

Appendix I:
Shadow Flicker Impact Assessment

**Barrachois Wind Farm
Shadow Flicker Assessment Report
October 2013**



CONFIDENTIALITY

This document contains proprietary and confidential information, which is provided on a commercial in confidence basis. It may not be reproduced or provided in any manner to any third party without the consent of Natural Forces Wind Inc.

© **Copyright Natural Forces Wind Inc. 2013**


This work and the information contained in it are the copyright of Natural Forces Wind Inc. No part of this document may be reprinted or reproduced without the consent of Natural Forces Wind Inc.

Disclaimer

Whilst every effort has been made to ensure the accuracy of this information, the publisher accepts no responsibility for any discrepancies and omissions that may be contained herein.

Natural Forces Wind Inc.
1801 Hollis Street Suite 1205
Halifax, NS B3J 3N4
P +1 (902) 422 9663
F +1 (902) 422 9780

Report Information

| | |
|----------------|---|
| Client | Natural Forces Wind Inc.. |
| Client Contact | Amy Pellerin |
| Report Name | Barrachois Wind Farm Shadow Flicker Assessment |
| Created By | Amy Pellerin |
| Signature |  |

** The WindPRO v2.8, Decibel Module Calculation Results for Enercon E-92 2.3 MW @ 98m Hub Height. To review General Specification for the Enercon E-92 please contact:

Amy Pellerin, Development Engineer
Natural Forces Wind Inc..
1801 Hollis Street Suite 1205
Halifax Nova Scotia B3J 3N4
Telephone: 902 422 9663 ext. 211
Fax: 902 422 9780
Contact email: apellerin@naturalforces.ca

Table of Contents

| | |
|--|----|
| 1. Introduction | 1 |
| 2. Background | 2 |
| 3. Policy and Guidelines..... | 3 |
| 4. General Description of Project Site and Surrounds | 4 |
| 5. Description of Receptors | 5 |
| 6. Description of Sources..... | 7 |
| 7. Impact Assessment..... | 8 |
| 8. Conclusions and Recommendations | 11 |
| 9. References..... | 12 |

List of Tables

| | |
|---|---|
| Table 1: Description of receptors. | 5 |
| Table 2: Coordinates of proposed turbine locations. | 7 |
| Table 3: Enercon E-92 2.3 MW turbine characteristics. (Enercon, 2012) | 7 |
| Table 4: Predicted shadow flicker for E-92 2.3 MW @ 98 m hub height. | 9 |

List of Annexes

| | |
|--|--|
| Annex A: Site Layout Map | |
| Annex B: WindPRO v2.8, Shadow Module Calculation Results – E92-2.3 MW @ 98m Hub Height | |

I. Introduction

Natural Forces Wind Inc. has undertaken a shadow flicker impact assessment for the proposed Barrachois Wind Farm to assess the potential impact of shadow flicker on the surrounding shadow receptors. Details outlining the shadow receptors, prediction methodology and assumptions made for the assessment are included herein, with complete WindPRO results supplied in the annexes. This report also provides background information on shadow flicker.

As there are very few federal, provincial or municipal guidelines or policies for governing or quantifying what is an acceptable amount of shadow flicker at this time, the German standards, *Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen*, have been adopted for this study. Often, careful site design in the first instance is recommended, followed by industry accepted mitigation strategies thereafter. This assessment will be used as supporting documentation to demonstrate compliance with these standards. The shadow flicker analysis was conducted using the Shadow module of the software package, WindPRO version 2.8.

2. Background

Flicker is caused by incident light rays on a moving object which then casts an intermittent shadow on a receptor. This intermittent shadow, perceived as a change in light intensity to an observer, as it pertains to wind turbines, is referred to as shadow flicker. Shadow flicker is caused by incident sun rays on the rotor blades as they turn.

For shadow flicker to occur, the following criteria must be met:

1. The sun must be shining and not obscured by any cloud cover.
2. The wind turbine must be between the sun and the shadow receptor.
3. The line of sight between the turbine and the shadow receptor must be clear. Light-impermeable obstacles, such as vegetation, buildings, awnings etc., will prevent shadow flicker from occurring at the receptor.
4. The shadow receptor has to be close enough to the turbine to be in the shadow.

3. Policy and Guidelines

As previously stated, there are very few federal, provincial or municipal guidelines or policies for governing or quantifying what is an acceptable amount of shadow flicker. As a result, the German standards have been adopted for this study. The German shadow flicker guidelines provide a means of quantifying acceptable levels of shadow flicker exposure based on the astronomical worst case. Acceptable levels at shadow receptors are:

- no more than 30 hours per year of astronomical maximum shadow (worst case), and
- no more than 30 minutes on the worst day of astronomical maximum shadow (worst case).

The guidelines also stipulate two factors that limit the shadow flicker effect, due to optic conditions in the atmosphere:

- 1) the angle of the sun over the horizon, which must be at least 3 degrees, and
- 2) the blade of the WTG must cover at least 20 % of the sun.

Receptors not exposed to more than 30 minutes per day on the worst affected day or a total of 30 hours per year from all surrounding wind turbines are considered unlikely to require technical mitigation.

4. General Description of Project Site and Surrounds

The proposed Barrachois Wind Farm consists of a maximum of 2 wind turbine generators WTG located in Cape Breton Regional Municipality, Nova Scotia. Currently, Enercon E-92 2.0 MW wind turbines are being considered for the project and therefore were used in this assessment, however if the turbine type was to change, a new shadow flicker assessment would be conducted.

The project site is situated approximately 17 kilometers west of Sydney and adjacent to the Grand Narrows Highway. Land around the proposed project area is zoned as a General Development Zone and so, will not require re-zoning.

5. Description of Receptors

The 64 points of reception taken into consideration for this noise impact assessment are residential buildings and/or seasonal camps located within 2,000 metres (m) of the nearest proposed WTG. The receptors are located at dwellings along Long Island Rd, Grand Narrows Hwy and Scotch Lake Rd.

Details of receptor locations and distances to nearest WTG are detailed in Table I. Receptor IDs included in Table I correspond with the WindPRO generated map included in Annex B.

Table I: Description of receptors.

| Point of Reception ID Letter | Location (UTM Zone 20, NAD 83) | | Distance from Receptor to | |
|------------------------------|--------------------------------|-----------|---------------------------|----------------|
| | Easting | Northing | Wind turbine 1 | Wind turbine 2 |
| A | 699,390 | 5,114,718 | 1111 | 1222 |
| B | 699,996 | 5,115,986 | 1219 | 1697 |
| C | 698,494 | 5,113,292 | 2545 | 2344 |
| D | 699,579 | 5,115,277 | 997 | 1329 |
| E | 698,898 | 5,114,057 | 1788 | 1700 |
| F | 699,607 | 5,115,353 | 1006 | 1361 |
| G | 700,006 | 5,116,009 | 1236 | 1715 |
| H | 698,713 | 5,113,573 | 2201 | 2024 |
| I | 698,904 | 5,113,699 | 1972 | 1799 |
| J | 698,960 | 5,114,160 | 1687 | 1622 |
| K | 702,080 | 5,113,531 | 2080 | 1740 |
| L | 699,711 | 5,115,698 | 1136 | 1564 |
| M | 702,185 | 5,115,542 | 1823 | 1988 |
| N | 699,192 | 5,114,507 | 1348 | 1379 |
| O | 702,093 | 5,115,230 | 1642 | 1744 |
| P | 699,348 | 5,114,636 | 1166 | 1243 |
| Q | 698,858 | 5,113,874 | 1912 | 1783 |
| R | 699,594 | 5,115,576 | 1139 | 1534 |
| S | 699,677 | 5,115,651 | 1126 | 1544 |
| T | 699,431 | 5,114,837 | 1059 | 1220 |
| U | 702,007 | 5,113,556 | 2008 | 1664 |
| V | 699,080 | 5,114,064 | 1624 | 1520 |
| W | 698,450 | 5,113,228 | 2619 | 2413 |
| X | 699,565 | 5,115,235 | 994 | 1311 |
| Y | 699,791 | 5,115,839 | 1193 | 1644 |
| Z | 699,273 | 5,114,844 | 1217 | 1371 |
| AA | 698,473 | 5,113,175 | 2636 | 2419 |
| AB | 701,523 | 5,113,504 | 1714 | 1303 |
| AC | 698,811 | 5,113,558 | 2131 | 1941 |
| AD | 699,257 | 5,114,656 | 1251 | 1336 |
| AE | 699,186 | 5,114,312 | 1419 | 1382 |

| Point of Reception ID Letter | Location (UTM Zone 20, NAD 83) | | Distance from Receptor to | |
|------------------------------|--------------------------------|-----------|---------------------------|----------------|
| | Easting | Northing | Wind turbine 1 | Wind turbine 2 |
| AF | 698,526 | 5,113,330 | 2497 | 2298 |
| AG | 699,698 | 5,115,684 | 1135 | 1560 |
| AH | 699,373 | 5,114,684 | 1132 | 1229 |
| AI | 702,141 | 5,113,610 | 2078 | 1757 |
| AJ | 699,959 | 5,116,274 | 1500 | 1981 |
| AK | 702,141 | 5,115,488 | 1763 | 1922 |
| AL | 698,770 | 5,113,700 | 2081 | 1923 |
| AM | 699,276 | 5,114,439 | 1289 | 1291 |
| AN | 699,235 | 5,114,397 | 1341 | 1330 |
| AO | 699,311 | 5,114,914 | 1179 | 1360 |
| AP | 699,496 | 5,115,042 | 1008 | 1254 |
| AQ | 698,861 | 5,113,932 | 1881 | 1765 |
| AR | 698,428 | 5,113,212 | 2646 | 2440 |
| AS | 699,329 | 5,114,805 | 1162 | 1305 |
| AT | 700,016 | 5,116,082 | 1300 | 1781 |
| AU | 698,452 | 5,113,159 | 2662 | 2445 |
| AV | 699,456 | 5,114,938 | 1036 | 1239 |
| AW | 699,736 | 5,115,734 | 1145 | 1581 |
| AX | 699,157 | 5,114,195 | 1494 | 1421 |
| AY | 698,481 | 5,113,258 | 2577 | 2372 |
| AZ | 698,788 | 5,113,803 | 2009 | 1871 |
| BA | 701,712 | 5,113,599 | 1765 | 1392 |
| BB | 698,948 | 5,114,120 | 1716 | 1640 |
| BC | 702,072 | 5,113,418 | 2148 | 1791 |
| BD | 699,969 | 5,115,937 | 1186 | 1660 |
| BE | 699,846 | 5,116,154 | 1435 | 1907 |
| BF | 699,782 | 5,115,796 | 1164 | 1611 |
| BG | 699,773 | 5,115,771 | 1150 | 1594 |
| BH | 699,904 | 5,116,104 | 1365 | 1839 |
| BI | 699,303 | 5,114,585 | 1221 | 1278 |
| BJ | 699,484 | 5,114,571 | 1049 | 1097 |
| BK | 698,904 | 5,114,096 | 1766 | 1688 |
| BL | 698,907 | 5,114,023 | 1795 | 1698 |

6. Description of Sources

6.1. Turbine Locations

A map of the project area with the proposed WTG layout is illustrated in Annex A. There are no existing or proposed wind farms within 5 kilometers the project, thus it is unlikely any cumulative noise effects will occur. Coordinates of the wind turbines are given below in Table 2. Turbine ID numbers included in Table 2 with the WindPRO generated figures included Annex B.

Table 2: Coordinates of proposed turbine locations.

| Wind Turbine ID Number | Proposed Turbine Location (UTM Zone 20, NAD 83) | |
|------------------------|---|-----------|
| | Easting | Northing |
| 1 | 700,490 | 5,114,871 |
| 2 | 700,566 | 5,114,388 |

6.2. Turbine Types

The models of WTGs being considered for the proposed wind farm are the Enercon E-92 2.0 MW. Because the Enercon E-92 2.0MW are the same dimension as the E-92 2.3MW. This turbine was used for the assessment.

This model utilizes horizontal axis, upwind, 3-bladed, and a microprocessor pitch control system. Table 3 below outlines their main characteristics.

Table 3: Enercon E-92 2.3 MW turbine characteristics. (Enercon, 2012)

| Generator Type | Rotor Diameter (m) | Hub Height (m) | Swept area (m ²) | Rated Output (MW) |
|----------------|--------------------|----------------|------------------------------|-------------------|
| E-92 2.3 | 92 | 98 | 6648 | 2.3 |

7. Impact Assessment

7.1. Prediction Methodology

The shadow flicker impact was calculated at each receptor using the Shadow module of the software package, WindPRO version 2.8. The model simulates the Earth's orbit and rotation, to provide the astronomical maximum shadow, also known as the astronomical worst-case scenario. The astronomical maximum shadow calculation assumes that for every day of the year:

1. The sky is cloudless between sunrise and sunset,
2. The turbines are always in operation, and
3. The wind direction changes throughout the day such that the rotor plane is perpendicular to the incident sun rays at all times.

The position of the sun relative to the wind turbine rotor plane and the resulting shadow is calculated in steps of one minute intervals throughout a complete year. If the rotor plane, assumed to be a solid disk equivalent in size to the swept area shown in Table 3 casts a shadow on a receptor window during one of these intervals, it is registered as one minute of potential shadow impact.

As previously noted, following the German guidelines, the impact of shadow flicker on surrounding receptors is limited by two factors. The first being that the angle of the sun over the horizon must be greater than 3 degrees, due to optic conditions in the atmosphere which cause the shadow to dissipate before it could potentially reach a receptor. The second is that the blade of the wind turbine must cover at least 20% of the incident solar rays in order to have a noticeable effect. Distances from WTGs to receptors are shown in Table I.

