Appendix I

Bat Population Study

Characterization of the magnitude of bat activity at the proposed Kemptown Wind Energy Project, Colchester County, NS

Final Report Prepared for:
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Context

Project Background

Affinity Renewables (LLC), with oversight from RMS Energy, is proposing to install three GE 1.6 megawatt (MW) wind turbines near the community of Kemptown, Colchester County, Nova Scotia. The project is in an early phase with wind monitoring onsite at a meteorological tower.

Commercial scale wind energy production is one of the fastest growing sectors of the global energy industry as the demand for renewable energy sources for electricity generation continues to increase (Nelson 2009). This demand, combined with recent advances in wind turbine technology that have improved the cost-competitiveness of wind energy, has led to a global increase in the number of wind energy installations. In Canada, energy production and regulation falls under provincial jurisdiction and thus most renewable energy targets are set at the provincial level. In the province's Renewable Electricity Plan , the Provincial Government of Nova Scotia has set an aggressive target of 40% of the province's electricity needs to be met by renewable energy by the year 2020 (Nova Scotia Department of Energy 2010). Of this amount, 25% has been set as coming from made-in-Nova Scotia sources by 2015, and the wind energy sector is anticipated to be the largest contributor in meeting these goals. The Kemptown project is part of the Community Feed-In Tariff program (COMFIT) of the Renewable Electricity Plan which facilitates small-scale, local renewable projects that involve community groups.

Despite the many environmental benefits of electrical generation via wind energy, the rapid global growth of the wind energy sector has raised concerns regarding the impacts of these developments on both resident and migratory populations of wildlife (Arnett et al. 2008b). The documentation of large numbers of bat fatalities at wind energy facilities is a relatively recent development (Johnson 2005a), although is gaining considerable global attention. As a result, fatalities of bats have become a primary environmental concern associated with wind energy development.

Efforts to minimize conflicts between wildlife and wind energy have focused mainly on two areas: risk avoidance and impact mitigation (Weller and Baldwin 2012). Impact mitigation refers to those efforts focused on developing methods to reduce wildlife fatalities at operational wind facilities and does not apply to this project at this time. Risk avoidance involves conducting surveys prior to construction to avoid sites, or areas within sites, with high levels of usage by wildlife. The assumption of this approach is that low indices of activity prior to construction should result in low fatality rates post-construction since there should be fewer animals 'available' to be killed assuming that bats are not attracted to the infrastructure once built (Baerwald and Barclay 2009). As the planning phase proceeds for the development of the project, surveys of the wildlife at the proposed site are being undertaken to address any potential wildlife issues related to the development of the site. This document provides a summary of the echolocation survey undertaken for bats at the Kemptown Wind Energy Project in 2013.

Regulatory Context

The following legislation and policy were considered in relation to the proposed survey at the Kemptown Wind Energy Project:

- Federal Species at Risk Act (http://laws-lois.justice.gc.ca/eng/acts/S-15.3/page-1.html)
- Nova Scotia *Wildlife Act* (http://nslegislature.ca/legc/statutes/wildlife.pdf)
- Nova Scotia *Endangered Species Act* (http://www.novascotia.ca/legislature/legc/statutes/endspec.htm)

Additional resources that are relevant to the proposed surveys used include:

- Atlantic Canada Conservation Data Centre (http://www.accdc.com/)
- Wild Species The General Status of Species in Canada (http://www.wildspecies.ca/home.cfm?lang=e)
- Global Species Rankings (http://www.natureserve.org/explorer/)

Study Objectives

The objectives of this project were to:

(1) Provide information on the occurrence and relative magnitude of bat activity in the proposed development area, based on analysis of acoustic survey results;

(2) Provide relevant information on the resource requirements of local bat species that may be useful for the decision-making process on the proposed development; and

(3) Make relevant recommendations based on the results of this project and recent developments in the field of bats and wind energy.

Review of Key Issues

Background

Currently in Nova Scotia there are >150 wind turbines in operation (CanWEA 2013) and, as of yet, we are not aware of any incidents of major mortality, though bats have been killed. For context and qualification, most of these turbines have been in operation for only a short period of time (months to 7 years or less) and it is not known how thoroughly all existing operational turbines have been surveyed for bat fatalities or how well documented and reported the findings are. In the following sections we discuss the various means by which bats may be impacted by wind energy developments, including direct mortality, changes to habitat availability, and disruption of movement patterns (e.g., foraging, mating, migrations, or abandonment of sites).

Direct Mortality

Proximate causes of bat fatalities at wind energy developments may be due to direct strike by rotating turbine blades, collision with turbine towers, barotrauma or any combination of the three. Barotrauma involves tissue damage to the lungs due to rapid or excessive air-pressure reduction near moving turbines blades (Baerwald et al. 2008, Cryan and Barclay 2009) and the discussion of the relative role of barotrauma in the death of bats at wind energy developments remains on-going (Grodsky et al. 2011, Capparella et al. 2012, Rollins et al. 2012). In North America, significant bat fatality events at wind energy developments occur primarily in the late summer and early fall, peaking during the period that coincides with fall migration (Johnson 2005b, Cryan and Brown 2007, Arnett et al. 2008a). These trends have led researchers to believe that migration plays a key role in the susceptibility of certain bat species to wind turbine fatalities (Cryan and Barclay 2009). Although some fatality has also been documented during the spring (Brown and Hamilton 2006, Arnett et al. 2008a), numbers are much lower, thought to be a result of more scattered migratory behaviour, or possibly the use of different routes compared to fall migration.

The species that have the largest number of kills at wind farms are the long-distance migratory bats, including the hoary bat (*Lasiurus cinereus*), the eastern red bat (*L. borealis*), and the silver-haired bat (*Lasionycteris noctivagans*). In North America, these species make up about 75-80% of the documented fatalities at wind energy developments, with the hoary bat alone comprising almost half (Kunz et al. 2007, Arnett et al. 2008a). The cumulative impacts of current mortality rates as a result of wind turbines on these affected species could have long-term population effects (Kunz et al. 2007). Bat fatalities have also been reported for resident hibernating bat species, including the big brown bat (*Eptesicus fuscus*), the little brown bat (*Myotis lucifugus*), the northern long-eared bat (*M. septentrionalis*), and the tri-colored bat (*Perimyotis subflavus*) (Nicholson 2003, Johnson 2005b, Jain et al. 2007, Arnett et al. 2008a). At some sites in the eastern United States high numbers of fatalities of these resident, hibernating species have been reported (Kunz et al. 2007).

