

2.0 PROXIMITY AND NOISE

2.1 Proximity of Turbines to Residences

In response to public concerns about the proximity of turbines, SWI has revised the layout of the wind turbines for the Glen Dhu Project in order to provide a greater setback between the turbines and local residences. The municipal by-laws in Pictou County require a 600m setback from houses and the proposed by-laws for Antigonish will require a 1000m setback from houses. SWI has increased the setback on the western portion of the Project, which is where the public comments on the proximity to dwellings have been focused, to approximately 1.44 km. SWI has increased the setbacks on the eastern portion of the project (the Antigonish County end) to 1.12 km. The 1.44 km distance applies to all residences who are Non-Project Participants. The 1.12 setback applies to a Project Participant who will lease land for turbines. For purposes of this document, 1.44 km will be used to describe the minimum setback distance as it applies to non-participant residences.

These changes to the layout required careful analysis to optimize the economics of the Project as the previous layout of the turbine included some sights which were significant energy producers. As such, the changes have consumed financial resources which were not previously considered. SWI is prepared to bear these costs in order to mitigate public concern over the noise issue.

The mitigation of noise and proximity concerns required the re-evaluation of some areas of the wind farm; however, the revised sites are within the boundaries of previously studied area for the environmental assessment. The adjustments to the turbine locations fall within the Project area. This area has been the subject of extensive ecological, geotechnical, archaeological, avian species and Mi'kmaq Ecological Knowledge surveys. As part of the final micro-siting program, a field botanist will conduct site specific botanical surveys for any revised sites which fall outside the areas of the previous botanical surveys. SWI is committed to avoiding any areas of concern that arise during the micro-siting process and will adjust the roads and foundations locations accordingly. The relocation of some turbines does not significantly alter the impact assessment or preclude its application to the revised layout. The existing assessment conclusions still stand.

Figure 2.1 shows the revised turbine layout and physiographic features of the Project area. The site plan indicates that proximity of turbines to residences has increased to a minimum of 1.44 km. Figure 2.2 shows the project area with distances to nearest residences of 640 m (original minimum distance), 1000 m, 1500 m, and 2,000 m. There are no day cares, hospitals, or residences for senior citizens within this 2,000m zone. Table 2.1 shows the number of residences within each of the above distance intervals. The minimum setback of wind turbines from dwellings required for Pictou County is 600m and the minimum setback for Antigonish County is proposed to be 1000m.

Table 2.1: Distance Intervals From Wind Turbines to Residences

Interval (m)	Number of Residences
0- 640	0
640- 1000	0
1000- 1500	7
1500 - 2000	12

Table 2.2 shows the numbers of turbines visible from homes in the 1000-1500 m range and the 1500 - 2000m range. The house numbers are identified on Figure 2.2. The homes of Project participants are also identified.

Table 2.2: Number of Turbines Visible by Distance

House Number (See Figure 2.2)	Number of Turbines Visible	Project Participant
1000 – 1500 m		
2	1	Yes
5	4	No
11	0	No
16	0	No
17	4	Yes
18	0	Yes
19	0	Yes
1500 – 2000 m		
1	4	No
3	7	Yes
4	0	Yes
6	6	No
7	9	No
8	12	Yes
9	6	No
10	10	Yes
12	0	No
13	0	No
14	8	No
15	0	No

A noise model was used to assess potential sound levels around the turbine sites. This model is an ISO approved model and used international standards to assess potential noise levels. Figure 2.3 shows Estimated Turbine Sound Levels from modeling of the revised locations. Figure 2.3 replaces Figure 5.5 of the EA Registration Document. Details of the model and the assumptions used are described in Section 2.2. All residences fall outside the 40 db(A) zone which is considered to be typical of background sound levels. All non-participant residences fall outside the 35db(A) noise isoline. The model assumptions are provided in Appendix E.

The Turbine Visibility Analysis is provided in Figure 2.4 of this Addendum and replaces Figure 5.3 of the EA Registration.

