28 April 2013

Hon. Sterling Belliveau
Nova Scotia Environment
PO BOX 442
Halifax, NS
B3J 2P8

RE: Addendum to McLellans Brook Wind Energy Project Registration Document

Dear Minister Belliveau,

Please find attached the addendum to the originally submitted registration document completed for the Class 1 environmental assessment of the Community Feed In Tariff wind energy project in McLellan's Brook, originally submitted January 29th, 2013.

As per your letter of March 19th, 2013, it was determined that further information was required before a decision on the project could be rendered.

On Monday, April 8, 2013 a meeting was held with Watts Wind and representatives from NSE and NSDNR to further clarify details of the additional information required.

The following document (including Appendices) outlines our response to NSE's request for additional information.

Please feel free to contact us if any questions or clarification.

Sincerely,

Paul Pynn, Vice-President
Watts Wind Energy Inc.

1.0 Introduction

Watts Wind Energy Inc is proposing to construct a 6 MW wind generating facility near McLellans Brook, i.e., the McLellans Brook Wind Farm (MBWF or the Project). The Project is part of the Community Feed-In-Tariff program with commissioning of the Project proposed in late 2013. The Project is a Class I undertaking under the NS Environmental Assessment Regulations and as such, requires an Environmental Assessment (EA) as identified under Schedule A of the Regulations. On January 29th, 2013 Watts Wind Energy Inc. submitted the MBWF EA Registration Document to Nova Scotia Environment (NSE). The registration document was completed according to the methodologies and requirements outlined in the "Proponent's Guide to Wind Power Projects: Guide for Preparing and Environmental Assessment Registration Document" (Nova Scotia Environment 2007, updated 2012). On March 19th, 2013, Watts Wind Energy received a letter from the NS Minister of Environment, Sterling Belliveau, advising that the registration information was insufficient to allow the Minister to make a decision and that more information was required. On April 8, 2013 Watts Wind personnel met with NSE and NSDNR to get further clarification on what additional information would be required. This Addendum contains the following additional information:

- Documentation from Dr. Hugh Broders, interpreting the results of the fall 2012 bat studies (Appendix A)
- Spring/fall 2012 bird migration surveys, summer 2012 breeding bird surveys and associated mapping (Appendix B)
- Mainland moose mapping (Appendix C)
- Project footprint mapping (Appendix D)

2.0 Bats

Dr. Hugh Broders conducted bat survey and monitoring activities during the fall of 2012. Results can be found in the MBWF EA registration document (Appendix 6 of the MBWF EA registration document). Attached in Appendix A is a letter from Dr. Broders which explains the following:

1) his interpretation of the data collected from the fall 2012 monitoring program including during the period of equipment malfunction.

2) his additional explanation on Broders et al desktop work on hibernacula

Watts Wind Energy Inc. is also participating with Dr. Broders on a regional assessment of the potential interaction of wind development with bat populations. The project is being partially funded by NSERC and St. Mary's University, in collaboration with industry partners.

3.0 Birds

Three separate avian bird studies were completed as per Canadian Wildlife Service (CWS) Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (Environment Canada, 2007a). As per the MBWF EA registration document, this work was led by Andy Horn of Dalhousie University with the field work completed by Ken McKenna, local ornithologist.

Each prospective turbine location waypoint was sent to the ornithologist responsible for performing the transect surveys and migration counts. On two occasions the proponent met with the ornithologist (Ken McKenna) to ensure surveying was being performed inside the project boundary. The figure in Appendix B shows the locations of the project bounds, the bird field survey points, and the turbine locations. Appendix B also contains the completed 2012 spring/fall migration surveys and the 2012 summer breeding bird surveys.

It should also be noted that a precautionary approach to site sensitivities based on CWS protocols were used. According to CWS, Category 1 is the lowest Level of Concern, Category 4 is the highest. Desktop data suggested that the project was at the lowest Level of Concern, but proposed field studies treated the site as being at a higher Level of Concern. Based on the field work completed, the site was concluded to be a Category 1.

4.0 Moose

Moose occupancy (home base) in a region can be defined by a boundary totalling 25km^2 (pers. conversation Mark Pulsifer, NSDNR). Mr. Pulsifer also noted that negative Pellet Group Inventory (PGI) results do not conclude that moose are not present in the area. Personal conversation with the property owner, an area resident for over 60 years who also produces maple sugar from the trees surrounding the project site, indicated that there have not been moose sited on his property since at least 60 years. The landowner noted an abundance of deer surrounding the project area.

The functional needs of moose are feeding, calving, mating, security and thermal refuge (NSDNR, 2012). Habitat features which provide such functional needs are described by DNR as: open, early succession areas for forage, browsing, closed/covered areas (for calving, security, foraging, thermal refuge) vegetated aquatic features (for foraging, thermal refuge and calving).

The development of the MBWF allows for the preservation of such habitat features based upon review of (NSDNR, 2012). Anthropogenic threats to moose populations include poaching, vehicle collisions, habitat loss and fragmentation and human access to moose habitat (NSDNR, 2012). The project site is located on private land, and a gate will be installed on the newly constructed access road, reducing human access to the area.

Climate change and acid rain have also been postulated as potential threats to mainland moose populations (NSDNR, 2007). Additionally, a deficiency of trace elements (e.g. copper, selenium, cobalt) or elevated levels of heavy metals (e.g. cadmium) can affect the physiology of moose and be expressed in many ways, including decreased reproduction and elevated calf mortality rates (NSDNR, 2007). The MBWF will reduce the overall amount of coal combustion (i.e., locally at Trenton power plant). A reduction in coal combustion will result in less harmful toxins being introduced into moose habitat (i.e., cadmium), and reduce the overall impacts of climate change.

The MBWF farm site is located in the eco-district known as the Pictou-Antigonish Highlands, an eco-district known to have suitable habitat for mainland moose populations (NSDRN, 2009b). Figure 1 displays the relative distribution of mainland moose populations around Nova Scotia. According to Figure 1 there are thought to be approximately 25 moose in the County of Pictou (NSDNR, 2007).

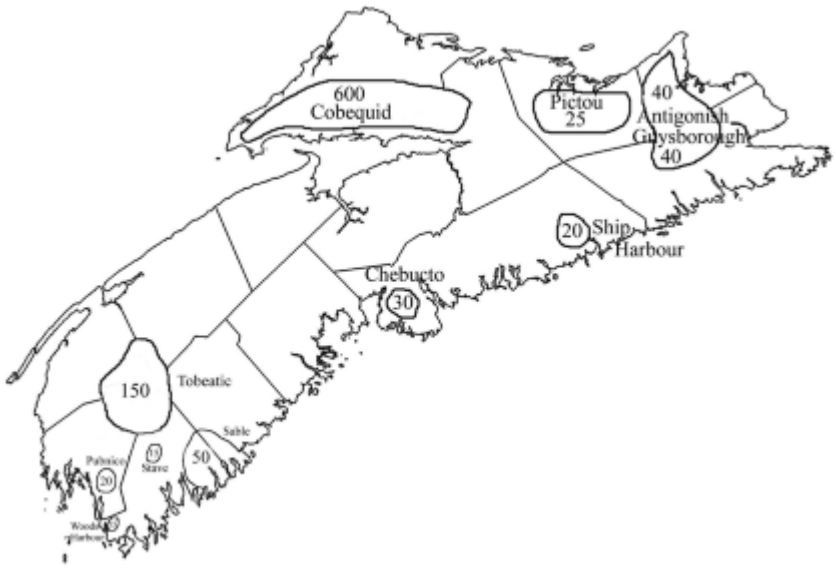


Figure 1: Relative Distribution of mainland moose populations (NSDNR, 2007)

According to the Mainland Moose Recovery Plan report, core areas of moose distribution on mainland Nova Scotia and approximate numbers are based upon personal interviews with regional biologists. Numerical estimates are based upon data collected using different methodologies. In addition to the

numbers referenced in Figure 1, another 150 moose scattered throughout Halifax, Guysborough and Pictou Counties provides a total estimate for mainland Nova Scotia of approximately 1200 moose (NSDNR, 2007).