Various explanations for the high incidence of bat fatalities at wind energy developments have been proposed (Johnson 2005b, Kunz et al. 2007, Arnett et al. 2008a, Cryan and Barclay 2009). Estimates of the number of bat fatalities vary widely from less than 3 bats/turbine/year (Johnson et al. 2003, Johnson et al. 2004) to upwards of 50 bats/turbine/year (Nicholson 2003, Kerns et al. 2005, Jain et al. 2007). Given the considerable variability in species composition and rates of bat fatalities among wind energy facilities, it is likely that location-specific qualities of individual facilities are important (e.g., located along migration routes or other flight corridors). It has also been proposed that the use of turbines with increasing height has extended developments further into the flight space used by migrating bats (Barclay et al. 2007). However, behavioural observations of bats displaying flight patterns typical of foraging activity prior to collisions with turbines (Horn et al. 2008) may suggest that bats are actively foraging which may mean that foraging while migrating may take place for some individuals. Others have hypothesized that collisions may result from bats being attracted to turbines out of curiosity, misperception (failure to avoid a detected obstacle or interference with perception of an obstacle), or as potential feeding, roosting, and mating opportunities (reviewed in Cryan and Barclay 2009). To date, the cause(s) of bat fatalities at turbines remains unclear and is an active area of research.

As mortalities may be the result of site-specific and design-specific characteristics and conditions, it is important to conduct site-specific monitoring studies to make reliable inferences on the potential impacts of a wind energy development on local bat populations (American Society of Mammalogists 2008).

Habitat Availability

In forested landscapes, habitat availability for bats may be impacted by the alteration or removal of vegetation to accommodate roads and wind turbine installations. This may include the direct loss of resources (e.g., roost trees), fragmentation of habitat components (e.g., foraging and roosting areas), or other disturbance that may cause bats to vacate certain areas, likely acting to degrade the local environment for bat colonies/populations that reside in the area during the summer. This negative impact of new wind energy developments is likely to occur, and will contribute to the cumulative effect of habitat loss that is occurring throughout the range of most bat species.

At the site level, small-scale clearings in forested landscapes have been shown to attract certain bat species, which use these areas for foraging (Grindal and Brigham 1998, Hayes and Loeb 2007). Removal of vegetation can create edges and small clearings which can act to concentrate prey for bats. The extent to which this loss of vegetation can be perceived to be beneficial to bats is not known and will vary from site to site, as there must be a balance between the availability of suitable roosting resources with the availability of suitable foraging areas within commuting distance to provide conditions that favour the occupancy of resident bat species (Henderson and Broders 2008).

Movement Patterns

From the perspective of bat movement, resident bats may be affected by wind energy developments through alterations to foraging areas and possible disruption of commuting movements between roosting and foraging areas. There is some genetic evidence to suggest that bat movements can be impeded by fragmentation of habitat, which can scale up to population or distributional level effects (Kerth and Petit 2005, Meyer et al. 2009). However, this is not well understood for most species.

Little is known about the dynamics of movement (e.g., altitude, travel routes, frequency of visitation) of resident, hibernating bats to and from hibernation sites. Anecdotal evidence suggests that bats likely use ridges and other linear landscape elements (e.g., riparian corridors) as travel routes, depending on the landscape (Arnett 2005, Lausen 2007, Furmankiewicz and Kucharska 2009). In the late summer and early autumn large numbers of bats congregate at the entrances to underground hibernacula in an activity referred to as ‘swarming’ (Davis and Hitchcock 1965, Fenton 1969, Thomas and Fenton 1979, Glover and Altringham 2008). During the swarming period bats do not roost in hibernacula; research being conducted in Nova Scotia indicates that resident bats are ‘on the move’, roosting transiently on the landscape (Lowe 2012), though we do not have a full understanding of the dynamics of these behaviours. Swarming may serve several functions, including courtship, copulation, and orienting young-of-the-year to over-wintering sites (Fenton 1969, Thomas and Fenton 1979).

Movement data from Ontario and Manitoba suggests that resident bats may move up to at least 120 km between hibernacula within a year, and up to at least 500 km between years (Fenton 1969, Norquay et al. 2013). In New England, there are records of bats moving 214 km between hibernacula within one year, with one female moving 128 km in only three nights during spring emergence from hibernation (Davis and Hitchcock 1965). Obviously these resident hibernating species are at least capable of large scale migratory movements on the order of hundreds of kilometers. It is not known whether flight behaviour (e.g., height, routes, etc.) during this time differs from when resident species are in their summering area; the paucity of information on this aspect of their biology would appear to be one of the largest impediments in accurately predicting the impact of wind energy developments on local bat populations (Weller et al. 2009).

Bats in Nova Scotia

Nova Scotia Bat species

In Nova Scotia there are occurrence records for seven species of bats (Table 1; van Zyll de Jong 1985, Broders et al. 2003, Segers et al. 2013), and each have been documented to have experienced fatalities at wind turbine sites (Arnett et al. 2008a). There are three species of long-distance migratory bats recorded in the province, the hoary bat, the eastern red bat, and the silver-haired bat. These three species have extensive distributional ranges throughout North America, with Nova Scotia at or near their northern range limit (van Zyll de Jong 1985). Low numbers of echolocation recordings of the long-distance migratory species in Nova Scotia by Broders (2003) and other unpublished work suggests that there are no significant populations or large scale migratory movements of these species in the province, but they do occur regularly and are often associated with coastal or off-shore occurrences (Cryan and Brown 2007, Czenze et al. 2011, Segers et al. 2013). Two species of bats in the genus Myotis, the little brown bat and the northern long-eared bat, are the only abundant and widely distributed bats in Nova Scotia (Broders et al. 2003, Henderson et al. 2009). These 5–8g insectivorous bats are sympatric over much of their range (Fenton and Barclay 1980, van Zyll de Jong 1985, Caceres and Barclay 2000). A third species, the tri-coloured bat, has a significant population in the province, however they are likely restricted to southwest Nova Scotia (Broders et al. 2003, Rockwell 2005, Farrow and Broders 2011). These three species are gregarious species that over-winter in caves and abandoned mines in the region (Moseley 2007, Randall 2011). There is only one unconfirmed observation of the big brown bat, also a gregarious species, hibernating at a cave in central mainland Nova Scotia (Taylor 1997).

