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## MEMORANDUM

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**TO:** PAUL CARTER, DEPARTMENT OF ENVIRONMENT AND CONSERVATION OF NEWFOUNDLAND AND LABRADOR

**FROM:** SHANT DOKOUZIAN, ENG.

**SUBJECT:** FERMEUSE WIND FARM – NOISE SIMULATIONS – **REVISION 1**

**DATE:** 2008-06-12

**CC:** JULIE TURGEON, ENG. - HELIMAX, CHARMAINE THOMPSON, SKYPOWER CORP.

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This document provides an addition to the Environmental Assessment of the Fermeuse Wind Farm, submitted to federal and provincial agencies in March 2008. As requested, this document presents details on the noise simulation conducted for the Fermeuse Wind Farm Project and an additional noise simulation.

Noise simulations are produced using industry standard software, such as WindFarmer in the case of Fermeuse. The software is based on the currently approved ISO 9613 standard. This standard provides a model for the calculation of the equivalent continuous A-weighted sound pressure level at a distance from one or more point sources under meteorological conditions favourable to propagation from sources of sound emission. These conditions are for downwind propagation and propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night.

The method consists of octave-band algorithms (i.e. with nominal mid-band frequencies from 63 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 effect – attenuation due to the acoustical properties of the ground.

ISO-9613 input parameters are ambient air temperature, ambient barometric pressure, humidity, source ground factor, middle ground factor, receptor ground factor, receptor height and wind turbine characteristics, amongst others.

In addition to being internationally recognized, ISO 9613 is the calculation methodology strongly recommended by CanWEA (2007) and provinces such as Ontario (NPC-252) and Quebec (Instruction Note 98-01). This methodology was used in both simulations attached hereto. Differences between provincial jurisdictions mainly lie in the input parameters used for the simulations, namely the turbine characteristics and the recommended maximum noise levels at dwellings.

In absence of provincial guidelines, the initial noise simulation produced by Helimax followed national best practices and was based on the *worst case scenario principle* by using the maximum noise output of the wind turbine, regardless of wind speed. This simulation is included in the *Noise and Visual Analysis Study*

Report presented to the DEC and to the Town of Fermeuse, last March. Initially, the Project was configured to comply with the *Health Canada Wind Farm Fact Sheet* (2006) which recommends that the simulated noise generated from wind turbines should not exceed 45 dBA outside dwellings. The noise isocontour map in the report showed clearly that no dwellings were within the 45 dBA limits. For illustrative purposes, we have attached the same map to this memo, but added the 40 dBA isocontour; the map shows that dwellings are also outside the 40 dBA limits. Once again, this represents a worst-case scenario, as the model considers the following:

- that turbines are spinning at maximum noise output;
- the model takes into account the cumulative effect of all turbines;
- the model assumes that the dwellings are always downwind from all turbines;
- the model does not include any screening from vegetation.

The second simulation, and also attached hereto, follows CanWEA guidelines (2007) (as used in Ontario–NPC-252) which recommend using the noise output of the wind turbine when the wind speed is 6 m/s at a height of 10 m above ground level, whilst respecting 40 dBA at dwellings. Thus, the latter is somewhat less conservative as the wind turbines do not produce as much noise at 6 m/s, and the results are clearly illustrated in the attached map.

In summary:

- The initial noise simulation was done as per ISO 9613 with the maximum sound power level (SPL) of the Vestas V90 turbine (109.4 dBA);
- The second noise simulation was done as per ISO 9613 with the sound power level (SPL) of the turbine at winds of 6 m/s (at 10m above ground level), equivalent to 106.0 dBA, as recommended in the CanWEA guidelines;

For both simulations, the results show that all permanent dwellings, which are located in the Town of Fermeuse, are below the limit of 40 dBA.

Please feel free to contact us on the matter, if need may be.