2.2 Description of Noise/Visual Model

SWI commissioned the German firm, AL-PRO GmbH & Co. KG to analyze the wind resources in the Project area and to optimize the locations of the wind turbines based on site specific wind characteristics, wind flow dynamics as a function of the orography and the specific power generating and engineering characteristics specific to the Enercon E-82 turbine. WindPRO (version 2.6.0.235 August 2008), which is produced using EMD International A/S of Denmark was used to run the optimization. This software has been used extensively in Canada (and internationally) in the analysis and development of wind farms.

After the turbine layout was finalized, Decibel, a module contained within WindPRO, was used by AL-PRO to predict the sound levels generated by the Glen Dhu Wind Farm. The calculations were based on the ISO 9613-2 Standard using specific German model parameters.

The sound level module uses 3 dimensional (3D) turbine location data, wind data, digital topography and other physiographic features. The output report containing the assumptions used in this model is attached in Appendix E. The model output provided noise isolines which are shown in Figure 2.3, Estimated Turbine Sound Levels.

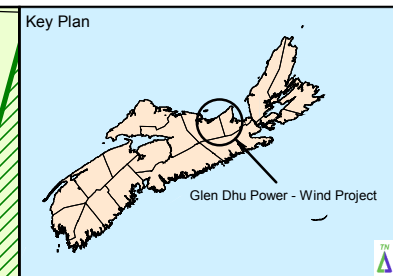
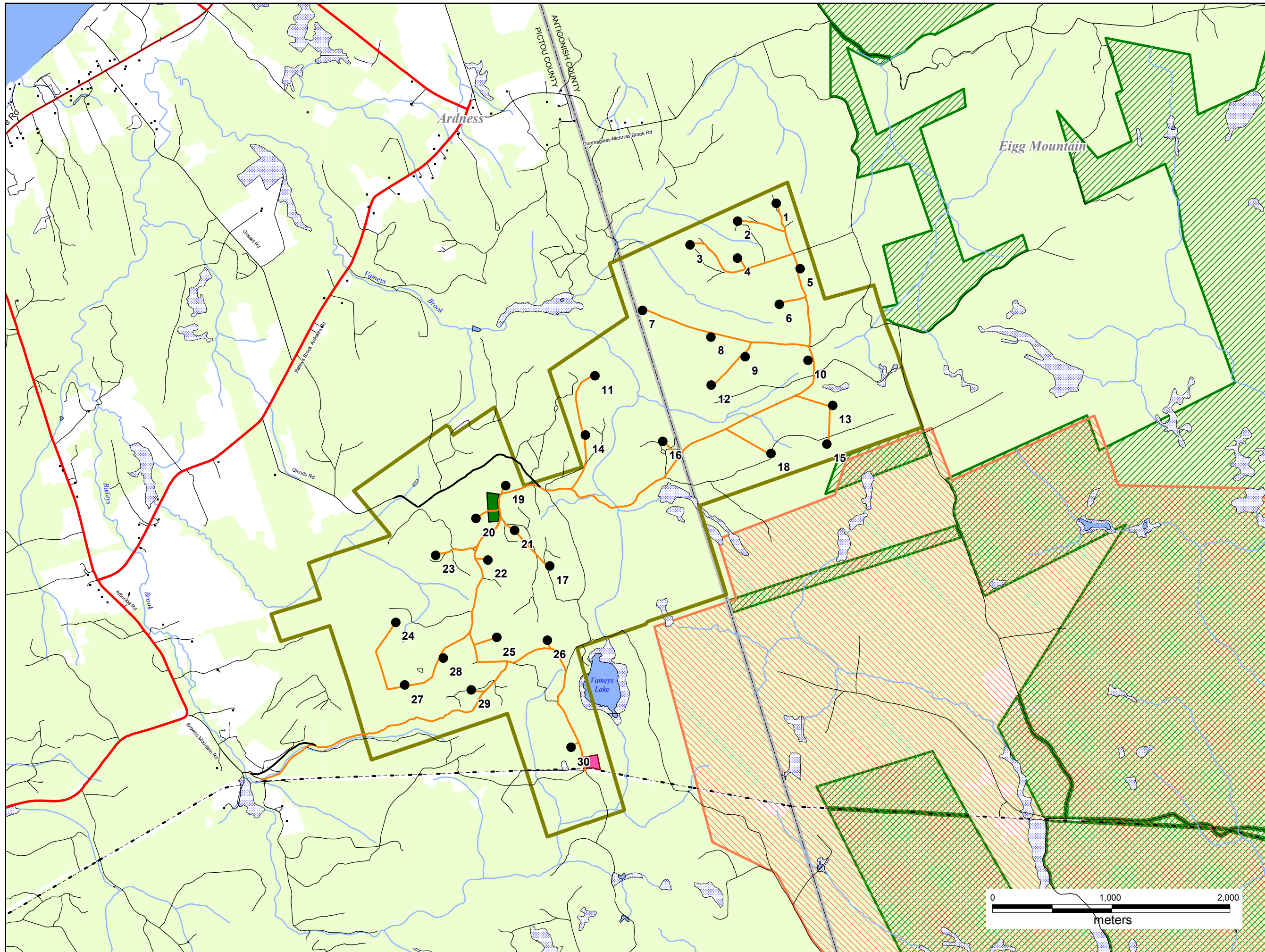
The WindPRO also has a module (ZVI) for calculating the visibility of wind turbines from any angle on the landscape. Inputs to this model include the 3D locations of the turbines, digital topography, vegetation obstacles and curvature of the earth. The output of the model provides a long distance map of the visual effects of the turbine array. This output was adapted using Arc View GIS software to create Figure 2.4.

