

Appendix E
Visual Study

DRAFT



VISUAL STUDY
GRAND BEND WIND FARM

August 2012



**RENEWABLE ENERGY APPROVAL
APPLICATION - VISUAL STUDY
GRAND BEND WIND FARM, ONTARIO**

Client Grand Bend Wind Limited Partnership
Contact Lyle Parsons/Gordon Potts
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Date 13 August 2012

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REVISION HISTORY

Issue	Issue Date	Summary
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1 INTRODUCTION

Grand Bend Wind Limited Partnership, c/o Northland Power Inc. (“the Proponent” or “Northland”) is proposing to develop, construct and operate a 100 MW wind facility located north of Grand Bend, Ontario. An application for approval is being prepared under Ontario Regulation 359/09 of the Environmental Protection Act. The Grand Bend Wind Farm (“the Project”) is located in Huron County, spanning the lower-tier municipalities of Bluewater and Huron South. Portions of the transmission line also traverse the municipality of Huron East and municipality of West Perth in Perth County. The Project is classified as a Class 4 Wind Facility under the Regulation.

The basic Project components will include up to 48 turbines (Siemens SWT-2.3-113 direct drive wind turbine generators with a total name plate capacity of 100 MW), turbine access roads, a 36 kV electrical collection system, and a substation. The Project also includes a new transmission line within municipal road right-of-ways (“ROWS”) along Rodgerville Road, Line 17 and Road 183 with connection to the provincial power grid at the 230 kV transmission line south of the Seaforth Transformer Station. During construction, temporary components will include access roads and work/storage areas at the turbine locations and transmission connections.

GL Garrad Hassan Canada Inc. (GL GH), a member of the GL Group and part of the GL Garrad Hassan brand, has been commissioned by Grand Bend Wind Limited Partnership to independently create visual simulations of the wind farm from viewpoints in the vicinity of the Project using specialized modeling software. Given that a visual study is not required under Ontario reg. 359/09, this report is presented as complementary information to the Renewable Energy Approval (REA) application for this Project.

This report includes a brief presentation of the Project site, a description of how the viewpoints were selected, a description of each viewpoint, an explanation of the visual simulation methodology, visual simulation results and concluding comments.

2 DESCRIPTION OF THE WIND FARM SITE

2.1 Site Description

The proposed Grand Bend Wind Farm is located in Southwestern Ontario, on the coast of Lake Huron, in Huron County, Ontario. More specifically, the area being studied for the wind farm components is located east of Highway 21, south of Staffa Road, west of Blackbush Line, and north of Grand Bend Line. Several small towns and villages exist in proximity to the Project, the three largest being Grand Bend, Zurich, and Dashwood. Project components will be installed on privately-owned agricultural lots.

The proposed wind farm is situated in relatively simple terrain, consisting of mostly flat areas and some rolling hills, with elevations ranging from 185 m to 220 m. The landscape in the study area is predominantly characterized by agricultural fields and associated farms punctuated with numerous hedgerows, isolated woodlands, and the occasional watercourse.

2.2 Wind Farm Layout and Turbines

The proposed turbine layout, which consists of 48 Siemens SWT-2.3-113 wind turbine generators, has been supplied by the Proponent. The coordinates of each turbine are presented in Appendix A; coordinates are presented in this report in UTM Zone 17N, NAD 1983 datum [1].

The Siemens SWT-2.3-113 has a blade tip height of 156 m, a hub height of 99.5 m and a rotor diameter of 113 m.

2.3 Applicable Regulations

There are no applicable local or provincial requirements with regard to visual impact for this Project.

3 VISUAL SIMULATIONS

3.1 Landscapes

The Grand Bend Project Area and its vicinity are composed of various types of landscapes resulting from the different land uses, namely residential, agricultural, recreational, and from the presence of natural areas (parks, woodlots, and Lake Huron).

The study area can be divided into four main landscape units, as follows:

- *Residential (Town) Unit.* This unit is represented by the communities nearby such as Grand Bend, Dashwood, Zurich, and their vicinities.
- *Shoreline Unit.* This unit comprises the area directly associated to the Lake Huron shoreline, characterized by open areas looking towards the lake, cottages and wooded areas.
- *Parks, Beaches and Recreation Unit.* This unit is represented by the beaches and parks nearby, such as Grand Bend Beach and St. Joseph's Beach.
- *Agricultural Unit.* This unit is the large farmland area where all the turbines of the Grand Bend Project are located; the unit comprises relatively flat, privately-owned agricultural fields, several residences and farm buildings, as well as several natural heritage features such as woodlots, wetlands and watercourses.

3.2 Selection of Viewpoints

Based on this identification of landscape units, a number of photos were taken during a site visit in July 2012 from representative viewpoints in the vicinity of the Project Area in order to depict the Project. While on site, GL GH staff evaluated the general visual setting, visited all landscape units and took several pictures from each landscape unit, with the objective of providing a balanced approach to the visual study, i.e. showing various types of views from important viewpoints to adequately characterize the anticipated level of visibility of the wind farm. The ten selected viewpoints are found in Table 1, and are shown on a map in Appendix B.

Table 1: Selected Viewpoints for the Visual Simulations

Viewpoint #	Photo Location #	Landscape Unit	Viewpoint	Comment
1	18	Parks and Recreational	Oakwood Golf Course	Looking east-northeast
2	36	Parks and Recreational	St. Joseph's Beach	Looking south
3	43	Parks and Recreational	Grand Bend Beach	Looking northeast
4	41	Parks and Recreational	Grand Bend Beach	Looking east
5	50	Shoreline	Elmwood Road, 200 m west of Bluewater Highway	Looking east-northeast
6	46	Residential/Agricultural	Highway 21 and Sunset Cove	Looking east-southeast
7	40	Residential/Agricultural	Bluewater Highway, 100 m south of King Street	Looking east-southeast
8	38	Residential/Agricultural	B Line, 1 km south of Gore Road	Looking west
9	13	Residential/Agricultural	Zurich Hensall Road and Blind Line	Looking west
10	34	Residential/Agricultural	Dashwood Road, 500 m west of Centre Street	Looking northwest

3.3 Description of Viewpoints

Viewpoints 1 to 4 were selected to represent parks, beaches, and recreational areas in the vicinity of the Project. In particular, the importance of beach views has been emphasized by the Proponent. Viewpoint 1 also represents the view from just north of the town of Grand Bend.

Viewpoint 5 was selected to represent a typical open view from the cottage areas along the Lake Huron shoreline.

Viewpoints 6 to 8 were selected to represent views from throughout the Project Area where several residences are found. Viewpoints 9 and 10 were selected to represent views from the nearby population centres of Zurich and Dashwood, respectively.

3.4 Visual Simulation Methodology

In an effort to better illustrate the integration of the wind turbines in the landscape, photo-montages are prepared using specialized software. These photo-montages are produced by the superimposition of a technical drawing on the photograph of a landscape.

The technical drawing shows the wind turbines on a given territory, observed from a specific viewpoint and from a specific angle, while taking into consideration topographical contour lines, the Project's layout configuration, and the wind turbine model's specifications. Other landscape components such as vegetation cover and existing structures are not considered in the technical drawing.