Each receptor was treated as a 'greenhouse' with 3m high windows for 360° of the building. Furthermore, no topographical shielding (other buildings, barns, trees etc.) has been considered between the wind turbines and receptors. This is a worst-case assumption and results in a conservative prediction of the potential shadow flicker impacts.

Table 4 below provides results of the analysis for shadow flicker at each of the 64 receptors used in this assessment.

7.2. Results of Shadow Flicker Predictions

The results of the shadow flicker prediction model at each receptor, as summarized Table 4, prove compliance with the German standards of no more than 30 hours per year of astronomical maximum shadow (worst case), and no more than 30 minutes on the worst day of astronomical maximum shadow (worst case). Furthermore, some receptors within 2,000 km of the closest WTGs are not predicted to encounter any shadow flicker impacts.

While all receptors are subject to less than 30hrs/year or 30mins/day, the highest worst case shadow flicker modelled was 13.51 hours per year and 21 minutes per day. Tabulated results for the Enercon E-92 2.3 MW can be found in Table 4, while modelled results representing shadow flicker hours per year and WindPRO generated shadow flicker calendars are mapped in Annex B.

Table 4: Predicted shadow flicker for E-92 2.3 MW @ 98 m hub height.

| Point of Reception ID letter | Shadow flicker | | |
|------------------------------|---------------------------------|----------------------------------|----------------------------------|
| | Shadow hours per year (hr/year) | Shadow days per year (days/year) | Shadow hours per day (hours/day) |
| A | 7:38 | 30 | 0:20 |
| B | 0:00 | 0 | 0:00 |
| C | 0:00 | 0 | 0:00 |
| D | 0:00 | 0 | 0:00 |
| E | 0:00 | 0 | 0:00 |
| F | 0:00 | 0 | 0:00 |
| G | 0:00 | 0 | 0:00 |
| H | 0:00 | 0 | 0:00 |
| I | 0:00 | 0 | 0:00 |
| J | 0:00 | 0 | 0:00 |
| K | 0:00 | 0 | 0:00 |
| L | 0:00 | 0 | 0:00 |
| M | 0:00 | 0 | 0:00 |
| N | 6:39 | 31 | 0:17 |
| O | 0:00 | 0 | 0:00 |
| P | 7:42 | 31 | 0:19 |
| Q | 0:00 | 0 | 0:00 |
| R | 0:00 | 0 | 0:00 |
| S | 0:00 | 0 | 0:00 |
| T | 12:48 | 51 | 0:21 |
| U | 0:00 | 0 | 0:00 |
| V | 0:00 | 0 | 0:00 |
| W | 0:00 | 0 | 0:00 |
| X | 0:00 | 0 | 0:00 |
| Y | 0:00 | 0 | 0:00 |
| Z | 9:44 | 44 | 0:18 |
| AA | 0:00 | 0 | 0:00 |
| AB | 0:00 | 0 | 0:00 |
| AC | 0:00 | 0 | 0:00 |
| AD | 6:13 | 27 | 0:18 |
| AE | 13:51 | 63 | 0:17 |
| AF | 0:00 | 0 | 0:00 |
| AG | 0:00 | 0 | 0:00 |
| AH | 7:37 | 30 | 0:20 |
| AI | 0:00 | 0 | 0:00 |
| AJ | 0:00 | 0 | 0:00 |
| AK | 0:00 | 0 | 0:00 |
| AL | 0:00 | 0 | 0:00 |

| Point of Reception ID letter | Shadow flicker | | |
|------------------------------|---------------------------------|----------------------------------|----------------------------------|
| | Shadow hours per year (hr/year) | Shadow days per year (days/year) | Shadow hours per day (hours/day) |
| AM | 9:45 | 44 | 0:18 |
| AN | 10:03 | 46 | 0:17 |
| AO | 9:59 | 45 | 0:18 |
| AP | 7:15 | 26 | 0:21 |
| AQ | 0:00 | 0 | 0:00 |
| AR | 0:00 | 0 | 0:00 |
| AS | 6:17 | 26 | 0:19 |
| AT | 0:00 | 0 | 0:00 |
| AU | 0:00 | 0 | 0:00 |
| AV | 12:47 | 50 | 0:21 |
| AW | 0:00 | 0 | 0:00 |
| AX | 0:00 | 0 | 0:00 |
| AY | 0:00 | 0 | 0:00 |
| AZ | 0:00 | 0 | 0:00 |
| BA | 0:00 | 0 | 0:00 |
| BB | 0:00 | 0 | 0:00 |
| BC | 0:00 | 0 | 0:00 |
| BD | 0:00 | 0 | 0:00 |
| BE | 0:00 | 0 | 0:00 |
| BF | 0:00 | 0 | 0:00 |
| BG | 0:00 | 0 | 0:00 |
| BH | 0:00 | 0 | 0:00 |
| BI | 7:30 | 32 | 0:18 |
| BJ | 0:00 | 0 | 0:00 |
| BK | 0:00 | 0 | 0:00 |
| BL | 0:00 | 0 | 0:00 |

8. Conclusions and Recommendations

Natural Forces Wind Inc. has completed a thorough assessment to evaluate the astronomical worst case shadow flicker impact of the proposed Barrachois Wind Farm at receptor locations within 2,000 m of a proposed wind turbine generator. Based on the parameters used to run the shadow flicker prediction model via WindPRO, it has been shown that the predicted duration of shadow flicker emitted by the wind turbine generators at all points of reception is less than the German guidelines, adopted for this assessment. As a result of this study, no mitigation strategies are recommended.

9. References

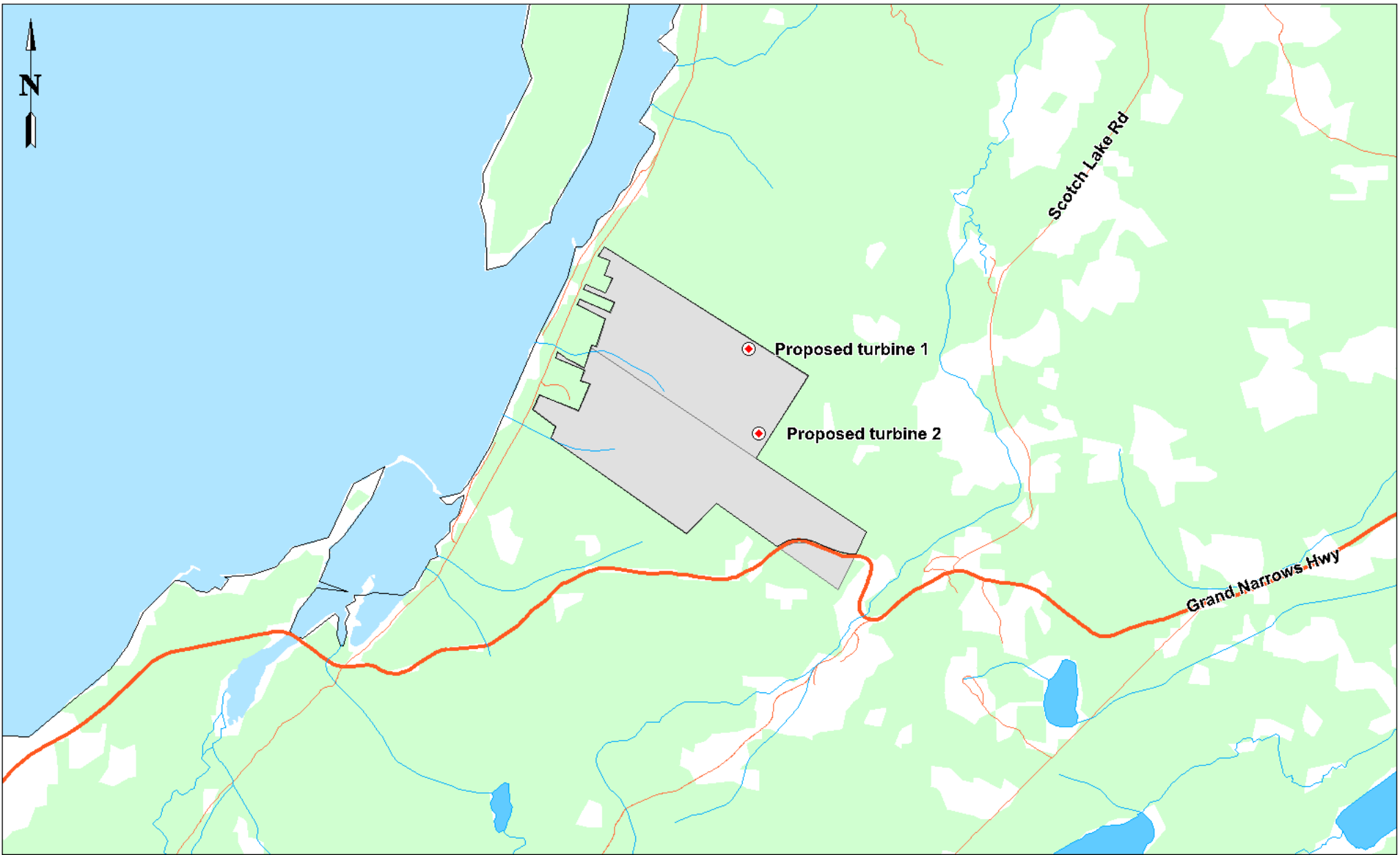
Enercon Canada (2012). *Enercon E-92 2.3 MW Wind Turbine Generator data sheet*.

Nielson, P. (2012). *Windpro 2.8 user guide*. (1st ed.). Denmark: EMD International A/S.






WEA-Schattenwurf-Hinweise (2002). *Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (Notes on the identification and assessment of the optical pollutions of Wind Turbines)*. WindPRO

ANNEX A

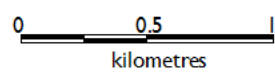
Site Layout Map



LEGEND

-  Project land
-  Proposed turbines
-  Highway
-  Arterial & minor road
-  Watercourse

SCALE



KEY MAP



PROJECT

Barrachois Wind Farm

FIGURE

Annex A

TITLE

Site Layout

DATE

October 3rd 2013



1205-1801 Hollis Street
 Halifax, NS B3J 3N4
 Tel: 902.422.9663
 Fax: 902.422.9780
 www.naturalforces.ca

Source: Nova Scotia Department of Natural Resources
 Base Map © Her Majesty the Queen in Right of Canada, Department of Natural Resources. All rights reserved.

ANNEX B

WindPRO v2.8, Shadow Module Calculation Results

E92-2.3 MW @ 98m Hub Height

| | | |
|--|--|--|
| Project: Barrachois Wind Farm | Description: Worst case assumes sun always shining (from sun rise to sun set), turbine always running and rotor oriented perpendicular to neighbour. | Printed/Page: 03/10/2013 2:28 PM / 1 Licensed user: Natural Forces Wind Inc 1791 Barrington Street Suite 1030 CA-HALIFAX, Nova Scotia B3J 3L1 Amy / apellerin@naturalforges.ca Calculated: 03/10/2013 2:25 PM/2.8.579 |
|--|--|--|

SHADOW - Main Result

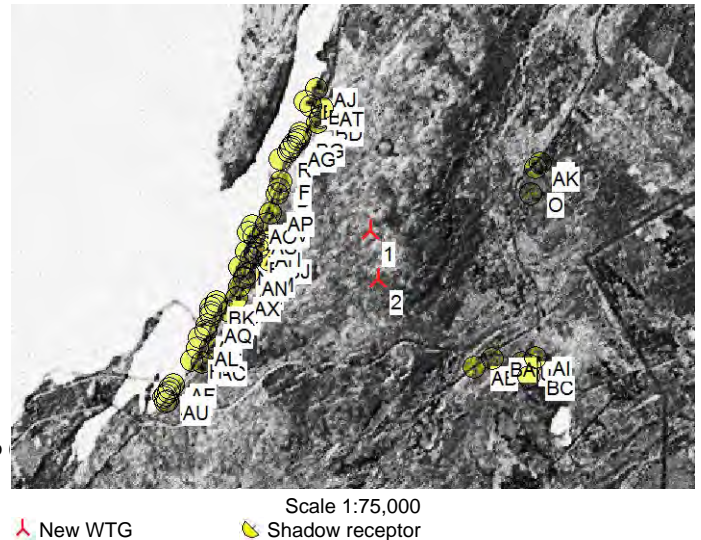
Calculation: Barrachois - Shadow Flicker Assesment

Assumptions for shadow calculations

Maximum distance for influence
 Calculate only when more than 20 % of sun is covered by the blade
 Please look in WTG table

Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 1 minutes
 The calculated times are "worst case" given by the following assumptions:
 The sun is shining all the day, from sunrise to sunset
 The rotor plane is always perpendicular to the line from the WTG to the sun
 The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
 Height contours used: Height Contours: CONTOURLINE_ONLINEDATA_0.wpo
 Obstacles used in calculation
 Eye height: 1.5 m
 Grid resolution: 10.0 m



WTGs

| | UTM (north)-NAD83 (US+CA) Zone: 20 | | | Row data/Description | WTG type | | | Shadow data | | | | |
|---|------------------------------------|-----------|-------|---------------------------------|----------|-----------|-------------------|-------------------|--------------------|----------------|--------------------------|-----------|
| | East | North | Z | | Valid | Manufact. | Type-generator | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Calculation distance [m] | RPM [RPM] |
| | | | [m] | | | | | | | | | |
| 1 | 700,490 | 5,114,871 | 192.4 | ENERCON E-92 2,3 MW 2300 92.... | Yes | ENERCON | E-92 2,3 MW-2,300 | 2,300 | 92.0 | 98.0 | 1,639 | 16.0 |
| 2 | 700,566 | 5,114,388 | 176.1 | ENERCON E-92 2,3 MW 2300 92.... | Yes | ENERCON | E-92 2,3 MW-2,300 | 2,300 | 92.0 | 98.0 | 1,639 | 16.0 |