Supplementary habitat information was provided by DNR and can be seen in Appendix C. The figure in Appendix C was derived from shapefiles provided by NSDNR regional biologist, Mark Pulsifer, and field studies completed by Jody Hamper. The DNR provided shapefile (Sig. Moose Conc. Area) shows possible moose habitat nearest the MBWF site. It should also be noted that typical moose habitat is known to be quite variable due to pressures imposed on conventional moose habitat due to human development (pers. conversation with Mark Pulsifer, 2013). Additional information was gathered from the Regional Biologist in Truro, Shavonne Meyers. According to compiled moose sighting data from DNR shapefiles, there were 6 sightings within 7km of the Project bounds, occurring between November 2002 and March 2009. For reasons of confidentiality, the precise locations of the moose sightings are not made public. A literature review of the nearest wind energy environmental assessment registration documents completed within 50kms of the MBWF site determined that each project performed PGI surveys for indirect detection of moose presence. The PGI method is used to detect indirect signs of moose presence such as tracks, browsing and pellets. April 2012 surveys (PGIs) completed by Jody Hamper determined that there was no signs of moose presence in the area of the MBWF (see figure in Appendix C).

In summary, the field work completed as presented in the Registration Document showed no evidence of moose; while this is does not confirm the absence of moose, it indicates low usage during the field work. This subsequent historical review and analysis of moose occupancy in the project area further supports the prediction of negligible residual environmental effects on moose as presented in the Registration Document in Section 6.3.

5.0 Project Footprint

Appendix D contains a map which defines the Project footprint. The original layout of the MBWF site as per Figure 3.1 in the Registration Document included the possible installation of an additional fifth turbine. It has been determined that the MBWF will include a maximum of four turbines, due to the fact that the remaining capacity on the distribution substation has been awarded to another proponent, (ie. the fifth turbine will not be installed). The determination of the Project footprint was done using numerous different factors, including:

- setback distances from houses and property lines
- project properties under option agreement
- separation distances for turbines to optimize energy capture, minimizing wake losses
- use of existing roads
- elevation contour lines
- Valued Environmental Components (VEC) identified during project scoping

The areas surveyed by the various consultants were both inside and outside of the boundary outlined in Appendix D. For example, the moose survey area was approximately 25 ha (likely 'home base area – refer to Section 4.0), and the survey area for breeding birds included the specific areas surrounding each turbine as well as the areas between each turbine.

In summary, the Project footprint has been refined to show conservative limits of the Project activities, and there are no plans for expansion. As the baseline studies were completed within the Project footprint, the results of the VEC analyses as presented in Section 6 of the Registration Document remain supported.

6.0 Wetlands

A. Survey History

The McLellan's Brook site was visited in June and August 2012 by Nick Hill and Jim Jotcham which can be found in the MBWF EA registration document, in Appendix 8. There were three basic goals; these and their outcomes are listed below:

1) Compile a list of all plants, knowing what rare species had been found in a larger radius (ACCDC) and understanding the possible occurrences of other rare plants based on the habitats present at site.

Outcome: Of 183 vascular plants, a minority were exotic (13 species) and one (the tender sedge) was Yellow-listed in Nova Scotia.

2) Determine whether rare or unusual plants occurred in the proposed turbine platform sites.

Outcome: no rare or unusual plants in turbine areas though as noted above tender sedge was noted; a minimum 50m buffer will be maintained.

3) Determine whether there were potential wetland areas in the above proposed sites.

Outcome: no wetland observed in the high elevation plateau areas proposed for wind turbine pads; additional verification is required to maintain the proposed 50m buffer when micro-siting is completed (see below).

B. Approach to Avoid Wetlands

In keeping with the approach of the Nova Scotia Wetland Conversation Policy (2011), the Proponent has proposed a plan to avoid wetlands by altering project design within the site footprint. Avoidance is the best choice of mitigation strategies.

A process for achieving wetland conservation through the application of a hierarchical progression of alternatives to the adverse effects of alterations. These alternatives include:

a) Avoidance of adverse effects;

b) Minimization of unavoidable adverse effects;

c) Compensation for adverse effects that cannot be avoided.

Based on initial delineation completed within the Project Footprint (see Figure 4.3 of the MBWF EA registration document), the Proponent committed to avoiding wetlands and further protection via a minimum buffer of 50m. The road layout and turbine placement as presented in the January 2013 Registration Document (Figure 4.3) was based on this initial delineation from two sites visits by qualified wetland delineators.

Additional micro-siting of the turbine pads and detailed design of the access road are planned for spring 2013. The Proponent has committed to additional delineation to ensure that wetlands are avoided and the 50m buffer is maintained. If there are any locations where maintenance of the 50m buffer is not feasible, the Proponent will submit to NSE: 1) additional wetland delineation (see below) and 2) assessment of design alternatives. Where wetland alteration is unavoidable, the Proponent will make an application for an approval from NSE before any alteration of a wetland under the Activities Designation Regulations (Section 5(a)) under the *Environment Act*.

C. Proposed Wetland Delineation Strategy: 2013

<u>Context</u>

The area of the proposed development is high elevation plateau in the watershed of Forbes Lake which in turn flows into the East River. The plateau area is largely well-drained and the gravelly and silty loam soils (Barney Soil type) support Alleghanian Element trees (e.g., sugar maple, beech, yellow birch, red maple). The soils are acidic and infertile (values for sugarbush at similar elevation in East River upland 9km distant = pH 4.7, Ca 225 ppm as per Hill and Garbary 2011).

Hill and Jotcham described three types of wetland areas present at the site (can be seen in Figure 4.3 of the MBWF EA document).

Seeps (small wet areas--unconfirmed whether hydric soils present);

Swamps (the largest wetlands in depressions); and

Stream associated (stream course and vernal pools where stream bed slope is relatively flat).

Wetland delineation

Delineation of wetlands will be conducted between late May and early fall (early October) and be carried out according to the Regional Supplement for the Northcentral and Northeast Region (2012). Proposed roadways will be walked and wetlands within the zone of potential interference by the proposed road will be identified and delineated using vegetation patterns, soils and signs of surface hydrology. Each discrete wetland area will be fully delineated and waypoint markers will be taken using a GPS unit at least at 15m intervals and more frequently where wetland boundaries are irregular or at small wetlands. Linear continuous wetlands associated with streams that cross the proposed roadways will be delineated for 50 metres on either side of the roadway. Each waypoint will be flagged with wetland tape. For each wetland, two sample plots that compare a wetland and its adjacent upland position will be described. The wetland to adjacent upland position should be less than 5m apart. Each wetland will have a record of a set of Wetland Determination data forms (U.S. Army Corps of Engineers, 2012) with the accompanying Nova Scotia Wetland Delineation Data Form for Soils (June 2012-Kevin Keys).