This technical drawing is then superimposed on a landscape photograph taken from the same geographical point to allow the visualization of the wind turbines in a real landscape. Parameters such as colors and contrast of the photograph, hub height, rotor diameter and geographical orientation of the rotor can be adjusted to render the visual simulation as realistic as possible.

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4 RESULTS

The ten visual simulations described in Section 3.2 can be found in Appendix C, each including a photo-montage, a wireframe view and the original photo used to create the photo-montage.

The visual simulations are summarized in Table 2, including comments on the visibility of turbines from each landscape unit.

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Table 2: Selected Viewpoints for the Visual Simulations

Landscape Unit	Visual Simulation	#	Comments
Parks and Recreational	Oakwood Golf Course	1	Some of these areas have significant vegetation and many views, such as those from Grand Bend Beach, will be blind to the presence of the Grand Bend Wind Farm due to the presence of wooded areas in close proximity to the beach.
	St. Joseph’s Beach	2	
	Grand Bend Beach	3	In many cases, vegetation and houses screen the view of the lower portion of most turbines.
	Grand Bend Beach	4	
Shoreline	Elmwood Road, 200 m west of Bluewater Highway	5	<p>Lower elevation areas. Some open views to Project Area.</p> <p>In many cases, vegetation and houses screen the view of the lower portion of most turbines.</p> <p>Highly valued views from this unit are directed towards the lake itself and not in direction of the Project Area.</p>
Residential/Agricultural	Highway 21 and Sunset Cove	6	Most views within residential areas and towns are closed due to the presence of built structures.
	Bluewater Highway, 100 m south of King Street	7	Open views are all located in the surroundings and can also be considered as views typical of the Agricultural landscape.
	B Line, 1 km south of Gore Road	8	
	Zurich Hensall Road and Blind Line	9	In many cases, few turbines are visible due to vegetation cover, buildings and other man-made structures.
	Dashwood Road, 500 m west of Centre Street	10	<p>Due to the winds in the area, many of the agricultural lots are bordered by windbreaks (in the form of planted hedgerows) that will partially block views of the wind farm. The agricultural landscape unit also includes some woodlots with mature trees.</p> <p>Throughout this landscape, views vary from partially closed to open.</p>

5 CONCLUSIONS

Visual simulations have been created at ten representative viewpoints showing the expected views of the Grand Bend Wind Farm during the Project's operational phase. These viewpoints were selected to represent the range of landscapes present in the vicinity of the Project, including Parks and Recreational, the Lake Huron Shoreline, Residential, and Agricultural. Views towards the proposed wind farm vary from fully closed to open.

Given that a visual study is not required under Ontario reg. 359/09, this report is presented as complementary information to the Renewable Energy Approval (REA) application for this Project.

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6 REFERENCES

- [1] Turbine locations sent by email, by Paul Stubbert, RJ Burnside, to Andrew Brunskill, GL GH, July 2012. “PIA019991_Turbine_Location.shp”

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APPENDIX A TURBINE LAYOUT

Coordinates of turbines

Turbine ID	Easting [m] ¹	Northing [m] ¹
T01	444036	4811878
T02	444376	4811760
T03	445882	4810067
T04	443802	4810147
T05	444206	4809869
T06	444035	4809533
T07	443954	4809147
T08	443718	4808841
T09	444323	4808855
T10	444002	4808745
T11	444330	4808461
T12	444001	4808315
T13	444228	4808041
T14	443802	4807902
T15	444500	4807773
T16	443896	4807611
T17	443376	4805355
T18	443717	4805337
T19	446261	4804829
T20	446913	4804825
T21	443635	4804535
T22	443974	4804635
T23	443320	4804183
T24	443623	4804057
T25	443997	4804036
T26	443339	4803814
T27	443638	4803681
T28	443409	4803439
T29	443154	4802383
T30	443011	4802014
T31	443540	4801110
T32	442448	4800448
T33	442838	4800465
T34	442243	4800119
T35	442757	4800013
T36	442447	4799830

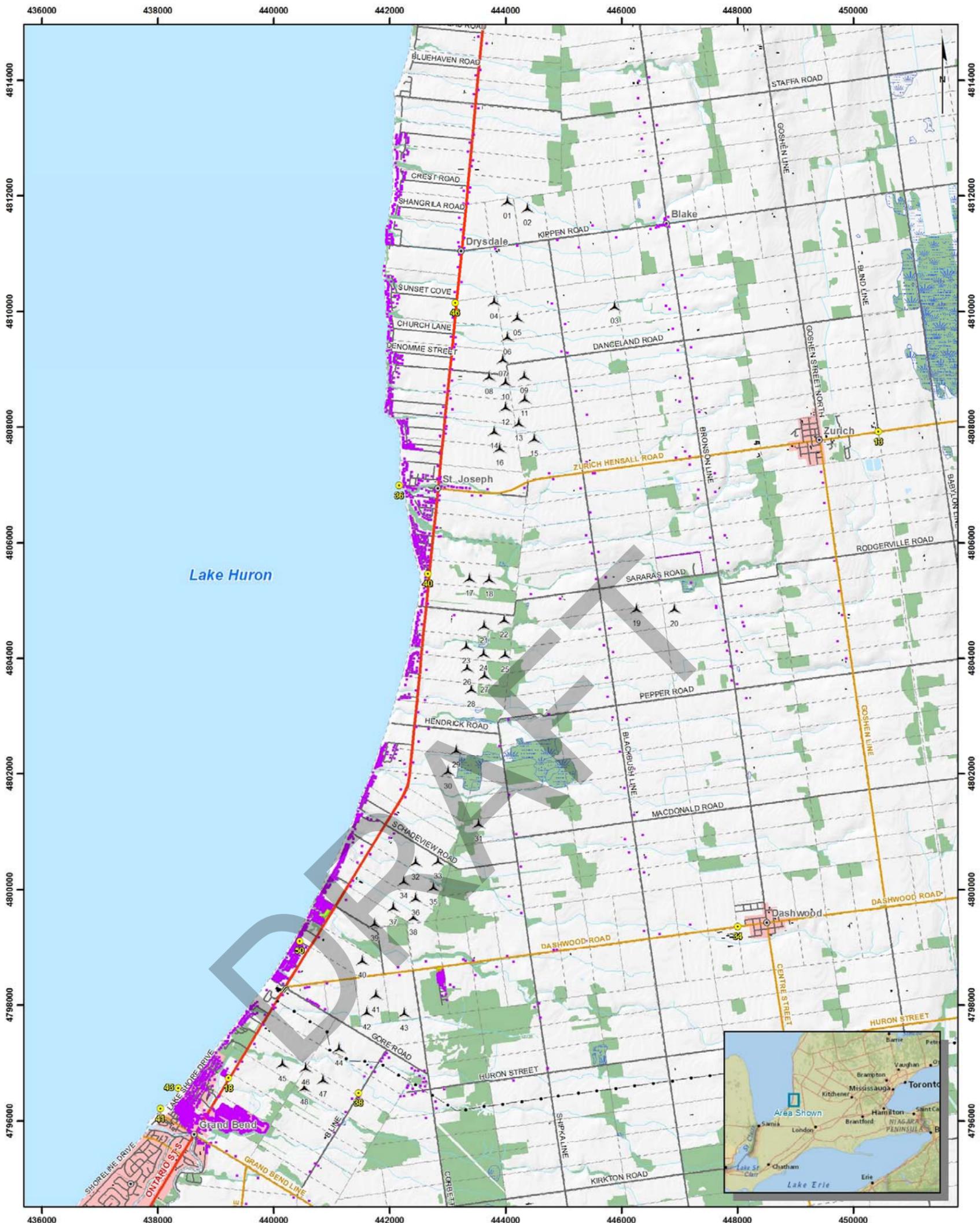
Turbine ID	Easting [m]¹	Northing [m]¹
T37	442062	4799669
T38	442409	4799492
T39	441744	4799389
T40	441527	4798742
T41	441764	4798145
T42	441607	4797850
T43	442249	4797830
T44	441123	4797225
T45	440154	4796958
T46	440550	4796892
T47	440850	4796687
T48	440529	4796554