Ecology of Resident Species

Northern long-eared and little brown bats are expected to be the most likely species to occupy the proposed development area. The life history of both of these species is typical for temperate, insectivorous bats. Their annual cycle consists of a period of activity (reproduction) in the summer, and a hibernation period in the winter. Females of the two species bear the full cost of reproduction in the summer, from pregnancy to providing sole parental care to juveniles (Barclay 1991, Hamilton and Barclay 1994, Broders 2003).

The northern long-eared bat is a forest interior species that primarily roosts and forages in the interior of forests (Broders 2003, Jung et al. 2004, Henderson and Broders 2008). Females form maternity colonies, roosting in coniferous or deciduous trees, depending on availability (Foster and Kurta 1999, Broders et al. 2006, Garroway and Broders 2008). Males typically roost solitarily in either deciduous or coniferous trees (Lacki and Schwierjohann 2001, Jung et al. 2004, Ford et al. 2006). The little brown bat is a generalist species that is associated with forests, as well as human-dominated environments (Barclay 1982, Jung et al. 1999). This species has been found to forage over water and in forests (Anthony and Kunz 1977, Fenton and Barclay 1980), and both males and females (i.e., maternity colonies) have been documented roosting in both buildings and trees (Crampton and Barclay 1998, Broders and Forbes 2004). During the summer, it appears that most of the commuting and foraging activity of northern long-eared and little brown bats occurs close to the ground (Broders 2003). Nonetheless, our ability to survey bat activity at high altitudes is extremely limited, and therefore our ability to make inference on the vertical distribution of bats is also limited.

A third species that occurs in significant numbers in Nova Scotia, the tri-colored bat, is not likely to occur in the proposed development area (Farrow and Broders 2011). In Nova Scotia, work that we have done in Kejimkujik National Park suggests that this species roost in Usnea lichen species and forages over waterways (Poissant et al. 2010).

White Nose Syndrome

In 2012, three species of bats found in Nova Scotia were listed by COSEWIC as Endangered, and in 2013 were listed as Endangered by the Province of Nova Scotia. This is primarily due to the spread of an emerging infectious disease known as White Nose Syndrome (WNS) that is responsible for unprecedented mortality in hibernating bats through much of eastern North America (Blehert et al. 2009, United States Fish & Wildlife Service 2012). The condition is caused by *Pseudogymnoascus destructans* (formerly *Geomyces destructans)*, a cold-loving fungus that thrives in cave conditions and as such, impacts bat population directly during the winter hibernation period (Lorch et al. 2011, Blehert 2012, Minnis and Lindner 2013). It is thought to disrupt patterns of torpor which results in death by starvation or dehydration (Cryan et al. 2010, Reeder et al. 2012, Warnecke et al. 2013). First documented in New York State in 2006 (Blehert et al. 2009), WNS spread rapidly to 19 states and four Canadian provinces by 2011 and is thought to be responsible for the death of more than 5.5 million bats (United States Fish & Wildlife Service 2012). White Nose Syndrome has been confirmed among populations of seven species of bats; the little brown bat, the most abundant species in the region currently affected by WNS, has experienced the most dramatic population declines (Frick et al. 2010). Some hibernacula have seen mortality rates of 90 to 100 percent of resident hibernating bats as a result of infection with WNS (United States Fish & Wildlife Service 2012), leading researchers to believe that WNS could lead to local extinctions of the little brown bat, as well as other species (Frick et al. 2010).

White Nose Syndrome was first documented in Nova Scotia in April 2011 and declines of 80% to 99% have since been recorded in winter populations (Broders and Burns, unpublished data). Therefore it would be prudent to protect any surviving animals that may be genetically predisposed to surviving the infection. Even prior to WNS, bats were increasingly recognized as a conservation priority in North America. Now, in consideration of the sharp declines and rapid spread of WNS, serious concerns have been raised about the impact of WNS on the population viability of affected bat species, consequently impacting the conservation status of bat species at the local, national and global level (Table 1). Given that hibernacula represent one of the more critical resources for bats, as they allow successful over-wintering, they are important to protect.

Potential for Hibernacula

The Nova Scotia Proponent's Guide to Wind Power Projects (Nova Scotia Environment 2012) states that wind farm sites within 25 km of a known bat hibernacula have a 'very high' site sensitivity. There are no major hibernacula within 25 km of the Kemptown Wind Energy Project area (Moseley 2007). Abandoned mine adits at New Lairg, Pictou County, are within 25 km although no overwintering count data exists for these (Moseley 2007) and recent acoustic surveys in 2010 by Randall suggest they are not significant autumn swarming sites (Randall 2011). In other ultrasonic monitoring by Randall in 2010, at two other sites in the vicinity of the proposed development area, McLellan's Brook Cave, Pictou County and at Natural Bridge Cave, Colchester County she concluded that neither of these exhibited strong evidence of fall swarming activity by bats although there were captures of bats at Natural Bridge Cave on one sampling night. The nearest known major bat hibernaculum to the Kemptown project is Hayes Cave, the largest known hibernaculum in NS, which is located in Maple Grove approximately 40 km from the proposed development area. At approximately 42 km away is Lear Shaft, located in Londonderry in an area with extensive underground mine workings and a number of mine openings. There are no underground records of hibernating bats from this site (owing to the structure of the site, a now-gated vertical shaft). In sampling on 7 nights in the autumns of 2009 and 2010, bat captures using harp traps resulted in an average of 8 bats captured per sampling hour indicating this is a fall swarming site (Burns unpublished data). Overwinter surveys for white-nose syndrome monitoring in 2012 yielded the collection of bat carcasses around the mine opening in winter demonstrating this site is a hibernaculum.

According to the Nova Scotia Abandoned Mine Openings Database (Fisher and Hennick 2009), there are 33 underground abandoned mine opening records in the vicinity of the Kemptown project (within 25km). Of these, the records suggest that 25 of the records have original depths of 30 m or less and/or were filled in or are flooded suggesting they would be unsuitable as hibernacula. Of the remaining 8 sites, 4 have been filled in (KPT-1-025, EMM-1-001, LCU-1-003,SPB-1-006) and 1 is one of the New Lairg sites investigated by Randall in 2010 (LCU-1-004; 2011) was not found to have high autumn bat activity levels. This leaves three openings to be potentially explored for bat activity.