Flow Paths

Many of the wetlands in the area around the proposed turbines are associated with the flow path of this headwater section of McLellan's Brook. Wetlands along a section of this brook that initially flows south and southwest, were identified in the preliminary report (see Appendix 8 in MBWF EA Registration Document). Understanding this flow path and the wetland flows entering the watercourse will help site the road most efficiently from economic and ecological standpoints. This is important as it is the intent that the final design will avoid wetlands with the maintenance of the 50m buffer where feasible; if not feasible, the least impact design will be selected.

Reporting

The Proponent commits to submitting final design and wetland delineation to NSE/DNR prior to any clearing and grubbing. Communication with the local Environmental Monitoring and Compliance branch in Pictou County will be maintained throughout the entire process. As per Item B above, the Proponent will submit to NSE justification via review of alternatives if the 50m buffer cannot be maintained. Further, if any alteration of a wetland is required, the Proponent will submit an application for Wetland Alteration Approval as per the Activities Designation Regulations (Government of Nova Scotia, 2011a).

Figure 4.3 of the MBWF EA shows the completed field work completed to date, with the identified wetlands and proposed 50m buffer.

NAME OF PROPONENT:	Watts Wind Energy Inc.
DATE:	April 29, 2013
SIGNATURE:	
NAME:	Paul Pynn
TITLE:	Vice President
ADDRESS:	300 PRINCE ALBERT ROAD, DARTMOUTH, NS B2Y4J2

Bibliography

Environment Canada. (2007a). *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds.*

Government of Nova Scotia. (2011a, October 28). *Activities Designation Regulations*. Retrieved 11 12, 2012, from http://gov.ns.ca/just/regulations/regs/envactiv.htm

NSDNR. (2012). *Central Woodland Conference.* Truro.

NSDNR. (2007). *Recovery Plan for Moose (Alces alces Americana) in Nova Scotia.* Halifax.

NSDRN. (2009b, October 09). *Mainland Moose Frequently Asked Questions*. Retrieved November 12, 2012, from NSDNR: http://www.gov.ns.ca/natr/wildlife/large-mammals/mmoosefaq.asp#mm1

U.S. Army Corps of Engineers. (2012). *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region v2.0.* Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Appendix A - Bat documentation

SAINT MARY'S UNIVERSITY SINCE 1802
One University. One World. Yours.

Department of
Biology

16 April 2013

Re: Response on the request for additional information for MacLennan's Brook Bat studies.

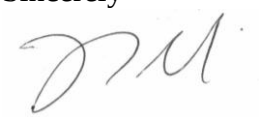
In a letter dated 4 March 2013 The Nova Scotia Department of Environment indicated that the Environmental Assessment in relation to bat studies for the MacLellans Brook Community Wind Farm was lacking in two areas. First, that the acoustic surveys were not conducted during the optimal window to detect bats (last week of August to second week of September). Second, that hibernacula in adjacent areas were not confirmed or refuted as being significant overwintering sites.

In response to the first point, data from my lab indicates that in Nova Scotia maternity roosts begin to break up and swarming at the entrance of hibernacula begins in early august. Swarming around hibernacula continues until October, with diminished activity after 20 September. In specific relation to this project, the surveys would have included the start of the swarming season (i.e., up until the 8th of August) and the end of the swarming season (from the 8th to the 17th of September). While it is true that our surveys did not include all of the 3 week window as indicated in the memo from the Department of Environment, it did include at least 1 full week of this window (the second week of September), and did include part of the first part of the swarming season (but admittedly outside of the stated "optimal window"). The data did not indicate abnormally high levels of activity during the swarming season at the site.

In relation to our work on the potential hibernacula in the area we identified abandoned mine adits at New Lairg and the MacLennans Brook Cave as occurring within 25 kms of the site. For each we indicated that acoustic surveys were conducted at each of these sites for the MSc work by Jen Randall in 2010 who was working in my lab. These data from the swarming season indicated that neither had sufficient levels of activity to be categorized as a significant site (data ranged from 0.4 to 37 echolocation sequences per night among these sites). As a result of the low level of echolocation, follow-up trapping surveys at these sites were not conducted. Wintering counts at these sites were not conducted due to safety considerations (as part of Jens work, or this project). It is quite possible that there are hibernacula in the area, but no "significant" ones are known, and the data collected at sites that seemed to be the best candidates to be important suggested they were not "significant" (i.e., used by 'large' numbers of bats). By these statements I am not suggesting there are no hibernacula in the vicinity. My point is to clarify the data that are available, and were referred to in our report, on which it is possible to make reasonable inference. The data suggest that neither of these potential sites represent "significant" hibernacula. However, like anywhere in the province, there may be bats swarming and hibernating in the study area at sites that we are unable to reasonably identify.

I hope that this additional information will inform the decision-making process in relation to this proposal. If any further clarification is required please do not hesitate to contact me.

Sincerely



Hugh Broders

Appendix B - Bird Surveys

Pre-construction Baseline Spring Migration and Breeding Bird Surveys at the Proposed Forbes Lake Wind Development

Andrew G. Horn

Summary

This document summarizes the results of spring migration and breeding bird surveys at the proposed wind turbine project at Forbes Lake, near New Glasgow, Nova Scotia. These surveys consisted of 21 visits from 14 April to 12 July 2012. Methods included point counts, transects, area searches, passage migration watches, and owling.

The surveys did not reveal any high sensitivity factors for migrating or breeding birds (e.g., colonies, staging area), nor any species at risk (except for one Canada Warbler 300m from the site), and few migrants were seen. The results suggest that the Site Sensitivity (EC 2007b) is Low, pending results of autumn migration surveys.

Background information

Construction of up to 5 turbines (5-7 MW total) is planned for a site at Forbes Lake, near New Glasgow, Nova Scotia. An initial evaluation of the required preconstruction bird surveys (in consultation with EC 2007a, b) classed the site as having High Sensitivity, because it is near the north side of the Nova Scotia Uplands and thus on a landform that might concentrate birds. As a precautionary approach, the site was treated as having a Very High Site Sensitivity, pending the results of preconstruction surveys.

The size category of the project ($\leq$ 5 turbines) is Small, so the Level of Concern was initially judged to be at least Category 2. Given the uncertainties expressed above, the site was treated as Category 4, at least until spring and summer baseline surveys were completed.

Methods

All fieldwork and data compilation was done by Ken McKenna.

Spring migration

The site was visited during the main spring migration period, April 15 to May 31, with an effort to visit every three days during the peak migration period (May 1-21) and every five days outside that period. Most visits included a line transect and point counts between dawn and four hours after sunrise (Table 1). The line transect (the shortest line connecting all the point count stations) was initially planned to follow the methods in EC 2007a, but was found to detect the same birds as in the point counts, so after the first few visits it was only used to detect any species not detected during the point counts. Point counts were conducted approximately every 250m along each transect (Figure 1). Each lasted 5 minutes (initial trials showed that extending the time to 10 minutes gained few additional individuals). All detections were estimated as occurring within 50, 100, or >100 m from the observer. The line transect and point counts were accompanied by less

standardized area searches, focused on searching for species or habitats that are suspected of being present but missed by the other methods. Suitable days for daytime migration (i.e., those with no precipitation and light to moderate tail winds) included passage migration counts totaling 4 h and 40 min, following the methods in EC 2007a, noting flight heights, positions, and directions relative to the proposed turbines One evening visit (29 April) searched for crepuscular species, such as American Woodcock, and owls (using playback).