1. Coordinate system is UTM Zone 17N, NAD83 datum.

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APPENDIX B VISUAL SIMULATION LOCATION MAP

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Legend	
Project Components	— Pipeline
▲ Wind Turbine (48)	— Transmission Line
	— Permanent Watercourse
Other Components	— Intermittent Watercourse
• Dwelling	■ Residential Area
• Other Building	■ Waterbody
▬ Freeway	■ Wetland
▬ Expressway / Highway	□ Lot Line
▬ Arterial / Collector	
▬ Local Road / Street	





NORTHLAND POWER
Grand Bend Wind Farm

VISUAL SIMULATION
48 TURBINE LAYOUT



GL Garrard Hassan

800281-002-12008-010
P14010001
August 08, 2012

Projection: UTM Zone 17N, NAD83
Sources: Ontario Base Mapping, Ontario Road Network, CanVec
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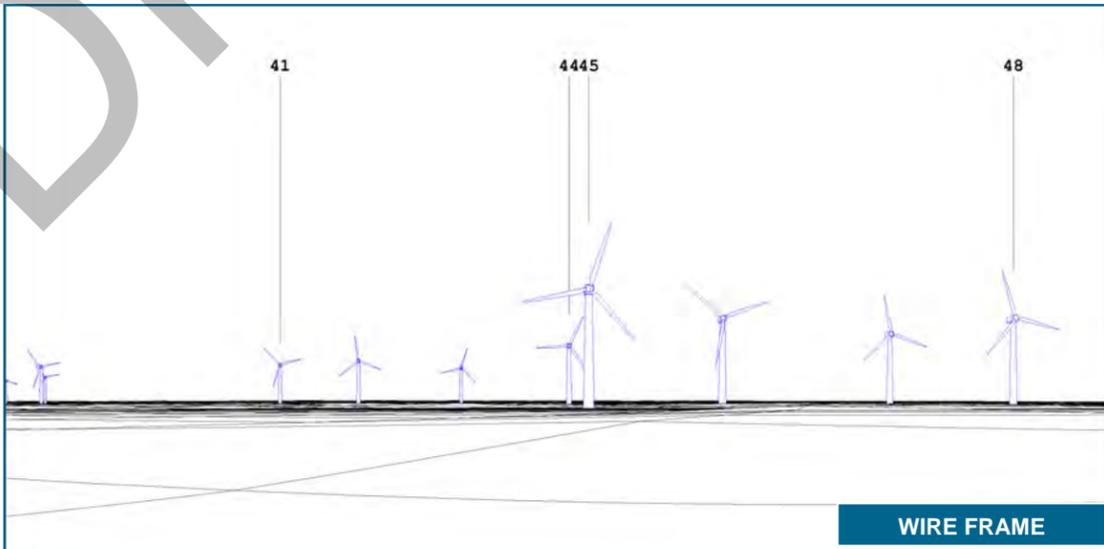
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VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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 27 th , 2012
Direction :		75 degrees T.N.
Focal Length :		6 mm
View span :		56 degrees
Altitude of photograph with respect to ground :		1.8 m

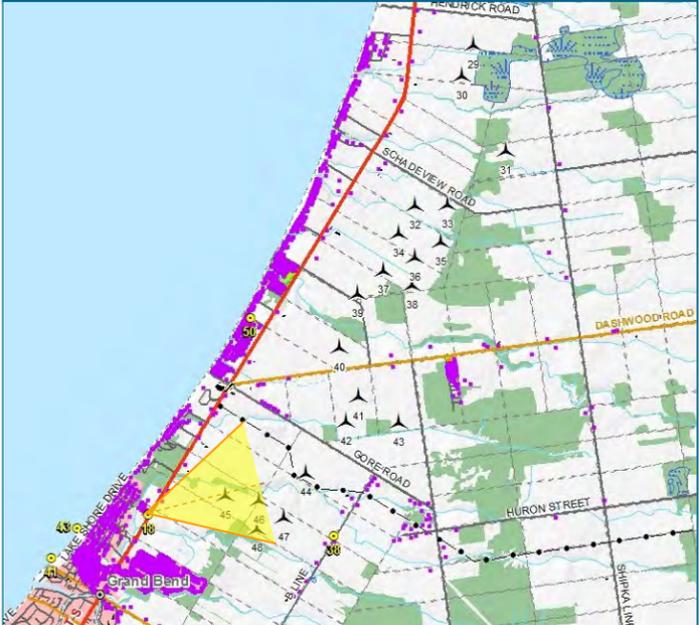
WIND TURBINES USED

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

SIMULATION

Visual Simulation No. :	PM01-800281GRB-IMG4196_LOC18-E439227_N4796736-L01-T01-D075-MLR00.WFV
Configuration No. :	L01-800281GRB-20120730-MLR.WFL
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



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POWER**

Prepared by :



GL
GL Garrad Hassan
Date : August 6th, 2012
Version 00

VISUAL SIMULATION
 As viewed from Oakwood Golf Course

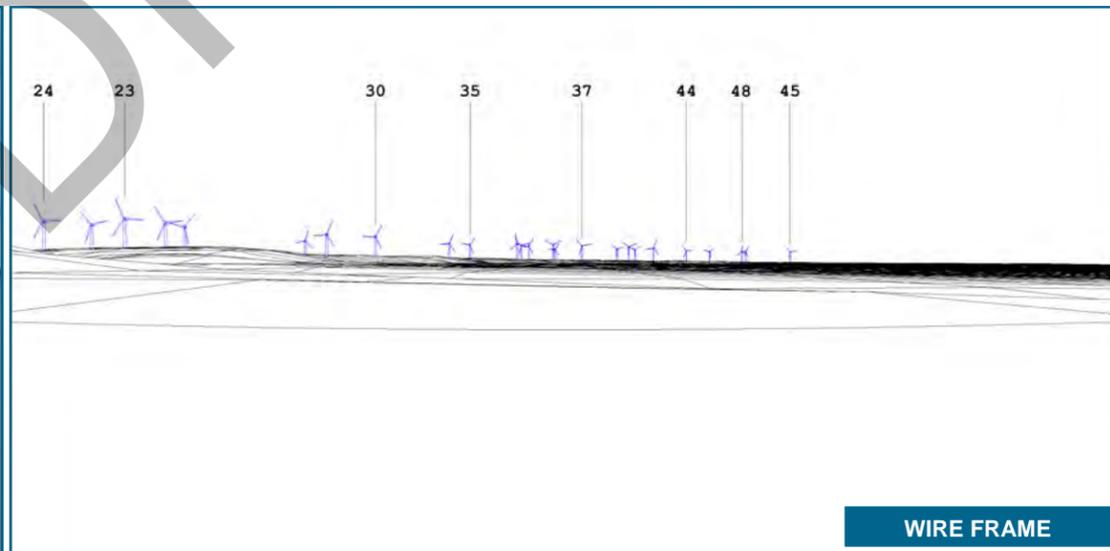
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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