Best regards,

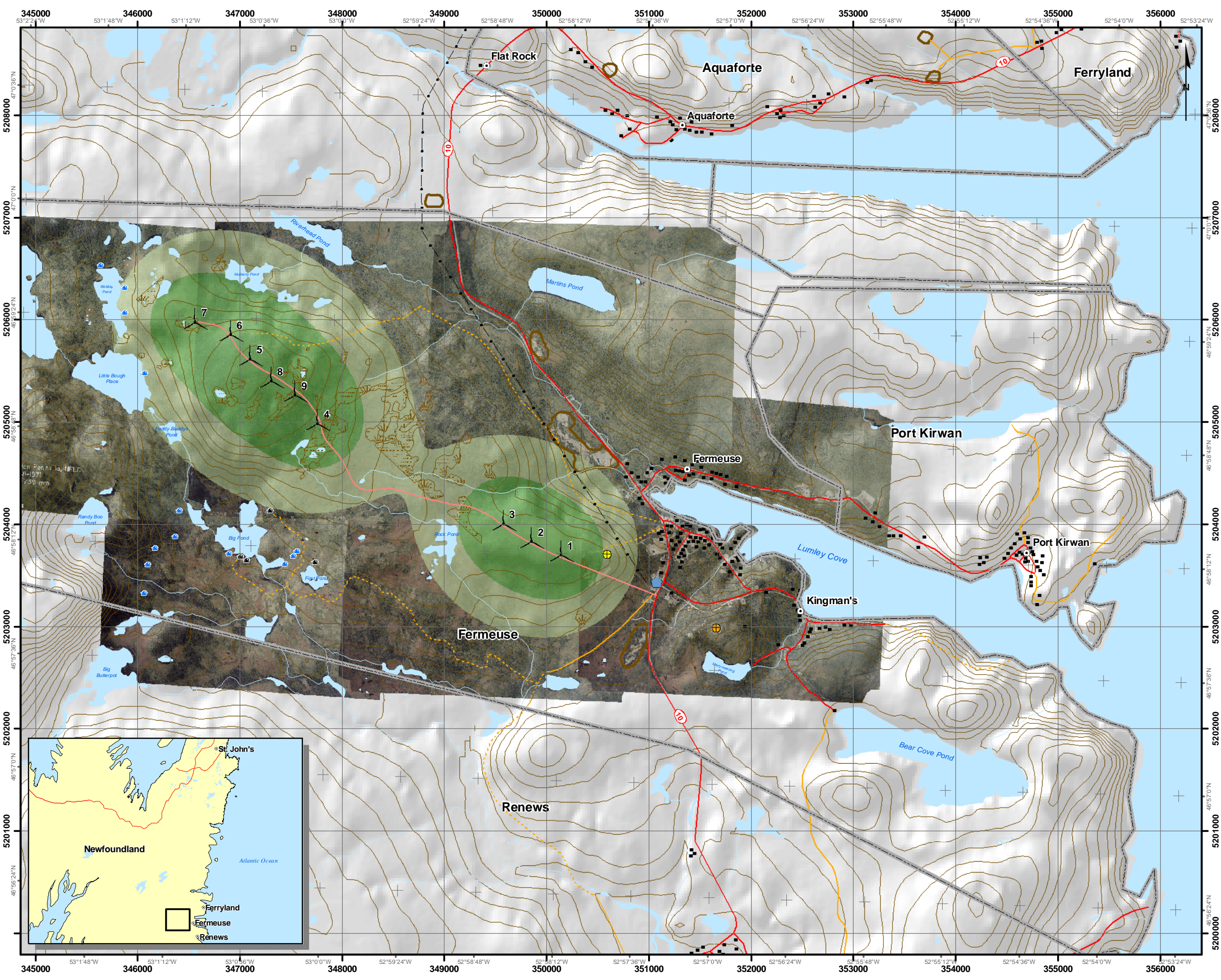


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Enclosure (2)





**Legend**

Wind Turbine

Wind Monitoring Tower

Radiocommunication Tower

Building

Cabin

Cabin (Approximate Position)

Transformer Station

Transmission Line

Access Road

Road

Limited-use Road

ATV and Snowmobile Trail

Contour (interval: 10 m)

Watercourse

Mining Site

Peatland (Site Visit)

Municipality

Waterbody

40 - 45 dB(A)45 and More dB(A)