Breeding season

CWS protocols (EC 2007a) recommend that a breeding bird survey last at least 4-10 days between late May and July. The present site was small, so it presumably falls at the low end of that range. Given that it had already been visited throughout May as part of the migration surveys, only four additional visits were made, across at least two weeks as recommended in EC 2007a (Table 1). Methods were as described above, except the point counts were 10 min long and no passage counts were done.

Disposition of data

All data were georeferenced and formatted to be compatible with the Wind Energy Bird & Bat Monitoring Database hosted on the website of Bird Studies Canada (http://www.bsc-eoc.org/birdmon/wind/main.jsp), for later uploading to that site.

Results

Spring migration

No obvious migrants (i.e., non-breeding species, mixed flocks, or birds passing through the entire site) were encountered during the spring transects and point counts. Passage counts detected 27 individuals of 13 identified species, none of which, based on species identity, flight height, or flight direction, could be definitively identified as migrants (Table 2). The overall passage rate was 5.8 birds/h (27 individuals in 4.7 h observation).

Flight paths lacked strong directionality overall, and most birds seen were flying well below turbine height (Table 2), suggesting local movements rather than migration.

Breeding bird survey

Birds breeding at the site were widespread species typical of the habitats they were found in, although they do include several Partners in Flight Priority Species and species known to have flight displays (Table 3). No species at risk were found, although one Canada Warbler was detected 600 m from the nearest (southernmost) turbine site (Figure 1) and Olive-sided Flycatchers and Canada Warblers were found breeding just over 2 km south of the southernmost turbine site (Figure 1). The one provincially Yellow-listed species that was detected (a Common Loon) was flying over the site, and likely breeds on Forbes Lake.

Additional species seen within 2 km of the study area, and not listed in Table 3,

included Osprey, Broad-winged Hawk, Fox Sparrow, Grey Jay, Boreal Chickadee, Nashville Warbler, and Chestnut-sided Warbler.

Conclusions

The spring survey results suggest that the project area does not concentrate migrants, and the breeding bird survey results did not reveal any particularly sensitive features within the project area. Overall, these results suggest that the Site Sensitivity (EC 2007b) is Low, pending results of autumn migration surveys.

References

Environment Canada, Canadian Wildlife Service (EC). 2007a. Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds.

Environment Canada, Canadian Wildlife Service (EC). 2007b. Wind Turbines and Birds, A Guidance Document for Environmental Assessment.

Rosenberg, K. V., and T. P. Hodgman. 2000. Partners in Flight Bird Conservation Plan for Eastern Spruce-Hardwood Forest (Physiographic Area 28).

Table 1. Sampling effort. Each visit included area searches, point counts, transects, and passage counts, except as noted.

Date	Time	Duration	Comments
14-Apr	08:15-10:30	2:15	Area search only
17-Apr	16:30-18:30	2	Area search only
21-Apr	05:30-9:00	3:30	
25-Apr	05:20-12:00	6:40	
29-Apr	05:15-10:00	4:45	
29-Apr	20:30-22:15	1:45	Night visit (for crespuscular and nocturnal species)
02-May	05:22-11:15	5:53	
05-May	05:35-10:20	4:45	
08-May	05:32-13:00	7:28	
11-May	05:20-08:20	3	No passage count
14-May	05:00-0920	4:20	
15-May	13:30-15:30	2:00	Passage only
18-May	05:06-12:00	6:54	No passage count
21-May	05:01-11:45	6:44	
24-May	04:50-11:30	6:40	
28-May	05:10-09:10	4:00	No passage count
31-May	05:09-12:40	7:31	
11-Jun	0450-0944	4:56	
22-Jun	0830-1420	5:50	Area search only
25-Jun	0501-0915	4:14	
12-Jul	0630-1130	5:00	

Table 2. Species detected during passage counts, with median height above ground level (estimated to 5 m if ≤ 20 m, to 10 m if > 20), and number flying in no particular direction (⦸) or flying in each cardinal direction. Total watch time was 4h, 40 min.

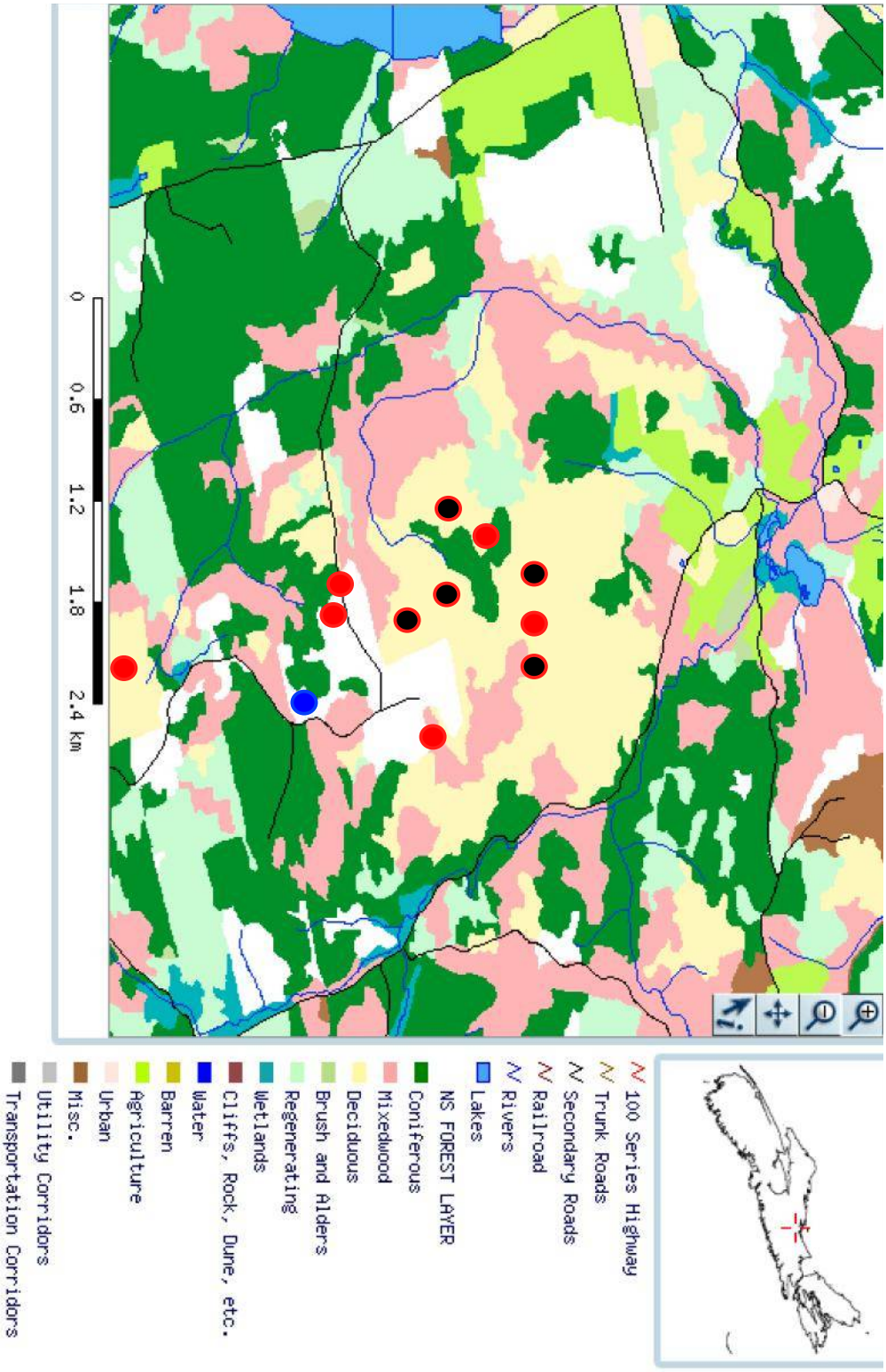
Species	**Median height in m (range)**	**Flight direction**					
		⦸	**N**	**NE**	**E**	**S**	**W**
Turkey Vulture	10				1		
Red-tailed Hawk	5 (5-5)		1		1		
American Kestrel	70		1				
Hairy Woodpecker	15	1					
Blue Jay	12.5 (12.5-5)	2					
Common Raven	50	1			1		
Tree Swallow	15 (15-15)				2		
American Robin	5				1		
Yellow-rumped Warbler	32.5 (32.5-15)	4				1	
Palm Warbler	15	1					
Unidentified Warbler	5					1	
Purple Finch	15 (15-15)				1		
Pine Siskin	7.5 (7.5-5)	3					
American Goldfinch	17.5 (17.5-5)	2			2		

