

Appendix G: Shadow Flicker Modeling Results

Notes:

1. Reference: Site Plan supplied by client. Digital topographic Mapping by Nova Scotia Geomatics Centre.
2. Projector: NAD83(CSRS), UTM Zone 20 North.

Legend:

- Proposed Turbine Location
- Receptor Locations
- Project Area
- County Boundary
- Proposed Road
- Existing Paved Road
- Existing Trail / Access Road
- Mapped Stream
- Mapped Indefinite Stream
- Mapped Water Bodies
- Mapped Wet Area
- Cleared Area

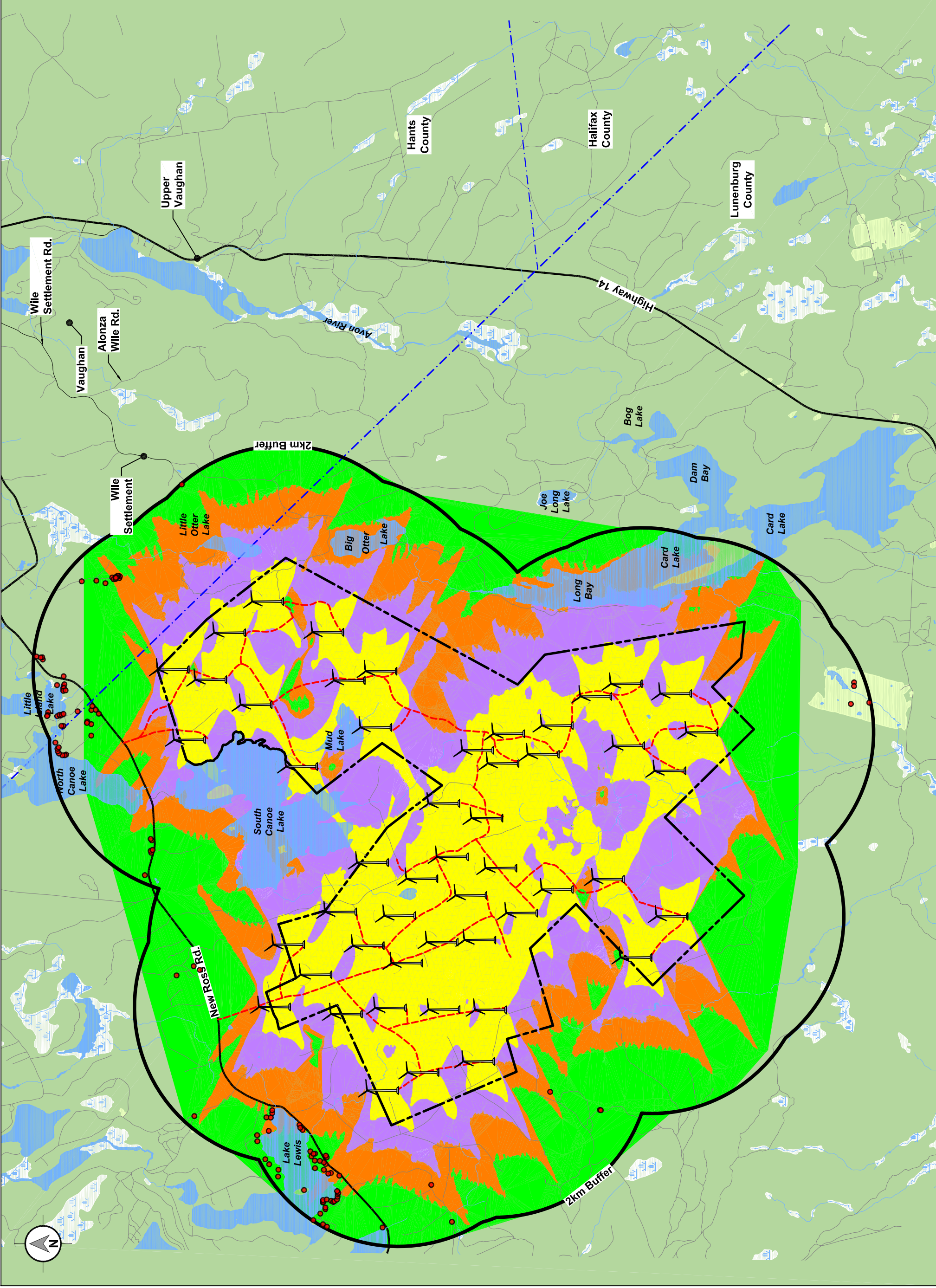
**Shadow Flicker Analysis
(Hours per Year):**

