# Appendix D3

## Final Public Meeting (Fall 2012) Display Boards

# Grand Bend Wind Farm

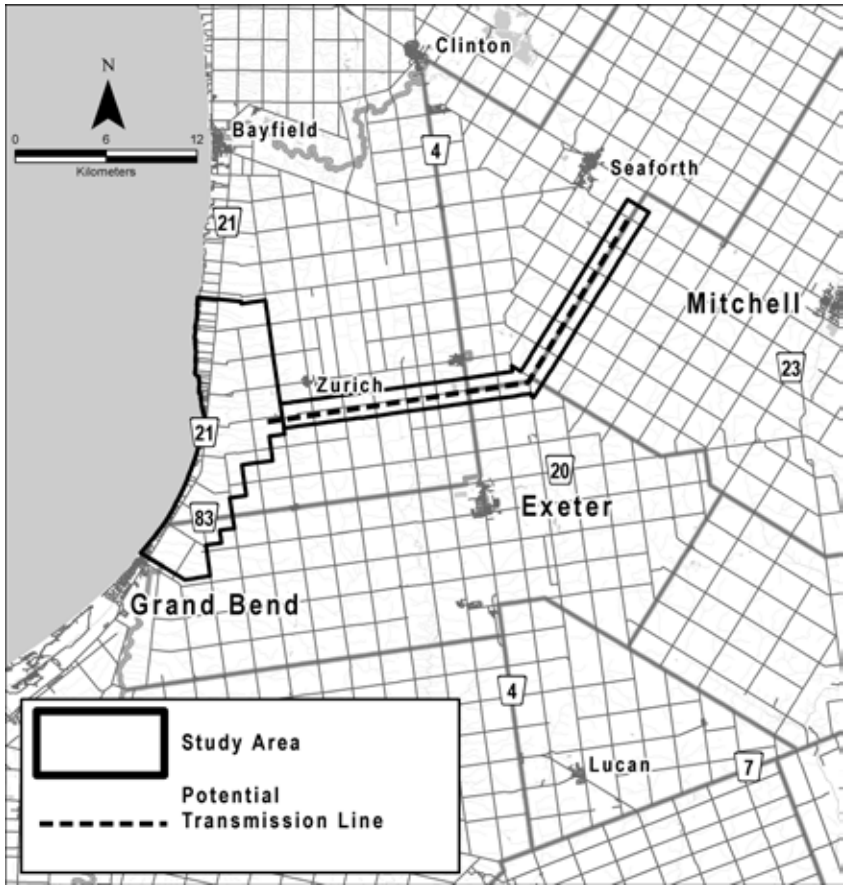
## Public Information Centre #2

## Fall 2012

NORTHLAND POWER

MEEGAN BURNSIDE

# Welcome




**Please…..**

- Sign In.
- Ask us any questions you may have about the project or the results / scope of study.
- There is an opportunity at any time during the REA process for interested persons to provide comments.
- Complete a comment sheet and place it in the box or mail back to the address shown on the form by December 21, 2012.
- Note: boards, comment sheets and all supporting documentation are available on the Project website http://grandbend.northlandpower.ca

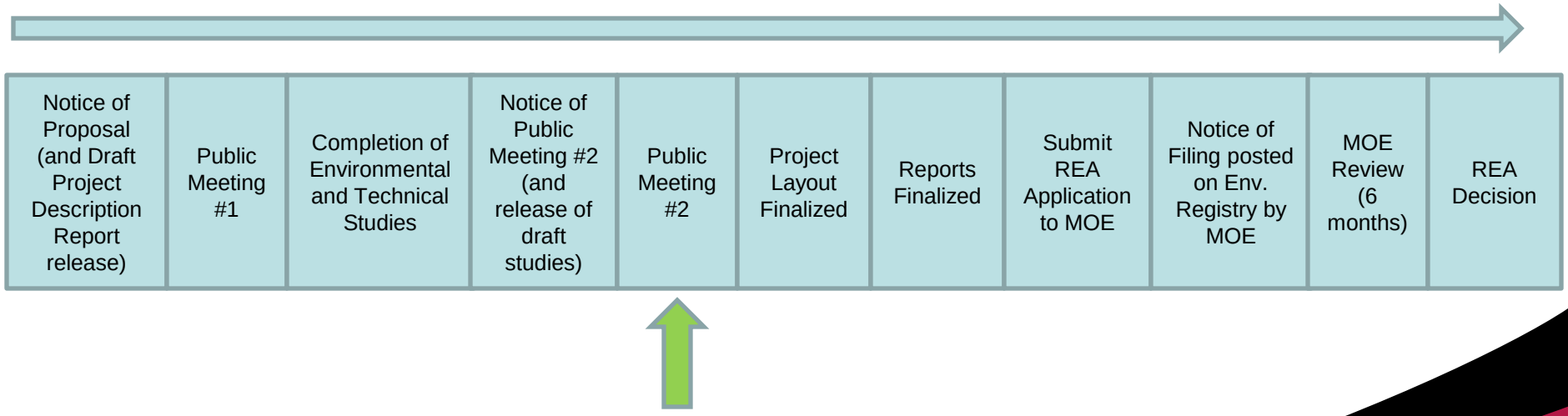
# Purpose of Today's Meeting

- To present the proposed turbine locations and collector / transmission line routing for the Project
- To present findings of the base line studies and discuss the Draft REA Reports
- To present the Proposed Environmental Impacts and Preliminary Mitigation Measures
- Identify Next Steps in the process
- Listen to your questions and comments
- Collect and consider your feedback

Representatives from Northland Power and their independent consultants are available to answer your questions and take your comments

# Renewable Energy Approvals (REA) An Overview

The Project is subject to the REA process, subject to the provisions of the Environmental Protection Act and Ontario Regulation 359/09. The REA process entails consideration of environmental aspects, natural heritage features and water bodies as well as heritage and archaeological resources. In addition, the REA process includes, public, agency and First Nation consultations. Throughout the REA process, Northland Power will do everything in its power to ensure that negative environmental impacts are reduced and/or eliminated.



# Contact Information

- If you have any questions or concerns regarding the proposed project, Please feel free to contact: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Northland Power Inc.
30 St. Clair Avenue West, 17th Floor
Toronto, Ontario M4V 3A1
647-288-1272

Lyle Parsons, B.E.S.
Neegan Burnside Ltd.
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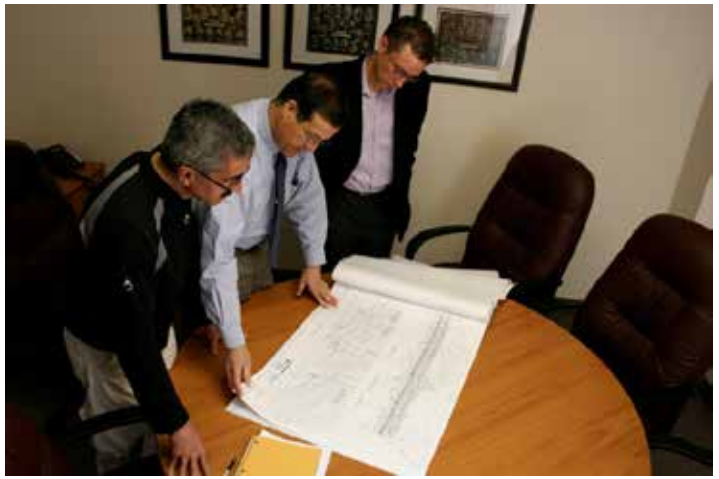
519-823-4992

Fiona Christiansen, M.Sc
Stantec Consulting Ltd.
70 Southgate Drive, Suite 1
Guelph ON N1G 4P5
519-836-6050

**Project Specific E-mail Address and Free Phone Telephone Hotline:**

grandbendwind@neeganburnside.com

1-800-696-8093

# General Project and Site Information

# Grand Bend Wind Limited Partnership
# Wholly Owned Subsidiary
# of Northland Power Inc

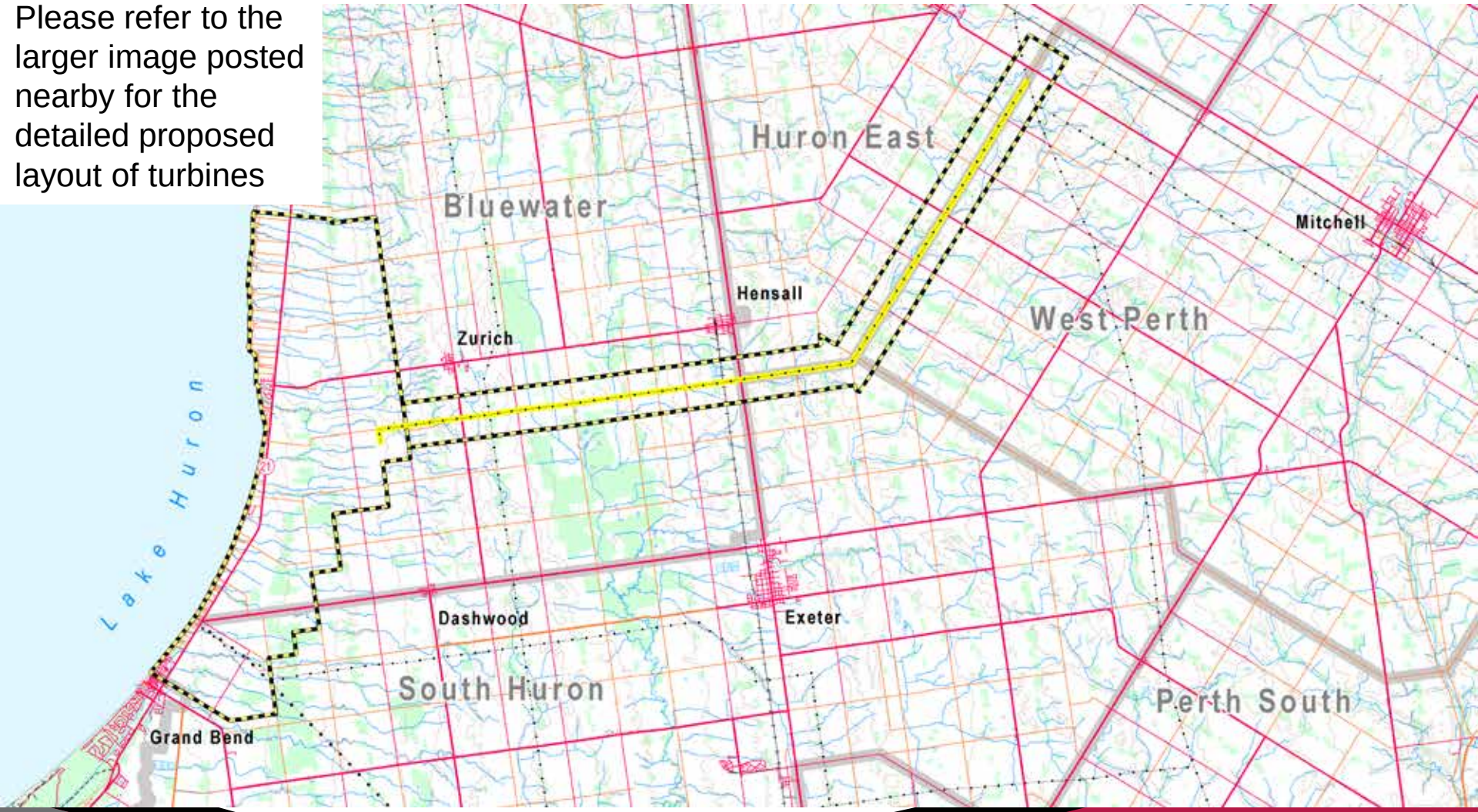
- Since its inception in 1987, Northland Power has developed facilities generating a total of approximately 1,004 MW of electricity.
- Sustainability is a core value at Northland Power:
  - Ø **Health and Safety** – Northland's first priority is to ensure their people have the knowledge, tools and time to work safely.
  - Ø **Financial** – Northland only pursues projects that meet strict return thresholds and have creditworthy customers. Thus they have only paid stable monthly dividends since 1997.
  - Ø **Operational** – Northland maintain and reinvest constantly in their operating assets for maximum efficiency and economic life.
  - Ø **Environmental** – Northland Power was founded on the belief that clean and green energy is vital to the future of our planet. Construction and operational practices are engineered to meet the highest environmental standards, even in jurisdictions where lower standards are legislated.
  - Ø **Community** – Northland invests continuously in its host communities to ensure they remain vibrant, healthy places to live.

# Project Overview

- The Grand Bend Wind Limited Partnership is proposing to develop a 100 MW wind facility north of Grand Bend, Ontario.
- The Project will include up to 48 turbines, turbine access roads, an underground electrical collection system, new transmission lines within municipal road right of ways and connection to the provincial power grid.
- All turbines are located to the east of Highway 21. The closest turbine is 650 m from the Highway. The majority of the turbines are over 1,000 m from the Highway. All turbines are over 550 m from any noise receptor.
- The Project is located on private land within the County of Huron, spanning the lower-tier Municipalities of Bluewater and South Huron. Portions of the transmission line traverse the municipality of Huron East and municipality of West Pert in Perth County

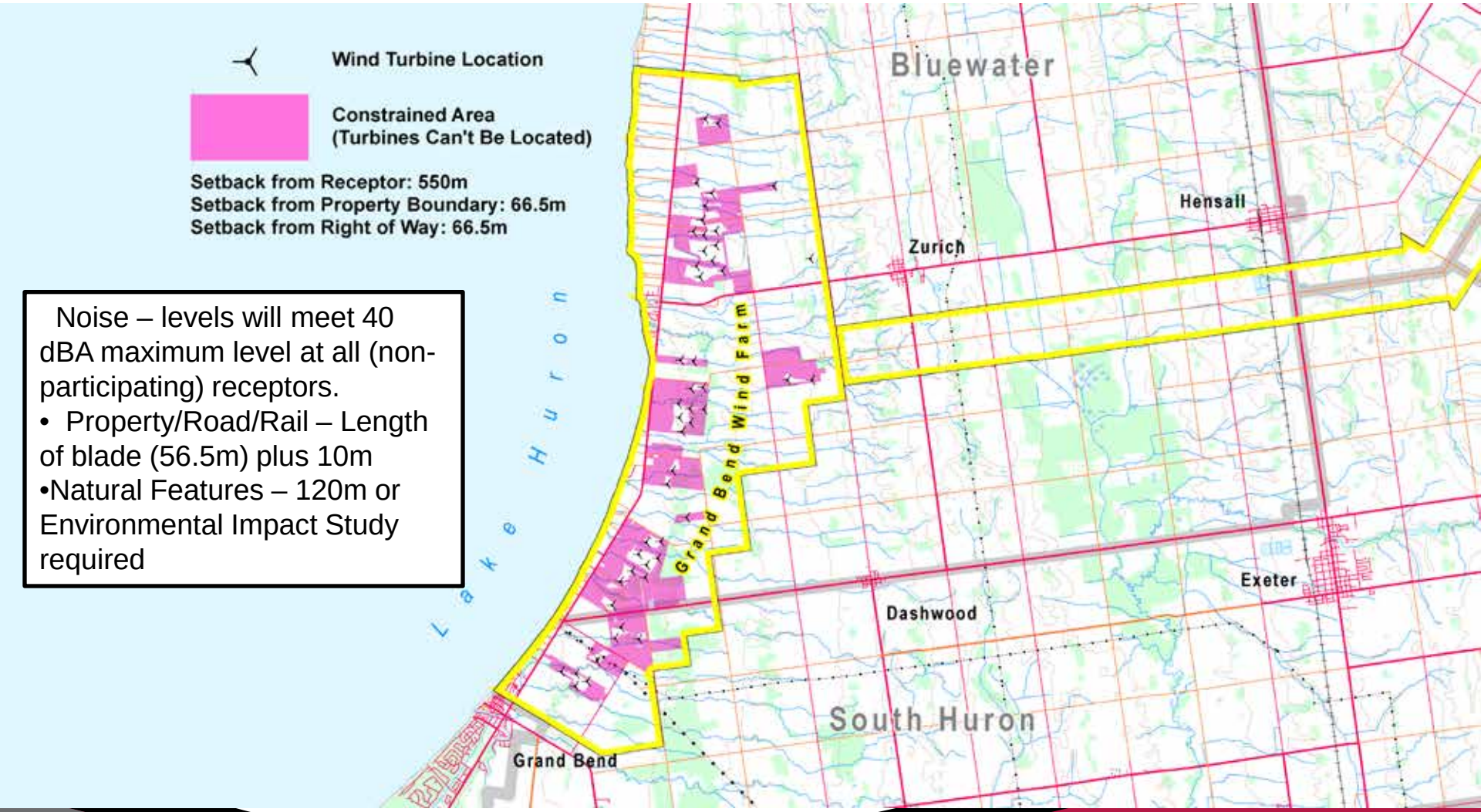
# Project Study Area

Please refer to the larger image posted nearby for the detailed proposed layout of turbines



