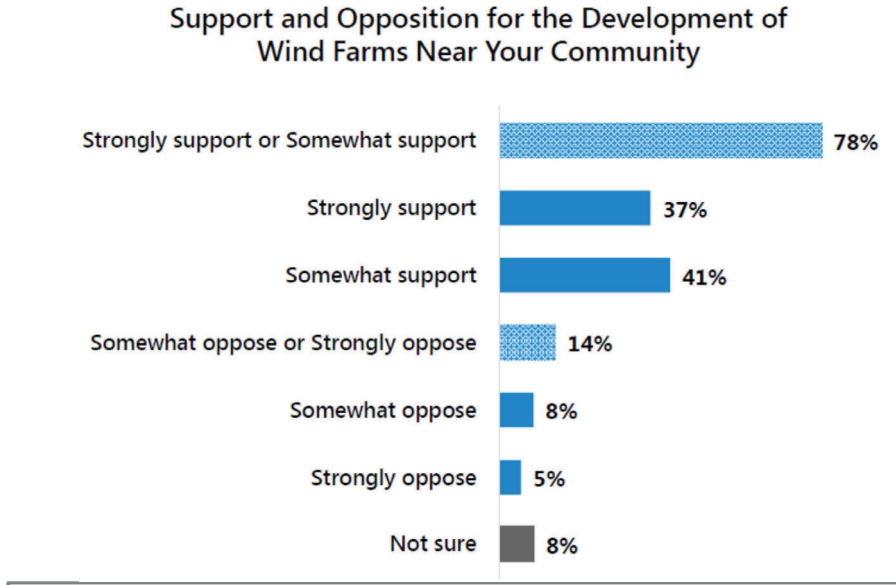
**Mary Lou Kominek**, Community Relations
(519) 350-5164 / marylou.kominek@res-group.com

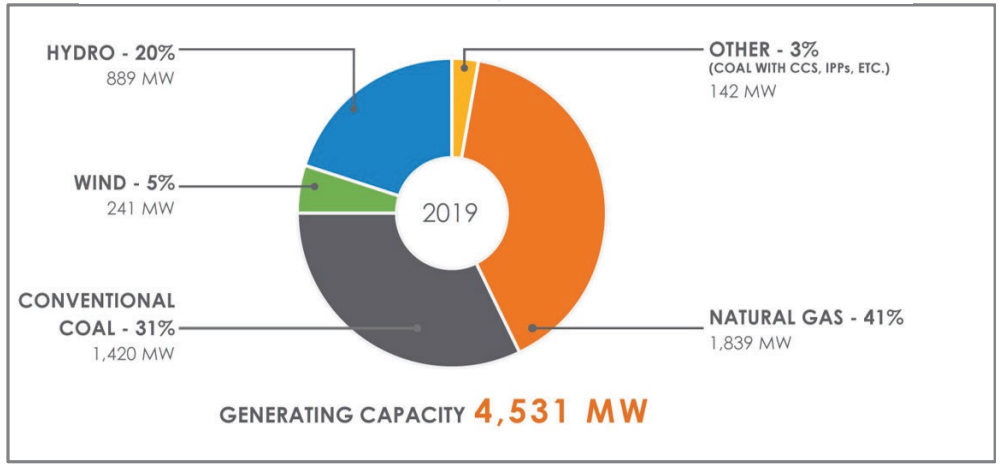
# WHY WIND ENERGY IN SASKATCHEWAN?

Bekevar Wind L.P.

res power for good | CVL | ANEDC

- ***Saskatchewan Climate Change Action Plan***: commitment to phasing out coal-fired electricity by 2030
- **WIND ENERGY** is the leading source of power that is set to replace much of it… **WHY?**
  - Wind does not emit greenhouse gases or other pollutants
  - **the MOST AFFORDABLE source of electricity today**
  - Largely supported by the population of Saskatchewan
    - **Over 20 Rural Municipalities in Saskatchewan have officially supported wind energy projects on their territories**
  - Highly compatible with large agricultural holdings, while creating a **risk-free revenue stream to farmers and local communities**
  - Creates local jobs
  - Significant local revenues from property taxes, landowner payments and employment



# THE PROPONENT

Bekevar Wind L.P.

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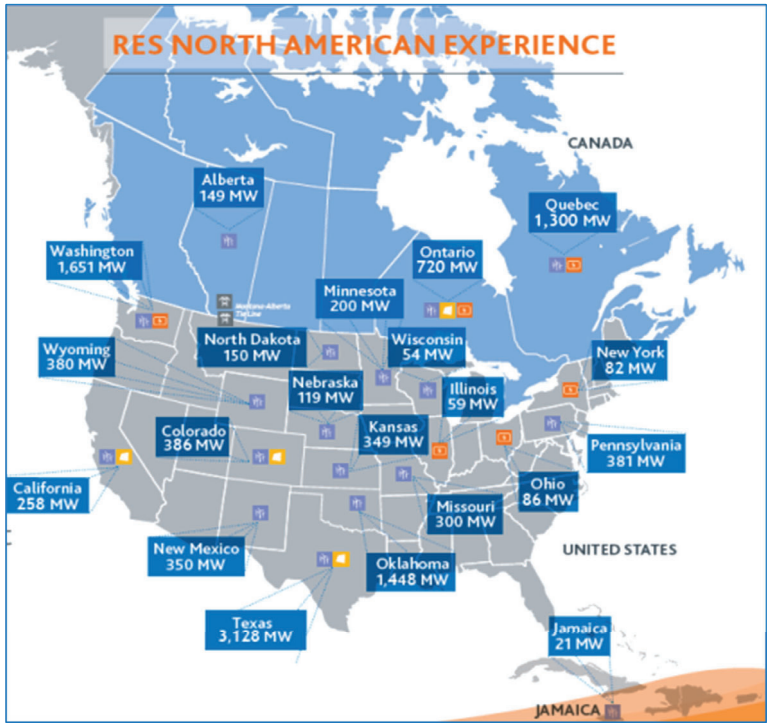
## ABOUT RENEWABLE ENERGY SYSTEMS

- World's **largest independent** renewable energy company
- Develops, constructs, and operates projects around the globe: onshore and offshore wind, solar, energy storage, and transmission projects
- Globally: **17 GW**, over 2000 employees
- USA: over **9,000MW**, representing over 10% of installed US wind capacity
- Canada: Since early 2000s, over **2,000MW** developed and/or constructed (Alberta, Ontario, Québec)
- **RES is the majority owner of Bekevar Wind L.P. and is responsible for the development, construction and operations of the Bekevar Wind Project**

## ABOUT COWESSESS FIRST NATION

- Located in south east Saskatchewan and has 4300 members, 950 of which live on the home reserve
- Four foundational pillars: a) Cultural Rejuvenation B) Political Sovereignty, C) Effective and Efficient Administration and D) Economic Self Sustainability
- Awasis Nehiyawewini Energy Development Corporation (ANEDC), was incorporated in 2010 and is wholly owned by Cowessess Ventures Ltd.
- Renewable energy experience:
  - 10 MW of solar generation under PPA with SaskPower
  - 1 MW wind, solar and lithium ion battery facility
  - On reserve solar net metering of five community owned buildings
- **ANEDC is a minority local owner in the project and is responsible for project development assistance and contributing land holdings to the project.**



# PROJECT SUMMARY

**Bekevar Wind L.P.**

- Located in the RMs of Hazelwood and Kingsley, and 500 acres of Cowessess reserve land
- 20,000 acres of land under option
- Total installed net capacity of 200MW
  - Approximately 35 to 40 turbines
- Low turbine density: turbines spread over approximately 40 square miles
- Other project components: underground electrical collector system, one substation and access roads
- 25-year contract with SaskPower
- Total investment of over $300M
- Enough electricity to power over 90,000 Saskatchewan homes

**TO MAY 2022**
Consultation, Enviromental Approvals, Permitting and Engineering

**SUMMER 2022**
Start of Construction

**DECEMBER 2023**
Start of Commercial Operations

# SOCIO-ECONOMIC BENEFITS TO YOUR COMMUNITY

Bekevar Wind L.P.

res power for good | CVL | ANEDC

**Local revenues amounting to $40 million + over 25 years (duration of contract with SaskPower) from:**

- **Property and school tax payments**
- **Royalties to participating landowners**
- **Direct and indirect employment and local business opportunities**

- Over **150 full-time equivalent jobs** during construction
- **~6-8** permanent jobs in operations and maintenance
- Other contractual work through life of the Project (road maintenance and repairs, snow removal, etc.)

- **Local hiring policy** will result in job opportunities for qualified local contractors and workers, and indigenous-owned companies

- **Training bursary** for youth in the RMs and Indigenous persons to receive training on wind turbine maintenance and operations; and work locally on the wind project

# UNDERSTANDING TURBINE SOUND

Bekevar Wind L.P.

*Wind turbines emit noise from the blades moving through the air and mechanical equipment in the hub*

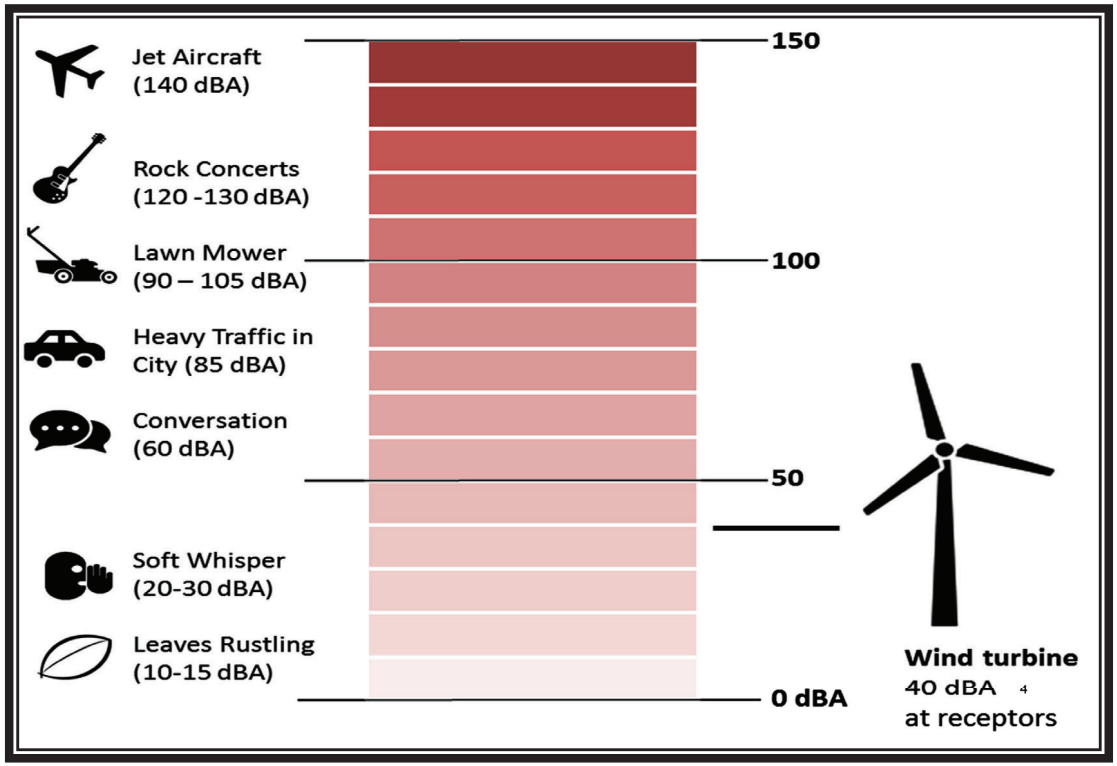
**Did you know?**

- Wind turbine noise decreases greatly with distance
- When it is windy, ambient noise levels increase, having the typical effect of covering the noise emitted by the turbine itself

**Bekevar Wind L.P.'s commitment:**

1. **All turbines AT LEAST 750m from any neighboring residence**
2. **Perform an independent engineering study on noise (pre-construction noise modelling)**
3. **Comply to strict noise standards applied in Alberta, ie no more than 40 dBA outside all residences**
4. **Monitor noise levels during operations when required**

Conservative assumptions are used in the modelling (temperature, humidity, wind direction, etc.) which over predict the noise levels



# SITING CONSIDERATIONS and MINIMISING IMPACT

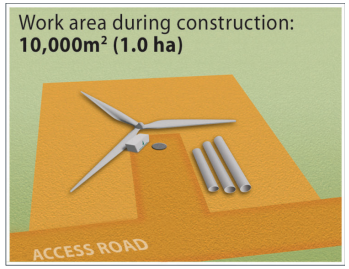
Bekevar Wind L.P.

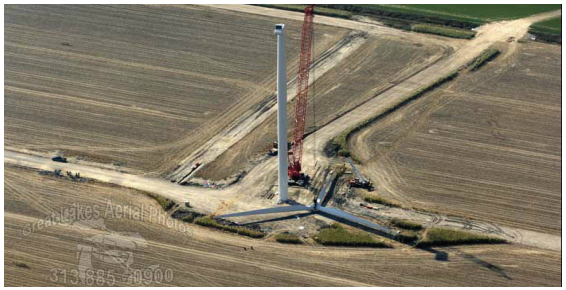
power for good

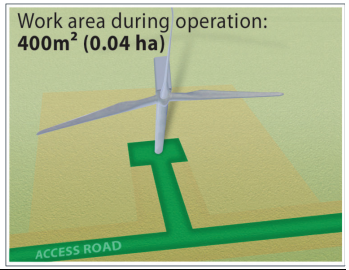
***Bekevar Wind L.P.'s goal is to develop sustainable projects that maximise energy yield while minimising impacts on the land, the environment, and local communities***

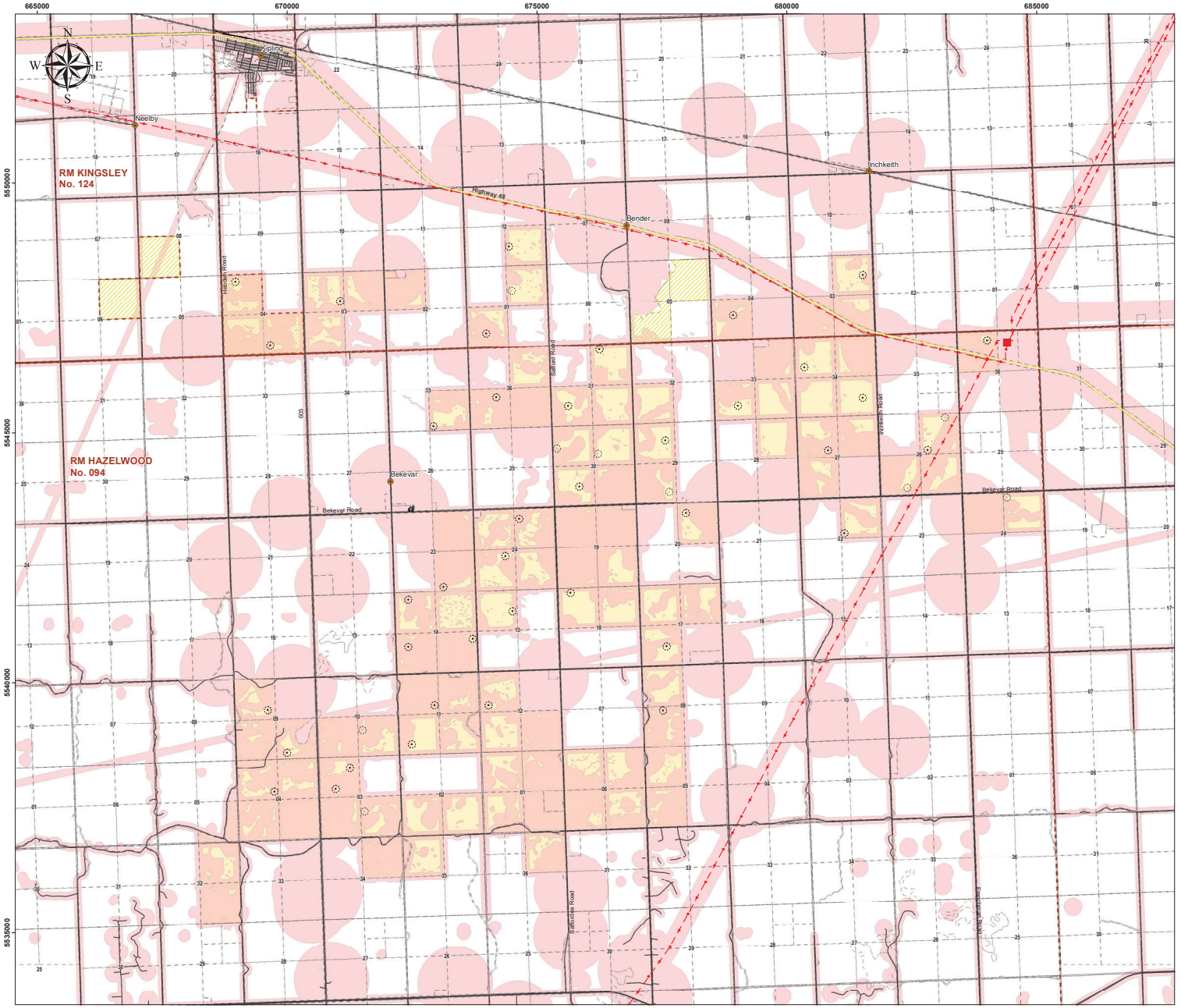
- MINIMAL LAND USE:
  - CONSTRUCTION FOOTPRINT: less than 1 ha (**2.5 acres**) at each turbine
  - OPERATIONS FOOTPRINT: under 0.04 ha (**0.1 acre**) at each turbine
  - Total estimated footprint for the Project (including roads, substation) of 50 acres, spread over approximately 20,000 acres of land
  - All electrical cabling is underground

- SITING CONSIDERATIONS:
  - Siting of wind turbines, roads and electrical network carefully determined through environmental studies, landowner and local stakeholder consultations
  - Turbines are sited far from residences to comply to strict Alberta noise guidelines
  - Compliance with RM draft land use zoning by-law
  - ENVIRONMENTAL
    - Avoidance of all SK MOE Wind Turbine Avoidance Zones
    - Avoidance of native prairie
    - Compliance of turbines to recommended wildlife setbacks
    - Avoidance of Environmentally Significant Areas







# BEKEVAR WIND ENERGY PROJECT
## Buildable Area and Setbacks Map

**PRELIMINARY DESIGN FOR CONSULTATION ONLY**
**39 x 5.2MW TURBINE OPTION ONLY**

## LEGEND

**SITE**
- Project Site Quarter Sections
- Turbine Layout
- Alternate Turbine Positions
- Rotor-Swept Area (72.5m)
- Rural Municipality
- Quarter Section
- Sections
- Reserve Land

**INFRASTRUCTURE**
- Roads
- Highway
- Railway
- 230 kV Line
- Kennedy Substation NE 36-12-04-2

**SETBACK**
- Setback Layers Merged

Projection / Coordinate System
Transverse Mercator
NAD 1983 UTM Zone 13N / North American 1983
Meters

Absolute Scale
1:35,000

0 1 2 4 Km


**BEKEVAR WIND L.P.**
*By its General Partner Bekevar Wind G.P. Inc.*
1500-1874 Scarth St.
Regina, SK S4P 4R9



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Sources :
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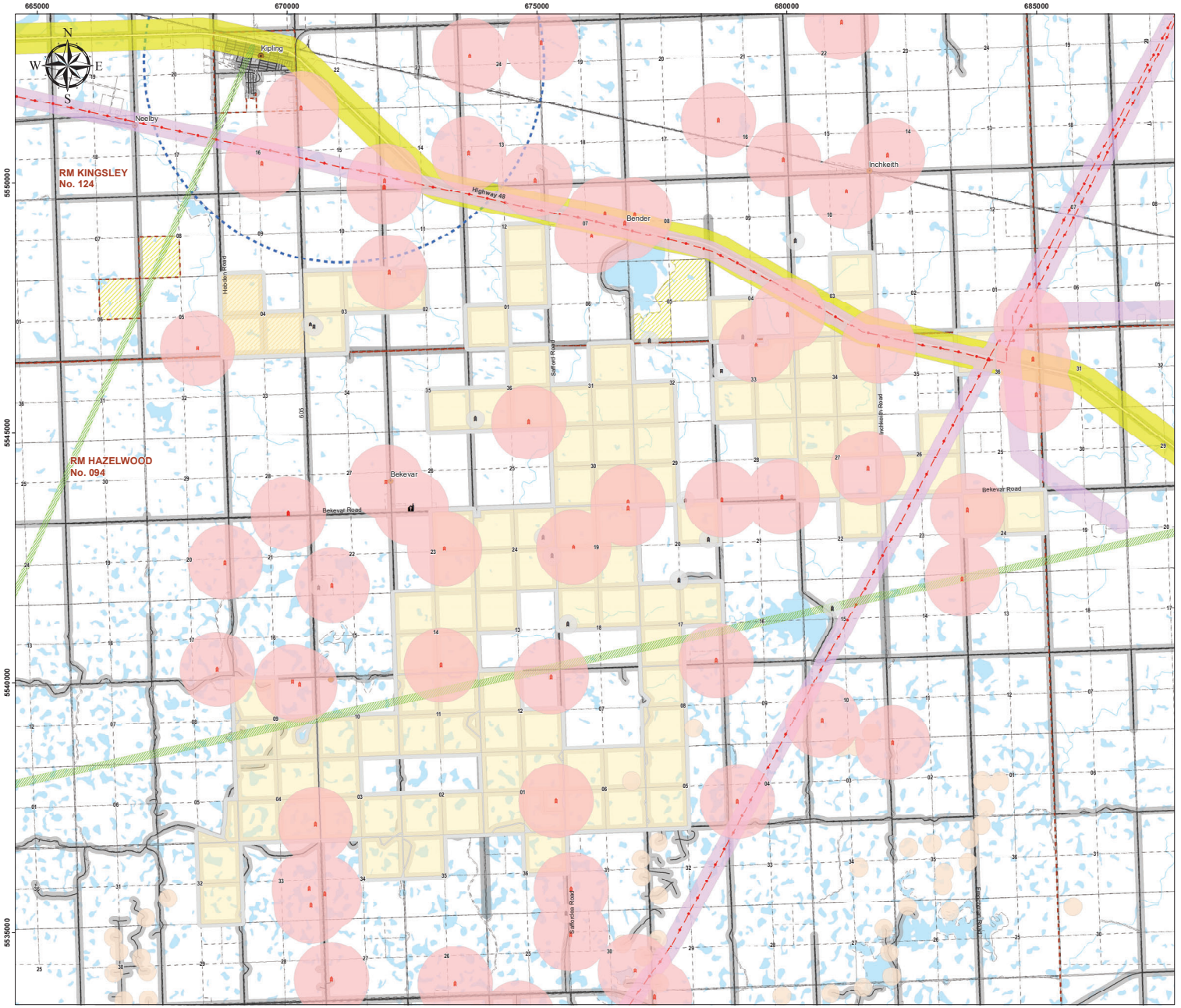
Format : 24x36



# BEKEVAR WIND ENERGY PROJECT
## Built and Infrastructure Features and Setbacks Map

## LEGEND

**SITE**
- Project Site Quarter Sections

**TERRITORY**
- Occupied Residence
- Other Buildings
- Towns
- Rural Municipality
- Quarter Section
- Sections
- Reserve Land

**INFRASTRUCTURE**
- Roads
- Highway
- Railway
- 230 kV Line

**SETBACK**
- Buildings Buffer (750m)
- Other Buildings Buffer (Tower Height + 10m)
- Transmission Line Buffer (Tower Height + 10m)
- Property Boundary Buffer (Blade + 5m)
- Roads Buffer (Blade + 5m)
- Road Allowance Buffer (85m)
- Highway Buffer (300m)
- Oil & Gas Wells Buffer (5m + Blade)
- Telecommunication Microwave
- Kipling Airport Buffer (4km)

**ENVIRONMENT**
- River & Stream
- Waterbody

Projection / Coordinate System
Transverse Mercator
NAD 1983 UTM Zone 13N / North American 1983
Meters

Absolute Scale
1:35,000

0 1 2 4 Km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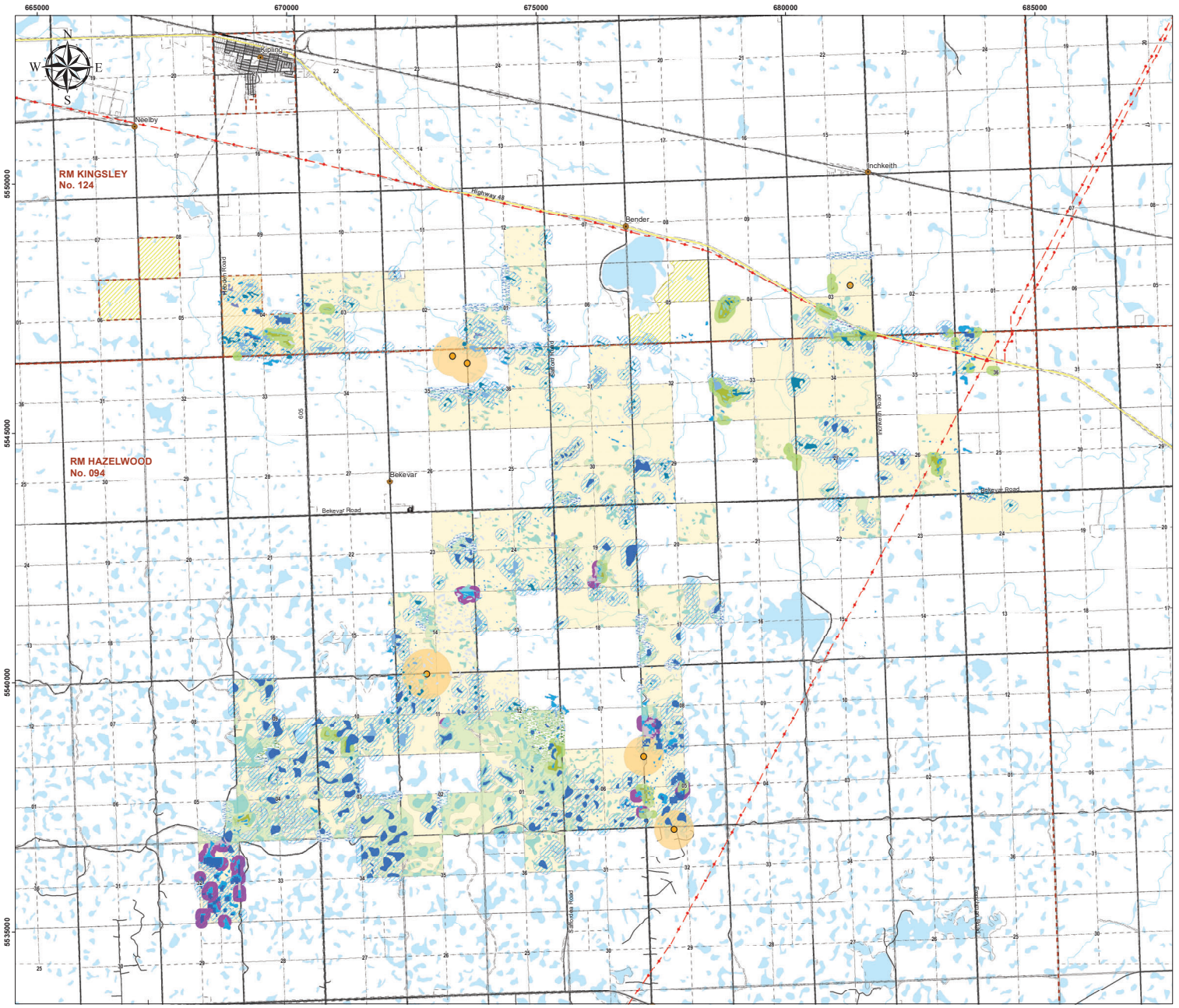

# BEKEVAR WIND ENERGY PROJECT
# Environmental Site Features and Setbacks Map

## LEGEND

**SITE**
- Project Site Quarter Sections

**TERRITORY**
- Towns
- Rural Municipality
- Quarter Section
- Sections
- Reserve Land

**LAND COVER**
- Wooded Area
- Shrubland
- Native Prairie
- Potential Native Prairie

**INFRASTRUCTURE**
- Roads
- Highway
- Railway
- 230 kV Line

**ENVIRONMENT**
- Permanent Wetlands
- Semi-Permanent Wetlands
- Seasonal Wetlands
- Temporary Wetlands
- Unclassified Wetlands
- Temporary Seasonal Wetlands
- Ephemeral Waterbody
- River & Stream
- Waterbody
- Sensitive Species

**SETBACK**
- Permanent Wetlands Buffer (Blade + 30m)
- Semi-Permanent Wetlands Buffer (Blade + 30m)
- Seasonal Wetlands Buffer (Blade + 30m)
- Shrubland Buffer (Blade + 5m)
- Native Prairie Buffer (Blade + 5m)
- Potential Native Prairie Buffer (Blade + 5m)
- Sensitive Species Regulatory Setback

Projection / Coordinate System
Transverse Mercator
NAD 1983 UTM Zone 13N / North American 1983
Meters

Absolute Scale
1:35,000

0 1 2 4 Km

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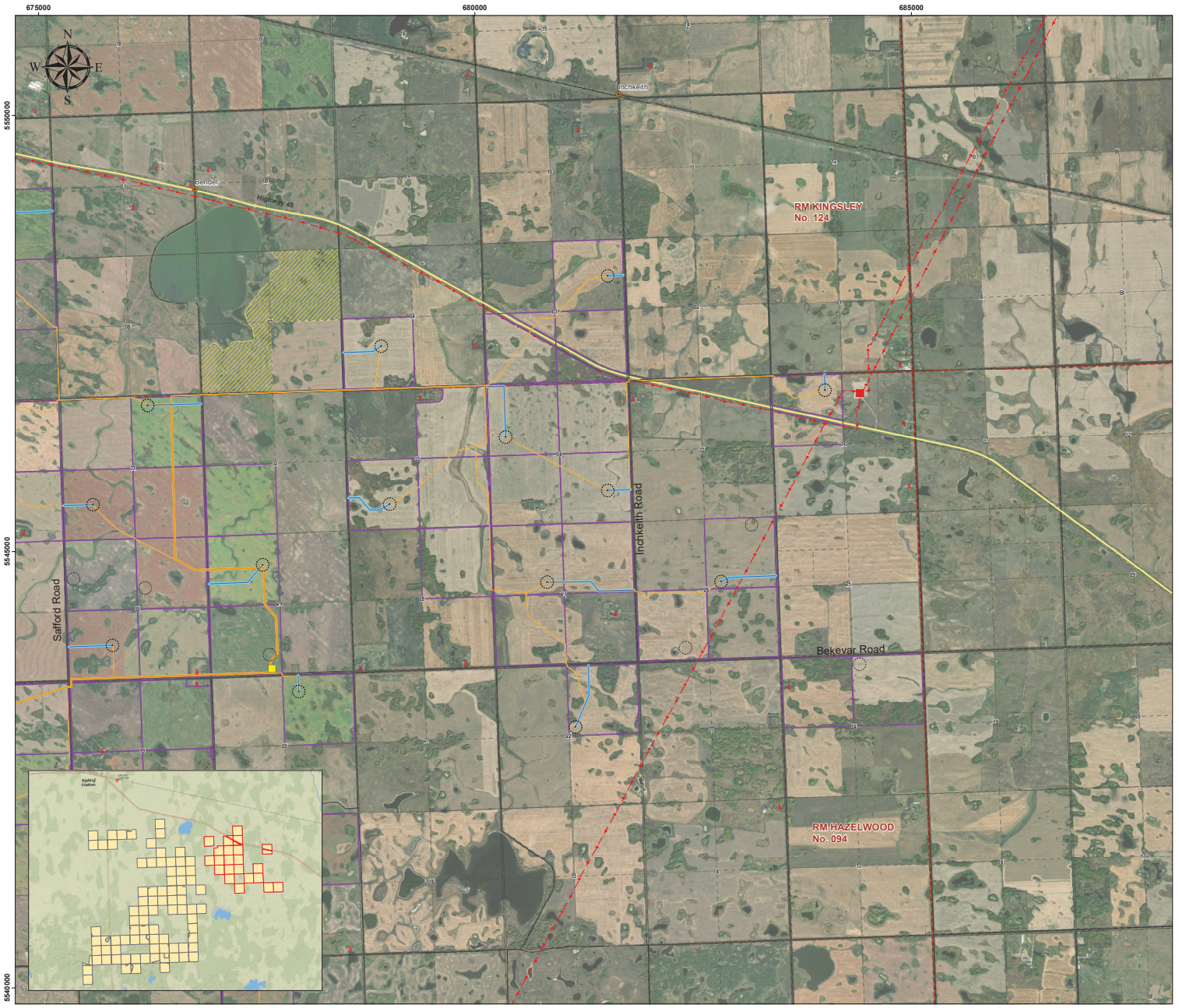

# BEKEVAR WIND ENERGY PROJECT
## Site Plan - Northeast Side

**PRELIMINARY DESIGN FOR CONSULTATION ONLY**
**39 x 5.2MW TURBINE OPTION ONLY**

## LEGEND

**SITE**
- Project Site Quarter Sections
- Turbine Layout
- Alternate Turbine Positions
- Project Substation SW 29-12-04-2 Ext 0
- Access Roads
- Underground Collector System
- Rotor-Swept Area (72.5m)
- Access Road Limit of Disturbance (30m)
- Collector System Limit of Disturbance (10m)

**INFRASTRUCTURE**
- Roads
- Highway
- Road Allowances
- Railway
- 230 kV Line
- Kennedy Substation NE 36-12-04-2

**TERRITORY**
- Occupied Residence
- Towns
- Rural Municipality
- Sections
- Quarter Section
- Reserve Land

Projection / Coordinate System
Transverse Mercator
NAD 1983 UTM Zone 13N / North American 1983
Meters