- 0.00 - 10.00
- 10.00 - 30.00
- 30.00 - 100.00
- 100.00 - 300.00

Shadow Flicker Results



DATE:	May 2012	PROJECT #:	12-4361
SCALE:	1:45,000	DRAWING #:	
DRAWN BY:	H. Serhan	CHECKED BY:	L. Hynes



Receptor ID	Easting	Northing	Shadow Hours Per Year [h/year]	Shadow Days Per Year [days/year]	Max Shadow Hours Per Day [h/day]
A	390110	4958704	17:03	85	0:21
B	389563	4959329	3:21	19	0:15
C	389574	4960043	3:03	21	0:13
D	389604	4960093	3:14	23	0:13
E	389741	4960128	4:28	28	0:15
F	389798	4960063	4:52	28	0:16
G	389819	4960063	5:07	30	0:16
H	389885	4960095	6:04	33	0:17
I	389893	4960090	6:12	34	0:17
J	389922	4960046	6:25	34	0:17
K	389905	4959988	5:50	30	0:17
L	389901	4959946	5:40	28	0:18
M	389921	4959914	5:50	28	0:18
N	389959	4959906	6:10	28	0:18
O	389991	4959904	6:39	31	0:18
P	390030	4959912	7:23	32	0:19
Q	390228	4959883	11:34	45	0:21
R	390262	4959992	19:16	64	0:22
S	390254	4960025	17:57	58	0:21
T	390303	4960082	10:11	38	0:19
U	390377	4960059	7:46	44	0:15
V	390399	4960082	2:14	17	0:12
W	390418	4960133	2:21	17	0:13
X	390324	4960195	0:00	0	0:00
Y	390421	4960198	5:24	35	0:14
Z	390511	4960194	6:21	39	0:15
AA	390509	4960214	6:14	38	0:15
AB	390540	4960256	6:32	39	0:15
AC	390815	4960356	10:00	46	0:17
AD	390842	4960385	10:32	51	0:17
AE	391067	4960744	13:09	67	0:20
AF	391031	4960744	15:02	75	0:19
AG	390973	4960763	15:42	77	0:19
AH	390747	4960938	4:07	20	0:16
AI	390669	4960935	3:45	20	0:15
AJ	390438	4960833	2:41	17	0:13
AK	390304	4960665	0:00	0	0:00
AL	392867	4961673	0:00	0	0:00
AM	392915	4961752	0:00	0	0:00
AN	394370	4962297	3:01	22	0:13
AO	394395	4962303	3:08	22	0:13
AP	394406	4962279	3:24	23	0:14
AQ	394528	4962289	5:01	28	0:17
AR	394547	4962303	5:14	29	0:17
AS	396153	4962969	0:00	0	0:00
AT	396203	4963009	0:00	0	0:00
AU	396251	4963053	0:00	0	0:00
AV	396200	4963064	0:00	0	0:00
AW	396053	4963117	0:00	0	0:00
AX	396035	4963121	0:00	0	0:00