Table 3. Breeding birds, with number per point count, breeding evidence, and Partners in Flight priority (Rosenberg and Hodgman 2000). Yellow-listed species in **bold**, species with flight display starred (*).

Species	**n/ count**	**Breeding code**	**PIF priority**
Canada Goose	0.02	X	
Black Duck		X	
Ring-necked Pheasant	0.01	T	
Ruffed Grouse	0.25	T	PIF II
Common Loon	0.01	X	PIF IV
Pied-billed Grebe		X	
American Kestrel		H	
Red-tailed Hawk	0.02	T	
Wilson's Snipe*	0.01	X	
American Woodcock*	0.01	T	PIF I
Mourning Dove*	0.25	T	
Barred Owl	0.01	T	
Ruby-throated Hummingbird	0.01	H	
Belted Kingfisher	0.00	X	PIF II
Yellow-bellied Sapsucker	0.50	NY	PIF II
Downy Woodpecker	0.09	NY	
Hairy Woodpecker	0.12	NY	
Northern Flicker	0.23	T	
Pileated Woodpecker	0.07	T	
Unidentified Woodpecker	0.07	H	
Eastern Wood-Pewee	0.06	T	PIF II
Yellow-bellied Flycatcher		H	
Alder Flycatcher*	0.01	S	
Least Flycatcher	0.62	CF	PIF II
Blue-headed Vireo	0.47	CF	
Red-eyed Vireo	0.56	T	
Blue Jay	0.05	T	
American Crow	0.15	H	
Common Raven*	0.03	H	
Tree Swallow		H	
Black-capped Chickadee	0.66	NB	
Red-breasted Nuthatch	0.03	T	
White-breasted Nuthatch	0.01	H	
Brown Creeper	0.12	CF	
Winter Wren	0.05	T	
Golden-crowned Kinglet	0.06	CF	
Ruby-crowned Kinglet	0.13	T	
Veery	0.01	H	
Swainson's Thrush	0.23	CF	PIF II
Hermit Thrush	1.44	NE	
American Robin	1.20	FY	

Unidentified Thrush	0.00	S	
European Starling		X	
Cedar Waxwing	0.01	H	
Northern Parula	0.36	T	
Magnolia Warbler	0.22	T	
Cape May Warbler	0.01	X	PIF I
Blackpoll Warbler		X	PIF II
Black-throated Blue Warbler	0.21	NY	PIF II
Yellow-rumped Warbler	0.28	T	
Black-throated Green Warbler	0.44	T	PIF II
Blackburnian Warbler	0.06	T	PIF II
Bay-breasted Warbler	0.01	S	PIF I
Black-and-white Warbler	0.25	T	
American Redstart	0.08	T	
Ovenbird*	1.68	T	
Mourning Warbler	0.07	T	
Common Yellowthroat*	0.07	T	
White-throated Sparrow	1.04	T	
Dark-eyed Junco	0.29	NE	
Rose-breasted Grosbeak	0.01	S	
Red-winged Blackbird*	0.01	X	
Common Grackle	0.00	H	
Purple Finch*	0.41	D	PIF II
Pine Siskin	0.01	T	
American Goldfinch*	0.01	S	
Evening Grosbeak	0.10	T	

Figure 1. Approximate locations of proposed turbines (black), point counts (red), and Canada Warbler (blue) on forest cover map of site (https://ca.nfis.org/provinces/ns/index_eng.html). Point counts were also conducted at each turbine location. The vantage point for migration watches was approximately 600m SE of the southernmost point count station.



Pre-construction Baseline Fall Migration Surveys at the Proposed Forbes Lake Wind Development

Andrew G. Horn

Summary

This document summarizes the results of spring migration and breeding bird surveys at the proposed wind turbine project at Forbes Lake, near New Glasgow, Nova Scotia. These surveys consisted of 10 visits from 2 September to 7 November 2012, to conduct transects and passage migration watches.

The overall passage rate was 9 birds/h. Some of these birds were likely migrants, but no large movements or species at risk were seen. These results show that there is some migration through the site, but using the criteria of EC 2007b, together with earlier results from spring and summer surveys, suggest that the Site Sensitivity is Low

Background information

Construction of up to 5 turbines (5-7 MW total) is planned for a site at Forbes Lake, near New Glasgow, Nova Scotia. An initial evaluation of the required preconstruction bird surveys (in consultation with EC 2007a, b) classed the site as having High Sensitivity, because it is near the north side of the Nova Scotia Uplands and thus on a landform that might concentrate birds. As a precautionary approach, the site was treated as having a Very High Site Sensitivity, pending the results of preconstruction surveys.

The size category of the project ($\leq$ 5 turbines) is Small, so the Level of Concern was initially judged to be at least Category 2. Given the uncertainties expressed above, and applying a precautionary approach, the site was treated as Category 4, until baseline surveys were completed.

Methods

All fieldwork and data compilation was done by Ken McKenna.

The site was visited ten times during the autumn migration period from September 2 to November 7, with an attempt to visit on days with suitable tail winds (Table 1). Visits included 7 1-2 h passage counts from a vantage point with a full view of the turbine area (Figure 1) and 7 transect surveys along the transects described in Horn (2012), which also describes further details of the methods.

Results

During transects, mostly summer or permanent resident species were encountered (Table 2). Species seen on few days but in high numbers, and thus likely migrants, included Cedar Waxwings, Common Grackles, and Evening

Grosbeaks, but were not particularly concentrated at the site (Table 1).

On passage counts, again some of the birds seen were presumably local residents, but some were likely migrants (Table 3), despite no strong directionality in flights through the area overall (Figure 2). The largest flocks were 35 Cedar Waxwings (2 Sep), 6 American Goldfinches (11 Sep), 25 gulls (2 flocks on 8 Oct), 20-25 finches (2 flocks on 7 Nov), and 6 Canada Geese (7 Nov). All other sightings were of 1-3 birds at a time. No species at risk or particularly rare species were seen.

Because Canada Geese had been noted during the surveys, on 7 November, the observer checked for waterfowl in the beaver pond in Churchville. There were 250 Black Ducks, 60 Green-winged Teal, 3 Mallards, 1 recognizable Mallard X Black Duck hybrid, 1 Northern Pintail, and 2 American Wigeon. There was also a large flock of Canada Geese in Forbes Lake.

In total, 217 birds were seen in 24 hours, yielding a pooled passage rate of 9 birds/h.