Shadow receptor-Input

| No. | UTM (north)-NAD83 (US+CA) Zone: 20 | | | Width [m] | Height [m] | Height a.g.l. [m] | Degrees from south cw [°] | Slope of window [°] | Direction mode |
|-----|------------------------------------|-----------|------|-----------|------------|-------------------|---------------------------|---------------------|--------------------|
| | East | North | Z | | | | | | |
| A | 699,390 | 5,114,718 | 36.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| B | 699,996 | 5,115,986 | 37.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| C | 698,494 | 5,113,292 | 6.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| D | 699,579 | 5,115,277 | 34.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| E | 698,898 | 5,114,057 | 3.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| F | 699,607 | 5,115,353 | 35.2 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| G | 700,006 | 5,116,009 | 35.8 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| H | 698,713 | 5,113,573 | 7.2 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| I | 698,904 | 5,113,699 | 17.8 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| J | 698,960 | 5,114,160 | 6.1 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| K | 702,080 | 5,113,531 | 95.0 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| L | 699,711 | 5,115,698 | 9.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| M | 702,185 | 5,115,542 | 72.5 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| N | 699,192 | 5,114,507 | 19.8 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| O | 702,093 | 5,115,230 | 66.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| P | 699,348 | 5,114,636 | 35.2 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| Q | 698,858 | 5,113,874 | 6.5 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| R | 699,594 | 5,115,576 | 7.5 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| S | 699,677 | 5,115,651 | 9.5 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| T | 699,431 | 5,114,837 | 35.5 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| U | 702,007 | 5,113,556 | 95.2 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| V | 699,080 | 5,114,064 | 43.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |

To be continued on next page...

| | | |
|--|--|--|
| Project: Barrachois Wind Farm | Description: Worst case assumes sun always shining (from sun rise to sun set), turbine always running and rotor oriented perpendicular to neighbour. | Printed/Page: 03/10/2013 2:28 PM / 2 Licensed user: Natural Forces Wind Inc 1791 Barrington Street Suite 1030 CA-HALIFAX, Nova Scotia B3J 3L1 Amy / apellerin@naturalforges.ca Calculated: 03/10/2013 2:25 PM/2.8.579 |
|--|--|--|

SHADOW - Main Result

Calculation: Barrachois - Shadow Flicker Assessment

...continued from previous page

UTM (north)-NAD83 (US+CA) Zone: 20

| No. | East | North | Z | Width | Height | Height a.g.l. | Degrees from south cw | Slope of window | Direction mode |
|-----|---------|-----------|-------|-------|--------|------------------|--------------------------|--------------------|--------------------|
| | | | [m] | [m] | [m] | [m] | [°] | [°] | |
| W | 698,450 | 5,113,228 | 7.2 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| X | 699,565 | 5,115,235 | 35.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| Y | 699,791 | 5,115,839 | 3.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| Z | 699,273 | 5,114,844 | 8.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AA | 698,473 | 5,113,175 | 16.3 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AB | 701,523 | 5,113,504 | 100.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AC | 698,811 | 5,113,558 | 13.8 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AD | 699,257 | 5,114,656 | 18.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AE | 699,186 | 5,114,312 | 36.8 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AF | 698,526 | 5,113,330 | 7.3 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AG | 699,698 | 5,115,684 | 9.1 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AH | 699,373 | 5,114,684 | 36.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AI | 702,141 | 5,113,610 | 92.0 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AJ | 699,959 | 5,116,274 | 10.0 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AK | 702,141 | 5,115,488 | 72.3 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AL | 698,770 | 5,113,700 | 4.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AM | 699,276 | 5,114,439 | 40.0 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AN | 699,235 | 5,114,397 | 36.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AO | 699,311 | 5,114,914 | 10.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AP | 699,496 | 5,115,042 | 38.1 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AQ | 698,861 | 5,113,932 | 5.2 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AR | 698,428 | 5,113,212 | 6.2 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AS | 699,329 | 5,114,805 | 19.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AT | 700,016 | 5,116,082 | 28.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AU | 698,452 | 5,113,159 | 15.3 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AV | 699,456 | 5,114,938 | 34.0 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AW | 699,736 | 5,115,734 | 9.3 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AX | 699,157 | 5,114,195 | 42.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AY | 698,481 | 5,113,258 | 8.4 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| AZ | 698,788 | 5,113,803 | 1.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BA | 701,712 | 5,113,599 | 96.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BB | 698,948 | 5,114,120 | 5.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BC | 702,072 | 5,113,418 | 95.3 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BD | 699,969 | 5,115,937 | 38.3 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BE | 699,846 | 5,116,154 | 0.0 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BF | 699,782 | 5,115,796 | 8.7 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BG | 699,773 | 5,115,771 | 10.1 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BH | 699,904 | 5,116,104 | 6.0 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BI | 699,303 | 5,114,585 | 31.1 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BJ | 699,484 | 5,114,571 | 67.9 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BK | 698,904 | 5,114,096 | 1.6 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |
| BL | 698,907 | 5,114,023 | 7.6 | 3.0 | 3.0 | 1.0 | 0.0 | 90.0 | "Green house mode" |

Calculation Results

Shadow receptor

Shadow, worst case

| No. | Shadow hours per year [h/year] | Shadow days per year [days/year] | Max shadow hours per day [h/day] |
|-----|--------------------------------------|--|--|
| A | 7:38 | 30 | 0:20 |
| B | 0:00 | 0 | 0:00 |
| C | 0:00 | 0 | 0:00 |
| D | 0:00 | 0 | 0:00 |

To be continued on next page...

Project:

Barrachois Wind Farm

Description:

Worst case assumes sun always shining (from sun rise to sun set), turbine always running and rotor oriented perpendicular to neighbour.

Printed/Page

03/10/2013 2:28 PM / 3

Licensed user:

Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforges.ca

Calculated:

03/10/2013 2:25 PM/2.8.579

SHADOW - Main Result**Calculation: Barrachois - Shadow Flicker Assessment**

...continued from previous page

Shadow, worst case

| No. | Shadow hours per year [h/year] | Shadow days per year [days/year] | Max shadow hours per day [h/day] |
|-----|--------------------------------------|--|--|
| E | 0:00 | 0 | 0:00 |
| F | 0:00 | 0 | 0:00 |
| G | 0:00 | 0 | 0:00 |
| H | 0:00 | 0 | 0:00 |
| I | 0:00 | 0 | 0:00 |
| J | 0:00 | 0 | 0:00 |
| K | 0:00 | 0 | 0:00 |
| L | 0:00 | 0 | 0:00 |
| M | 0:00 | 0 | 0:00 |
| N | 6:39 | 31 | 0:17 |
| O | 0:00 | 0 | 0:00 |
| P | 7:42 | 31 | 0:19 |
| Q | 0:00 | 0 | 0:00 |
| R | 0:00 | 0 | 0:00 |
| S | 0:00 | 0 | 0:00 |
| T | 12:48 | 51 | 0:21 |
| U | 0:00 | 0 | 0:00 |
| V | 0:00 | 0 | 0:00 |
| W | 0:00 | 0 | 0:00 |
| X | 0:00 | 0 | 0:00 |
| Y | 0:00 | 0 | 0:00 |
| Z | 9:44 | 44 | 0:18 |
| AA | 0:00 | 0 | 0:00 |
| AB | 0:00 | 0 | 0:00 |
| AC | 0:00 | 0 | 0:00 |
| AD | 6:13 | 27 | 0:18 |
| AE | 13:51 | 63 | 0:17 |
| AF | 0:00 | 0 | 0:00 |
| AG | 0:00 | 0 | 0:00 |
| AH | 7:37 | 30 | 0:20 |
| AI | 0:00 | 0 | 0:00 |
| AJ | 0:00 | 0 | 0:00 |
| AK | 0:00 | 0 | 0:00 |
| AL | 0:00 | 0 | 0:00 |
| AM | 9:45 | 44 | 0:18 |
| AN | 10:03 | 46 | 0:17 |
| AO | 9:59 | 45 | 0:18 |
| AP | 7:15 | 26 | 0:21 |
| AQ | 0:00 | 0 | 0:00 |
| AR | 0:00 | 0 | 0:00 |
| AS | 6:17 | 26 | 0:19 |
| AT | 0:00 | 0 | 0:00 |
| AU | 0:00 | 0 | 0:00 |
| AV | 12:47 | 50 | 0:21 |
| AW | 0:00 | 0 | 0:00 |
| AX | 0:00 | 0 | 0:00 |
| AY | 0:00 | 0 | 0:00 |
| AZ | 0:00 | 0 | 0:00 |
| BA | 0:00 | 0 | 0:00 |
| BB | 0:00 | 0 | 0:00 |
| BC | 0:00 | 0 | 0:00 |
| BD | 0:00 | 0 | 0:00 |
| BE | 0:00 | 0 | 0:00 |
| BF | 0:00 | 0 | 0:00 |
| BG | 0:00 | 0 | 0:00 |

To be continued on next page...

| | | |
|---|---|---|
| Project: Barrachois Wind Farm | Description: Worst case assumes sun always shining (from sun rise to sun set), turbine always running and rotor oriented perpendicular to neighbour. | Printed/Page 03/10/2013 2:28 PM / 4 Licensed user: Natural Forces Wind Inc 1791 Barrington Street Suite 1030 CA-HALIFAX, Nova Scotia B3J 3L1 Amy / apellerin@naturalforges.ca Calculated: 03/10/2013 2:25 PM/2.8.579 |
|---|---|---|

SHADOW - Main Result

Calculation: Barrachois - Shadow Flicker Assesment

...continued from previous page

Shadow, worst case

| No. | Shadow hours per year [h/year] | Shadow days per year [days/year] | Max shadow hours per day [h/day] |
|-----|--------------------------------------|--|--|
| BH | 0:00 | 0 | 0:00 |
| BI | 7:30 | 32 | 0:18 |
| BJ | 0:00 | 0 | 0:00 |
| BK | 0:00 | 0 | 0:00 |
| BL | 0:00 | 0 | 0:00 |

Total amount of flickering on the shadow receptors caused by each WTG

| No. | Name | Worst case [h/year] | Expected [h/year] |
|-----|--|------------------------|----------------------|
| 1 | ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (1) | 73:11 | |
| 2 | ENERCON E-92 2,3 MW 2300 92.0 !-! hub: 98.0 m (TOT: 144.0 m) (2) | 14:13 | |

Project:
Barrachois Wind Farm

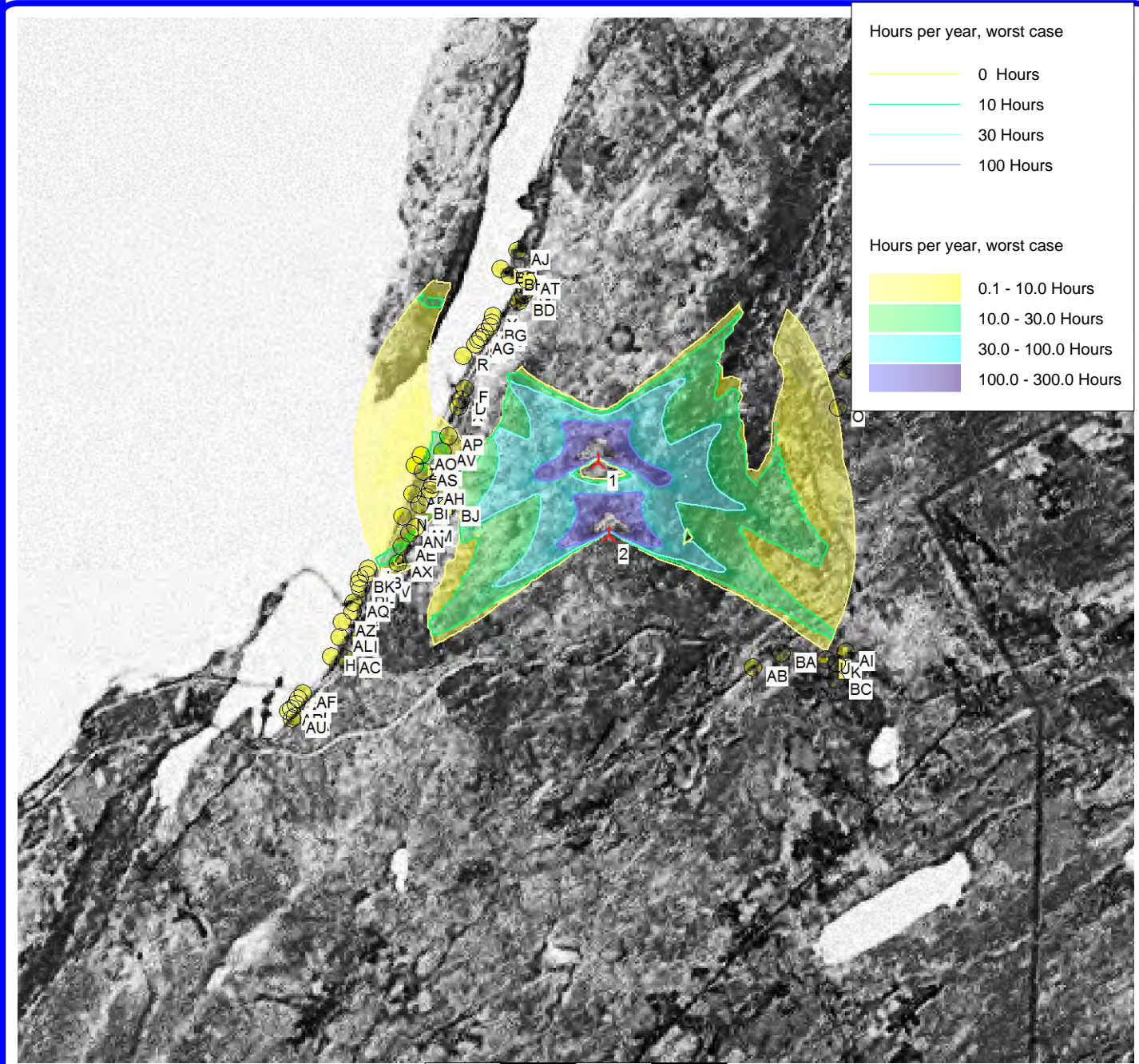
Description:
Worst case assumes sun always shining (from sun rise to sun set), turbine always running and rotor oriented perpendicular to neighbour.