Absolute Scale
1:20,000

0 0.5 1 2 Km

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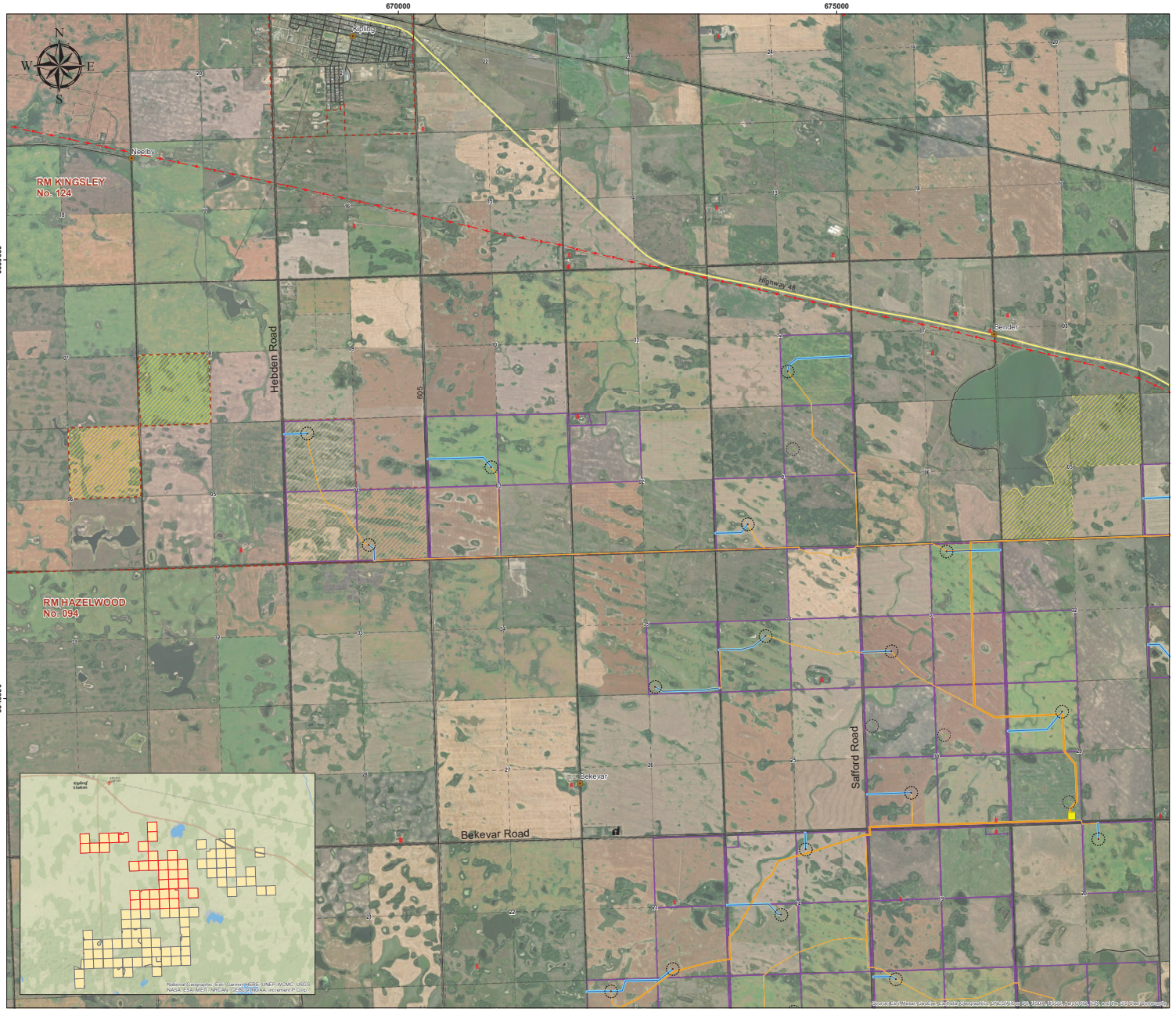


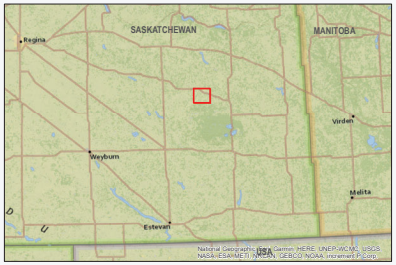


# BEKEVAR WIND ENERGY PROJECT
## Site Plan - Northwest Side

**PRELIMINARY DESIGN FOR CONSULTATION ONLY**
**39 x 5.2MW TURBINE OPTION ONLY**

## LEGEND

**SITE**

- Project Site Quarter Sections
- Turbine Layout
- Alternate Turbine Positions
- Project Substation SW 29-12-04-2 Ext 0
- Access Roads
- Underground Collector System
- Rotor-Swept Area (72.5m)
- Access Road Limit of Disturbance (30m)
- Collector System Limit of Disturbance (10m)

**INFRASTRUCTURE**

- Roads
- Highway
- Road Allowances
- Railway
- 230 kV Line
- Kennedy Substation NE 36-12-04-2

**TERRITORY**

- Occupied Residence
- Towns
- Rural Municipality
- Sections
- Quarter Section
- Reserve Land

Projection / Coordinate System
Transverse Mercator
NAD 1983 UTM Zone 13N / North American 1983
Meters

Absolute Scale
1:20,000

0 0.5 1 2 Km


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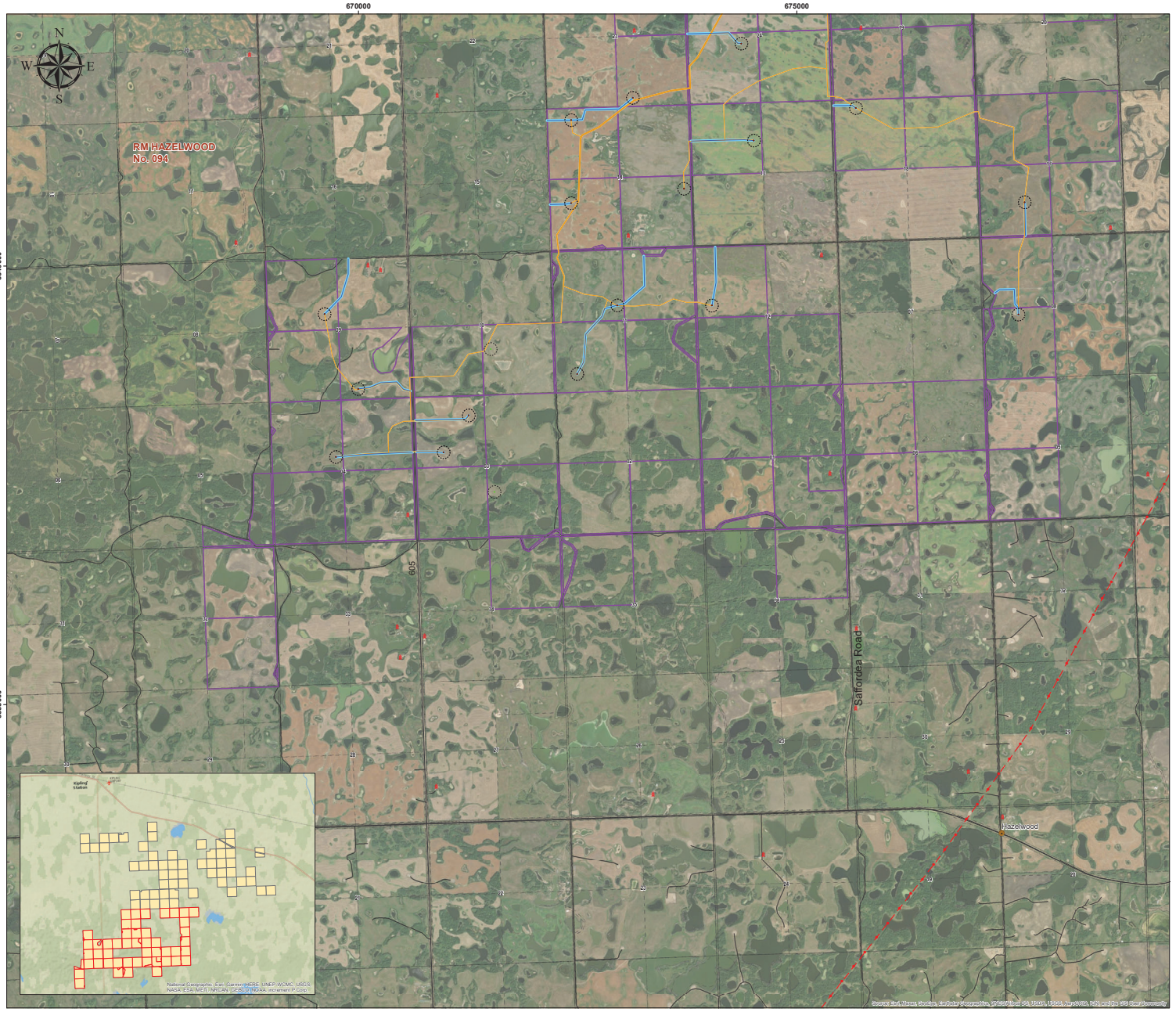


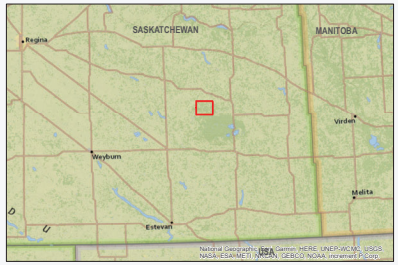


# BEKEVAR WIND ENERGY PROJECT
## Site Plan - South Side

**PRELIMINARY DESIGN FOR CONSULTATION ONLY**
**39 x 5.2MW TURBINE OPTION ONLY**

## LEGEND

**SITE**

- Project Site Quarter Sections
- Turbine Layout
- Alternate Turbine Positions
- Access Roads
- Underground Collector System
- Rotor-Swept Area (72.5m)
- Access Road Limit of Disturbance (30m)
- Collector System Limit of Disturbance (10m)

**INFRASTRUCTURE**

- Roads
- Highway
- Road Allowances
- Railway
- 230 kV Line
- Kennedy Substation NE 36-12-04-2

**TERRITORY**

- Occupied Residence
- Towns
- Rural Municipality
- Sections
- Quarter Section
- Reserve Land

Projection / Coordinate System
Transverse Mercator
NAD 1983 UTM Zone 13N / North American 1983
Meters

Absolute Scale
1:20,000

0 0.5 1 2 Km


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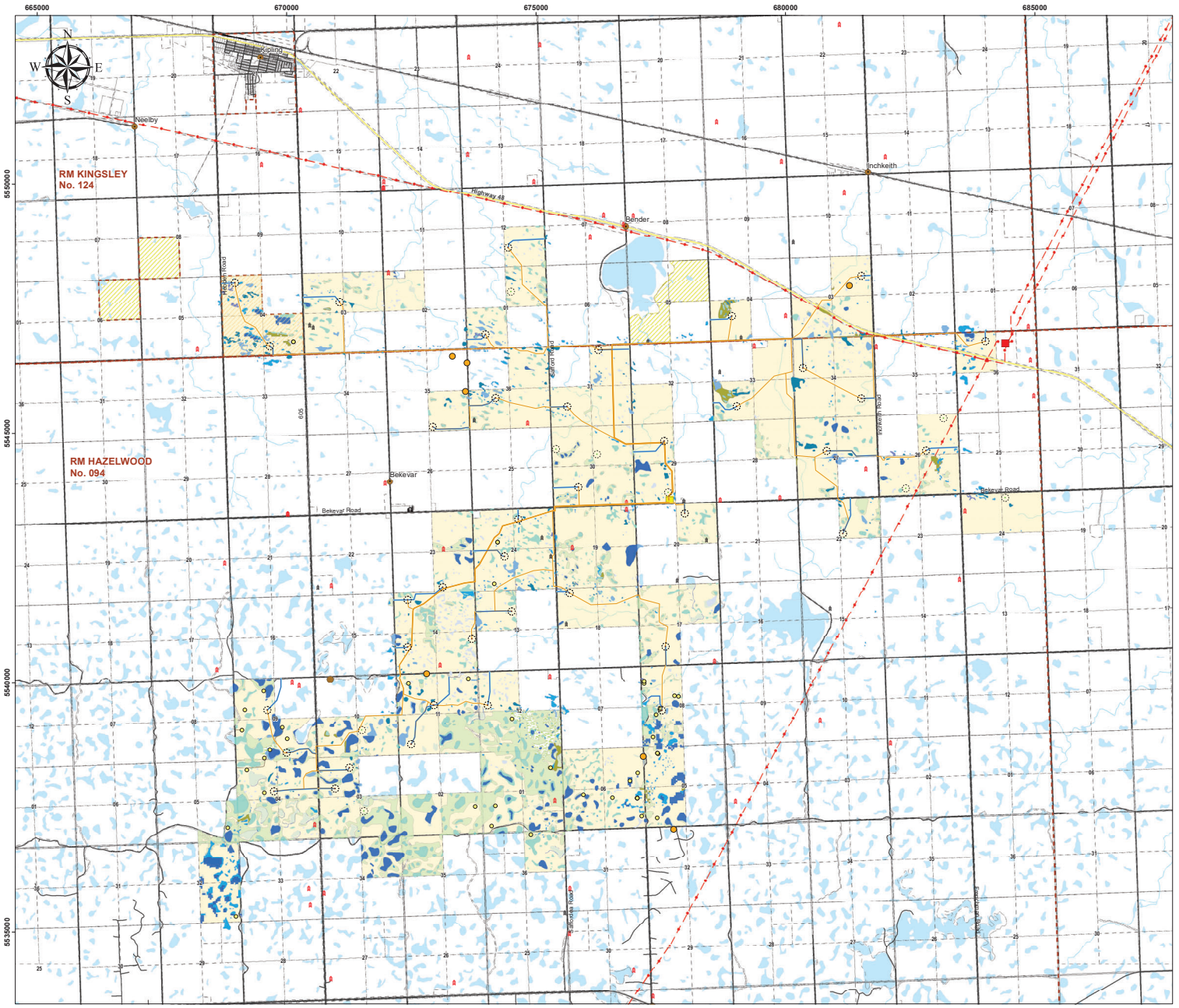

# BEKEVAR WIND ENERGY PROJECT
## Land Use Features and Project Site Plan

## LEGEND

**SITE**
- Project Site Quarter Sections
- Turbine Layout
- Alternate Turbine Positions
- Project Substation SW 29-12-04-2 Ext 0
- Access Roads
- Underground Collector System
- Rotor-Swept Area (72.5m)
- Access Road Limit of Disturbance (30m)
- Collector System Limit of Disturbance (10m)

**TERRITORY**
- Occupied Residence
- Other Buildings
- Rural Municipality
- Quarter Section
- Sections
- Reserve Land

**LAND COVER**
- Wooded Area
- Shrubland
- Native Prairie

**INFRASTRUCTURE**
- Roads
- Highway
- Railway
- Communication Towers
- 230 kV Line
- Kennedy Substation NE 36-12-04-2
- Oil & Gas Wells

**ENVIRONMENT**
- Permanent Wetlands
- Semi-Permanent Wetlands
- Seasonal Wetlands
- Temporary Wetlands
- Unclassified Wetlands
- Temporay Seasonal Wetlands
- Ephemeral Waterbody
- River & Stream
- Waterbody
- Sensitive Species

Projection / Coordinate System
Transverse Mercator
NAD 1983 UTM Zone 13N / North American 1983
Meters

Absolute Scale
1:35,000

0 1 2 4 Km


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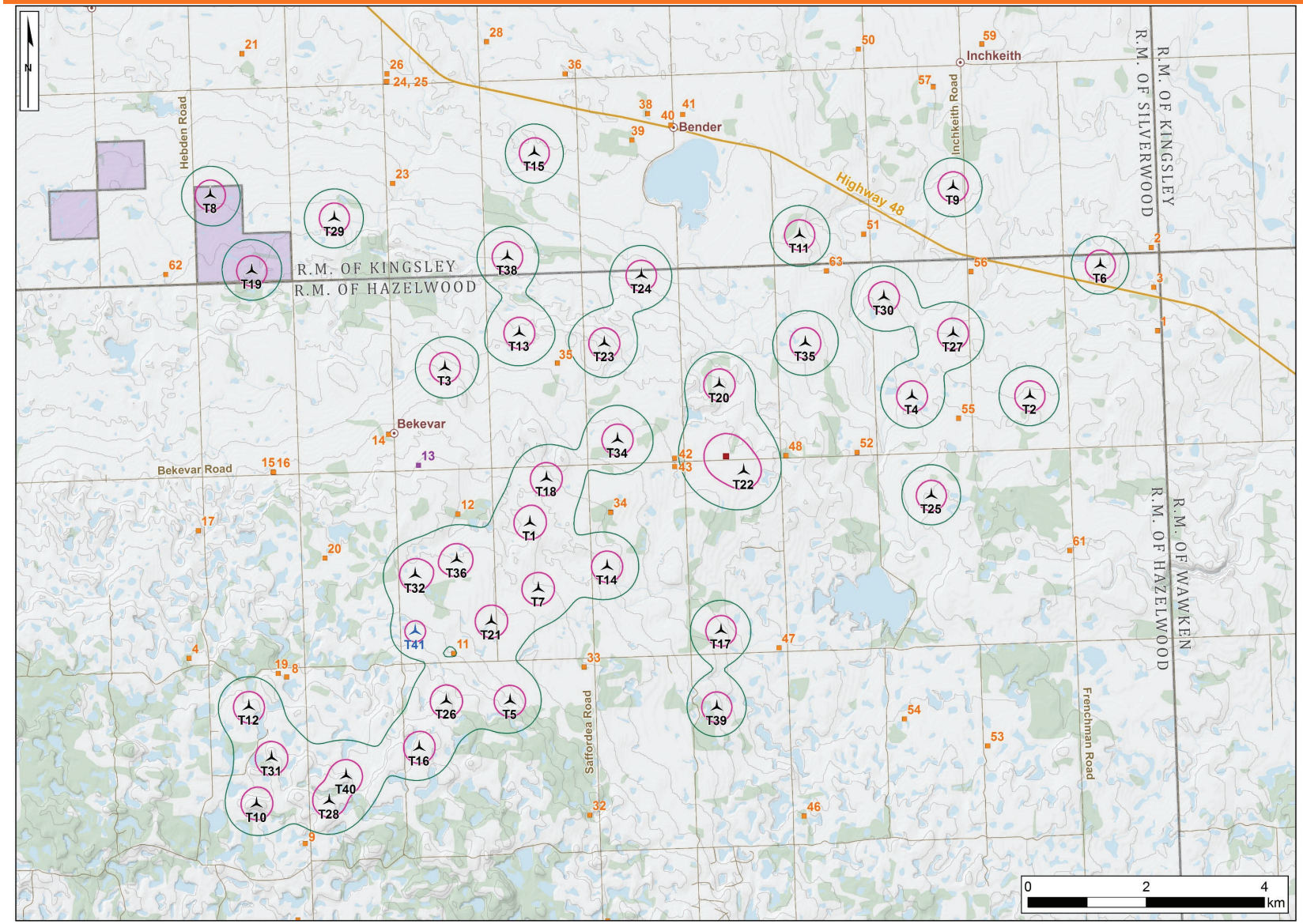
# BEKEVAR WIND ENERGY PROJECT

**Bekevar Wind L.P.**

power for good




## Legend

**Project Components**

- SG-145 5.0 MW
- SG-145 5.0 MW (Low Noise Mode N4)
- Substation
- Receptor
- Bekevar Church (Receptor)

**Base Map Components**

- Contour (interval: 5 m)
- Local Road
- Highway
- Watercourse
- Waterbody
- Wooded Area
- Cowessess First Nation
- Rural Municipality Boundary

**Predicted Cumulative Sound Level**

*Including 35 dB(A) ambient sound level*

- 40 dB(A) at 1.5 m agl*
- 45 dB(A) at 1.5 m agl*

*agl: Above Ground Level

10320750-211105-IE

November 5, 2021

Projection: UTM Zone 13, NAD83

Sources: ArcGIS Online, CanVec, CDEM, RES Canada

**Turbine Layout 145**

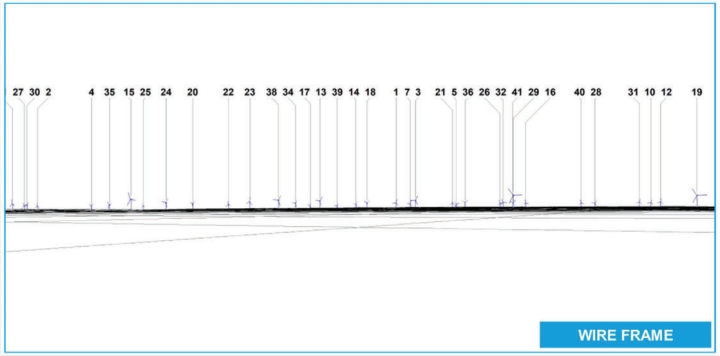
## Noise Modelling

DNV

# BEKEVAR WIND ENERGY PROJECT

**Bekevar Wind L.P.**

power for good




Note:
* The Wire Frame Technical drawing does not take into consideration vegetation. It is possible that wind turbines are visible on the wire frame drawing but not on the visual simulation.

## TECHNICAL DATA

**PHOTOGRAPH - VIEW POINT**

| | | |
|---|---|---|
| Photograph Number: | | Bek 2 |
| Coordinates (UTM 13 NAD83, meters) : | 670180 E | 5552138 N |
| Altitude with respect to mean sea level: | | 661 m |
| Date Photograph was taken : | | October 6, 2021 |
| Direction : | | 152.5 degrees T.N. |
| Focal Length (35 mm equivalent) : | | 26 mm |
| View span : | | 69 degrees |
| Height of photograph with respect to ground : | | 1.5 m |

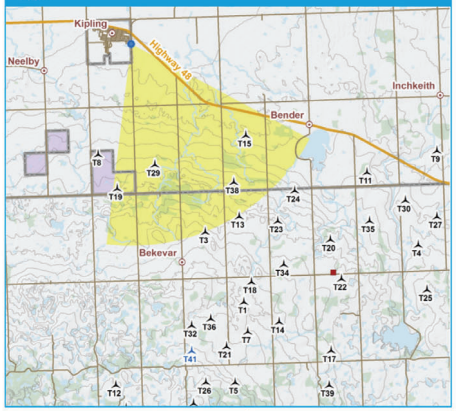
**WIND TURBINES USED**

| | |
|---|---|
| Model : | Siemens Gamesa SG-5.0-145 |
| Height of nacelle : | 102.5 m |
| Rotor Diameter : | 145 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No.: | PHOM2 |
| Layout No. : | PCANkpg145 |
| Total number of wind turbines for the project: | 39 |
| Total number of visible wind turbines in visual simulation: | 30 |
| Closest visible wind turbine : | 29 at 4.6 km |
| Farthest visible wind turbine : | 39 at 14.7 km |

## MAP




Prepared for :

power for good

Prepared by :

DNV

Date : November 5, 2021
Version 01

## VISUAL SIMULATION

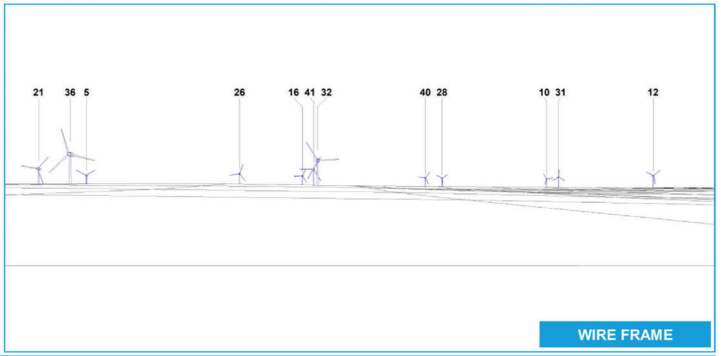
**From Kipling, Looking Southeast**

***Bekevar Wind Project***

# BEKEVAR WIND ENERGY PROJECT

**Bekevar Wind L.P.**

power for good




Note:
* The Wire Frame Technical drawing does not take into consideration vegetation. It is possible that wind turbines are visible on the wire frame drawing but not on the visual simulation.

## TECHNICAL DATA

**PHOTOGRAPH - VIEW POINT**

| | | |
|---|---|---|
| Photograph Number: | | Bek 3 |
| Coordinates (UTM 13 NAD83, meters) : | 672469 E | 5543460 N |
| Altitude with respect to mean sea level: | | 738 m |
| Date Photograph was taken : | | October 6, 2021 |
| Direction : | | 186 degrees T.N. |
| Focal Length (35 mm equivalent) : | | 26 mm |
| View span : | | 69 degrees |
| Height of photograph with respect to ground : | | 1.5 m |

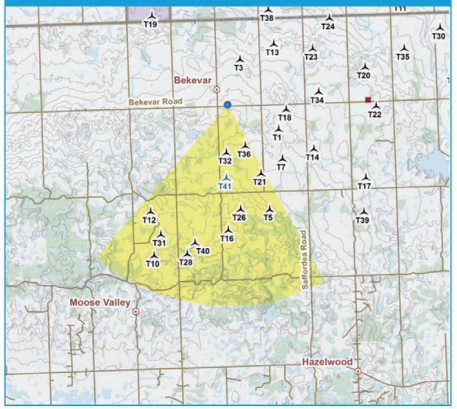
**WIND TURBINES USED**

| | |
|---|---|
| Model : | Siemens Gamesa SG-5.0-145 |
| Height of nacelle : | 102.5 m |
| Rotor Diameter : | 145 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No.: | PHOM3 |
| Layout No. : | PCANkpg145 |
| Total number of wind turbines for the project: | 39 |
| Total number of visible wind turbines in visual simulation: | 9 |
| Closest visible wind turbine : | 36 at 1.7 km |
| Farthest visible wind turbine : | 28 at 5.8 km |

## MAP

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Prepared by :

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Date : November 5, 2021
Version 01

## VISUAL SIMULATION

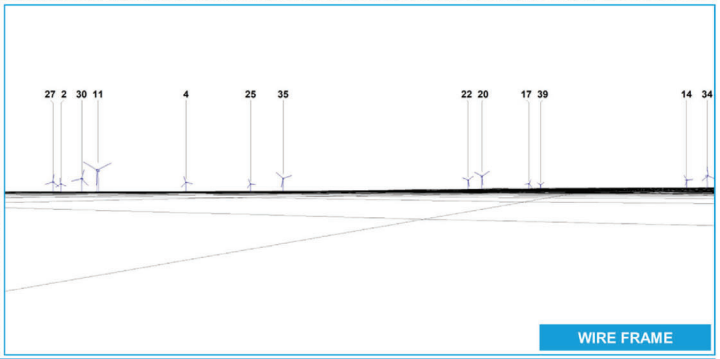
### Church, Looking South to Bekevar Road

***Bekevar Wind Project***

# BEKEVAR WIND ENERGY PROJECT

**Bekevar Wind L.P.**

power for good




Note:
* The Wire Frame Technical drawing does not take into consideration vegetation. It is possible that wind turbines are visible on the wire frame drawing but not on the visual simulation.

## TECHNICAL DATA

**PHOTOGRAPH - VIEW POINT**

| | | |
|---|---|---|
| Photograph Number: | | Bek 5 |
| Coordinates (UTM 13 NAD83, meters) : | 676792 E | 5549127 N |
| Altitude with respect to mean sea level: | | 674m |
| Date Photograph was taken : | | October 6, 2021 |
| Direction : | | 156.5 degrees T.N. |
| Focal Length (35 mm equivalent) : | | 26 mm |
| View span : | | 69 degrees |
| Height of photograph with respect to ground : | | 1.5 m |

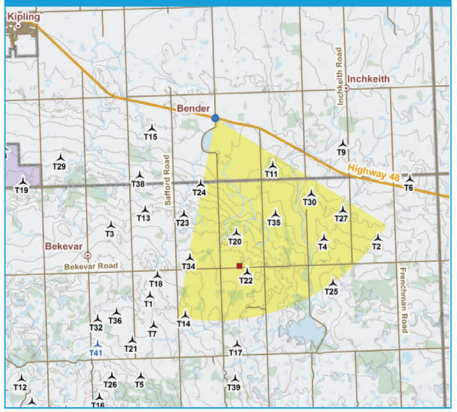
**WIND TURBINES USED**

| | |
|---|---|
| Model : | Siemens Gamesa SG-5.0-145 |
| Height of nacelle : | 102.5 m |
| Rotor Diameter : | 145 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No.: | PHOM5 |
| Layout No. : | PCANkpg145 |
| Total number of wind turbines for the project: | 39 |
| Total number of visible wind turbines in visual simulation: | 9 |
| Closest visible wind turbine : | 35 at 4.2 km |
| Farthest visible wind turbine : | 39 at 9.7 km |

## MAP




Prepared for :

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Prepared by :

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Date : November 5, 2021
Version 01

## VISUAL SIMULATION

From Highway 48 near Bender Lake

***Bekevar Wind Project***

# BEKEVAR WIND ENERGY PROJECT

Bekevar Wind L.P.

power for good

## Environmental Setting:

·Land use dominated by cultivation and pasture, with very little native prairie.

·Wetlands are present throughout the site, typical of the Prairie Ecozone.

·Aspen tree stands present in the southwestern portion of the Project area.

·No areas of wildlife concentration, migratory corridors, or other notable congregations identified.

## Siting Considerations:

·Full avoidance of *Wind Turbine Avoidance Zones*.

·Full avoidance of Native Prairie.

·Full avoidance of Environmentally Significant Areas.

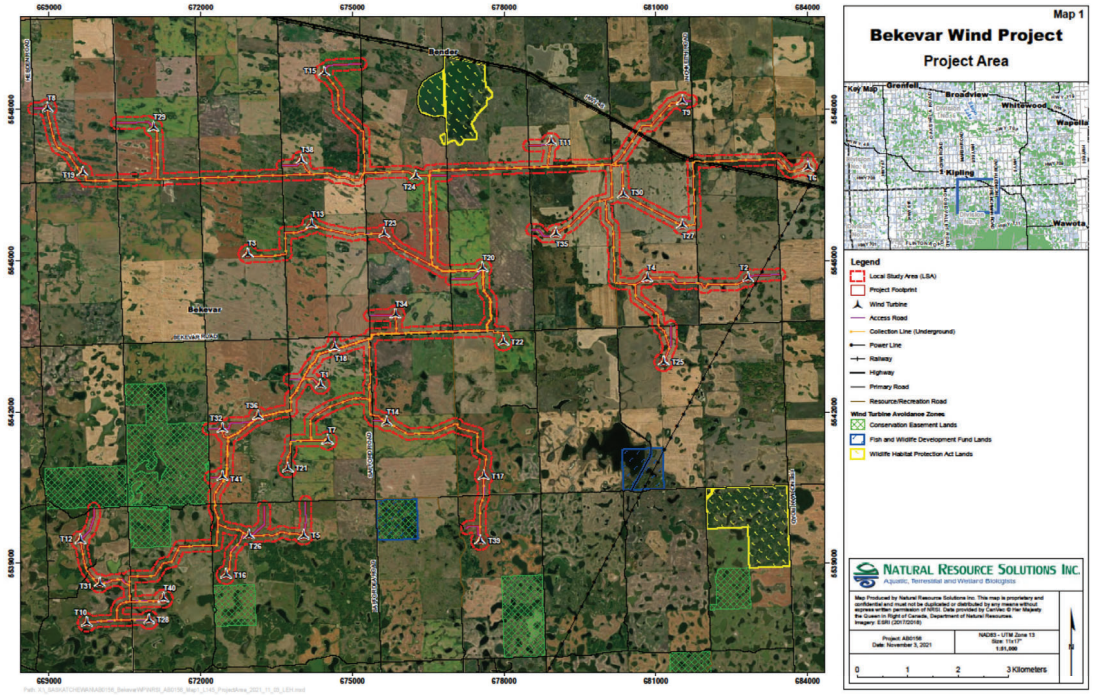
·More than 70km from nearest Important Bird Area.

·Turbines have been sited to incorporate all recommended wildlife setbacks

·Few previously known records of species of conservation concern

·Relatively low risk profile for wildlife

·Ecologically Significant Areas and other sensitive habitats and landscape features have been avoided

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Aquatic, Terrestrial and Wetland Biologists

# BEKEVAR WIND ENERGY PROJECT

Bekevar Wind L.P.

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## Ecological Monitoring Overview:

·Habitat and land use mapping was undertaken throughout the general area.

·Comprehensive wildlife use surveys were completed from March to October 2021, including avian, bat, and amphibian studies, raptor nest searches, and surveys targeting species of conservation concern.

·Rare vascular plant studies and wetland delineations were undertaken.

## Summary of Preliminary Findings:

·No evidence of regionally significant bird migration and no identified migration corridors.

·Thirteen (13) raptor nests identified; associated with Red-tailed Hawk, Swainson's Hawk, and Great-horned Owl.

·One (1) area of lekking Sharp-tailed Grouse.

·Few observations of species of conservation concern.

## Next Steps:

·Continue analyzing 2021 monitoring data.

·Final monitoring data will be used to recommend any additional ecological setbacks, mitigation measures, or monitoring programs.

·Compile into regulatory submission.

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

# BEKEVAR WIND ENERGY PROJECT

Bekevar Wind L.P.

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## Bird Risk Assessment:

·Project infrastructure will occur primarily within areas of cultivation.

·No nests of sensitive raptor species have been identified.

·Very few observations of species of conservation concern.

·Impacts to birds from operational wind turbines are typically small relative to other sources of mortality (Zimmerling et al 2013)

·Most commonly reported bird mortalities in Alberta (*no Saskatchewan data available)* are to Horned Lark (>28% of all bird impacts; BSC et al 2018), a common species with secure populations

Estimated Operational Fatality Rates:

Birds: 2.15 birds/turbine/year
Bats: 6.33 bats/turbine/year
Raptors: 0.11 raptors/turbine/year

Based on Alberta data from *Wind Energy Bird and Bat Monitoring Database Summary* (BSC et al 2018)

## Bat Risk Assessment:

·Project siting has been designed to minimize removal of trees and to avoid impacts to treed habitats.

·Overall landscape is relatively open, with few areas suitable for bat roosting.

·Bat data is still being analyzed, but small proportions of species of conservation concern are expected, including Little Brown Myotis, although this species is rarely impacted by operational turbines (BSC et al 2018)

·Most commonly reported operational impacts in Alberta (*no Saskatchewan data available)* are to Hoary Bat and Silver-haired Bat, which combine to account for 94% of all bat mortalities (BSC et al 2018).

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

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Box 491
Kipling, Sask
S0G 2S0
2022-12-31

# The Clipper

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Friday, November 19, 2021

Vol. 1 • Issue 10

# Open house for wind project held in Kipling

By Connie Schwalm
*Grasslands News*

The wind is a persistent variable in our part of this world. No other force of nature intervenes to shape our daily lives as frequently as the wind. Mere circumstance can prove decidedly flimsy in the face of a prairie wind. No matter whether our circumstances cause us to welcome the wind or curse it...there is no denying its power. But now, a wind energy project taking shape in this area may mean that the 'power' carried by the wind becomes a part of our daily lives in an entirely different way.

Last Wednesday, residents had an opportunity to learn more about the Bekevar Wind Project at a day-long Open House Information Session held at the Kipling Friendship Center in Kipling.

Project team members from RES (Renewable Energy Systems – the company responsible for the development, construction and operation of the project) along with experts in a variety of different areas, were on hand to answer questions and address concerns. As well, representatives from ANEDC (Awasis Nehiyawewini Energy Development – the Cowessess First Nation owned entity that has partnered with RES to form the Bekevar Wind L.P.) were there to discuss the potential benefits that Cowessess First Nation sees in this development.

Patrick Henn (Senior Development Manager) explains that RES is a global corporation that has been involved in renewable energy products in Canada.

"RES is based in the UK and has been involved with renewable energy projects all over the world. We came to Canada about 20 years ago and have been involved with renewable energy projects in Quebec, Ontario, Eastern Canada and Alberta."

He goes on to say that RES has been interested in developing a wind project in this area for several years.

"We were here in 2016, when the provincial government first announced its intention to phase out coal. This area was of interest because of the proximity to the Kennedy substation...good wind and a supportive land base."