Receptor ID	Easting	Northing	Shadow Hours Per Year [h/year]	Shadow Days Per Year [days/year]	Max Shadow Hours Per Day [h/day]
AY	396019	4963066	0:00	0	0:00
AZ	395620	4963406	0:00	0	0:00
BA	395620	4963436	0:00	0	0:00
BB	395643	4963480	0:00	0	0:00
BC	395671	4963497	0:00	0	0:00
BD	395704	4963500	0:00	0	0:00
BE	395782	4963526	0:00	0	0:00
BF	396122	4963633	0:00	0	0:00
BG	396135	4963626	0:00	0	0:00
BH	396122	4963502	0:00	0	0:00
BI	396139	4963473	0:00	0	0:00
BJ	396129	4963467	0:00	0	0:00
BK	396140	4963444	0:00	0	0:00
BL	396150	4963422	0:00	0	0:00
BM	396183	4963241	0:00	0	0:00
BN	396446	4963424	0:00	0	0:00
BO	396506	4963420	0:00	0	0:00
BP	396520	4963505	0:00	0	0:00
BQ	396633	4963420	0:00	0	0:00
BR	396848	4963688	0:00	0	0:00
BS	396877	4963695	0:00	0	0:00
BT	396874	4963716	0:00	0	0:00
BU	396887	4963770	0:00	0	0:00
BV	397859	4963000	0:00	0	0:00
BW	397900	4962797	12:17	46	0:19
BX	397878	4962778	12:41	46	0:20
BY	397881	4962754	14:45	52	0:20
BZ	397897	4962750	15:37	54	0:20
CA	397905	4962753	15:45	56	0:20
CB	397904	4962738	16:28	58	0:20
CC	397922	4962729	16:30	62	0:19
CD	397921	4962720	16:35	64	0:20
CE	397892	4962706	17:09	62	0:20
CF	397915	4962699	16:17	66	0:19
CG	399093	4961905	0:00	0	0:00
CH	391303	4957179	13:23	58	0:19
CI	391067	4956529	0:00	0	0:00
CJ	391071	4956540	0:00	0	0:00
CK	396507	4953281	0:00	0	0:00
CL	396555	4953280	0:00	0	0:00
CM	395872	4963066	0:00	0	0:00
CN	395629	4963388	0:00	0	0:00
CO	395722	4963483	0:00	0	0:00
CP	395997	4963449	0:00	0	0:00
CQ	396452	4963395	0:00	0	0:00
CR	396475	4963428	0:00	0	0:00
CS	396484	4963418	0:00	0	0:00
CT	396530	4963411	0:00	0	0:00
CU	394082	4962378	1:14	15	0:07
CV	392797	4961972	0:00	0	0:00

Receptor ID	Easting	Northing	Shadow Hours Per Year [h/year]	Shadow Days Per Year [days/year]	Max Shadow Hours Per Day [h/day]
CW	390216	4960669	0:00	0	0:00
CX	390375	4960784	0:00	0	0:00
CY	390802	4960789	0:00	0	0:00
CZ	390976	4960819	6:53	37	0:19
DA	390463	4960045	5:29	39	0:14
DB	390485	4960056	5:38	37	0:13
DC	389658	4960218	3:57	28	0:14
DD	389915	4960092	6:37	36	0:16
DE	389891	4959962	5:34	28	0:17
DF	390009	4959897	7:00	31	0:19
DG	390475	4960242	5:48	37	0:14
DH	389636	4958439	6:32	47	0:14
DI	396278	4953321	0:00	0	0:00
DJ	396295	4953085	0:00	0	0:00
DK	396173	4963619	0:00	0	0:00
DL	397852	4963188	0:00	0	0:00
DM	397827	4962884	0:00	0	0:00
DN	390992	4961744	4:40	28	0:13

Appendix H: NAVCAN Consultation Response Letter

Appendix I: Transportation Study Report

SOUTH CANOE WIND FARM ROUTE SURVEY

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Study Overview

This report is for a proposed wind farm site in the South Canoe Lake area in the Province of Nova Scotia for 100MW of wind turbines. The survey and results documented herein include active discussions with the Province to analyze proposed methods of road transport for the components from Trenton, NS and The Port of Halifax, NS to the South Canoe Wind Farm site.

Component Sourcing Locations:

- DSTN Trenton, Nova Scotia
- Blades, Nacelle and Hub: Port of Halifax, Nova Scotia

The scope of the route study was to survey all routes for overhead obstructions including wires, cables, power lines, traffic lights, overhead signage, bridges, etc., proper turning radius to allow for the trailer to maneuver safely, including signage and other obstacles, and the overall road conditions.