Table 1. Over-wintering strategy and conservation status of bat species recorded in Nova Scotia

Species	Overwintering Strategy	Global Ranking[1]	COSEWIC Status	ACCDC status[3]	NSESA[4]
Little brown bat	Resident hibernator	G5	Endangered[2]	S1	Endangered
Northern long-eared bat	Resident hibernator	G4	Endangered[2]	S1	Endangered
Tri-coloured bat	Resident hibernator	G5	Endangered[2]	S1	Endangered
Big brown bat	Resident hibernator	G5	Not assessed	N/A	Not listed
Hoary bat	Migratory	G5	Not assessed	S1	Not listed
Silver-haired bat	Migratory	G5	Not assessed	S1	Not listed
Eastern red bat	Migratory	G5	Not assessed	S1	Not listed

[1] Global Ranking based on the NatureServe Explorer: G1 = Critically Imperiled, G2 = Imperiled, G3 = Vulnerable, G4 = Apparently Secure, G5 = Secure. All the above species were reassessed in July 2012.
[2] Assessed by COSEWIC and designated in an emergency assessment on February 3, 2012.
[3] Atlantic Canada Conservation Data Centre ranking, based on occurrence records from NB and NS: S1 = Extremely rare: May be especially vulnerable to extirpation (typically five or fewer occurrences or very few individuals).
[4] Listing status under the Nova Scotia Endangered Species Act: Endangered = a species facing imminent extirpation or extinction; species were reassessed in July 2013.

Methods

Study Area

The project area is located near the community of Kemptown, Colchester County which is situated approximately 16 km from the town of Truro which has a population of 12,500 people. This area is within the Rolling Upland District of the Carboniferous Lowlands Theme Region (Davis and Browne 1996) and the Nova Scotia Highlands Ecoregion and St. Mary's Block Ecodistrict (Webb and Marshall 1999). This area contains upland slopes ranging from 100 to 300 m in elevation. Softwood forests dominate the area with scattered sugar maple, beech and yellow birch occurring on low ridges and spruces, balsam fir, red maple and eastern hemlock common on well-drained mid-slopes. Forestry is the dominant land use activity in the area with some small mixed farming.

Ultrasonic Surveys

We used two automated bat detectors (model Song Meter SM2Bat+, Wildlife Acoustics, Concord, MA) to sample at two locations within the proposed development area (Table 2). One detector was deployed adjacent to a meteorological tower with two microphones: one microphone recorded at 2 m off the ground and another microphone recorded at approximately 40 m above ground (high microphone). The second detector was deployed along a trail in a regenerating forest and used one microphone that was placed at about 3 m above ground. Microphones were oriented parallel to the ground, or slightly down to shed rain. The seasonal timing of sampling likely corresponded to the end of the summer residency period, movement of resident species to local hibernacula, and to fall migration by migratory species.

Three other bat detectors (Anabat, Titley Electronics, Ballina, NSW, Australia) were placed in the vicinity of the identified abandoned mine openings (AMO) from the Nova Scotia Abandoned Mine Openings Database (Brookfield, BRF-1-002; Smithfield, SPB-1-003; Kemptown, KPT-1-007: Table 2). These openings are approximately 22.1, 10.5 and 3.8 km away from the proposed wind energy development, respectively.

Identification of many bat species is possible because of the distinctive nature of their echolocation calls (Fenton and Bell 1981, O'Farrell et al. 1999). Species were qualitatively identified from recorded echolocation call sequences by comparison with known echolocation sequences recorded in this and other geographic regions. All recorded bat call sequences from SM2Bat units were converted to zero-crossing file formats using Kaleidoscope™ software (Wildlife Acoustics) and were imported into AnalookW software (Titley Electronics, vs3.8v) for identification and analysis. Calls from Anabat units were directly used in AnalookW. In the case of species in the genus Myotis (northern long-eared and little brown bat), we did not identify sequences to the species level as their calls are too similar to be reliably separated. Call sequences that were clearly bat generated ultrasound, but could not be confidently classified due to poor quality of the recordings were classified as 'unknown'. As the unit of bat activity, we used the number of recorded echolocation files, which approximate an echolocation call sequence, defined as a continuous series of greater than two calls (Johnson et al. 2004). Because an individual bat may be recorded making multiple passes, the data presented represent a measure of bat activity, and cannot be used as a direct measure of the number of bats within or passing through an area.

Differences in bat call sequence detections, call quality and ultimately species identifications are known among different models of bat detectors. Recent comparisons have shown that Wildlife Acoustics SM2Bat units record more bat call sequence files then Anabat units (Allen et al. 2011, Adams et al. 2012) and these differences must be incorporated into the interpretations and inferences of data when using both detectors.

Table 2. Locations of ultrasonic survey sites for the 2013 survey of bat activity at the proposed Kemptown Wind Energy Project area, Colchester county, Nova Scotia. Coordinates are NAD83 UTM Zone 20T.

Site	Location	Site type	Coordinates		Deployed	Retrieved
1	Kemptown forest	Project Area	491314 E	5032843 N	30 Jul 2013	11 Oct 2013
2	Kemptown tower	Project Area	490786 E	5032690 N	30 Jul 2013	11 Oct 2013
3	Brookfield AMO	Mine opening	481526 E	5013245 N	30 Jul 2013	21 Sep 2013
4	Smithfield AMO	Mine opening	494061 E	5012824 N	30 Jul 2013	21 Sep 2013
5	Kemptown AMO	Mine opening	494234 E	5034854 N	28 Aug 2013	09 Nov 2013

Table 3. Site descriptions for ultrasonic survey sites for the 2013 survey of bat activity at the proposed Kemptown Wind Energy Project area, Colchester County, Nova Scotia.