2.3 Mitigation of Potential Noise Issues

As shown in Figure 2.1 and noted in Tables 2.1 and 2.2, the updated layout as been adopted to mitigate concerns about noise and proximity. The updates to the original layout include:

- Deletion of four sites (as the original study had four extra sites to allow some design flexibility);
- Adjustment of the remaining closest turbines along the western edge of Project area;
- Adjusting the turbine locations along the entire northern section of the Project area.

The letters sent in regarding the issue of proximity to residences was concentrated on the western boundary of the Project. These three houses, of which the nearest was roughly 640m, on the original layout for the EA submission, now lie no closer than 1.44 km from the nearest turbine. The revised layout means that no turbines are located within a 1.44 km distance of any non-participant residences. The noise model indicates that sound levels at these distances are at typical background levels for rural locations.



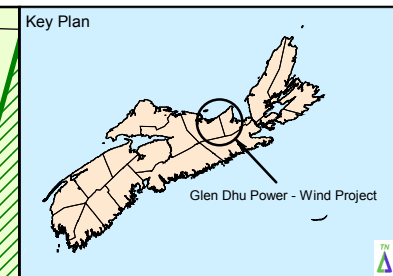
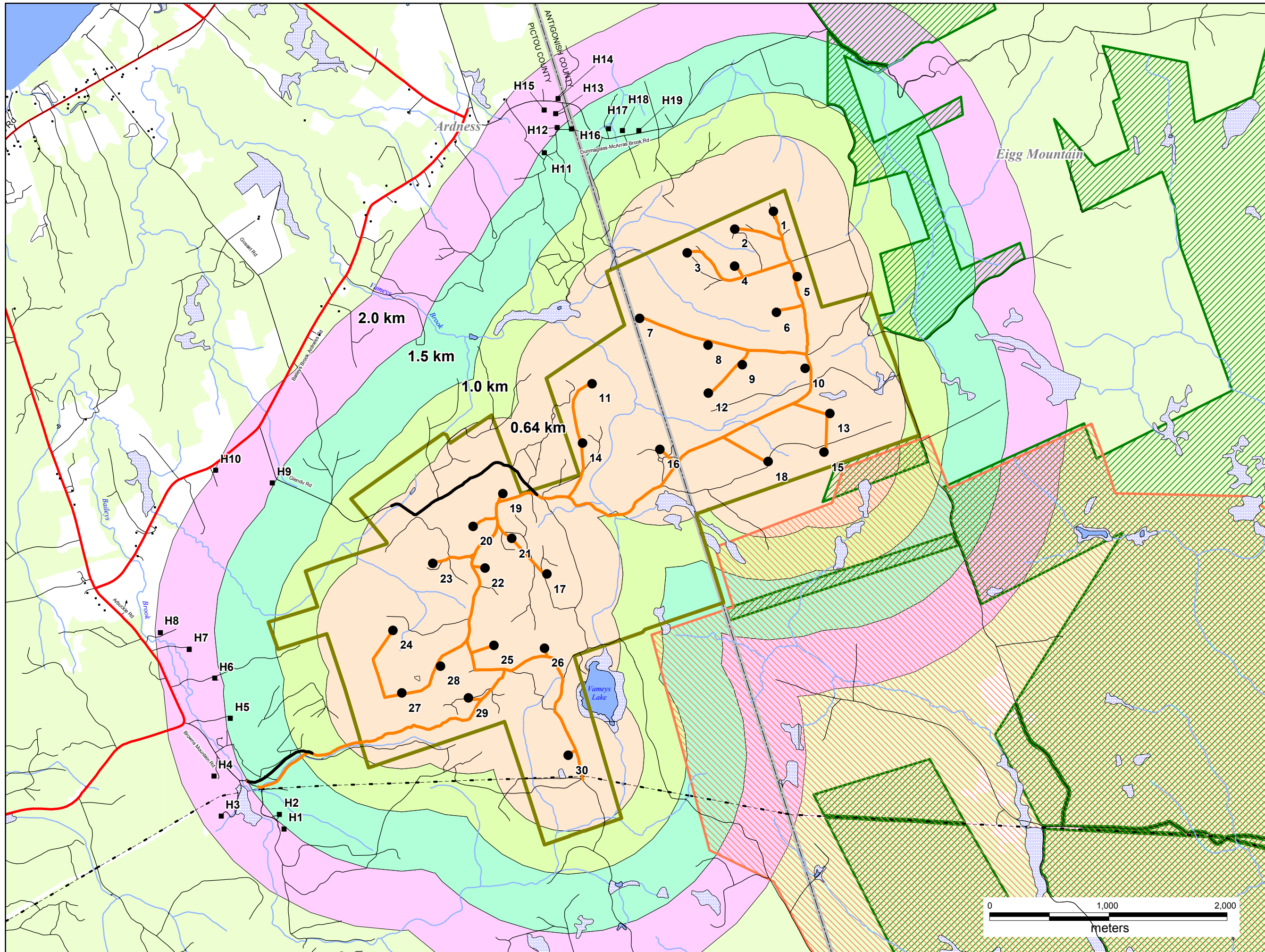
- Legend:**
- Existing Features**
- Paved Roads
 - Local Roads
 - - - Transmission Line
 - Streams
 - Forested
 - Non Forested
 - Water
 - General Wetlands
 - Eigg Mountain Wilderness Area
 - James River Watershed Area
- Project Features**
- Project Site
 - Proposed Roads
 - Optional Proposed Roads
 - Laydown Area
 - Transformer Station
 - Proposed WTG's, V10.2b
 - 23 WTG ID