The study has identified the need for a few slight road modifications required within the South Canoe Lake area, which is mainly sign removal or replacement, guardrail removal, and the possibility of widening a couple of corners to allow for a wider turning radius coming off the main highway to travel to the wind turbine project site on Route 14 or Route 12, depending on the location of the wind farm. It is of our opinion these modifications are minor in scope, and is not of significant financial impact. The remainder of the routing to the project site, from Halifax and Trenton, are suitable for the transport of all components to the South Canoe Lake area.

Meetings were held with the Department of Transportation for the Province of Nova Scotia to review the proposed route, equipment configurations and component dimensions. The specific results of the meeting appear in Section 7 below.

The plan to move the nacelle was presented, and accepted by the province, however, the Province has identified the need for some extra signage, and extra traffic control in certain areas, mainly the urban areas of Halifax and the South Canoe Lake area. This can be maintained through the Royal Canadian Mounted Police efforts, and well as private escort vehicles hired by the trucking firm.

During the period where the survey was conducted, road use agreements have not been provided and the potential entrance(s) to the wind farm site and site roads are not developed in the South Canoe Lake area. This greatly limits the ability to determine any specific potential

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risk factors and turning radiuses in the local area of South Canoe in the vicinity of the proposed wind farm site.

Road Conditions: All routes driven in the Province, up until the time you exit on Local Route 14 or Route 12 for the South Canoe Lake area, are all Canada 100 Series Roadways. These roadways are well travelled, well maintained, and take top priority from the province in maintaining. The portion of the trip from DSTN Trenton to Truro, Nova Scotia will be made on Route 104, the Trans-Canadian Highway, which is maintained in the same fashion as the other Series 100 Highways. All road conditions from Trenton and Halifax are very good and the components will have no issues utilizing these roads for transit to the wind farm site. Because of the high volume of traffic related to the wind farm construction in and around the South Canoe Lake area, the Province will require road bonds to be in place for this section of roads. The transport of the wind turbine components should not damage the infrastructure of the roads in the Province during the normal course of transport on Series 100 roadways or local routes. Tractors and trailers will be used as prescribed in the permitting process from the Province that will evenly distribute the weight of the load across all axles, and will not damage the roadways in any manner.

Environmental Impact Study: Per the Province of Nova Scotia, the potential developers bidding to build the South Canoe Wind Farm were required to complete an Environmental Impact Study.

Traffic Impact: During the normal course of transport, the wind turbine components will not adversely impact traffic flow on the Series 100 Roads. The components will travel with escort vehicles as prescribed in the truck permits from the Province. The purpose of the escort vehicles is to allow for the safe transport of the components on the roadways, and manage the traffic flow while entering/exiting roadways, and during the normal course of transport. Upon exiting the Port of Halifax or the DSTN Facility, police and/or escort vehicles will be used to guide the traffic flow to allow for the trucks to make the turning radiuses onto the roads. Since one to three trucks at the most would be traveling together, the impact to traffic would be no more than the delay with light road construction. All efforts will be made to limit the impact to traffic flows by not entering the roadways during rush hour traffic hours or when other events or construction are planned. The traffic flows on the local roads in the South Canoe Lake area will be maintained through private escort vehicles as well. Please note the Province was unable to provide detailed information on traffic statistics for any area of the Province during the meeting. This information can be obtained as the project progresses and the developer and construction companies have been awarded.

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Halifax Ports

Halifax is very limited on port options where cargo can be unloaded. There are three main ports/piers to choose from that are acceptable for this project: Ceres Container Pier, Halterm, and Pier 27/31.