Printed/Page
03/10/2013 2:27 PM / 1
Licensed user:
Natural Forces Wind Inc
1791 Barrington Street Suite 1030
CA-HALIFAX, Nova Scotia B3J 3L1

Amy / apellerin@naturalforges.ca
Calculated:
03/10/2013 2:25 PM/2.8.579

SHADOW - Map

Calculation: Barrachois - Shadow Flicker Assesment



Map: WindPRO map , Print scale 1:40,000, Map center UTM (north)-NAD83 (US+CA) Zone: 20 East: 700,330 North: 5,114,360
 New WTG Shadow receptor
 Flicker map level: Height Contours: CONTOURLINE_ONLINEDATA_0.wpo (2)

Appendix J:
EMI Study

Natural Forces

IMPACT ASSESSMENT OF PROPOSED WIND
TURBINES IN BARRACHOIS, NS
ON PERFORMANCE OF EXISTING
MICROWAVE RADIO LINKS

REVISION: B02
OCT 7TH, 2013

MACNEIL Telecom Inc.

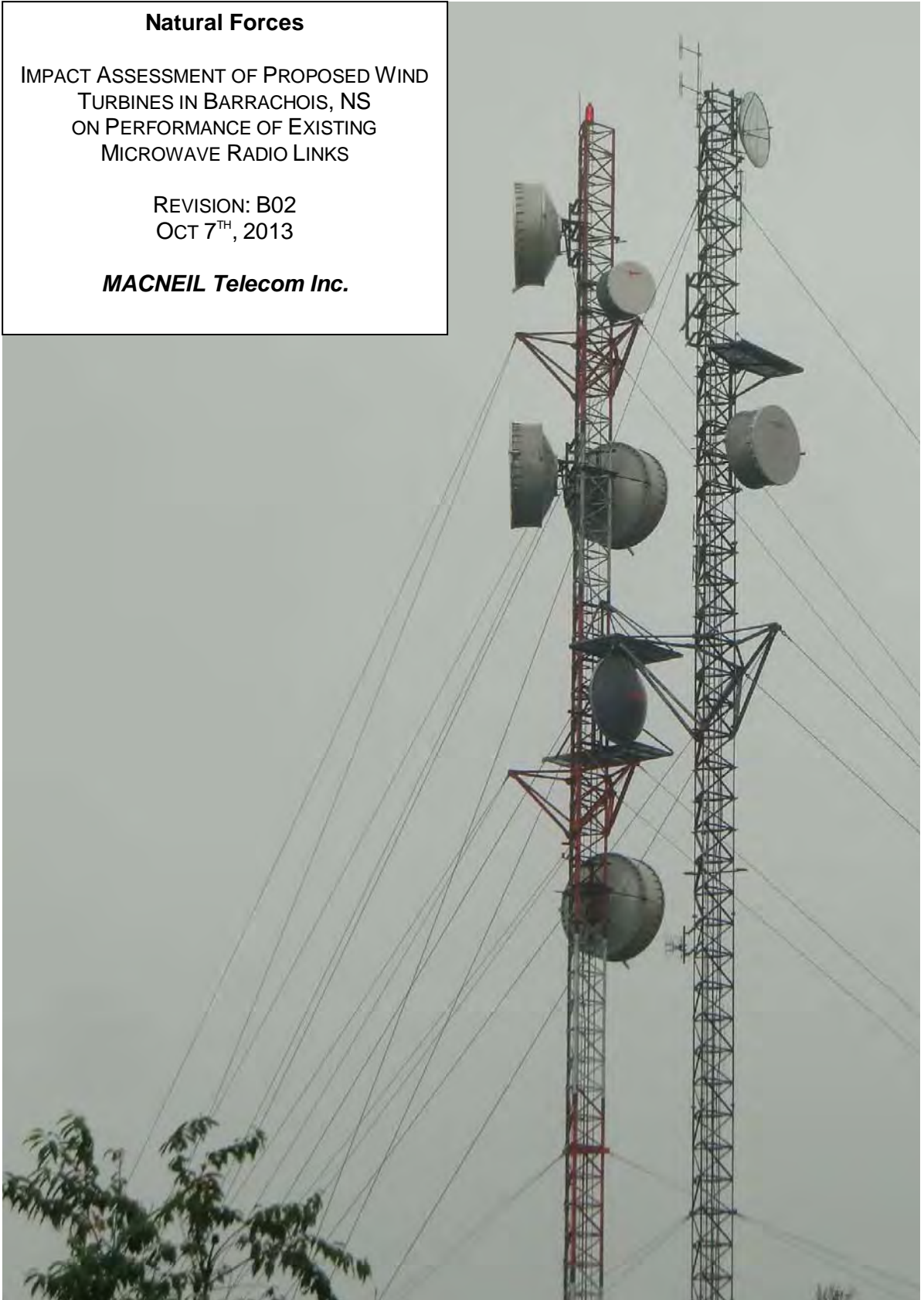


TABLE OF CONTENTS

Contents

PURPOSE OF REPORT:..... 2
ANALYSIS METHODOLOGY: 2
LIMITATIONS OF INDUSTRY CANADA DATA:..... 2
LIMITATIONS OF ANALYSIS:..... 3
INPUTS: 4
FINDINGS:..... 4
ANALYSIS:..... 10
CONCLUSIONS/RECOMMENDATIONS: 11
APPENDIX A – TAFL DATA (SEPT 15TH, 2013) – 35KM RADIUS BARRACHOIS MOUNTAIN..... 12

LIST OF FIGURES

FIGURE 1 - ACTIVE LICENSED NON-PROTECTED PTP LINKS WITHIN 35KM RADIUS OF PROPOSED
BARRACHOIS MOUNTAIN TURBINES 5
FIGURE 2 - LICENSED NON-PROTECTED PTP RADIO LINKS AT BARRACHOIS MOUNTAIN..... 6
FIGURE 3 – ROGERS’ BARRACHOIS MOUNTAIN RADIO SITE 7
FIGURE 4 - LICENSED NON-PROTECTED PTP LINKS AT ROGERS' SYDNEY SITE 8
FIGURE 5 - ROGERS' SYDNEY RADIO SITE..... 9

PURPOSE OF REPORT:

Natural Forces is proposing to construct 2 wind turbines in the Barrachois, NS area. As part of the design phase of the project, MacNeil Telecom Inc. was contacted to examine the impact the proposed wind turbines may have on the performance of existing radio communication systems that in the immediate area.

ANALYSIS METHODOLOGY:

1. Identify proposed location and size of wind turbines.
2. Obtain data for licensed radio systems within 35km of the wind farm from the radio spectrum licensing authority, Industry Canada (IC) – TAFL database.
3. Plot applicable radio links on a map to show their proximity wrt to the turbines.
4. Review the Industry Canada data records/map to produce a “short list” of radio systems that could potentially be impacted by the turbines.
5. Perform a site visit to verify the location of applicable radio towers and to verify the existence of the antennas identified on the “short list”.
6. Tabulate a “verified inventory” of existing radio links that may be of concern and update maps with field verified data.
7. Calculate the recommended required clearance between the radio links of concern and the wind turbine: Fresnel zone and turbine radius.
8. Calculate the expected achievable clearance based on field verified radio site coordinates and specified turbine locations.
9. Assess the results and identify potential issues.
10. If required, recommend what steps can be taken to minimize the impact the turbines will have on existing radio links. The first approach will to work with Natural Forces to consider the possibility of relocating those wind turbines that infringe on existing radio links.

LIMITATIONS OF INDUSTRY CANADA DATA:

The data contained in the Industry Canada database, like any database is subject to certain limitations:

1. Accuracy of Data

System parameters such as site locations (latitudes and longitudes), antenna heights and radio operating parameters are provided by the licensee (or their representative) and are sometimes prone to error. Other system parameters such as the operating frequencies assigned by Industry Canada are much less likely to suffer from serious errors. For the purpose of this particular report, the accuracy of physical parameters of the radio systems (i.e. site locations, elevations, antenna heights, etc.) are of highest importance, making it necessary to confirm the parameters by means of field survey.

2. Extent of Data

The report considers only systems data included in the Industry Canada database as of September 15th, 2013.

3. Licensed Radio Systems

The Industry Canada database only includes radio systems that require a license from Industry Canada to operate. Non-licensed radio systems (e.g. certain spread-spectrum radios) are not captured in the database and therefore cannot be identified.

4. Status of Systems

It is assumed that all systems identified on the Industry Canada database are still in service (provided the antennas associated with that system was found to still exist during the field survey).

LIMITATIONS OF ANALYSIS:

1. Point-to-point Radio Links

The report considers point-to-point (PTP) radio links employing narrow beamwidth (e.g parabolic) antennas operating above 900MHz. It does not consider lower frequency systems (i.e. below 900MHz) employing wide beam antennas (e.g. omni-direction or yagi antennas) as such systems are not expected to be significantly impacted by the proposed structures. Typically, lower frequency systems operating in the VHF and UHF band for example are much less susceptible to diffraction loss resulting from obstructions beyond the immediate proximity of its antennas. The dimensions and shape of the proposed wind turbines (i.e. tower and blades) are considered relatively narrow wrt the wavelength of such lower frequency systems and would therefore only be of concern (to cause significant performance degradation) if positioned in very close proximity to the antenna itself. The performance of cellular type radio systems operating in the 1900/2100 MHz bands that use sectorial antennas and operate in the near vicinity of the wind turbines are also examined.

2. Accuracy of Field Measurements

Location and ground elevations of towers were measured using Magellan Explorist 310 GPS receiver. The expected accuracy of this unit is in the neighborhood of +/- 5m horizontal.

3. Accuracy of Customer Data

The accuracy of the location of the proposed wind turbines is unknown.

INPUTS:

The location of the proposed wind turbines have been identified as:

Turbine 1 46° 9' 28.51"N 60° 24' 02.03"W

Turbine 2 46° 9' 12.79"N 60° 24' 09 09.23"W

Initial indications are the proposed turbines will have a rotor radius of 46m (92m diameter).

FINDINGS:

Table A in Appendix A outlines the active licensed non-protected PTP radio links operating in the vicinity (within 35km) of the proposed wind turbines as of Sept 15th, 2013. This data was sourced from Industry Canada's TAFL. This information is shown visually on a map in **Figure 1**. **Figure 2** shows a close up view of the area around the turbines and the links operating nearby.

An existing radio site on the same mountain as the turbine farm is of the most concern and the focus of the study can be narrowed down to a single active microwave link operating at this site. The radio link in question is owned by Rogers Communications and links the Barrachois Mountain radio site and Rogers' Sydney site (actually located in Whitney Pier). The link operates in the 2.2GHz band.

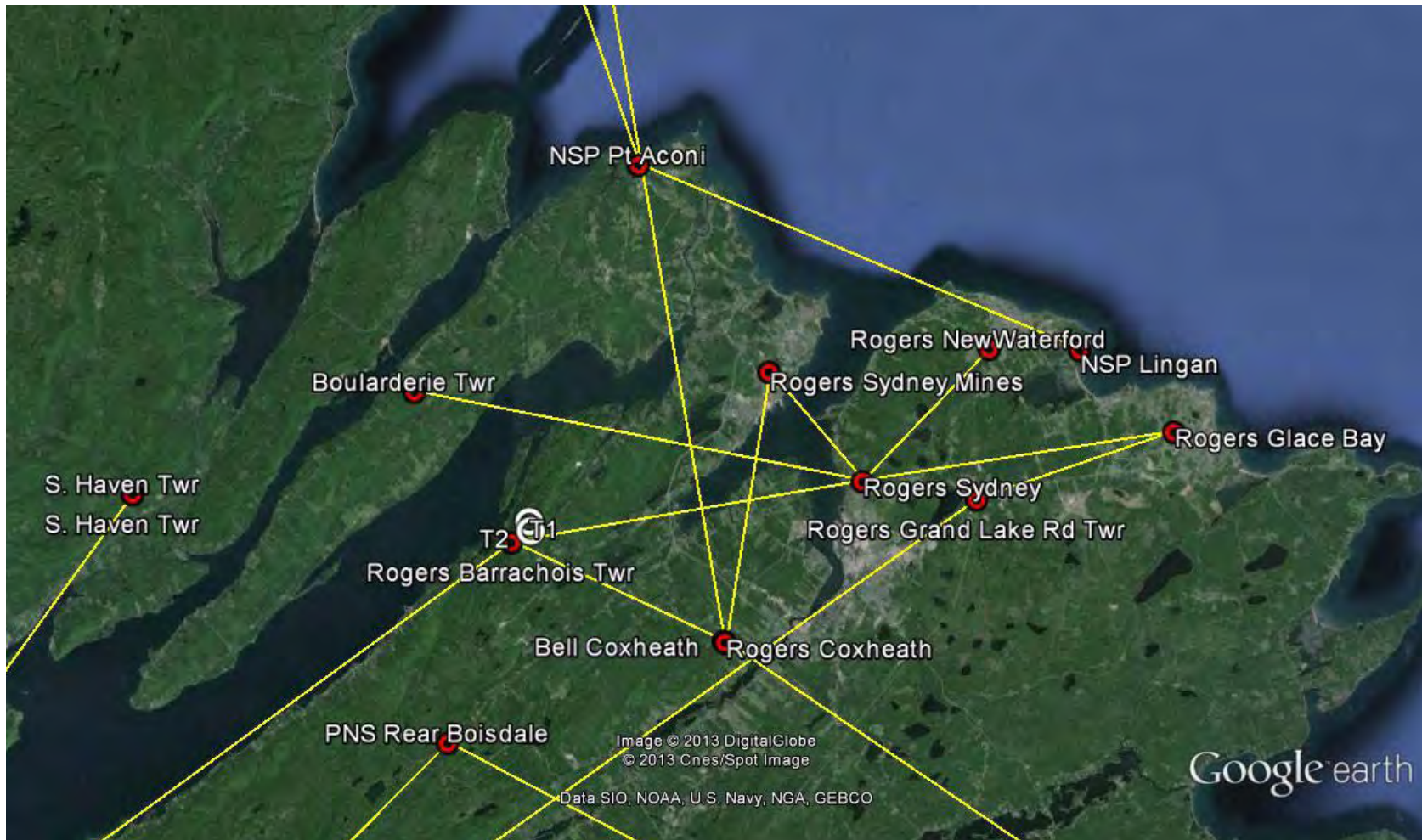


Figure 1 - Active Licensed Non-Protected PTP Links within 35km radius of Proposed Barrachois Mountain Turbines