Conclusions

The results do not suggest that the project area particularly concentrates migrants, consistent with similar findings of the spring survey. Similarly, the breeding bird survey did not reveal any particularly sensitive features within the project area. Overall, these results suggest that the Site Sensitivity (EC 2007b) is Low.

References

Environment Canada, Canadian Wildlife Service (EC). 2007a. Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds.

Environment Canada, Canadian Wildlife Service (EC). 2007b. Wind Turbines and Birds, A Guidance Document for Environmental Assessment.

Horn, A.G. 2012. Pre-construction Baseline Spring Migration and Breeding Bird Surveys at the Proposed Forbes Lake Wind Development. Report for Eon WindElectric, August 2012.

Table 1. Sampling effort and weather conditions.

Date	**Start**	**Length (min)**	**Method**	**Temp (°C)**	**Wind**		Cloud cover
					speed (km/h)	direction	
2 Sep	11:10	60	passage	16	10	NE	40%
	12:53	167	transect	17	10	NE	60%
11 Sep	13:40	60	passage	16	30	NW	40%
12 Sep	8:15	155	transect	16	10	W	0%
	11:10	65	passage	18	10	NW	0%
24 Sep	8:00	127	transect	16	10	N	20%
	10:30	105	passage	16	10	NW	40%
28 Sep	8:15	85	transect	3	15	W	0%
	10:30	120	passage	10	15	NW	20%
6 Oct	9:10	100	transect	14	20	SW	0%
8 Oct	11:30	75	passage	11	30	WNW	50%
9 Oct	8:30	108	transect	4	20	NE	100%
14 Oct	8:45	90	transect	1	13	SW	100%
7 Nov	12:50	120	passage	2	15	NNE	0%

Table 2. Species detected during transects.

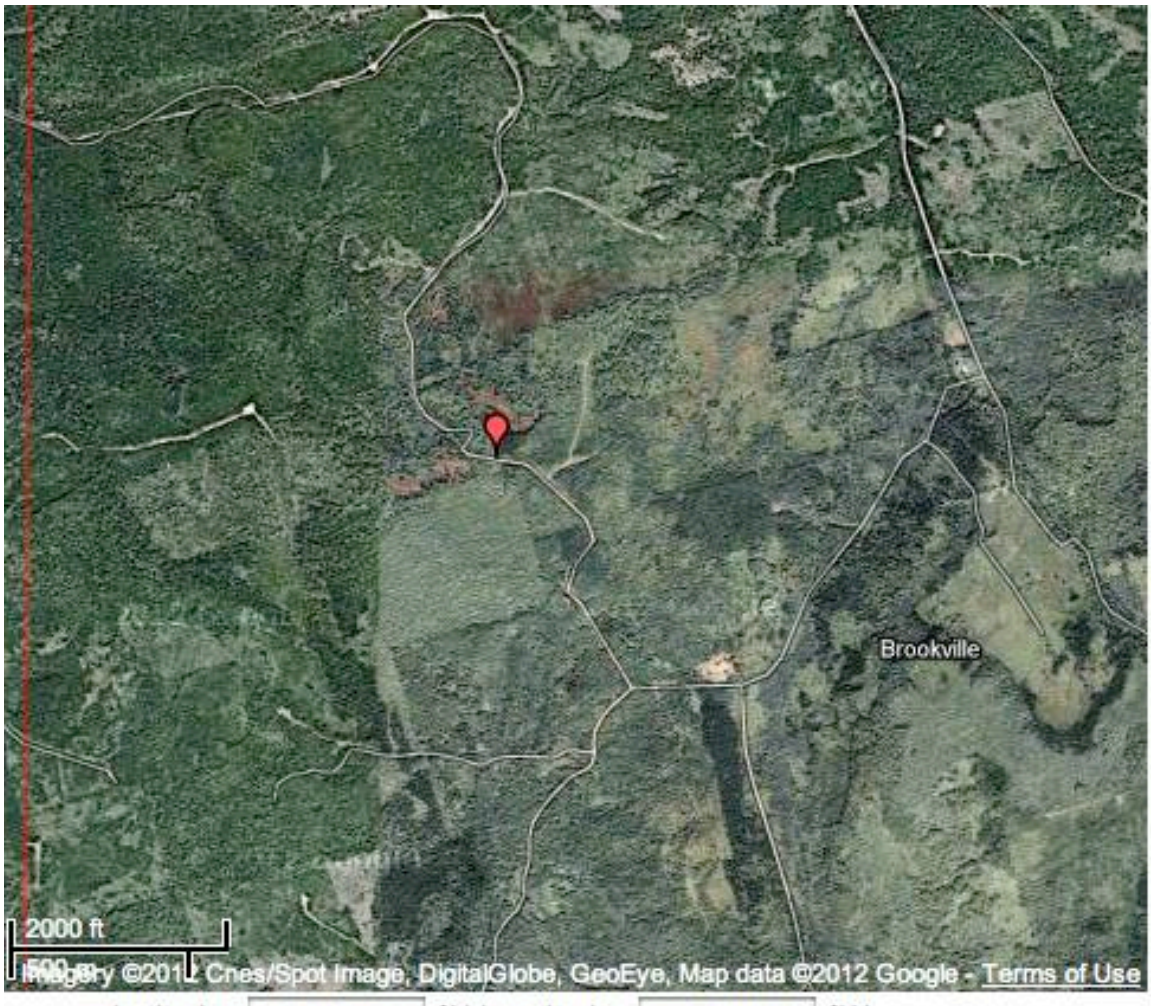
Species	Days found	Max. flock size	Total found	Total/day
Canada Goose	3	1	3	0.43
Ruffed Grouse	3	1	4	0.57
Yellow-bellied Sapsucker	3	3	6	0.86
Downy Woodpecker	2	1	2	0.29
Hairy Woodpecker	3	1	4	0.57
Northern Flicker	1	1	2	0.29
Pileated Woodpecker	1	1	1	0.14
Blue-headed Vireo	3	2	6	0.86
Red-eyed Vireo	2	5	13	1.86
Blue Jay	4	2	12	1.71
American Crow	5	2	8	1.14
Common Raven	4	2	7	1.00
Black-capped Chickadee	6	7	80	11.43
White-breasted Nuthatch	2	1	2	0.29
Brown Creeper	4	2	9	1.29
Golden-crowned Kinglet	5	3	23	3.29
Ruby-crowned Kinglet	2	1	2	0.29
Hermit Thrush	3	1	3	0.43
American Robin	4	5	14	2.00
Cedar Waxwing	1	10	10	1.43
Northern Parula	2	2	5	0.71
Chestnut-sided Warbler	1	1	1	0.14
Magnolia Warbler	2	2	5	0.71
Black-throated Blue Warbler	2	1	2	0.29
Yellow-rumped Warbler	4	2	12	1.71
Black-throated Green Warbler	3	2	13	1.86
Blackburnian Warbler	2	2	4	0.57
Blackpoll Warbler	2	2	4	0.57
Black-and-white Warbler	2	2	3	0.43
Ovenbird	3	3	6	0.86
Mourning Warbler	1	1	1	0.14
Common Yellowthroat	3	4	7	1.00
White-throated Sparrow	5	8	30	4.29
Dark-eyed Junco	6	7	27	3.86
Common Grackle	1	20	20	2.86
Purple Finch	3	2	8	1.14
Pine Siskin	3	1	3	0.43
American Goldfinch	4	2	5	0.71
Evening Grosbeak	5	4	18	2.57

Table 3. Species detected during passage counts. “Flocks” are separate detections of one or more individuals; “detections” is the sum of birds across all flocks. Median height above ground level was estimated as 0-10 m, 10-50 m, 50-100 m, or > 100 m; maximum values for each height class given here, with 150 m given for heights > 100 m.