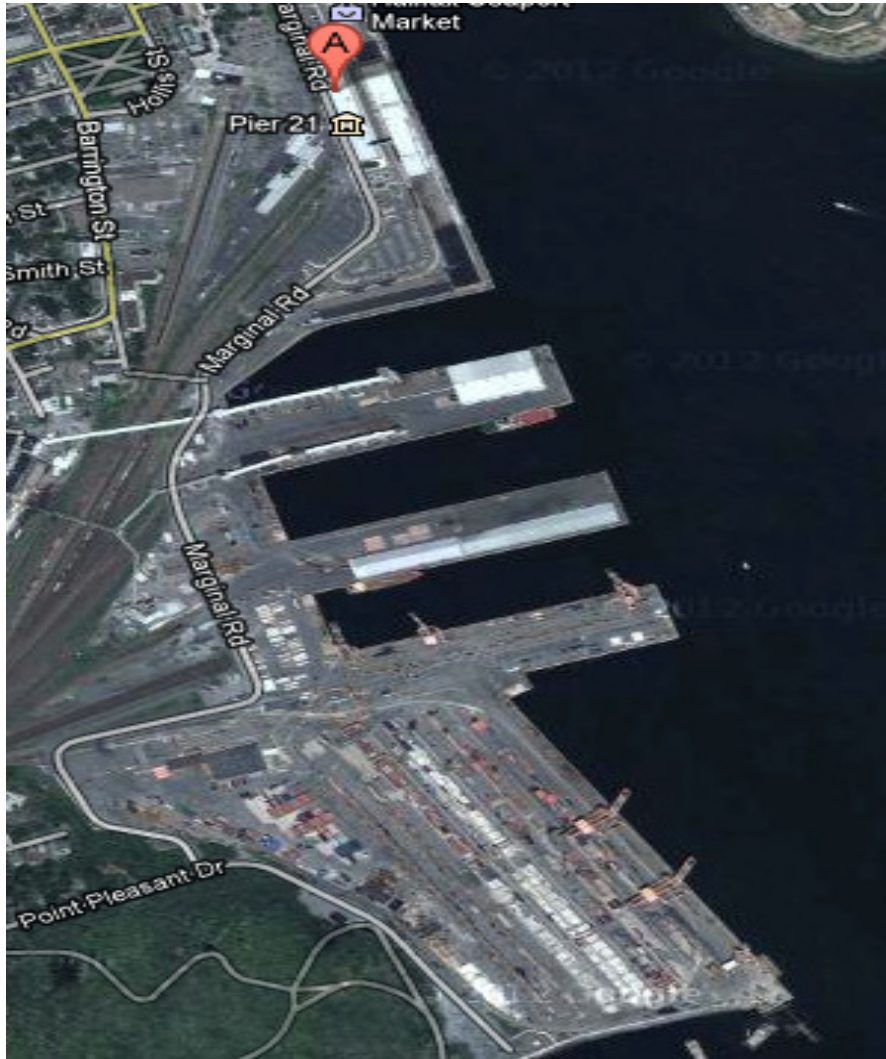
Because of the shortage of land at all three piers, storage space is limited for long-term component storage. Well in advance of the cargo arriving in Halifax, a meeting should be held with the Port Authority to determine the impact of cargo being unloaded and the best manner and location to store it.

In the event that storage is an issue at the Port, a land lease could be facilitated in close proximity to the port that will serve as the project distribution center.

In the opinion of the Author of this Report, the only Port and Stevedoring Company that is fully capable of successfully performing a project of this nature, is Logistic Stevedoring, who is located at Pier 31 in the Port of Halifax. They have cranes capable of lifting all cargo on site, whereas other piers will be required to bring in outside cranes at an additional cost.

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Port Of Halifax, Nova Scotia