Note: All turbine layouts comply with regulated setbacks

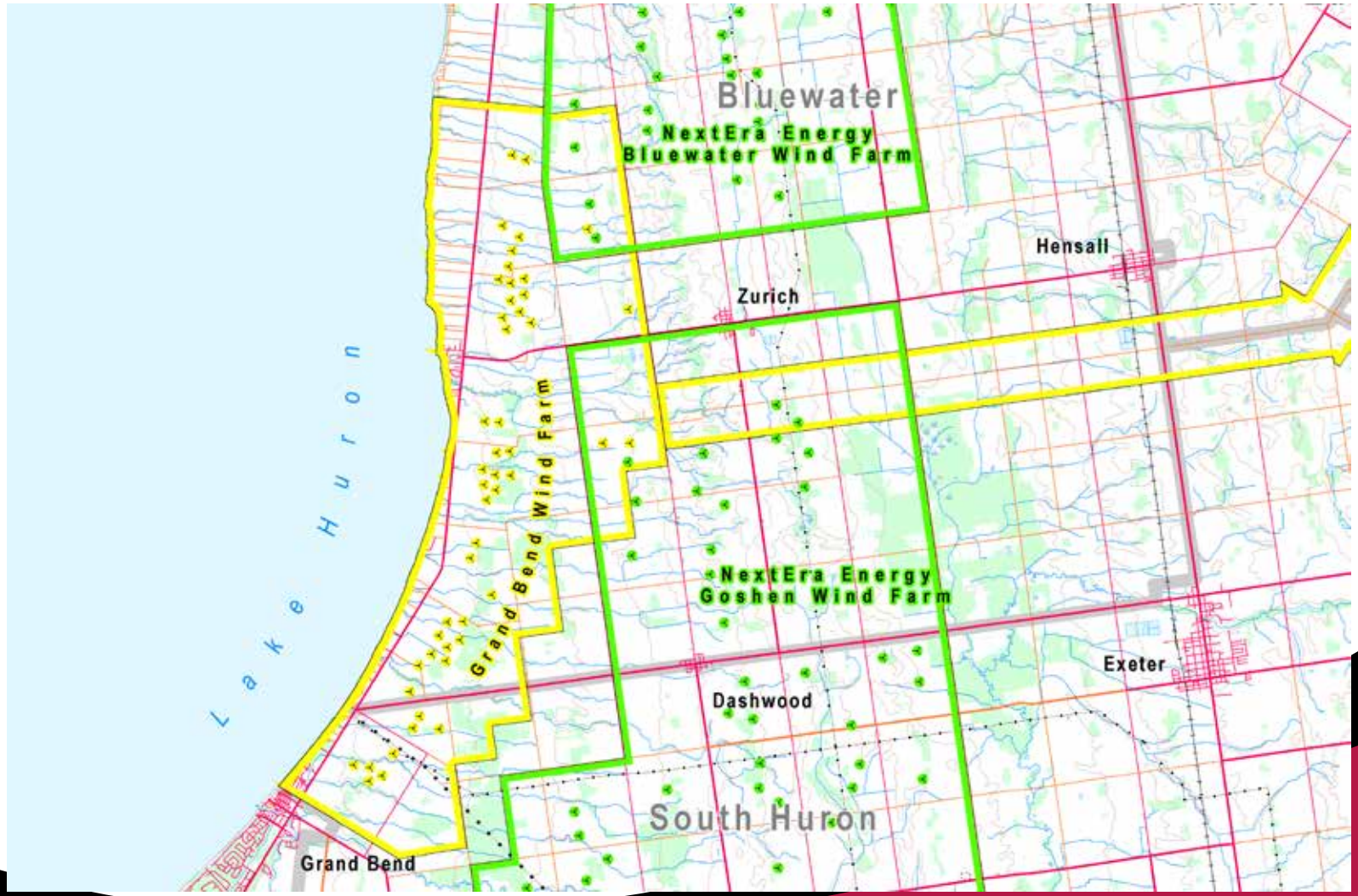
# Regulated Setbacks




Noise – levels will meet 40 dBA maximum level at all (non-participating) receptors.

- Property/Road/Rail – Length of blade (56.5m) plus 10m
- Natural Features – 120m or Environmental Impact Study required

# Other Projects in Immediate Vicinity



# Draft REA Reports

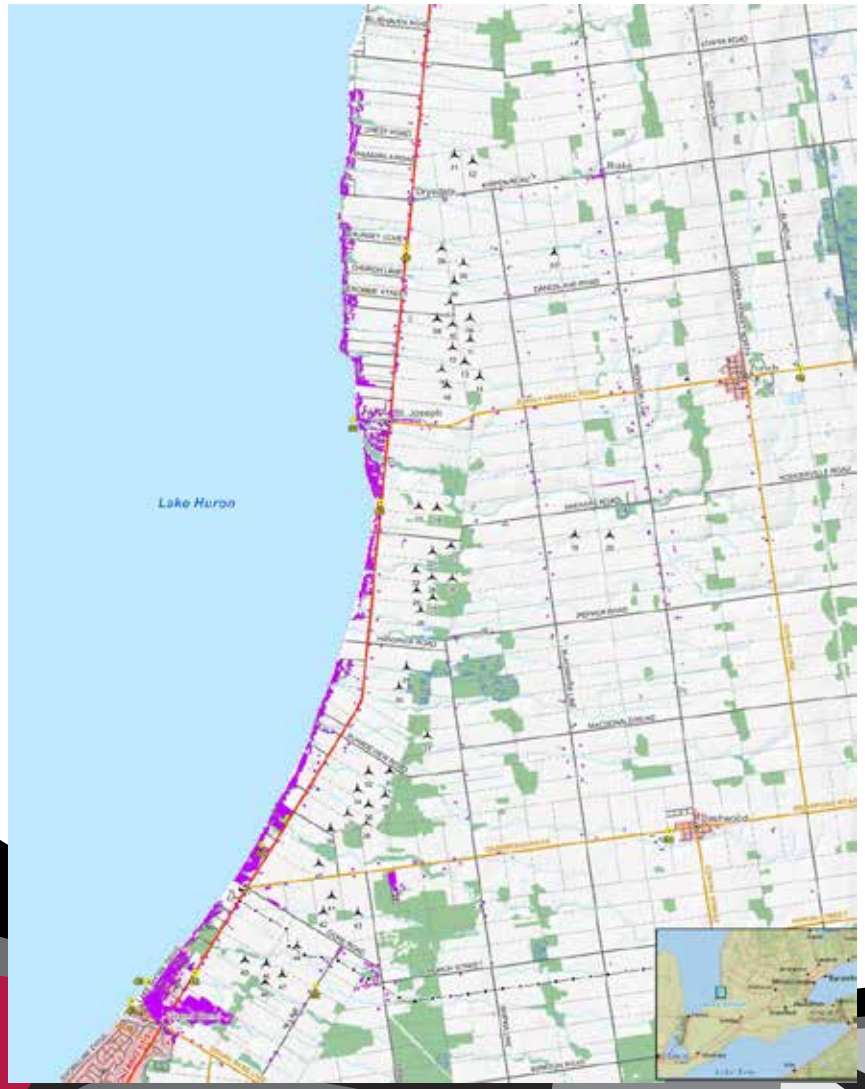
The following reports are available for review at this meeting and online (http://grandbend.northlandpower.ca), as well as local municipal and county offices.

- Draft Water Assessment and Water Body Report
- Draft Site Investigation Report
- Draft Records Review Report
- Draft Project Description Report
- Draft Evaluation of Significance Report
- Draft Environmental Impact Study Report
- Environmental Effects Monitoring Report
- Draft Wind Turbine Specification Report
- Draft Telecom Impact Study Report
- Draft Noise Assessment Report
- Draft Design and Operations Report
- Draft Decommissioning Plan Report
- Cultural Heritage Assessment Report
- Draft Construction Plan Report
- Archeological Assessment Report
- Project Update Report

# Project Schedule

| Project Activity | Anticipated Schedule |
|---|---|
| Issue First Draft Project Description Report | Completed January 2012 ✓ |
| REA Technical Studies | Completed 2012<br>Additional Studies to be completed prior to construction. ✓ |
| Public Information Centre #1 | Completed Spring 2012 ✓ |
| Issue Draft REA Reports to the Public | September 2012 ✓ |
| Public Information Centre #2 | Fall 2012 ✓ |
| REA Submission/Approval | January 2013 |
| Additional Permitting and Approvals Completed | Ongoing 2012 through 2013 |
| Start of Construction | Fall 2013 |
| Commercial Operation Date (“COD”) | Fall 2014 |
| Project Operation | 2014- 2035 |
| New Contract or Decommissioning | Approximately 20 years after COD |

# Noise and Visual Considerations




## Your Questions…

How loud is a wind turbine, and how does varying wind speed effect its sound?

How tall are the wind turbines and how far away can they be seen?

Will the turbines affect local tourism?

Will the turbines be equipped with blinking lights operating at all times?

What is shadow flicker and how does it occur?

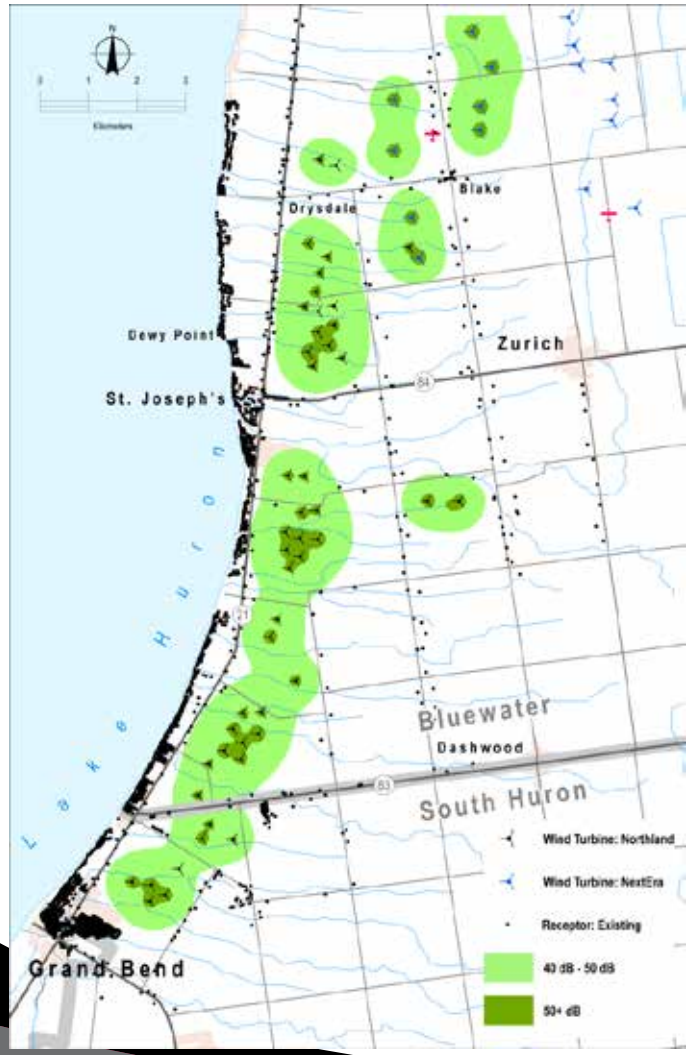
# Sound and Visual Assessment: Our Reply…

Source: URS Corporation, 2008

**Wind Turbine Noise Characteristics**

- Emission: the PWL (sound power level) produced by the wind turbine (100-105 dBA).
- Immission: the sound pressure level heard by a noise receptor (less than 40 dBA).
- You can stand directly beneath an operating turbine and carry on a conversation without raising your voice.
- As wind speeds increase:
  - the turbine emission will increase, but only up to its maximum sound power level (PWL) rating (100 – 105 dBA).
  - the ambient (background) noise levels at the receptor may increase due wind effects, which may mask and effectively lessen the perceived sound of the turbines.
  - at all wind speeds, the immission level at all non-participating noise receptors will not exceed 40 dBA.

# Sound and Visual Assessment: Our Reply…




**Grand Bend Wind Farm Noise Model**

- 46 Siemens 2.3MW SWT2.3 turbine locations modeled with sound power levels (PWLs) between 100-105 dBA.
- Noise contributions from two alternate turbine locations (T-10, T-44) have also been considered and evaluated, in the event these locations are used.
- These 46 turbine locations and PWLs meet noise limits (maximum 40 dBA, the hourly background sound level established in accordance with the requirements of MOE NPC-232/ 233) at all non-participating receptors.
- The noise model includes noise emitted from the transformer substation, and the turbines from NextEra's Bluewater Wind Energy Centre.

# Visual Assessment: Our Reply…

**Wind Turbine Visual Characteristics**

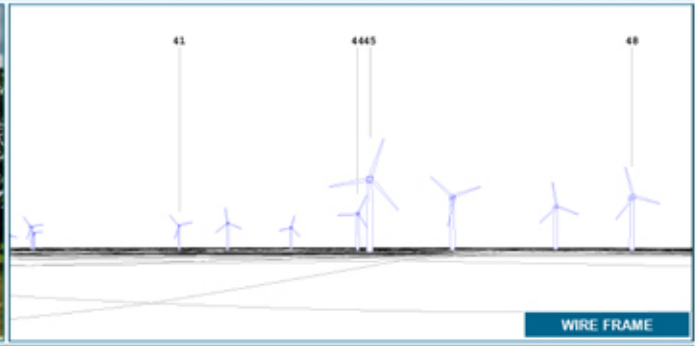
- The Grand Bend Wind Farm turbines have the following height profile:
  - 99.5m hub height (measured from the ground to the centre of the rotor)
  - 113m rotor diameter (the hub is at the centre of the rotor).
  - Therefore the total height from the ground to the blade tip when a blade is aligned vertically is 156m.
- While the extent to which the turbines can be seen depends on the location of the observer, the topography, and presence of visual obstacles, visual simulations are available.