Site	Description
1	The detector was placed along a trail through a regenerating coniferous forest.
2	The site was within a regenerating coniferous forest and the immediate vicinity of the tower had a gravel base with road access for the meteorological tower.
3	The exact location of the mine opening could not be located and was possibly filled in or collapsed. Regardless there was evidence of mine workings and a detector was deployed along a forest edge at the expected location of the opening and among the mine workings.
4	The exact location of the candidate mine opening could not be located but there were a number of locations where there was evidence of mine workings within 40 m of the GPS location which straddled a narrow patch of forest bounded by a road and a large field. The detector was deployed at the edge of the forest and the microphone was pointed into the field.
5	The exact location of the candidate mine opening could not be located and it is possible the opening was filled in. Detector was deployed in a small gap in a patch of forest approximately 20 m from the adjacent road.

Results

At site 1, the bat detector recorded from July 30 to October 3, 2013. Upon retrieval of this unit it was discovered that the unit had been vandalized with the power supply cut on October 4 such that no data was recorded for the remaining 7 nights before the unit was retrieved. Site 2 recorded data from July 30 to October 11, 2013 continuously. Detectors at the Smithfield and Brookfield abandoned mine openings were deployed and recorded continuously from July 30 to September 21 and the Kemptown abandoned mine opening recorded from August 28 to November 10, 2013.

Within the proposed wind energy development area there were 59 acoustic files recorded on the 3 microphones (2 detectors) with 14 classified as bat-generated ultrasound files and the remaining classified as extraneous noise (Table 4). Of these, 2 were recorded along the trail through the regenerating forest (site 1), 6 were recorded at the base of the meteorological tower (site 2) and 6 bat call sequence files were recorded on the high microphone on the meteorological tower. The majority of call sequences (10/14; 71.4 %) were classified as Myotis species (i.e., includes northern long-eared and little brown bats); as stated above no attempt was made to identify these call sequences to the species level given the difficulty in achieving such identifications. There were 4 call sequences attributed to hoary bats that were recorded on 3 nights during the fall migration period. Two hoary bat call sequences were recorded on August 17 where a single call was recorded on each of the low and high microphones at the same time and thus likely represent the same individual flying in the area. The other single hoary call sequences were recorded on each of August 27 and September 24th and are also suggestive that an individual bat was present each night and made the calls.

The bat detector at the Brookfield AMO recorded 46 acoustic files with 21 classified as bat-generated ultrasound files (Table 5). Sixty-six percent (n= 14) of the bat call sequences were classified as Myotis species, 28.6 % (n=6) were classified as hoary bat and there was one call sequence that was classified as unknown (4.7%). The hoary bat sequences were recorded on three nights with one sequence on the evening of Aug 21, two sequences on September 1st within 18 minutes of each other and three sequences on Sept 2nd within 28 minutes of each other. This suggests an individual bat on each night made the calls. The unknown sequence recorded was short in duration (5.14 milliseconds) consisting of 8 calls which lacked the distinctive frequency modulated sweep typical of bat calls and thus encompassed a maximum and minimum frequency of 39.54 and 38.54 kHz, respectively. These characteristics fall within known parameters for Myotis species or potentially a red bat however the missing shape parameters precluded a positive identification to a particular species group although do represent discrete bat call pulses. The bat detector at the Smithfield AMO recorded 210 acoustic files with 87 classified as bat-generated ultrasound files (Table 5). Myotis species again dominated the call sequences at 97.7% followed by 2.3% attributable to hoary bat call sequences. The hoary bat sequences at Smithfield were recorded on 2 separate nights with a single call sequence recorded on each of August 27 and September 8th. At the Kemptown AMO there was 1204 acoustic files recorded with10 classified as bat-generated ultrasound files. Myotis species comprised 60% of the call sequences and the remaining 40% were attributable to hoary bat call sequences. The hoary bat sequences were recorded on three nights with one sequence on the evening of Aug 28, two sequences on September 2 and one sequence on September 3rd. This is suggestive of an individual bat on each night.

The average number of recorded bat call sequences per night in the proposed development area (average for the two sites) was 0.19 (SD =0.52) during the sampling period. To place the relative magnitude of activity recorded in the study area into context, in 129 nights of monitoring along five forested edges in the Greater Fundy National Park Ecosystem from June to August 1999, the average number of sequences per night was 27 (SD = 44; Broders unpublished data). In 650 nights of monitoring at river sites in forested landscapes in southwest Nova Scotia from June to August of 2005-2006, the average number of sequences per night was 128 (SD = 232; Farrow unpublished data), though note that rivers act to concentrate bat activity, as they are used as foraging and commuting corridors (Laval et al.

1977, Fenton and Barclay 1980, Fujita and Kunz 1984, Krusic et al. 1996, Zimmerman and Glanz 2000, Lacki et al. 2007). Both of these previous comparisons were conducted prior to the emergence of white nose syndrome and therefore may not be directly comparable. In a forested landscape in Colchester Count, Nova Scotia, we detected an approximate 99% decrease in bat echolocation activity from 2012 to 2013 at forested and riparian sites that were monitored for bat activity following the confirmation of mortality from white nose syndrome in Nova Scotia (Segers and Broders, unpublished data).

The average number of recorded bat call sequences per night for the Brookfield, Smithfield and Kemptown abandoned mine openings were 0.40 (SD = 0.91), 1.64 (SD = 2.72), 0.14 (SD = 0.42), respectively. The Smithfield AMO had the highest level of bat activity of the four study areas and although bat activity was low, there was a trend of bat activity increasing towards the end of August and early September (Figure 1) as predicted for swarming sites.