SOUTH CANOE WIND FARM

ROUTE SURVEY

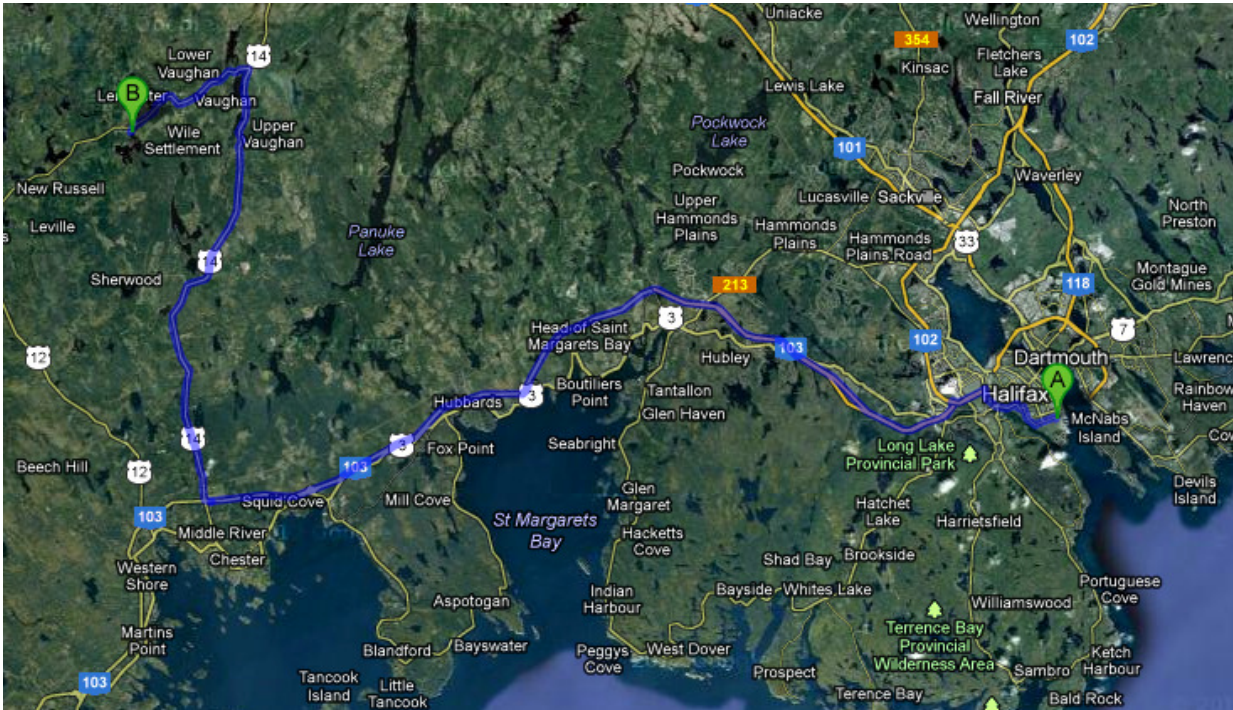
Port of Halifax Routing

Detailed Summary from Entrance of Logistics Terminal Halifax

Route surveyed for 16' High

1. Drive Straight out of Logistics Entrance.
2. **You must straddle all stop lights and cross walk signs**
3. .8 km turn left onto Lower Water Street
4. When merging onto Barrington Street, stay in left lane
5. First set of lights on Barrington hit wire 15.6 will skip to increase
6. Merge from Barrington to Bedford Highway (Note up to this point this is the common route out of the port).
 - a. Blades will continue on Bedford Highway and exit to Highway 102. Based on the turning radius review the blades will enter onto highway 102 at Exit 1G or from Hammonds Plains Road. In the event that neither one of these two exits have adequate turning radius Blades will continue on Hammonds Plains Road to Route 213 and merge back onto 103 at Tantallion.
 - b. Nacelles route would be preferred to exit on to Highway 102 at 1G from the Bedford Highway, however there are some structures that may not be suitable. In the event this is the case we will propose to the Province that we be allowed to exit at Kearny Lake from Bedford Highway, Turn left up to Dunbrack Street, right onto Lacewood, exit to 102, then exit to 103 or we will also propose Bedford Highway, Kearny Lake, left to Dunbrack, continue on to North Arm, St Margarets Bay Road, exit onto 103
 - c. Hubs will go Bedford Highway to 102 at 1G
 - d. The remaining components will go to the Bedford Highway to Kearny Lake to 102 exit to highway 103.
7. From the 103, depending on where the site entrance are, the trucks will either exit at Exit 8 onto Route 14 or they will continue on to Exit 9 to route 12 and cut across Windsor Road, which also connects to Route 14 at the end. It is important to note that at each of these exits it is very likely signage and guardrail sections will have to be removed.