**Other Visual Considerations**

- The turbines are required to have lighting in accordance with Transport Canada requirements for air traffic safety.
  - Subject to NavCan / Transport Canada approval Northland will install a radar system that will control the obstruction lighting, such that the lights will only be on when a plane is detected. Based on the data available, it is estimated that the lighting will be on less than 10% of night time hours.
- Turbine “shadow flicker” occurs during certain times of the day and year when the turbine blades are located between the sun and a receptor.
  - Complaints after construction will be addressed on an individual basis.
- All turbines are located east of Bluewater Highway (#21) and should not negatively affect local tourism.
- Visual simulations have been provided in the Draft Design and Operations Report and are available for viewing at this PIC.

# Visual Simulation: Our Reply…






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: | | IMG_4196 |
| Coordinates (UTM 17 NAD83) : | 439227 E | 4796736 N |
| Altitude with respect to mean sea level: | | 185 m |
| Date Photograph was taken : | | July 27th, 2012 |
| Direction : | | 75 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

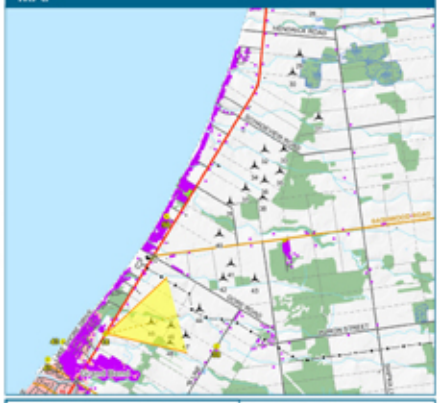
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | |
| Configuration No. : | |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 2 |
| Closest visible wind turbine : | No. 45 @ 1.0 km |
| Furthest visible wind turbine : | No. 46 @ 1.3 km |

## MAP



Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

**VISUAL SIMULATION**

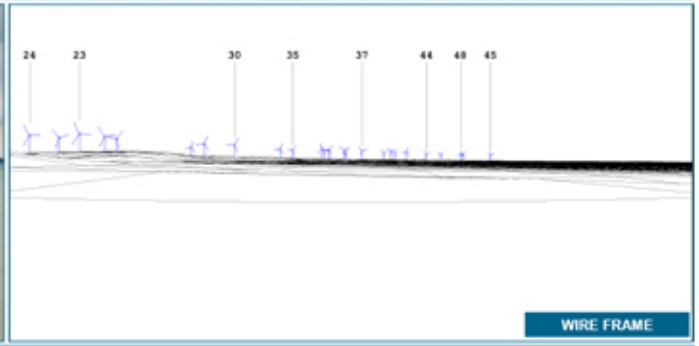
**As viewed from Oakwood Golf Course**

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…

NORTHLAND POWER






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: | | IMG_3996 |
| Coordinates (UTM 17 NAD83) : | 442175 E | 4806991 N |
| Altitude with respect to mean sea level: | | 180 m |
| Date Photograph was taken : | | July 26th, 2012 |
| Direction : | | 180 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

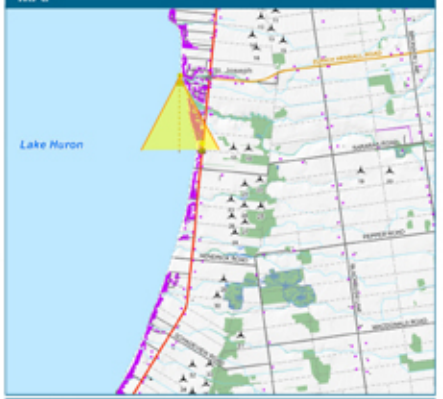
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | [illegible] |
| Configuration No. : | [illegible] |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 21 |
| Closest visible wind turbine : | No. 23 @ 3.0 km |
| Furthest visible wind turbine : | No. 48 @ 10.6 km |

**MAP**




Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

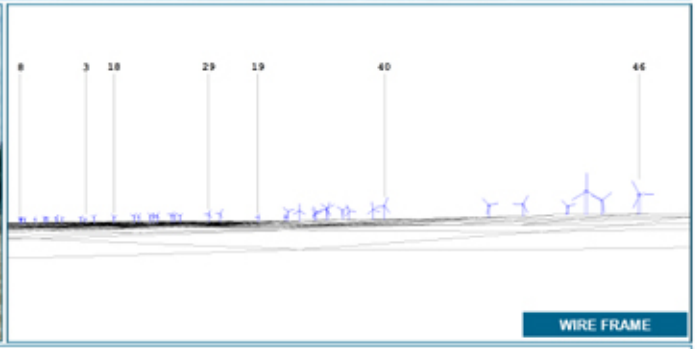
**VISUAL SIMULATION**

**As viewed from St. Joseph's Beach**

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…






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: | | IMG_4151 |
| Coordinates (UTM 17 NAD83) : | 438057 E | 4796210 N |
| Altitude with respect to mean sea level: | | 179 m |
| Date Photograph was taken : | | July 27th, 2012 |
| Direction : | | 51 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

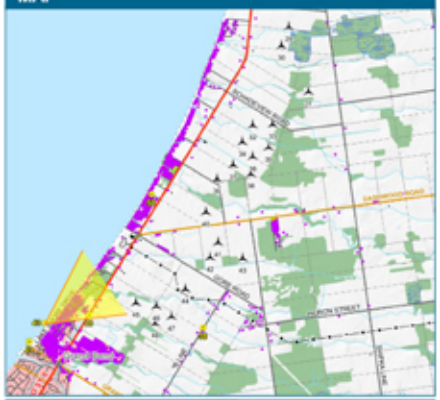
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | [illegible] |
| Configuration No. : | [illegible] |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 24 |
| Closest visible wind turbine : | No. 29 @ 8.0 km |
| Furthest visible wind turbine : | No. 3 @ 15.9 km |

**MAP**



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Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

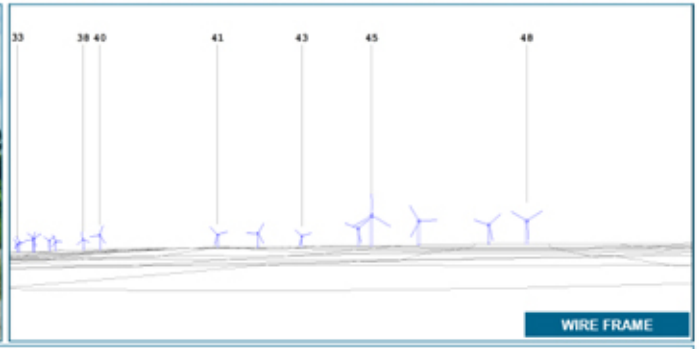
**VISUAL SIMULATION**

**As viewed from Lambton Shores – Grand Bend Beach**

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…






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: | | IMG_4167 |
| Coordinates (UTM 17 NAD83) : | 438366 E | 4796568 N |
| Altitude with respect to mean sea level: | | 180 m |
| Date Photograph was taken : | | July 27th, 2012 |
| Direction : | | 76 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

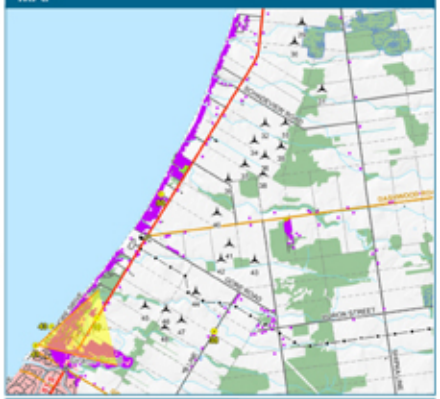
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | [illegible] |
| Configuration No. : | [illegible] |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 0 |
| Closest visible wind turbine : | N/A |
| Furthest visible wind turbine : | N/A |

## MAP



Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

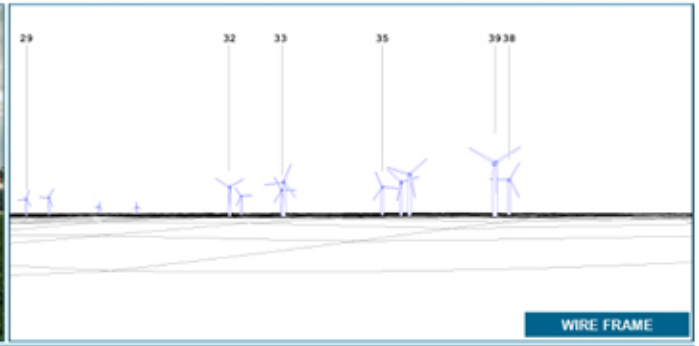
## VISUAL SIMULATION

**As viewed from Lambton Shores – Grand Bend Beach**

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…






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: | | IMG_4086 |
| Coordinates (UTM 17 NAD83) : | 440458 E | 4791100 N |
| Altitude with respect to mean sea level: | | 188 m |
| Date Photograph was taken : | | July 27th, 2012 |
| Direction : | | 66 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

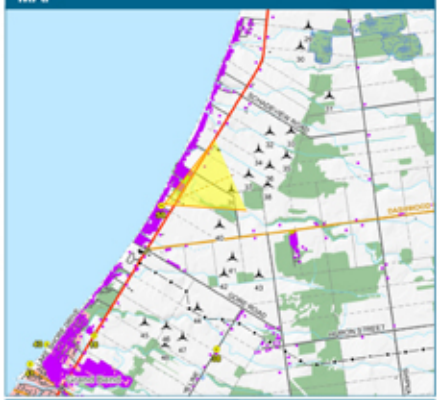
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | [illegible] |
| Configuration No. : | [illegible] |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 7 |
| Closest visible wind turbine : | No. 39 @ 1.3 km |
| Furthest visible wind turbine : | No. 33 @ 2.8 km |

## MAP



Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

**VISUAL SIMULATION**

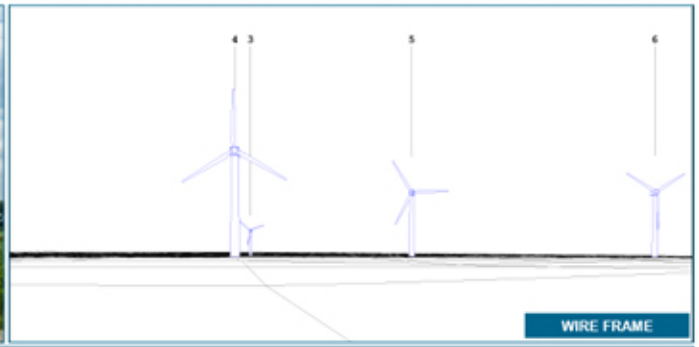
**As viewed from Elmwood Road, 200 m west of Bluewater Highway**

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…

NORTHLAND POWER






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: | | IMG_3871 |
| Coordinates (UTM 17 NAD83) : | 443144 E | 4810153 N |
| Altitude with respect to mean sea level: | | 198 m |
| Date Photograph was taken : | | July 26th, 2012 |
| Direction : | | 100 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | PH06-60328-10R8-IMG3871_L0C46-E4K3144_N4810153-L21-T01-D100-HLR01.WFV |
| Configuration No. : | L21-60328-10R8-20120730-HLR.WPL |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 4 |
| Closest visible wind turbine : | No. 4 @ 0.7 km |
| Furthest visible wind turbine : | No. 3 @ 2.7 km |

## MAP

Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

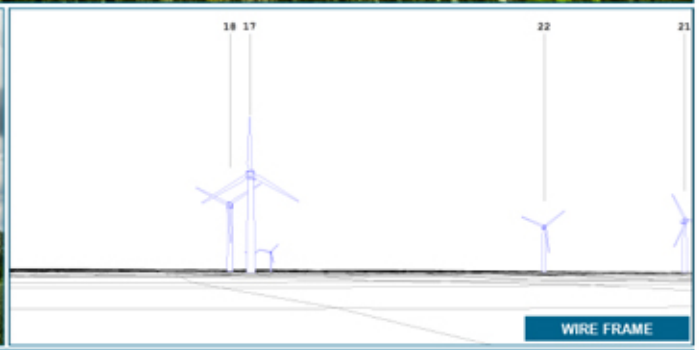
## VISUAL SIMULATION

As viewed from the intersection of Highway 21 and Sunset Cove

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…






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: | | IMG_4223 |
| Coordinates (UTM 17 NAD83) : | 442671 E | 4805458 N |
| Altitude with respect to mean sea level: | | 195 m |
| Date Photograph was taken : | | July 27th, 2012 |
| Direction : | | 106 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | PHOT-602281GRB-IMG4223_LOC445-5442671_N4805458-L21-T01-D1064LR01.WFV |
| Configuration No. : | L21-602281GRB-20120730-NLR.WPL |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 4 |
| Closest visible wind turbine : | No. 17 @ 0.7 km |
| Furthest visible wind turbine : | No. 22 @ 1.5 km |

## MAP

Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

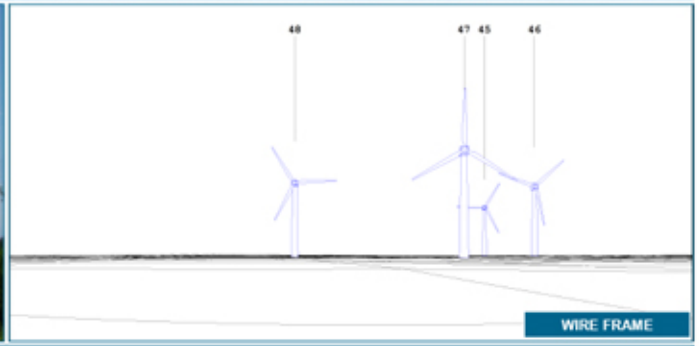
## VISUAL SIMULATION

As viewed from Bluewater Highway, 100 m south of King Street

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…






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: | | IMG_4213 |
| Coordinates (UTM 17 NAD83) : | 441473 E | 4796483 N |
| Altitude with respect to mean sea level: | | 191 m |
| Date Photograph was taken : | | July 27th, 2012 |
| Direction : | | 280 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

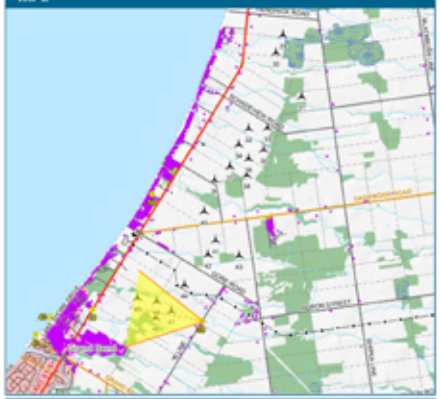
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | [illegible] |
| Configuration No. : | [illegible] |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 4 |
| Closest visible wind turbine : | No. 47 @ 0.7 km |
| Furthest visible wind turbine : | No. 45 @ 1.4 km |

**MAP**



Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

**VISUAL SIMULATION**

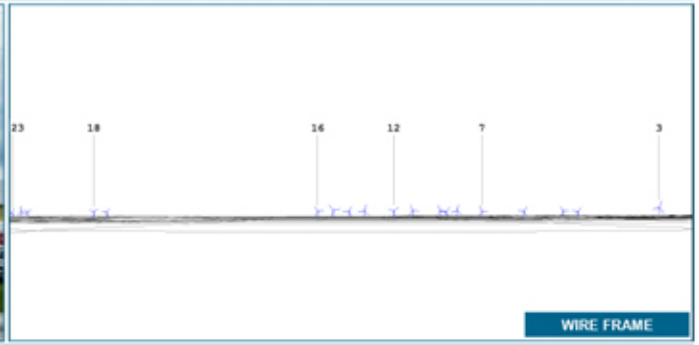
**As viewed from B Line, 1 km south of Gore Road**