Species	Flocks	Detections	Median height (range)
Canada Goose	1	6	50
Bald Eagle*	12	19	150 (50-150)
Red-tailed Hawk	4	3	150
Unidentified Raptor	1	1	100
Gull sp.	3	51	150 (50-150)
Northern Flicker	3	2	50
Blue Jay	9	7	50 (50-100)
Common Raven	17	24	100 (50-150)
American Robin	5	1	50
Cedar Waxwing	2	37	30 (10-50)
Pine Grosbeak	1	2	
Purple Finch	4	2	30 (10-50)
White-winged Crossbill	1	2	
Pine Siskin	1	1	50
American Goldfinch	8	10	50 (10-50)
Evening Grosbeak	2	4	100
Finch sp.	2	45	30 (10-50)

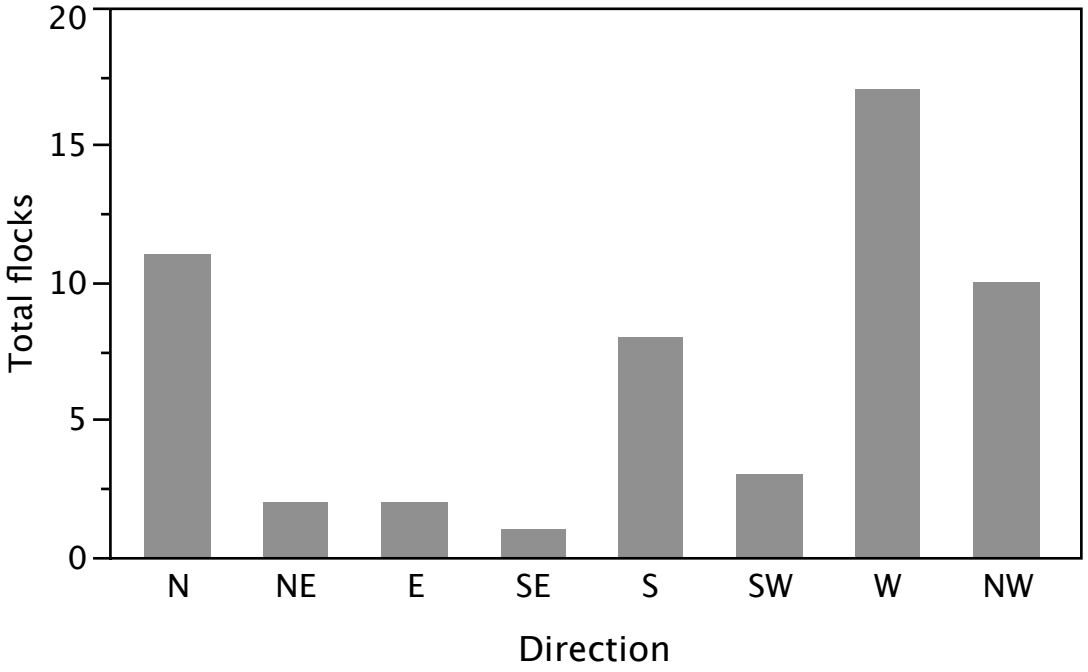
*7 of the “flocks” and 15 of the detections were on one day (7 Nov).

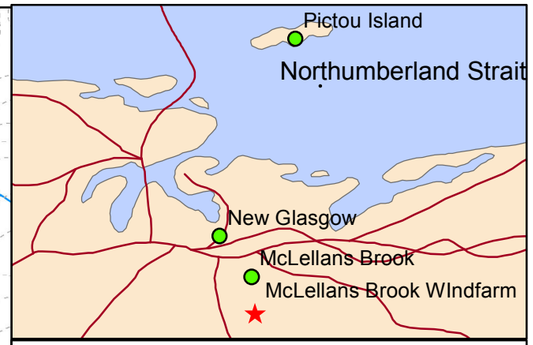
Figure 1. Vantage point for passage counts.



Latitude: 45.488121 °N Longitude: -62.599043 °W

Figure 2. Flight direction of flocks (including flock size = 1) seen during passage counts.





Legend

- WTG
- Building Points
- Bird Survey Pnts
- Migration Vantage Point
- MET tower
- Existing Roads
- Contours
- Watercourse
- Project Survey Bounds
- Property Bounds
- Lake Waterbody
- DNR Wetland
- Project Footprint (proposed)

Avian Field Studies

Drawn by: AWA	Date: 2013/04/27
Project #: 2012043	Scale @ 11"x17"