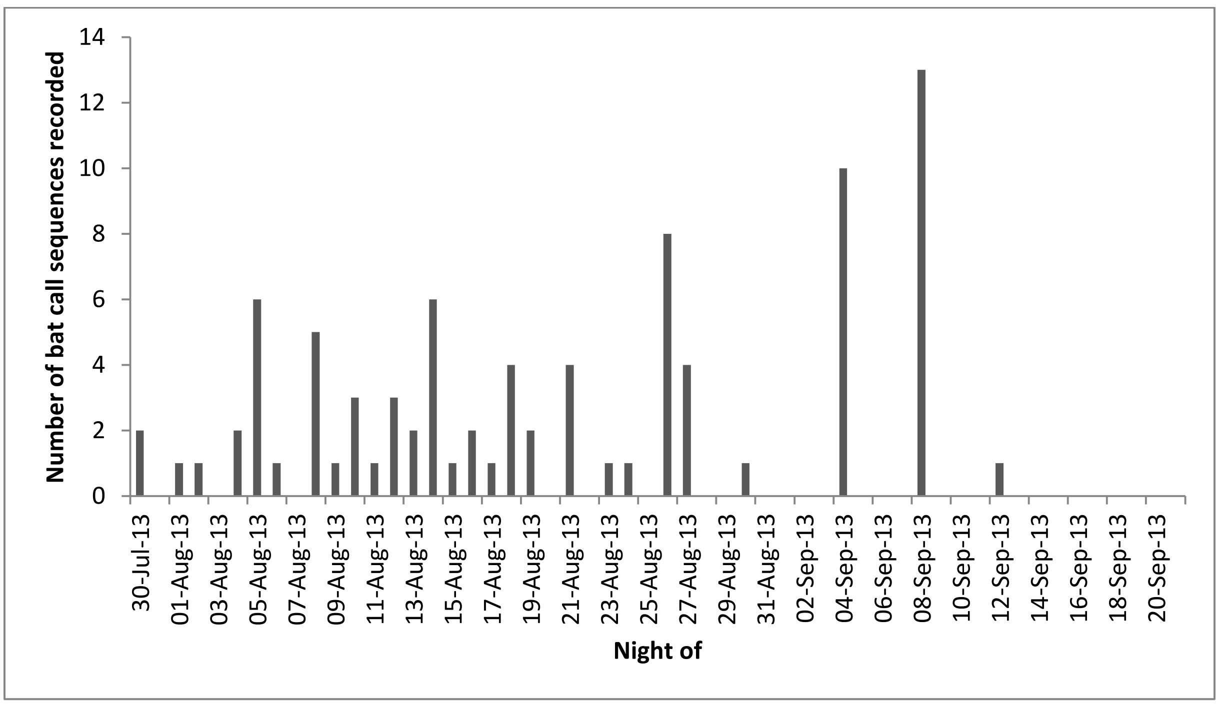

Figure 1. Number of bat call sequences recorded, by night, at the Smithfield abandoned mine opening, July 30 to September 20, 2013.

Table 4. Number of echolocation bat call sequence files recorded per night for the 2013 survey of bat activity at the proposed Kemptown Wind Energy Project area, Colchester County, Nova Scotia. MYO = Myotis species, LACI = *Lasiurus cinereus.*

	Site 1	Site 2 (low mic)		Site 2 (high mic)		Nightly total
Night of	**MYO**	**MYO**	**LACI**	**MYO**	**LACI**	**all sites**
30-Jul-13	0	0	0	0	0	0
31-Jul-13	2	1	0	0	0	3
01-Aug-13	0	0	0	0	0	0
02-Aug-13	0	0	0	0	0	0
03-Aug-13	0	0	0	0	0	0
04-Aug-13	0	0	0	0	0	0
05-Aug-13	0	0	0	0	0	0
06-Aug-13	0	0	0	1	0	1
07-Aug-13	0	0	0	0	0	0
08-Aug-13	0	0	0	0	0	0
09-Aug-13	0	0	0	0	0	0
10-Aug-13	0	0	0	0	0	0
11-Aug-13	0	0	0	1	0	1
12-Aug-13	0	0	0	0	0	0
13-Aug-13	0	0	0	0	0	0
14-Aug-13	0	0	0	0	0	0
15-Aug-13	0	1	0	0	0	1
16-Aug-13	0	0	0	0	0	0
17-Aug-13	0	0	1	0	1	2
18-Aug-13	0	0	0	0	0	0
19-Aug-13	0	0	0	1	0	1
20-Aug-13	0	0	0	0	0	0
21-Aug-13	0	0	0	0	0	0
22-Aug-13	0	0	0	1	0	1
23-Aug-13	0	0	0	0	0	0
24-Aug-13	0	0	0	0	0	0
25-Aug-13	0	0	0	0	0	0
26-Aug-13	0	0	0	0	0	0
27-Aug-13	0	0	1	0	0	1
28-Aug-13	0	0	0	0	0	0
29-Aug-13	0	0	0	0	0	0
30-Aug-13	0	0	0	0	0	0
31-Aug-13	0	0	0	0	0	0
01-Sep-13	0	0	0	0	0	0
02-Sep-13	0	0	0	1	0	1
03-Sep-13	0	0	0	0	0	0

Continued on next page

Night of	Site 1 MYO	Site 2 (low mic) MYO	Site 2 (low mic) LACI	Site 2 (high mic) MYO	Site 2 (high mic) LACI	Nightly total all sites
04-Sep-13	0	0	0	0	0	0
05-Sep-13	0	0	0	0	0	0
06-Sep-13	0	0	0	0	0	0
07-Sep-13	0	0	0	0	0	0
08-Sep-13	0	0	0	0	0	0
09-Sep-13	0	1	0	0	0	1
10-Sep-13	0	0	0	0	0	0
11-Sep-13	0	0	0	0	0	0
12-Sep-13	0	0	0	0	0	0
13-Sep-13	0	0	0	0	0	0
14-Sep-13	0	0	0	0	0	0
15-Sep-13	0	0	0	0	0	0
16-Sep-13	0	0	0	0	0	0
17-Sep-13	0	0	0	0	0	0
18-Sep-13	0	0	0	0	0	0
19-Sep-13	0	0	0	0	0	0
20-Sep-13	0	0	0	0	0	0
21-Sep-13	0	0	0	0	0	0
22-Sep-13	0	0	0	0	0	0
23-Sep-13	0	0	0	0	0	0
24-Sep-13	0	0	1	0	0	1
25-Sep-13	0	0	0	0	0	0
26-Sep-13	0	0	0	0	0	0
27-Sep-13	0	0	0	0	0	0
28-Sep-13	0	0	0	0	0	0
29-Sep-13	0	0	0	0	0	0
30-Sep-13	0	0	0	0	0	0
01-Oct-13	0	0	0	0	0	0
02-Oct-13	0	0	0	0	0	0
03-Oct-13	0	0	0	0	0	0
04-Oct-13	-	0	0	0	0	0
05-Oct-13	-	0	0	0	0	0
06-Oct-13	-	0	0	0	0	0
07-Oct-13	-	0	0	0	0	0
08-Oct-13	-	0	0	0	0	0
09-Oct-13	-	0	0	0	0	0
10-Oct-13	-	0	0	0	0	0
Totals	2	3	3	5	1	14
Site average						0.19
Num nights	66		73		73	

Table 5. Number of echolocation bat call sequence files recorded per night for the 2013 survey of bat activity at abandoned mine openings (AMO) near the proposed Kemptown Wind Energy Project area, Colchester County, Nova Scotia. MYO = Myotis species, LACI = *Lasiurus cinereus*, UNKN = unknown species of bat.