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…

NORTHLAND POWER






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: | | IMG_3973 |
| Coordinates (UTM 17 NAD83) : | 450446 E | 4807922 N |
| Altitude with respect to mean sea level: | | 260 m |
| Date Photograph was taken : | | July 26th, 2012 |
| Direction : | | 270 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

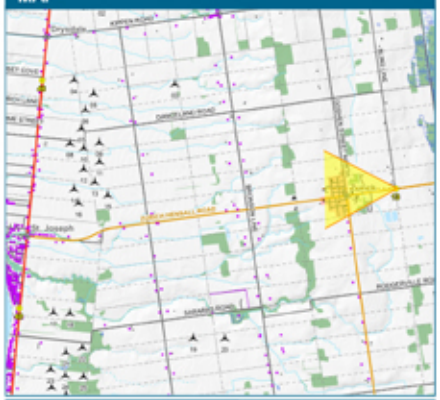
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | [illegible] |
| Configuration No. : | [illegible] |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 0 |
| Closest visible wind turbine : | N/A |
| Furthest visible wind turbine : | N/A |

## MAP



Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

## VISUAL SIMULATION

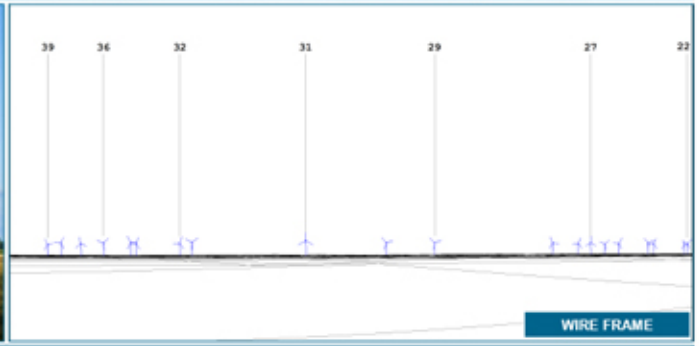
As viewed from the intersection of Zurich Hensall Road and Blind Line

***Grand Bend Wind Farm***

# Visual Simulation: Our Reply…

NORTHLAND POWER






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: | | IMG_4127 |
| Coordinates (UTM 17 NAD83) : | 448018 E | 4799365 N |
| Altitude with respect to mean sea level: | | 223 m |
| Date Photograph was taken : | | July 27th, 2012 |
| Direction : | | 295 degrees T.N. |
| Focal Length : | | 6 mm |
| View span : | | 56 degrees |
| Altitude of photograph with respect to ground : | | 1.8 m |

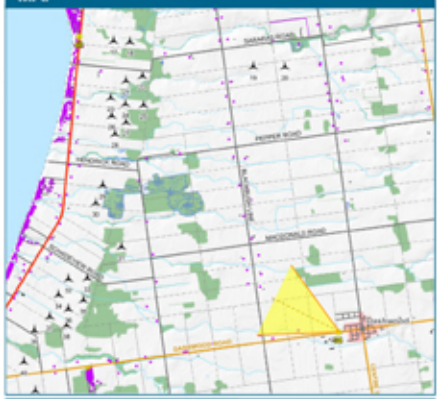
**WIND TURBINES USED**

| | |
|---|---|
| Model : | SWT-2.3-113 |
| Height of nacelle—mid point : | 99.5 m |
| Rotor Diameter : | 113 m |

**SIMULATION**

| | |
|---|---|
| Visual Simulation No. : | |
| Configuration No. : | |
| Total number of wind turbines for the project: | 48 |
| Total number of visible wind turbines in visual simulation: | 14 |
| Closest visible wind turbine : | No. 31 @ 4.8 km |
| Furthest visible wind turbine : | No. 22 @ 6.6 km |

**MAP**



Prepared for : NORTHLAND POWER

Prepared by : GL Garrad Hassan

Date : November 23rd, 2012
Version 01

**VISUAL SIMULATION**

**As viewed from Dashwood Road, 500 m west of Centre Street**

***Grand Bend Wind Farm***

# Natural Environment

## Your Questions…

How was the natural environment assessed?

Will birds and bats be affected? Will there be effects on Tundra Swans?

How will the environment be protected?

# Natural Environment: Our Reply…

## Identification of Significant Features:

- Baseline conditions were documented in 2011 and 2012.
- Features assessed according to provincial criteria to determine significance.
- For features found to be provincially significant, an Environmental Impact Study was completed.

## Results:

Significant features present include:

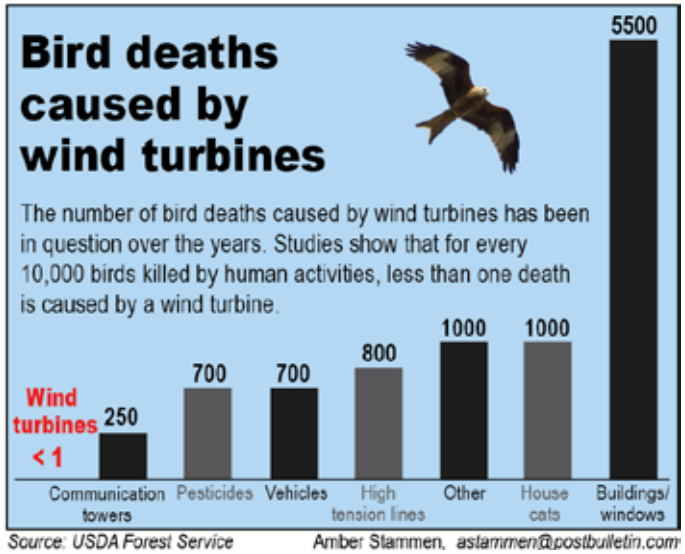
- 1 Valleyland
- 24 Wetlands
- 32 Woodlands
- 7 types of significant wildlife habitat are/may be present:
  - Turtle nesting/overwintering areas, deer yarding areas, amphibian breeding habitat, bat maternal colonies, habitat for rare species, general wildlife habitat.

## Effects Assessment:

- For each significant feature:
  - Potential effects were identified,
  - Performance objectives were developed.
  - Mitigation measures were proposed to avoid or minimize effects,
  - A monitoring program was developed to ensure mitigation is successful,
  - Contingency plans were developed to address any unexpected effects.

# Birds and Bats: Our Reply…

## Bird and Bat Collisions




**Average mortality in Ontario is:**

- 2.5 birds/turbine/per year, and
- 4-14 bats/turbine/year.

## Critical Thresholds

(as defined by the MNR)

Birds:

- 14 birds/turbine/year
- 0.2 raptors/turbine/year (all raptors)
- 0.1 raptors/turbine/year (provincially tracked raptors)

Or, single event of:

- >10 birds at any one turbine
- >33 birds at multiple turbines

Bats:

- 10 bats/turbine/year

## Monitoring

- Monitoring will be undertaken 2x per week for 3 years
- + additional years if effects are observed and if contingency plans are enacted.

*"At current mortality levels, wind power projects are not a sustainability concern for most of Ontario's bird populations"*
MNR, 2011

# Tundra Swans: Our Reply…

- Tundra Swans are a relatively common species in Ontario and are the most common type of swan in North America.
- They are not protected under the Endangered Species Act.
- During spring migration, Tundra Swans stopover in flooded fields to feed on waste corn and grains.

## Thedford Flats

- Located south of Grand Bend, approx. 9.5 km from the nearest turbine.
- Area provides flooded fields every spring and a supply of waste corn.
- Similar conditions are not present within 120m of the project.
- Most fields in the area are tile drained and no longer hold water in the spring.

*"There are no primary threats facing this site because the swans are taking advantage of an artificial situation. If the farmers increase the drainage, change the pump-draining schedule, or stop planting corn, swan use would diminish".* IBA Canada

# Potential Environmental Impacts / Additional Studies

| Project Phase | Potential Effects | Proposed Mitigation/Additional Studies |
|---|---|---|
| Construction/ Decommissioning | · Vegetation Removal. | · Environmental Inspector to stake significant features to ensure no vegetation removal occurs within them.<br>· Any vegetation removed will be replaced with native trees, shrubs and grasses. |
| | · Encroachment of equipment into sensitive areas.<br>· Erosion and sedimentation within significant features.<br>· Harm to wildlife which may move through the work zone. | · Sediment/tree protection fencing to be installed along edges of significant features to prevent movement of soil into the feature and prevent wildlife from moving into construction areas. |
| | · Soil and water contamination due to accidental spills of oil, gas, lubricants. | · Preparation of a plan for safe storage and use of hazardous materials.<br>· Preparation of a spill response plan.<br>· Contact with MOE if any spills occur. |
| Operation | · Bird and bat mortality due to collisions with turbine components. | · Monitoring will occur to quantify mortality.<br>· Contingency measures will be enacted if mortality is significant (e.g. turbine feathering, periodic shut-downs).<br>· Additional monitoring to confirm success of contingency measures. |

See reporting for further detail.

# Your Questions about Potential Health Effects

Dr. Loren D. Knopper, B.Sc., M.Sc., Ph.D.,
of Intrinsik Environmental Sciences Inc.
is here to respond to your questions.

# Health and Wind Power

Many studies have been conducted world-wide to examine the relationship between wind turbines and possible human health effects (e.g., audible/inaudible noise, shadow flicker, electromagnetic fields (EMF)).

**Audible / Inaudible Noise:** Ontario's Chief Medical Officer of Health (May 2010) conducted a review of the scientific literature related to wind turbines and public health. The review concluded that:

> ***"****while some people living near wind turbines report symptoms such as dizziness, headaches, and sleep disturbance, the scientific evidence available to date does not demonstrate a direct causal link between wind turbine noise and adverse health effects. The sound level from wind turbines at common residential setbacks is not sufficient to cause hearing impairment or other direct health effects, although some people may find it annoying."*

**Shadow flicker:** Scientific evidence suggests that shadow flicker from wind turbines does not pose a risk of photo-induced seizures; modern wind turbines simply don't rotate at a speed that has been linked to this condition (generally less than 20 rpm vs. over 60 rpm).

**EMF:** Health Canada (2010) has stated: *"You do not need to take action regarding daily exposures to electric and magnetic fields at extremely low frequencies. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors"*.

# Impacts/Additional Studies

Overall, health and medical agencies agree that when sited properly, wind turbines are not causally related to adverse effects*.

Reports of annoyance by people living around wind turbines appear to be more related to variables like personal attitude and whether a person can see a turbine from their home and not a turbine-specific variable like noise.

> *"Ontario doctors, nurses, and other health professionals support energy conservation combined with wind and solar power – to help us move away from coal"**.*

Scientists and medical experts around the world continue to publish research in this area. In fact, Health Canada will be undertaking a study of wind turbine projects across the country, with results expected in 2014. It is important to note that Health Canada has not called for a moratorium on new wind projects across Canada while they undertake their research. Through our health consultants, Northland is committed to keeping informed on this issue.

*Chatham-Kent Public Health Unit, 2008; Australian Government, National Health and Medical Research Council, 2010; Australian Government, 2011; Massachusetts Department of Environmental Protection (MassDEP) and Massachusetts Department of Public Health (MDPH), 2012.

**Ontario College of Family Physicians, Registered Nurses Association of Ontario, Canadian Association of Physicians for the Environment, Physicians for Global Survival, the Asthma Society of Canada, and the Lung Association.

# Your Questions about Property Value

# Property Value

## Your Question…

- What is being done to protect the housing market in the area of the turbines?

## Our Reply…

- Multiple studies have consistently found no evidence that wind energy projects are negatively impacting property values:
  - A 2010 study conducted in Chatham-Kent, Ontario, found there was no statistically relevant relationship between the presence of a wind project and negative effects on property value, (Effect on Real Estate Values in the Municipality of Chatham-Kent – Canning Consultants Inc and John Simmons Realty Services Ltd., Feb 2010).
  - A similar analysis by the US Department of Energy's Lawrence Berkeley National Laboratory found that proximity to wind energy facilities does not have a pervasive or widespread effect on the value of nearby homes, the study covered a time span from before the wind farms were announced to well after construction and operation, (The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonistic Analysis – Ben Hoen, Ryan Wiser, Peter Cappers, Mark Thayer and Gautam Sethi, Dec 2009).
  - A 2010 study looking a property values near the 396MW Twin Groves Wind Farm in Illinois found prices were negatively affected before the wind farm was built, but rebounded after it was in place, (Wind Farm Proximity and Property Values: Pooled Hedonistic Regression Analysis of Property Values in Central Illinois – Jennifer L Hinman, May 2010).

Some of these studies can be found on the Project website:
http://grandbend.northlandpower.ca

# Electricity Distribution

Source: http://www.rev2g.com/index-6.html

## Your Questions…

How will stray voltage be addressed?

Will the transmission line be built on new or existing hydro poles?

How will tree removal be addressed along the transmission line?

# Stray Voltage: Our Reply…

**What is stray voltage?**

- Occurrence of electrical potential between two objects that should ideally not have any voltage difference between them.
- Commonly caused by failure of wire insulation, or improper design.

**Mitigation Measures for Stray Voltage**

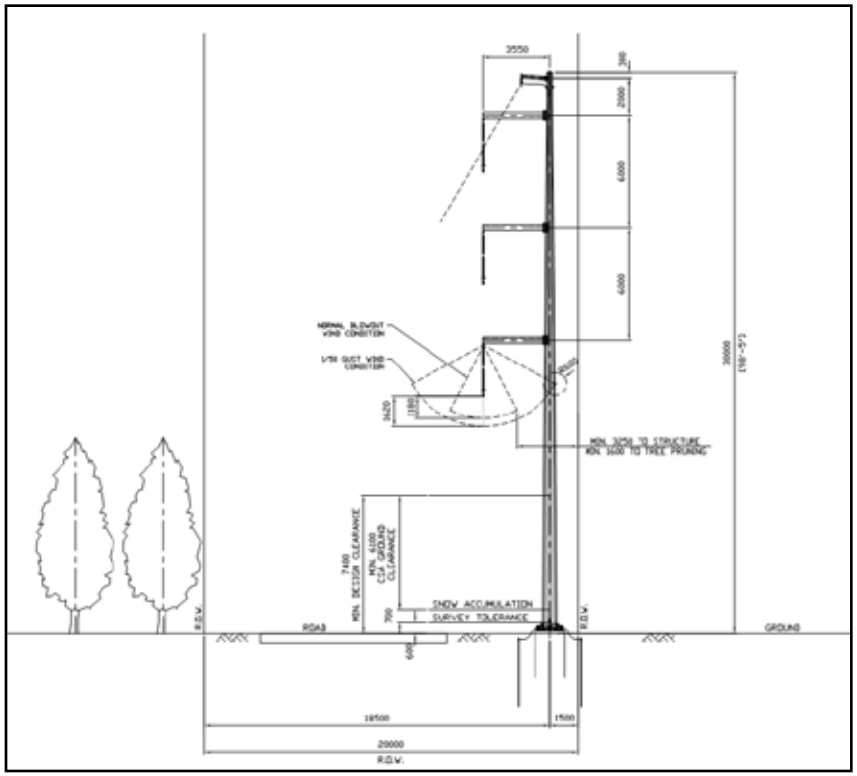
- Design will meet or exceed Hydro One, Independent Electricity System Operator (IESO), Ontario Energy Board (OEB), Ontario Grid Control Centre (OGCC), and Electrical Safety Authority (ESA) requirements.
- Electrical components will be tested and commissioned to ensure safe operation prior to project operation.
- Electrical system will be monitored during operation to ensure continued safe operation.
- Protection and control devices will be installed, and will automatically shut down operations if unsafe conditions are detected.