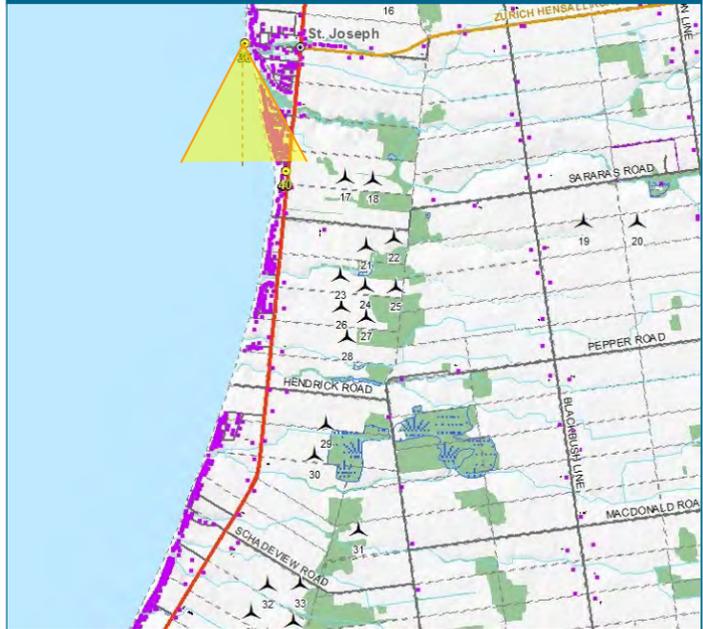
WIND TURBINES USED

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

SIMULATION

Visual Simulation No.: PM02-800281GRB-IMG3996_LOC36-E442175_N4806991-L01-T01-D180-MLR00.WFV
 Configuration No.: L01-800281GRB-20120730-MLR.WFL
 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



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Prepared by:



Date: August 6th, 2012
 Version 00

VISUAL SIMULATION

As viewed from St. Joseph's Beach

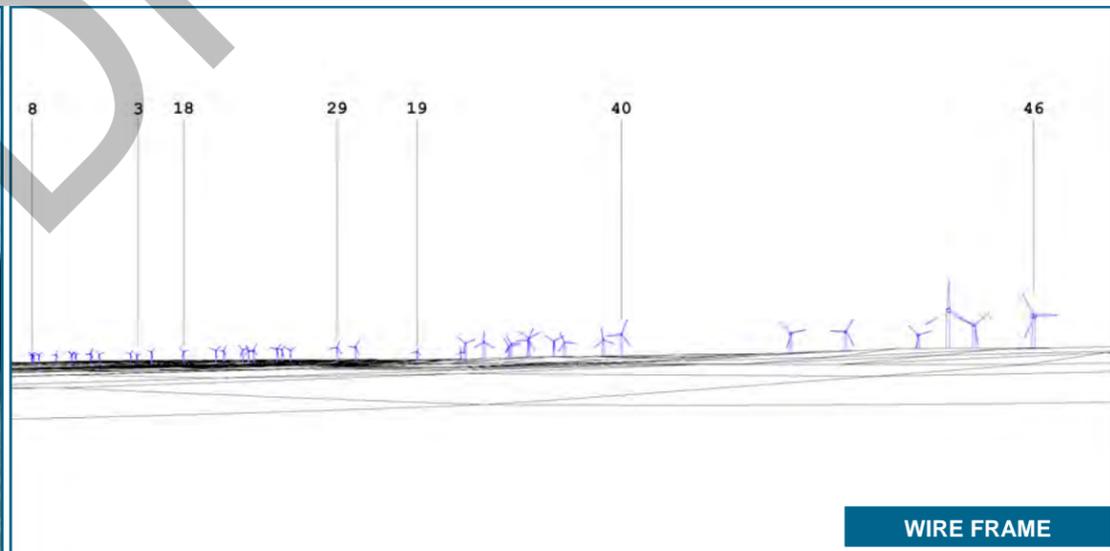
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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 27 th , 2012
Direction:		51 degrees T.N.
Focal Length:		6 mm
View span:		56 degrees
Altitude of photograph with respect to ground:		1.8 m

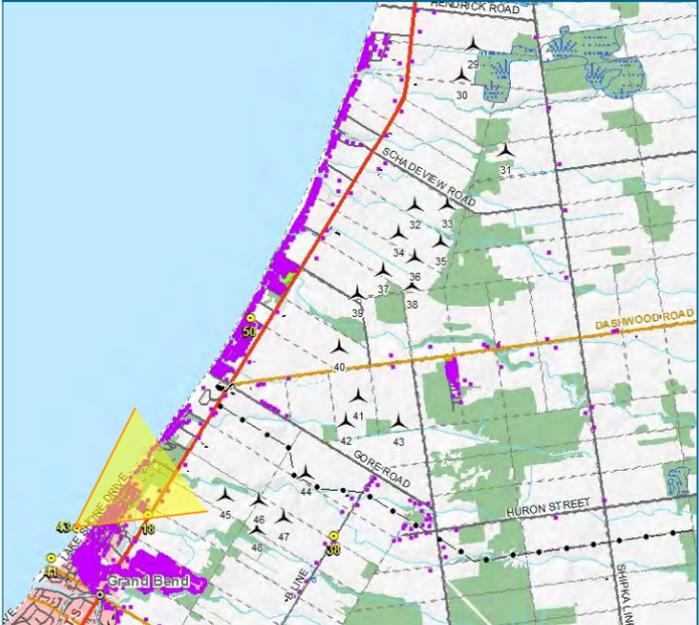
WIND TURBINES USED

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

SIMULATION

Visual Simulation No.:	PM03-800281GRB-IMG4151_LOC43-E438057_N4796210-L01-T01-D051-MLR00.WFV
Configuration No.:	L01-800281GRB-20120730-MLR.WFL
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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Date : August 3rd, 2012
Version 00