	Brookfield AMO				Smithfield AMO			Kemptown AMO		
Night of	MYO	LACI	UNKN	Nightly Total	MYO	LACI	Nightly Total	MYO	LACI	Nightly Total
30-Jul-13	1	0	0	1	2	0	2	-	-	-
31-Jul-13	0	0	0	0	0	0	0	-	-	-
01-Aug-13	1	0	0	1	1	0	1	-	-	-
02-Aug-13	0	0	0	0	1	0	1	-	-	-
03-Aug-13	0	0	0	0	0	0	0	-	-	-
04-Aug-13	2	0	0	2	2	0	2	-	-	-
05-Aug-13	0	0	0	0	6	0	6	-	-	-
06-Aug-13	0	0	0	0	1	0	1	-	-	-
07-Aug-13	0	0	1	1	0	0	0	-	-	-
08-Aug-13	3	0	0	3	5	0	5	-	-	-
09-Aug-13	0	0	0	0	1	0	1	-	-	-
10-Aug-13	0	0	0	0	3	0	3	-	-	-
11-Aug-13	0	0	0	0	1	0	1	-	-	-
12-Aug-13	0	0	0	0	3	0	3	-	-	-
13-Aug-13	0	0	0	0	2	0	2	-	-	-
14-Aug-13	0	0	0	0	6	0	6	-	-	-
15-Aug-13	0	0	0	0	1	0	1	-	-	-
16-Aug-13	0	0	0	0	2	0	2	-	-	-
17-Aug-13	0	0	0	0	1	0	1	-	-	-
18-Aug-13	0	0	0	0	4	0	4	-	-	-
19-Aug-13	0	0	0	0	2	0	2	-	-	-
20-Aug-13	0	0	0	0	0	0	0	-	-	-
21-Aug-13	0	1	0	1	4	0	4	-	-	-
22-Aug-13	0	0	0	0	0	0	0	-	-	-

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	Brookfield AMO				Smithfield AMO			Kemptown AMO		
Night of	MYO	LACI	UNKN	Nightly total	MYO	LACI	Nightly total	MYO	LACI	Nightly total
23-Aug-13	1	0	0	1	1	0	1	-	-	-
24-Aug-13	0	0	0	0	1	0	1	-	-	-
25-Aug-13	0	0	0	0	0	0	0	-	-	-
26-Aug-13	0	0	0	0	8	0	8	-	-	-
27-Aug-13	1	0	0	1	3	1	4	-	-	-
28-Aug-13	0	0	0	0	0	0	0	1	1	2
29-Aug-13	0	0	0	0	0	0	0	0	0	0
30-Aug-13	1	0	0	1	1	0	1	1	0	1
31-Aug-13	0	0	0	0	0	0	0	0	0	0
01-Sep-13	0	2	0	2	0	0	0	1	0	1
02-Sep-13	0	3	0	3	0	0	0	0	2	2
03-Sep-13	0	0	0	0	0	0	0	0	1	1
04-Sep-13	0	0	0	0	10	0	10	0	0	0
05-Sep-13	0	0	0	0	0	0	0	0	0	0
06-Sep-13	0	0	0	0	0	0	0	0	0	0
07-Sep-13	0	0	0	0	0	0	0	0	0	0
08-Sep-13	0	0	0	0	12	1	13	0	0	0
09-Sep-13	0	0	0	0	0	0	0	1	0	1
10-Sep-13	0	0	0	0	0	0	0	0	0	0
11-Sep-13	0	0	0	0	0	0	0	0	0	0
12-Sep-13	1	0	0	1	1	0	1	0	0	0
13-Sep-13	2	0	0	2	0	0	0	0	0	0
14-Sep-13	0	0	0	0	0	0	0	0	0	0
15-Sep-13	0	0	0	0	0	0	0	0	0	0
16-Sep-13	0	0	0	0	0	0	0	0	0	0
17-Sep-13	0	0	0	0	0	0	0	0	0	0
18-Sep-13	0	0	0	0	0	0	0	0	0	0

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Night of	Brookfield AMO MYO	LACI	UNKN	Nightly total	Smithfield AMO MYO	LACI	Nightly total	Kemptown AMO MYO	LACI	Nightly total
19-Sep-13	1	0	0	1	0	0	0	0	0	0
20-Sep-13	0	0	0	0	-	-	-	0	0	0
21-Sep-13	-	-	-	-	-	-	-	0	0	0
22-Sep-13	-	-	-	-	-	-	-	1	0	1
23-Sep-13	-	-	-	-	-	-	-	0	0	0
24-Sep-13	-	-	-	-	-	-	-	0	0	0
25-Sep-13	-	-	-	-	-	-	-	1	0	1
*									Data not shown*	
Site total	14	6	1	21	85	2	87	6	4	10
Site average				0.40			1.64			0.14
Num nights				53			53			73

*Kemptown AMO was sampled further from 26-Sep-13 until 8-Nov-13 although no further bat call sequences were recorded

Discussion

Interpretation of these data are problematic for assessing relative risk to bats at the proposed development given our knowledge of the devastating impacts that white nose syndrome has had, and is having, on local bat populations. Elsewhere, white nose syndrome reduced the summer bat activity by >75% (Dzal et al. 2011). This past winter (2012-2013), there were hundreds of fatalities recorded at several known hibernacula in the province and annual monitoring counts of bats at such hibernacula down, on average, by 94% (Broders and Burns, unpublished data). The disease is now confirmed in seven counties in central Nova Scotia, including the proposed development area. These observations are suggestive of a major mortality event in the area, potentially decreasing the magnitude of bat activity in the area in the summer of 2013. This is supported by other work we are conducting in the region during summer suggesting a 99% reduction in the magnitude of echolocation activity in 2013, relative to 2012 (Segers and Broders, unpublished), and decimation of a number of maternity colonies in the region. For these reasons this dataset must be interpreted with caution.