SOUTH CANOE WIND FARM ROUTE SURVEY



SOUTH CANOE WIND FARM ROUTE SURVEY

DSTN Trenton Routing

Detailed Summary from Entrance of Trenton Works Facility

Route surveyed for 15'8" High

Note: The Province will want us to stay on 100 series highways as much as possible. In saying this there is a 15.2" restriction on highway 104 at Brookside Road, I am going to speak to the government about making a permanent road modification. Should the Government not wish to perform the road modification, we will have to re-route the base only down through Highway 289 from Highway 104 to Highway 102.

1. Turn left out of Trenton Works onto Trenton Connector.



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2. Travel .6 km then turn left following Trenton Connector.



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3. At km 2.7, there is a structural issue for weight: a steel grated Causeway. This should not be an issue as it has already been used for crossing with significant wind turbine components



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4. At km 9, turn left from Trenton Connector to Highway 106.



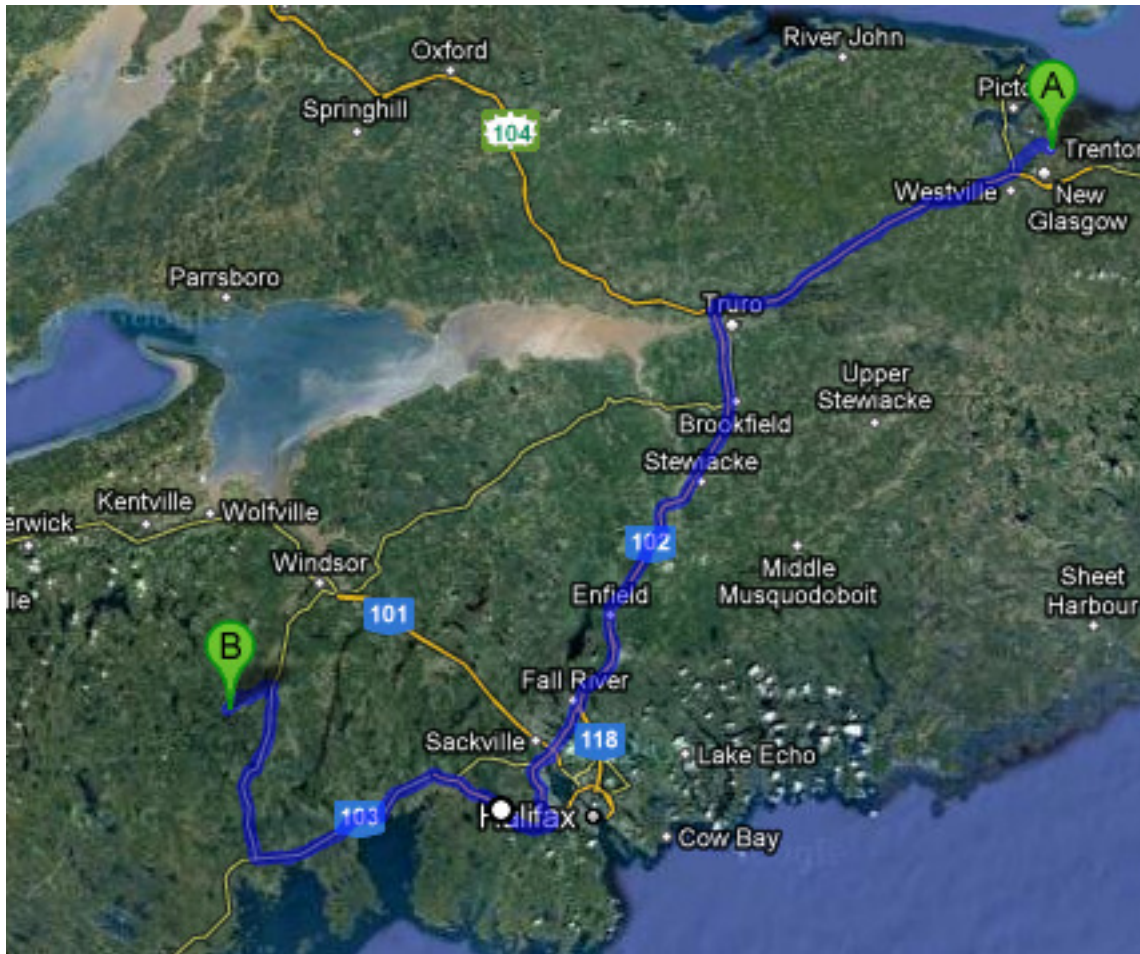
5. This is a picture of the approach from the Trenton connector to make the left onto Highway 106.