GENERATING A BRIGHTER FUTURE

*Fermeuse Wind Farm*

**PROJECT LAYOUT AND  
NOISE ISO-CONTOURS  
(WIND TURBINES V90  
AT MAXIMUM SPL - 109.4 dBA)**

152-219-260508-01-CLA

Layout: L09-152FER(VW22901)-20080215-SD00

Noise Analysis:  
ICB03-152Fermuse-9ms-20080219-MS00

May 26, 2008

Projection: UTM Zone 22, NAD83

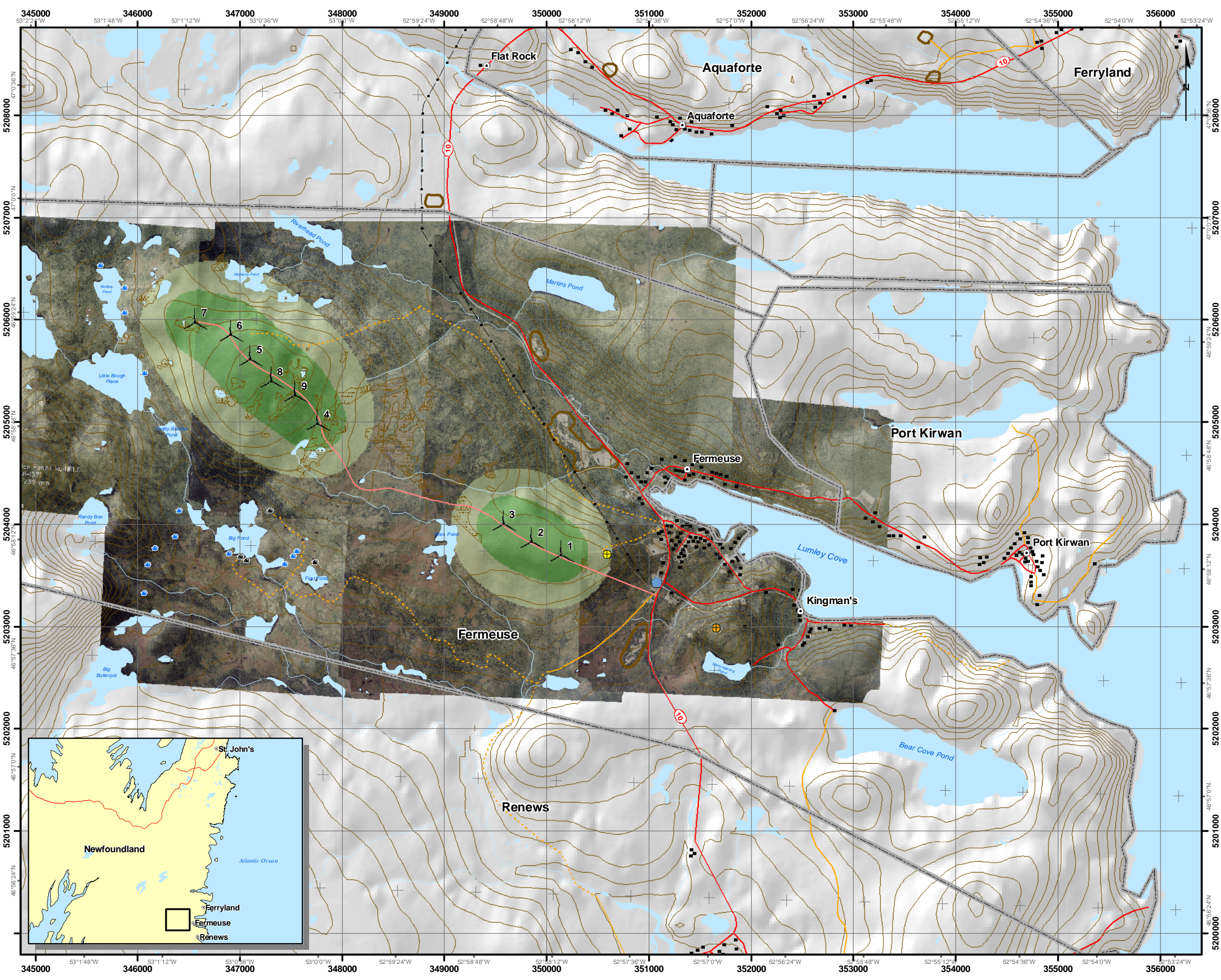
Sources: NTDB 1:50 000, Geobase and Envirolat 3000

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**Legend**

Wind Turbine

Wind Monitoring Tower

Radiocommunication Tower

Building

Cabin

Cabin (Approximate Position)

Transformer Station

Transmission Line

Access Road

Road

Limited-use Road

ATV and Snowmobile Trail

Contour (interval: 10 m)

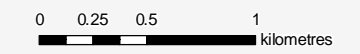
Watercourse

Mining Site

Peatland (Site Visit)

Municipality

Waterbody

**Simulated Noise Level**35 - 40 dB(A)40 - 45 dB(A)

GENERATING A BRIGHTER FUTURE

*Fermeuse Wind Farm*

**PROJECT LAYOUT AND  
NOISE ISOCONTOURS -  
WIND TURBINES V90  
AT SPL = 106.0 dBA  
(for wind speed of 6 m/s at 10 m agl)**



152-220-260508-01-CLA  
Layout: L09-152FER(VW22901)-20080215-SD00  
Noise Analysis:  
CB152Fermeuse-6ms-20080523-SD00  
May 26, 2008  
Projection: UTM Zone 22, NAD83  
Sources: NTDB 1:50 000, Geobase and Envirolat 3000  
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