Above: Typical cross-section of 115 kV and 380 kV cables.
Source: http://en.wikipedia.org/wiki/File:Hochspannungskabel_110kV_400kV.JPG

**Impact on Livestock**

- Through proper design and mitigation outlined above, no effects on livestock are anticipated.
- The proposed collector and transmission lines will be safely operated in the same manner as the existing distribution and transmission lines in the area.

# Transmission Line Route: Our Reply…




Conceptual Pole Design supplied by Northland.

**Collection vs. Transmission Systems**

- All collector lines will be installed underground from the turbines to the transformer substation. A 230kV transmission line will be installed from the substation to the connection point with the provincial grid near Road 183 and Front Rd. / 32 Line in Huron East. Northland is examining the feasibility of locating some of this transmission line underground.

**Existing vs. New Utility Poles**

- Portions of the transmission line are on roads that currently have utility poles within the right-of-way (ROW).
- The proposed transmission line will operate at a higher voltage than the existing distribution lines.
- New utility poles will be required to achieve the regulated heights and setbacks associated with the proposed transmission line.
- Discussions will take place with Hydro One regarding the joint use of utility poles.

# Transmission Line Route: Our Reply…

Both photos show existing infrastructure along the transmission route.

**Tree Considerations**

- The transmission line will be designed to minimize impact on existing trees and wooded areas.
- Minor tree clearing is anticipated in regions where technical constraints do not allow for an alternate route. Tree removal and replacement in woodlots will be performed in accordance with a Tree Preservation Plan.

**Local Airstrip Mitigation**

- The proposed 230 kV transmission line passes a private property with an airstrip along Rodgerville Rd.
- This section of the transmission line will modified to maintain safe operation of the airstrip.

# Potential Environmental Impacts and Proposed Mitigation

| Project Activity | Potential Effects | Proposed Mitigation Strategy |
|---|---|---|
| Vegetation clearing along the 230 kV transmission line to meet safety requirements for vegetation around overhead transmission lines. | · Limited vegetation removal along the edge of significant woodlands along the 230 kV overhead transmission line.<br>· Could have minor effect on the size of the feature. | · The detailed design will attempt to avoid the need for vegetation removal within woodlands to the extent possible through adjustments to utility pole locations and heights, side of road considerations, below ground installation, etc.<br>· Only where technical factors do not permit a feasible alternative will vegetation removal occur within woodlands.<br>· No vegetation removal will occur in portions of the woodlands that are also identified as wetlands.<br>· A Tree Preservation Plan will be developed during the detailed design phase in order to identify trees which may need to be removed or trimmed during construction of the transmission line. Trees requiring removal will be replaced at a ratio determined through the Tree Preservation Plan based on the age, size, species and health of the tree. The Tree Preservation Plan will also include recommendations for minor adjustments to utility pole locations in order to minimize tree loss to the extent possible.<br>· Where features will be protected, the boundaries of the features are to be delineated in the field by a qualified environmental technician based on the following definitions:<br>  · Woodlands: Edge of the drip line<br>  · Wetlands: Ontario Wetland Evaluation System methodology<br>· Silt and/or tree protection fencing will be installed along the staked boundaries.<br>· Vegetated buffers will be left in place to the extent possible.<br>· Where vegetation removal is unavoidable, removal will be timed to avoid periods of habitat use especially during the breeding bird season for migratory birds (May 1 – July 30). If vegetation removal is to be undertaken within this timeframe, a survey of active nests is required. If active nests are found in an area where vegetation must be cleared, construction activities in the affected areas will be suspended during breeding bird period.<br>· Any cleared areas will be re-vegetated using a native seed mix and/or native shrub and tree plantings as determined through the Tree Preservation Plan. |

# Design, Construction, Operation and Decommissioning

Source: Siemens Press Picture

## Your Questions…

Turbine Selection and Siting

Drainage Considerations

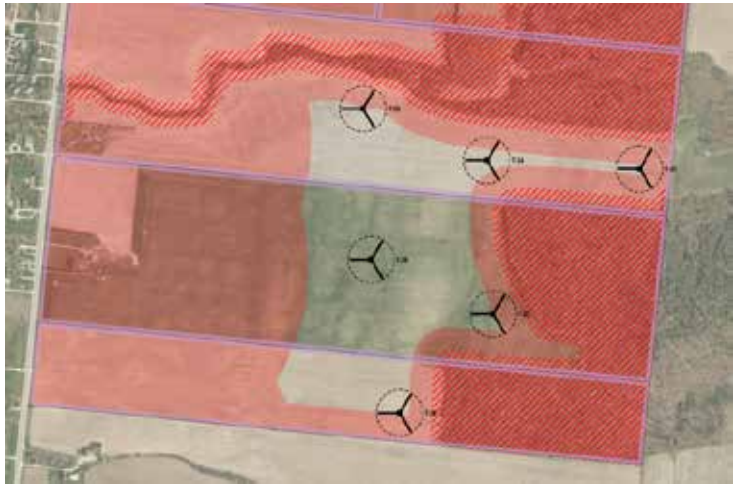
Project Schedule

Decommissioning

# Design Considerations: Our Reply…

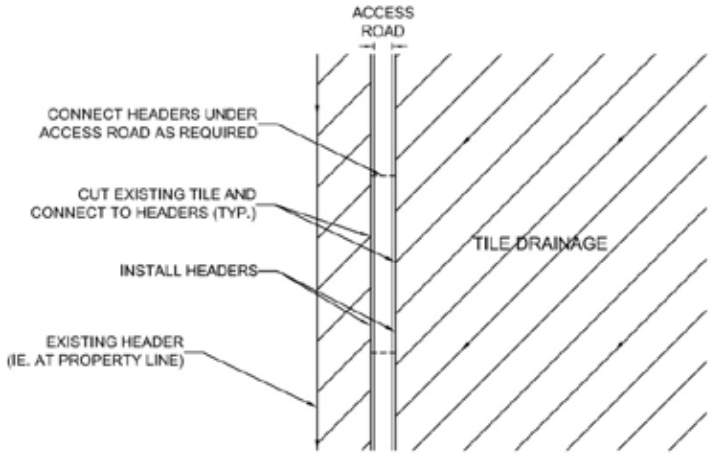
**Turbine Selection and Siting**

- Turbine models are generally selected based on generating capacity, physical characteristics, and sound profile.
- Turbine siting was based on:
    - Wind resource
    - Proximity to main power distribution system lines
    - Avoidance of interference with telecommunications network infrastructure
    - Local topography and access constraints
    - Coordination with landowners to reduce impact on farming operations
    - Regulated setbacks from:
        - noise receptors (550m / 40 dBA)
        - significant natural environment features
        - property lines
        - public road right-of-ways
        - rail right-of-ways

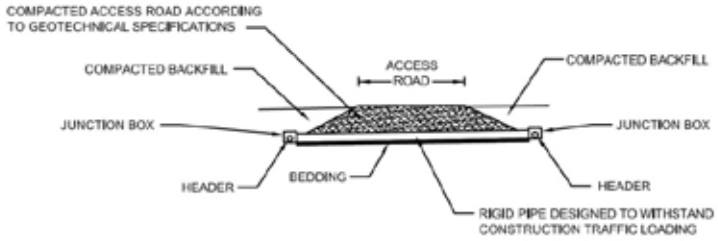


Example of various turbine siting constraints (represented by areas shaded in red).

# Agricultural Drainage Considerations: Our Reply…




REPRESENTATIVE ACCESS ROAD
TILE DRAIN MODIFICATIONS




REPRESENTATIVE HEADER
CONNECTION UNDER ACCESS ROAD

**During Construction**

- Access roads will be constructed in a manner to allow surface drainage to flow across roads and maintain existing drainage patterns.
- Tile drainage modifications on agricultural land will be made at the start of construction by a licensed drainage contractor.
- Tile drainage modifications will be designed and constructed in a manner that allows for proper agricultural drainage during construction and operation of the facility.

**During Operation**

- Upon completion of turbine construction, temporary work areas along the access roads and at the turbine installation areas will be restored for agricultural use.
- Tile drainage will be reinstated in temporary construction areas.
- Soil compaction will also be remediated to mitigate impacts on agricultural land.

# Decommissioning: Our Reply…

Source: Siemens Press Picture

**Project Schedule**

- Construction is scheduled to begin in Fall 2013 and be completed in Fall 2014.
- The project is scheduled to be in operation for at least 20 years from 2014 – 2034.
- After 20 years of operation, the project may:
  - Continue operation with the same equipment
  - Continue operation with new equipment
  - Discontinue operation and remove equipment (decommissioning).

**Decommissioning**

- If operations are discontinued at any point, the project will be decommissioned. Northland is responsible for decommissioning and related costs.
- Decommissioning generally involves the following steps:
  - Identify and sell infrastructure in-place that can be used for future use (eg. transmission line, selected access roads).
  - Remove all unused infrastructure using reverse engineering.
  - Salvage or dispose of infrastructure at approved facilities.
  - Restore lands to original use where applicable.
- For removal of turbines, access roads will need to be re-constructed in a similar manner as required during construction to facilitate transportation.
- Further details are available in the Decommissioning Plan Report.

# We're Listening…

**Based on your feedback and as a result of our investigations, we've made project changes to address concerns:**

- Selection of the northern transmission route to avoid environmentally sensitive areas, more densely populated areas, and reduce its length
- Modified transmission line design to avoid impact on private airstrip
- Underground 230 kV transmission line under consideration.
- Selection of radar technology to reduce duration of blinking lights
- Movement of turbine T-21 to avoid telecommunications interference
- Movement of access road servicing T-29 to avoid wetland
- Consideration of alternative location for Parts and Storage building to make use of existing commercial land in the community.

# Appendix D4

# Frequently Asked Questions for Final Public Meeting

# Grand Bend Wind Farm – Frequently Asked Questions

## 1. Why are you building this project?

The Ontario Power Authority (OPA) is responsible for ensuring the long-term electricity supply for Ontario. The province also has a strategy to focus on environmentally friendly energy sources. Wind power projects are seen as a way to achieve both goals. The OPA has invited Northland and any other energy company to propose wind projects that fit its requirements. This project was proposed to the OPA by Northland, and the OPA selected it as a project it would contract for under the feed-in tariff (FIT) program.

## 2. Why is the project being built in this location?

This area of the province has a strong wind resource. In addition, the Grand Bend site addresses the Province's strict land use concerns and is located close to main power transmission lines.

## 3. Does the project require environmental approval?

Yes. Northland has commenced the Renewable Energy Approval (REA) process as required under Ontario Regulation 359/09 and the Environmental Protection Act. Other permits will be obtained as required by law.

## 4. How long will construction take?

Once Northland has received all required permits and notice to proceed, we expect construction will take 12 to 14 months to complete.

## 5. Will the project increase traffic in the area?

During construction, there will be some heavy equipment, truck and car traffic to and from the site. Please see the project construction report for preliminary information on the construction process. Once the facility is operating, there will be minimal traffic as the site will have only a few full-time staff.

## 6. Will the project produce emissions?

Although the construction process itself will produce some emissions (operation of trucks & heavy equipment), operating wind farms do not produce emissions. The carbon footprint created by manufacturing the turbines will be offset within 8 months of operation, due to the wind farm's reduced emissions as compared with coal-fired generation.

## 7. Will the project create noise?

Wind turbines produce sound when operating. At the minimum mandated setback from residences of 550 m it is difficult to distinguish the sound from the turbines from the background noise of the wind passing through trees and other obstructions. Even right at the base of the turbine, the normal level of noise from a turbine is not high enough to prevent a normal conversation.

## 8. Will the project require new high-voltage power lines?

The project will require a new 230 kV electrical transmission line to connect to the Hydro One transmission system. The power produced by the individual turbines is collected at a lower voltage using buried cables and then "stepped up" to 230 kV at the project's sub-station.

## 9. Have you asked residents for input?

Yes. We have been working on this project for 8 years and have had informal meetings with the public in the past. In July 2011 we received a Power Purchase Agreement (PPA) from the Ontario Power Authority.

In April of this year we held our first public information centre. Our second public information centre is being held on November 28th, November 29th, December 3rd and December 4th. In the spring of 2012 we began running a bi-weekly column in the Exeter Times and Lakeshore Advance covering topics of concern with respect to this project and wind farms in general. As a result of our consultation we have received letters, emails and telephone calls from interested community members and are committed to answering all questions in a timely fashion. Our REA submission will include a summary of these communications.

## 10. How can I ask questions or make comments?

Please comment:

- Via the Feedback page on our website: http://grandbend.northlandpower.ca/
- Our toll free hotline: 1-800-696-8093; or
- Leave your comments with us at our Public Information Centres.

## 11. What impacts will the project have on the natural environment? How will these effects be mitigated?

In order to obtain a Renewable Energy Approval (REA), detailed environmental studies of natural features (wildlife habitat, woodlands, wetlands, valley lands) and water bodies on and surrounding the project site are required. Through these studies, the existing environmental characteristics of a given project location are identified.

Once the studies are complete, the effects of the project can be determined and mitigation measures identified to limit any negative effects. This work, in draft form, is currently available on the Reports page of the project website in the Natural Heritage Assessment reports, the Water Body reports, and the Construction Plan Report. Printed copies can be found at the local municipality and county offices. Final versions of all reports will be made available on the Reports page of the project website, in January 2013.

## 12. Will the project impact water quality?

Wind turbines will not be located within the flood plain of any watercourse. Furthermore, Northland will undertake mitigation measures (such as sediment and erosion control), as identified in the Water Body reports and Construction Plan Report, to ensure that the installation of the turbines does not impact water quality.

**13. Will the project impact groundwater quality or quantity? Will my well be impacted?**

No groundwater wells will be installed on the project site. Any water required for construction and operations will be brought in from offsite sources.

As part of this plan, geotechnical assessment has been done at each turbine site to indicate potential issues with groundwater, and precautions will be taken during construction to minimize impact.

**14.Will the project impact my property value?**

There is no evidence to suggest property values are negatively impacted as a result of proximity to wind farms. The Municipal Property Assessment Commission (MPAC) has studied this issue and has found no negative impact on property values. In a recent Assessment Review Board hearing in Ontario focused on wind turbines and property values, MPAC argued that there was no evidence to show that construction and operation of wind turbines had reduced the current value of the landowner's property.

As well, a comprehensive analysis by the US Department of Energy's Lawrence Berkeley National Laboratory found that proximity to wind energy facilities does not have a pervasive or widespread adverse effect on the value of nearby homes. Researchers examined 7,500 single-family property sales between 1996 and 2007, covering a time span from before the wind farms were announced to well after construction and operation.

Northland Power has gathered suggestions from neighbouring landowners on ways to mitigate the impact of the project. Suggestions have also been provided to Northland through direct conversation, at public meetings, through comment cards and via email. Northland continues to welcome suggestions through these and other channels.

**15. Are there any health impacts associated with wind projects?**

Despite many allegations, there are no known health impacts associated with wind projects. This was documented as recently as May 2010 by the Ontario Chief Medical Officer of Health in a report titled "The Potential Health Impact of Wind Turbines."

In fact, the use of wind energy will contribute to the province's ability to retire coal fired power plants, and thus will contribute to the improvement of air quality throughout the province. According to Environment Canada, 80% of the total national greenhouse gas emissions are associated with the production or consumption of fossil fuels for energy purposes. Recent statistics on the Environment Canada website show that air pollution causes approximately 5,000 premature deaths each year in Canada. In Ontario, exposure to air pollution results in an estimated 60,000 emergency room visits and 17,000 hospital admissions each year, with children and seniors at the highest risk of suffering adverse health effects.