VISUAL SIMULATION

As viewed from Lambton Shores – Grand Bend Beach

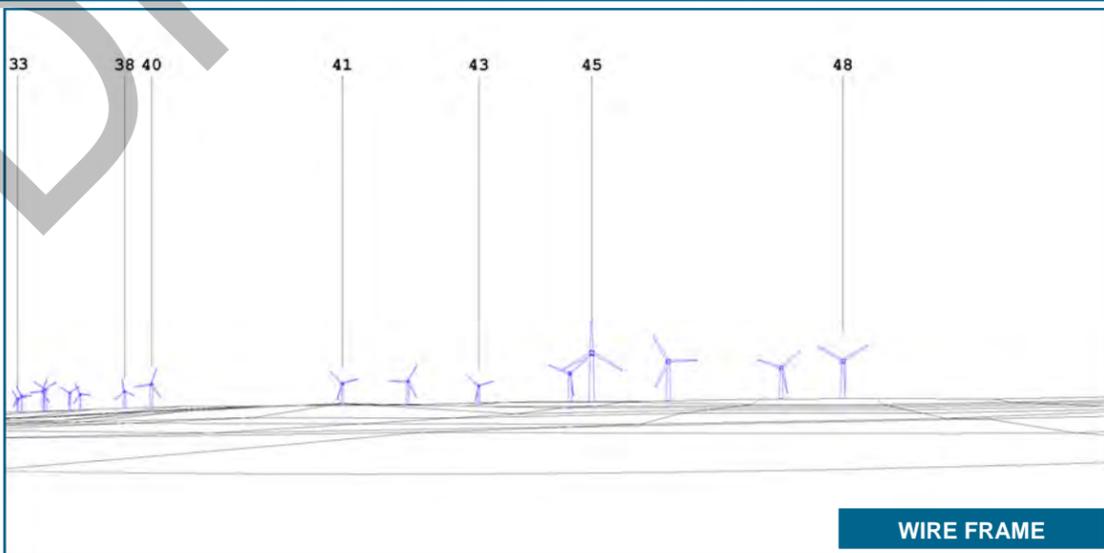
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



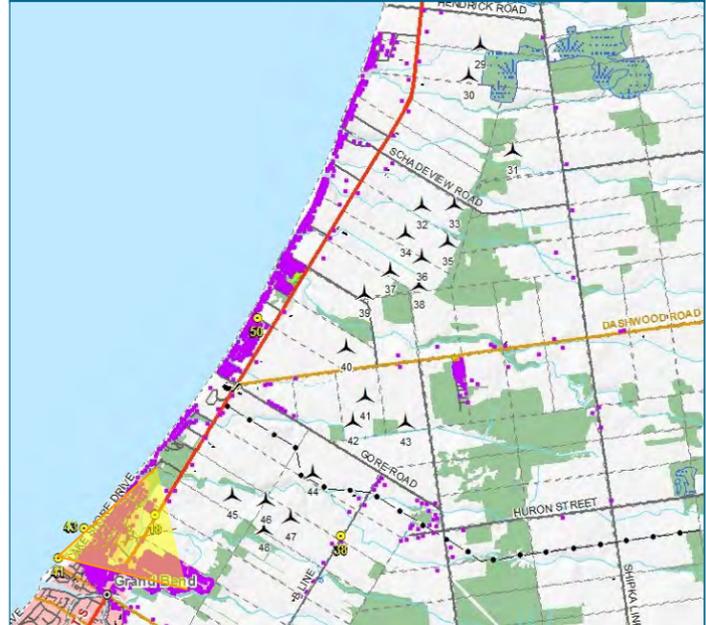
WIRE FRAME

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 27 th , 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. :	PM04-800281GRB-IMG4167_LOC41-E438366_N4796568-L01-T01-D076-MLR00.WFV	
Configuration No. :	L01-800281GRB-20120730-MLR.WFL	
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



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GL Garrad Hassan
Date : August 3rd, 2012
Version 00

VISUAL SIMULATION
 As viewed from Lambton Shores –
 Grand Bend Beach

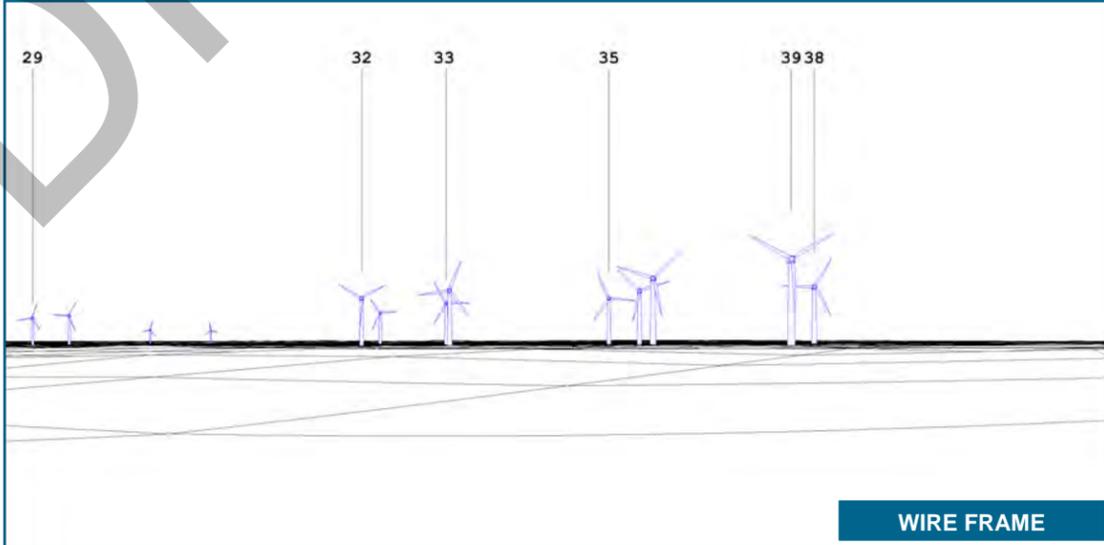
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



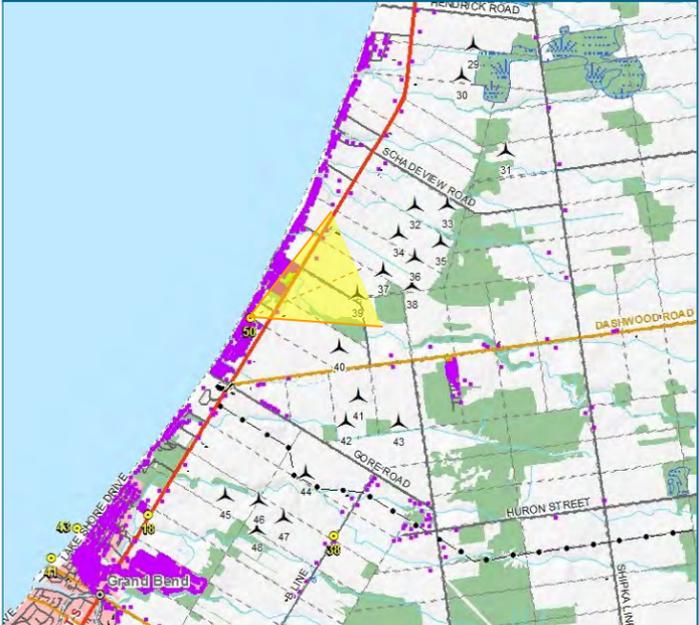
WIRE FRAME

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 27 th , 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.:	PM05-800281GRB-IMG4086_LOC50-E440458_N4799110-L01-T01-D066-MLR00.WFV	
Configuration No.:	L01-800281GRB-20120730-MLR.WFL	
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

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Prepared by:



GL Garrad Hassan
 Date: August 6th, 2012
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VISUAL SIMULATION