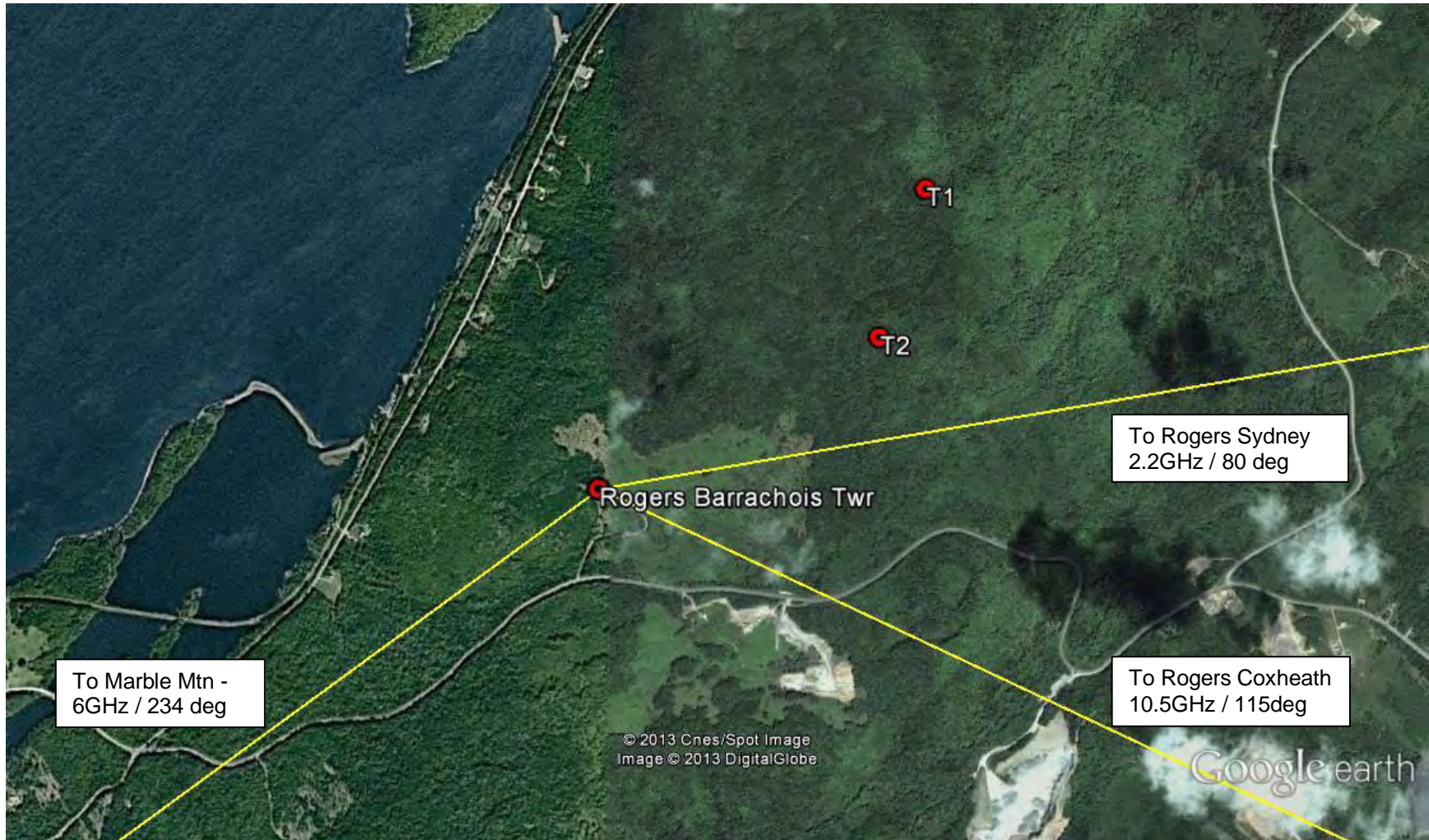


Figure 2 - Licensed Non-Protected PTP Radio Links at Barrachois Mountain

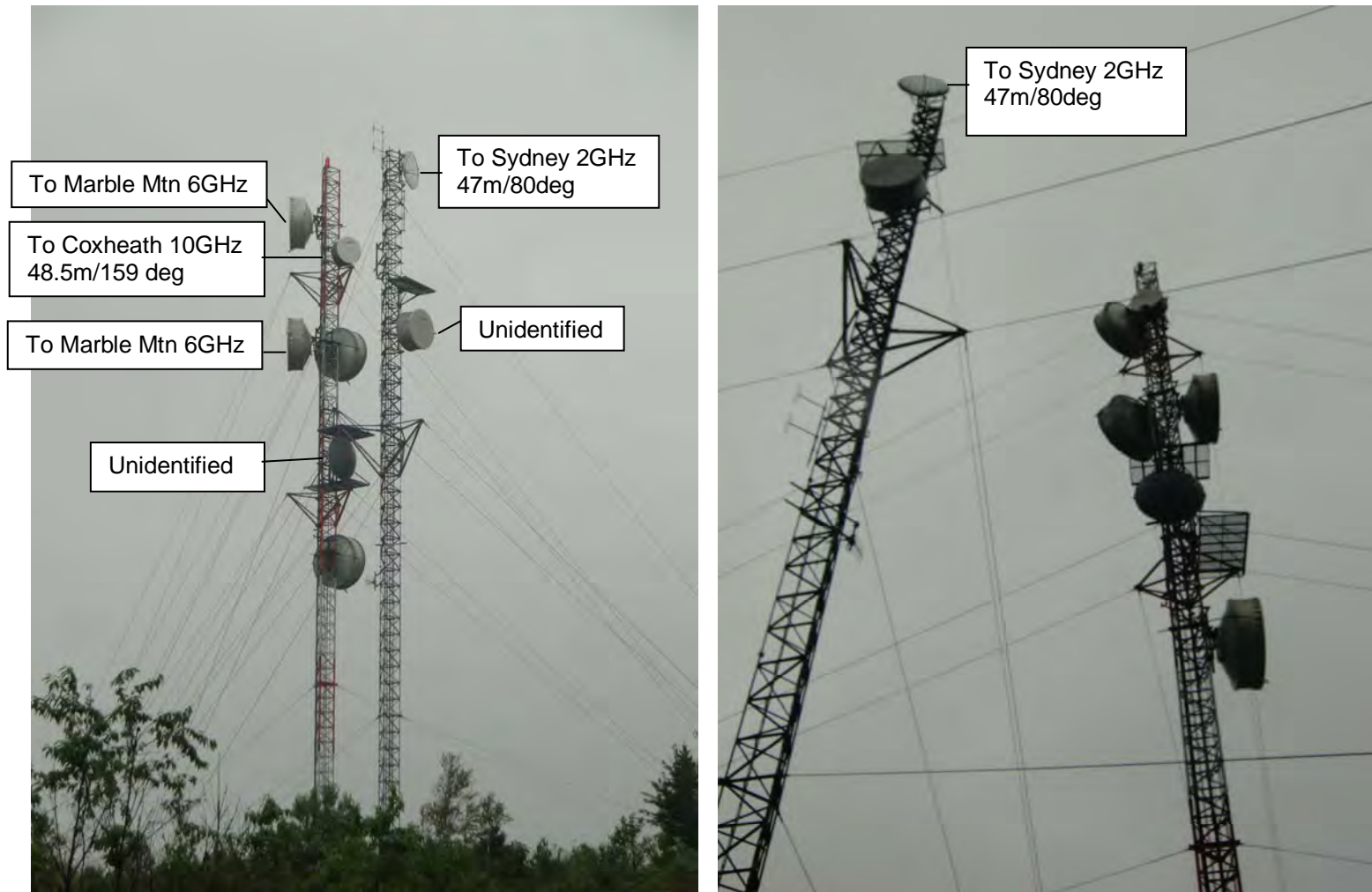


Figure 3 – Barrachois Mountain Radio Site

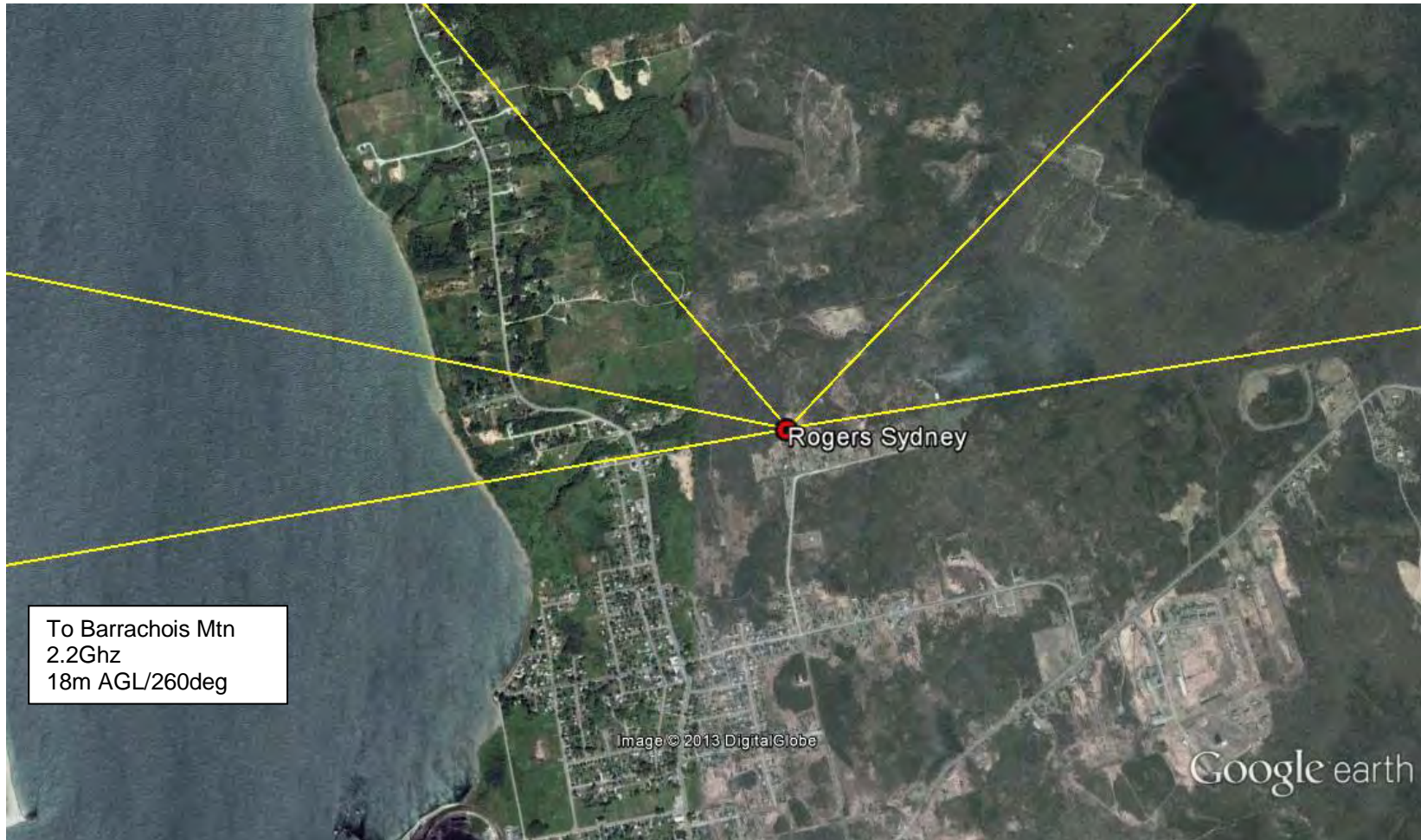


Figure 4 - Licensed Non-Protected PTP Links at Rogers' Sydney Site



Figure 5 - Rogers' Sydney Radio Site

ANALYSIS:

One (1) active licensed point-to-point radio link shoots in the proximity of the proposed wind turbines. The PTP link between Barrachois Mountain and Sydney is owned by Rogers Communications and operates in the 2.2GHz band.