**16. What about the study released recently, "Effects of industrial wind turbine noise on sleep and health" by Michael A Nissenbaum, Jeffery J Aramini, and Christopher D Hanning?**

While recently published, much of the information contained in this recently published paper was previously reviewed and considered by experts at the first Environmental Review Tribunal (Erikson v. MOE 2011) hearing on wind energy in Ontario and in the Queen's Bench of Saskatchewan case McKinnon v. Martin (Red Lily Legal Case in 2010). This information was also reviewed by an expert panel on wind turbines and human health commissioned by The Massachusetts Department of Environmental Protection and Massachusetts Department of Public Health (MassDEP/MDPH, 2012), which concluded, "attributing any of the observed associations to the wind turbines (either noise from them or the sight of them) is premature".

The Canadian Wind Energy Association (CanWEA) and the American Wind Energy Association (AWEA) jointly commissioned experts to conduct a scientific critique of this now published paper. The review by Intrinsik Environmental Sciences has identified "concerns related to study design, methodology, sample size and administration of questionnaires to participants". They concluded, "Overall, in our opinion the authors extend their conclusions and discussion beyond the statistical findings of their study. We believe that they have not demonstrated a statistical link between wind turbines – distance – sleep quality – sleepiness and health. In fact, their own values suggest that although scores may be statistically different between near and far groups for sleep quality and sleepiness, they are no different than those reported in the general population. The claims of causation by the authors (i.e., wind turbine noise) are not supported by their data."

Download the Intrinsik critique here: http://www.canwea.ca/pdf/Intrinsik-Review-of-Nissenbaum-2012.pdf

**17. What happens when the project is no longer required?**

Under the terms of the REA Northland is required to decommission the project once it is no longer required, and to restore the lands consistent with their original uses. This requirement passes to any subsequent owner, should Northland ever sell the wind farm. Details of this requirement are contained in a Decommissioning Plan that Northland has provided in draft form and will submit as part of the final REA reports.

**18. Will this project be a burden on local taxpayers?**

No. This project is entirely financed by the project partners. In addition to providing jobs and rental fees to landowners, the project will pay annual taxes of between $100,000 and $150,000 to the municipality.

**19. Can I build on my property close to a turbine?**

Yes. The 550 metre setback is solely for the benefit of existing residences. There are no provincial or municipal setback requirements regarding new construction near wind turbines.

**20. Will the wind farm benefit anyone other than a few farmers?**

There are approximately 20 family farms that will benefit from renting their land for turbine sites. In addition, the wind farm will provide the community with construction and permanent jobs, additional municipal taxes, and potential tourism opportunities. More broadly, the project will benefit all Ontarians, by providing a clean, renewable source of energy generation that will help to improve Ontario's air quality.

**21.How many jobs will Grand Bend produce?**

The project will employ about 150 people at the peak of construction. In operation, it will employ 6-8 full-time people, including both Northland Power employees and maintenance contractors.

**22.Why do we need wind energy – don't we already have too much power?**

Ontario currently has a small surplus of electricity due to falling demand from a restructuring of our economy and conservation efforts. However, this surplus is only temporary. All of our coal plants are being phased out and, as soon as 2015, all of our nuclear plants will need refurbishing. Removing these energy supplies from our grid will require new power sources to be in place. We're getting started now to be ready for the future.

Canada needs a variety of reliable, clean and safe sources of new energy to meet its future electricity demands and greenhouse gas emission commitments. Wind energy is part of a balanced energy mix.

**23.Is wind energy efficient?**

Yes. A modern wind turbine produces electricity 70-85% of the time, but it generates different outputs dependent on wind speed. Over the course of a year, it will generate about 35% of the theoretical maximum output. One modern wind turbine will generate enough to meet the electricity demands of more than a thousand homes over the course of a year.

**24. Is wind energy more expensive than other forms of power?**

A 2011 Pembina Institute study, *Behind the Switch: Pricing Ontario's Electricity Options,* found that cancelling the Green Energy Act would result in a slightly slower increase in electricity prices – about the price of a coffee and doughnut per month for the typical household. But in the long term, it found that the investments we're making in renewables are far more likely to lead to cost savings because the price of more traditional energy sources is expected to increase.

The cost of electricity from onshore wind turbines will drop 12%in the next five years thanks to a mix of lower-cost equipment and gains in output efficiency (Bloomberg New Energy Finance).

Electricity prices are poised to increase across Canada as a result of necessary investment in new electricity generation and infrastructure – the Conference Board of Canada predicts that $347 billion in investment is required between now and 2030. All new generation is more expensive than existing generation and wind energy is

extremely cost competitive. This is even more apparent when all costs are considered when choosing an energy source – including impacts on the air we breathe, the water we drink, and cost over-runs that are often passed on to ratepayers.

**25. Do you have any examples of Ontario municipalities that have already successfully integrated wind power into their community?**

Yes. Below are quotes from municipal leaders across Ontario who have already benefitted from wind power.

> "The Erie Shores wind farm has become a part of our identity here in Bayham. We've actually incorporated a wind turbine into our tourism logo. My advice would be to come to the Erie Shores Wind Farm and see for yourself. They are majestic and sleek. Stand beneath a turbine and listen for yourself. Talk to the farmers and hear what they have to say."
>
> -Lynn Acre, Mayor, Municipality of Bayham

> "The township as a whole is happy with the wind farm. We have 61 of its turbines and I wish we had 60 more. When you consider the revenue, why wouldn't I? We receive taxes from the wind farm, but we don't plough the road, we don't do garbage pick-up, and we don't provide policing. For the township, it's a win-win."
>
> -Lou Madonna, Reeve, Township of Prince

> "We very early realized the benefits that came with construction of the wind farm, but there was also an attitudinal change. We are working on a renewable energy plan, but when you have a business... that actually turns it into reality and people can see it and people can touch it, then that acts as a real catalyst."
>
> -John Roswell, Mayor, Sault Ste. Marie

> "I personally think this wind farm is the best rural Ontario good news story that you will find. Annual income from the wind development has allowed this municipality to achieve sustainability and to reduce property taxes. The construction phase significantly increased business for local shops and restaurants."
>
> - Former Frontenac Island Mayor, Jim Vanden Hoek, played a key leadership role in working with the wind developer to capture social and economic benefits for his community.

# Appendix D5

## Newspaper Columns

# Grand Bend Wind Farm

## Community News

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

## The Wind – Powering Change in Grand Bend and Ontario

by Gord Potts

Wind energy has the potential to power Ontario's future. We want to make sure you have access to information about wind power and this project.

### Wind powers the human race.

Wind power. For as long as there have been people, wind has been powering the human race. The ancient Egyptians used wind to power the world's first sailboats. Holland's iconic windmills were used to pump water in the 1600s. And in 1888, the first large-wind generator started powering North America's electricity grid.

Today, wind energy has the potential to power Ontario's future. A future of innovative, renewable energy sources, using all of the natural resources at our disposal – including solar, hydropower and, of course, wind.

In 2003, Ontario had 19 coal units and just 10 wind turbines. Today, the province has over 800 wind turbines capable of generating over 1,500 MW every year and has closed four coal units – all without disrupting the power grid. By 2014, all of Ontario's coal units are scheduled to be shut down, in favour of cleaner power-generation sources, including wind.

As many of you are likely aware, one of those projects, under development by Northland Power, is happening in your backyard. Many of you have questions. Some of you are worried about what impacts wind power will have on your community, your property and your loved ones.

### Access the information you need to know.

We want to make sure you have access to information about wind power and about this project. We have held a number of public meetings in your community since the project first started, and we will continue to do so until the project is completed. However, we recognize that not everyone has the time or ability to come out to these meetings. That's why we are reaching out through this new, bi-weekly column, written and paid for by Northland Power. Our goal is to provide you with helpful, factual information about wind power, and to keep you up-to-date on the project's status and milestones, including any upcoming public meetings.

### Why Northland Power? Why Grand Bend?

Unlike many companies, we at Northland Power develop, build and operate our facilities throughout their lifecycle – from when a project first starts until it is decommissioned and deconstructed. We are a publically traded, 100% Canadian company, with our head office located in Toronto, and with employees working at a number of locations across Ontario and beyond. For the Grand Bend Wind Farm, we are working with Neegan Burnside, a Canadian majority-owned aboriginal firm, throughout the environmental permitting process.

Northland Power has been developing this project over the past eight years. The location was selected for its strong wind resource and availability of transmissions capacity, and we have worked to identify the best possible sites to maximize wind capture while minimizing the environmental impact.

### We are working to mitigate community concerns.

To that end, we have met with municipal staff from Bluewater, South Huron, Huron East and West Perth, and with county staff from Huron and Perth to identify issues of concern with the objective of finding acceptable solutions. We have also had individual meetings and correspondence with several members of the community to answer their questions. This work continues and we are committed to continuing this dialogue.

Making Grand Bend a producer of clean, reliable wind energy will result in a number of investments in the Grand Bend economy. Northland Power is committed to making sure that Grand Bend remains a prosperous, vibrant, and healthy community. A community we hope to be a part of for many years.

If you have any questions, please don't hesitate to contact me at grandbend@northlandpower.ca

# Grand Bend Wind Farm

## Community News

**Gord Potts**
Director Business Development and Project Manager
Grand Bend Wind Farm for Northland Power Inc.

# Wind Sounds

by Gord Potts

Current setbacks were designed to limit the sounds of wind turbines at residences to under 40 decibels (dB), equivalent to the sound of a quiet room.

### How loud is a wind turbine?

How does the sound compare to other daily noises? Will a wind turbine keep me up at night? One of the biggest concerns we've heard from residents is the issue of wind sounds. There is a common misunderstanding that wind farms are noisy.

Many of these perceptions are likely based on older wind farm technology. Over the past decade, new technology has resulted in wind turbines that are much more effective and quiet.

In addition, Ontario's current setback requirement between wind turbines and residences is 550m - nearly the length of six football fields. These setbacks - the most stringent in North America - were designed to limit the sounds of turbines at residences to under 40 decibels (dB). This limit includes situations where there is more than one turbine on or adjacent to a property. And according to the World Health Organization, this limit is below the level at which impacts on sleep occur.

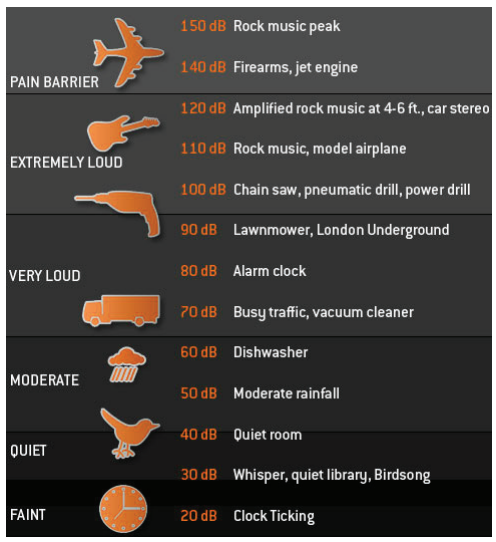
There is also a persistent misconception that wind turbine sounds result in health problems from "low frequency sound" and "infrasound". As you may already be aware, the federal government announced very recently that it will conduct a study to look at the purported connection between turbine noise and health effects on people living near wind turbines, with results anticipated in 2014. This is good news - we believe the study will make an important contribution to research that is already ongoing around the world on this issue. That being said, significant research has already been done both here in Ontario and abroad, with the balance of evidence clearly indicating that wind turbines do not have an impact on human health.

In 2010, after significant review, Ontario's Chief Medical of Health concluded that "there is no scientific evidence... to indicate that low frequency sound generated from wind turbines causes adverse health effects." Other scientific reviews from Canada, the U.S., Australia and Europe support these findings.

Sounds are everywhere in our natural and man-made environment, coming from rivers, cars, and even the wind itself. For example, on a calm night in April this year we measured the sound of small waves lapping up on the beach near the Oakwood Inn. From a distance of 100 metres from the shore our instrument registered over 60 decibels, or 4 times louder than 40 dB. Decibel measurements use a logarithmic scale. A 10 dB increase represents a doubling of the sound energy.

There is much misinformation available on the issue of wind-generated energy. We want to provide you with access to factual, relevant, and current information. To learn more about how Ontario's setback distances were determined, how wind turbine noise is measured, and for access to studies reviewed by Ontario's Ministry of the Environment (MOE) when developing the Renewable Energy Approvals (REA) regulation, we encourage you to visit the MOE website at http://www.ene.gov.on.ca/environment/en/subject/wind_energy/index.htm

Please contact me if you would like further information about recent studies or sound testing done here in the community, as part of the project, to meet REA requirements.



# Grand Bend Wind Farm

## Community News

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

Renewable energy sources such as wind are being adopted in Ontario and around the world to combat climate change, a confirmed real threat to wildlife.

## Wind and Wildlife

by Gord Potts

### Minimizing the risk to wildlife

How do you make sure that wind turbines don't negatively impact area wildlife? What is the average rate of bird deaths from wind turbines and other sources? Are wind turbines more harmful to wildlife than climate change? These are important questions to ask as Grand Bend and the province of Ontario increase adoption of renewable energy sources.

The proper siting of a wind farm and each wind turbine is key to minimizing the risk to wildlife. Before any Ontario wind farm receives approval from the Ministry of the Environment, it undergoes a detailed and extensive Renewable Energy Approval (REA) process. This process studies the proposed site over the course of a full year to evaluate the potential impact on wildlife and to determine appropriate methods to mitigate any risk. Monitoring continues after approvals are received and the wind turbines are erected and operational.

Wind turbines do not pose a hazard to most animals. Cows, horses and deer can be seen safely grazing and resting in close proximity to turbines because ample clearance between the blades and the ground prevents injury. And although birds and bats can be injured or killed if they collide with turbine blades or towers, and their breeding, nesting and feeding habits may be disturbed by wind turbines, those impacts can be minimized with proper siting.

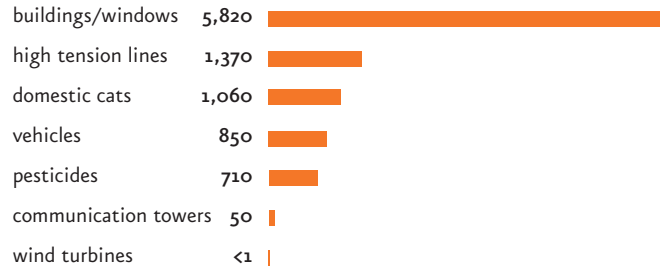
Northland Power, like all wind developers in Ontario, is required to engage in both the REA process as well as a post-construction, multi-year monitoring program to mitigate risk. Wildlife experts conduct an extensive study of the site and significant data on wildlife habitats is reviewed which results in a comprehensive site assessment. The Ministry of Natural Resources (MNR) reviews and monitors the process throughout.

### Working with wildlife experts

In Grand Bend, our team is working closely with the MNR and the Ausable Bayfield Conservation Authority to ensure minimal impact to the natural environment as a result of the project. As part of this work, the following field studies and ecological inventories are being undertaken: vegetation surveys and vegetation community classification (Ecological Land Classification), bird migration, breeding and over-wintering surveys, amphibian breeding surveys, aquatic habitat mapping, reptile hibernacula surveys, turtle surveys, bat habitat mapping, wetland assessments and surveys to identify specific Endangered, Threatened, Special Concern and rare species. Upon completion, all documents produced as part of the REA process will be posted on our project website. Public notice will be given when these and other reports are available.