**Wind project open house**
CONNIE SCHALWM I GRASSLANDS NEWS
**Patrick Henn (Senior Development Manager RES) discusses the Bekevar Wind Project with a resident at the Open House held in Kipling last Wednesday.**

**Seeing benefits**
CONNIE SCHALWM I GRASSLANDS NEWS
**Daphne Kay (Community Energy Specialist - Cowessess First Nation) and Jessica Nixon (Director of Economic Development) say that Cowessess First Nation expects to see several benefits arising from its partnership with RES in the Bekevar Wind Project.**

Last year, we put in a competitive tender for a development here. In June, the government announced that the Bekevar Wind Project had been selected. The project will consist of approximately 35-40 wind turbines that will be located in the RMs of Kingsley and Hazelwood as well as on land that is owned by the Cowessess First Nation."

Henn notes that the project will bring several benefits to the area.

"The main benefits will be socio-economic. Landowners will receive sizable payments for land rental over the life of the project (20 – 30 years). So, it will be a secure revenue source for them.

Approximately 200 people will be working on-site at the peak of the two-year construction phase of the project. There are also roads that will have to be built and numerous other opportunities to outsource work in different areas.

Once the construction phase is complete, the project will need a half dozen Wind Farm Operators. These are well-paying jobs and these individuals will be living in this area. All of this will mean increased economic activity in Kipling and in other nearby communities."

Henn added that residents have been generally supportive of the project.

"We've been actively consulting with people who live in the area. Over the summer, we went door to door, talked with people on their porch and left information with them. Overall, the project has been very well received.

The RMs of Kingsley and Hazelwood have given an official resolution supporting this development. Some landowners we spoke with did not want wind turbines built on their land. But we have 20,000 acres of land signed up for the project right now. That's enough for it to proceed."

Shant Dokouzian (Principal Wind Turbine Engineer – Energy Advisory - DNV) says that one of the concerns that is most often raised is the issue of noise coming from the turbines. While he acknowledges that turbines do emit some noise during peak wind conditions, he says that the turbines will be located so that the noise will no exceed acceptable levels.

"It takes in the order of 40km/hr wind for a turbine to produce its maximum or nominal speed. Even if the wind gets faster, the turbine won't turn any faster than that nominal speed.

The noise at the base of a turbine that's turning at its nominal speed is approximately 60 – 65 A-weighted decibels. That's about the level of a conversation that happens in a room full of people. As you move away from the base of the turbine, the sound diminishes. One turbine located approximately 300 – 400 meters away will produce about 40 decibels of noise. That's slightly more than the level of a whisper. One also has to keep in mind that the wind will be blowing when the wind turbine reaches that level. Quite often, the sound of the wind blowing on trees and structures like houses will mask some or all of the noise from the turbines, particularly in flat terrain"

He adds that proper placement of turbines is also important in minimizing noise.

"If you have several turbines located too close to you, the cumulative noise level would be unacceptable. Acoustic Engineers work to determine where turbines should be located, so that during a 'worst case' situation, when its cold and humid and the wind is blowing directly at the house, the noise level will still not exceed 40 A-weighted decibels."

Dokouzian notes that RES has put that requirement in place, even though there is no formal noise regulation for wind turbines in Saskatchewan.

"That standard is in line with the strictest regulations in Canada. But it's worth noting that Saskatchewan does not have any regulations regarding this. So, RES is using the regulations set in Alberta as the guide for this project. That's the benefit of having a company like RES involved in this type of development. They are actually abiding by strict regulations when they are not explicitly required to do so."

Andrew Ryckman (Biologist with Natural Resource Solutions Inc.) says that the impact of wind turbines on migratory birds is another issue that is frequently raised.

"There are environmental surveys and assessments that must be done before a project like this can proceed. One of the key factors that must be considered is the impact that the project will have on birds...particularly sensitive species of birds such as the Burrowing Owl and the more common Horned Lark

- SEE WIND PROJECT. 13

Clipper p.13

CONNIE SCHWALM I GRASSLANDS NEWS

**Getting the facts**

**Kipling mayor Pat Jackson (left) speaks to Patrick Henn, Senior Development Manager for the wind farm project, during an open house that was held in Kipling last week.**

# Wind project proposed for Kipling area

- continued from front page

(which accounts for about approximately a quarter of the mortalities associated with wind turbines).

We began doing surveys of bird populations and migration patterns in March of this year, and are just wrapping those surveys up now. As well, because this area has been of interest for some time, there are other studies that have been done previously. We use these surveys to determine where turbines should be located so as to have the least amount of impact possible. You will never be able to have zero mortality. There is a level of impact that is considered 'acceptable' and in my opinion that level is quite low. So, the goal is to keep the impact that this project has on bird and bat populations at or below that 'acceptable' level."

Ryckman adds that "safeguards" have been put in place to account for variations that might be caused circumstances such as the current drought.

"It's inevitable that there will be variations from year to year. So, one of the components built into a project like this is a monitoring system that's put in place when the turbines are operating. If it's found that the number of mortalities that are occurring are greater than expected, adjustments can be made so that the level of impact can be reduced to an acceptable level."

He also points out that environmental assessments are also done to ensure the project will not negatively impact various ecosystems in the area.

"There are a number of steps that go into determining where turbines will be located, so that sensitive features can be protected. We identify areas of native prairie, wetlands and other sensitive spaces. We also identify sensitive plant species in the area. This is done in order to ensure that turbines will not be located in these spaces. Ultimately, the impact of a project like this will never be 'none'. But our goal is to ensure that the impact on various species and their habitat is minimized."

Jessica Nixon (Director of Economic Development – Cowessess First Nation) says that the potential benefits of the Bekevar Wind Projectled to the decision to partner with RES on this project.

"Cowessess owns three quarter sections of land south of Kipling. The land was purchased through the Treaty Land Entitlement process, with the objective of building a land portfolio that could achieve higher economic value for Cowessess than agricultural leases. When RES approached Cowessess in 2017 about including that land in the Bekevar Wind Project, the decision was made to partner with RES on the project. Cowessess has a minority ownership stake in the project and will be contributing equity to it. In the years ahead, this project will generate economic returns that can go back into Cowessess First Nation for reinvestment in other business opportunities or to help fund social programming."

Daphne Kay (Community Energy Specialist for Cowessess ) says the project is a "big win" for Cowessess members.

"This will be a great opportunity for training and mentorship to take place in construction and wind turbine maintenance, that will allow our people to build a broader skill set and become 'job ready'. We are passionate about renewable energy. According to our values...we are not to take more from the land than we need...and are to give back to the land as much as we can. Capturing the power of the wind fits well with those values."

Patrick Henn notes that while some steps need to be taken before work on the Bekavar Wind Project can begin, he is optimistic that construction will begin next summer.

"It's not a 'done deal' yet. The Ministry of the Environment has to give us the necessary permit. The RMs need to provide us with a development permit as well. Zoning amendments have to be made and the final site design has to be completed. But at this point, we see no reason why there would be any 'push back'. So, we're looking forward to starting construction on this project in June."


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Carlyle Observer

# Open house in Kipling provides an update on the Bekevar Wind Energy Project

**By Laura Kish**

SaskPower has awarded its next utility-scale wind facility to Renewable Energy Systems (RES) Canada and Awasis Nehiyawewini Energy Development, a wholly owned Cowessess First Nation entity.

Set to be constructed south of Kipling in the RM of Hazelwood, the RM of Kingsley and on Cowessess First Nation reserve land, the Bekevar Wind Energy Project will supply 200 megawatts (MW) of zero-emissions power, enough to serve up to 100,000 homes.

Patrick Henn, development manager with RES, says it's so important to have open houses such as one recently in Kipling to answer any of the public's questions about the project.

"People have been speaking with their councillors, the reeve and administrators. We have had great support from the RM offices."

Meetings and open houses such as this are held to explain and answer any concerns the public may have so they won't have any misconceptions about it.

"We do consultations and want to make sure the people understand the project."

"This is a big construction project, it's $300 million in investments. It's a big project for the community for sure. People are completely entitled to have concerns. It's a new industrial facility."

"We're quite happy. We've been out here since 2016 and it's been going great. We were successful in the competition to get this project. We just have a great community here, also combined with the partnership with Cowessess and a good mix of the two collaborative RMs, all the landowners and the 20,000 acres of land from more than 25 families."

The turbine locations range from approximately seven kilometres south of Kipling to as far south as almost to the 7-11 Grid. The whole area covers roughly 40 square miles which will definitely change the landscape as we know it. The tall structures will have a footprint in the scenery.

At the open house there were visual simulations of what the landscape will look like once the wind farm is finished.

"What I like about this project is that it is very spread out."

Long after the wind farm is complete, benefits will still be seen by Kipling and area.

"Economic benefits will include the landowners with turbines receiving yearly rent, RM's will receive property tax, school tax every year, a mill rate based on commercial and industrial."

The wind farm will create jobs as well, and the operations will need at least six or more full-time workers. Temporary jobs will include snow removal and maintaining roads, and maintenance of the sub-station.

"We're very proud to offer a bursary program which we will be launching next year. We are planning to offer a bursary for youth who are from the RMs to be trained in a one-year program that is specific to wind turbine maintenance and operations. There's one stipulation – you can't be scared of heights."

Daphne Kay, community energy specialist for Cowessess First Nation, explains that it's a 200-megawatt wind farm with 35 to 40 wind turbines. The decision is yet to be made on which model of wind turbine the company will go with.

Maps were available at the open house showing where the proposed wind turbines will be erected.

"We're looking at starting construction in the spring of 2022 with hopes of commercial operations by 2023, although we're still in the consultation and developmental stages."

On June 1, they signed a 25-year power purchase agreement with SaskPower.

"We're had a lot of traffic come through the doors today asking many questions about the project and that's exactly what we want."

Why wind energy?

The towers go up quickly with a very small footprint afterwards and it's a safe and economical source of energy.

Benefits to the local community include training, hiring for over 150 local jobs during the construction of the project, and afterwards, looking to train candidates for the operations and maintenance.

*Representatives from Renewable Energy Systems, Cowessess First Nation, SaskPower and consultants regarding the Bekevar Wind Energy Project were in attendance at an open house held in Kipling. Photo by Laura Kish*

"Out of the 150 to 200 open houses I've held throughout my career regarding a wind turbine project, noise is probably the topic that the community has the most questions about," explains Henn.

Shant Dokouzian was in attendance as a consultant explaining that the company will be using the strict Alberta noise regulations to locate turbines.

"Forty decibels (dBA) is basically a pretty conservative level that other provinces have implemented. Elsewhere in the world, it's a sound level which is deemed to be acceptable."

For example 40 dBA is more than a whisper and a regular conversation is about at 60. If you're at the base of a turbine, you'll hear it, although these wind turbines will be set no closer than 750 meters to a residence.

Why talk about sound?

Because it is a concern with many of 'how much noise do they make with the humming and the swoosh sound with every turn'.

"Sound will be extremely low based on the distance the turbines will be from houses. Taking into consideration the weather conditions, humidity, temperature and wind – all of these are factored in to make sure the sound is below 40 dBA."

If by chance there's a tornado, each wind turbine has its own meteorological sensor which measures the wind direction, speed, humidity and temperature and it continually adjusts itself. Therefore, if the wind changes it turns into the wind. If the temperature gets too cold or too hot it stops. If the wind becomes too high, say 70 to 80 kilometres per hour (km/h) up at the turbine, not at the ground, it will stop.

It will feather the blades so it doesn't catch the wind. The turbines are designed to withstand up to 150 km/h winds.

"Since the early 2000s, there have been many more safeguards installed in these turbines. There are over 400,000 turbines erected worldwide and there hasn't been one injury to the public," explains Dokouzian.

When there's an ice storm, they have sensors to alert the blades to stop turning.

Andrew Ryckman of Natural Resource Solutions Inc. explains that as part of the regulatory process they work through ecological requirements, guidelines and surveys.

"For this particular project we've gone through three-season surveys at the site. Beginning in March of this year, we observed spring bird migration, we've done breeding bird surveys, and acoustic bat surveys, amphibian surveys, and we just finished up the fall bird migration surveys a couple of weeks ago. Then we do a whole series of targeted surveys including sharp-tailed grouse, burrowing and short-eared owls and document every raptor nest."

Other than the wildlife, they also survey the vegetation and habitat.

"We're still processing a lot of the data. What we've seen so far is that there's not that many sensitive species records."

Patrick Henn explains:

"There are three pillars to having a good wind project."

"The main reasons why we chose this area for the wind farm, first is the wind which produces good fuel in the area, proximity to SaskPower grid – the switching station at Kennedy, local support of this new idea from landowners and RM's. You need those three combined. If you're missing one of these three, you don't have a project."


**Daryl Harrison**

*Member of the Legislative Assembly for*
***Cannington Constituency***

**1-833-670-4400**

CanningtonConstituency@sasktel.net

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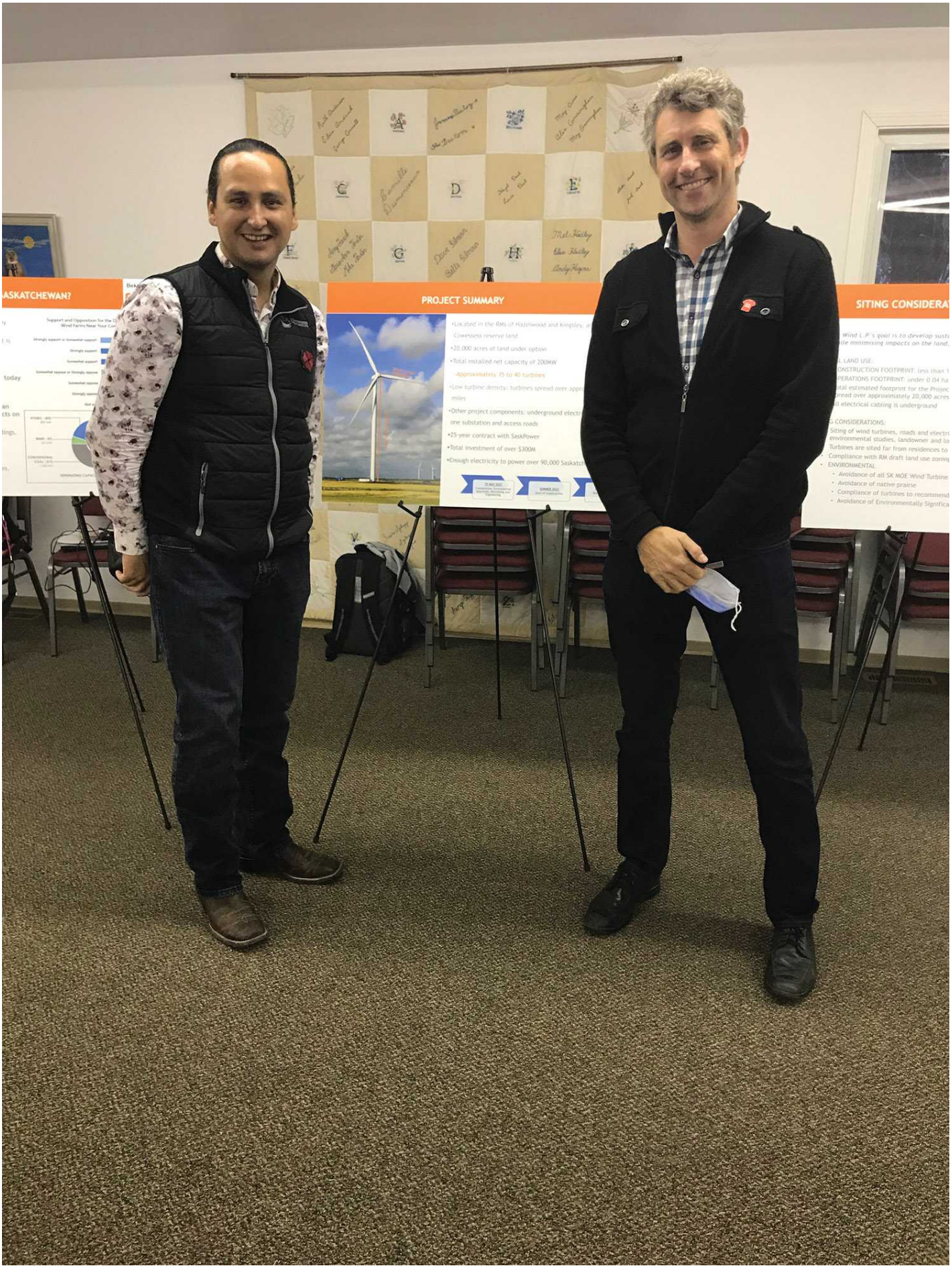
# Open house for Bekevar Wind Project

## Wind farm to be developed south of Kipling

November 15, 2021, 7:22 am
Kevin Weedmark




**Wind project open house** Chief Cadmus Delorme of Cowessess First Nation and Patrick Henn of Renewable Energy Systems Canada at the open house for the Bekevar Wind Energy Project.

An open house was held in Kipling Wednesday for the Bekevar Wind Project, a 200 megawatt wind project that will be developed in the RMs of Hazelwood and Kingsley, south of Kipling and west of Kennedy, as well as on 500 acres of Cowessess First Nation land.

The project will consist of 30 to 40 wind turbines and will power about 90,000 Saskatchewan homes when completed in 2023.

Bekevar Wind LP has entered into a 25-year power purchase agreement with SaskPower.

Patrick Henn of Renewable Energy Systems Canada, which is the majority owner of the limited partnership developing the Bekevar project, said he was happy with how the open house went.

“It was an okay turnout and there were a lot of new people—not just landowners who know the project already,” he said.

“There were all kinds of different questions. There are a lot of questions on how much power they produce and how big they are, how many turbines. There were questions about how much space a turbine will take. They want to know how much space you’re taking up that won’t be available for agriculture. Once we’ve built a turbine, it takes a tenth of an acre and you can farm around it.”

Because there are wind farms at Moosomin and Grenfell, Henn says many people at the open house are familiar with wind farms.

“Having other wind farms close by, people are familiar with it. It’s not like they’ve never seen a turbine before, which could have been the case 10 years ago,” he said.

“These turbines we’re installing are a bit bigger than Grenfell, but what they would look like in the landscape is not much different. These are big structures but when you have some in the area it gives people a balanced view of what it looks like in the landscape.”

The Bekevar project signed a power purchase agreement with SaskPower in the spring of this year.

Under that power purchase agreement, Bekevar’s commitment is to have the facility in service by the end of 2023.

“December 2023 is the target for the in-service date,” says Henn.

“We’re pretty far along, we’ve done a lot of environmental studies on the site. We’ve already done quite a bit of engineering. It’s not fully done yet. We’re working on that, and on getting our permits.

“We are working toward breaking ground in the summer of 2022. This is a two-season build. We will start in 2022, take a break in the winter and install the turbines in 2023.”

The project will create a large number of construction jobs.

“This project will create about 150 full time equivalent jobs over the two years,” said Henn.

“In peak periods during construction you might have 150-200 workers. It also spans all sorts of different scopes of work. You have civil, building roads, installing cable, we need to build foundations, we need rebar, we need sand. There’s more of the specialized trades. We need to hire a company that has the big cranes that can put up a turbine, so we’ll have to hire a company from somewhere else in Canada or even the U.S.

“Locally there’s a lot of work there and we have an important strategy in our company to hire locally. RES is a constructor. I’m on the development side and my job is to develop these jobs and get it to construction. We have a construction arm, so we will bring in a few construction managers to oversee the project, but work like road building, cable install, foundations, materials, we try to source that locally. One reason we have events like the open house is to meet with local contractors or companies that might be involved in the construction.

“We’ve also asked the town of Kipling and the RMs about what companies there are in the area that could work on a project like this.”

Work is still being done to finalize locations of the turbines.

“It’s close to final but not finalized,” says Henn. “We’re still looking at a bit of micrositing. A project like this has all these turbines that are all interdependent on each other. To maximize the wind you have to space them out in a certain way so you’re producing as much power as possible.

“We’re doing geotechnical studies in the next couple of weeks and that might inform us a little bit more on ground conditions and we will see if we need to move some around a bit.

“The area is nailed down. We have 20,000 acres of land signed up and that’s where the turbines are going. For exact locations we’re close to final but we will have to work through detailed engineering during the winter and have more site visits and some consultations with the landowners themselves.

“The next step is we’re going to walk the fields with the landowners one by one, and look at the exact positions, and we might do a bit more micrositing.”

Cowessess First Nation is involved in the project both as a landowner and as an equity investor in the limited partnership developing the wind farm.

“Cowessess has three quarter sections in the project area, and they do own a minority position as well in the project. RES is a majority owner of Bekevar Wind Energy LP, and Cowessess owns a minority position, so they are an equity owner,” says Henn.

What are the next steps in the project?

“The land is nailed down. We have all the land for the project. Now it’s just a matter of getting the permits from the ministry of the environment, and because we have the Cowessess lands we also need approval from Indigenous Services Canada. We have to do the environmental assessment and get the permits from those two entities. We also need to get the development permits from the RMs. So there’s a lot of permitting to do by next spring, and through that process, the detailed engineering will be done and we will have details on things like exactly how much aggregate we need, and rebar and concrete, and get those plans finalized over the winter. Then there will be final consultations with the landowners who will have the turbines or

cable or roads on their land.

“Then we sign the ground leases with the landowners. Each is very small, about an acre when you include the footprint of the road plus the turbine, but the turbine itself is about a tenth of an acre.”

What’s the toughest part of developing a project like this?

“The challenge is to have the combination of all the right elements so you can have a winning site and get that contract from SaskPower,” says Henn.

“There are a lot of developers out there. We were competing with 18 other companies for this contract and they probably had one or two projects each, and SaskPower selects just one project, and this time around we were the one.

“The most challenging is to pick the right site that has the combination of good winds, a good interconnection with SaskPower. In this case we have the Kennedy switching station. Then the third part, which is the base of a project like this, is local support from the rural municipalities, and landowners who want to participate and partner with us. The challenge is to find that sweet spot where you have all three of those pillars for a successful project.”

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(https://www.world-spectator.com/ad-server2/www/delivery/ck.php?oaparams=2__bannerid=91__zoneid=9__cb=3faa616d93__oadest=http%3A%2F%2Fwww

**Appendix VI**
Visual Simulations

# BEKEVAR WIND ENERGY PROJECT

**Bekevar Wind L.P.**

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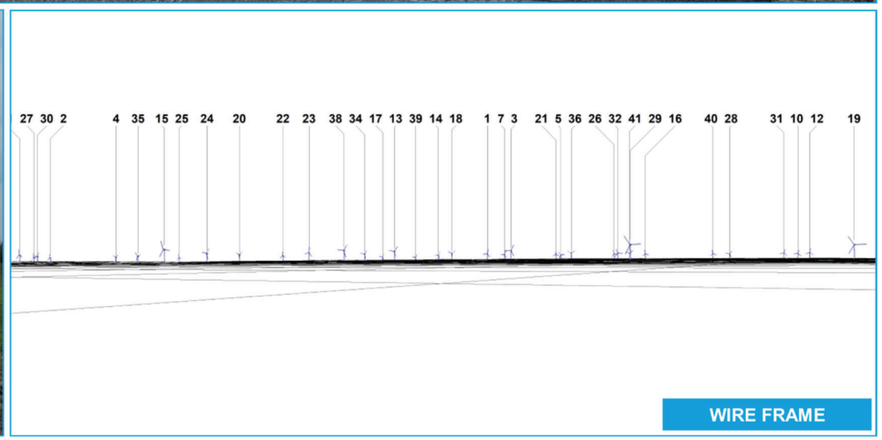



Note:
* The Wire Frame Technical drawing does not take into consideration vegetation. It is possible that wind turbines are visible on the wire frame drawing but not on the visual simulation.

## TECHNICAL DATA

**PHOTOGRAPH - VIEW POINT**

| | | |
|---|---|---|
| Photograph Number: | | Bek 2 |
| Coordinates (UTM 13 NAD83, meters) : | 670180 E | 5552138 N |
| Altitude with respect to mean sea level: | | 661 m |
| Date Photograph was taken : | | October 6, 2021 |
| Direction : | | 152.5 degrees T.N. |
| Focal Length (35 mm equivalent) : | | 26 mm |
| View span : | | 69 degrees |
| Height of photograph with respect to ground : | | 1.5 m |

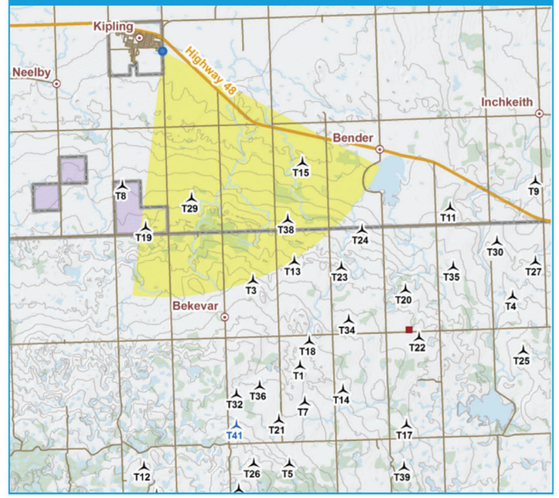
**WIND TURBINES USED**

| | |
|---|---|
| Model : | Siemens Gamesa SG-5.0-145 |
| Height of nacelle : | 102.5 m |
| Rotor Diameter : | 145 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No.: | PHOM2 |
| Layout No. : | PCANkpg145 |
| Total number of wind turbines for the project: | 39 |
| Total number of visible wind turbines in visual simulation: | 30 |
| Closest visible wind turbine : | 29 at 4.6 km |
| Farthest visible wind turbine : | 39 at 14.7 km |

## MAP

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Prepared by :

DNV

Date : November 5, 2021
Version 01

## VISUAL SIMULATION

## From Kipling, Looking Southeast

***Bekevar Wind Project***

# BEKEVAR WIND ENERGY PROJECT

**Bekevar Wind L.P.**

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## TECHNICAL DATA

**PHOTOGRAPH - VIEW POINT**

| | | |
|---|---|---|
| Photograph Number: | | Bek 3 |
| Coordinates (UTM 13 NAD83, meters) : | 672469 E | 5543460 N |
| Altitude with respect to mean sea level: | | 738 m |
| Date Photograph was taken : | | October 6, 2021 |
| Direction : | | 186 degrees T.N. |
| Focal Length (35 mm equivalent) : | | 26 mm |
| View span : | | 69 degrees |
| Height of photograph with respect to ground : | | 1.5 m |

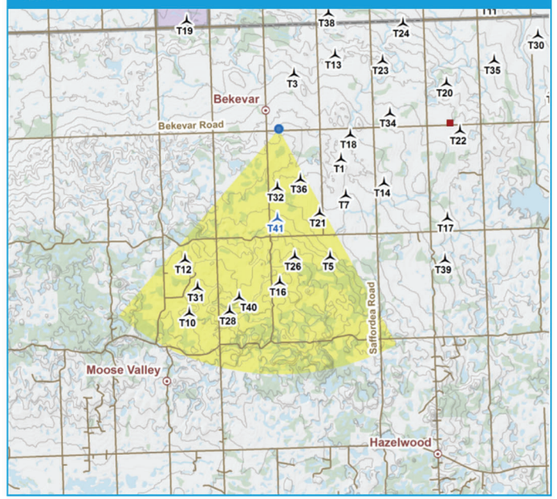
**WIND TURBINES USED**

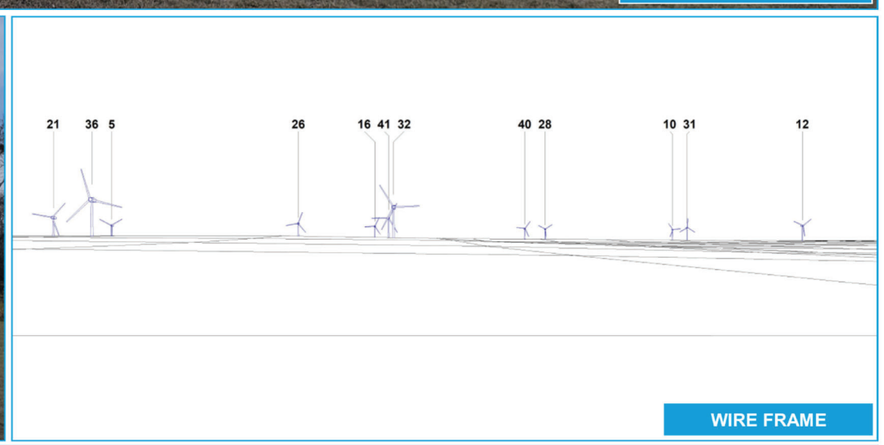
| | |
|---|---|
| Model : | Siemens Gamesa SG-5.0-145 |
| Height of nacelle : | 102.5 m |
| Rotor Diameter : | 145 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No.: | PHOM3 |
| Layout No. : | PCANkpg145 |
| Total number of wind turbines for the project: | 39 |
| Total number of visible wind turbines in visual simulation: | 9 |
| Closest visible wind turbine : | 36 at 1.7 km |
| Farthest visible wind turbine : | 28 at 5.8 km |

## MAP






Note:
* The Wire Frame Technical drawing does not take into consideration vegetation. It is possible that wind turbines are visible on the wire frame drawing but not on the visual simulation.

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## VISUAL SIMULATION

## Church, Looking South to Bekevar Road

***Bekevar Wind Project***

# BEKEVAR WIND ENERGY PROJECT

**Bekevar Wind L.P.**

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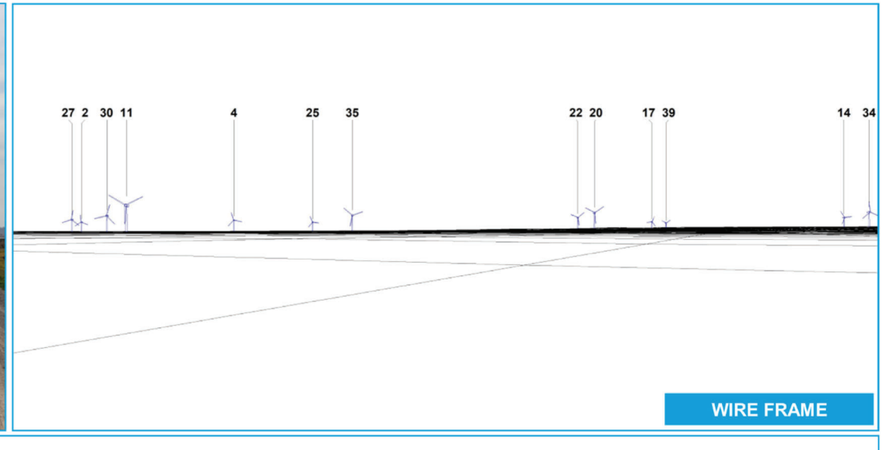
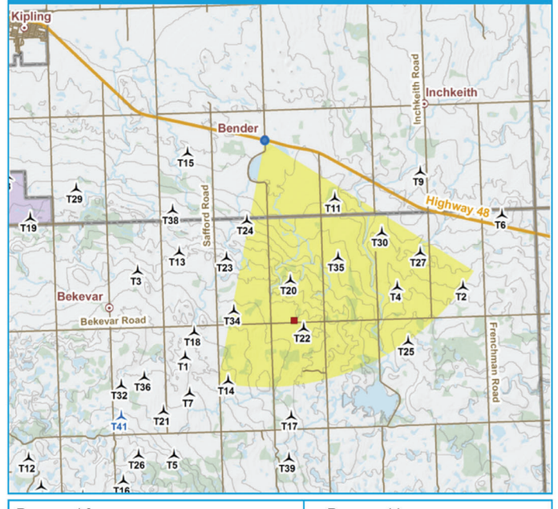



Note:
* The Wire Frame Technical drawing does not take into consideration vegetation. It is possible that wind turbines are visible on the wire frame drawing but not on the visual simulation.

