



BOW LAKE WIND FARM
WIND TURBINE SPECIFICATIONS REPORT

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Prepared for:

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Nodin Kitagan 2 Limited Partnership**
by its General Partners Shongwish Nodin
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1.0 Introduction

1.1 PROJECT OVERVIEW

Nodin Kitagan Limited Partnership and Nodin Kitagan 2 Limited Partnership, by their General Partners Shongwish Nodin Kitagan GP Corp. and Shongwish Nodin Kitagan 2 GP Corp., respectively (the “Proponent”), are proposing to develop Phase 1 and Phase 2 of the Bow Lake Wind Farm predominantly on Provincial Crown Land within the unorganized Townships of Smilsky and Peever, in the District of Algoma, Ontario (the “Project”). The Project is located approximately 80 km north of Sault Ste. Marie and roughly six kilometres east of Montreal River Harbour. The Project has three Feed-in Tariff Contracts with the Ontario Power Authority for the sale of electricity generated by the Project.

As part of the Project’s design, construction, and operational activities, and understanding the Project falls within the territory of the Batchewana First Nation of Ojibways (“BFN”), the Proponent has engaged directly with the BFN. As a result of these efforts, the BFN:

- Has entered the Project as partner;
- Has entered into various business and relationship agreements with the Proponent to guide Project activities; and
- Has issued a Development and Power Generation Permit, which provides the BFN’s approval to construct, operate, repower, and decommission the Project.

The English name of the Project is the *Bow Lake Wind Farm*, however, the BFN know and refer to the Project as *Chinodin Chigumi Nodin Kitagan*.

The basic components of the Project include 36 wind turbines for a total maximum installed nameplate capacity of up to 58.32 MW. In addition, the operation of the Project will require 34.5 kilovolt (“kV”) above and below ground electrical collector and communication lines, pad-mounted transformers, crane pads, two permanent meteorological (“Met”) towers, access roads, an operations and maintenance building, welfare buildings, a transformer station (“TS”), construction compounds and laydown yards, and other ancillary facilities. The Project will connect to the provincial power grid via existing 115 kV transmission lines located adjacent to the Project’s TS. A full description of Project infrastructure is provided in the **Project Description Report**.

The Proponent has retained Stantec Consulting Ltd. (“Stantec”) to prepare a Renewable Energy Approval (“REA”) Application, as required under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the *Environmental Protection Act* (“O. Reg. 359/09”). Based upon the criteria set out in subsection 6.(3) of O.Reg.359/09, the Project is classified as a Class 4 Wind Facility and has followed and will follow the requirements identified in O.Reg.359/09 for such a facility.

1.2 REPORT REQUIREMENTS

This **Wind Turbine Specifications Report** is one component of the REA Application for the Project, and has been prepared in accordance with Item 14, Table 1 of O. Reg. 359/09 which sets out specific content requirements as provided in the following table (**Table 1.1**).

Table 1.1: Wind Turbine Specifications Report Requirements: O. Reg. 359/09

Requirements	Completed	Section Reference
Provide specifications of each wind turbine, including:		
1. The make, model, name plate capacity, hub height above grade, rotational speeds.	✓	2.1 and Appendix A
2. The acoustic emissions data, determined and reported in accordance with standard CAN/CSA-C61400-11-07, "Wind Turbine Generator Systems – Part 11: Acoustic Noise Measurement Techniques", dated October 2007, including the overall sound power level, measurement uncertainty value, octave-band sound power levels (linear weighted) and tonality and tonal audibility.	✓	Appendix A

2.0 Wind Turbines

2.1 SPECIFICATIONS

The selected model of wind turbine for the Project is the General Electric (“GE”) 1.6-100. The general specifications of this wind turbine are outlined in **Table 2.1**.

Table 2.1: Wind Turbine Specifications

Operating Data	Specification
General	
Make	GE
Model	GE 1.6-100
Name plate capacity (MW)	1.62
Maximum Sound Power Level (dBA)	105
Rotor	
Rotor diameter (m)	100
Blade length (m)	48.7
Blade swept area (m ²)	7,854
Rotation Speed (RPM)	9.75-15.33
Tower	
Hub height above grade (m)	96
Tip height (m)	146

Each wind turbine consists of the following key components:

- Concrete tower foundation and pedestal;
- Steel tower sections;
- Nacelle (comprised of gearbox, electrical generator and housing);
- Three rotor blades;
- Hub (the structure to where the blades attach);
- Power convertor;
- Pad-mounted transformer; and
- Electrical wiring and grounding.


Turbine details, including acoustic emissions data, are provided in **Appendix A** as provided by the manufacturer.

3.0 Closure

The Wind Turbine Specifications Report for the Project has been prepared by Stantec for the Proponent in accordance with Item 14, Table 1 of Ontario Regulation 359/09 and the MOE's *Technical Guide to Renewable Energy Approvals*.

This Report has been prepared by Stantec for the sole benefit of the Proponent, and may not be used by any third party without the express written consent of the Proponent. The data presented in this Report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

STANTEC CONSULTING LTD.



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Appendix A

Wind Turbine Specifications from the Manufacturer

GE
Energy

REA Specifications Report

BluEarth Renewables – Bow Lake

1.6-100



February, 2012



Basic Turbine Information

Make and Model: GE 1.6-100

Nameplate Capacity: 1.62 MW

Hub Height Above Grade: 96m

Rotational Speed Range: 9.75 to 15.33 RPM

Acoustic Emissions Data*

*In Accord with CAN/CSA-C61400-11:07 – which adopted without modification IEC 61400-11, ed. 2.1:2006.

Overall and Octave-Band Sound Power Values

Wind speed at hub height (m/s)	Overall 1.6-100 96 m hub height LWA (dBA)	63 Hz Octave band level (dBA)	125 Hz Octave band level (dBA)	250 Hz Octave band level (dBA)	500 Hz Octave band level (dBA)	1000 Hz Octave band level (dBA)	2000 Hz Octave band level (dBA)	4000 Hz Octave band level (dBA)	8000 Hz Octave band level (dBA)	16000 Hz Octave band level (dBA)
7.2	98.4	81.9	87.1	91.2	93.0	91.7	90.5	83.6	63.4	18.5
7.9	100.8	84.1	89.3	93.7	95.8	94.0	92.5	86.1	66.5	21.3
8.6	102.9	86.0	91.3	95.7	98.2	96.2	94.4	88.2	69.2	23.7
9.3	104.2	88.0	92.8	95.5	98.7	99.1	96.0	87.9	67.8	24.6
10.0	105.0	89.1	93.8	95.6	98.7	100.6	97.1	88.2	69.2	25.4
11.5	105.0	89.2	94.0	95.6	98.5	100.8	97.0	87.3	67.8	24.5
12.9	105.0	89.2	94.0	95.6	98.6	100.9	96.7	86.7	67.2	25.8
14 - cutout	105.0	89.1	93.8	95.6	98.8	101.0	96.2	86.1	67.2	27.3

Measurement Uncertainty Value: <2 dBA for 95% confidence interval per IEC/TS 61400-14

Tonality and Tonal Audibility: <2dB at a ground distance from the turbine base equal to hub height plus half the rotor diameter.