### Check out the numbers

According to one study available at http://studentaffairs.case.edu/farm/doc/birdmortality.pdf, wind turbines are a far smaller threat to birds than other sources. The study cites that for every 10,000 bird deaths, only one is caused by wind turbines, compared to 1,060 deaths caused by domestic cats and 5,820 from crashing into buildings and windows.




*Source: canWEA*

In conclusion, it is important to note that renewable energy sources such as wind are being adopted in Ontario and around the world to combat climate change. Climate change has been confirmed to be a real threat to wildlife. According to a 2004 study in *Nature*, the international weekly journal of science, up to a quarter of all bird species may become extinct by 2054 as a result of global climate change.

Northland Power is taking a proactive approach to protecting Grand Bend's wildlife. I encourage you to contact me with any questions at grandbend@northlandpower.ca or to visit the project website to review the data and plans we've prepared to date.

http://grandbend.northlandpower.ca/

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

**Gord Potts**
Director Business Development and Project Manager
Grand Bend Wind Farm for Northland Power Inc.

## The True Cost of Renewable Energy

by Gord Potts

Today, renewable energy is helping Ontario's economy by creating local jobs and, over the long term, is expected to lead to cost savings in energy prices.

### A worldwide challenge

Are renewable energy sources more expensive? Don't we already have more electricity than we need? Why are we "subsidizing" renewable energy?

One of the biggest challenges currently facing Ontario, Canada and countries around the world is how to supply energy to a growing population while reducing greenhouse gas emissions. The recent blackout in India that left more than 700 million people without power only reinforces the importance of a stable, reliable power grid to ensure productivity and quality of life.

According to the Ontario Power Authority, up to 43% of Ontario's electricity facilities will need to be rebuilt or retired in the next decade. Across the country, electricity prices are rising because those systems – built around the same time as ours – are aging. In Alberta, rates are forecast to rise 50% by 2016, and between 2002 and 2010 rates in Nova Scotia and Saskatchewan rose 37% and 36%, respectively. Much of these increases can be attributed to the expense of new capital projects and required infrastructure upgrades. Whether we like it or not, now is the time to rebuild and expand Ontario's power grid, looking to how it will serve us best now and in the future.

### The need for new power sources

Ontario currently has a small surplus of electricity due to falling demand from a restructuring of our economy and conservation efforts. However, this surplus is only temporary. All of our coal plants are being phased out and, as soon as 2015, all of our nuclear plants will need refurbishing. Removing these energy supplies from our grid will require new power sources to be in place. We're getting started now to be ready for the future.

To this end, the Ontario government introduced their Long-Term Energy Plan to develop a more modern energy system and a diverse supply mix, including renewable energy. The Green Energy Act supports these goals by expanding renewable energy generation and promoting the creation of clean energy jobs in the province through the Feed-in Tariff (FIT) Program.

### How feed-in tariff programs work

While some have argued that the FIT Program is an unfair "subsidy" that is driving up the cost of our electricity bills, the reality is that traditional forms of electricity generation have also been heavily subsidized over the years. The FIT program is designed to openly and transparently reflect the current costs of building renewable-energy projects.

Around the world, FITs have helped countries to increase their renewable energy supply and kick-start a new market, allowing industry to decrease costs over time. As more facilities are built, the cost of technology and equipment decreases, and the rates paid can be lowered. According to the *Renewables 2010 Global Status Report*, FIT programs reduced the cost of wind energy by 33% between 1998 and 2008. Germany's FIT program has been credited for the worldwide decrease in the cost of solar energy and, recognizing the value, Germany, along with several other countries, continues to offer FIT programs to encourage renewable-energy development.

### The increasing price of traditional energy

A 2011 Pembina Institute study, *Behind the Switch: Pricing Ontario's Electricity Options*, found that cancelling the Green Energy Act would result in a slightly slower increase in electricity prices – about the price of a coffee and doughnut per month for the typical household. But in the long term, it found that the investments we're making in renewables are far more likely to lead to cost savings because the price of more traditional energy sources is expected to increase.

In the meantime, renewable energy is creating jobs in Ontario and feeding the economy. A 2011 study by ClearSky Advisors estimated that wind power in Ontario will generate 80,328 person-years of employment and attract $16.4 billion in private investments, of which $8.5 billion will be invested locally in Ontario. Projects installed between 2011 and 2018 are expected to contribute more than $1.1 billion in revenue to Ontario municipalities and landowners in the form of taxes and lease payments over these projects' 20-year lifespan.

I encourage you to read some of the studies I've referred to or to contact me at grandbend@northlandpower.ca with any questions. There is much information available about the true cost of energy. And while today I've focused on dollars and cents, it is important to remember that a sustainable environment, for today and our future, is priceless.

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

## Where the Wind Blows – Determining Turbine Locations

by Gord Potts

The large, flat agricultural land east of Highway 21 provides a near-perfect location for a wind power generation project.

### Ideal location characteristics

How are a wind farm's turbine locations selected? What are the key location features? What factors affect turbine height and distance decisions? This week's column will aim to answer your questions about how the Grand Bend Wind farm turbines will look and where they will be placed in advance of the construction phase.

Turbine location is determined through extensive scientific research. To determine the best possible location for a wind power system, one must first assess the prevailing wind patterns and wind speeds. The large, flat agricultural land east of Highway 21 provides a near-perfect location for a wind power generation project. The close proximity of the Grand Bend Wind Farm to the shoreline of Lake Huron exposes the area to an above average wind resource. Extensive data collection and wind studies have confirmed the potential of this site.

### Other important factors

An ideal turbine location is also easily accessible to facilitate construction and operation, does not encroach on any environmentally sensitive areas, and is a reasonable distance from large natural or man-made obstructions and residences. In addition, the Green Energy Act requires that turbines be located a minimum of 550 meters from any defined 'receptor' (or residence).

Individual turbine locations are determined by a computer program designed to meet all of the above-stated criteria while ensuring that the turbines don't shadow each other from the prevailing wind.

### Turbine Models

Turbines are then selected, based on the aerodynamic characteristics of the blade, generator output versus blade length, and tower height. Every turbine is slightly different. Matching the turbine to the site's conditions is key to ensuring that power output is optimized, sound level limits are respected, and community impact is minimized. The Grand Bend Wind Farm will use 45 to 48 Siemens 2.3 MW wind turbines. These machines have a rotor diameter of 113 meters and the center of the turbine is approximately 100 m above the ground. They were chosen to minimize the number of turbines required while maintaining a high level of energy production.

Grand Bend's geographical location, large flat agricultural land base and wind resources make it an ideal spot to generate, clean, renewable wind energy that will be used locally and across the province. The turbine location map is available on our website for your review. I encourage you to have a look and contact me at **grandbend@northlandpower.ca** with any questions about the proposed layout.

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

In addition to the REA process, any wind energy development project also involves working with the host municipalities.

## Proponent Responsibilities

by Gord Potts

### Roles and responsibilities

Who ensures a wind farm is built to meet the highest safety and environmental standards? How do we know a developer is reporting appropriately on any environmental issues? Who protects the local taxpayer from any resulting or unforeseen expenditures related to a local wind project?

As more wind energy is developed across Ontario, it is important to understand the extent of the consultations and permitting requirements included in the provincial environmental approval process to ensure that it is fair, reasonable, enforceable and transparent.

Generally, when a developer comes into a community to develop a project, they are responsible for costs related to the project, including any additional expenses that may occur unexpectedly. Local municipalities are not made to bear the burden of the project's costs.

### Renewable Energy Approvals Regulation

Under the Green Energy Act, the provincial Ministry of the Environment (MOE) has undertaken the majority of accountability for ensuring that renewable energy projects meet the strict guidelines set out in the Renewable Energy Approvals (REA) regulation. In addition to the MOE, various other Ministries and agencies are consulted with and take significant roles in the review and approval process. The REA regulation has spurred the growth of renewable sources of energy by consolidating the approvals process for energy developers,while ensuring the surrounding land, buildings, wildlife, and residents are protected.

Here is additional detail, directly from the MOE REA website:

*Rules in the regulation require developers to have a plan to respond to the public, a safety and emergency management plan, and engineering assessments and environmental reports to ensure there is no harm to human health, the environment, archaeology or natural heritage. The ministry's minimum requirements also include holding at least two public meetings (except very small wind projects and on farm bio-energy facilities) and sharing any reports and project plans with the municipality in the early stages of project planning.*

*If mandatory public, municipal and Aboriginal consultation requirements are not met, a Renewable Energy Approval will not be issued, and the project will not proceed.*

### A Good Neighbour

Northland Power fully understands and accepts the responsibilities that come along with developing wind energy in the region. We are committed to being a good neighbour.

In addition to the REA process, any wind energy development project also involves working with the host municipalities. Construction permits and municipal road use allowances remain under the jurisdiction of the local municipal authority. Northland Power and the municipalities of Bluewater, South Huron and Huron East will enter into a 'Road User Agreement'.

We have heard some concerns about abandonment of turbines or equipment in the event of termination or expiry of Northland's contract with the Ontario Power Authority (OPA). Rest assured, this is not the case. The REA regulation clearly stipulates the requirement of a decommissioning plan, including removal of all project components within a specified timeframe.

Northland Power has and will continue to cooperate fully with local municipalities throughout the project's lifespan. As the project moves forward, we will continue to keep the community informed and up to date, and will continue to make every effort to ensure that this project results in positive outcomes and opportunities for the community and its residents.

If you have any further questions about Northland Power's responsibilities as they relate to the development of this project, please do not hesitate to contact me. I would be pleased to discuss your questions or concerns in greater detail.

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

## Powering Sustainable Communities

by Gord Potts

Wind energy is helping to address climate change while creating jobs, providing an income source for local landowners, tax revenue for municipalities, and tourism opportunities for host communities.

### The many benefits of wind energy

What is the green economy and what does it mean to me? What benefits can a wind farm offer my community? Do wind farms impact tourism?

Wind is becoming an increasingly important part of Ontario's electricity supply mix. According to CANWEA, wind energy output currently powers over 440,000 homes across the province. Across Canada, that number grows to more than 1.2 million.

In addition to meeting our growing energy needs, wind power has many benefits to offer Ontario communities. It helps us reduce air pollution and address climate change by decreasing our reliance on carbon-based energy sources, creates jobs and economic development, is a source of income for local landowners, provides tax revenue for municipalities, and creates tourism opportunities for host communities.

### Ontario's green energy economy

Wind energy is an important part of Ontario's green energy economy. According to Environmental Defence's April 2012 report, Building Ontario's Green Economy: A Road Map, available here: **http://environmentaldefence.ca/blog/building-ontarios-green-economy**, the Green Energy and Economy Act has already successfully attracted over 30 green energy manufacturing facilities to the province, led to new business for existing industries, and created over 13,000 jobs. The report states:

"There are particularly compelling reasons for {Ontario} to pursue a green economy... Research shows that a green economy is more manufacturing and export intensive than the rest of the economy, offers better wages, and is growing faster than the economy at large. This growth is projected to continue, even accelerate, meaning the green economy should be at the centre of any strategy for Ontario's economic recovery."

### Preserving our water supply

There are also significant environmental benefits to wind energy. For example, wind energy uses virtually no water. This means that local water resources are preserved. This fact is of growing importance, particularly in rural or farming communities, as climate change makes droughts more likely, frequent, and intense. A recent article by Tyler Hamilton in the Toronto Star states, "It's often forgotten when talking about energy production that environmental impacts stretch far beyond air pollution and emissions of heat-trapping greenhouse gases. Less discussed, particularly in the context of electricity generation, is the dependence and impact on fresh water resources that are vital to other industries and ecosystems."

### Community benefits

Finally, wind energy enables host communities to benefit from new income for rural landowners, net new municipal tax revenue, and creation of local jobs. It has also been shown to provide tourism opportunities.

But you don't have to take my word for it. Below are quotes from municipal leaders across Ontario who have already benefitted from wind power. You can read more about Ontario communities' experiences with wind farms here: **http://www.canwea.ca/municipalities/municipalities_e.php**

"The Erie Shores wind farm has become a part of our identity...We've actually incorporated a wind turbine into our tourism logo. My advice would be to come to the Erie Shores Wind Farm and see for yourself. They are majestic and sleek. Stand beneath a turbine and listen for yourself. Talk to the farmers and hear what they have to say." Lynn Acre, Mayor, Municipality of Bayham

"The township as a whole is happy with the wind farm. We have 61 of its turbines and I wish we had 60 more. When you consider the revenue, why wouldn't I? We receive taxes from the wind farm, but we don't plough the road, we don't do garbage pick-up, and we don't provide policing. For the township, it's a win-win." Lou Madonna, Reeve, Township of Prince

"We very early realized the benefits that came with construction of the wind farm, but there was also an attitudinal change. We are working on a renewable energy plan, but when you have a business... that actually turns it into reality and people can see it and people can touch it, then that acts as a real catalyst." John Roswell, Mayor, Sault Ste. Marie

If you have any questions about the specific benefits that the Grand Bend community can anticipate as a result of the Grand Bend Wind Farm, please don't hesitate to contact me. We look forward to helping to ensure that the area remains healthy, vibrant and sustainable for many years to come.

## Intelligent energy for a greener planet

**Northland Power** is an Ontario-based company with over 25 years experience developing, owning and operating facilities that produce and sell clean and green energy.

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# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

## Renewable Energy Approvals Process

by Gord Potts

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

The REA process is interactive, thorough and transparent.

### The REA Process

You may have heard that a wind farm has been proposed for the area and are wondering what requirements must be met in order for a wind project to receive its Ministry of the Environment (MOE) Renewable Energy Approval (REA)? How stringent are the protections to the public and to the environment? How does the public get the opportunity to have input and be involved in the REA process?

The Ontario government has set up a robust and rigorous approval process for renewable energy projects such as the one proposed here in Grand Bend. The process ensures that potential environmental impacts are considered upfront and that public consultation is conducted.

The REA process was developed to facilitate the growth of renewable energy sources by streamlining the approvals process for energy developers, while ensuring that all developers comply with Ontario's stringent environmental legislation.

### REA Requirements

Taking a look at the REA process, there are numerous requirements that must be satisfied before a permit is issued.

The first project milestone is generally a Feed-In Tariff (FIT) power purchase contract. Before construction, most developers of renewable energy projects in Ontario require a long-term agreement with the Ontario Power Authority (OPA) for the purchase of the generated electricity. Since the spring of 2010, the OPA has entered into 20-year contracts with renewable energy developers under the FIT Program. Once the FIT contract has been secured, developers will begin the REA process. There are five key steps to obtaining an REA:

1. Pre-submission work: For large wind facilities like Grand Bend, there are numerous mandatory studies and assessments that must be completed. These include assessments of noise, adjacent property uses and setback requirements. There are also extensive studies examining natural heritage resources (including land, water and wetland systems), potential wildlife impacts and cultural heritage/historical use.
2. Public consultation on the extensive study work and project development activities including Public Information Centres (PIC).
4. Public/Agency review period and published notice on the MOE Environmental Registry.
5. MOE decision.

The REA process is interactive, thorough and transparent. Public consultation is a significant element of this process, and information related to an REA application must be made available to all interested parties through formal notices, PICs and online.

### Status of Grand Bend's REA

Northland Power submitted its draft REA submission to local municipalities and First Nations communities in August 2012 and, as required by regulation, provided notice and made numerous study reports available to the public on our website on September 26, 2012.