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

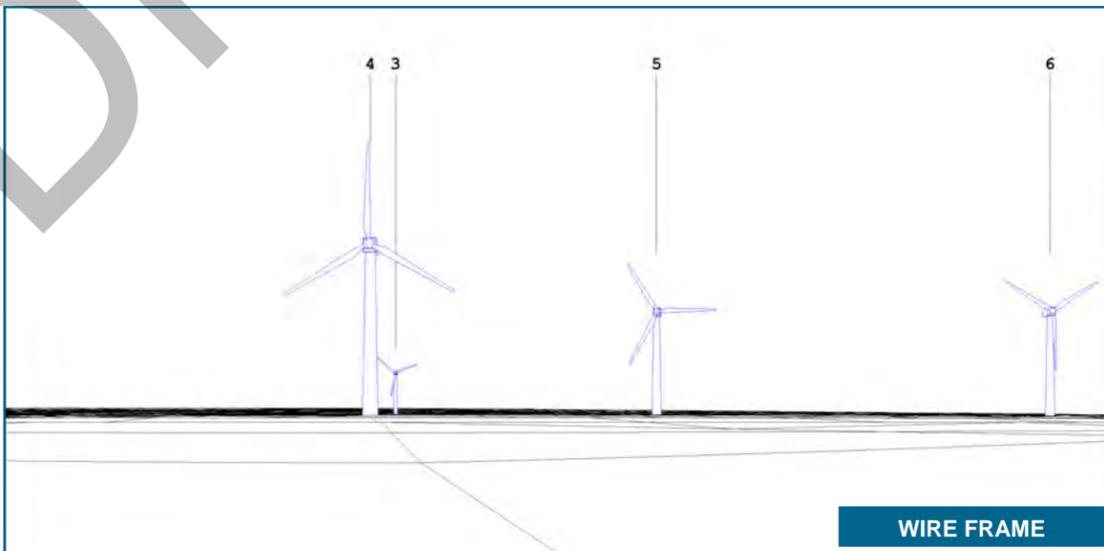
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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
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Direction :		100 degrees T.N.
Focal Length :		6 mm
View span :		56 degrees
Altitude of photograph with respect to ground :		1.8 m

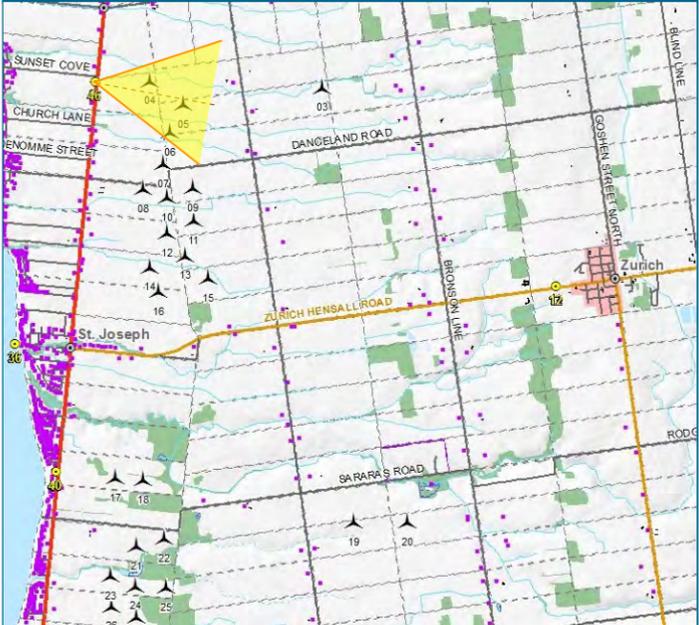
WIND TURBINES USED

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

SIMULATION

Visual Simulation No. :	PM06-800281GRB-IMG3871_LOC46-E443144_N4810153-L01-T01-D100-MLR00.WFV
Configuration No. :	L01-800281GRB-20120730-MLR.WFL
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



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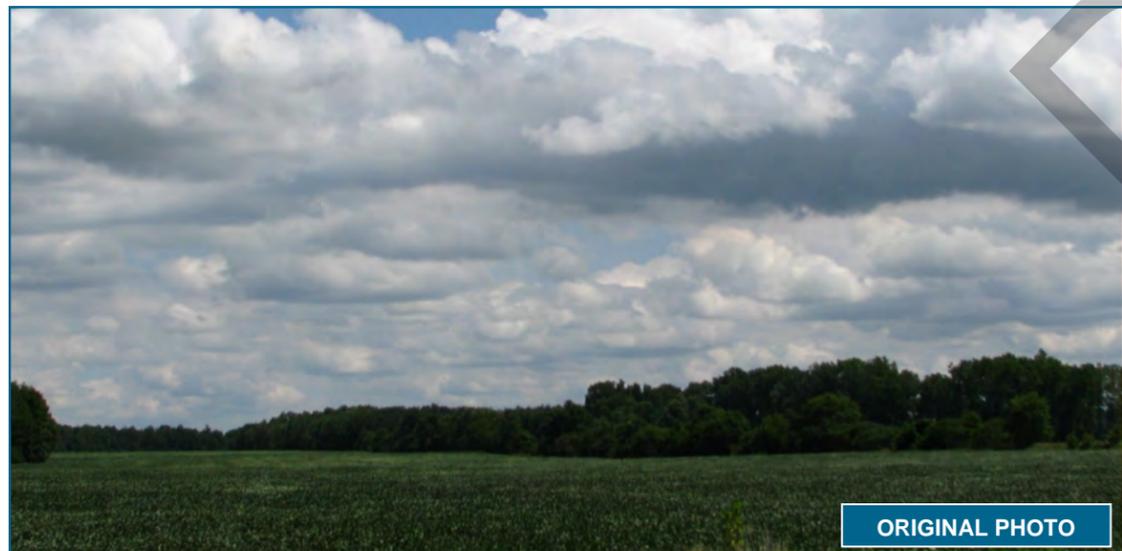
VISUAL SIMULATION

**As viewed from the intersection of
Highway 21 and Sunset Cove**

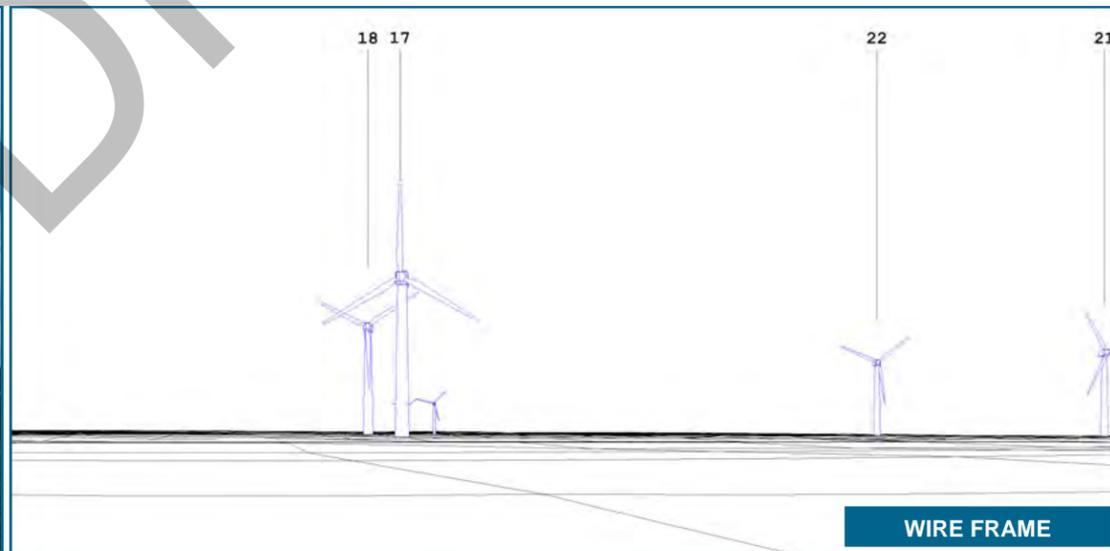
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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