## TECHNICAL DATA

| | | |
|---|---|---|
| **PHOTOGRAPH - VIEW POINT** | | |
| Photograph Number: | | Bek 5 |
| Coordinates (UTM 13 NAD83, meters) : | 676792 E | 5549127 N |
| Altitude with respect to mean sea level: | | 674m |
| Date Photograph was taken : | | October 6, 2021 |
| Direction : | | 156.5 degrees T.N. |
| Focal Length (35 mm equivalent) : | | 26 mm |
| View span : | | 69 degrees |
| Height of photograph with respect to ground : | | 1.5 m |
| **WIND TURBINES USED** | | |
| Model : | | Siemens Gamesa SG-5.0-145 |
| Height of nacelle : | | 102.5 m |
| Rotor Diameter : | | 145 m |
| **SIMULATION** | | |
| Visual Simulation No.: | | PHOM5 |
| Layout No. : | | PCANkpg145 |
| Total number of wind turbines for the project: | | 39 |
| Total number of visible wind turbines in visual simulation: | | 9 |
| Closest visible wind turbine : | | 35 at 4.2 km |
| Farthest visible wind turbine : | | 39 at 9.7 km |

## MAP

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Prepared by :

DNV

Date : November 5, 2021
Version 01

## VISUAL SIMULATION

## From Highway 48 near Bender Lake

***Bekevar Wind Project***

**Appendix VII**
Vascular Plant List

| Scientific Name | Common Name | Provincial General Status* |
|---|---|---|
| **Trees and Shrubs** | | |
| *Acer negundo* var. *interius* | Manitoba Maple | S5 |
| *Amelanchier alnifolia* var. *alnifolia* | Saskatoon | S5 |
| *Artemisia cana* ssp. *cana* | Hoary Sagebrush | S5 |
| *Cornus sericea* ssp. *sericea* | Red-osier Dogwood | S5 |
| *Corylus cornuta var. cornuta* | Beaked Hazelnut | S5 |
| *Crataegus chrysocarpa* | Northern Hawthorn | S4 |
| *Elaeagnus commutata* | Silverberry | S4 |
| *Lonicera tatarica* | Tartarian Honeysuckle | SNA |
| *Populus balsamifera* ssp. *balsamifera* | Balsam Poplar | S5 |
| *Populus tremuloides* | Trembling Aspen | S5 |
| *Prunus virginiana* var. *virginiana* | Chokecherry | S5 |
| *Ribes americanum* | Wild Black Currant | S4 |
| *Ribes hirtellum* | Smooth Gooseberry | S4 |
| *Ribes hudsonianum* var. *hudsonianum* | Northern Black Currant | S4 |
| *Ribes oxyacanthoides* ssp. *oxyacanthoides* | Bristly Gooseberry | S4 |
| *Rosa acicularis* ssp. *sayi* | Prickly Rose | S5 |
| *Rosa arkansana* | Low Prairie Rose | S5 |
| *Rosa woodsii* var. *woodsii* | Wood's Rose | S5 |
| *Rubus idaeus* ssp. *strigosus* | American Red Raspberry | S5 |
| *Salix bebbiana* | Long-beaked Willow | S4 |
| *Salix discolor* | Pussy Willow | S4 |
| *Salix famelica* | Yellow Willow | S4 |
| *Salix interior* | Sandbar Willow | S4 |
| *Salix petiolaris* | Basket Willow | S4 |
| *Salix pseudomonticola* | False Mountain Willow | S4 |
| *Shepherdia canadensis* | Canada Buffaloberry | S4 |
| *Spiraea alba* var. *alba* | Narrow-leaved Meadow-sweet | S4 |
| *Symphoricarpos albus* var. *albus* | Snowberry | S5 |
| *Symphoricarpos occidentalis* | Western Snowberry | S5 |
| *Toxicodendron rydbergii* | Poison Ivy | S4 |
| *Viburnum edule* | Low Bush-cranberry | S5 |
| *Viburnum opulus var. americanum* | High Bush-cranberry | S4 |
| **Forbs** | | |
| *Achillea alpina* | Siberian Yarrow | S4 |
| *Achillea millefolium* | Common Yarrow | S5 |
| *Actaea rubra* | Red Baneberry | S5 |
| *Agastache foeniculum* | Giant Hyssop | S4 |
| *Alisma triviale* | Broad-leaved Water Plantain | S4 |
| *Amaranthus blitoides* | Prostrate Amaranth | SNA |
| *Amaranthus retroflexus* | Red-root Pigweed | SNA |
| *Ambrosia artemisiifolia var. elatior* | Annual Ragweed | S5 |
| *Anemone canadensis* | Canada Anemone | S5 |
| *Anemone cylindrica* | Long-fruited Anemone | S4 |
| *Antennaria parvifolia* | Small-leaved Everlasting | S4 |
| *Apocynum androsaemifolium* | Spreading Dogbane | S4 |
| *Aralia nudicaulis* | Wild Sarsaparilla | S4 |
| *Arctium lappa* | Greater Burdock | SNA |
| *Arctium minus* | Common Burdock | $SNA^N$ |
| *Artemisia absinthium* | Absinthe | $SNA^N$ |

| Scientific Name | Common Name | Provincial General Status* |
|---|---|---|
| *Artemisia biennis var. biennis* | Sagewort | SNA |
| *Artemisia borealis ssp. borealis* | Northern Wormwood | S5 |
| *Artemisia dracunculus* | Tarragon | S4 |
| *Artemisia frigida* | Pasture Sage | S5 |
| *Artemisia ludoviciana ssp. ludoviciana* | Prairie Sage | S5 |
| *Asclepias ovalifolia* | Oval-leaved Milkweed | S5 |
| *Astragalus agrestis* | Field Milk-vetch | S4 |
| *Bassia scoparia* | Kochia | SNA$^{N}$ |
| *Bidens vulgata* | Beggar-ticks | S5 |
| *Botrychium virginianum* | Rattlesnake Fern | S4 |
| *Capsella bursa-pastoris* | Shepherd's-purse | SNA |
| *Cerastium arvense ssp. strictum* | Field Mouse-ear Chickweed | S5 |
| *Chenopodium album var. album* | Lamb's-quarter's | SNA |
| *Chenopodium pratericola* | Narrow-leaved Goosefoot | S4 |
| *Chenopodium rubrum var. humile* | Red Goosefoot | S4 |
| *Chenopodium simplex* | Giant-seed Goosefoot | S4 |
| *Cicuta bulbifera* | Water Hemlock | S4 |
| *Cicuta maculata var. angustifolia* | Water-hemlock | S4 |
| *Cirsium arvense* | Canada Thistle | SNA$^{N}$ |
| *Cirsium undulatum var. undulatum* | Wavy-leaved Thistle | S4 |
| *Cirsium vulgare* | Bull Thistle | SNA |
| *Comandra umbellata ssp. pallida* | Bastard Toadflax | S5 |
| *Crepis tectorum* | Annual Hawksbeard | SNA$^{N}$ |
| *Cyclachaena xanthiifolia* | False Ragweed | S4 |
| *Cypripedium parviflorum var. makasin* | Small Yellow Lady's Slipper | S3$^{T}$ |
| *Dalea purpurea var. purpurea* | Purple Prairie-clover | S4 |
| *Descurainia sophia* | Flixweed | SNA |
| *Equisetum arvense* | Common Horsetail | S5 |
| *Equisetum hyemale var. affine* | Common Scouring-rush | S4 |
| *Erigeron philadelphicus var. philadelphicus* | Philadelphia Fleabane | S4 |
| *Erysimum cheiranthoides* | Wormseed Mustard | SNA |
| *Fallopia convolvulus* | Wild Buckwheat | SNA |
| *Fragaria vesca ssp. americana* | American Wild Strawberry | S4 |
| *Fragaria virginiana ssp. glauca* | Smooth Wild Strawberry | S5 |
| *Galeopsis tetrahit var. tetrahit* | Common Hemp-nettle | SNA |
| *Galium aparine* | Cleavers | S5 |
| *Galium boreale* | Northern Bedstraw | S5 |
| *Galium trifidum ssp. trifidum* | Small Bedstraw | S4 |
| *Galium triflorum* | Sweet-scented Bedstraw | S4 |
| *Geum rivale* | Purple Avens | S4 |
| *Glycyrrhiza lepidota* | Wild Licorice | S4 |
| *Helianthus nuttallii ssp. nuttallii* | Common Tall Sunflower | S4 |
| *Helianthus petiolaris ssp. petiolaris* | Prairie Sunflower | S4 |
| *Heracleum maximum* | Cow Parsnip | S4 |
| *Heterotheca villosa var. villosa* | Hairy False Golden Aster | S5 |
| *Heuchera richardsonii* | Alumroot | S4 |
| *Hippuris vulgaris* | Common Mare's-tail | S4 |
| *Lactuca serriola* | Prickly Lettuce | SNA$^{N}$ |
| *Lathyrus ochroleucus* | Cream-coloured Vetchling | S5 |
| *Lathyrus palustris* | Marsh Vetchling | S5 |

| Scientific Name | Common Name | Provincial General Status* |
|---|---|---|
| *Lathyrus venosus* | Wild Peavine | S4 |
| *Lemna turionifera* | Turion Duckweed | S4 |
| *Lepidium densiflorum* | Common Pepper-grass | S4 |
| *Liatris ligulistylis* | Meadow Blazing-star | S4 |
| *Linum lewisii var. lewisii* | Flax | S5 |
| *Lithospermum canescens* | Hoary Puccoon | S4 |
| *Lonicera dioica* | Wild Honeysuckle | S5 |
| *Lotus corniculatus* | Bird's-foot Trefoil | SNA |
| *Lycopus americanus* | Water Horehound | S4 |
| *Lysimachia ciliata* | Fringed Loosestrife | S4 |
| *Maianthemum canadense* | Two-leaved Solomon's-seal | S5 |
| *Maianthemum stellatum* | Starflower False Solomon's-seal | S4 |
| *Medicago lupulina* | Black Medic | SNA |
| *Medicago sativa ssp. sativa* | Alfalfa | SNA |
| *Melilotus albus* | White Sweet-clover | SNA |
| *Melilotus officinalis* | Yellow Sweet-clover | SNA |
| *Mentha canadensis* | Wild Mint | S4 |
| *Mertensia paniculata var. paniculata* | Tall Lungwort | S5 |
| *Moehringia lateriflora* | Blunt-leaved Sandwort | S4 |
| *Mulgedium pulchellum* | Common Blue Lettuce | S4 |
| *Osmorhiza longistylis* | Long-styled Anise-root | S5 |
| *Persicaria amphibia var. emersa* | Water Smartweed | S4 |
| *Persicaria lapathifolia* | Pale Persicaria | S4 |
| *Persicaria maculosa* | Lady's Thumb | SNA |
| *Petasites frigidus var. sagittatus* | Arrow-leaved Colt's-foot | S4 |
| *Plantago elongata* | Narrow-leaved Palntain | S4 |
| *Plantago major* | Common Plantain | SNA |
| *Polygala senega* | Seneca Snakeroot | S4 |
| *Potentilla anserina ssp. anserina* | Silverweed | S4 |
| *Potentilla gracilis var. fastigiata* | Nuttal's Cinquefoil | S4 |
| *Potentilla norvegica* | Rough Cinquefoil | S4 |
| *Potentilla pensylvanica* | Prairie Cinquefoil | S4 |
| *Potentilla rivalis* | Brook Cinquefoil | S4 |
| *Prosartes trachycarpa* | Fairybells | S4 |
| *Pyrola asarifolia ssp. asarifolia* | Pink Wintergreen | S5 |
| *Ranunculus cymbalaria* | Seaside Buttercup | S4 |
| *Ranunculus gmelinii* | Small Yellow Watercrowfoot | S4 |
| *Ranunculus sceleratus var. sceleratus* | Cursed Crowfoot | S4 |
| *Rubus pubescens* | Dewberry | S5 |
| *Rudbeckia hirta var. pulcherrima* | Black-eyed-susan | S4 |
| *Rumex crispus* | Curled Dock | SNA |
| *Rumex fueginus* | Golden Dock | S5 |
| *Sanicula marilandica* | Black Snakeroot | S4 |
| *Silene latifolia* | White Cockle | SNA |
| *Silene noctiflora* | Night-flowering Catchfly | $SNA^N$ |
| *Sisyrinchium montanum var. montanum* | Common Blue-eyed Grass | S4 |
| *Sium suave* | Water Parsnip | S4 |
| *Smilax lasioneura* | Herbaceous Greenbrier | S4 |
| *Solanum dulcamara* | Climbing Nightshade | SNA |
| *Solidago altissima var. altissima* | Tall Goldenrod | S5 |

| Scientific Name | Common Name | Provincial General Status* |
|---|---|---|
| *Solidago gigantea* | Late Goldenrod | S4 |
| *Solidago missouriensis* | Low Goldenrod | S5 |
| *Solidago rigida* ssp. *humilis* | Stiff Goldenford | S4 |
| *Sonchus arvensis* ssp. *uliginosus* | Perennial Sow-thistle | SNA$^{N}$ |
| *Sparganium emersum* | Broad-leaved Bur-reed | S4 |
| *Stachys pilosa var. pilosa* | Hairy Hedge-nettle | S4 |
| *Stellaria borealis ssp. borealis* | Northern Stitchwort | S4 |
| *Suaeda calceoliformis* | Sea-blite | S4 |
| *Symphyotrichum ericoides var. pansum* | Tufted White Prairie Aster | S5 |
| *Symphyotrichum falcatum var. falcatum* | White Praiei Aster | S4 |
| *Symphyotrichum laeve var. geyeri* | Smooth Blue Aster | S5 |
| *Symphyotrichum lanceolatum var. lanceolatum* | White Panicled American-aster | S4 |
| *Taraxacum officinale ssp. officinale* | Common Dandelion | SNA |
| *Tephroseris palustris* | Marsh Ragwort | S4 |
| *Thalictrum dasycarpum* | Tall Meadow-rue | S4 |
| *Thalictrum venulosum* | Veiny Meadow-rue | S5 |
| *Thermopsis rhombifolia* | Golden-bean | S5 |
| *Thlaspi arvense* | Stinkweed | SNA |
| *Tragopogon dubius* | Yellow Goat's-beard | SNA |
| *Trifolium hybridum* | Alsike Clover | SNA |
| *Trifolium pratense* | Red Clover | SNA |
| *Trifolium repens* | White Clover | SNA |
| *Tripleurospermum inodorum* | Scentless Chamomile | SNA$^{N}$ |
| *Urtica dioica ssp. gracilis* | Stinging Nettle | S4 |
| *Vicia americana ssp. americana* | American Purple Vetch | S5 |
| *Viola adunca var. adunca* | Early Blue Violet | S5 |
| *Viola canadensis var. rugulosa* | Western Canada Violet | S5 |
| *Zizia aptera* | Heart-leaved Alexanders | S4 |
| **Graminoids** | | |
| *Alopecurus aequalis* var. *aequalis* | Short-awn Meadow-foxtail | S4 |
| *Avena sativa* | Oat | SNA |
| *Beckmannia syzigachne* | Slough Grass | S4 |
| *Bolboschoenus maritimus* ssp. *paludosus* | Prairie Bulrush | S4 |
| *Bromus ciliatus* | Fringed Brome | S4 |
| *Bromus inermis* | Smooth Brome | SNA |
| *Calamagrostis stricta* | Northern Reed Grass | S5 |
| *Carex atherodes* | Awned Sedge | S4 |
| *Carex aurea* | Golden Sedge | S4 |
| *Carex sprengelii* | Sprengel's Sedge | S4 |
| *Carex utriculata* | Northwest Territory Sedge | S4 |
| *Deschampsia cespitosa* ssp. *cespitosa* | Tufted Hairgrass | S4 |
| *Echinochloa muricata* var. *microstachya* | Rough Barnyard Grass | S4 |
| *Eleocharis palustris* | Creeping Spikerush | S5 |
| *Elymus canadensis* var. *canadensis* | Canada Wild Rye | S4 |
| *Elymus lanceolatus* ssp. *lanceolatus* | Northern Wheatgrass | S5 |
| *Elymus trachycaulus* ssp. *trachycaulus* | Slender Wheatgrass | S5 |
| *Glyceria grandis* var. *grandis* | American Manna Grass | S4 |
| *Glyceria striata* var. *striata* | Fowl Manna Grass | S4 |
| *Hordeum jubatum* ssp. *jubatum* | Foxtail Barley | S5 |
| *Juncus balticus* | Baltic Rush | S4 |

| Scientific Name | Common Name | Provincial General Status* |
|---|---|---|
| *Juncus bufonius* | Toad Rush | S4 |
| *Juncus longistylis* var. *longistylis* | Long-style Rush | S4 |
| *Phalaris arundinacea* | Reed Canary Grass | S4 |
| *Phleum pratense* ssp. *pratense* | Timothy | SNA |
| *Phragmites australis* ssp. *americanus* | Common Reed Grass | S4 |
| *Poa palustris* | Fowl Blue Grass | S4 |
| *Poa pratensis* | Kentucky Blue Grass | SNA |
| *Puccinellia nuttalliana* | Nuttal's Salt-meadow Grass | S4 |
| *Schoenoplectus acutus* var. *acutus* | Hard-stemmed Bulrush | S4 |
| *Schoenoplectus pungens* | Three-square Rush | S4 |
| *Schoenoplectus tabernaemontani* | Soft-stem Bulrush | S4 |
| *Setaria viridis* var. *viridis* | Green Foxtail | SNA |
| *Triglochin maritima* | Seaside Arrow-grass | S4 |
| *Typha latifolia* | Common Cattail | S4 |

* Species Conservation S-Rank: S5 – Common / Secure; S4 – Apparently Secure; S3 – Vulnerable / Rare to Uncommon; S2 – Imperiled / Very Rare; S1 – Critically Imperiled / Extremely Rare; SNA – status not applicable, introduced species (SKDC 2021b).

[N] – Listed as Noxious (Government of Saskatchewan 2010); [T] – Listed as Tracked (SKDC 2021b)

**Appendix VIII**
Avian Field Monitoring Results

| Common Name | Scientific Name | Provincial Status[1] | Abundance | | | Number of Flocks | |
|---|---|---|---|---|---|---|---|
| | | | Spring Migratory | Fall Migratory | Grassland Breeding Bird | Spring Migratory | Fall Migratory |
| **Passerines** | | | | | | | |
| Alder Flycatcher | *Empidonax alnorum* | S5B,S5M | - | - | 2 | - | - |
| American Goldfinch | *Spinus tristis* | S5B,S5M | - | 272 | 11 | - | 18 |
| American Pipit | *Anthus rubescens* | S5M | - | 4 | - | - | 2 |
| American Redstart | *Setophaga ruticilla* | S5B,S5M | - | - | 2 | - | - |
| American Robin | *Turdus migratorius* | S5B,SUN,S5M | 42 | 58 | 19 | 6 | 12 |
| American Tree Sparrow | *Spizelloides arborea* | S4B,S5M | 5 | 38 | - | 2 | 9 |
| Baltimore Oriole | *Icterus galbula* | S5B,S5M | - | - | 11 | - | - |
| Barn Swallow | *Hirundo rustica* | S4B,S4M | - | 11 | 12 | - | 2 |
| Black-and-white Warbler | *Mniotilta varia* | 5B,S5M | - | - | 1 | - | - |
| Black-capped Chickadee | *Poecile atricapillus* | S5 | 5 | 28 | 5 | 1 | 7 |
| Blue Jay | *Cyanocitta cristata* | S5 | - | - | 1 | - | - |
| Bobolink | *Dolichonyx oryzivorus* | S4B,S4M | - | - | 14 | - | - |
| Brewer's Blackbird | *Euphagus cyanocephalus* | S4B,SUN,S4M | 45 | 6 | 13 | 7 | 1 |
| Brown Thrasher | *Toxostoma rufum* | S5B,S5M | - | - | 1 | - | - |
| Brown-headed Cowbird | *Molothrus ater* | S5B,SUN,S5M | 1 | - | 9 | - | - |
| Cedar Waxwing | *Bombycilla cedrorum* | S5B,S5M | - | 55 | 6 | - | 7 |
| Chestnut-sided Warbler | *Setophaga pensylvanica* | S5B, S5M | - | - | 2 | - | - |
| Chipping Sparrow | *Spizella passerina* | S5B, S5M | 4 | 6 | 9 | 2 | 1 |
| Clay-coloured Sparrow | *Spizella pallida* | S5B,S5M | 1 | 15 | 41 | - | 5 |
| Common Grackle | *Quiscalus quiscula* | S5B | 58 | 100 | 14 | 9 | 1 |
| Common Nighthawk | *Chordeiles minor* | S4B,S4M | - | - | - | - | - |
| Common Redpoll | *Acanthis flammea* | S4B,S4N,S4M | - | 15 | - | - | 1 |
| Common Yellowthroat | *Geothlypis trichas* | S5B, S5M | - | - | 3 | - | - |
| Dark-eyed Junco | *Junco hyemalis* | S5B,S4N,S5M | 14 | 109 | - | 3 | 11 |
| Downy Woodpecker | *Dryobates pubescens* | S5 | 1 | 4 | 2 | - | - |

| Common Name | Scientific Name | Provincial Status[1] | Abundance | | | Number of Flocks | |
|---|---|---|---|---|---|---|---|
| | | | Spring Migratory | Fall Migratory | Grassland Breeding Bird | Spring Migratory | Fall Migratory |
| Eastern Kingbird | *Tyrannus tyrannus* | S5B, S5M | - | - | 9 | - | - |
| Eastern Phoebe | *Sayornis phoebe* | S4B, S4M | - | - | 1 | - | - |
| European Starling | *Sturnus vulgaris* | SNA | 25 | 29 | 6 | 7 | 4 |
| Grasshopper Sparrow | *Ammodramus savannarum* | S4B | - | - | 1 | - | - |
| Gray Catbird | *Dumetella carolinensis* | S5B, S5M | - | - | 5 | - | - |
| Great Crested Flycatcher | *Myiarchus crinitus* | S5B,S5M | - | - | 1 | - | - |
| Hairy Woodpecker | *Dryobates villosus* | S5 | 1 | 4 | 2 | - | - |
| Harris's Sparrow | *Zonotrichia querula* | SUB,S5M | - | 3 | 1 | - | 1 |
| Hermit Thrush | *Catharus guttatus* | S5B, S5M | - | - | 1 | - | - |
| Horned Lark | *Eremophila alpestris* | S4B,S3N,SUM | 51 | 16 | 3 | 12 | 4 |
| House Finch | *Haemorhous mexicanus* | S5N | - | - | 4 | - | - |
| House Wren | *Troglodytes aedon* | S5B, S5M | - | 1 | 5 | - | - |
| Lapland Longspur | *Calcarius lapponicus* | S4N,S4M | - | 4 | - | - | 1 |
| Lark Sparrow | *Chondestes grammacus* | S5B, SNRM | - | - | 2 | - | - |
| Least Flycatcher | *Empidonax minimus* | S5B, S5M | - | - | 6 | - | - |
| Lincoln's Sparrow | *Melospiza lincolnii* | S5B,S5M | - | 1 | - | - | - |
| Marsh Wren | *Cistothorus palustris* | S4B, S4M | - | 1 | 3 | - | - |
| Northern Flicker | *Colaptes auratus* | S5B, SUN, S5M | 2 | 23 | 1 | - | 4 |
| Olive-sided Flycatcher | *Contopus cooperi* | S4B,S4M | - | 2 | - | - | - |
| Orange-crowned Warbler | *Oreothlypis celata* | S5B,S5M | - | 1 | 1 | - | - |
| Orchard Oriole | *Icterus spurius* | | - | - | 1 | - | - |
| Ovenbird | *Seiurus aurocapilla* | S5B, S5M | - | - | 1 | - | - |
| Palm Warbler | *Setophaga palmarum* | S5B,S5M | - | 2 | - | - | - |
| Pine Siskin | *Spinus pinus* | S5 | - | 124 | - | - | 8 |
| Red-breasted Nuthatch | *Sitta canadensis* | S5B,S5N,S5M | - | 1 | - | - | - |
| Red-eyed Vireo | *Vireo olivaceus* | S5B, S5M | - | - | 1 | - | - |

| Common Name | Scientific Name | Provincial Status[1] | Abundance | | | Number of Flocks | |
|---|---|---|---|---|---|---|---|
| | | | Spring Migratory | Fall Migratory | Grassland Breeding Bird | Spring Migratory | Fall Migratory |
| Red-winged Blackbird | *Agelaius phoeniceus* | S5B,SUN,S5M | 1023 | 26 | 61 | 117 | 2 |
| Ruby-throated Hummingbird | *Archilochus colubris* | S5B, S54M | - | - | 1 | - | - |
| Savannah Sparrow | *Passerculus sandwichensis* | S5B, S5M | 5 | 25 | 14 | - | 8 |
| Say's Phoebe | *Sayornis saya* | S4B, S4M | - | - | 1 | - | - |
| Snow Bunting | *Plectrophenax nivalis* | S5N,S5M | - | 3 | - | - | 1 |
| Song Sparrow | *Melospiza melodia* | S5B,S5M | 19 | 10 | 6 | 2 | 3 |
| Tennessee Warbler | *Oreothlypis peregrina* | S5B,S5M | - | 1 | - | - | - |
| Tree Swallow | *Tachycineta bicolor* | S5B,S5M | 5 | 2 | 26 | 2 | 1 |
| Veery | *Catharus fuscescens* | S4B,S4M | - | - | 2 | - | - |
| Vesper Sparrow | *Pooecetes gramineus* | S5B, S5M | 13 | 45 | 18 | - | 12 |
| Warbling Vireo | *Vireo gilvus* | S5B, S5M | - | - | 13 | - | - |
| Western Kingbird | *Tyrannus verticalis* | S5B, S5M | - | - | 2 | - | - |
| Western Meadowlark | *Sturnella neglecta* | S4B,S4M | 4 | 4 | 6 | - | 1 |
| Western Wood-pewee | *Contopus sordidulus* | S4B, S4M | - | - | 1 | - | - |
| White-breasted Nuthatch | *Sitta carolinensis* | S5 | - | 3 | 2 | - | - |
| White-crowned Sparrow | *Zonotrichia leucophrys* | S4B,S4M | 6 | 19 | - | 1 | 5 |
| White-throated Sparrow | *Zonotrichia albicollis* | | 6 | 1 | 2 | 1 | - |
| Yellow Warbler | *Setophaga petechia* | S5B, S5M | - | 8 | 29 | - | 2 |
| Yellow-bellied Sapsucker | *Sphyrapicus varius* | S5B, S5M | - | 1 | 2 | - | - |
| Yellow-headed Blackbird | *Xanthocephalus xanthocephalus* | S5B,S5M | 27 | - | 7 | 3 | - |
| Yellow-rumped Warbler | *Setophaga coronata* | S5B,S5M | - | 11 | - | - | 2 |
| **Raptors** | | | | | | | |

| Common Name | Scientific Name | Provincial Status[1] | Abundance | | | Number of Flocks | |
|---|---|---|---|---|---|---|---|
| | | | Spring Migratory | Fall Migratory | Grassland Breeding Bird | Spring Migratory | Fall Migratory |
| American Kestrel | *Falco sparverius* | S5B,S1N,S5M | 1 | - | 1 | - | - |
| Bald Eagle | *Haliaeetus leucocephalus* | S5B,S5N,S4M | - | 2 | - | - | - |
| Merlin | *Falco columbarius* | S5B,S5N,S5M | - | 2 | 1 | - | - |
| Northern Harrier | *Circus hudsonius* | S4B,S4M | 4 | 5 | - | - | - |
| Red-tailed Hawk | *Buteo jamaicensis* | S5B,S1N,S5M | 14 | 16 | 4 | - | - |
| Rough-legged Hawk | *Buteo lagopus* | S4N,S4M | - | 1 | - | - | - |
| Swainson's Hawk | *Buteo swainsoni* | S4B,S4M | - | 11 | 2 | - | 4 |
| **Grouse and Allies** | | | | | | | |
| Gray Partridge | *Perdix perdix* | SNA | - | 51 | 4 | - | 5 |
| Ruffed Grouse | *Bonasa umbellus* | S5 | 4 | - | 2 | - | - |
| Sharp-tailed Grouse | *Tympanuchus phasianellus* | S5 | 27 | 1 | - | 5 | - |
| **Waterfowl** | | | | | | | |
| American Wigeon | *Mareca americana* | S5B,S2N,S5M | 11 | 7 | - | 2 | 2 |
| Blue-winged Teal | *Spatula discors* | S5B, S5M | 38 | - | 9 | 8 | - |
| Bufflehead | *Bucephala albeola* | S5B,S1N,S3M | 10 | - | 1 | 5 | - |
| Canada Goose | *Branta canadensis* | S5B,S2N,S5M | 512 | 3937 | 5 | 50 | 38 |
| Canvasback | *Aythya valisineria* | S5B,S2N,S5M | 40 | - | - | 2 | - |
| Common Goldeneye | *Bucephala clangula* | S5B,S3N,S3M | 6 | - | - | 2 | - |
| Gadwall | *Mareca strepera* | S5B,S2N,S5M | 89 | 20 | 9 | 5 | 4 |
| Greater Scaup | *Aythya marila* | S5M | 2 | - | - | 1 | - |
| Greater White-fronted Goose | *Anser albifrons* | S5M | 2968 | 1100 | - | 11 | 5 |
| Green-winged Teal | *Anas crecca* | S5B,S2N,S5M | 28 | - | 3 | 7 | - |
| Lesser Scaup | *Aythya affinis* | N5B,N5N,N5M | - | - | 2 | - | - |
| Mallard | *Anas platyrhynchos* | S5B,S5M | 164 | 152 | 24 | 42 | 9 |
| Northern Pintail | *Anas acuta* | S5B,S4N,S5M | 18 | - | 1 | 3 | - |
| Northern Shoveler | *Spatula clypeata* | S5B,S5M | 13 | 6 | 5 | 3 | 2 |
| Pied-billed Grebe | *Podilymbus podiceps* | S5M,S5M | - | - | 1 | - | - |

| Common Name | Scientific Name | Provincial Status[1] | Abundance | | | Number of Flocks | |
|---|---|---|---|---|---|---|---|
| | | | Spring Migratory | Fall Migratory | Grassland Breeding Bird | Spring Migratory | Fall Migratory |
| Redhead | *Aythya americana* | S5B,S2N,S5M | 4 | 2 | 2 | 1 | - |
| Red-necked Grebe | *Podiceps grisegena* | S5B,S5M | 11 | - | 5 | 4 | - |
| Ring-necked Duck | *Aythya collaris* | S5B,S5M | - | 3 | 8 | - | 1 |
| Snow Goose | *Anser caerulescens* | S5M | 5350 | 1845 | - | 30 | 9 |
| Tundra Swan | *Cygnus columbianus* | S5M | 52 | - | - | 5 | - |
| **Waterbirds** | | | | | | | |
| Double-crested Cormorant | *Phalacrocorax auritus* | S5B,S5M | 8 | - | - | 1 | - |
| Great Blue Heron | *Ardea herodias* | S5B, S5M | - | 1 | 4 | - | - |
| Greater Yellowlegs | *Tringa melanoleuca* | S5B,S5M | 6 | 1 | - | 1 | - |
| Killdeer | *Charadrius vociferus* | S5B,S5M | 29 | 18 | 8 | 2 | 3 |
| Least Sandpiper | *Calidris minutilla* | S4B,S4M | 5 | - | - | 1 | - |
| Lesser Yellowlegs | *Tringa flavipes* | S4B,S4M | 12 | 12 | - | 2 | 2 |
| Ring-billed Gull | *Larus delawarensis* | S5B,S5M | 91 | 15 | 6 | 14 | 1 |
| Sandhill Crane | *Antigone canadensis* | S5B,S5M | 1193 | 123 | 4 | 15 | 4 |
| Solitary Sandpiper | *Tringa solitaria* | SUB,SUM | 1 | - | - | - | - |
| Spotted Sandpiper | *Actitis macularius* | S4B,S4M | - | 5 | 3 | - | 2 |
| Upland Sandpiper | *Bartramia longicauda* | S5B, S5M | - | - | 2 | - | - |
| Willet | *Tringa semipalmata* | S4B, S4M | - | - | 2 | - | - |
| Wilson's Phalarope | *Phalaropus tricolor* | S5B, S5M | - | - | 4 | - | - |
| Wilson's Snipe | *Gallinago delicata* | S5B,S5M | 1 | - | 7 | - | - |
| **Other** | | | | | | | |
| American Crow | *Corvus brachyrhynchos* | S5B,S4N,S5M | 40 | 63 | 13 | 9 | 12 |
| Black-billed Magpie | *Pica hudsonia* | S5 | 17 | 91 | 3 | 2 | 12 |
| Common Raven | *Corvus corax* | S5 | 4 | 31 | 6 | - | 2 |
| Mourning Dove | *Zenaida macroura* | S5B,S5M | 2 | 9 | 6 | - | 1 |
| Rock Pigeon | *Columba livia* | SNA | - | - | 10 | - | - |

[1] SKCDC 2021

**Appendix IX**
Noise Impact Assessment

BEKEVAR WIND ENERGY PROJECT

# Noise Impact Assessment

## Bekevar Wind L.P.

**Document No.:** 10320750-HOU-R-01
**Issue:** B**, Status:** Final
**Date:** 14 December 2021

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| | | |
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Task and objective:
This report presents the results of a sound analysis conducted by DNV on behalf of Bekevar Wind L.P.

| Prepared by: | Verified by: | Approved by: |
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# EXECUTIVE SUMMARY

DNV Energy Systems Canada Inc. (“DNV”) has conducted a sound assessment for the Bekevar Wind Energy Project (the “Project”) located approximately 10 km southeast of Kipling, Saskatchewan.

The Project layout consists of a total of 39 wind turbine generators (WTGs) and a substation with one step-up transformer. There is no external energy facility noise in the vicinity of the Project.

Of the 63 points of reception (PoR) identified in proximity to the Project, 24 PoRs within 1.5 km of a WTG or substation transformer have been included in this report.

The sound pressure level (SPL) at each PoR for the aggregate of all WTGs and the substation transformer, were calculated based on the ISO 9613-2 method, and in accordance with Alberta Utilities Commission (AUC) Rule 012: Noise Control, in the absence of any formal noise guidelines for wind turbines in Saskatchewan.

The highest modelled cumulative nighttime SPL is 40 dBA at PoRs 42 and 43 near the transformer and PoR 11 near T41.

When not including ambient noise, the highest modelled nighttime SPL is <39 dBA at PoRs 42 and 43 near the transformer and PoR 11 near T41.

All PoRs are in compliance with the permissible sound levels (PSL) defined in AUC Rule 012, provided that one turbine (T41) operates in a reduced noise mode (N4) at night.

# 1 INTRODUCTION

Bekevar Wind L.P. (“Proponent”) requested that DNV Energy Systems Canada Inc. (“DNV”) performs a noise analysis for the Bekevar Wind Energy Project (the “Project”) located approximately 10 km southeast of Kipling, Saskatchewan.

The Project was selected by SaskPower under their 2020 wind energy Request for Proposals (RFP) and subsequently entered into a 25-year power purchase agreement with SaskPower in 2021. The Proponent is planning to start construction in summer 2022 with a target commercial operations date (COD) of December 2023.

The layout considered for the noise analysis consists of 39 Siemens Gamesa SG 5.2-145 wind turbine generators (WTGs) with a hub height of 102.5 m, and one step-up transformer within the substation.

The objective of this assessment is to predict the sound levels generated by the Project’s WTGs and substation transformer at all points of reception (PoR) within 1.5 km of the Project’s sound emitting equipment using the ISO 9613-2 sound propagation model [1] and, in the absence of formal sound modeling guidelines or regulations in Saskatchewan, using Alberta Utilities Commission (AUC) Rule 012: Noise Control [2] as the primary guideline to follow.

## 1.1 General characteristics

The Project area, defined as the combination of all land parcels under a development agreement with the Proponent, comprises approximately 20,000 acres of private lands in the RMs of Hazelwood and Kingsley, as well as three quarter sections of Cowessess First Nation reserve lands.

The area is sparsely populated with dwellings interspersed within and around the Project area. Ambient sound levels in the Project area and on adjacent lands are typical of rural-agricultural settings, with sounds originating from residential activities, agricultural activities (tractors and other machinery), vehicle traffic, and ambient natural noise (wind through vegetation, birds, etc).

The total installed capacity of the Project is 202.8 MW which results is a net capacity at the Project substation of just under 200 MW. The Project also includes access roads on Project lands, a 34.5 kV 3-phase collector system, a substation, an operations and maintenance building, as well as a temporary laydown area and permanent wind monitoring towers.