We expect that the final REA submission will be submitted to the MOE in the first quarter of 2013. We will provide additional public notice when this has occurred by publishing advertisements in local print publications and this column. As required by the REA regulations, the final submission material will be available for review for a period of at least 30 days.

Following consideration of all the relevant information provided and all the public comments received, the MOE will have the option to approve, approve with conditions, or refuse approval of the REA. If approval is granted, the applicant must then obtain a number of additional approvals and permits required to move forward with the project. This includes permits and approvals from municipalities, the provincial Ministries of Natural Resources and Transportation, the Independent Electricity System Operator and others. A notice to proceed from the OPA under the FIT contract is also required as well as any additional federal requirements.

If you have not already done so, I encourage you to visit our website to review the documents that are available there, including the public notice regarding the upcoming PICs scheduled between November 28 and December 4, 2012. I am also always available at grandbend@northlandpower.ca to answer any questions you may have and will do my best to address your concerns.

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

## Wind Energy and the Environment by Gord Potts

### Wind power can help to improve our planet and our health

Is wind energy environmentally-friendly? Can it really help to address climate change? What kind of environmental footprint does a wind farm create?

According to Environment Canada, over 80% of the total national greenhouse gas emissions are associated with the production or consumption of fossil fuels for energy purposes.[1] Recent statistics show that air pollution causes approximately 5,000 premature deaths each year in Canada. In Ontario, exposure to air pollution results in an estimated 60,000 emergency room visits and 17,000 hospital admissions each year[2], with children and seniors at the highest risk of suffering adverse health effects.

To combat climate change and remove pollution from our atmosphere, Ontario is moving away from fossil-fuel-based, non-renewable energy sources, and toward natural sources, like wind, that generate less pollution and will help improve Ontario's air quality.

### Combating climate change

To effectively address climate change, Ontario needs a mix of new and existing renewable energy technologies combined with energy-efficiency measures. Wind energy is the most cost-effective renewable energy source available today that can generate clean electricity and help combat climate change.

Wind turbines typically produce enough clean electricity in three to five months[3] to offset all of the greenhouse gas emissions emitted throughout their construction. With a minimum 20- to 25-year lifespan, wind turbines will generate a significant amount of clean electricity to power Ontario's electricity grid while offsetting the emissions that traditional sources would cause.

It has been reported by the U.S. Department of Energy that 825 million tons of $CO_2$ could be avoided annually if, by 2030, 20% of energy is provided by wind. By doing so,expected electricity-sector emissions would be reduced by 20-25% which is equivalent to taking 140 million vehicles off of the road.[4]

### No emissions, no water

When considering the environmental footprint of wind energy, it is important to take into account the lifecycle analysis of power-generation sources. This analysis includes the total environmental impact of generating energy – from its initial source through to its endpoint when you use it in your home or business. Traditional sources of energy often have higher lifecycle costs because of the activity required to transform natural resources into electricity. This process may include on-site construction, mining or extraction of the fuel source, transporting the fuel, converting it to energy and the decommissioning of a plant. In comparison, wind generates electricity whenever the wind blows and has no need for extraction, transportation or other environmentally-damaging processes.

Furthermore, wind power generates no emissions, no carbon dioxide or other greenhouse gases that are emitted by fossil-fuel electric generation. Wind-powered turbines generate no air pollution. Wind power does not contribute to smog, acid rain or climate change. Once decommissioned, the area where the turbine was located can be restored with minimal negative impact on the environment and minimal cost.

In addition, unlike traditional energy sources, wind energy requires virtually no water to operate. This fact is of growing significance as we recognize the importance of maintaining one of our most precious natural resources – fresh water. A 2008 study by the U.S. Department of Energy found that generating 20% of U.S. electricity needs from wind power by 2030 would reduce cumulative water consumption in the electricity sector by 8% or by four trillion gallons.[5]

### Let's work together to combat climate change

The role of wind energy in combating climate change is unquestionable. With the operation of the Grand Bend Wind Farm, this community will foster positive change for Ontario's energy system and environment. Once operational, the project will provide a renewable supply of clean and safe wind energy, while helping to address climate change and reduce air pollution for future generations.

As always, if you have any questions, please contact me at grandbend@northlandpower.ca. I hope to see some of you at the Public Information Centre meetings on November 28 and 29, and December 3 and 4.

In Ontario, air pollution causes approximately 60,000 emergency room visits and 17,000 hospital admissions each year.

1 http://www.climatechange.gc.ca/default.asp?lang=En&n=F2DB1FBE-1

2 http://www.ec.gc.ca/scitech/default.asp?lang=En&n=4B40916E-1&xsl=privateArticles2,viewfull&po=99968A4E

3 http://www.bwea.com/energy/myths.html

4 http://www.awea.org/learnabout/publications/upload/Climate_Change.pdf

5 http://www.awea.org/learnabout/publications/upload/Climate_Change.pdf

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

# The Evolution of Wind Power

by Gord Potts

**Gord Potts**
Director Business Development and Project Manager
Grand Bend Wind Farm for Northland Power Inc.

Technology advances to wind turbine design have made it a valuable addition to our energy generation mix, and an important tool to counter climate change.

### Wind power through the ages

When did we first start using wind as a power source? What is the history of the use and design of wind turbines? How has technology improved the modern wind turbine?

The earliest known harnessing of wind power was in 5000 BC, when Egyptians used it to power their sailboats. This initial use of wind power was an early indication of the importance of utilizing the vast potential of wind energy. The use of a sail to capture the wind was an important design feature which would later influence the development of sail-type (broad fan blades) windmills.

The first windmills were developed to ease the burden of essential tasks, including grain-grinding and water-pumping, with the first documented design and use of windmills by the Persians and Chinese, occurring over 2,000 years ago. In approximately 1390, the Dutch set out to refine the wind-powered tower mill design, creating big sails that generated aerodynamic lift and improved rotation efficiency.

In North America, the first major advances in windmill technology occurred in the 19th century. The most important refinement of the American fan-type windmill was the development of steel blades in 1870. Between 1850 and 1970, over six million wind machines – generally small, with an output of one horsepower or less – were installed across the United States. In the late 19th century, the first successful American multi-blade windmill design was created by Charles F. Brush.

### Large-scale wind power

The development of large, utility-scale wind energy conversion systems was first undertaken in Russia in 1931, utilizing the 100 kilowatts (kW) Balaclava wind generator. Experimental wind plants subsequently emerged in the United States, Denmark, France, Germany and Great Britain from 1935-1970, demonstrating that large-scale wind turbines would be a functional addition to the energy generation mix.

From 1973-1986, the commercial wind turbine market evolved further, increasing the output of the machines up to 600 kW. Until the early 1990s, the majority of wind turbine installations occurred in California, with the installation of over 17,000 turbines. At the height of development, these turbines had a collective output of over 1,700 megawatts and produced over 3 million megawatt hours of electricity – enough to power a city of 300,000.

Post-1990, the majority of market activity shifted to Europe and Asia. The installation of over 10,000 MW of European wind capacity supported a thriving private wind turbine and manufacturing industry. Along with a move to green power initiatives, the 1990s also brought significant technology advancements that reduced noise levels, balanced weighting, improved maintenance and enabled much greater amounts of power to be produced.

### Current wind turbine technology

Today, the most common types of wind turbine has three blades rotating on a horizontal axle with the blades facing upwind from the tower structure. This design of machine can be seen from highway 21 at locations north and south of Grand Bend, less than an hour's drive away. These types of machines are well-suited for large-scale generation of electricity, and will be used at the Grand Bend Wind Farm. Additional information on the turbines can be found in the turbine specification report on our website.

Wind energy has been around almost as long as humankind. Technology advances to wind turbine design have made it a valuable addition to our energy generation mix, and an important tool in our fight to counter climate change. If you'd like to learn more about this project, or the wind turbines that will be used, please contact me at **grandbend@northlandpower.ca**.

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

## Public Consultation

by Gord Potts

Northland Power is committed to being a good neighbour, and consulting with our host communities is an important part of that promise.

### The Process

This week's column will provide information about the ongoing public consultation process and how you can get involved.

Before any renewable energy project is granted its Renewable Energy Approval (REA), it must first complete the stringent and robust REA process. This process includes a full review of all environmental aspects, natural heritage features, and water bodies, as well as heritage and archaeological resources.

In addition, the REA process requires public, agency and First Nation consultations be conducted. Since the inception of this project, Northland has been active in meeting with local municipal officials, agencies and their staff and communicating with stakeholders through meetings, telephone conversations, written and email correspondence and public meetings.

Our first round of public meetings occurred in April of this year, and our second set is taking place this week and next. Dates, times and locations are below:

Municipality of West Perth
**DATE:** 28th November 2012,
**TIME:** 5pm – 8pm,
**PLACE:** Mitchell District Arena & Community Centre, 185 Wellington St, Mitchell, ON N0K 1N0

Municipality of Huron East
**DATE:** 4th December 2012,
**TIME:** 5pm – 8pm,
**PLACE:** Seaforth and District Community centre
122 Duke Street, Seaforth, ON N0K 1W0

Municipality of Bluewater
**DATE:** 29th November 2012
**TIME:** 5pm – 8pm
**PLACE:** Bluewater Community Center/Zurich Arena, 15 East St, Zurich, ON N0M 2T0

Municipality of South Huron
**DATE:** 3rd December 2012
**TIME:** 5pm – 8pm
**PLACE:** Dashwood Community Centre, 158 Centre St., Dashwood, ON N0M 1N0

### Engaging the Community

The purpose of these meetings is to provide an update on the Project status, to answer questions, and to consult with the community on the proposed project. We look forward to hearing your questions and hope to address your concerns.

We also commit to consider all feedback received about the Project – feedback received to date has already resulted in changes to the Project plan. Please note, however, that you have the opportunity to ask questions or provide your comments at any time during the REA process (comment sheets are available on the Project website).

A number of Northland staff and third party experts will be on hand to answer your questions and listen to your feedback. Comment sheets will also be available. In addition, we will show you where we have made changes to the Project plan based on community feedback received to date.

### Meeting Format

The meeting format is an 'Open House'. This means that you can come at anytime during the posted hours, review the information at your leisure, and speak one-on-one with project experts about any questions, concerns, or feedback you might have. We will have a display set up to walk you through the project and our progress to date. More specifically, we will present:

- The proposed turbine locations and collector/transmission line routing for the projects;
- The findings of the base line studies – we will also be available to discuss the draft REA reports;
- The Proposed Environmental Impacts and Preliminary Mitigation Measures; and
- Next Steps in the process.

To foster informed discussion, project developers are required to make project documents available to the public in advance of these meetings. You can find the documents in the 'Reports' section of the project website.

Northland Power is committed to being a good neighbour, and consulting with our host communities is an important part of that promise. I hope to see many of you at these meetings, and welcome your questions and feedback. If you aren't able to come out, then please feel free to send us an email anytime at **grandbend@northlandpower.ca**.

# Grand Bend Wind Farm

## Community News

http://grandbend.northlandpower.ca

**Gord Potts**
Director Business Development and Project Manager

Grand Bend Wind Farm for Northland Power Inc.

## Summary of Public Consultation Meetings

by Gord Potts

The second round of Public Information Meetings were held on November 28-29 and December 3-4. The meetings were an opportunity to provide an update on the project, the status of our Renewable Energy Approval (REA) application, and most importantly, to meet with members of the community, answer questions and address concerns. Below is a summary of the questions we heard most frequently during these meetings:

### Q Do we really need wind energy – don't we already have too much power?

Ontario currently has a small surplus of electricity due to falling demand from a restructuring of our economy and conservation efforts. However, this surplus is only temporary. All of Ontario's coal fired plants are being phased out with a targeted closure date of 2014 and many of the nuclear generating units are scheduled for long refurbishing outages. These changes to our electricity supply require that new power generating sources be put in place. Ontario is getting started now, to be ready for the future.

Canada needs a variety of reliable, clean and safe sources of new energy to meet its future electricity demands and commitments to reduce greenhouse gas emissions. Wind energy is part of a balanced energy mix.

### Q Will the project require new high-voltage power lines?

The project will require a new 230 kV electrical transmission line to connect to the Hydro One transmission system. The planned transmission line route can be seen on our project website. The power produced by the individual turbines is collected at a lower voltage using buried collector cables and then "stepped up" to 230 kV at the project's sub-station.

### Q How will the project impact tundra swans?

We completed many natural environment studies (including surveys on tundra swans and eagles) to accurately characterize the existing natural environment within the study area. Our project team is working closely with the Ministry of Natural Resources (MNR), with the ultimate aim of ensuring minimal impacts to the natural environment as a result of the Project.

In general, studies have indicated that few waterfowl fatalities occur as a result of contact with wind turbines, relative to the numbers of waterfowl present, due to avoidance behaviours. Collision and direct mortality of migratory waterfowl is not expected to be a significant issue.

### Q Does the project put me at risk from Electromagnetic Fields (EMF)?

From the Health Canada website: Health Canada does not consider that any precautionary measures are needed regarding daily exposures to EMFs at extremely low frequencies (any frequency below 300 hertz). EMFs produced by the transmission and use of electricity belong to this category. There is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors. Learn more here: **http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/magnet-eng.php**.

We've been listening to all of the questions and concerns received to date. Based on your feedback, we've made a number of project changes to address concerns:

- Selection of the northern transmission route option to avoid environmentally sensitive areas, more densely populated areas, and reduce its length
- Modified transmission line design to avoid impact on a private airstrip
- Underground 230 kV transmission line under consideration.
- Selection of radar technology to reduce duration of blinking navigation lights
- Moved turbine T-21 to avoid telecommunications interference
- Moved an access road servicing T-29 to avoid wetland
- Consideration of alternative location for Parts and Storage building to make use of existing commercial land in the community

We are happy to receive your comments on the project at anytime. However, to have your input included in our REA submission of January 2013 it must be received by us before December 21, 2012. Please visit the 'Feedback' section of our website.

To have your input included in our REA submission of January 2013 it must be received by us before December 21, 2012.

## Intelligent energy for a greener planet

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# Appendix D6

## E-mail Public Notifications – Pembina Speaking Tour Event

**Living beside wind turbines : Perspectives from a wind farm neighbour**

Fiona Christiansen to: 06/22/2012 01:47 PM

Bcc:

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Dear Grand Bend residents:

We wanted to bring to your attention an event taking place in Grand Bend next week. Heidi Eijgel — an Albertan rancher with a decade of experience living next to a wind farm - is touring Southern Ontario to share her experiences. Heidi will be making three stops on the tour, in Grand Bend (June 25), London (June 26) and Chatham-Kent (June 27). Additional information is available here: http://www.pembina.org/blog/633. The meeting on Monday June 25 in Grand Bend will be held at the Alhambra Hall, Grand Bend, from 7 to 9 p.m.

Please note this event is **in no way sponsored by or affiliated with Northland Power**. We simply wanted to share the information with you as an opportunity to learn more about what it's like living near wind turbines, ask questions and have your concerns addressed by someone with first-hand experience.

As always, should you have any questions about Northland Power's Grand Bend Wind Farm, you can contact us at grandbendwind@neeganburnside.com or visit the project website: http://grandbend.northlandpower.ca/

**About Heidi**
Heidi Eijgel raises horses on a ranch 700m from Summerview Wind Farm , a 70.2 MW wind power project in southern Alberta. Heidi and her husband do not have an ownership stake in the wind farm, but for 10 years they have been some of the wind farm's closest neighbours as well as some of its biggest advocates.

Sincerely,

Northland Power