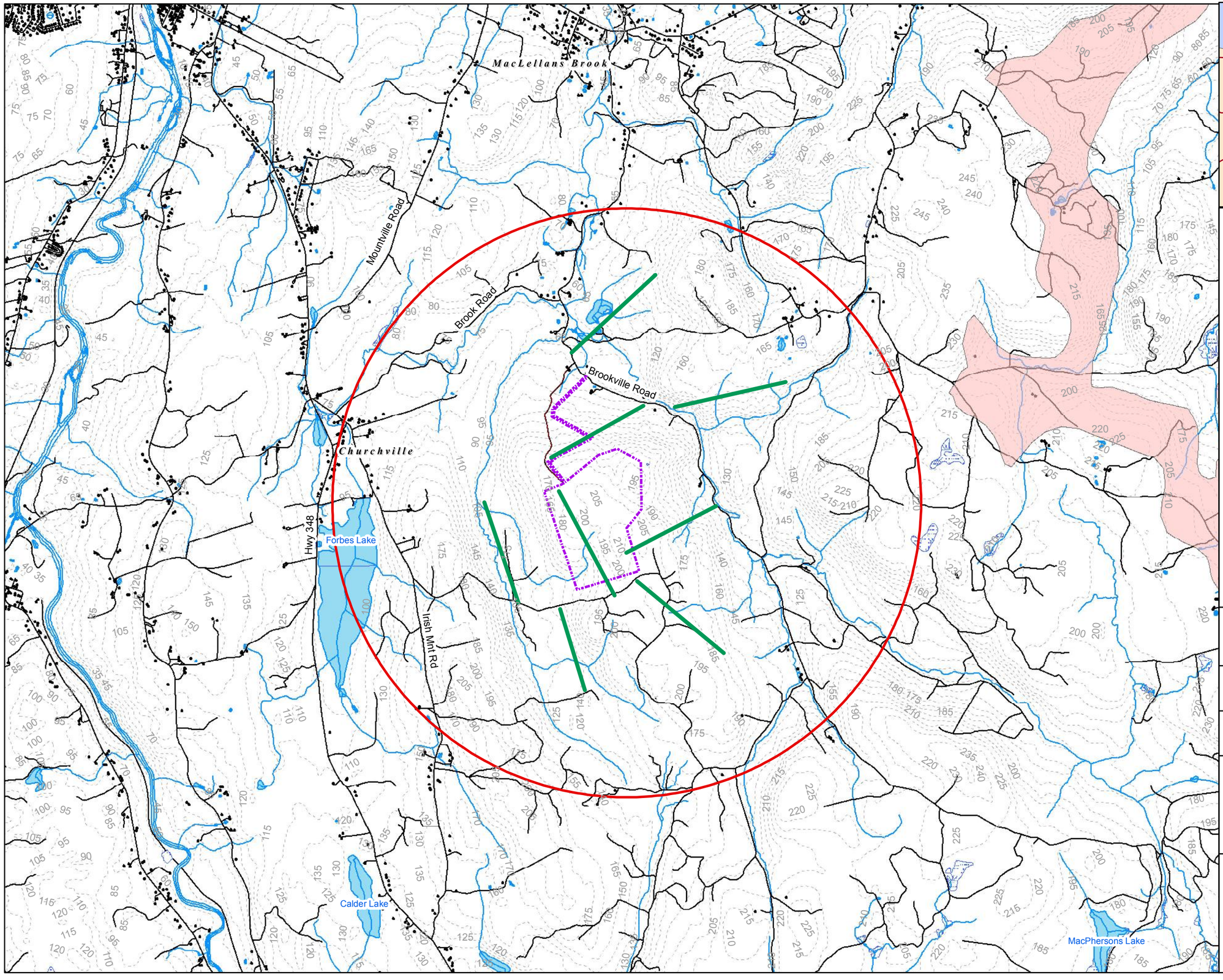
EON WindElectric

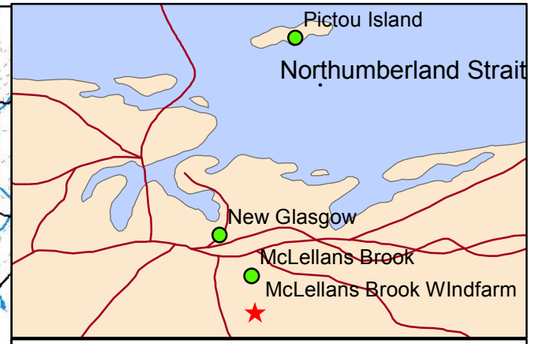
0 250 500 1,000
Meters

Coord. System: NAD83 CSRS UTM Z20N
Projection: Trasnverse Mercator
Units: Meters

N

Appendix C - Mainland moose surveys





Legend

- Building Points
- Project Survey Bounds
- PGI Transects
- Existing Roads
- Contour Lines
- Watercourse
- 25km sq. home base
- Sig. Moose Conc. Area
- Lake Waterbody
- DNR Wetland

FIGURE 2

Project Footprint/Moose mapping

Drawn by: AWA	Date: 2013/04/10
Project #: 2012043	Scale @ 11"x17"

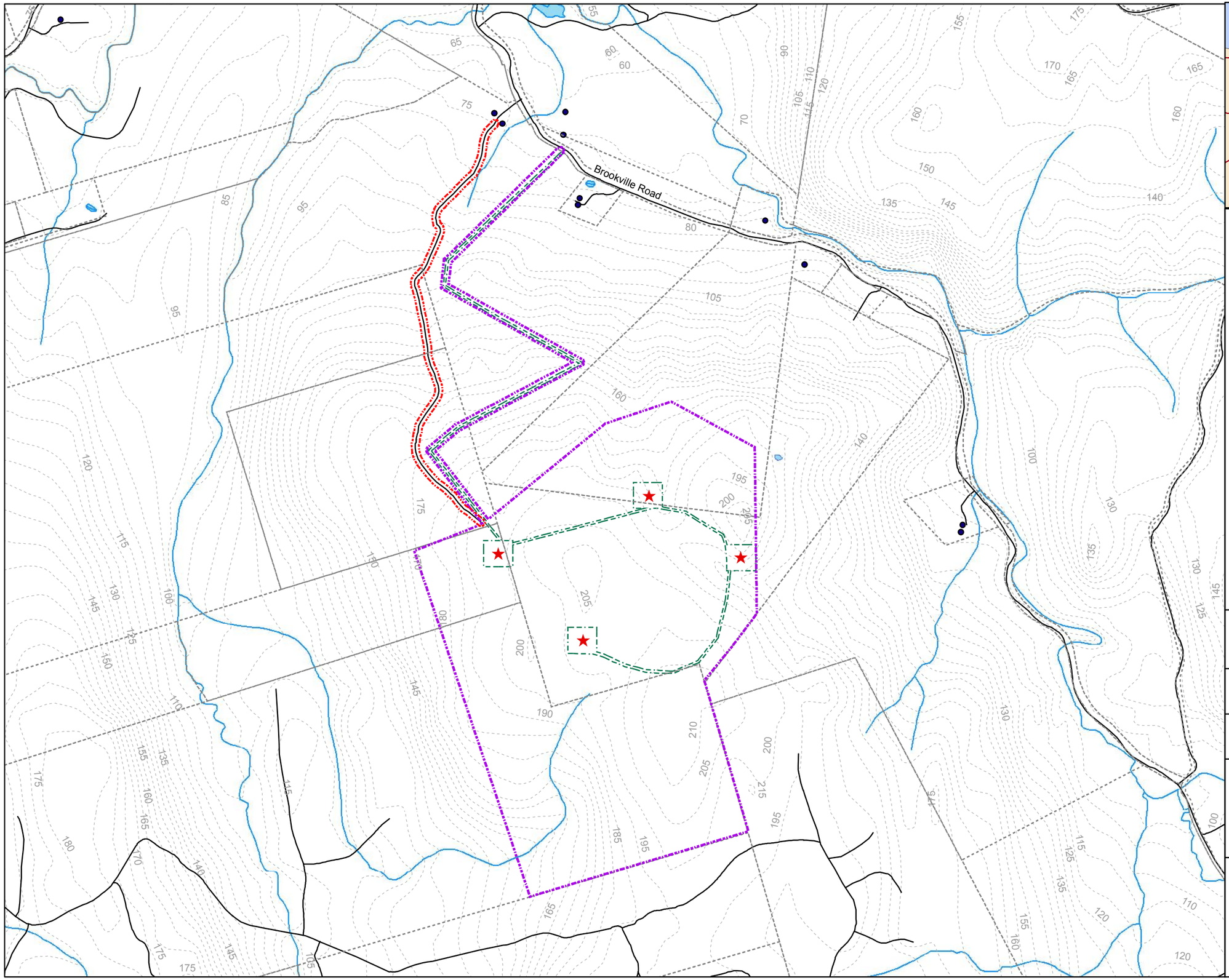
EON WindElectric

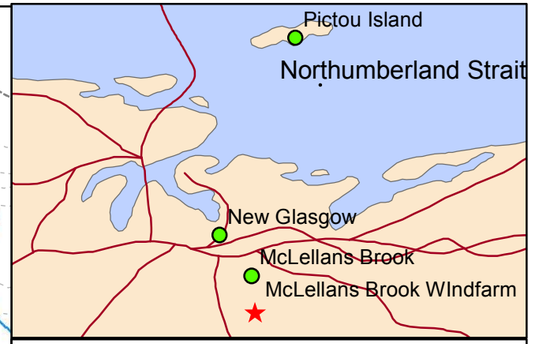
0 625 1,250 2,500
Meters

Coord. System: NAD83 CSRS UTM Z20N
Projection: Trasnverse Mercator
Units: Meters

N

Appendix D - Footprint Mapping





Legend

- ★ WTG
- • Building Points
- — Watercourse
- Existing Woods Road
- Project Survey Bounds
- Project Footprint (proposed)

PROJECT BOUNDARIES

Drawn by: AWA	Date: 2013/04/24
Project #: 2012043	Scale @ 11"x17"

EON WindElectric

0 150 300 600
Meters

Coord. System: NAD83 CSRS UTM Z20N
Projection: Trasnverse Mercator
Units: Meters

N