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6. When merging from Highway 106 on to Highway 104 there is a nice sloping ramp we will have no issues.
7. Continue on Highway 104 to Exit 15 and enter onto Highway 102.
8. Only the base section will deviate from 102 at the Elmsdale Exit, to highway 214, then turn left onto highway 2, getting back onto highway 102 at the Enfield Exit
9. Take exit 4C off of 102, to avoid low structure. Turn right onto Glendale Road, then left onto Cobequid, then at end of Cobequid turn left onto Highway 101
10. Highway 101 exit back onto Highway 102
11. Continue on Highway 102 to Highway 103
12. From the 103, depending on where the site entrances are, the trucks will either exit at Exit 8 onto Route 14 or they will continue on to Exit 9 to route 12 and cut across Windsor Road, which also connects to Route 14 at the end. It is important to note that at each of these exits it is very likely signage and guardrail sections will have to be removed.

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Nova Scotia Holiday and Travel Restrictions

Condition 15 of the Nova Scotia Permit states that: *The vehicle is not permitted on any highway after 3:00 pm on any Friday, and after noon hour on any Saturday, Sunday or public holiday.*

The statutory holidays in Nova Scotia are:

- New Years Day
- Good Friday
- Victoria Day

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-Canada Day

-Natal Day

-Labour Day

-Thanksgiving Day

-Remembrance Day

-Christmas Day

-Boxing Day

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Topics of Discussion with Province of Nova Scotia

Meeting Date March 14, 2012

1. Review component dimensions
 - a. Province Transport Officials do not see an issue with transporting any of the components in the Province for the South Canoe Lake wind farm. All components are within the tolerances allowed for oversize/overweight transport.
2. Discuss Provincial Equipment preferences for transport
 - a. The Province has accepted the equipment types proposed for moving wind towers and blades to the site.
3. Review Proposed Equipment to accommodate nacelle
 - a. The Province has accepted the concept for moving the nacelle. Final review will be done when permits are applied for as the start date of the project gets closer.
4. Review Proposed Routes from Trenton and Halifax
 - a. The Province reviewed the proposed routing from both locations to the South Canoe Lake area, and found them acceptable (detailed above in the respective sections).
5. Determine impacts on construction schedule
 - a. As of March 2012, there is only one major construction project planned. This bridge replacement project will not interfere with the proposed routing to site. As the project gets closer, the construction plans of the Province will be confirmed.
6. Ask for a new copy of the revised Traffic Management document that the province wants filled out with a minimum of 6 months notice of project commencement
 - a. The Province is reviewing the Traffic Management process, but at present the current standard format for Traffic Management will be acceptable.
7. Determine if the Province will impose Road Bonds
 - a. Because of the added volume of traffic in and around the South Canoe Lake area, the Province will require road bonds on the secondary roads near the project site. This is typically imposed on the Developer or Construction companies.

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8. Review if the Province will impose any additional requirements that we are unaware of
 - a. The Province is reviewing this, but the initial thought is that the Province will require extra signage, signage crews, and public announcements as the project gets closer.
9. Verify permit costs
 - a. At this time, the Province is discussing a 2% to 5% increase in permit costs.
10. Ask Province if we can submit test applications to commence provincial engineering study. As a note, in some previous projects, the province has asked for independent studies as well
 - a. Per the direction of the Province, this cannot be done in advance because the final site selection and vendors have not yet been awarded.
 - b. The Province will discuss this with the bridge engineering department, as well as the Minister of Transportation as to when a test application can be submitted.
11. Review and confirm travel restrictions
 - a. As stated in the previous section
12. Review Permit issuance procedures
 - a. The permit process will be in the standard format for oversize loads.
13. Ask Province if they are aware of any constraints that are not yet public knowledge
 - a. There are no constraints for the transport of the wind turbine components that the Province is aware of as of March 2012.