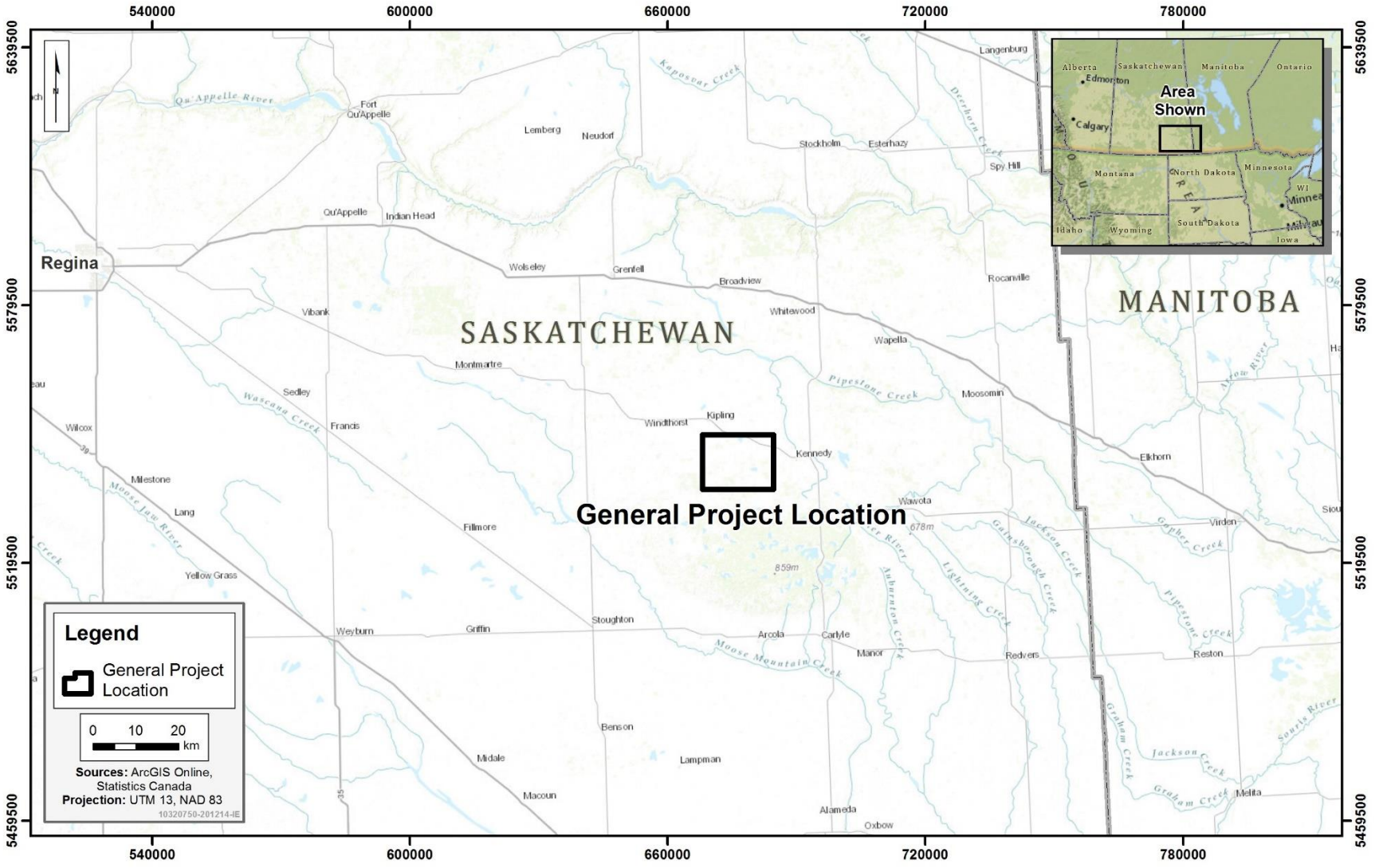



**Figure 1-1 General location of the Project**

# 2 ENVIRONMENTAL SOUND BACKGROUND

Sound levels are expressed in the decibel unit and are quantified on a logarithmic scale to account for the large range of acoustic pressures to which the human ear is exposed. A decibel (dB) is used to quantify sound levels relative to a 0 dB reference. The reference level of 0 dB is defined as a sound pressure level of 20 micropascals (µPa), which is the typical lower threshold of hearing for humans.

Sound levels can be presented both in broadband (sound energy summed across the entire audible frequency spectrum) and in octave band spectra (audible frequency spectrum divided into bands). Frequency is expressed in the Hertz unit (Hz), measuring the cycles per second of the sound pressure waves. The audible range of humans spans from 20 to 20,000 Hz. Since the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter. The A-weighting filter is applied to closely approximate the human ear's response to sound. This scale is commonly used in environmental and industrial sound. Sound expressed in the A-weighted scale is denoted dBA. This is used as the weighting in this report.

A sound source has a certain sound power level rating which describes the amount of sound energy per unit of time. This is a basic measure of how much acoustical energy it can produce and is independent of its surroundings. Sound pressure is created as sound energy flows away from the source. The measured sound pressure level (SPL) at a given point depends not only on the power rating of the source and the distance between the source and the measurement point (geometric divergence), but also on the amount of sound energy absorbed by environmental elements between the source and the measurement point (attenuation). Sound attenuation factors include meteorological conditions such as wind direction, temperature, and humidity, sound interaction with the ground, atmospheric absorption, terrain effects, diffraction of sound around objects and topographical features, and foliage.

# 3 APPLICABLE REGULATIONS

There are currently no regulations in Saskatchewan pertaining to acoustic impact modeling or monitoring for wind power projects. In the absence of any regulations, the current analysis considers the Alberta Utilities Commission (AUC) Rule 012: Noise Control [2].

## 3.1 Determination of permissible sound level

As stated in the AUC Rule 012, the PSL for a wind farm is calculated as follows:

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Permissible sound level (PSL) | = | Basic sound level (BSL) | + | Daytime adjustment | + | Class A adjustment | + | Class B adjustment | + | Class C adjustment |

As mentioned in Rule 012, the average rural ambient sound level in Alberta (and realistically in Saskatchewan) is approximately 35 dBA Leq at night. Therefore, the minimum nighttime Basic sound level (BSL) is determined to be 40 dBA Leq (5 dB above ambient).

The Daytime adjustment adds 10 dBA to the BSL during the hours of 7:00 a.m. and 10:00 p.m.

Class A adjustments are based on the nature of the activity and/or the actual ambient sound level in an area.

Class B adjustments are applicable if the activity will only be of a temporary duration.

Class C adjustments account for sound caused by wind near a dwelling resulting in the wind masking the noise level of a wind turbine at certain wind speeds.

In the case of the present assessment, no Class A, B, or C adjustments have been considered in order to remain conservative in the analysis. Therefore, the applicable Permissible sound level (PSL), which represents "the maximum sound level that the wind farm must not exceed at a point 15 m from the nearest or most impacted dwelling unit" when combined with the ambient sound level, is considered equivalent to the BSL of each respective dwelling unit at night.

All points of reception (PoR) are assumed to have a night-time BSL (and PSL) of 40 dBA. The daytime PSL is 50 dBA at all PoRs.

# 4 DESCRIPTION OF THE PROJECT SITE

## 4.1 Site description

The Project is situated in relatively simple terrain, consisting of flat farmland. Due to the flat topography throughout the Project area, terrain elevations were not included in the sound model. The ground cover on and near the site is primarily composed of farmland or open fields. Dwellings are interspersed throughout the Project site. The Project is located approximately 10 km southeast of Kipling, Saskatchewan.

## 4.2 Project layout

The Project layout used in this assessment consists of 39 Siemens Gamesa SG 5.2-145 WTGs with a hub height of 102.5 m. One transformer was included at the substation location.

The coordinates of the Project equipment are presented in Appendix A. The turbine layout and substation transformer location were provided by the Customer [3].

## 4.3 Neighbouring External Energy Projects

There is no neighbouring external energy related facility noise in the vicinity of the Project.

## 4.4 Points of Reception (PoR) locations

All dwellings (i.e., points of reception) considered for the NIA were identified by the Customer through field reconnaissance to verify locations and building types.

A list of 63 PoRs was provided by the Proponent [4]. Of the total number of identified PoRs, results for 24 PoRs within 1.5 km of the Project equipment were included in this assessment. Coordinates of each PoR are presented in Section 6.

All PoRs have been modeled at a height of 1.5 m above ground level.

The distance between a WTG or transformer and the nearest PoR varies from 748 m up to 1,470 m.

# 5 SOUND ASSESSMENT

## 5.1 Description of the sound sources

The sources of sound considered in this analysis are the WTGs and substation transformer. Sound associated with other sources in the vicinity of the Project, such as construction activities, have not been considered.

### 5.1.1 Project turbines

Broadband and octave band sound power levels for the Siemens Gamesa SG 5.2-145 wind turbines at a hub height of 102.5 m are contained in the manufacturer documentation [5]. The maximum sound power level for the SG 5.2-145 turbine model is 106.3 dBA. According to the documentation, this sound level includes noise reduction add-ons attached to the blade.

A Noise Reduction System (NRS®) operational mode N4 was applied to Turbine 41 only in order to keep sound levels compliant at nearby PoRs [6].

Table 5-1 shows the octave band sound power levels associated with the turbines used in this analysis. Excerpts of the original documents are shown in Appendix B.

**Table 5-1 WTG sound power levels [dBA]**

| WTG Model | Frequency [Hz] | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| SG 5.2-145 Standard Acoustic Emission | 77.9 | 89.7 | 94.8 | 97.8 | 98.9 | 101.0 | 100.0 | 94.1 | 80.6 | 106.3 |
| SG 5.2-145 Operational Mode N4 | 77.2 | 88.1 | 92.1 | 94.1 | 95.1 | 96.9 | 96.5 | 90.3 | 76.8 | 102.7 |

### 5.1.2 Substation transformer

There is one transformer planned at the Project substation, rated at 234 MVA with a voltage of 230 kV on the high voltage side.

A total broadband sound power level of 109 dBA for the transformer was estimated according to IEEE standard C57.12.90-2015 [7], based on an audible sound level of 85 dBA [8]. A tonality penalty of 5 dB is included in this value in accordance with ISO-1996-2 [9].

A typical transformer octave band distribution [10] was used. The octave band sound power levels of the Project transformer are shown in Table 5-2.

**Table 5-2 Transformer sound power levels [dBA]**

| Transformer | Frequency [Hz] | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | |
| 234 MVA 230 kV | 66.2 | 85.4 | 97.5 | 100.0 | 105.4 | 102.6 | 98.8 | 93.6 | 84.5 | 109.0 |

## 5.2 Assessment methodology

The sound pressure level at each PoR for the aggregate of all WTGs and the substation transformer associated with the Project were calculated using CadnaA acoustic modeling software based on the ISO 9613-2 method [1]. The simulation was performed using the maximum sound power level of the turbines and transformer. The Project turbines were modeled with a 102.5 m hub height. The substation transformer was modeled at a height of 4.5 m above ground level (agl). The PoRs were modeled at a height of 1.5 m agl.

The ISO 9613-2 standard provides a prediction of the equivalent continuous SPL at a distance from one or more point sources. The method consists of octave-band algorithms (i.e., with nominal mid band frequencies from 31.5 Hz to 8 kHz) for calculating the attenuation of the emitted sound. The algorithm takes into account the following physical effects:

- Geometrical divergence – attenuation due to spherical spreading from the sound source
- Atmospheric absorption – attenuation due to absorption by the atmosphere
- Ground absorption – attenuation due to the acoustical properties of the ground

The ISO 9613-2 standard calculates attenuation “under meteorological conditions favorable to propagation from sources of sound emission.” These meteorological conditions are for “downwind propagation or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night”. In other words, though a physical impracticality, the ISO 9613-2 standard treats every PoR as being downwind from every source of sound emission (in this case, transformer and turbines).

The ISO 9613-2 standard accounts for ground absorption by assigning a numerical coefficient (G) with a value ranging from 0 to 1. A value of G = 0 represents hard ground (paving, water, ice, concrete, tamped ground, and other ground surfaces with a low porosity), while a G = 1 value represents porous ground (ground covered by grass, trees, or other vegetation, and other ground surfaces suitable for the growth of vegetation such as farming land). Though the ground use on and around the site is farming, a mixed (semi-reflective) global ground factor of G = 0.7 was used in this assessment.

Additionally, temperature, barometric pressure, and humidity parameters were selected to represent typical local annual averages, and topographical information to accurately represent terrain in three-dimensions was included in this assessment.

Specifically, the ISO 9613-2 parameters were set as follows:

- Ambient air temperature: 10º C
- Ambient barometric pressure: 101.32 kPa
- Humidity: 70%
- Overall ground factor: 0.7
- Topography included (5 m elevation intervals)

Additional attenuation from foliage was not considered in this assessment, implying that lower sound levels are expected in areas where there is foliage present in the line of sight between any turbine and a PoR. Similarly, because the model assumes every PoR is downwind of every sound source at all times, lower sound levels are expected at times when a PoR is upwind of any sound source.

# 6 RESULTS

Table 6-1 and Table 6-2 show the combined cumulative sound levels at a height of 1.5 m agl produced by the wind farm during daytime and nighttime. The cumulative sound level at each PoR considered was found to be compliant with the permissible sound level of each PoR.

The only difference between daytime and night time operation is turbine T41 operates in mode N4 only at night.

A detailed map illustrating predicted night time sound pressure levels at PoRs located in the vicinity of the Project is presented in Figure 6-1**.**

The highest modelled nighttime SPL is 40 dBA at PoR 42 and 43 near the transformer and PoR 11 near T41. When not including ambient noise, the highest modelled nighttime SPL is <39 dBA at PoRs 42, 43 and 11.

**Table 6-1 Noise levels at Points of Reception (nighttime)**

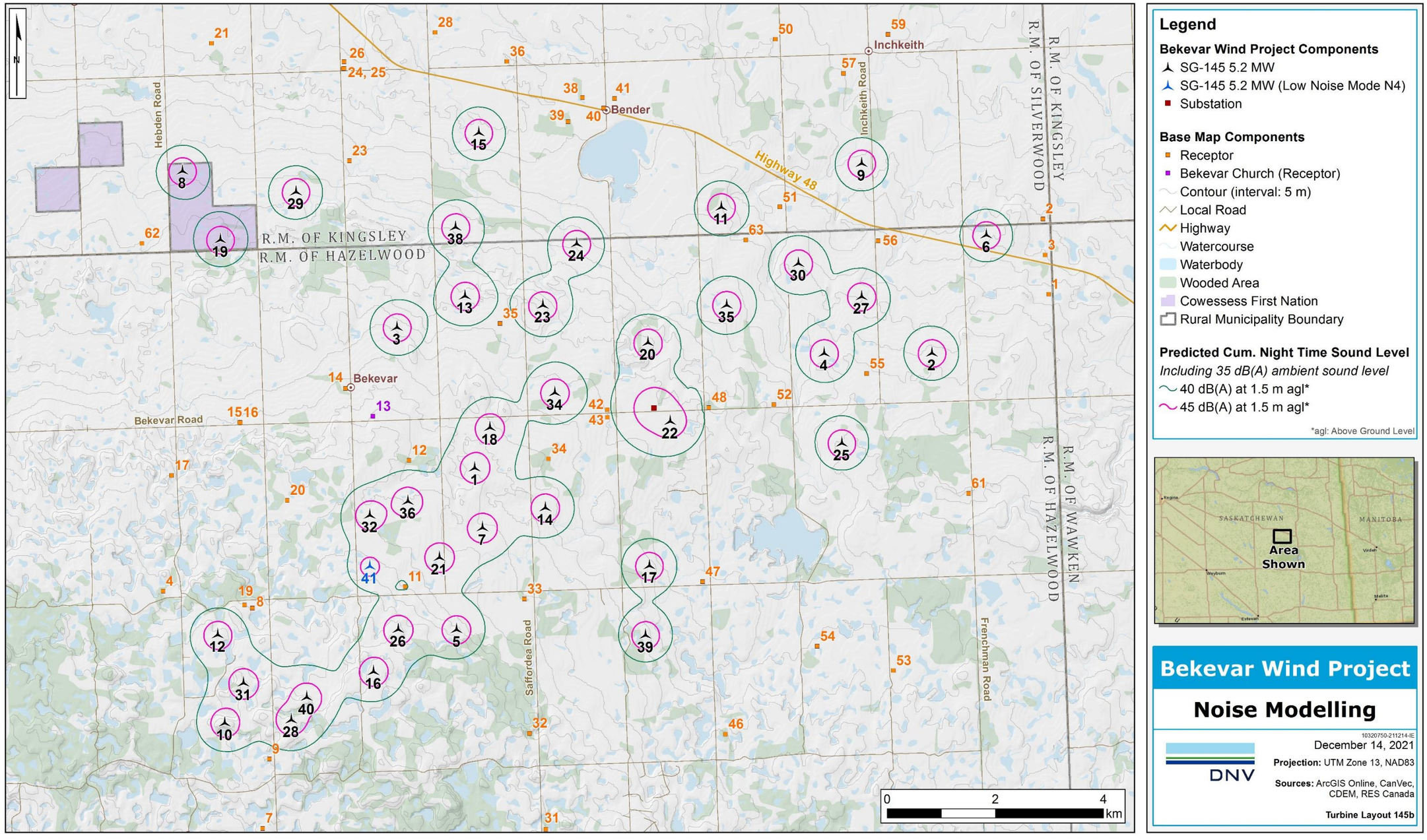
| PoR ID | Easting [m] | Northing [m] | Distance from nearest Project noise source [m] | ID of nearest Project noise source | Project noise contribution without ambient noise [dBA] | Ambient sound level (ASL) [dBA] | Predicted Cumulative sound level with ambient noise [dBA] | Applicable night time PSL [dBA] |
|---|---|---|---|---|---|---|---|---|
| 2 | 684872 | 5547146 | 1089 | T6 | 30.5 | 35 | 36 | 40 |
| 3 | 684913 | 5546477 | 1146 | T6 | 30.1 | | 36 | |
| 4 | 668605 | 5540268 | 1297 | T12 | 30.0 | | 36 | |
| 8 | 670256 | 5539954 | 816 | T12 | 35.4 | | 38 | |
| 9 | 670568 | 5537164 | 819 | T28 | 36.4 | | 39 | |
| 11 | 673080 | 5540350 | 751 | T41 | 38.9 | | 40 | |
| 12 | 673149 | 5542681 | 764 | T36 | 37.2 | | 39 | |
| 14 | 671976 | 5544014 | 1470 | T3 | 30.7 | | 36 | |
| 19 | 670109 | 5540012 | 748 | T12 | 35.8 | | 38 | |
| 23 | 672047 | 5548219 | 1146 | T29 | 31.2 | | 37 | |
| 33 | 675283 | 5540121 | 1376 | T5 | 33.5 | | 37 | |
| 34 | 675730 | 5542712 | 914 | T14 | 36.8 | | 39 | |
| 35 | 674833 | 5545212 | 817 | T13 | 37.4 | | 39 | |
| 36 | 674961 | 5550053 | 1423 | T15 | 28.0 | | 36 | |
| 42 | 676817 | 5543619 | 864 | transf | 38.5 | | 40 | |
| 43 | 676817 | 5543478 | 880 | transf | 38.3 | | 40 | |
| 47 | 678579 | 5540441 | 1022 | T17 | 32.9 | | 37 | |
| 48 | 678694 | 5543660 | 760 | T22 | 36.9 | | 39 | |
| 51 | 680008 | 5547369 | 1082 | T11 | 34.4 | | 38 | |
| 52 | 679897 | 5543715 | 1319 | T4 | 33.1 | | 37 | |
| 55 | 681613 | 5544286 | 868 | T4 | 35.7 | | 38 | |
| 56 | 681824 | 5546741 | 1083 | T27 | 33.8 | | 37 | |
| 62 | 668212 | 5546694 | 1453 | T19 | 29.5 | | 36 | |
| 63 | 679378 | 5546756 | 751 | T11 | 36.8 | | 39 | |

Turbine T41 operates in reduced noise mode N4 during night time.

**Table 6-2 Noise levels at Points of Reception (daytime)**

| PoR ID | Easting [m] | Northing [m] | Distance from nearest Project noise source [m] | ID of nearest Project noise source | Project noise contribution without ambient noise [dBA] | Ambient sound level (ASL) [dBA] | Predicted Cumulative sound level with ambient noise [dBA] | Applicable daytime PSL [dBA] |
|---|---|---|---|---|---|---|---|---|
| 2 | 684872 | 5547146 | 1089 | T6 | 30.5 | 45 | 45 | 50 |
| 3 | 684913 | 5546477 | 1146 | T6 | 30.1 | | 45 | |
| 4 | 668605 | 5540268 | 1297 | T12 | 30.0 | | 45 | |
| 8 | 670256 | 5539954 | 816 | T12 | 35.4 | | 46 | |
| 9 | 670568 | 5537164 | 819 | T28 | 36.4 | | 46 | |
| 11 | 673080 | 5540350 | 751 | T41 | 39.6 | | 46 | |
| 12 | 673149 | 5542681 | 764 | T36 | 37.2 | | 46 | |
| 14 | 671976 | 5544014 | 1470 | T3 | 30.7 | | 45 | |
| 19 | 670109 | 5540012 | 748 | T12 | 35.9 | | 46 | |
| 23 | 672047 | 5548219 | 1146 | T29 | 31.2 | | 45 | |
| 33 | 675283 | 5540121 | 1376 | T5 | 33.5 | | 45 | |
| 34 | 675730 | 5542712 | 914 | T14 | 36.8 | | 46 | |
| 35 | 674833 | 5545212 | 817 | T13 | 37.4 | | 46 | |
| 36 | 674961 | 5550053 | 1423 | T15 | 28.0 | | 45 | |
| 42 | 676817 | 5543619 | 864 | transf | 38.5 | | 46 | |
| 43 | 676817 | 5543478 | 880 | transf | 38.3 | | 46 | |
| 47 | 678579 | 5540441 | 1022 | T17 | 32.9 | | 45 | |
| 48 | 678694 | 5543660 | 760 | T22 | 36.9 | | 46 | |
| 51 | 680008 | 5547369 | 1082 | T11 | 34.4 | | 45 | |
| 52 | 679897 | 5543715 | 1319 | T4 | 33.1 | | 45 | |
| 55 | 681613 | 5544286 | 868 | T4 | 35.7 | | 46 | |
| 56 | 681824 | 5546741 | 1083 | T27 | 33.8 | | 45 | |
| 62 | 668212 | 5546694 | 1453 | T19 | 29.5 | | 45 | |
| 63 | 679378 | 5546756 | 751 | T11 | 36.8 | | 46 | |

All turbines are in standard mode during daytime.




## Legend

**Bekevar Wind Project Components**

- SG-145 5.2 MW
- SG-145 5.2 MW (Low Noise Mode N4)
- Substation

**Base Map Components**

- Receptor
- Bekevar Church (Receptor)
- Contour (interval: 5 m)
- Local Road
- Highway
- Watercourse
- Waterbody
- Wooded Area
- Cowessess First Nation
- Rural Municipality Boundary

**Predicted Cum. Night Time Sound Level**

*Including 35 dB(A) ambient sound level*

- 40 dB(A) at 1.5 m agl*
- 45 dB(A) at 1.5 m agl*

*agl: Above Ground Level




**Bekevar Wind Project**

**Noise Modelling**

10320750-211214-IE

December 14, 2021

**Projection:** UTM Zone 13, NAD83

**Sources:** ArcGIS Online, CanVec, CDEM, RES Canada

**Turbine Layout 145b**

**Figure 6-1 Modeled sound levels at the Bekevar Wind Energy Project (night)**

# 7 CONCLUSION

DNV has conducted an analysis to determine the maximum predicted sound levels at PoRs in the vicinity of the Bekevar Wind Energy Project in Saskatchewan. The Project equipment considered in the analysis were 39 SG 5.2-145 WTGs with a hub height of 102.5 m and one step-up transformer within the substation.

Results are presented for PoRs within 1.5 km of a sound source. Modeled night time cumulative sound pressure levels range from 36 dBA to 40 dBA at the PoRs. When not including ambient noise, the highest modelled nighttime SPL is <39 dBA at PoRs 42 and 43 near the transformer and PoR 11 near T41.

# 8 REFERENCES


[1] International Organization for Standardization. *ISO 9613-2: Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation*. 15 December 1996.

[2] Alberta Utilities Commission (AUC), Rule 012 – Noise Control. Effective 5 March 2021.

[3] Turbine and substation locations sent by email to DNV on 30 November 2021, "*AB0156; BekevarWP; L145b [Full_revised]_2021_11_29.kmz*"

[4] PoR locations provided by Proponent within a CadnaA noise modeling workspace to DNV on 13 October 2021.

[5] Siemens Gamesa, *Hilda - SG 5.0-145 (AM-0, 5.0 MW) and (AM+1, 5.2 MW) - Sound Power Spectra_rev01*. 8 Dec 2021.

[6] Siemens Gamesa, *Developer Package SG 5.0. Document ID GD410616 R6. Standard operation*. Page 19 and 25 of 60. 2020

[7] C57.12.90-2015 IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers. 11 March 2016.

[8] National Electrical Manufacturers Association. NEMA Standards Publication No TR 1-2013: Transformers, Regulators, and Reactors. Table 1.

[9] International Organization for Standardization. *ISO 1996-2: Acoustics – Description, measurement and assessment of environmental noise -Part 2: Determination of sound pressure levels*. July 2017.

[10] *Handbook of Acoustics*. Edited by Malcolm J. Crocker. John Wiley & Sons. 1998.

# APPENDIX A – BEKEVAR WIND ENERGY PROJECT SOUND SOURCE LOCATIONS

| ID | Description | UTM Zone 13, NAD 83 Datum | |
|---|---|---|---|
| | | Easting [m] | Northing [m] |
| transf | Substation transformer | 677681 | 5543648 |
| T1 | Turbine- SG 5.2-145 | 674367 | 5542535 |
| T2 | | 682820 | 5544657 |
| T3 | | 672929 | 5545133 |
| T4 | | 680826 | 5544651 |
| T5 | | 674031 | 5539549 |
| T6 | | 683827 | 5546840 |
| T7 | | 674510 | 5541430 |
| T8 | | 668962 | 5548021 |
| T9 | | 681521 | 5548161 |
| T10 | | 669745 | 5537823 |
| T11 | | 678926 | 5547355 |
| T12 | | 669613 | 5539452 |
| T13 | | 674187 | 5545713 |
| T14 | | 675673 | 5541800 |
| T15 | | 674440 | 5548729 |
| T16 | | 672495 | 5538769 |
| T17 | | 677597 | 5540727 |
| T18 | | 674646 | 5543280 |
| T19 | | 669663 | 5546751 |
| T20 | | 677568 | 5544850 |

| ID | Description | UTM Zone 13, NAD 83 Datum | |
|---|---|---|---|
| | | Easting [m] | Northing [m] |
| T21 | Turbine- SG 5.2-145 | 673713 | 5540880 |
| T22 | | 677982 | 5543397 |
| T23 | | 675624 | 5545539 |
| T24 | | 676250 | 5546676 |
| T25 | | 681153 | 5542991 |
| T26 | | 672952 | 5539551 |
| T27 | | 681521 | 5545702 |
| T28 | | 670972 | 5537877 |
| T29 | | 671060 | 5547637 |
| T30 | | 680351 | 5546314 |
| T31 | | 670090 | 5538561 |
| T32 | | 672426 | 5541663 |
| T34 | | 675848 | 5543926 |
| T35 | | 679023 | 5545545 |
| T36 | | 673129 | 5541917 |
| T38 | | 674012 | 5546983 |
| T39 | | 677525 | 5539446 |
| T40 | | 671258 | 5538297 |
| T41 | Turbine- SG 5.2-145 (Noise reduced mode N4 during nighttime) | 672425 | 5540716 |

# APPENDIX B – TURBINE MANUFACTURER SOUND EMISSION SPECIFICATIONS

## Acoustic Emission

**Table 3** shows the acoustic emission for the SG 5.0-145 MW expressed as A-weighted sound power level, $L_{wA}$, [dB(A )], in function of wind speed at hub height, for (AM-0, 5.0 MW) ), (AM+1, 5.2 MW) and NRO modes

| Wind Speed [m/s] | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Up to cut-out |
|---|---|---|---|---|---|---|---|---|---|
| $L_{wA}$ [dB(A)] SG 5.0-145 (AM+1, 5.2 MW) | 99.2 | 102.7 | 105.7 | 106.3 | 106.3 | 106.3 | 106.3 | 106.3 | 106.3 |
| $L_{wA}$ [dB(A)] SG 5.0-145 (AM-0, 5.0 MW) | 99.2 | 102.7 | 105.7 | 106.3 | 106.3 | 106.3 | 106.3 | 106.3 | 106.3 |
| $L_{wA}$ [dB(A)] SG 5.0-145 (N1, 3.964 MW) | 99.2 | 102.7 | 105.7 | 105.7 | 105.7 | 105.7 | 105.7 | 105.7 | 105.7 |
| $L_{wA}$ [dB(A)] SG 5.0-145 (N2, 3.8 MW) | 99.2 | 102.7 | 105.2 | 105.2 | 105.2 | 105.2 | 105.2 | 105.2 | 105.2 |
| $L_{wA}$ [dB(A)] SG 5.0-145 (N3, 3.615 MW) | 99.2 | 102.7 | 103.7 | 103.7 | 103.7 | 103.7 | 103.7 | 103.7 | 103.7 |

**Table 3:** Noise Curves for the SG 5.0-145 (AM-0, 5.0 MW), (AM+1, 5.2 MW) and NRO Modes

| Central Frequency [Hz] | 10 | 12.5 | 16 | 20 | 25 | 31.5 | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SG 5.0-145 AM+1 @ 5.2 MW | 46.1 | 51.8 | 57.5 | 62.8 | 67.4 | 72.0 | 76.1 | 80.6 | 84.7 | 87.1 | 88.8 |
| SG 5.0-145 AM-0 @ 5.0 MW | 46.1 | 51.8 | 57.5 | 62.8 | 67.4 | 72.0 | 76.1 | 80.6 | 84.7 | 87.1 | 88.8 |
| SG 5.0-145 N1 @ 3.964 MW | 46.1 | 51.8 | 57.4 | 62.8 | 67.3 | 71.9 | 75.9 | 80.4 | 84.5 | 86.8 | 88.4 |
| SG 5.0-145 N2 @ 3.8 MW | 46.1 | 51.8 | 57.4 | 62.8 | 67.3 | 71.8 | 75.8 | 80.2 | 84.3 | 86.5 | 88.1 |
| SG 5.0-145 N3 @ 3.615 MW | 46.1 | 51.8 | 57.4 | 62.7 | 67.1 | 71.6 | 75.5 | 79.8 | 83.7 | 85.8 | 87.2 |
| **Central Frequency [Hz]** | **125** | **160** | **200** | **250** | **315** | **400** | **500** | **630** | **800** | **1000** | **1250** |
| SG 5.0-145 AM+1 @ 5.2 MW | 90.1 | 90.9 | 91.9 | 93.4 | 93.7 | 93.5 | 93.6 | 95.2 | 95.0 | 96.0 | 96.7 |
| SG 5.0-145 AM-0 @ 5.0 MW | 90.1 | 90.9 | 91.9 | 93.4 | 93.7 | 93.5 | 93.6 | 95.2 | 95.0 | 96.0 | 96.7 |
| SG 5.0-145 N1 @ 3.964 MW | 89.7 | 90.4 | 91.2 | 92.7 | 93.1 | 92.8 | 92.9 | 94.5 | 94.3 | 95.3 | 96.0 |
| SG 5.0-145 N2 @ 3.8 MW | 89.3 | 90.0 | 90.7 | 92.2 | 92.6 | 92.3 | 92.4 | 94.0 | 93.8 | 94.8 | 95.5 |
| SG 5.0-145 N3 @ 3.615 MW | 88.2 | 88.6 | 89.2 | 90.7 | 91.0 | 90.8 | 90.9 | 92.5 | 92.3 | 93.3 | 94.0 |
| **Central Frequency [Hz]** | **1600** | **2000** | **2500** | **3150** | **4000** | **5000** | **6300** | **8000** | **10000** | | |
| SG 5.0-145 AM+1 @ 5.2 MW | 96.6 | 95.5 | 94.1 | 91.9 | 88.8 | 84.5 | 79.3 | 73.5 | 68.9 | | |
| SG 5.0-145 AM-0 @ 5.0 MW | 96.6 | 95.5 | 94.1 | 91.9 | 88.8 | 84.5 | 79.3 | 73.5 | 68.9 | | |
| SG 5.0-145 N1 @ 3.964 MW | 95.9 | 94.8 | 93.4 | 91.2 | 88.1 | 83.8 | 78.6 | 72.8 | 68.2 | | |
| SG 5.0-145 N2 @ 3.8 MW | 95.4 | 94.3 | 92.9 | 90.7 | 87.6 | 83.3 | 78.1 | 72.3 | 67.7 | | |
| SG 5.0-145 N3 @ 3.615 MW | 93.9 | 92.8 | 91.4 | 89.2 | 86.1 | 81.8 | 76.6 | 70.8 | 66.2 | | |

**Table 7:** One-third Octave Spectra of SG 5.0-145 (AM-0, 5.0 MW), (AM+1, 5.2 MW) and NRO Modes @ 9 m/s

The 1/3 octave band noise spectra expressed as A-weighted sound power level for a given frequency band is shown below for 12m/s at hub height, for the standard power operation setting as well as the low noise modes.

| | Noise [dB(A)] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *1/3 octave band, center frequency [Hz]* | Standard Power 5.0MW | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 |
| | 106.3 dB(A) | 105.7 dB(A) | 105.2 dB(A) | 103.7 dB(A) | 102.7 dB(A) | 101.7 dB(A) | 99.9 dB(A) | 99.0 dB(A) | 98.0 dB(A) |
| 10 | 46.1 | 46.1 | 46.1 | 46.1 | 46.1 | 46.1 | 46.1 | 46.1 | 46.1 |
| 12.5 | 51.8 | 51.8 | 51.8 | 51.8 | 51.8 | 51.8 | 51.8 | 51.7 | 51.7 |
| 16 | 57.5 | 57.4 | 57.4 | 57.4 | 57.4 | 57.4 | 57.3 | 57.3 | 57.3 |
| 20 | 62.8 | 62.8 | 62.8 | 62.7 | 62.6 | 62.6 | 62.5 | 62.4 | 62.3 |
| 25 | 67.4 | 67.3 | 67.3 | 67.1 | 67.0 | 66.9 | 66.7 | 66.6 | 66.5 |
| 31.5 | 72.0 | 71.9 | 71.8 | 71.6 | 71.4 | 71.3 | 71.0 | 70.8 | 70.7 |
| 40 | 76.1 | 75.9 | 75.8 | 75.5 | 75.3 | 75.1 | 74.6 | 74.4 | 74.2 |
| 50 | 80.6 | 80.4 | 80.2 | 79.8 | 79.5 | 79.2 | 78.6 | 78.3 | 78.0 |
| 63 | 84.7 | 84.5 | 84.3 | 83.7 | 83.3 | 82.9 | 82.2 | 81.8 | 81.4 |
| 80 | 87.1 | 86.8 | 86.5 | 85.8 | 85.3 | 84.8 | 83.8 | 83.4 | 82.8 |
| 100 | 88.8 | 88.4 | 88.1 | 87.2 | 86.6 | 86.0 | 84.8 | 84.2 | 83.6 |
| 125 | 90.1 | 89.7 | 89.3 | 88.2 | 87.5 | 86.7 | 85.3 | 84.6 | 83.8 |
| 160 | 90.9 | 90.4 | 90.0 | 88.6 | 87.7 | 86.8 | 85.2 | 84.3 | 83.4 |
| 200 | 91.9 | 91.2 | 90.7 | 89.2 | 88.1 | 87.1 | 85.2 | 84.2 | 83.2 |
| 250 | 93.4 | 92.7 | 92.2 | 90.7 | 89.6 | 88.6 | 86.7 | 85.7 | 84.7 |
| 315 | 93.7 | 93.1 | 92.6 | 91.0 | 90.0 | 89.0 | 87.1 | 86.1 | 85.0 |
| 400 | 93.5 | 92.8 | 92.3 | 90.8 | 89.7 | 88.7 | 86.8 | 85.8 | 84.7 |
| 500 | 93.6 | 92.9 | 92.4 | 90.9 | 89.8 | 88.8 | 86.9 | 85.9 | 84.8 |
| 630 | 95.2 | 94.5 | 94.0 | 92.5 | 91.4 | 90.4 | 88.5 | 87.5 | 86.4 |
| 800 | 95.0 | 94.3 | 93.8 | 92.3 | 91.2 | 90.2 | 88.3 | 87.3 | 86.3 |
| 1000 | 96.0 | 95.3 | 94.8 | 93.3 | 92.2 | 91.2 | 89.3 | 88.3 | 87.3 |
| 1250 | 96.7 | 96.0 | 95.5 | 94.0 | 92.9 | 91.9 | 90.0 | 89.0 | 88.0 |
| 1600 | 96.6 | 95.9 | 95.4 | 93.9 | 92.8 | 91.8 | 89.9 | 88.9 | 87.9 |
| 2000 | 95.5 | 94.8 | 94.3 | 92.8 | 91.7 | 90.7 | 88.8 | 87.8 | 86.8 |
| 2500 | 94.1 | 93.4 | 92.9 | 91.4 | 90.3 | 89.3 | 87.4 | 86.4 | 85.4 |
| 3150 | 91.9 | 91.2 | 90.7 | 89.2 | 88.1 | 87.1 | 85.2 | 84.2 | 83.2 |
| 4000 | 88.8 | 88.1 | 87.6 | 86.1 | 85.0 | 84.0 | 82.1 | 81.1 | 80.1 |
| 5000 | 84.5 | 83.8 | 83.3 | 81.8 | 80.7 | 79.7 | 77.8 | 76.8 | 75.8 |
| 6300 | 79.3 | 78.6 | 78.1 | 76.6 | 75.5 | 74.5 | 72.6 | 71.6 | 70.6 |
| 8000 | 73.5 | 72.8 | 72.3 | 70.8 | 69.7 | 68.7 | 66.8 | 65.8 | 64.8 |
| 10000 | 68.9 | 68.2 | 67.7 | 66.2 | 65.1 | 64.1 | 62.2 | 61.2 | 60.2 |

Further information about noise spectra, including other wind speeds, is available upon request.
Noise values included in the present document correspond to the wind turbine configuration equipped with noise reduction add-ons attached to the blade.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## About DNV

DNV is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil & gas, power and renewables industries. We also provide certification, supply chain and data management services to customers across a wide range of industries. Operating in more than 100 countries, our experts are dedicated to helping customers make the world safer, smarter and greener.