TABLE A – MEASURED RADIO SITE DATA

| Site | Description | UTM Northing (m) | UTM Easting (m) | Site Elev. (m) |
|------|-----------------------|------------------|-----------------|----------------|
| 1 | Rogers Barrachois Mtn | 5113848.05 | 699698.03 | 155 |
| 2 | Rogers Sydney | 5117548.05 | 717431.92 | 51 |

The required clearance around a given radio link to avoid diffraction loss is inversely proportional to its frequency (i.e. the higher the frequency, the narrower the clearance area - aka the Fresnel zone).

The absolute minimum clearance required for a given radio link to avoid diffraction loss is 60% of the first fresnel zone (0.6 F1) at the obstruction. However to account for limitations of field measurements and inaccuracies of the actual positioning of turbines, we recommend a minimum clearance of 30m + F1.

TABLE B – FRESNEL ZONE CALCULATION

| Freq (GHz) | Wave Length | D (km) Link Length | d1 (km) | F1 (m) | F1 + 30m (m) | Rotor Radius (m) | Recommended Minimum Clearance (m) |
|------------|-------------|--------------------|---------|--------|--------------|------------------|-----------------------------------|
| 2.2 | 14 cm | 18.1 | 1.0 | 11.5 | 41.5 | 46m | 97m |

TABLE C – SPECIFIED TURBINE LOCATIONS AND CALCULATED OFFSET WRT LINK

| Site | UTM Northing (m) | UTM Easting (m) | Calculated Offset (m) | Rec. Min Clearance (m) | Difference (m) | Status |
|------|------------------|-----------------|-----------------------|------------------------|----------------|--------|
| T1 | 5114878.53 m | 700704.27 m | 803m | 97m | +706m | OK |
| T2 | 5114388.00 m | 700565.00 m | 351m | 97m | +254m | OK |

Cellular Systems

It is noted that there are no cellular types systems operating on the towers on Barrachois Mountain.

CONCLUSIONS/RECOMMENDATIONS:

Based on the results of our findings, the proposed wind turbines at Barachois Mountain are not expected to cause significant performance degradations on existing radio systems in the area.

Point To Point Systems:

The proposed wind turbines are not expected to significantly impact the performance of licensed PTP radio systems operating in the area. It is noted that all non-licensed radio systems may not have been included in the assessment if these were not identified in the Industry Canada database.

Fixed Mobile Radio Systems:

Lower frequency fixed systems (below 900MHz) utilizing non-directional antennas (i.e. omni-direction or sector type antennas) that operate close to the turbines are not expected to be negatively impacted with the possible exception being high EMI or local signal scatter that could negatively impacting mobile radio operating very near the wind turbines.

HSPA/LTE Cellular Systems:

There are no cellular type systems (1900/2100 MHz bands) operating at Barrachois Mountain that could be potentially impacted by the structures.

APPENDIX A – TAFL DATA (SEPT 15TH, 2013) – 35KM RADIUS BARRACHOIS MOUNTAIN

| Ref# | Tx Freq (MHz) | Rx Freq (MHz) | Status | Latitude (ddmmss) | Longitude (ddmmss) | Station Location | Twr Height AGL (m) | Tx Ant Gain | Tx Ant Az (deg) | Tx Ant Hgt (AGL - m) | Tx Ant BW (deg) | Link Call Sign | Link Licence Number | Link Station Location | Az (deg) wrt Site | Dist (km) wrt Site | Licensee Name | Licence Number | Call Sign |
|------|---------------|---------------|--------|-------------------|--------------------|------------------------------------|--------------------|-------------|-----------------|----------------------|-----------------|----------------|---------------------|-----------------------|-------------------|--------------------|--|----------------|-----------|
| 1 | 931.6125 | | 6 | 461036 | 601056 | SYDNEY,N.S. (MACLEODS HILL RD) | 98 | 10 | 0 | 98 | | | | | 81.32 | 17.14 | Rogers Communications Inc. (Paging) Wilson Tam, Mgr. Radio Engineering | 3776615 | VAC236 |
| 2 | 931.6875 | | 6 | 461036 | 601056 | SYDNEY,N.S. (MACLEODS HILL RD) | 98 | 10 | 0 | 98 | | | | | 81.32 | 17.14 | Rogers Communications Inc. (Paging) Wilson Tam, Mgr. Radio Engineering | 3776615 | VAC236 |
| 3 | 931.7375 | | 6 | 460614 | 601630 | COXHEATH NS | 46 | 9 | 0 | 46 | 90 | | | | 119.37 | 11.26 | Bell Mobility Inc Attn: Meyang Yunga: PEIN 6026826 | 3665638 | VAC506 |
| 4 | 931.7375 | | 6 | 461141 | 595912 | GLACE BAY NS | 69 | 9 | 0 | 69 | 30 | | | | 81.72 | 32.32 | Bell Mobility Inc Attn: Meyang Yunga: PEIN 6026826 | 3665640 | VAC507 |
| 5 | 931.7375 | | 6 | 461515 | 602127 | N.S., BOULARDERIE CAPE BRETON | 107 | 12 | 0 | 107 | 360 | | | | 17.09 | 11.7 | Bell Mobility Inc Attn: Meyang Yunga: PEIN 6026826 | 4057609 | XLX588 |
| 6 | 931.9375 | | 6 | 461036 | 601056 | SYDNEY,N.S. (MACLEODS HILL RD) | 98 | 10 | 0 | 98 | | | | | 81.32 | 17.14 | Rogers Communications Inc. (Paging) Wilson Tam, Mgr. Radio Engineering | 3776615 | VAC236 |
| 7 | 932.33125 | 941.33125 | 6 | 461442 | 600551 | NEW WATERFORD, NS NSPI SUBSTATION | 15 | 9.9 | 102.3 | 15 | 48 | | | | 66.46 | 25.56 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5124937 | CGW804 |
| 8 | 933.2 | 942.2 | 6 | 461410 | 600221 | LINGAN GEN STATION, NS | 46 | 12.1 | 335.2 | 46 | | CFW782 | 5010134 | NEW WATERFORD NS | 71.7 | 29.41 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5010132 | CFW781 |
| 9 | 941.33125 | 932.33125 | 6 | 461411 | 600225 | LINGAN, NS NSPI GENERATING STATION | 47 | 9.9 | 282 | 15 | 48 | | | | 71.59 | 29.34 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5124938 | CGW805 |
| 10 | 942.2 | 933.2 | 6 | 461431 | 600235 | NEW WATERFORD, NS (WIND MILL SUB) | 6 | 12.1 | 155.2 | 6 | | CFW781 | 5010132 | LINGAN GEN STATION | 70.31 | 29.34 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5010134 | CFW782 |
| 11 | 943.2 | 934.2 | 6 | 461917 | 601947 | POINT ACONI, NS | 59 | 18.4 | 350.5 | 59 | | CJ453 | 5037266 | CAPE SMOKEY | 16.61 | 19.47 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 3700133 | XOA848 |
| 12 | 956.125 | | 6 | 461132 | 595818 | GLACE BAY, NS (STUDIO) | 13 | 18.2 | 327.3 | 13 | | VFS780 | 5042622 | GLACE BAY (TX SITE) | 82.47 | 33.43 | Coastal Community Radio Co-operative | 5042620 | VFS779 |
| 13 | 956.875 | | 6 | 460715 | 601416 | SYDNEY, NS (5 DETHERIDGE DR.) | 15 | 18.2 | 246.7 | 12 | | VFF982 | 5061839 | COXHEATH, NS | 105.99 | 13.18 | CKCH-FM/CHRK-FM C/O Newcap Inc. Attention: Dave Newbury | 5061837 | VFF981 |
| 14 | 958.875 | | 6 | 460715 | 601416 | SYDNEY, NS (5 DETHERIDGE DR.) | 15 | 18.2 | 246.7 | 10 | | VFF455 | 5061831 | COXHEATH, NS | 105.99 | 13.18 | CKCH-FM/CHRK-FM C/O Newcap Inc. Attention: Dave Newbury | 5061829 | VFF754 |
| 15 | 959.5 | | 6 | 460821 | 601140 | SYDNEY, NOVA SCOTIA | 20 | 22 | 3.5 | 15 | | | 2616969 | SYDNEY | 95.66 | 16.09 | CICB C/O MARITIME BROADCASTING SYSTEM LTD. | 2616967 | CJX713 |
| 16 | 1030 | 1090 | 6 | 460535 | 602616 | SYDNEY(MACAULAY LAKE), NOVA SCOTIA | 22 | 27 | 0 | 18 | | | | | 202.16 | 7.27 | NAV CANADA CNS ENGINEERING | 3537581 | XLW800 |
| 17 | 1442.75 | 1509.25 | 6 | 455030 | 601137 | GABARUS, NOVA SCOTIA | 25 | 17 | 199.4 | 25 | | XMZ281 | 4681217 | FOURCHU | 155.01 | 38.25 | BELL ALIANT REGIONAL COMM. INC. Attn Karen Bradbury- Contract Mgt. | 4681215 | XMZ280 |
| 18 | 2293 | 2393 | 6 | 455912 | 605119 | GRASS COVE, NS | 91 | 35.1 | 241.3 | 49 | | XKH296 | 3737563 | GLENDALE | 242.19 | 39.57 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737565 | XKH298 |
| 19 | 2299 | 2399 | 6 | 460901 | 602445 | BARACHOIS, NS (MTS ALLSTREAM SITE) | 49 | 32.2 | 80.5 | 47 | | XKH299 | 3737567 | SYDNEY, NS | 244.92 | 0.87 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737569 | XKH297 |
| 20 | 2399 | 2299 | 6 | 461036 | 601056 | SYDNEY, NS | 91 | 32.2 | 260.7 | 18 | | XKH297 | 3737569 | BARACHOIS(AT&T), NS | 81.32 | 17.14 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737567 | XKH299 |
| 21 | 3690 | 3970 | 6 | 460615 | 601628 | COXHEATH, NOVA SCOTIA | 42 | 41 | 350.1 | 40 | | CGJ609 | 2855305 | SMOKEY MOUNTAIN | 119.13 | 11.28 | BELL ALIANT REGIONAL COMM. INC. Attn Karen Bradbury- Contract Mgt. | 2855307 | CGJ610 |
| 22 | 3770 | 4050 | 6 | 460615 | 601628 | COXHEATH, NOVA SCOTIA | 42 | 41 | 350.1 | 40 | | CGJ609 | 2855305 | SMOKEY MOUNTAIN | 119.13 | 11.28 | BELL ALIANT REGIONAL COMM. INC. Attn Karen Bradbury- Contract Mgt. | 2855307 | CGJ610 |
| 23 | 3810 | 4150 | 6 | 460615 | 601628 | COXHEATH, NOVA SCOTIA | 42 | 41 | 350.1 | 40 | | CGJ609 | 2855305 | SMOKEY MOUNTAIN | 119.13 | 11.28 | BELL ALIANT REGIONAL COMM. INC. Attn Karen Bradbury- Contract Mgt. | 2855307 | CGJ610 |
| 24 | 5620 | 5620 | 6 | 455658 | 601219 | MARION, NS. WTHR RDR. (XMB) | 18 | 43 | | 20 | 1.1 | | | | 146.13 | 27.32 | Environment Canada Attn: Mgr - National Radar Program | 4848345 | CZJ424 |
| 25 | 5878.875 | 5912.375 | 6 | 455948 | 602725 | CHRISTMAS ISLAND, NS | 90 | 42.7 | 229.8 | 38 | | XMZ264 | 4668047 | ARICHAT, NS | 193.62 | 17.95 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4668049 | XMZ265 |
| 26 | 5878.875 | 5912.375 | 6 | 461014 | 603944 | SOUTH HAVEN, NS | 91 | 40.8 | 216.2 | 49 | | XKH298 | 3737565 | GRASS COVE | 275.47 | 20.11 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4919359 | VEL891 |
| 27 | 5912.375 | 5878.875 | 6 | 455912 | 605119 | GRASS COVE, NS | 91 | 40.8 | 36 | 49 | | VEL891 | 4919359 | SOUTH HAVEN | 242.19 | 39.57 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737565 | XKH298 |
| 28 | 6093.45 | 6345.49 | 6 | 455803 | 595921 | LOUISBOURG, NOVA SCOTIA | 91 | 40.8 | 304.5 | 53 | | VEL408 | 4898944 | COXHEATH | 122.85 | 38 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4900894 | VEL421 |
| 29 | 6093.45 | 6345.49 | 6 | 455912 | 605119 | GRASS COVE, NS | 91 | 40.8 | 36 | 49 | | VEL891 | 4919359 | SOUTH HAVEN, NS | 242.19 | 39.57 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737565 | XKH298 |
| 30 | 6093.45 | 6345.49 | 6 | 461303 | 602838 | BOULARDERIE, NS | 90 | 40.8 | 101.2 | 62 | | XKH299 | 3737567 | SYDNEY, NS | 320.93 | 9.15 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4668045 | XMZ263 |