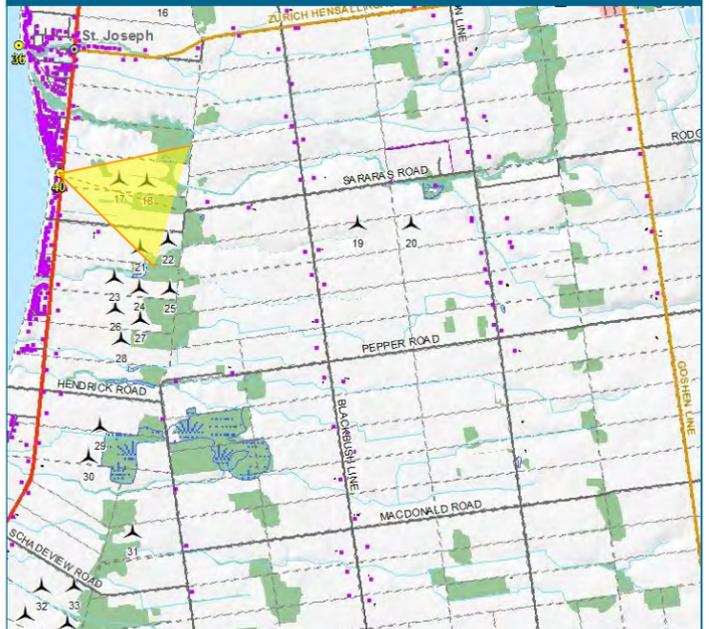
WIND TURBINES USED

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

SIMULATION

Visual Simulation No.: PM07-800281GRB-IMG4223_LOC40-E442671_N4805458-L01-T01-D106-MLR00.WFV
 Configuration No.: L01-800281GRB-20120730-MLR.WFL
 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 :



Prepared by :



GL Garrad Hassan
 Date : August 3rd, 2012
 Version 00

VISUAL SIMULATION

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

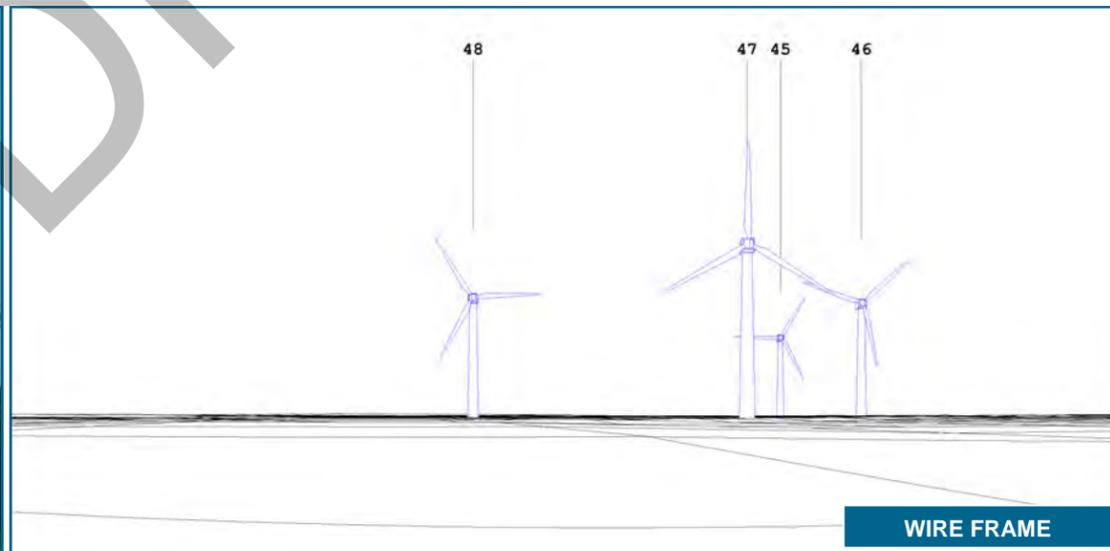
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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 27 th , 2012
Direction :		280 degrees T.N.
Focal Length :		6 mm
View span :		56 degrees
Altitude of photograph with respect to ground :		1.8 m

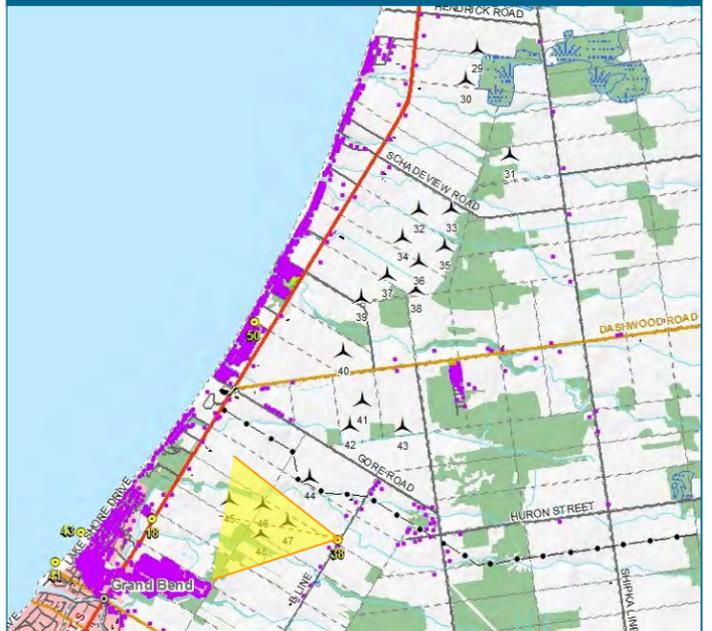
WIND TURBINES USED

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

SIMULATION

Visual Simulation No. :	PM08-800281GRB-IMG4213_LOC38-E441473_N4796483-L01-T01-D280-MLR00.WFV
Configuration No. :	L01-800281GRB-20120730-MLR.WFL
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 :



Prepared by :