**Appendix X**
Environmental Management Plan

# *Bekevar Wind Energy Project*
## Environmental Management Plan

Prepared for:
Bekevar Wind L.P.
1500-1874 Scarth St.
Regina, SK  S4P 4R9

Project No. AB0156 | December 2021

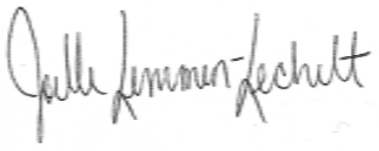
NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

# *Bekevar Wind Energy Project*
# Environmental Management Plan

## Project Team

| Staff | Role |
|---|---|
| Andrew Ryckman, P.Biol. | Project Manager/Senior Biologist |
| Cassiano Porto, P.Biol. | Vegetation Specialist/Qualified Wetland Practitioner |
| Joelle Lemmen-Lechelt, P.Biol. | Wildlife Biologist |
| Gerry Schaus, M.E.S. | GIS Manager |

Report prepared by:



Joelle Lemmen-Lechelt, P.Biol.
Wildlife Biologist

Report reviewed by:

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# 1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by Bekevar Wind L.P. (the "Proponent"), a limited partnership between Renewable Energy Systems Canada Inc. (RES Canada) and Awasis Nehiyawewini Energy Development (ANEDC), a Cowessess First Nation entity, to prepare an Environmental Management Plan (EMP) as part of the Environmental Impact Statement (EIS) submission for the Bekevar Wind Energy Project (the "Project"), which is located southeast of the Town of Kipling, Saskatchewan.

The purpose of this EMP is to provide regulatory bodies with a commitment to reduce, mitigate, and, where possible, avoid any potential environmental impacts of construction and operations on the natural systems at, or near, the Project. The EMP will also serve as a guide to the Project development and construction contractors to ensure successful conservation and reclamation of valued ecosystem components, in accordance with the EIS, and ensure regulatory compliance during construction, operations, and reclamation at the Project.

The operating procedures contained in this document are intended to act as a guide for conducting Project activities with consideration to environmental value components. The procedures included herein are based on existing Project commitments, typical industry best practices, and are based on general regulatory requirements and expectations, but are not intended to be used in substitution to specific regulations or Project approval conditions, nor are they intended to be an exhaustive review or interpretation of applicable legislation. When used in conjunction with legislation and permitting documents for the Project, including those which may be provided by the Engineering, Procurement and Construction (EPC) contractors, the procedures contained within this EMP are a valuable tool in guiding construction and operations.

## 1.1. Project Description and Scope

The Project Area, defined as the combination of all land parcels under a development agreement with the Proponent, comprises approximately 20,000 acres of private lands in the Rural Municipalities (RMs) of Hazelwood and Kingsley, as well as three quarter sections of Cowessess First Nation (CFN) reserve lands. The general Project Area is located southeast of the Town of Kipling and spans general area of approximately 100km$^2$. As wind projects typically require a very small amount of land, only a very small fraction of the Project Area will be used for the Project's construction and operational activities.

The proposed Project includes the installation of 39 turbines, each with a generation capacity of 5.2MW, and with a 145m rotor diameter and a 102.5m hub height, for a total tip height of 175m. The total installed capacity of the Project is 202.8MW which results in a maximum net capacity at the Project substation of just under 200MW. The Project activities also include the installation of supporting infrastructure, including access roads, a 34.5kV 3-phase collector system, a substation, an operations and maintenance building, a temporary laydown area, and a permanent meteorological (MET) tower.

## 2.0 Project Team Roles and Responsibilities

The effective implementation of environmental mitigation and minimization measures on a large-scale project is depending, in part, on a clear understanding of team members, and the associated roles and responsibilities. The following overview of roles and responsibilities provides a typical framework of responsibility, although it is ultimately the responsibility of the Proponent to ensure all team members understand their respective roles and responsibilities.

### 2.1 Proponent

As the owner and operator of the Project, the Proponent is typically responsible for the management of Project development and permitting, maintaining the Project schedule. Depending on the chosen approach of the Proponent during the operational phase, the Proponent is also typically responsible for the regulatory compliance during the operational phase of the Project, unless site operations is led by a contractor.

As the owner of the Project, the Proponent is ultimately responsible for the regulatory compliance of all Project-related activities, but will typically retain experienced, competent, and respected contractors that will provide specific support to assist with the monitoring or regulatory compliance, particularly during the construction phase of the Project.

### 2.2 Construction Contractor(s)

The Proponent will retain a construction contractor(s) that will be responsible for the installation of Project infrastructure to the design specifications of the Proponent, and with regards to Project commitments, approval conditions, and any other applicable regulatory requirements. Construction contractors will typically have a defined employee, which may include, among others, a Site Supervisor, Project Manager, and/or Environmental Monitor, all of which will have their internal roles defined by the Contractor, which may include responsibility for permitting and planning (e.g. Project Manager), supervision of workers and scheduling activities (e.g. Site Supervisor), and monitoring and managing environmental compliance (e.g. Environmental Monitor).

### 2.3 Environmental Construction Monitor

As recommended within the EIS (NRSI 2021), and summarized below, it is also recommended that the Proponent separately retain a designated Environmental Construction Monitor (ECM) that is independent to the Contractor. The ECM is typically responsible for periodic assessments of Project activities and inspections of mitigation measures, and will report directly to the Proponent with any environmental concerns, mitigation deficiencies, or other instances of potential non-compliance. The specific effort and frequency of assessments shall be determined by the Proponent and may vary based on the type and location of Project activities, seasonality, and/or the extent of work that is happening.

## 3.0 Overview of Existing Conditions

The Project is located within the Aspen Parkland ecoregion of Saskatchewan, and within the broader Prairie ecozone. This ecoregion is characterized by a mix of aspen tree stands and fescue grasslands. Continuous aspen cover is found in the northern areas and on lower, moist, north-facing slopes, while grasslands are generally more prevalent in the south, and occupy upper, drier, south-facing slopes. The slopes within this ecoregion are characteristic of the glacial till landscape, with steep hills and numerous undrained depressions that provide habitat for waterfowl. Most of the land in this ecoregion is cultivated due to the fertile, loamy, black soils (Saskatchewan Conservation Data Centre 2014).

The Construction Disturbance Area (CDA) is the maximum area anticipated to be impacted by the full extent of construction and decommissioning phases of the Project, including temporary disturbances, while the Operational Footprint will encompass the smaller area of land that is required for the actual placement of surficial infrastructure that will remain in place of the life of the Project (i.e. access roads, turbine pad, substation, and operations and maintenance building).

In order to characterize site conditions and inform a detailed effects assessment, a comprehensive environmental survey program was conducted within the Project Area in 2021, which included wildlife surveys (e.g. migratory birds, raptor nesting, breeding birds, migratory bats, amphibians, etc.), land cover mapping, wetland delineations and classifications, and rare vascular plant surveys.

The Operational Footprint has a total area of 19.88ha, of which 19.15ha (96.3%) is currently used as agriculture (i.e. cultivated fields). The Operational Footprint also comprises small overlaps with pasture/forage (0.48ha; 2.4%), wetlands (0.10ha; 0.5%), forest (0.10ha; 0.5%) and ephemeral waterbody (0.05ha; 0.3%).

When considering the land use within the larger CDA (187.64ha), the area remains largely dominated by agricultural land, which accounts for 177.40ha (94.5%) of the CDA. Similar to the Operational Footprint, pasture/forage and wetland account for the next most common land use, accounting for 6.62ha (3.5%) and 2.33ha (1.2%), respectively. Small proportions of ephemeral waterbody and forest are also found within the CDA, each accounting for less than 1% of the total CDA.

A full overview of all land cover classifications, including their total area and relative proportion, in each of the Operational Footprint and CDA is shown in Table 1 below.

**Table 1. Summary of Land Cover and Use within Different Project Area Extents.**

| Land Cover Class | Operational Footprint | | CDA | |
|---|---|---|---|---|
| | Area (ha) | % | Area (ha) | % |
| Agriculture | 19.15 | 96.3 | 177.67 | 94.7 |
| Pasture/Forage | 0.48 | 2.4 | 6.65 | 3.5 |
| Dugout Pond | 0.00 | --- | 0.00 | --- |
| Ephemeral Waterbody (Class I) | 0.05 | 0.3 | 0.17 | 0.1 |
| Wetland | 0.10 | 0.5 | 2.33 | 1.2 |

| | | | | |
|---|---|---|---|---|
| Native Grassland | 0.00 | --- | 0.00 | --- |
| Shrubland | 0.00 | --- | 0.00 | --- |
| Forest | 0.10 | 0.5 | 0.86 | 0.5 |
| Transmission Corridor | 0.00 | --- | 0.00 | --- |
| **TOTAL** | **19.88** | | **187.68** | |

The resulting impacts to non-agricultural wildlife habitats will be limited to 2.33ha of wetland and 0.86ha of forest (i.e. tree stands) during the construction phase, most of which will be reclaimed. The Operational Footprint will only result in the long-term removal of 0.1ha each of wetland and forest, which is expected to have a negligible effect on wildlife habitat within the general Project area. These long-term habitat effects will still be reclaimed at the end of the Project life, resulting in no permanent loss of habitat

The EIS (NRSI 2021) has also identified several sensitive, rare, or endangered species that have been detected within the general Project area during the comprehensive baseline surveys described above. For the purpose of this report, these species are collectively referred to as species of conservation concern, and are characterized by meeting at least one of the following criteria:

- Federal Species at Risk (i.e. Endangered, Threatened, or Special Concern);
- Provincial species listed as Endangered, Threatened, or Vulnerable (Government of Saskatchewan 1998);
- Species with a provincial breeding status of S3 or lower (SKCDC 2021); and/or
- Species listed in the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* (MOE 2017).

A summary of the species of conservation concern that have been detected within the general Project Area has been provided in Table 2. Most of these observations are species observations, with no confirmed, or likely, evidence of breeding within the Project Area.

**Table 2. Summary of Species of Conservation Concern within the Project Area**

| Common Name | S-Rank[1] | Activity Restrictions[2] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| **Flora** | | | | |
| Small Yellow Lady's Slipper | S3 | Yes | --- | --- |
| **Birds** | | | | |
| Bald Eagle | S5B, S5N, S4M | Yes | Not at Risk | --- |
| Barn Swallow | S4B, S4M | --- | Special Concern | Threatened |
| Black Tern | S5B, S5M | Yes | Not at Risk | --- |
| Bobolink | S4B, S4M | --- | Threatened | Threatened |
| Common Nighthawk | S4B, S4M | Yes | Special Concern | Threatened |
| Double-crested Cormorant | S5B, S5M | Yes | --- | --- |
| Great Blue Heron | S5B, S5M | Yes | --- | --- |
| Lesser Yellowlegs | S4B, S4M | --- | Threatened | --- |
| Olive-sided Flycatcher | S4B, S4M | Yes | Special Concern | Threatened |
| Sharp-tailed Grouse | S5 | Yes | --- | --- |
| Turkey Vulture | S3B, S3M | --- | --- | --- |

| | | | | |
|---|---|---|---|---|
| **Bats** | | | | |
| Little Brown Myotis | S4B, S4N | --- | Endangered | Endangered |
| **Amphibians** | | | | |
| Northern Leopard Frog | S4 | Yes | Special Concern | Special Concern |
| **Other Wildlife** | | | | |
| American Badger | S3 | --- | Special Concern | Special Concern |
| Monarch | S2B, SNRM | --- | Endangered | Special Concern |

## 4.0 Soil Management

The vast majority of the Project Area is currently in cultivation, and therefore relies heavily on healthy soil conditions and structure for optimal crop production. Further, areas that are not currently in cultivation, including pastures, wetlands, and forests, will have established seed banks in the topsoil which, if managed appropriately, will facilitate efficient and effective reclamation activities after temporary construction activities have been completed.

Project activities will interact with soils during the construction and decommissioning phases of the Project, when varying degrees of soil handling and management will be required to support access road construction, underground collection line installation, and excavation for turbine foundations. These potential interactions will be entirely limited to the (CDA).

Based on considerations within the EIS (NRSI 2021), it was concluded that with the implementation of industry best practices for soil handling and management, it was unlikely that the Project activities would have an adverse effect on soils within the Project Area. Mitigation and minimization measures relating to soil handling and management have been included in Table 3 below.

**Table 3. Soil Handling and Management Mitigation Measures Summary**

| Soil Handling and Management Mitigation Measures |
|---|
| • Actual areas of disturbance within the CDA, particularly those requiring vegetation removal and/or soil disturbance, shall be limited to the smallest practical area.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• Retain an ECM to monitor and advise on Project activities to ensure that mitigation measures are working efficiently and any potential deficiencies are quickly identified and corrected. The extent of ECM involvement may vary based on time of year, type of Project activities, weather conditions, etc.<br>• Where topsoil stripping is required, separate topsoil and from underlying layers in different piles at least 1m apart. Replace the soil in reverse order of excavation, to preserve organic content and native seedbank.<br>• Soil stockpiles will be maintained at low profiles, and will be covered and/or stabilized to minimize erosion.<br>• Soil handling should not occur during high wind or high precipitation events.<br>• The ECM will regularly monitor soil handling, soil conditions, and soil stockpiles to ensure soil is not degraded and remains suitable for reclamation activities.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical.<br>• During reclamation, re-grade the local landscape, as necessary, to return original surface drainage patterns.<br>• In areas of topsoil replacement, spread as evenly as possible.<br>• In areas of reclamation, ESC measures shall remain in place until the ECM, or other Qualified Professional, has inspected the area(s) to confirm ESC measures are no longer necessary. |

## 5.0 Erosion and Sediment Control Plan

The potential for erosion and sedimentation is most likely to result from rain or wind events during Project activities that result in temporarily exposed, or stockpiled, soil. It will be the Proponent, and their selected contractor(s) and ECM, that will be responsible for implementing measures that will minimize the potential for erosion and sedimentation during Project activities. If left unmitigated, the resulting sedimentation can have adverse effects on surrounding natural habitats, particularly to wetlands and watercourses.

Project activities have the potential to result in erosion and sedimentation during the construction and decommissioning phases of the Project, when varying degrees of disturbance to soils and vegetation will be required to support access road construction, underground collection line installation, and during the excavation of turbine foundations, when there will be exposed and stockpiled soil for temporary periods of time.

In consideration of the potential effects of erosion and sedimentation, a series of mitigation and minimization measures have been established, and are listed in Table 4 below.

**Table 4. Erosion and Sedimentation Mitigation Measure Summary**

| Biophysical Best Management Practices |
|---|
| • Actual areas of disturbance within the CDA, particularly those requiring vegetation removal and/or soil disturbance, shall be limited to the smallest practical area.<br>• Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• When working in non-cultivated habitats, particularly those with native vegetation, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, direct plough techniques, and/or horizontal boring, to the extent possible.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any non-cultivated habitat.<br>• Retain an ECM to monitor and advise on Project activities to ensure that mitigation measures are working efficiently and any potential deficiencies are quickly identified and corrected. The extent of ECM involvement may vary based on time of year, type of Project activities, weather conditions, etc.<br>• Soil stockpiles will be maintained at low profiles, and will be covered and/or stabilized to minimize erosion.<br>• Soil handling should not occur during high wind or high precipitation events.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Cross watercourses in dry conditions.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical.<br>• In areas of reclamation, ESC measures shall remain in place until the ECM, or other Qualified Professional, has inspected the area(s) to confirm ESC measures are no longer necessary. |

## 6.0 Vegetation Management

Vegetation within the Project Area is dominated by row crop agriculture, accounting for 94.7% of the CDA, and the Project design has been optimally sited to fully avoid native prairie and shrubland habitats. Areas not in cultivation include small amounts of pasture/forage, wetland, and forest, which may be impacted by Project activities.

Project activities will interact with vegetation during the construction and decommissioning phases of the Project, when varying degrees of disturbance to vegetation will be required to support access road construction, underground collection line installation, and for the staging and erection of turbines.

In consideration of the potential effects of Project activities on vegetation, a series of mitigation and minimization measures have been established, and are listed in Table 5 below.

**Table 5. Vegetation Mitigation Measures Summary**

| Vegetation Mitigation Measures |
|---|
| • If a new and/or previously identified habitat or wildlife observation is documented (or suspected), consider applicable timing windows, setbacks, and/or mitigation measures to minimize potential effects, consistent with the approach taken within this EIS.<br>• Actual areas of disturbance within the CDA, particularly those requiring vegetation removal and/or soil disturbance, shall be limited to the smallest practical area.<br>• When working in non-cultivated habitats, particularly those with native vegetation, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, direct plough techniques, and/or horizontal boring, to the extent possible.<br>• Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• Retain an ECM to monitor and advise on Project activities to ensure that mitigation measures are working efficiently and any potential deficiencies are quickly identified and corrected. The extent of ECM involvement may vary based on time of year, type of Project activities, weather conditions, etc.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any non-cultivated habitat.<br>• Construction vehicles and equipment entering or leaving the site should be inspected for, and cleaned of, any soil or vegetation debris.<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland or non-agricultural habitat (e.g. tree stand, native grassland, etc.).<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Develop, and implement, a Weed Management Plan.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical.<br>• During reclamation, re-grade the local landscape, as necessary, to return original surface drainage patterns. |

## 7.0 Wetland and Watercourse Management

The Project's CDA overlaps 2.33ha of wetland habitat, which represents 1.2% of the full CDA. Most of these areas will be reclaimed after the completion of the construction phase, leaving only 0.1ha of wetland habitat that is overlapped by the Operation Footprint. Several wetlands within the Project area are likely to have some hydrological connectivity through overland flow, ephemeral draws, or intermittent watercourses. These features flow almost exclusively during periods of snowmelt or heavy precipitation. No permanent watercourses were observed within the general Project Area.

Project activities may interact with wetlands and/or watercourses during the construction and decommissioning phases of the Project, when varying degrees of wetland disturbance may occur during access road construction, underground collection line installation, and for the staging and installation of turbines.

In consideration of the potential effects of Project activities on wetlands and watercourses, a series of mitigation and minimization measures have been established, and are listed in Table 6 below.

**Table 6. Wetland and Watercourse Mitigation Measures Summary.**

| Wetland and Watercourse Mitigation Measures |
|---|
| • Actual areas of disturbance within the CDA, particularly those requiring vegetation removal and/or soil disturbance, shall be limited to the smallest practical area.<br>• When working in non-cultivated habitats, particularly those with native vegetation, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, direct plough techniques, and/or horizontal boring, to the extent possible.<br>• The Project will obtain, as necessary, an Aquatic Habitat Protection Permit (AHPP), and will comply with all conditions.<br>• Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Retain an ECM to monitor and advise on Project activities to ensure that mitigation measures are working efficiently and any potential deficiencies are quickly identified and corrected. The extent of ECM involvement may vary based on time of year, type of Project activities, weather conditions, etc.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any non-cultivated habitat.<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland or non-agricultural habitat (e.g. tree stand, native grassland, etc.).<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Cross watercourses in dry conditions.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• During reclamation, re-grade the local landscape, as necessary, to return original surface drainage patterns. |

## 8.0 Wildlife and Wildlife Habitat Management

Project activities are being proposed primarily within an agricultural landscape, dominated by cultivation; however, the general Project Area is interspersed with numerous wetlands, tree stands, and forage/pasture, all of which have the potential support local, or migratory, wildlife use. In addition, several species of conservation concern have been identified within the Project Area.

Project activities may interact with wildlife, or wildlife habitat, during all phases of Project activities, when varying degrees of potential disturbance to wildlife, or wildlife habitat, may occur during proposed Project activities.

In consideration of the potential effects of Project activities on wildlife and wildlife habitat, a series of mitigation and minimization measures have been established, and are listed in Table 7 below.

**Table 7. Wildlife and Wildlife Habitat Management Mitigation Measures Summary.**

| Wildlife and Wildlife Habitat Mitigation Measures |
|---|
| • If a new and/or previously identified habitat or wildlife observation is documented (or suspected), consider applicable timing windows, setbacks, and/or mitigation measures to minimize potential effects, consistent with the approach taken within this EIS.<br>• Actual areas of disturbance within the CDA, particularly those requiring vegetation removal and/or soil disturbance, shall be limited to the smallest practical area.<br>• Clearly delineate all work areas that occur in, or within 10m of, any non-cultivated and non-pasture, using erosion fencing or other suitable barrier to avoid accidental damage to adjacent wildlife habitat.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• Prior to any construction activity occurring in, or within, 10m of a non-cultivated wetland between March 15 and October 31, a Qualified Professional will undertake an assessment of potential effects to amphibians and will make any additional recommendations, as appropriate.<br>• Prior to any construction activity occurring in, or within, 10m of a non-cultivated habitat (e.g. pasture, wetland, forest, etc.) between April 15 and August 16, a Qualified Professional will undertake a breeding bird nest search of the affected habitat(s) to ensure compliance with the MBCA.<br>• On-site speed limits will be established, will be communicated to, and expected to be followed by, all on-site personnel.<br>• Retain an ECM to monitor and advise on Project activities to ensure that mitigation measures are working efficiently and any potential deficiencies are quickly identified and corrected. The extent of ECM involvement may vary based on time of year, type of Project activities, weather conditions, etc.<br>• If guy wires are required on new MET installations, use visible markers along the wires to minimize the potential for avian collisions.<br>• Lighting of ground infrastructure (i.e. non-turbine) will be minimized, down-shielded, and/or controlled by proximity or motion sensors, wherever practical.<br>• Using a turbine lighting scheme that minimizes lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable requirements for aviation safety.<br>• On-site personnel will be trained in how to respond if a wildlife fatality is encountered.<br>• Develop, and follow, an AMP in accordance with provincial guidance documents.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical. |

## 9.0 Spill Prevention and Response

During regular Project activities, in all phases of the Project life, there is a potential for chemicals, fuels, and other hazardous materials to be accidentally released into the environment. These spills can result from a variety of avoidance and unavoidable circumstances, such as improper material handling or refueling and machinery leaks, malfunctions, or failures.

Spills of hazardous materials can affect several environmental components, including, but not limited to, soil, surface water, groundwater, wildlife, and wetlands, if not properly, effectively, and efficiently contained and controlled. The environmental effects could include direct or indirect effects that are related to the spill itself or, depending on the scale or material associated with the spill, effects may be experienced during clean-up efforts.

Typically, the potential effects associated with small spills can be effectively managed and minimized through the implementation of typical best management practices for addressing spills. In consideration of the potential effects associated will hazardous material spills, a series of mitigation and minimization measures have been established, and are listed in Table 8 below.

**Table 8. Spill Prevention Mitigation Measure Summary**

| Spill Prevention Mitigation Measures |
|---|
| • Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• Retain an ECM to monitor and advise on Project activities to ensure that mitigation measures are working efficiently and any potential deficiencies are quickly identified and corrected. The extent of ECM involvement may vary based on time of year, type of Project activities, weather conditions, etc.<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland or non-agricultural habitat (e.g. tree stand, native grassland, etc.).<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations. |

In addition to the proactive mitigation measures described above, the Project shall ensure all workers who handle fuels, or other hazardous materials, will be sufficiently trained in the necessary steps to effectively manage, contain, clean, and report any spills that may occur.

The Project shall also prepare, and follow, a site-specific response plan that addresses spills (e.g. Spill Response Plan or Emergency Response Plan [ERP]) and which is available to all on-site workers for quick reference. A brief overview of the general approach to spill response is provided below.

### 9.1 Preliminary Spill Response Plan

Spills that require reporting are defined in the Saskatchewan Environmental Management and Protection Act (2010) and the Saskatchewan Environmental Code.

In general, all spills shall follow the same general approach and actions to recognize, control, communicate, and mitigate. The following actions are recommended in response to the release of any potentially hazardous material:

1. Stop the Spill
    - If safe to do so, take immediate action to prevent further release of material (e.g. close valves, turn off equipment, pick-up containers, etc.)
    - Depending on the extent of the spill, or actions necessary to stop the spill, call other workers for support.
    - If safety is a concern (e.g. fire or irritant risk), proceed to immediate notification.
2. Notification and Reporting
    - Notify the Site Manager, ECM, or other person responsible for the ongoing Project activity(ies).
    - Notify fellow workers of potential risks.
    - Consider and, if necessary, initiate provincial reporting, depending on the type of material and magnitude of the spill.
3. Isolate the Spill Area
    - Take action to contain the spill location to the smallest extent possible, using sandbags, trenches, absorbent pads or materials, or other similar tactics.
    - Prioritize the protection of surface water, wetlands, or native vegetation to minimize the potential effects and facilitate clean-up.
    - If the spill reaches open water (e.g. watercourse or wetland), consider the effectiveness of temporarily blocking water flow, particularly if the spill is large or cannot be immediately stopped.
4. Minimize Exposure and Implement Clean-Up
    - Avoid any unnecessary contact between the spill and equipment, clothing, etc.
    - Use appropriate equipment (e.g. shovels, brooms, mops, mobile equipment, etc.) to thoroughly clean affected areas.
    - If potential soil contamination has occurred, the soil, plus a conservative buffer, shall be excavated and will be stored, transported, and disposed of according to appropriate regulatory requirements for the transportation and disposal of hazardous materials.

## 9.2 Spill Reporting

In the event of a reportable spill, the Saskatchewan Spill Control Centre will be contacted immediately and a Spill Report Form will be submitted within 30 days. Spills that will need to be reported to the MOE include:

- Non-approved releases/discharges (including those to land, air and water);
- Discharge of fluids greater than 100L from a vehicle;
- Mineral oil releases greater than 100L from an electrical transformer or gearbox; and
- Discharges (including sediment) to water bodies.

The Saskatchewan Spill Control Centre phone number (1-800-567-4224) will be posted at the Project operations and maintenance building.

Any incidents of spills will be immediately documented, kept on file and sent to the MOE, as required. The documentation will include, at a minimum, the location and date of the incident,

date of reporting, name of reporter, description of the incident, cause of the incident, type and amount of material spilled, surrounding land use, actions taken, method(s) of disposal taken, communications to outside groups and internal personnel, and follow up as required.

## 10.0 Waste Management

Waste management procedures taken by the Project will comply with all applicable regulatory requirements, with a goal of reusing and recycling as much as possible before considering disposing of any waste.

Any on-site storage of waste, including hazardous waste, will occur in designated areas, well away from any natural or sensitive features. To the extent feasible, waste will be separated, and stored, based on general categories, which may include cardboard, metal, wood, and other waste to facilitate the ability to easily differentiate materials that may be recycled. All hazardous waste will be temporarily stored in a labeled container (as necessary) before being disposed of at an approved hazardous waste disposal facility.

During the decommissioning phase, waste and debris will be generated through the dismantling and removal of Project infrastructure. The specific practices associated with the Project decommissioning will be addressed at a later date since it is expected that best practices for disposal, reuse, and/or recycling of materials will continue to improve throughout the life of the Project. To the extent practicable, the Project will prioritize the salvage and/or recycling of materials during decommissioning phase of the Project.

## 11.0 Summary

The purpose of this EMP is to provide a comprehensive overview of the environmental mitigation strategy that is being implemented at the Project, which will sever to provide an overview of mitigation measures to regulatory authorities while providing a condensed document that can be used to guide development and construction contractors to ensure successful conservation and reclamation of valued ecosystem components.

The Project included the installation of 39 turbines with a total net capacity of 200MW, and the installation of supporting infrastructure (e.g. access roads, collection line, etc.). The Project Area is located southeast of the Town of Kipling, spans the RMs of Hazelwood and Kingsley, and includes three quarter sections of CFN reserve lands.

Comprehensive site assessments have confirmed a dominance of cultivated lands within the CDA, accounting for 94.5% of the total area that may be affected by Project activities. Relatively small areas of natural lands, including wetlands (2.33ha) and forest (0.86ha), may also be affected by Project activities; however, most of these areas will be reclaimed following construction as only 0.1ha each of wetland and forest will be overlapped by the Operational Footprint. No areas of native prairie or shrubland overlap with the CDA or Operational Footprint, and no permanent watercourses intersect with the CDA or Operational Footprint.

In consideration of site-specific conditions and environmental characteristics, a detailed mitigation and minimization strategy has been developed, through a combination of industry best practices, regulatory requirements and expectations, and additional measures designed in consideration of specific Project activities. These

The content of this EMP is intended to provide an overview of environmental mitigation measures that will be implemented during the Project life, and is intended to supplement (rather than supersede) other regulatory requirements, Project commitments, or Project approval conditions.

With the implementation of this EMP, it is expected that environmental effects can be sufficiently avoided, minimized, and/or mitigated so that any potential residual effects are manageable and at a reasonable level that does not warrant management concern.

## 12.0 References

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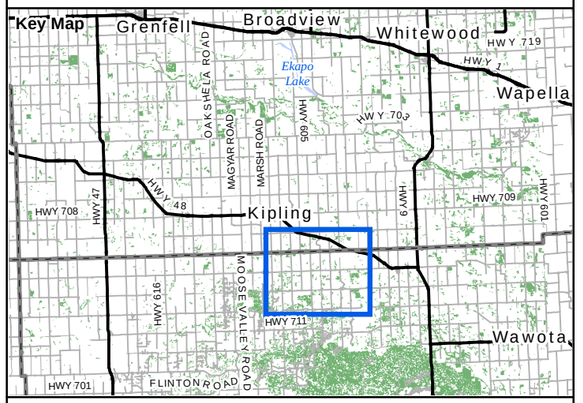
**Maps 1**
Project Area

# Map 1

# Bekevar WEP

## Project Area






## Legend

- Project Area

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Sweep Area
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Cowessess First Nation Lands

NATURAL RESOURCE SOLUTIONS INC.

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Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:56,000**

0 1 2 3 Kilometers

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Path: X:_SASKATCHEWAN\AB0156_BekevarWP\NRSI_AB0156C_Map1_L145b_ProjectArea_Standalone_56K_2021_12_16_GCS.mxd

**Appendix XI**
Adaptive Management Plan & Post-construction Monitoring Plan

# *Bekevar Wind Energy Project*

## Adaptive Management Plan & Post-construction Monitoring Plan

Prepared for:
Bekevar Wind L.P.
1500-1874 Scarth St
Regina, SK S4P 4R9

Project No. AB0156 l December 2021

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

# *Bekevar Wind Energy Project*
# Adaptive Management Plan & Post-construction Monitoring Plan

**Project Team:**

| NRSI Staff | Role |
|---|---|
| Andrew Ryckman, P.Biol. | Project Manager/Senior Biologist |
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Report submitted on December 15, 2021

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Map 1 Project Area

## 1.0 Introduction

The Bekevar Wind Energy Project (the "Project") is a 200MW project being proposed by Bekevar Wind L.P. (the "Proponent"), a limited partnership between Renewable Energy Systems Canada Inc. (RES Canada) and Awasis Nehiyawewini Energy Development (ANEDC), a Cowessess First Nation entity.

The Project is located southeast of the Town of Kipling and approximately 150km southwest of Regina, Saskatchewan. The general Project Area spans approximately 20,000 acres spanning the Rural Municipalities (RMs) of Hazelwood and Kingsley, and includes three quarter sections designated as Cowessess First Nation reserve land. More specifically, the Project is located in Townships 12 and 13 and Ranges 4 and 5 (Map 1).

The proposed Project includes the installation of 39 turbines, each with a generation capacity of 5.2MW. The total installed capacity of the Project is 202.8MW, which results in a maximum net capacity at the Project substation of just under 200MW. The Project also includes the proposed installation of supporting infrastructure including, but not limited to, access roads, underground electrical collector system, substation, and meteorological (MET) tower.

This Adaptive Management Plan ('AMP') has been prepared to accompany the Environmental Impact Statement (EIS) submission under the *Environmental Assessment Act* (Government of Saskatchewan 1980). The purpose of this AMP is to outline the approach to planning, minimizing, evaluating, and managing the Project's potential impact, if any, on wildlife and wildlife habitats. It uses a results-based process to inform and improve operational practices and reduce scientific uncertainty at the Project, as outlined in the draft *Adaptive Management Guidelines for Saskatchewan Wind Energy Projects* ('Guidelines'; MOE 2018). This AMP summarizes pre-project planning and siting, effects assessment, mitigation measures that are detailed in the EIS (NRSI 2021). It also provides an overview of the operational monitoring program, the process for evaluating monitoring results, the decision process relating to management responses, and the reporting, review, and updating process relating to the AMP.

## 2.0 Adaptive Management Plan Framework

The structure and framework of this AMP has been developed to follow what is presented in the Guidelines. The approach of the AMP is intended to allow for a results-based approach to long-term management of this Project relative to the application of appropriate provincial and federal legislation that protects wildlife, and their habitats.

The practice of adaptive management allows for a site-specific mitigation and monitoring strategy to be developed to address any site-specific concerns or risk factors that may arise during the planning, construction, and/or operational phases of a project. Although the adaptive management approach will follow a general outline, as prescribed by the Guidelines, the specific details and adaptive steps that are ultimately implemented may vary depending on the specific circumstances, and will be an iterative process throughout the operational life of the facility.

The first step in adaptive management is a comprehensive approach to project siting, including the implementation of baseline monitoring, effects assessments, and development of site-specific mitigation strategies. Following the planning phase, the approach to adaptive management will follow a cyclical process, as depicted in the Guidelines, which is driven by the following three steps:

1. Operations
    - Post-construction monitoring
    - Data collection
2. Evaluate
    - Data analysis
    - Re-asses potential impacts and other risk factors
3. Adjust (if necessary)
    - Modify site-specific monitoring, reporting, and/or mitigation strategies to address changes in potential impacts and/or risk factors

The specific details of the adaptive management strategy for the Project have been outlined in the following sections, including the detailed steps taken during the planning phase of the project, as well as the comprehensive adaptive management monitoring, evaluation, and mitigation measures that may be implemented, as informed by site-specific monitoring results.