| | | | | | | | | | | | | | | | | | | |
|----|---------|---------|---|--------|--------|------------------------------------|----|------|-------|----|--------|---------|---------------------------|--------|-------|--|---------|--------|
| 31 | 6110.75 | 6362.79 | 6 | 455948 | 602725 | CHRISTMAS ISLAND, NS | 90 | 40.8 | 54.6 | 64 | VFE878 | 5000655 | SYDNEY, NS- GRAND LAKE RD | 193.62 | 17.95 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4668049 | XMZ265 |
| 32 | 6345.49 | 6093.45 | 6 | 460612 | 601625 | COXHEATH, NS | 91 | 40.8 | 124.3 | 50 | VEL421 | 4900894 | LOUISBOURG | 119.38 | 11.38 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4898944 | VEL408 |
| 33 | 6345.49 | 6093.45 | 6 | 461014 | 603944 | SOUTH HAVEN, NS | 91 | 40.8 | 216.1 | 49 | XKH298 | 3737565 | GRASS COVE, NS | 275.47 | 20.11 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4919359 | VEL891 |
| 34 | 6345.49 | 6093.45 | 6 | 461036 | 601056 | SYDNEY, NS | 91 | 40.8 | 281.4 | 44 | XMZ263 | 4668045 | BOULARDERIE, NS | 81.32 | 17.14 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737567 | XKH299 |
| 35 | 6362.79 | 6110.75 | 6 | 461006 | 600630 | SYDNEY, NS (GRAND LAKE RD) | 70 | 40.8 | 234.8 | 65 | XMZ265 | 4668049 | CHRISTMAS ISLAND, NS | 85.76 | 22.69 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 5000655 | VFE878 |
| 36 | 6435 | 6775 | 6 | 455912 | 605119 | GRASS COVE, NS | 91 | 40.8 | 250.2 | 65 | VEM409 | 4935863 | WHYCOCOMAGH, NS | 242.19 | 39.57 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737565 | XKH298 |
| 37 | 6785 | 6445 | 6 | 460901 | 602445 | BARACHOIS, NS (MTS ALLSTREAM SITE) | 49 | 45.4 | 233.8 | 51 | CGJ421 | 4812119 | MARBLE MOUNTAIN, NS | 244.92 | 0.87 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737569 | XKH297 |
| 38 | 6815 | 6475 | 6 | 460901 | 602445 | BARACHOIS, NS (MTS ALLSTREAM SITE) | 49 | 45.4 | 233.8 | 51 | CGJ421 | 4812119 | MARBLE MOUNTAIN, NS | 244.92 | 0.87 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737569 | XKH297 |
| 39 | 6905 | 6565 | 6 | 460901 | 602445 | BARACHOIS, NS (MTS ALLSTREAM SITE) | 49 | 45.4 | 233.8 | 51 | CGJ421 | 4812119 | MARBLE MOUNTAIN, NS | 244.92 | 0.87 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737569 | XKH297 |
| 40 | 7163.75 | 7338.75 | 6 | 461411 | 600222 | LINGAN, NS | 48 | 42.5 | 293.1 | 45 | XOA848 | 5142399 | POINT ACONI, NS | 71.62 | 29.4 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 819187 | XOA362 |
| 41 | 7208.75 | 7383.75 | 6 | 460325 | 602712 | REAR BOISDALE, NS | 59 | 40.5 | 118.8 | 59 | VFE830 | 5052314 | WOODBINE | 200.15 | 11.45 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5052316 | VFE826 |
| 42 | 7208.75 | 7383.75 | 6 | 460325 | 602712 | REAR BOISDALE, NS | 59 | 43 | 225.2 | 59 | VFE827 | 5052308 | OBAN, NS | 200.15 | 11.45 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5052316 | VFE826 |
| 43 | 7338.75 | 7163.75 | 6 | 461917 | 601947 | POINT ACONI, NS | 59 | 42.5 | 112.9 | 45 | XOA362 | 819187 | LINGAN | 16.61 | 19.47 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5142399 | XOA848 |
| 44 | 7338.75 | 7163.75 | 6 | 461917 | 601947 | POINT ACONI, NS | 59 | 43 | 341.1 | 39 | XOA361 | 749324 | WRECK COVE | 16.61 | 19.47 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5142399 | XOA848 |
| 45 | 7383.75 | 7208.75 | 6 | 455923 | 601642 | WOODBINE, NS | 46 | 40.5 | 298.9 | 46 | VFE826 | 5052316 | REAR BOISDALE, NS | 152.28 | 20.58 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5052314 | VFE830 |
| 46 | 7488.75 | 7638.75 | 6 | 461411 | 600222 | LINGAN, NS | 48 | 42.5 | 293.1 | 45 | XOA848 | 5142399 | POINT ACONI, NS | 71.62 | 29.4 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 819187 | XOA362 |
| 47 | 7533.75 | 7683.75 | 6 | 460325 | 602712 | REAR BOISDALE, NS | 59 | 40.5 | 118.8 | 59 | VFE830 | 5052314 | WOODBINE | 200.15 | 11.45 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5052316 | VFE826 |
| 48 | 7533.75 | 7683.75 | 6 | 460325 | 602712 | REAR BOISDALE, NS | 59 | 43 | 225.2 | 59 | VFE827 | 5052308 | OBAN, NS | 200.15 | 11.45 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5052316 | VFE826 |
| 49 | 7638.75 | 7488.75 | 6 | 461917 | 601947 | POINT ACONI, NS | 59 | 42.5 | 112.9 | 45 | XOA362 | 819187 | LINGAN | 16.61 | 19.47 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5142399 | XOA848 |
| 50 | 7638.75 | 7488.75 | 6 | 461917 | 601947 | POINT ACONI, NS | 59 | 43 | 341.1 | 39 | XOA361 | 749324 | WRECK COVE | 16.61 | 19.47 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5142399 | XOA848 |
| 51 | 7683.75 | 7533.75 | 6 | 455923 | 601642 | WOODBINE, NS | 46 | 40.5 | 298.9 | 46 | VFE826 | 5052316 | REAR BOISDALE, NS | 152.28 | 20.58 | NOVA SCOTIA POWER CUSTOMER OPERATIONS - RAL | 5052314 | VFE830 |
| 52 | 7800 | 8100 | 6 | 461036 | 601056 | SYDNEY, NS | 91 | 41 | 81.2 | 85 | XMZ290 | 4737984 | GLACE BAY, NS | 81.32 | 17.14 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737567 | XKH299 |
| 53 | 8100 | 7800 | 6 | 461156 | 595839 | GLACE BAY, NS | 45 | 41 | 261.2 | 42 | XKH299 | 3737567 | SYDNEY, NS | 81.09 | 33.09 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4737984 | XMZ290 |
| 54 | 10552.5 | 10617.5 | 6 | 460901 | 602445 | BARACHOIS, NS (MTS ALLSTREAM SITE) | 49 | 43.5 | 115.9 | 41 | VEL408 | 4898944 | COXHEATH, NS | 244.92 | 0.87 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737569 | XKH297 |
| 55 | 10617.5 | 10552.5 | 6 | 460612 | 601625 | COXHEATH, NS | 91 | 39.9 | 296 | 55 | XKH297 | 3737569 | Barachois | 119.38 | 11.38 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4898944 | VEL408 |
| 56 | 10725 | 11215 | 6 | 461336 | 601440 | SYDNEY MINES, NS | 90 | 44 | 189.3 | 40 | VEL408 | 4898944 | COXHEATH, NS | 56.17 | 14.61 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4912384 | VEL719 |
| 57 | 10725 | 11215 | 6 | 461416 | 600553 | NEW WATERFORD, NS (ALIAN SITE) | 60 | 40.4 | 224.1 | 42 | XKH299 | 3737567 | SYDNEY, NS | 68.1 | 25.21 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4956120 | CIL738 |
| 58 | 10735 | 11225 | 6 | 461156 | 595839 | GLACE BAY, NS | 45 | 40.4 | 251.4 | 44 | VFE878 | 5000655 | SYDNEY @GRAND LAKE RD | 81.09 | 33.09 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4737984 | XMZ290 |

| | | | | | | | | | | | | | | | | | | |
|----|----------|----------|---|--------|--------|----------------------------------|-----|------|-------|----|--------|---------|--------------------------|--------|-------|--|---------|--------|
| 59 | 11215 | 10725 | 6 | 460612 | 601625 | COXHEATH, NS | 91 | 44 | 9.3 | 35 | VEL719 | 4912384 | SYDNEY MINES, NS | 119.38 | 11.38 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4898944 | VEL408 |
| 60 | 11215 | 10725 | 6 | 461036 | 601056 | SYDNEY, NS | 91 | 40.4 | 44.1 | 46 | CJL738 | 4956120 | NEW WATERFORD, NS | 81.32 | 17.14 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737567 | XKH299 |
| 61 | 11225 | 10735 | 6 | 461006 | 600630 | SYDNEY, NS (GRAND LAKE RD) | 70 | 44 | 71.3 | 65 | XMZ290 | 4737984 | GLACE BAY | 85.76 | 22.69 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 5000655 | VFE878 |
| 62 | 14258.75 | 11806.25 | 6 | 460937 | 600254 | SYDNEY (85YA), NS | 3 | 46 | 239.8 | 3 | | | | 88.31 | 27.27 | Telesat Canada - Domestic Coord & Licensing Attn: Richard Thommes | 3785299 | CY534 |
| 63 | 14855 | 15330 | 6 | 461336 | 601440 | SYDNEY MINES, NS | 90 | 46.3 | 139.6 | 33 | XKH299 | 3737567 | SYDNEY, NS | 56.17 | 14.61 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4912384 | VEL719 |
| 64 | 15330 | 14855 | 6 | 461036 | 601056 | SYDNEY, NS | 91 | 42.7 | 319.6 | 40 | VEL719 | 4912384 | SYDNEY MINES, NS | 81.32 | 17.14 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737567 | XKH299 |
| 65 | 18667.5 | 19007.5 | 6 | 461036 | 601056 | SYDNEY, NS | 91 | 44.6 | 43.5 | 44 | CJL738 | 4956120 | NEW WATERFORD, NS | 81.32 | 17.14 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 3737567 | XKH299 |
| 66 | 19007.5 | 18667.5 | 6 | 461416 | 600553 | NEW WATERFORD, NS (ALIAN SITE) | 60 | 44.6 | 223.6 | 44 | XKH299 | 3737567 | SYDNEY, NS | 68.1 | 25.21 | ROGERS COMMUNICATIONS PARTNERSHIP ATTN: M VUJOSEVIC, TRANSMISSION ENG | 4956120 | CJL738 |
| 67 | | 956.125 | 6 | 461159 | 595843 | GLACE BAY, NS (TRANSMITTER SITE) | 25 | | | | VFS779 | 5042620 | GLACE BAY (STUDIO) | 80.91 | 33.02 | Coastal Community Radio Co-operative | 5042622 | VFS780 |
| 68 | | 956.875 | 6 | 460555 | 601844 | COXHEATH, NS (CKCH-FM TX SITE) | 110 | | | | VFF981 | 5061837 | SYDNEY, NS (CKCH STUDIO) | 131.37 | 9.25 | CKCH-FM/CHRK-FM C/O Newcap Inc. Attention: Dave Newbury | 5061839 | VFF982 |
| 69 | | 958.875 | 6 | 460555 | 601844 | COXHEATH, NS (CHRK FM TX SITE) | 110 | | | | VFF754 | | 5 DETHERIDGE DR. SYDNEY | 131.37 | 9.25 | CKCH-FM/CHRK-FM C/O Newcap Inc. Attention: Dave Newbury | 5061831 | VFF755 |
| 70 | | 959.5 | 6 | 461050 | 601127 | SYDNEY(CJCB FM TX SITE), NS | 20 | | | | CJX713 | 2616967 | SYDNEY | 79.5 | 16.55 | CJCB C/O MARITIME BROADCASTING SYSTEM LTD. | 2616969 | XNR38 |
| 71 | | 3840 | 6 | 460720 | 601147 | SYDNEY, NOVA SCOTIA | 6 | | | | | | | 102.34 | 16.24 | CBC MONCTON ATT: TRANSMISSION SERVICES | 2815932 | |
| 72 | | 4020 | 6 | 460719 | 601023 | SYDNEY (SD2), NS | 8 | | | | | | | 101.2 | 18 | CTV INC. ATTN: YUL LEM (PEIN# 6057062) | 3086133 | |
| 73 | | 4040 | 6 | 460720 | 601147 | SYDNEY, NOVA SCOTIA | 6 | | | | | | | 102.34 | 16.24 | CBC MONCTON ATT: TRANSMISSION SERVICES | 2815932 | |
| 74 | | 4080 | 6 | 460720 | 601147 | SYDNEY, NOVA SCOTIA | 6 | | | | | | | 102.34 | 16.24 | CBC MONCTON ATT: TRANSMISSION SERVICES | 2815932 | |
| 75 | | 4180 | 6 | 460720 | 601147 | SYDNEY, NOVA SCOTIA | 6 | | | | | | | 102.34 | 16.24 | CBC MONCTON ATT: TRANSMISSION SERVICES | 2815932 | |

Appendix K:
Complaint Resolution Plan

Formal complaints procedure for Natural Forces Wind Inc. Barrachois Wind Farm

Natural Forces Wind Inc. is committed to addressing any public concerns regarding Barrachois Wind Farm in Barrachois in the Cape Breton Regional Municipality. The intention is that this policy can inform the public on the ways that they can communicate their concerns to Natural Forces Wind Inc., and how complaints will be addressed.

1.0 PURPOSE

The purpose of this policy is to ensure all public complaints are dealt with consistently and effectively. Natural Forces Wind Inc. aims to:

- Manage complaints openly, promptly and properly;
- Try to resolve complaints as soon as possible; and
- Learn from complaints and improve our services.

2.0 SCOPE

This policy will address any complaint; written or spoken expression of dissatisfaction.

3.0 PROCEDURE

All complaints of the Barrachois Wind Farm will be directed to the Project Manager, Andy MacCallum:

Andy MacCallum | VP Developments
Natural Forces Wind Inc.
1801 Hollis Street | Suite 1205 | Halifax | NS | B3J 3N4
Tel: +1 902 422 9663 x 214
Fax: +1 902 425 7840
For more information please refer to Natural Forces Wind Inc. website
www.naturalforces.ca

Complainant will be notified upon receipt of the complaint. The Project Manager will investigate complaints within 20 days of receiving the complaint; upon which complainant will be notified of how the concern was or will be addressed.