**Glen Dhu Power-Wind Project
Registration Document
Addendum**

Figure 2.1
Revised Wind Turbine Location
Map

DWG No: 2.1_11_26_08
 REVISION: 1.1
 SCALE: 1: 30,000
 DATE: November 26, 2008
 PRODUCED BY: NORTEK/STANTEC



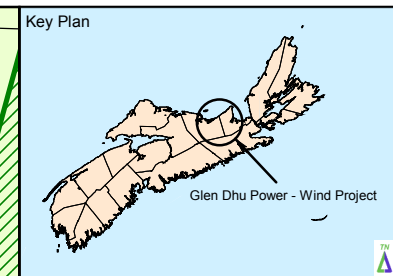
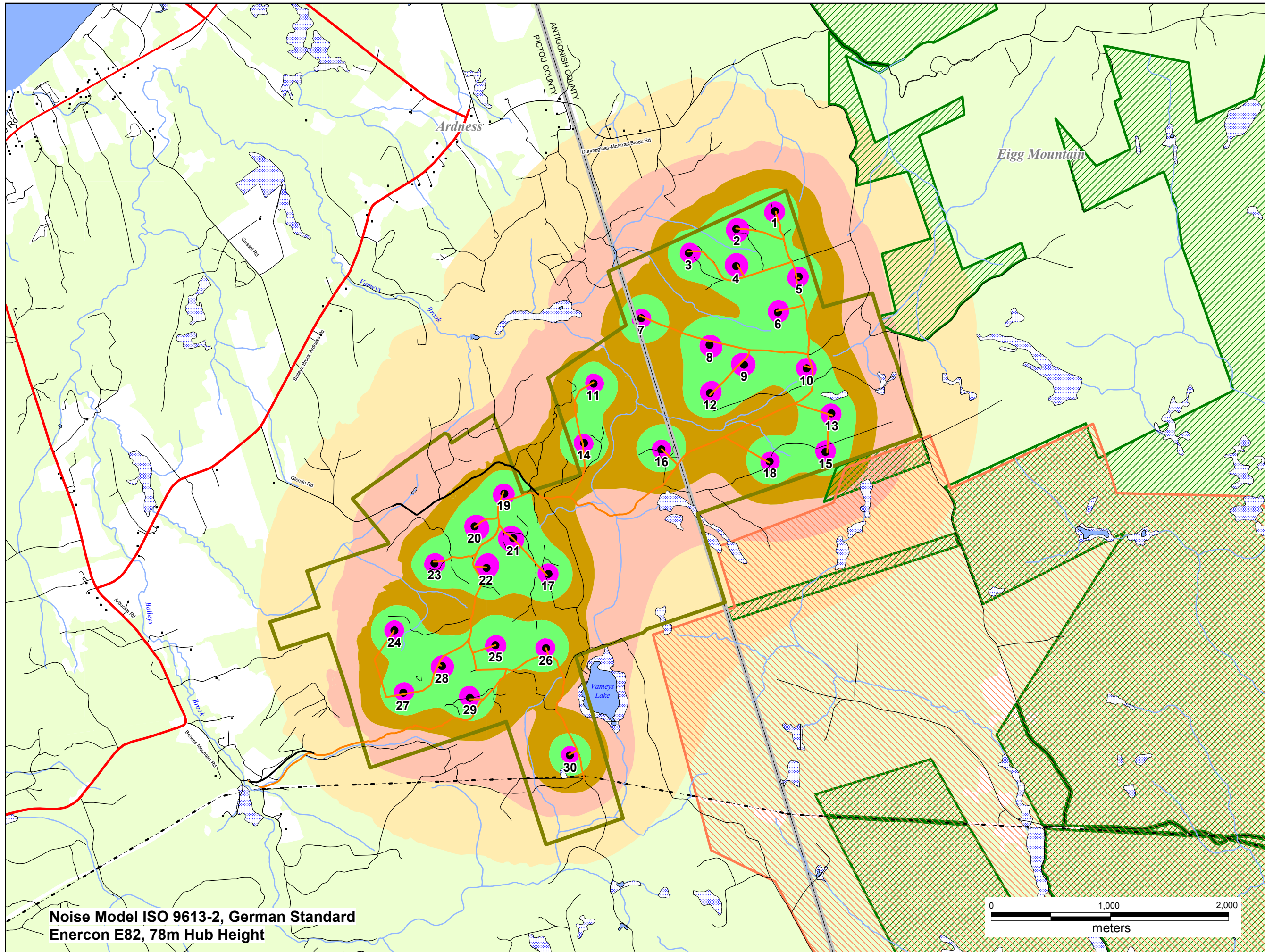
- Legend:**
- Existing Features**
- Paved Roads
 - Local Roads
 - - - Transmission Line
 - Streams
 - Forested
 - Non Forested
 - Water
 - General Wetlands
 - Eigg Mountain Wilderness Area
 - James River Watershed Area
- Project Features**
- Project Site
 - Proposed Roads
 - Optional Proposed Roads
 - Proposed WTG's, V10.2b
 - 23 WTG ID
 - Homes
 - Proximity Interval
 - Within 640 m of WTG's
 - Within 1.0 km of WTG's
 - Within 1.5 km of WTG's
 - Within 2.0 km of WTG's