## 3.0 Project Planning and Mitigation Measures

As outlined in the Guidelines, the AMP process begins with identifying methods to avoid or minimize impacts to wildlife and wildlife habitats during the planning phase (MOE 2018). Pre-construction planning and surveys include activities such as siting exercises to avoid impacting sensitive wildlife habitats or concentration areas, reviewing conservation databases for historical species records and reviewing literature to identify significant habitat or landscape features, field investigations to identify habitat types, and species detection surveys (MOE 2016).

The EIS describes, in detail, the biological environment, including vegetation types, land use, wetland and watercourses, wildlife detections, and the relative value of wildlife habitat in the project area (NRSI 2021). It also describes potential effects, and outlines application mitigation measures and best management practices that will be implemented in order to minimize these impacts. The monitoring and follow-up studies that will be completed are also outlined in the EIS.

This AMP provides a technical summary and elaborates on the commitments within the EIS, for the purpose of outlining the approach to planning, minimizing, evaluating and managing the Project's potential impact on wildlife and wildlife habitats. A summary of significant wildlife and wildlife habitats, and any predicted residual effects, as originally described in the EIS, are included in Sections 3.1 and 3.2 below. Section 3.3 outlines pre-project planning mitigation measures and best management practices that will be implemented at the Project.

### 3.1 Summary of Baseline Monitoring

In accordance with the Guidelines for the Terms of Reference and Environmental Impact Statement (MOE 2021), baseline wildlife monitoring was undertaken to identify and confirm the presence of any site-specific significant wildlife or habitats in proximity to the Project. Baseline wildlife monitoring was undertaken in 2021, and included specific surveys of the following:

- Raptor and songbird migration
- Grassland breeding birds
- Nesting raptor searches

- Burrowing Owl
- Short-eared Owl
- Sharp-tailed Grouse
- Common Nighthawk
- Calling anurans
- Spring and fall acoustic bat surveys

In addition to comprehensive wildlife monitoring, site-specific assessments of land use, with focus on the confirmation of native and/or sensitive habitats, was also undertaken throughout the Project Area.

These surveys were completed following the Plant and Wildlife Pre-construction Surveys for Renewable Energy Projects (ENV 2018), Saskatchewan Species Detection Survey Protocols (SDSPs), the Wildlife Directive for Alberta Wind Energy Projects (AEP 2018), Alberta's Bird Migration Survey Protocol (AEP 2020), and were undertaken in accordance with an approved Species Detection Permit, where necessary. Detailed monitoring protocol for each survey type is summarized within the EIS (NRSI 2021).

### 3.2 Summary of Existing Conditions

The Project is located within the regional context of the Aspen Parkland ecoregion of Saskatchewan and within the broader Prairie ecozone. This area is characterized by a mix of aspen tree stands and fescue grasslands. Continuous aspen cover is found in the northern areas and on lower, moist, north-facing slopes, while grasslands are generally more prevalent in the south, and occupy upper, drier, south-facing slopes. The slopes within this ecoregion are characteristic of the glacial till landscape, with steep hills and numerous undrained depressions that provide habitat for waterfowl. Most of the land in this ecoregion is cultivated due to the fertile, loamy, black soils (Saskatchewan Conservation Data Centre 2014).

The Project has been sited within a landscape that is dominated by agricultural activity, primarily of cultivated row crops, but also with perennial crops and livestock pastures. Through careful site planning and design, all areas of native grassland and shrubland have been fully avoided by all Project activities (i.e. Construction Disturbance Area (CDA)), avoiding direct effects to sensitive open upland habitats (i.e. native prairie and

shrubland). Small areas of treed habitat and wetlands, or varying classes, do overlap with the CDA. These areas are generally small in extent, restricted to edge habitat, and within habitats that are already affected by ongoing agricultural activities that occur adjacent, or in very close proximity, to these habitats. These areas are even further reduced when considering the Operational Footprint of the Project, which includes areas of surficial infrastructure (i.e. turbine pad, access road, substation, and operations building) that will not be reclaimed until the end of the Project life. An overview of the land cover within each of the Operational Footprint and CDA is provided in Table 1 below.

**Table 1. Summary of Land Cover and Use within Different Project Area Extents**

| Land Cover Class | Operational Footprint | | CDA | |
|---|---|---|---|---|
| | Area (ha) | % | Area (ha) | % |
| Agriculture | 19.15 | 96.3 | 177.67 | 94.7 |
| Pasture/Forage | 0.48 | 2.4 | 6.65 | 3.5 |
| Dugout Pond | 0.00 | --- | 0.00 | --- |
| Ephemeral Waterbody (Class I) | 0.05 | 0.3 | 0.17 | 0.1 |
| Wetland | 0.10 | 0.5 | 2.33 | 1.2 |
| Native Grassland | 0.00 | --- | 0.00 | --- |
| Shrubland | 0.00 | --- | 0.00 | --- |
| Forest | 0.10 | 0.5 | 0.86 | 0.5 |
| Transmission Corridor | 0.00 | --- | 0.00 | --- |
| **TOTAL** | **19.88** | | **187.68** | |

The resulting impacts to non-agricultural wildlife habitats will be limited to 2.33ha of wetland and 0.86ha of forest (i.e. tree stands) during the construction phase, most of which will be reclaimed. The Operational Footprint will only result in the long-term removal of 0.1ha each of wetland and forest, which is expected to have a negligible effect on wildlife habitat within the general Project area. These long-term habitat effects will still be reclaimed at the end of the Project life, resulting in no permanent loss of habitat.

The EIS (NRSI 2021) has also identified several sensitive, rare, or endangered species that have been detected within the general Project area during the comprehensive baseline surveys described above. For the purpose of this report, these species are collectively referred to as species of conservation concern, and are characterized by meeting at least one of the following criteria:

- Federal Species at Risk (i.e. Endangered, Threatened, or Special Concern) (SARA 2002, COSEWIC 2020);

- Provincial species listed as Endangered, Threatened, or Vulnerable (Wildlife Act 1998);
- Species with a provincial breeding status of S3 or lower (SKCDC 2018); and/or
- Species listed in the *Saskatchewan Activity Restriction Guidelines for Sensitive Species* (MOE 2017).

A summary of the species of conservation concern that have been detected within the general Project Area has been provided in Table 2. Most of these observations are species observations, with no confirmed, or likely, evidence of breeding within the Project Area.

**Table 2. Summary of Species of Conservation Concern within the Project Area**

| Common Name | S-Rank[1] | Activity Restrictions[2] | COSEWIC Status | SARA Schedule 1 |
|---|---|---|---|---|
| **Flora** | | | | |
| Small Yellow Lady's Slipper | S3 | Yes | --- | --- |
| **Birds** | | | | |
| Bald Eagle | S5B, S5N, S4M | Yes | Not at Risk | --- |
| Barn Swallow | S4B, S4M | --- | Special Concern | Threatened |
| Bobolink | S4B, S4M | --- | Threatened | Threatened |
| Common Nighthawk | S4B, S4M | Yes | Special Concern | Threatened |
| Double-crested Cormorant | S5B, S5M | Yes | --- | --- |
| Great Blue Heron | S5B, S5M | Yes | --- | --- |
| Lesser Yellowlegs | S4B, S4M | --- | Threatened | --- |
| Olive-sided Flycatcher | S4B, S4M | Yes | Special Concern | Threatened |
| Sharp-tailed Grouse | S5 | Yes | --- | --- |
| Turkey Vulture | S3B, S3M | --- | --- | --- |
| **Bats** | | | | |
| Little Brown Myotis | S4B, S4N | --- | Endangered | Endangered |
| **Amphibians** | | | | |
| Northern Leopard Frog | S4 | Yes | Special Concern | Special Concern |
| **Other Wildlife** | | | | |
| American Badger | S3 | --- | Special Concern | Special Concern |
| Monarch | S2B, SNRM | --- | Endangered | Special Concern |

## 3.3 Potential Wildlife Habitat Loss and Disturbance Effects

The potential for residual effects of the Project on wildlife and wildlife habitat, including for species of conservation concern, has been considered in detail in the EIS, and several mitigation measures for the Project have been identified to avoid or minimize potential these habitat-focused effects. Table 3 summarizes the potential effects and recommended mitigation measures relating to wildlife and wildlife habitat. Additional

detail on the effects assessment and mitigation measures are included in the EIS (NRSI 2021).

**Table 3. Summary of Mitigation Measures for Wildlife Habitat Effects**

| Potential Effect | Summary of Mitigation Measures |
|---|---|
| Change in Habitat Quantity | • Clearly delineate all work areas that occur in, or within 10m of, a wetland or forest/tree stand using erosion fencing or other suitable barrier to avoid accidental damage to adjacent wildlife habitat.<br>• When working in wetlands or forest/tree stand, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, to the extent possible.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical. |
| Change in Habitat Quality | • Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any non-cultivated feature, including away from pasture/forage land use.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated feature, including away from pasture/forage habitats.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical. |
| Change in Habitat Use | • Schedule all Project activities that occur within 400m of identified Sharp-tailed Grouse lek sites to occur outside of March 15 to May 15.<br>• Schedule construction activities to occur during daylight hours to avoid excessive noise and/or light disturbances, wherever practical.<br>• Project lighting will be minimized, down-shielded, and/or controlled by proximity or motion sensors, wherever practical. |

Based on the implementation of the mitigation measures outlined above, each of these potential effects have been determined to result in a residual effect that is considered not significant (NRSI 2021).

## 3.4 Potential Fatality Impacts and Mitigation Measures

Operational wind energy facilities have the potential to result in direct impacts to birds and bats, if left unmitigated. Although siting consideration and pre-project planning has already considered preferential avoidance of habitat and/or landscape features that could contribute to an elevated risk of mortality, additional proactive mitigation measures are being proposed to further mitigate and minimize the potential for direct impacts to birds and bats. These proactive mitigation and minimization measures have been outlined in Table 4.

**Table 4. Summary of Mitigation Measures for Wildlife Mortality Effects**

| Potential Effect | Summary of Mitigation Measures |
|---|---|
| Change in Mortality Risk (General) | • No vegetation removal or direct impacts to non-cultivated wetlands will occur from April 15 to August 16, unless approved by a Qualified Professional. This period is expected to cover breeding/nesting periods for amphibians, birds, and bats, which have the potential to be affected. Wildlife 'sweeps' by a Qualified Professional may be used during this period to confirm if wildlife are, or are not, likely to be present and/or impacted by activities done during this time frame.<br>• On-site speed limits will be established, will be communicated to, and expected to be followed by, all on-site personnel.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint. |
| Change in Mortality Risk (Birds) | • Using a lighting scheme that minimizes turbine lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable requirements for aviation safety.<br>• Develop, and follow, and Adaptive Management Plan (AMP) in accordance with provincial guidance documents. |
| Change in Mortality Risk (Bats) | • Using a lighting scheme that minimizes turbine lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable requirements for aviation safety.<br>• Develop, and follow, an AMP in accordance with provincial guidance documents. |

Based on the implementation of the mitigation measures outlined above, each of these potential effects have been determined to result in a residual effect that is considered not significant (NRSI 2021).

In addition to the implementation of site-specific minimization and mitigation efforts to reduce the potential effects on wildlife mortality, the Project will also implement other proactive mitigation strategies that have been designed to further minimize the potential for wildlife fatality during operations. These additional measures are summarized in the following sections.

### 3.4.1 Turbine Lighting Strategy

A lighting approach has been developed for the Project that will be implemented at the onset of the operational phase to minimize the potential for impacts to individual birds and bats. The lighting approach taken throughout the Project follows the key steps below, which are generally consistent with information in the Wildlife Siting Guidelines for Saskatchewan Wind Energy Projects (MOE 2016), and are similar to those recommended by the U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines (2012):

- Lighting will be the minimum allowed by Transport Canada for aeronautical safety, and red LED flashing lights will be used with the minimum intensity and flashes per minute allowable,
- Ground-level lights (i.e. buildings, substation, turbine bases, etc.) will be shielded downward and shall use motion or heat sensors where practical and allowed by applicable codes and the authority having jurisdiction,
- Use of high-intensity lighting or spotlights during construction, if required, will be temporary and will be kept to a minimum,
- Any internal nacelle lighting will only be used when occupied.

The approach of using red LED lights following the minimum requirements of the Federal Aviation Administration, which are similar to the requirements of Transport Canada, has been consistently shown to result in no increased risk of fatality compared with turbines that are left unlit (Arnett 2005, NWCC 2010, Ellison 2012, Bennett and Hale 2014). Similarly, the lighting approach taken at other structures, such as the substation, operations building, base of turbines, etc., has been designed to reduce potential attractions for birds and bats to the vicinity of operational wind turbines. This approach will be implemented at the Project at the onset of the operational phase to reduce the potential for bird and bat collisions with operational turbines and other Project infrastructure.

### 3.4.2 Habitat Protection During Operations

Regular operation of the Project is not anticipated to result in any residual effects to wildlife habitats. However, maintenance activities including ground or vegetation disturbance may occasionally be required adjacent to, or in the immediate vicinity of, wildlife habitats. These activities may include, but are not limited to, access road grading, turbine repairs, and culvert improvements or repairs. The following mitigation measures will be implemented across the Project during regular operational maintenance or repair activities, which have any potential to affect wildlife or their habitat, if left unmitigated:

- Clearly delineate work areas to avoid accidental encroachment into natural features or potential wildlife habitat,
- Implement sedimentation and erosion control measures, as appropriate,
- Implement dust suppression, as required,
- Re-vegetate any disturbed areas as soon as maintenance activity is complete, and
- Refueling, washing, and chemical storage (if necessary) will occur at least 30m from wetlands, watercourses, forests (i.e. tree stands), or any other non-agricultural features.

In addition, all regular maintenance activities will be conducted in a manner that considers other applicable legislation, such as the federal *Migratory Birds Convention Act* which regulates all work that may impact migratory birds, or their nests.

## 4.0 Post-construction Monitoring

Post-construction surveys are undertaken in order to monitor and evaluate the predicted effects of the operational phase of the Project on wildlife, with a focus on monitoring of assessing direct impacts (collision with turbines or impacts of habitat loss) on birds and bats resulting from Project activities.

### 4.1 Post-construction Fatality Monitoring Plan

The approach to bird and bat fatality monitoring at the Project will comply with methods outlined in the Guidelines, which includes the documentation of observed fatalities, which are then corrected using several defined variables that are collected throughout the monitoring season. These corrected bird and bat fatality estimates are used to identify any potentially increased risks to bird and bat individuals, and to inform the implementation of adaptive management and monitoring requirements.

Post-construction monitoring at the Project will consist of qualified professionals completing intensive bird and bat casualty surveys involving standardized carcass searches and trials to assess searcher efficiency and carcass removal variables for the purpose of correcting raw fatality data during the first two years of operation. The main components used to develop corrected fatality rates for birds and bats include:

- **Casualty Surveys**; to identify impacted species, periods of high fatality, or turbines or turbine groups at which fatalities are documented,
- **Carcass Removal Trials**; to determine the percent of casualties that are taken from the survey area by scavengers, and
- **Searcher Efficiency Trials**; to assess the percent of carcasses found by searchers in different habitats being searched.

This plan has been prepared to address the first 2 years of casualty surveys. The need, if any, for additional monitoring will be addressed through the consideration and implementation of any adaptive management responses, as described in Section 5.0 of this AMP.

Prior to commencing the casualty monitoring program, all appropriate permits will be obtained to allow for the collection of wildlife at the Project. This will include, at a minimum, a provincial Research Permit and a federal Migratory Birds Collection Permit.

### 4.1.1 Casualty Surveys

Casualty surveys will occur weekly (i.e. every 7 days) for a period of eight weeks in the spring and 10 weeks in the fall, during the overall time period of April 1 to October 31. In general, spring monitoring is expected to occur from early April to late May and fall monitoring is expected to occur from mid-July to late September; however, specific monitoring dates may be adjusted slightly based on annual weather conditions, regulatory consultation, and/or consideration of any previous monitoring results. Surveys will occur for a minimum of two consecutive years after the site becomes operational. Based on the anticipated commercial operation date of December 2023, it is currently anticipated that casualty surveys will begin in the spring of 2024. If the operational date of the Project is delayed, the start of the casualty surveys may be similarly delayed.

As required by the Guidelines (MOE 2018), bat and bird casualty surveys will be carried out at a sub-sample of at least 30% of installed turbines (minimum 10 turbines). Based on the proposed size of the Project (i.e. 39 turbines), casualty surveys are expected to occur at 12 turbines. Specific turbines to be selected for monitoring will be determined after the final turbine layout is confirmed, and will be selected to cover representative habitats and spatial locations throughout the Project geography.

Casualty surveys will adhere to the following generalized methods:

- Each surveyed turbine will have a circular search area with a radius that is half the height of the turbine from blade tip to the ground, or a 65m radius, whichever is greater.
- The search area will be surveyed using transects spaced approximately 5m apart.
- Surveys will be conducted between 1hr after sunrise and 1hr before sunset, in order to maximize visibility.
- Where possible, surveys will be conducted during light wind conditions, and will be avoided during rainy and extremely windy conditions; however, maintaining the search interval will always be prioritized over preferred weather conditions (excluding extreme weather that presents a health and safety concern).
- Ground cover around turbines may be maintained at low levels in order to facilitate more accurate bat and bird casualty surveys; however, this may not be feasible within some, or all, of the search radius.
- Searches will collect a level of detail that is consistent with the information required by the *Wind Energy Bird and Bat Monitoring Database.*
- The average length of time monitoring each turbine will be reported.

### 4.1.2 Carcass Removal Trials

The level of carcass scavenging must be determined through carcass removal, or scavenger impact, trials. In these trials, carcasses are placed around wind turbines and are monitored for the length of time it takes for scavengers to completely remove the carcass, or until the end of the designated trial period. The average carcass removal time is a factor in determining the total corrected bat or bird fatality rates. As carcass removal rates can vary considerably based on seasonal and geographic factors, removal trials will be conducted seasonally during both of the first 2 years of monitoring.

Carcass removal trials will adhere to the following generalized methods:

- Carcass removal trials will be conducted once per season (i.e. spring and fall), during the same period as the casualty surveys.
- A minimum of 10 carcasses per visibility class (i.e. easy, moderate, and difficult) will be used during each trial. A maximum of 3 trial carcasses will be placed at any one turbine to avoid flooding the area with carcasses.
- Carcasses will be monitored every 7 days in conjunction with regular casualty surveys, and will continue until they have been removed or until the end of the 20-day trial period (i.e. at least 2 casualty search events after placement).
- Carcasses will be placed using gloves to avoid imparting human smell that might bias trial results (e.g. attract scavengers, etc.).
- To avoid confusion with turbine related fatalities, GPS locations of all trial carcasses will be collected.
- Trials should include the use of bat and small brown bird carcasses. Other small brown mammal or bird carcasses (e.g., mice or brown chicks) may also be used when other appropriate bird and bat carcasses are not available.

In consideration of the carcass removal pertaining to raptors, it is common to use a separate carcass removal value for raptors than what is used for non-raptor birds and bats. The rationale is based on the generally long persistence of raptors, relative to smaller carcasses, particularly since even if a raptor carcass is scavenged, there often remains some evidence of presence (e.g. feathers) that will indicate a fatality has occurred and which often allows species identification. It is often assumed that carcass removal for raptors is 1.0, as it is likely that, even if some scavenging has occurred, there will still be enough evidence to document the presence of a fatality event.

### 4.1.3 Searcher Efficiency Trials

Searcher efficiency trials are necessary to understand the proficiency of detection by the observer(s), which is incorporated into the corrected estimate of total bat and bird

fatalities. Searcher efficiency trials require a known number of discretely marked carcasses to be placed around searched wind turbines without the knowledge of the searcher. Searchers will then examine the wind turbine area following casualty survey protocol, and the number of carcasses that they find is compared to the number of carcasses placed. Searcher efficiency may vary considerably for each searcher and may also vary seasonally and within different habitats or landscapes. Searcher efficiency trials will be conducted as part of the post-construction monitoring during each of the first 2 years of casualty surveys.

Searcher efficiency trials will adhere to the following generalized methods:

- Searcher efficiency trials will be conducted once per season during the same period as the casualty surveys.
- Searchers should not be aware of the trial limit bias (i.e. blind trials).
- A minimum of 20 carcasses will be placed per season. A maximum of 3 trial carcasses will be placed at any one turbine to avoid flooding the area with carcasses.
- Carcasses will be distributed across the range of habitats being searched.
- To avoid confusion with turbine related fatalities, GPS locations of all trial carcasses will be collected.
- Trial carcasses may be discreetly marked (e.g., clipping of ear, wing, leg, fur; hole-punching ear; etc.) with a unique identification so that they can be identified as a trial carcass by the tester.
- Trials should include the use of bat and small brown bird carcasses. Other small brown mammal or bird carcasses (e.g., mice or brown chicks) may also be used when appropriate bird and bat carcasses are not available.

In consideration of the searcher efficiency for raptors, it is common to use a separate searcher efficiency value than is used for non-raptor birds and bats. The rationale is based on relative ease of finding raptors with a search radius, relative to considerably smaller, and often inconspicuous, migratory birds and bats. It is often assumed that searcher efficient for raptors is 1.0, as it is unlikely that, if present, a raptor carcass would be missed by a searcher following the standardized search methods described above.

## 4.2 Fatality Estimate Calculation

Fatality estimates, as briefly described above, are a necessary calculation to consider several factors that will influence the ability to find carcasses within the search radius.

These estimates will consider, at a minimum, carcass removal, searcher efficiency, and the proportion of the search area that was searched.

Fatality estimates will be calculated annually, per megawatt, and separately for non-listed birds (excluding raptors), non-listed raptors, and non-listed bats.

In accordance with the Guidelines, fatality estimate methods and formulas shall follow, at a minimum, those associated with *An Estimator of Wildlife Fatality from Observed Carcasses* (Huso 2011). The Guidelines identify that other suitable estimators may be considered, based on site-specific conditions. One such estimator, Generalized Estimator (GenEst), was developed as an extension of the Huso estimate, and provides a greater ability to incorporate additional site-specific factors, which are expected to increase the accuracy of the final estimate.

If the Project intends to use the GenEst formula for estimating fatality rates at the Project, it will be confirmed separately through the preparation and submission of a final post-construction fatality monitoring plan prior to the implementation of monitoring.

### 4.3 Data Collection

All data will be collected in accordance with the requirements of the Guidelines, the Research Permit, and will provide a level of detail consistent with the information required by the Wind Energy Bird and Bat Monitoring Database. At a minimum, data collection will include the following:

- For each turbine search, the following data will be collected:
    - Turbine number and location,
    - Date and time of survey,
    - Weather conditions, including wind strength and direction,
    - Vegetation surrounding the turbine, and
    - Searcher ID.
- For each fatality that is documented, it will be photographed, in situ, prior to collection, and the following data will be collected:
    - UTM location,
    - Species,
    - Sex (if identifiable),
    - Age class (if identifiable),
    - State of decomposition,
    - Apparent injuries, and
    - Signs of scavenging.

All data, including incidental data, will be submitted to the Ministry of Environment (MOE) in a loadform, in accordance with typical permitting submission requirements, and will be submitted to Birds Canada using their standardized data submission templates.

## 4.4 Reporting Requirements

Following the completion of each full year of monitoring (i.e. spring and fall), a comprehensive annual report will be prepared that will present the detailed methods, raw data, detailed fatality estimate calculations, and consideration of adaptive management, based on the annual results.

In addition to annual reporting requirement, it's possible that results-based reporting may also be required if specific fatality, or fatality events, are documented. These may include, but are not limited to, regulatory notifications if provincially or federally protected species are documented. Regulatory notifications and/or additional reporting may also be required if a significant fatality event, as defined by the Guidelines, is documented.

## 5.0 Adaptive Management Overview

In accordance with the provincial Guidelines (MOE 2018), a comprehensive set of management triggers has been established for the Project. These triggers, which include annual fatality triggers, sensitive species triggers, and Significant Fatality Events (SFEs), are designed to provide early indication of potentially elevated risk factors to birds or bats as a result of Project activities. The specific management triggers being implemented by the Project are consistent with provincial Guidelines, and have been summarized in Table 5 below.

**Table 5. Management Triggers for Bird and Bat Fatality at the Bekevar Wind Energy Project**

| Fatality Triggers | | | | Significant Fatality Event (SFE)[5] |
|---|---|---|---|---|
| Annual Triggers[1] | | | Sensitive Species [3,4] | |
| Birds[2] | Raptors | Bats | | |
| **Tier 1** | | | | |
| < 4 / MW | < 0.1 / MW | < 2 / MW | N/A | N/A |
| **Tier 2** | | | | |
| 4 to 6 / MW | 0.1 - 0.2 / MW | 2 - 4 / MW | Any fatality of:<br><br>A species designated as Special Concern under the *Species at Risk Act* (SARA)<br><br>A provincially-tracked species ranked S3, S3B, or S3M | N/A |
| **Tier 3** | | | | |
| > 6 / MW | > 0.2 / MW | > 4 / MW | Any fatality of:<br><br>A species designated as Threatened or Endangered under SARA<br><br>A provincially-tracked species ranked S1, S1B, S1M, S2, S2B, or S2M | ≥33 birds or bats across the Project during a single monitoring event<br><br>≥10 birds or bats at a single turbine during a single monitoring event |

[1]Annual fatality triggers as calculated after an estimator has been applied.
[2]Annual fatality triggers do not include bird species listed in Section 4(1) of *The Wildlife Regulations.*
[3]In cases where the provincial and federal rankings differ, the federal designation must be used to determine the appropriate Fatality Event Tier.
[4]In cases where the provincial ranking contains 2 or more rankings (excluding 'N' rankings), the ranking with the lowest number must be used to determine the appropriate Fatality Event Tier (e.g. a bird ranked S3B, S2M, would be included in Tier 3).
[5]Significant Fatality Event numbers are observed fatalities on the same monitoring date and do not have an estimator applied.

None of the management triggers are individually indicative of an elevated risk, but instead will inform a series of management responses that will be implemented for the purpose of further documenting and quantifying the potential risk. Once the potential risk is evaluated, appropriate mitigation and minimization measures may be implemented (as appropriate) in consultation with MOE representatives. The management responses for each of the management trigger tiers, including discussion on additional monitoring, reporting, and mitigation considerations, has been summarized in Table 6.

**Table 6. Management Responses for Bird and Bat Fatality at the Bekevar Wind Energy Project**

| Management Triggers | Tiered Management Responses | | |
|---|---|---|---|
| | Cause-and-Effects (CEA) Analysis | Reporting | Mitigation Measures |
| **Baseline Requirements** | | | |
| Onset of the turbine operations | N/A | Annual monitoring reports following Years 1 and 2. | N/A |
| **Tier 1 Management Response** | | | |
| • < 4 non-listed birds/MW<br>• < 0.1 non-listed raptors/MW<br>• < 2 non-listed bat/MW | No CEA requirements | Annual reporting for each year that monitoring is required. | No mitigation measures warranted. |
| **Tier 2 Management Response** | | | |
| • 4 – 6 non-listed birds/MW<br>• 0.1 – 0.2 non-listed raptors/MW<br>• 2 – 4 non-listed bats/MW | Conduct and include in the annual reporting cycle. | Annual reporting for each year that monitoring is required.<br><br>CEA analysis included in the annual reporting cycle.<br><br>Increased reporting frequency may be required in consultation with MOE. | The extent of site-specific fatality and CEA results will inform the level of mitigation and/or minimization measures to be applied to the Project. Lower levels of corrected fatality are expected to require lower levels of mitigation to be applied.<br><br>The following is a non-inclusive list of mitigation and minimization options that may be implemented following consultation with MOE, as informed by site-specific results of the fatality monitoring and CEA:<br><br>• Increased reporting frequency<br>• Extended monitoring program (> 2 years)<br>• Blade feathering<br>• Increased cut-in speeds applied to all turbines or turbine groups (with higher fatality conditions) for specific times of day or year<br>• Seasonal curtailment<br>• Compensation for fatalities (conservation easements/offsets)<br>• Other technological advances (e.g., deterrents) as research into fatality prevention and reduction evolves |
| Any fatality of a species designated as Special Concern under the *Species at Risk Act* (SARA) or of a provincially-tracked species ranked S3, S3B, or S3M. | | | |
| **Tier 3 Management Response** | | | |
| • ≥ 33 birds or bats across the Project during a single monitoring event<br>• ≥ 10 birds or bats at a single during a single monitoring event | Conduct within 60 days of the event.[1] | Annual reporting for each year that monitoring is required.<br><br>CEA analysis must be reported within 60 days of the event.[1]<br><br>Reporting of all Significant Fatality Events must be reported within 24hrs (or next business day) of the event.<br><br>Increased reporting frequency may be required in consultation with MOE. | |
| • > 6 non-listed birds/MW<br>• > 0.2 non-listed raptors/MW<br>• > 4 non-listed bats/MW | | | |
| Any fatality of a species designated as Threatened or Endangered under SARA or of a provincially-tracked species ranked S1, S1B, S1M, S2, S2B, or S2M. | | | |

[1] The 60-day cycle will be considered to have begun at the end of the annual monitoring year for annual fatality triggers for non-listed birds, bats, and raptors.

## 6.0 Adaptive Management Plan Review

As outlined in the guidelines, and given the long life of this Project, this AMP will be reviewed in years five and ten, as measured relative to the first year of operational monitoring (i.e. year one). This regular review will ensure the information contained in the plan is current, includes all practical options for mitigation of any potential impacts, and reflects any new information that is available based on monitoring that has already been completed and any additional, and relevant, details regarding the operation of the facility.

These regular reviews will consider all aspects of the AMP including, but not limited to, monitoring programs, mitigation measures, management triggers, management responses and reporting frequency. The review will use site-specific monitoring data collected to-date, any publicly available monitoring data, or data summaries, for other nearby facilities, as well as any relevant scientific literature and updated agency guidelines to inform applicable updates to the AMP. This process will also include a review of species listed under the Species at Risk Act and provincially-ranked as S1, S1B, S1M, S2, S2B, S2M, S3, S3B or S3M.

## 7.0 Summary

This AMP has been prepared in accordance with the corresponding provincial (MOE 2018) for the purpose of outlining the approach to planning, monitoring, minimizing, evaluating, and managing the Project's effects, if any, on wildlife and wildlife habitats. Background information, site-specific habitat mapping and species inventories, disciplinary experts, literature review, and agency input to-date have all been considered in the development of this AMP. Based on the comprehensive consideration of wildlife, their habitats, and other sensitive natural features in the vicinity of the Project, the above monitoring plans, evaluation triggers, and mitigation plans have been developed with specific commitments to avoid and/or mitigate against any potential impacts to birds and bats.

In order to ensure that any potential impacts to the above species are minimized, mitigated, and/or avoided altogether, a series of mitigation, monitoring, and contingency commitments have been established for the operational phase of the Project (i.e. management responses). These commitments include previously established, and proactive, measures as part of the EIS (NRSI 2021), as well as, out an abundance of caution, additional management responses that have been developed within this AMP to avoid and/or minimize any impacts on birds and bats.

This AMP has used current and available knowledge on the potential for sensitive wildlife and bird and bat interactions with turbines in the Project and has established specific mitigation measures to ensure any potential impact is avoided, minimized and/or mitigated. Assuming the mitigation measures and monitoring commitments outlined above are implemented, it is expected that potential impacts to wildlife, or wildlife habitats will be minimal.

Given the anticipated life of this Project (i.e. 25 years), this plan will be reviewed in years five and 10, and may be updated (as appropriate) to reflect the best scientific information available at the time of review.

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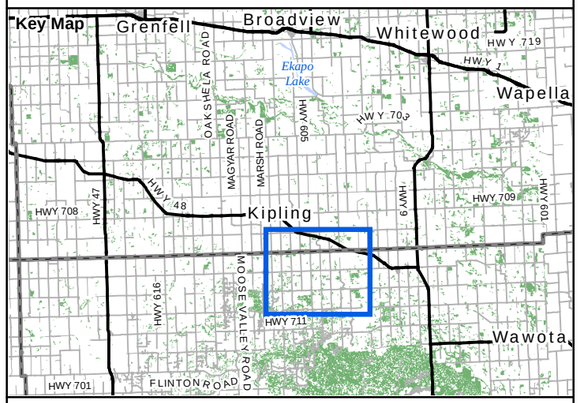
**Map 1**
Project Area

# Map 1

# Bekevar WEP

## Project Area






## Legend

- Project Area

**Project Layout**

- Wind Turbine (L145b)
- Wind Turbine (Alternate)
- Rotor Sweep Area
- Access Road
- Underground Collection
- Substation / O&M Building
- Temporary Laydown Area
- Construction Disturbance Area

**Base Layers**

- Power Line
- Railway
- Highway
- Primary Road
- Cowessess First Nation Lands

NATURAL RESOURCE SOLUTIONS INC.

Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by Bekevar Wind L.P and CanVec © Her Majesty the Queen in Right of Canada, Department of Natural Resources. Imagery: ESRI (2017/2018)

Project: AB0156C
Date: December 16, 2021

NAD83 - UTM Zone 13
Size: 11x17"
**1:56,000**

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**Appendix XII**
Community Benefits Plan

# Bekevar Wind Energy Project

Proposed by Bekevar Wind L.P., a partnership between Renewable Energy Systems Canada Inc. and Awasis Nehiyawewini Energy Development

# Community Benefits Plan

November 2020

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# 1 INTRODUCTION

Bekevar Wind L.P. (the "Partnership"), a partnership between Renewable Energy Systems Canada Inc. ("RES") and Awasis Nehiyawewini Energy Development (ANED), an entity wholly-owned by Cowessess First Nation, is proposing the Bekevar Wind Energy Project (the "Project"), a utility-scale wind energy development south of the town of Kipling with a generation capacity between 100MW and 200MW.

This Community Benefits Plan (CBP) was developed in accordance with section 10.7 of SaskPower Request for Proposals RFP RVS/155(2), and provides a detailed description of the various value-added benefits to the three communities present in or near the Project Site, that is, the Rural Municipality (RM) of Hazelwood and the RM of Kingsley, and Cowessess First Nation. The benefits for each are described in detail in Sections 3 and 4, respectively.

# 2 APPROACH TO THIS PLAN

The Partnership prides itself on being a responsible corporate citizen and ensuring benefits from its wind energy projects are shared with the local host communities. It is equally important for the Partnership to engage with local communities and hope to align the CBP's contents with local objectives and values.

As such, the Partnership's approach to this CBP was to present a draft CBP to the host RMs and Cowessess First Nation and seek their feedback on its contents. The plan presented herein reflects such feedback and comments, including feedback on the CBP's alignment with the objectives of these local communities.

# 3 RM OF HAZELWOOD AND RM OF KINGSLEY

As the developer of this Project, RES initiated development in 2016 and has engaged with the RM of Hazelwood Administrator and Council since then. Multiple conversations with the Administrator and Council members, as well as several meetings with Council occurred between 2017 and October 2020.

As the Project extended to the RM of Kingsley in 2019, RES engaged with the Administrator and Council of this RM in 2019 and continued such engagement in 2020.