3.1 Noise

Complaints dealing with noise will be assessed on whether noise monitoring is necessary.

If there are several complaints regarding noise from the Barrachois Wind Farm, then a noise monitoring program may be implemented.

Ways on reducing noise will be discussed with the wind farm operators.

Complainant(s) will be informed of noise mitigation strategies and will be contacted within a year of implemented noise reduction strategies on the success of the noise reduction strategy. This will help address any noise issues that may arise from the Barrachois Wind Farm.

3.2 Construction and Operation

Complaints regarding operation and construction activities will be discussed with workers or contractors involved.

Solutions to the complaints will be established with worker(s) and contractor(s). Complainant will be informed of how issue was addressed.

If complaints persist, then worker(s) and contractor(s) may be dismissed.

4.0 CLOSURE

If the complainant is not satisfied with the initial response, the complaint will be referred to a higher authority within the company to further resolve the issue.



Appendix L:
Stakeholder Consultation

| Date | Person Contacted | Band/Organization | Method of Communication | Content |
|--------------------|--|---|--------------------------------|---|
| September 15, 2011 | Twila Gaudet, Consultation Liaison Officer | Kwilmu'kw Maw-Klusuaqn Negotiation Office | Letter | Initial engagement efforts with Mi'kmaq communities |
| November 1, 2011 | Twila Gaudet, Consultation Liaison Officer | Kwilmu'kw Maw-Klusuaqn Negotiation Office | Letter | Invitation to first public meeting |
| November 1, 2011 | Norman Francis Bernard, Chief | Wagmatcook First Nation | Letter | Invitation to first public meeting |
| November 1, 2011 | Terry Paul, Chief | Membertou First Nation | Letter | Invitation to first public meeting |
| November 1, 2011 | Leyroy Denny, Chief | Eskasoni First Nation | Letter | Invitation to first public meeting |
| August 20, 2013 | Norman Francis Bernard, Chief | Wagmatcook First Nation | Letter | Project Update |
| August 20, 2013 | Terry Paul, Chief | Membertou First Nation | Letter | Project Update |
| August 20, 2013 | Leyroy Denny, Chief | Eskasoni First Nation | Letter | Project Update |
| September 6, 2013 | Norman Francis Bernard, Chief | Wagmatcook First Nation | Letter | Invitation to second public meeting |
| September 6, 2013 | Terry Paul, Chief | Membertou First Nation | Letter | Invitation to second public meeting |
| September 6, 2013 | Leyroy Denny, Chief | Eskasoni First Nation | Letter | Invitation to second public meeting |

| Date | Person Contacted | Department / Agency | Method of Communication | Content |
|--------------------|---|--|-------------------------|---|
| Municipal | | | | |
| March 25, 2011 | Malcolm Gillis, Planner & Wayne MacDonald, Director of Engineering & Public Works | Cape Breton Regional Municipality | Meeting | Introduction of company and proposed HBWF project |
| May 25, 2011 | Malcolm Gillis & Doug Foster, Planning Department | Cape Breton Regional Municipality | Meeting | Requirements for COMFIT and WTG land use bylaw update |
| August 30, 2011 | Malcolm Gillis, Planner | Cape Breton Regional Municipality | Letter | Support from CRBM and land use/zoning verification |
| Provincial | | | | |
| November 7, 2012 | Steve Sanford | Nova Scotia Environment – EA Branch | Meeting | Discussed EA process, forming CLC, health Canada study and EA scoping. |
| November 27, 2013 | Mark Elderkin & Peter MacCullins | Nova Scotia Environment | Meeting | Species at risk – lynx & marten / timing of avian studies |
| September 12, 2013 | Terry Power, Regional Wildlife Biologist | NS Department on Natural Resources | Meeting | Discusses recovery plan & species management plan for lynx & marten Also discussed bat hibernacula locations |
| September 13, 2012 | Mark Elderkin, Species at Risk | NS Department of Natural Resources | Meeting | Discussed approach to addressing lynx and marten in EA |
| April 2, 2014 | Steve Sanford & Bridget Tutty – | NS EA Branch – Nova Scotia Environment | Meeting | EA registration & mitigation measures |

| Date | Person Contacted | Department / Agency | Method of Communication | Content |
|--------------------|--|---|--------------------------------|---|
| Federal | | | | |
| November 14, 2012 | Adin Switzer, AEC Liaison Officer | Government of Canada, National Defence | Email | No interference with DND radar and airport facilities |
| September 18, 2012 | Mario Lavoie, Spectrum Engineering Technician | Government of Canada, Department of National Defence | Email | No interference with radio communications |
| September 18, 2012 | Carolyn Rennie, National Radar Program | Environment Canada, Meteorological Service of Canada | Email | No severe interference with meteorological radar systems |
| September 18, 2012 | Martin Gregoire | Canadian Coast Guard | Email | No interference with radar |

Appendix M:
Consultant CV



Christopher M. Milley, M.Sc., MMM **Senior Environmental Consultant, Dartmouth, NS**

Professional Summary

Chris Milley is a resource manager with over 25 years of experience working in cross cultural environments. Mr. Milley has managed resource and environmental management projects in the Caribbean, Central America and with the First Nations in Atlantic Canada. Mr. Milley has liaised actively with regional and national First Nations organizations, international agencies and organisations, such as the Assembly of First Nations, the UNPFII, UN FAO and UNESCO's Intergovernmental Oceanographic Commission, and co-ordinated co-operative support for international development assistance projects. He has been a delegate at the UN Economic and Social Council's Permanent Forum on Indigenous Issues

Mr. Milley specializes in working with Indigenous communities in the design, and implementation of species inventories and community-based resource management activities that promote sustainable social and economic development. Mr. Milley teaches Fisheries Management, and special courses on Indigenous Resource Management in the Faculty of Graduate Studies at Dalhousie University.

Relevant Experience

Environmental Project Management

Mr. Milley brings to this project an intimate familiarity of the local environmental issues of communities in Nova Scotia with a specific emphasis of the relationships between tradition, culture and local environment. Chris has a dept of knowledge and experience working with projects that have a potential impact on local and First Nation communities, particularly in identification of traditional resource use practices, harvesting areas and mapping traditional knowledge. Chris has worked with a number of resource development and management projects and organizations, including: the Eskasoni Fish and Wildlife Commission, the Mi'kmaq Fish and Wildlife Commission, where he served as Executive Director and the Atlantic Policy Congress as a fishery policy analyst, the Acadia Band in SW Nova Scotia as Director of their Fisheries Program, and with the Mi'kmaq Confederacy of PEI as Director of Integrated Resource Management.

Relevant Projects

Traditional Knowledge Study

Designed, implemented and managed a Traditional Ecological Knowledge Study for the Sable Offshore Energy Inc. Natural Gas Liquids (NGL) Pipeline Corridor (Goldboro to Point Tupper).

Fishermen and Scientist Research Society Conference

Coordinated the development and incorporation of the Fishermen and Scientist Research Society, a community-oriented research group involved in fishery research. Also organized an inaugural conference of the FSRS

Coastal Communities Network Workshop

Organized and facilitated a Coastal Communities Network workshop on Community-based Co-management. Also presented an overview of fisheries co-management concepts and principles to conference participants from municipal governments, fishery organization and ENGOs.

Years with AMEC: 3
Years Experience: >27

Education

Dalhousie University, 1995 (Masters of Marine Management)

Dalhousie University, 1983 (Master of Science (Oceanography))

Mount Allison University, 1979 (Bachelor of Science)

Training

Negotiation Skills, Conflict Management Group, Cambridge, MA

Meeting Facilitation, Saint Mary's University, 2002

Introduction to MapInfo Professional, Baseline Business Geographics, 1998

Middle Management Orientation Program, Public Service Commission, Ottawa, 1990

Project Management by Activity, Bureau of Management Consultants, Supply and Services Canada, Georgetown, Guyana, 1990

Resource Systems and Economic Development, Institute for Resource and Environmental Studies, Dalhousie University, 1985



Research on traditional management systems

Collaborated in the design and managed First Nation inputs to a collaborative research project with St. FX. This project, Social Research for Sustainable Fisheries, involved inter-community research on customary decision-making systems.

Coastal Traditional Resources Mapping Program – Bras D’or Lakes, Eskasoni First Nation

Managed and implemented a community-based coastal mapping program with the Eskasoni First Nation for the Bras D’or Lakes region of Cape Breton. This project involved organizing field data collection activities, designing information presentations systems (including GIS), and conducting community workshops throughout the Bras D’or Lakes region.

First Nations Renewable Energy Development

Assisted the Mi’kmaq First Nations on Prince Edward Island in the review and development of an alternative energy strategy that build upon available wind technology and ethanol production.

Teaching materials and Course delivery - Integrated Coastal Zone Management: A community perspective

Prepared a text and teaching modules for a short course on Integrated Coastal Zone Management for community organizations in Spain and delivered the course during a spring semester of the University of Las Palmas de Gran Canaria, Spain

Training Needs Assessment

Managed a study to assess the training needs and job/task analysis of the Lennox Island and Abegweit First Nations’ fisheries as part of an ongoing DFO funded initiative to determine the long-term and short term training needs that can be effectively addressed through an at-sea mentoring program.

Fisheries Management Program, Prince Edward Island First Nations

Designed and managed a Federal government funded program to enhance the institutional and administrative fisheries management capacity within the PEI First Nations

Study on Environmental Contaminants in the Food Fishery

Designed and managed a small project undertaken with the support of Health Canada to examine the presence of common environmental contaminants, including heavy metals, in the food fishery resources commonly consumed in First Nations Communities in PEI



Maureen Cameron-MacMillan, M.Sc. Environmental Scientist - Sydney, NS

Professional Summary

Ms. Maureen Cameron-MacMillan, M.Sc., is an environmental scientist with a wide variety of experience in the environmental field. She has over seven years of academic and consulting experience conducting terrestrial surveys, including bat surveys and breeding and migrating bird surveys, throughout eastern Canada. Ms. Cameron-MacMillan has worked on a number of environmental impact assessments and screenings under CEAA. She has several years of aquatic field experience in freshwater fish population surveys, stream and lake habitat assessments, and surface water sampling programs. As well, she is active in local nature societies and participates in volunteer-based survey programs including the Cape Breton Nocturnal Owl Survey, Maritimes Breeding Bird Atlas, Maritimes Butterfly Atlas, and Atlantic Canada Shorebird Survey.

Professional Associations

Member, Canadian Society of Environmental Biologists

Relevant Experience

Bird Surveys

Ms. Cameron-MacMillan has over 9 years of ornithological field work in consulting, academic, and volunteer settings, including five years' participation in the Maritimes Breeding Bird Atlas. She has conducted nest surveys for breeding birds, owl and early woodpecker surveys, and breeding and migrating bird surveys in Nova Scotia and elsewhere in eastern Canada.

Environmental Impact Assessment

Ms. Cameron-MacMillan has assisted in the preparation of EIAs since 2006, including conducting and assisting with various field surveys, collection of information on ecological components of proposed work sites and identification of mitigation measures. Ms. Cameron-MacMillan has also participated in the preparation of several screenings under the Canadian Environmental Assessment Act since 2005.

Relevant Projects

2011 Field Scientist, Biological Inventory, Effects Assessment, and Mitigation and Monitoring Recommendations for Reopening of a Tailings Pond: Desktop review and field surveys for terrestrial fauna, including targeted surveys for breeding birds, herpetiles and bats, in the proposed tailings area and adjacent land. Ms. Cameron-MacMillan was responsible for conducting bird surveys during early and late breeding season and assisted with bat and herpetile surveys; as well, she participated in preparation of a report summarizing desktop and field data and providing monitoring and mitigation recommendations for terrestrial fauna and habitat.

2010 Baseline Field Investigations for Fairmont Wind Farm Proposal Environmental Assessment: As part of the baseline data collection for an environmental assessment of a small (2 turbine) proposed wind farm, participated in baseline acoustic surveys for bats in the proposed wind farm footprint.

2009 – 2010 Project Manager and Field Scientist, Bird and Plant Species Inventory for Proposed Radar Array: Conducted bird surveys for a proposed Defence Construction Canada radar array throughout main breeding and migration periods, as well as surveys for wintering waterfowl. Field work included auditory and visual surveys (point counts and area searches) in the project area and along the proposed access route.

2010 Field Scientist, Terrestrial Fauna Surveys for Proposed Quarry: Conducted surveys of breeding birds and migrating passerines and shorebirds within the footprint of a proposed quarry, and assisted with odonate surveys. Point counts and area searches were conducted in the project area.

Years with AMEC: 8
Years Experience: 10

Education

Memorial University of Newfoundland, M.Sc.,
Cognitive and Behavioural Ecology, 2003

Mount Allison University,
Sackville, NB, B.Sc.,
Biopsychology (Honours),
2000

Screenings Under the
Canadian Environmental
Assessment Act Course,
Halifax, NS, 2005

Backpack Electrofishing
Certificate Course, 2007

Davis MacIntyre & Associates

Contact Details

109 John Stewart Drive
Dartmouth, Nova Scotia
Canada, B2W 4J7
Tel: 902.402.4441
Fax: 902.444.2854
E-mail: darch@eastlink.ca
www.davismacintyre.com

Company Details

Davis MacIntyre & Associates Limited was established in 2009 and previously operated as Davis Archaeological Consultants Limited. We are leaders in the cultural resource management discipline in the Atlantic Region. Our staff has over 50 years of combined experience in the field of archaeology. We provide comprehensive professional services in undertaking archaeological and historical cultural resource assessments for government, public, and private industry. We are committed to excellence and pride ourselves on offering our clients value-added services to meet modern environmental and development standards.

(Source: <http://www.davismacintyre.com/>)