**Glen Dhu Power-Wind Project
Registration Document
Addendum**

**Figure 2.2
Wind Turbine Proximity
to Residences Map**

DWG No: 2.2_11_25_08
 REVISION: 1.0
 SCALE: 1: 30,000
 DATE: November 25, 2008
 PRODUCED BY: NORTEK/STANTEC



Legend:

Existing Features

- Paved Roads
- Local Roads
- Transmission Line
- Streams
- Forested
- Non Forested
- Water
- Wetlands
- Eigg Mountain Wilderness Area
- James River Watershed Area

Project Features

- Project Site
- Proposed Roads
- Optional Proposed Roads
- Proposed WTG's, V10.2b
- WTG ID

Noise (dBa)

- 35 - 39
- 40 - 44
- 45 - 49
- 50 - 54
- 55 - 100

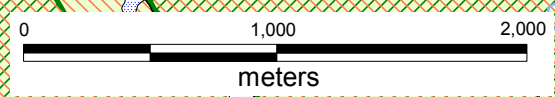


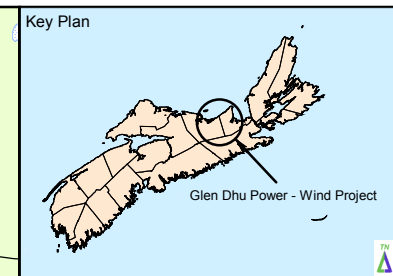
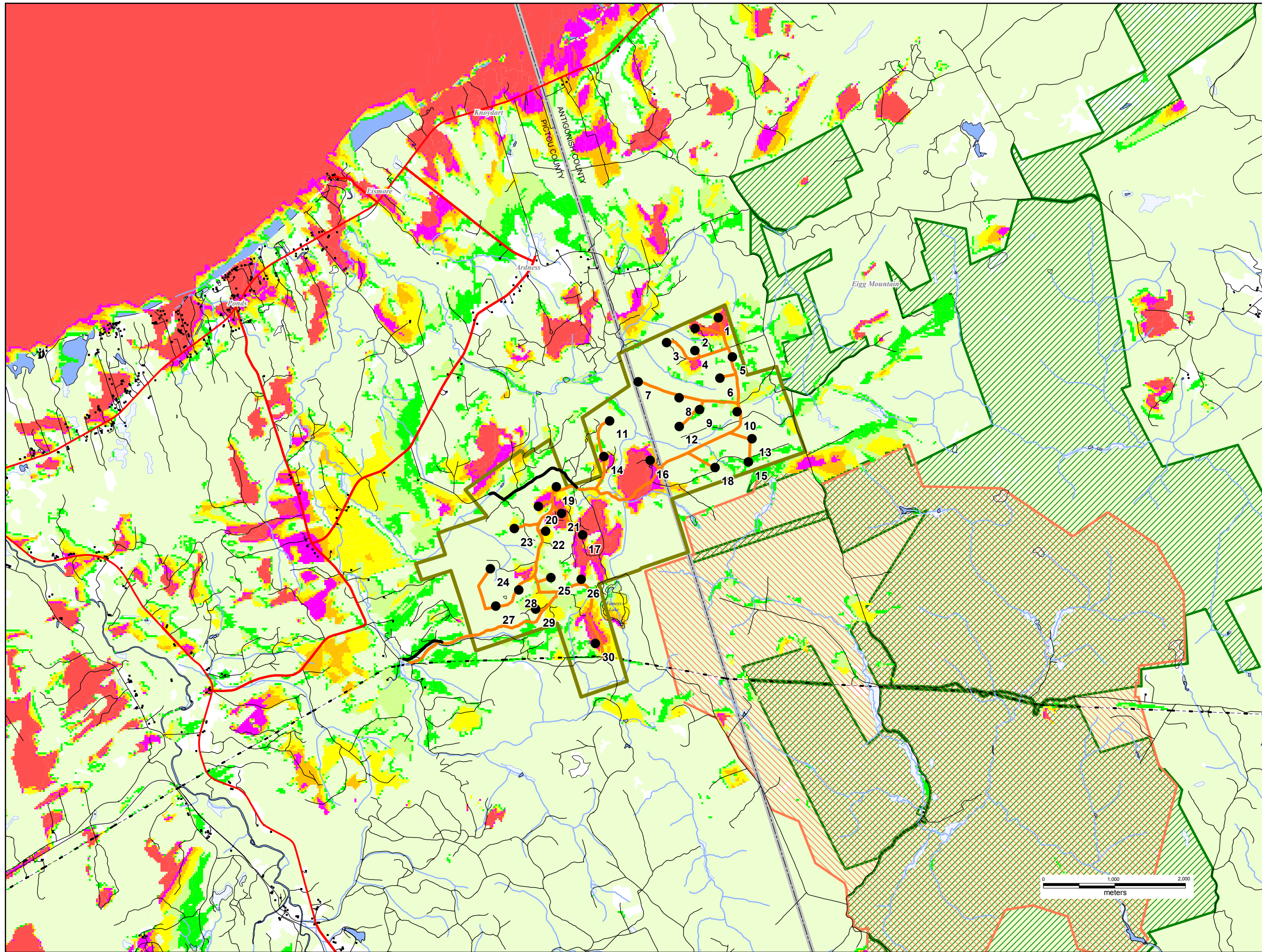
**Glen Dhu Power-Wind Project
Registration Document
Addendum**

**Figure 2.3
Estimated Turbine Sound Levels**

DWG No: 2.3_11_26_08
 REVISION: 3.4
 SCALE: 1: 30,000
 DATE: November 26, 2008
 PRODUCED BY: NORTEK/STANTEC

**Noise Model ISO 9613-2, German Standard
Enercon E82, 78m Hub Height**





- Legend:**
- Existing Features**
- Paved Roads
 - Local Roads
 - Transmission Line
 - Streams
 - Forested
 - Non Forested
 - Water
 - General Wetlands
 - Eigg Mountain Wilderness Area
 - James River Watershed Area
- Project Features**
- Project Site
 - Proposed Roads
 - Optional Proposed Roads
 - Proposed WTG's, V10.2b
 - 23** WTG ID
 - Homes
- Number of Visible WTG's**
- 1 to 5
 - 6 to 10
 - 11 to 15
 - 16 to 20
 - 21 to 25
 - 26 to 30



Glen Dhu Power - Wind Project Registration Document Addendum

Figure 2.4 Wind Turbine Visibility Analysis Map

DWG No: 2.4_11_25_08
 REVISION: 2.0
 SCALE: 1: 50,000
 DATE: November 25, 2008
 PRODUCED BY: NORTEK/STANTEC