In September 2020, RES presented the key concepts of the CBP to both Councils and received feedback shortly thereafter. Overall the CBP was well received and both RMs thought the plan was well aligned with their objectives and values. Written correspondence between RES and the RMs on this topic can be provided to SaskPower upon request.

The CBP, including feedback received, is presented herein.

## 1. RES Engagement and Consultation Principles

Effective and thorough engagement and consultation with the host RM council and office, as well as the local community, is vital to the success of the project.

Keeping the community informed, giving the community and general stakeholders the opportunity to provide input, have discussions, and provide responses to concerns in a timely manner, are key objectives of our consultation plan. Feedback from the public and from stakeholders is highly valued and is viewed as a critical component to project planning and development. Through engagement and consultation activities, we hope to gain the trust of the community. Ultimately, the goal is for everyone interested to be well informed, to understand the project, and to be aware of the various benefits and impacts of such a development.

Engagement also allows RES to develop site-specific and representative value-added benefits from the Project that are aligned with the community's needs and expectations.

Finally, engagement and consultation is an on-going process that continues through the development, construction and operations phases. As the project enters into more advanced stages, RES will employ several tools to ensure the success of its consultation plan, including holding public meetings, opening a local office, publishing a project website, establishing a project hotline and sending regular mail-outs to the local community, stakeholders and the RM offices and Councils.

## 2. Local Hiring and Local Supply Chain

As both a development and a constructor of its renewable energy projects, RES will manage the construction works on the Project and will always strive to maximise local hiring and supply of services and materials by local contractors, when feasible to do so. At this early stage of development, the RES construction team has already identified and established contact with local suppliers of raw materials, as well as local contractors including Aboriginal Suppliers.

RES and the Partnership's proposed local hiring and supply approach is as follows:

- provide the RM offices and local business associations with advanced, detailed lists of required personnel and training, equipment, materials and contracts required for the construction of the Project;
- provide local contractors and suppliers with the opportunity to provide proposals for various scopes of work required for construction of the Project, including the opportunity to provide locally-sourced raw materials;
- indicate to other suppliers providing proposals for various scopes of work that local contractors and suppliers, when acting as sub-contractors, should be given preferential consideration when suppliers are composing their teams;
- hold a job fair within the local community to provide information with regards to employment and contracting opportunities which may be available in respect of the Project.

## 3. Training

Operational wind farm projects require highly-skilled personnel to operate and maintain the facilities. Additionally, maintenance crews need to live nearby in order to properly execute their work. RES and the Partnership believe this is a great opportunity for youth

seeking challenging and well-paid work. Upon award of a power contract with SaskPower, the Partnership is planning to establish a bursary program to fund the training of local community members to work on the Project operation and maintenance activities. The Partnership would consult with the RMs in respect of the administration and size of the bursary program.

## 4. Road Maintenance Agreement

Upon award of a power contract with SaskPower, RES would enter into a Road Maintenance Agreement with the RMs in order to clearly define terms which will govern the use of public road allowances, and offer guarantees with regards to the maintenance and repair of any municipal roads used during project construction and operation.

Generally speaking, activities or works in and along selected road allowances in the RMs, subject to approval by the RM and compliance with local regulations, and would include the following:

- transporting materials, components and equipment including overweight or oversize cargoes;
- temporarily, or, if approved by the RM, permanently reconstructing or re-aligning road sections, turns and intersections on the road allowances to permit the passage of said overweight or over- size cargoes;
- constructing permanent roads on limited sections of undeveloped road allowance;
- constructing, maintaining and using entrances to private wind turbine access roads, and;
- installing, constructing, operating and maintaining electrical infrastructure.

Such works and activities on the road allowances will be under the responsibility of RES and all works as listed above and directly associated with the wind farm's construction will be at RES' cost.

## 5. Development Fund

As a general commitment to the host RMs, the Partnership will propose a fund to support council-approved initiatives. The Partnership would fully support local community initiatives that would increase public safety, improve aesthetics or improve recreational facilities, public facilities, or other initiatives aligned with the RM's development objectives. The RM of Hazelwood provided feedback that their development objectives would include, but not be limited to, health care, fire safety and recreation, which are objectives fully supported by the Partnership.

## 6. RM Support and Collaboration

To ensure success of this Project, RES and the Partnership will receive the RMs' support and collaboration to facilitate to the extent possible its development and construction. The RMs' collaboration would be particularly useful for the following key items:

- Supporting the identification of key stakeholders, including local organisations and associations that should be consulted on the Project
- Informing RES, at the RM's discretion, of concerns and issues raised by local community members
- Having a zoning by-law in place that will provide the framework for developing utility-scale wind projects that aligns with provincial guidelines and best practices
- Making RM staff and Council available from time to time to discuss and comment project issues, permitting and zoning, construction issues, road use, etc.

Finally, as a token of the RMs' willingness to provide a competitive advantage to the Project, and as such acting as a strategic local partner, the RM councils both have approved a property tax exemption in the first three years of the Project, to reduce this operating cost.

# 4 COWESSESS FIRST NATION

RES initiated the development of the Bekevar Wind Energy Project in 2016 and reached out to Cowessess First Nation (CFN) early on given the presence of five quarter sections of reserve land in the vicinity of the project development area.

Cowessess is a progressive Nation which has a history of supporting renewable energy initiatives. The Nation is described in detail in Section 4.1 below. With respect to the Bekevar Wind Energy Project, RES and CFN have had a relationship since 2017. CFN officially supported wind energy development in this area and entered, along with its subsidiary, ANED LP, into a "Collaboration and Benefits Agreement" in 2018 with RES. The CFN component of the CPB provided below is taken directly from the existing Collaboration and Benefits Agreement and is detailed in Section 4.2.

In addition, ANED LP and RES have also recently entered into a Limited Partnership Agreement, where ANED LP owns 11% of Bekevar Wind L.P. The details of this partnership are provided in Section 4.3 below.

Through the Collaboration and Benefits Agreement and the Limited Partnership Agreement, it is expected that the Project will not only bring many benefits to Cowessess First Nation but that the benefits will be tailored specifically to the Nations needs as CFN will be able to provide direct input into the Project development process. In addition, the Nation will benefit from sublease payments through the life of the Project.

## 4.1 About Cowessess First Nation

Cowessess First Nation is one of the largest and most progressive Nations in southern Saskatchewan and has emerged as a leader in Indigenous Renewable Energy Development in Saskatchewan. Cowessess Ventures Ltd. (CVL) is an economic development corporation solely owned by the Cowessess Nation which operates separately from Chief and Council (See Figure 1). CVL is governed by an independent board of directors that is comprised of business professionals from across Saskatchewan.

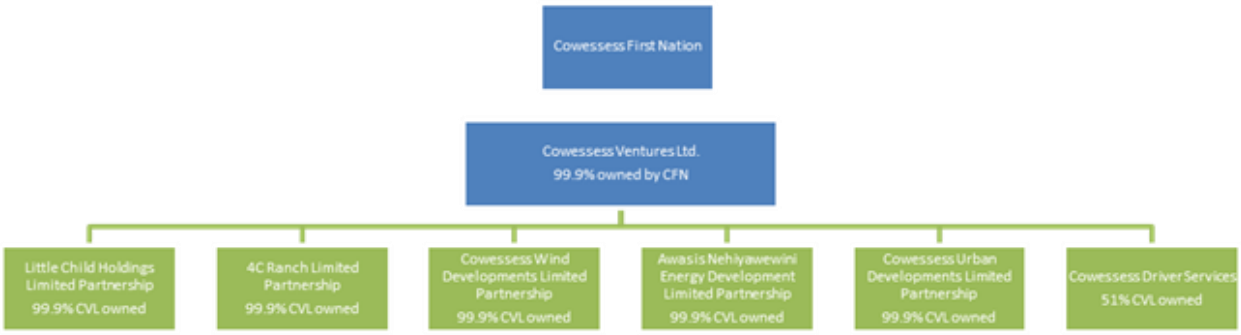


Figure 1 Cowessess Ventures Ltd. Organizational Chart

Within the CVL Strategic Plan there are 4 priority areas which include:

1. Improved Core Business Performance
2. New Deal Advancement
3. Community and Citizen Betterment
4. Strengthen Organizational Capacity

The Project fits within priority 2 and 3 of the CVL Strategic Priority Plans. The goal for CVL is to develop its land holdings to create profitable low risk business opportunities for the benefit of the Nation.

CVL uses two legal entities, Awasis Nehiyawewini Energy Development Corporation (ANEDC) and Cowessess Wind Developments Limited Partnership (CWDL), to develop renewable energy projects. ANEDC was incorporated in 2009 as a limited partnership (ANED LP) that is wholly owned by Cowessess First Nation. ANEDC was created for the specific purpose of developing utility scale energy projects and has been active in prior SaskPower wind procurement opportunities (2009 to 2012 and 2017).

ANED LP is also 51% owner in the Awasis Solar Limited Partnership that is developing a 10 MW solar project through the First Nations Opportunity Agreement set aside for Indigenous proponents. Awasis Solar LP secured their PPA with SaskPower in September 2020 and will commence construction in spring 2021, with a November 2021 targeted commercial operations date.

CWDL was incorporated in 2012 as a limited partnership that is wholly owned by Cowessess First Nation. The main business for CWDL for the past seven years has been the development of the wind turbine and battery project and its ongoing operations. This legal entity currently owns and operates the wind, solar, and battery storage assets currently located 3km South East of Regina.

Cowessess intends to create a head lease structure where CVL will hold the head lease with her Majesty the Queen in Right of Canada over the subject Cowessess land set aside for the Project. CVL will enter into a 35-year sublease agreement with Bekevar Wind L.P., the partnership between RES and ANED LP, to provide site control for the development of turbine and other

facilities as part of the Bekevar Wind Project. This sublease will provide CVL with a fixed revenue stream for the life of the Project.

## 4.2 Partnership between RES and Cowessess First Nation

In 2018, ANEDC, Cowessess First Nation and RES entered into a Collaboration and Benefits Agreement (CBA) to solidify the relationship between RES and the Nation, provide an opportunity for developing the Project on Cowessess reserve land and support ANED LP in participating in the development efforts of the Project. The value-added benefits to the Nation below are supported by the Nation itself and ANED.

### 4.2.1 Capacity Funding and Option Payment

In order to support ANED LP in participating in the development efforts of the Project, RES has committed to provide capacity funding as well as an option payment for the potential use of the reserve lands for installing wind turbines and associated infrastructure, as follows:

- Capacity funding for costs incurred, namely external legal fees, with respect to the negotiation of the Collaboration and Benefits Agreement
- Capacity funding for finalizing the head lease and sublease agreements and any other agreements required to secure for the Proponent the rights to the CFN Lands and to have the agreements registered with the Indian Lands Registry
- Capacity funding to facilitate participation by ANEDC, CFN members and consultants in the environmental assessment process and review of the environmental assessment report for the Project. The capacity funding shall be used by ANEDC and CFN for costs to review the EA Report, including professional and consultant fees and disbursements, costs for ANEDC, CFN and its consultants to travel to and participate in public consultation related to the EA Report, if applicable, as well as participation by ANEDC, CFN and its consultants in Project field survey work.
- Option payment paid annually since the execution of the Agreement, as compensation for the granting to the Proponent of the option for the exclusive right to sublease the CFN Lands for the Project

### 4.2.2 Employment and Business Opportunities

As a constructor of renewable energy projects, RES understands the importance of hiring Aboriginal community members as well as local workers. RES has committed to make reasonable efforts to identify and give favorable consideration to CFN members, consultants, suppliers and businesses owned or controlled by any CFN affiliates for the following:

- Assist with Project development
- Perform work and supply goods and services in connection with Project construction, operations and maintenance activities

Embedded into RES' approach to local hiring, the proposed approach to hire Aboriginal workers and suppliers is as follows:

- provide the band office and associated business entities with advanced, detailed lists of required personnel and training, equipment, materials and contracts required for the construction of the Project;
- provide CFN-related contractors and suppliers with the opportunity to provide proposals for various scopes of work required for construction of the Project;
- indicate to other suppliers providing proposals for various scopes of work that Aboriginal contractors and suppliers, when acting as sub-contractors, should be given consideration when suppliers are composing their teams;
- hold a job fair within the CFN community and other First Nations in the vicinity of the project area to provide information with regards to employment and contracting opportunities which may be available in respect of the Project.

### 4.2.3 Training

Operational wind farm projects require highly-skilled personnel to operate and maintain the facilities. Additionally, maintenance crews need to live nearby in order to properly execute their work. RES believes this is a great opportunity for Aboriginal youth seeking challenging and well-paid work. Upon award of a power contract with SaskPower, RES would establish a bursary program to help fund the training of Cowessess members to work on the Project operation and maintenance activities. RES would consult with CFN in respect of the administration of the bursary program and commit funding upon its establishment and every five (5) years thereafter over the term of the PPA.

### 4.2.4 Taxation

As a token of the Nation's willingness to provide a competitive advantage to the Project, and as such acting as a strategic local partner, the Nation also approved a property tax exemption in the first three years of the Project, in alignment with the neighboring RM of Kingsley.

## 4.3 Equity Participation

For First Nations able to do so, having an ownership share of a utility-scale wind project such as the Bekevar Wind Energy Project is a great opportunity as it can yield significant economic benefit for an extended period of time, through project returns and dividends, as well as provide valuable management and operational experience on a large-scale wind project.

As presented in a separate section of this submission to SaskPower, Cowessess Ventures Ltd. through its subsidiary Awasis Nehiyawewini Energy Development LP. owns 11% of the Bekevar Wind Energy Project. This ownership position is something the community has been working toward since 2010 when they first incorporated ANEDC. It will be a significant milestone for the community to finally own a share in a large-scale project like this after working for so many years to build credibility and capacity in the renewables sector.

## 5 CONCLUDING STATEMENT ON VALUE-ADDED BENEFITS

The Partnership and RES specifically as the lead developer of this Project are committed to this Community Benefits Plan. It was developed not only from extensive experience with other local rural communities and First Nations in Canada but also from feedback from the three host communities.

Generally speaking, and over and above the items of this plan, it is important to note that the Project will generate a significant revenue stream for the local community, extending to two RMs, namely from annual land lease payments to participating landowners and property tax and education property tax payments for the life of the Project. These annual payments will also apply to Cowessess First Nation reserve land, providing the nation as well with a guaranteed, risk-free revenue stream. The Partnership and RES are committed to honoring these contractual obligations.

The Partnership is also very pleased to have the support from these two RMs and Cowessess First Nation. The RFP stated that Proponents were encouraged to create local partnerships, and the plans set out above are a demonstration of that. The Partnership and RES consider these three communities as partners, given the support, including economic support and equity participation from Cowessess First Nation-owned ANED, they provide to the Project.

**Appendix XIII**
Commitments Register

## Development Name: Bekevar Energy Project

Proponent Name: Bekevar Wind L.P.

EASB File#:

| ID | Commitment | Section in EIS | Condition in Approval (y/n) | Permit # (if available) | Name and Section of Additional Report | Approving Agency or legislation | Measure of Compliance | Commitment Status (met, not met, in progress) | Preventative or Corrective Action | Adaptive Action | Commitment Due Date | Actual Completion Date | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Avoid or minimize changes to native habitat quality and quantity during construction and decommissioning, | Section 7.2.2 | | | | MOE [FWLB, EASB] | • All Project activities are limited to the Project Footprint.<br>• Regular monitoring of reclaimed areas confirms that native vegetation within the Project area maintains similar species diversity as what was documented during pre-construction surveys. | In progress | • Clearly delineate all work areas that occur within 10m of, or overlapping, a native habitat/community using erosion fencing or other suitable barrier to avoid accidental damage to adjacent habitat(s).<br>• When working in native habitats, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, wherever practical.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• Install Erosion and Sediment Control (ESC) measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an Environmental Construction Monitor (ECM).<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any native habitat.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate any temporary disturbances to native habitat as soon as practical.<br>• If temporary excavation is necessary, separate topsoil and from underlying layers in different piles at least 1m apart. Replace the soil in reverse order of excavation, to preserve organic content and native seedbank. | | Upon completion of post-reclamation monitoring | | |
| 2 | Avoid or minimize changes in invasive species abundance. | Section 7.2.2 | | | | MOE [FWLB, EASB] | • All Project activities are limited to the Project Footprint.<br>• Regular monitoring of reclaimed areas identifies the potential presence and/or ahead of invasive species. | In progress | • Clearly delineate all work areas that occur within 10m of, or overlapping, a native habitat/community using erosion fencing or other suitable barrier to minimize seed transfer.<br>• Construction vehicles and equipment should be cleaned regularly, particularly when entering or leaving the site.<br>• Vehicle use will occur on defined access routes, and within the limits of the Construction Disturbance Area, and will occur within agricultural habitats, to the extent possible, to minimize potential seed transfer.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any native habitat.<br>• Re-vegetate non-cultivated areas of temporary disturbance as soon as practicable after construction activities are complete.<br>• Areas of temporary disturbance within non-cultivated habitat will require follow-up monitoring to assess the presence of invasive species so that adaptive management can be implemented, as necessary.<br>• Prepare and implement, as necessary, a Weed Management Plan | | Upon completion of post-reclamation monitoring | | |
| 3 | Avoid or minimize changes in wetland area. | Section 7.3.2 | | | | MOE, WSA | • All Project activities are limited to the Project Footprint.<br>• Wetland protection measures are implemented during construction and decomissioning. | In progress | • Clearly delineate all work areas that occur within 10m of, or overlapping, any wetland using erosion fencing or other suitable barrier to avoid accidental damage to adjacent habitat(s).<br>• When working within, or near wetlands, particularly those with moderate to high water permanency (i.e. Class III to V), implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, wherever practical.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint.<br>• The Project will obtain, as necessary, an Aquatic Habitat Protection Permit (AHPP), and will comply with all conditions. | | Upon completion of construction and decommissioning phases of the Project | | |
| 4 | Avoid or minimize changes to wetland function, | Section 7.3.2 | | | | MOE, WSA | • All Project activities are limited to the Project Footprint.<br>• Wetland protection measures are implemented during construction and decomissioning. | In progress | • Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any native habitat.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated wetland.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate any temporary disturbances to native habitat as soon as practical. | | Upon completion of construction and decommissioning phases of the Project | | |
| 5 | Avoid or minimize changes to water balance, | Section 7.3.2 | | | | MOE, WSA | • All Project activities are limited to the Project Footprint.<br>• Wetland protection measures are implemented during construction and decomissioning. | In progress | • When working within, or near wetlands, particularly those with moderate to high water permanency (i.e. Class III to V) or crossing watercourses, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, wherever practical.<br>• The Project will obtain, as necessary, an Aquatic Habitat Protection Permit (AHPP), and will comply with all conditions.<br>• Cross watercourses in dry conditions.<br>• For all access road crossings of ephemeral or intermittent watercourses, the existing grade should be maintained to allow over-land flow or a suitable culvert should be installed so that existing hydrology is maintained.<br>• Limit, or avoid, taking of surface water or groundwater during periods of low flow.<br>• Control quantity and quality of stormwater discharge using best management practices, and avoid direct discharge into wetlands or watercourses.<br>• Water discharges should occur in vegetated areas with low grade, or should implement other techniques to control flow (e.g. sediment trap).<br>• Minimize the use of impervious surfaces, where practicable, such as utilizing and contouring permeable surface material (i.e. gravel) to increase infiltration, and reduce surface water runoff.<br>• Restrict construction equipment to designated vehicle access routes to minimize the potential for soil compaction beyond the defined footprint.<br>• Local natural drainage pattern should be restored to the best extent possible after construction, whenever a wetland or watercourse is affected.<br>• Following the construction and decommissioning phases, implement measures to de-compact soil (i.e. cultivation) within agricultural areas of the CDA.<br>• Re-vegetate any temporary disturbances to native habitat as soon as practical. | | Upon completion of construction and decommissioning phases of the Project | | |

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| 6 | Avoid or minimize disturbance and degradation of wildlife habitat, | Section 7.4.2 | | | | MOE [FWLB, EASB] | • All Project activities are limited to the Project Footprint.<br>• Activity restriction setback distances and timing windows are implemented for sensitive wildlife habitat for all Project activities, unless otherwise authorized by ENV | In progress | • Clearly delineate all work areas that occur in, or within 10m of, a wetland or forest/tree stand using erosion fencing or other suitable barrier to avoid accidental damage to adjacent wildlife habitat.<br>• When working in wetlands or forest/tree stand, implement minimum disturbance techniques, such as working in frozen conditions, reduced soil stripping, and/or horizontal boring, to the extent possible.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical.<br>• Install ESC measures (e.g. erosion fencing) around the CDA in all areas where there is a reasonable risk of erosion effects (e.g. near natural habitats, moderate to steep topography, high-wind/exposed areas, etc.), as informed by an ECM.<br>• Cover and/or use ESC measures to surround any spoil or stockpiled material, and keep stockpiled materials no closer than 30m to any non-cultivated feature, including away from pasture/forage land use.<br>• Schedule grading or other ground work to avoid times of high runoff (e.g. snow melt, periods following heavy precipitation, etc.), wherever practical.<br>• Keep spill kits on-site and establish, and implement (as needed), spill prevention and response measures.<br>• Store all waste, including hazardous waste, in designated areas and dispose of waste in accordance with applicable regulations.<br>• Avoid the broad application of herbicides, pesticides, or other chemical applications associated with Project activities (this will not restrict agricultural applications).<br>• Locate all vehicle refueling stations, chemical storage, and waste storage no closer than 30m to any non-cultivated feature, including away from pasture/forage habitats.<br>• Apply dust suppressants to unpaved areas, when necessary, as determined by the ECM.<br>• Re-vegetate all non-cultivated temporary disturbance areas as soon as practical. | | Upon completion of construction fo decommisioning phases of the Project | | |
| 7 | Avoid or minimize general mortality risk to wildlife during Project construction, operation, and decomissioning. | Section 7.4.2 | | | | MOE [FWLB, EASB] | • All Project activities are limited to the Project Footprint.<br>• Activity restriction setback distances and timing windows are implemented for sensitive species for all Project activities unless otherwise authorized by ENV. | In progress | • No vegetation removal or direct impacts to non-cultivated wetlands will occur from April 15 to August 16, unless approved by a Qualified Professional.<br>• This period is expected to cover breeding/nesting periods for amphibians, birds, and bats, which have the potential to be affected. Wildlife 'sweeps' by a Qualified Professional may be used during this period to confirm if wildlife are or are not, likely to be present and/or impacted by activities done during this time frame.<br>• On-site speed limits will be established, will be communicated to, and expected to be followed by, all on-site personnel.<br>• Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint | | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 8 | Avoid or minimize mortality risk to bats during Project construction, operation, and decomissioning. | Section 7.4.2 | | | | MOE [FWLB, EASB] | • All Project activities are limited to the Project Footprint.<br>• Compliance with the monitoring and reporting requirements outlined in the Adaptive Management Plan | In progress | • When siting the Project, avoid sensitive habitat such as bat roosts | • Using a lighting scheme that minimizes turbine lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable requirements for aviation safety.<br>• Develop, and follow, an AMP in accordance with provincial guidance documents. | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 9 | Avoid or minimize mortality risk to birds during Project construction, operation, and decomissioning. | Section 7.4.2 | | | | MOE [FWLB, EASB] | • All Project activities are limited to the Project Footprint.<br>• Compliance with the monitoring and reporting requirements outlined in the Adaptive Management Plan | In progress | • When siting the Project, avoid sensitive habitat of sensitive species. On-site speed limits will be established, will be communicated to, and expected to be followed by, all on-site personnel. • Restrict Project-related equipment, vehicles, and activity to designated access routes, and within the limits of the CDA, to avoid accidental impacts beyond the defined footprint | • Using a lighting scheme that minimizes turbine lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable requirements for aviation safety.<br>• Develop, and follow, and Adaptive Management Plan (AMP) in accordance with provincial guidance documents. | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 10 | Avoid or minimize habitat use change due to noise pollution, artificial illumination, and general activities. | Section 7.4.2 | | | | MOE [FWLB, EASB] | • All Project activities are limited to the Project Footprint.<br>• Compliance with the monitoring and reporting requirements outlined in the Adaptive Management Plan | In progress | • Using a lighting scheme that minimizes turbine lighting, and maximizes the 'off-phase' of any flashing lights, to the extent possible within the allowable requirements for aviation safety.<br>• Develop, and follow, and Adaptive Management Plan (AMP) in accordance with provincial guidance documents. | | Throughout construction, operation, and decommissioning phases of the Project | | |
| 11 | Minimize environmental noise levels from construction, operation, and decommissioning. | Section 7.5.1 | | | | | • The Project will be compliant with permissible daytime and nighttime sound levels at PoRs | In progress | • Implement a construction and traffic management plan.<br>• Limit noise-producing construction activities to daytime and early evening hours (0700 to 1900hrs), to the extent feasible.<br>• Limit vehicle speeds on access roads to 40km/hr.<br>• Inform local residents of scheduled significant noise-producing activities.<br>• Maintain all vehicle and machinery in good working order.<br>• Perform regular maintenance on all wind turbines to ensure proper functioning and minimization of excessive mechanical noise caused by wear.<br>• One turbine (T41) will operate in a noise reduce mode at night (2200hrs to 0700hrs). | | Throughout construction, operation, and decommissioning phases of the Project | | |
| 12 | Avoid or minimize soil loss and soil changes during construction and decommissioning. | Section 7.6 | | | | MOE [FWLB] | • All Project activities are limited to the Project Footprint. • Regular monitoring of reclaimed areas confirms that soil availability and distribution within the Project area is similar to pre-construction conditions | In progress | • Where topsoil stripping is required, separate topsoil and from underlying layers in different piles at least 1m apart. Replace the soil in reverse order of excavation, to preserve organic content and native seedbank.<br>• Soil stockpiles will be maintained at low profiles, and will be covered and/or stabilized to minimize erosion.<br>• Soil handling should not occur during high wind or high precipitation events.<br>• The ECM will regularly monitor soil handling, soil conditions, and soil stockpiles to ensure soil is not degraded and remains suitable for reclamation activities. | | Throughout construction and decommissioning phases of the Project | | |
| 13 | Avoid or minimize the loss of agricultural land during construction, operation, and decommissioning. | Section 8.1.1 | | | | MOE [FWLB] | All Project activities are limited to the Project Footprint. Regular monitoring of reclaimed areas confirms that effects to agricultural land use within the Project area will be reduced. | In progress | • The Proponent commits to not impact agricultural land in exceedance of the total CDA amounts, as depicted in this EIS.<br>• Implement site reclamation immediately following the construction phase.<br>• The Proponent commits to not impact agricultural land in exceedance of the total operations footprint, as depicted in this EIS.<br>• Consult with landowners on the Project location and take into account, to the extent feasible, comments on location of roads, turbines and collector system.<br>• Compensate landowners during construction and operations (construction phase payments, crop damage payments, annual rent) per provisions in the ground lease.<br>• Apply decommissioning and reclamation measures at the end of the Project life | | Throughout construction, operation, and decommissioning phases of the Project | | |

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| 14 | Avoid or minimize impacts to archeological and heritage resources in the Project area. | Section 8.3.1 | | | | HCB | • All Project activities are limited to the Project Footprint and do not impact archeological and heritage resources. | In progress | | | Upon completion of construction phase of the Project | | |
| 15 | Increase local and regional employment. | Section 8.4.1 | | | | | | In progress | • Implement the CBP, namtely to encourage the hiring of skilled workers and qualified contractors from the Project region.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 16 | Stimulate the local and regional economy. | Section 8.4.1 | | | | | | In progress | • Encourage the hiring of personnel from the Project region.<br>• Compensate participating landowners and host communities throughout the life of the Project.<br>• Encourage the use of local amenities and services by workforce, including lodging, restaurants, banks, shops, medical services, entertainment, parks, tourism, sports, gas stations, etc.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 17 | Meet the increased demand for community services and infrastructure. | Section 8.4.1 | | | | | • Consultation with community service providers and councils and adress public feedback and complaints throughout the Project phases | In progress | • Coordinate with emergency response stakeholders (RCMP, fire department, health care providers, RMs).<br>• Communicate regularly with RMs regarding Project status.<br>• Develop an ERP.<br>• Implement a Road Use Agreement with the RMs.<br>• Develop a Traffic Management Plan | | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 18 | Increase employment and contracting opportunities for Indigenous Groups. | Section 8.5.1 | | | | | • The Project is expected to directly create 150 full-time equivalent (FTE) jobs over the two years of construction, as well as create indirect employment due to needs for local services and supplies.<br>• The Project will directly create six to eight permanent jobs in turbine operations and maintenance.<br>• This phase will also require local contractors for activities such as snow removal, road maintenance and repairs, and substation maintenance.<br>• Decomissioning activities and site reclamation will require the hiring of several workers and generate short-term economic benefits to the region. | In progress | • Implement the CBP namely with respect to Indigenous groups.<br>• Implement the CEP, namely with respect to engaging with Indigenous Groups and providing information on contracting opportunities.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 19 | Increase revenue generation, capacity building, and training for CFN. | Section 8.5.1 | | | | | • The Project is expected to directly benefit CFN through ANEDC's equity participation in the Project and compensation for installing turbines on their reserve land.<br>• Participation as a limited partner also provides significant exposure and experience in developing and managing a large-scale wind energy project.<br>• A training bursary will be established for members of CFN to receive training on wind turbine maintenance and operations. | In progress | • Implement the CBP.<br>• Compensate CFN per ground lease provisions.<br>• Maintain outreach and communications mechanisms to inform qualified local contractors and workers. | | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |
| 20 | Avoid or minimize potential spills related to the Project | Section 10.0 | | | | Saskatchewan Ministry of Labour Relations and Workplace Safety | • Establishment of a Project-specific Emergency Response Plan (ERP) in coordination with local emergency services to address potential emergency scenarios related to fires, personal injuries, and spills. | In progress | • All vehicles must be in good condition and must be inspected regularly for fuel and/or oil leaks.<br>• All maintenance activities, vehicle refueling or washing, and chemical storage will be located at least 30 m from any wildlife or significant habitat .<br>• Machinery and trucks will be refuelled well away from any water body, water course and wetland (>30 m).<br>• Oil trays will be placed under equipment that could present oil or fuel leaks, where applicable and relevant.<br>• Develop a Spill Prevention and Response Plan and train staff on appropriate procedures.<br>• Proper spill kits and containment booms will be kept on site and on hand for rapid cleanup of any spill which may occur. Hazardous material will be stored at a designated location with tanks or drums equipped with secondary containment structure to prevent runoff of from the designated storage area.<br>• Training will be provided to all workers who handle fuels or other hazardous materials to prevent spills and effectively contain and clean up spills if they occur. Turbines are setback to residences, existing public roads and other public and private infrastructure based on best management practices and the local RMs' draft land-use by-laws.<br>• If a potential turbine failure is detected, a safety perimeter around the turbine(s) will be established until the area has been cleared by Project operators. The Proponent will only procure turbines that are adapted to the climate conditions typical of the Project area in Saskatchewan.<br>• Regularly inspect and maintain vehicles and machinery in good condition. | | | | |
| 20 | Avoid or minimize potential ice and fire accident events related to the Project | Section 10.0 | | | | Saskatchewan Ministry of Labour Relations and Workplace Safety | • Establishment of a Project-specific Emergency Response Plan (ERP) in coordination with local emergency services to address potential emergency scenarios related to fires, personal injuries, and spills. | In progress | • Implement automatic shutdown procedures in case of ice accretion on turbine blades.<br>• turbines will be equipped with systems that will detect icing event on the rotor, and then alert Project staff. It may trigger automatic shut down and/or a visual inspection of the turbine. The operator will be capable of stopping the operation of turbines if the risk of strong wind or ice rain is detected. If ice builds up on blades, a safety perimeter around the turbine(s) will be established until the area has been cleared by Project operators. When a turbine is shut down due to icing, it will be returned to service following an inspection of the blades by the operator when the restart is considered safe.<br>• The Proponent will only procure turbines that are adapted to the climate conditions typical of the Project area in Saskatchewan.<br>• A turbine maintenance schedule will be followed throughout the Project life.<br>• Fire detection equipment will be installed, and preventive and protection systems will be integrated in Project components and equipment to reduce risk of fires. These include fuses and circuit breakers that detect malfunctions and disconnect faulty electrical equipment in a timely manner, as well as fire suppressant systems in case of break-through fires.<br>• No vehicles and machinery will be allowed to be parked near flammable vegetation such as bushes, trees and brush during periods of high risk. If a fire is detected at the Project, a safety perimeter will be established until the area has been cleared by Project operators. Control the vegetation near the buildings.<br>• Prohibit throwing cigarette butts on the ground.<br>• Ensure presence of ABC multipurpose powder and water extinguishers at several locations, including the hazardous material storage sites, the service building, the substation and wind turbine nacelles.<br>• Regularly inspect the fire suppressant equipment.<br>• Training will be provided to all on-site personnel in fire suppression and the emergency response. | | | | |

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| 20 | Avoid or minimize potential turbine and vehicle accidents related to the Project | Section 10.0 | | | | Saskatchewan Ministry of Labour Relations and Workplace Safety | • Establishment of a Project-specific Emergency Preparedness and Response Plan (EPRP) in coordination with local emergency services to address potential emergency scenarios related to fires, personal injuries, and spills. | In progress | • If a potential turbine failure is detected, a safety perimeter around the turbine(s) will be established until the area has been cleared by Project operators.<br>• A thorough inspection of each turbine will occur prior to the operation of the Project to ensure that there are no design, equipment or construction flaws. They will also be inspected on a regular basis during the operation phase by turbine specialist.<br>• A turbine maintenance schedule will be followed throughout the Project life.<br>• Regularly inspect and maintain vehicles and machinery in good condition.<br>• All project vehicles must comply with the road safety code.<br>• Non-standard vehicles subject to a special driving permit must also comply with the permit issuance conditions.<br>• Speed limit will be imposed on the Project construction site and clearly marked.<br>• A traffic management plan will be developed for the construction phase to highlight preferred routes for components transportation, construction trucks and other Project vehicles; the plan will be made public to inform local residents and other road users of areas with the potential for more traffic associated with the Project. | | | | |
| 21 | Avoid or minimize potential impacts from natural hazards such as flooding, summer convection storms, wildfire, and winter storms, | Section 11.0 | | | | Saskatchewan Ministry of Labour Relations and Workplace Safety | • Establishment of a Project-specific Emergency Preparedness and Response Plan (ERP) in coordination with local emergency services to address the occurrence of potential natural hazards. | In progress | • Design, installation, operation and maintenance, and decommissioning will be completed according to applicable industry standards and certifications.<br>• Select turbines designed to automatically shut down when ice load on blades is detected.<br>• Buildings and infrastructure will comply with Saskatchewan and federal building and fire codes.<br>• Implement an ERP during severe weather event. Implement contingency plans for severe weather effects (such as installing backup power generators). Maintain fire prevention and response equipment on-site, including fire extinguishers.<br>• Provide additional personal protective equipment for workers, as appropriate.<br>• Develop weather monitoring plan and adjust construction schedule or reschedule maintenance and monitoring activities, as appropriate.<br>• Coordination with local emergency responders, when required. | | Throughout construction, operation, maintenance, and decommissioning phases of the Project | | |