Date : August 6th, 2012
 Version 00

VISUAL SIMULATION

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

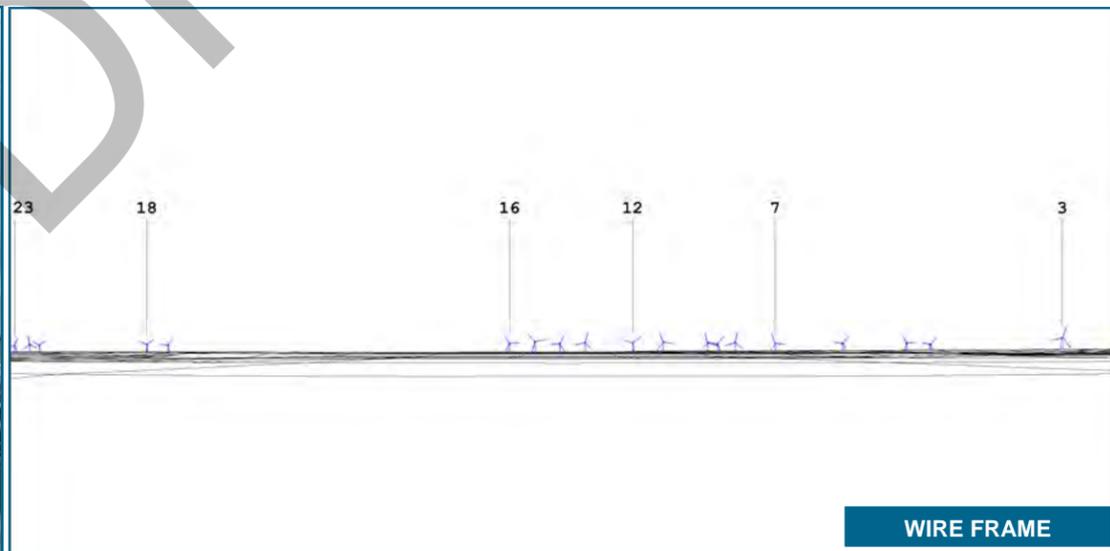
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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 26 th , 2012
Direction:		270 degrees T.N.
Focal Length:		6 mm
View span:		56 degrees
Altitude of photograph with respect to ground:		1.8 m

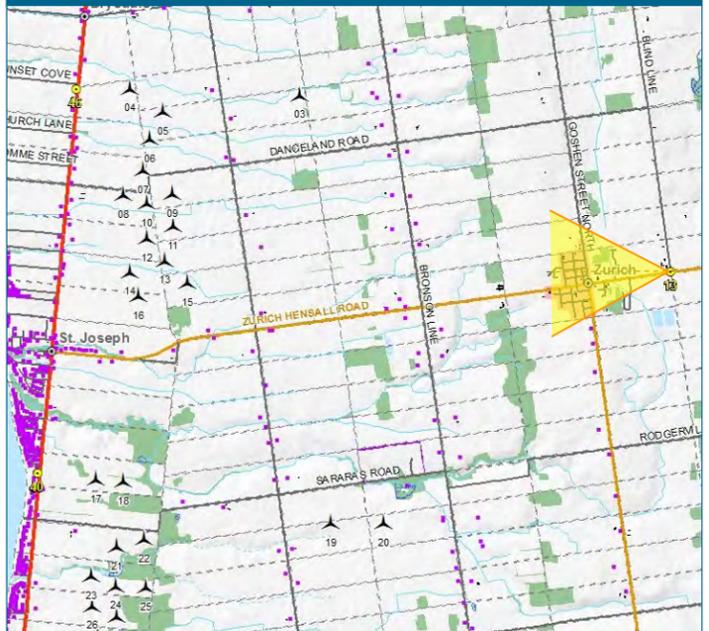
WIND TURBINES USED

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

SIMULATION

Visual Simulation No.:	PM09-800281GRB-IMG3973_LOC13-E450446_N4807922-L01-T01-D270-MLR00.WFV
Configuration No.:	L01-800281GRB-20120730-MLR.WFL
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:



Prepared by:



GL Garrad Hassan
 Date: August 8th, 2012
 Version 00

VISUAL SIMULATION

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

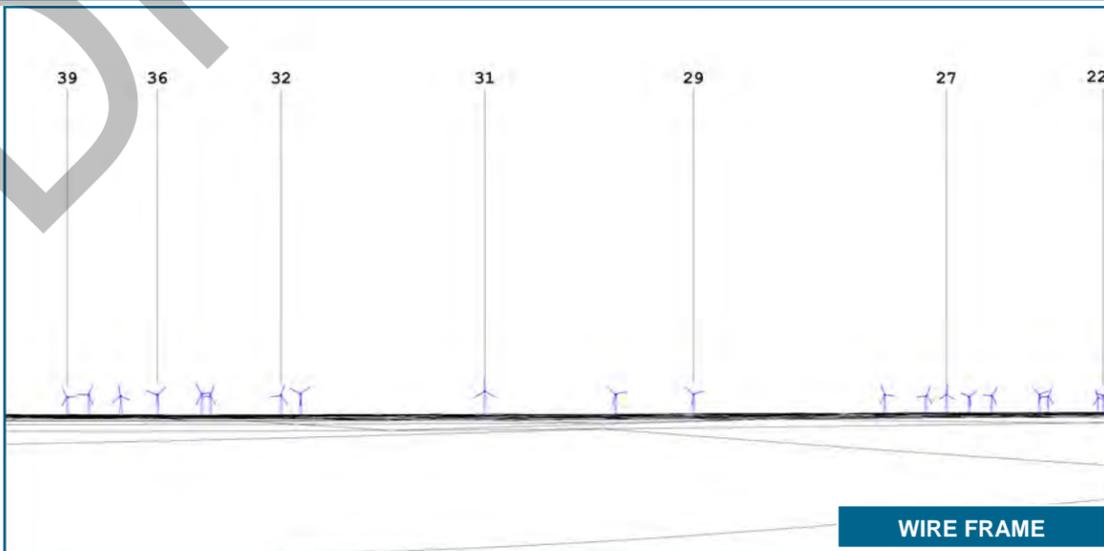
Grand Bend Wind Farm



VISUAL SIMULATION



ORIGINAL PHOTO



WIRE FRAME

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 27 th , 2012
Direction:		295 degrees T.N.
Focal Length:		6 mm
View span:		56 degrees
Altitude of photograph with respect to ground:		1.8 m

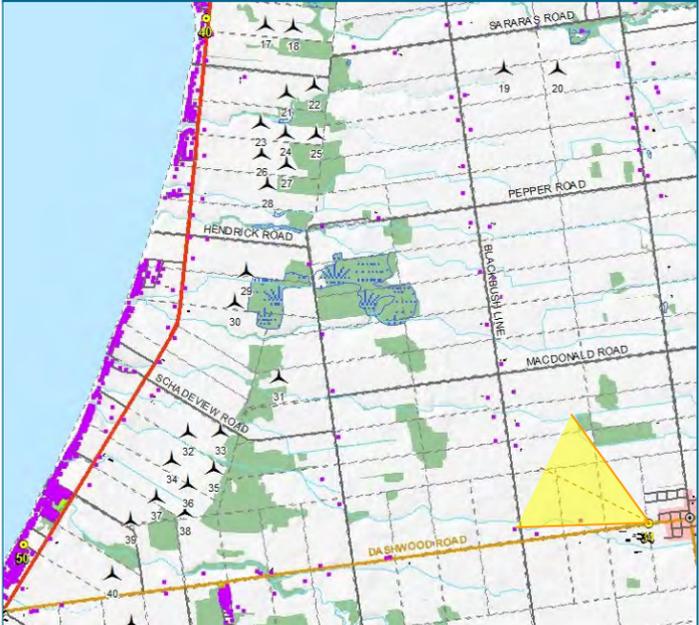
WIND TURBINES USED

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

SIMULATION

Visual Simulation No.:	PM10-800281GRB-IMG4127_LOC34-E448018_N4799365-L01-T01-D295-MLR00.WFV
Configuration No.:	L01-800281GRB-20120730-MLR.WFL
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: August 8th, 2012
 Version 00

VISUAL SIMULATION

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

Grand Bend Wind Farm