Despite the above, there was no acoustic evidence of a significant movement or concentration of bats through the area investigated during this pre-construction survey of bat activity. The magnitude of activity was low compared to baseline levels (collected prior to 2007) expected in a forested ecosystem in the region. Although we cannot rule out the possibility that mortality events associated with this development will occur, we have found no evidence to suggest that the proposed project will directly cause a large number of bat mortalities. That being said, in light of white nose syndrome and the recent listing of the species as endangered, the significance of any mortality is greater than just a couple of years ago.

The majority of the identified echolocation sequences recorded for this project were attributable to the two species of Myotis bats known to occur in Nova Scotia, the little brown bat and the northern long-eared bat. This was expected as they are the only abundant and widely-distributed species in the province, and are two of only three species with significant populations in the province (Broders et al. 2003). Although we did not distinguish the calls of Myotis species, the majority of the recorded sequences likely represent the little brown bat, as this species is known to forage in open areas and over water. The northern long-eared bat is a recognized forest interior species (Jung et al. 1999, Henderson and Broders 2008), and is less likely to use open areas for foraging and commuting (Henderson and Broders 2008). Additionally, the northern long-eared bat has lower intensity echolocation calls and is thus not recorded as well as the little brown bat (Miller and Treat 1993, Broders et al. 2004). There were no echolocation sequences that were attributable to the tri-colored bat, which was expected as this species is only locally abundant in southwest Nova Scotia and the proposed development is outside of the known provincial distribution for this species (Farrow and Broders 2011).

Myotis bats are relatively new to the list of species among fatalities at wind turbines sites. This may be due to the fact that the first large scale wind developments were located primarily in western North America, typically in agricultural and open prairie landscapes (reviewed in Johnson 2005b). Fatalities of these resident, non-migratory species were largely absent from these sites, likely due to the association of these species with forested landscapes. More recently, evidence of Myotis fatalities resulting from collisions with wind turbines have been noted at sites in eastern North America (reviewed in Johnson 2005b, Jain et al. 2007, Arnett et al. 2008a). Although there are fewer documented fatalities of Myotis bats compared to long-distance migratory species, there is still a risk of direct mortality.

Other than direct bat mortality as a result of collisions with turbines, there is also the potential that disruption of the forest structure (e.g., removal of trees and fragmentation of forest stands for roads and clearings) will degrade the local environment for colonies/populations of Myotis bats that reside in the area during the summer. This can occur by the elimination of existing roost trees, the isolation of trees left standing, as well as the elimination or degradation of foraging areas for bats. These negative impacts will almost certainly occur and will add to the cumulative impact of habitat loss that is occurring throughout the ranges of these species. Additionally, these resident bat species make what are generally considered to be short distance migrations, in comparison to long-distance migratory behaviour by other bats species, from their summering areas to underground sites where they hibernate. Little is known about the flight behaviour and dynamics of these movements (i.e., height of travel, and routes); therefore, it is difficult to predict the specific effects that wind developments will have on the movements of local populations of bats.

The low number of call sequences attributed to the hoary bat, a long-distance migratory bat species, suggests that there are no large populations or migratory movements of these species at the study area. This fits with our current knowledge of their status in the province, but they do occur regularly but in low frequency although are especially vulnerable to wind facilities. This species is a solitary, tree-roosting species with an extensive distributional range throughout North American (van Zyll de Jong 1985). This species, in addition to red and silver-haired bats, have received the greatest attention with regards to wind energy developments because they make up the large majority of documented fatalities at existing wind energy developments in North America. Any mortality of this species would be significant to Nova Scotia given there low numbers in the region. Significant bat fatality events at wind energy developments occur primarily in the late summer and early fall, peaking during the period that coincides with the long-distance fall migration of these species (Johnson 2005b, Cryan and Brown 2007, Arnett et al. 2008a), leading researchers to believe that migration plays a key role in the susceptibility of certain bat species to wind turbine fatalities (Cryan and Barclay 2009). It has been proposed that this may be because these species travel at a height that puts them at increased risk of collisions with rotating turbine blades (Barclay et al. 2007, Arnett et al. 2008a).

The low number of bat call sequences recorded at the abandoned mine openings suggest they are not major hibernacula. However, given the impacts of WNS such low levels of activity are not unsurprising, even if the sites were important hibernacula.   Although this activity is generally low and would not qualify for the criteria set out by Randall (2011) for designating swarming sites, this current work was carried out post-white nose syndrome which almost certainly reduced the overall magnitude of bat activity recorded. Further, Randall's work was carried out directly at the entrances of underground sites where activity is highest as the animals interact, whereas the detector at Smithfield was placed on a forest edge near presumed entrances and therefore activity may be lower since it is not directly at the swarming site entrance. Despite this, the activity at the Brookfield and Kemptown AMO's suggest that they are not currently major autumn swarming sites for bats. The Smithfield AMO had the highest level of bat activity recorded of all three study areas sampled in this study and the seasonal trend of increasing activity fits the pattern of increased activity at swarming sites in the period of the end of August and early September that begins to decrease around the middle of September (Burns unpublished data; Tutty 2006). These data are more suggestive of the site being a swarming site and may also potentially be a hibernaculum. Alternatively, this site may not represent a swarming site but may be situated along a migration corridor for bats to other travel among swarming sites which may explain the trend in bat activity following the patterns known for the autumn swarming season. Further work would be required to assess the importance of this site as an autumn swarming site, migration corridor or over-wintering site (hibernaculum).

Recommendations

1. *Post-construction monitoring* – A rigorous post-construction monitoring program, appropriately designed to account for searcher efficiency and scavenger rates, needs to be established to quantify bat fatality rates. These surveys should be conducted over an entire season (April to October), but especially during the fall migration period (mid-August to late-September) for at least two years. Should fatalities occur, they should be investigated with respect to their spatial distribution relative to wind turbines, turbine lighting, weather conditions, and other site specific factors, and should trends be identified, operations should be adjusted in an adaptive management framework. In this manner, mitigation can be focused on any identified high risk areas/infrastructure to minimize future fatalities. These data are essential for assessing potential risks at future developments in the region; therefore it is critical that the results of these surveys be appropriately reported.

2. *Retain key bat habitat* – Key bat habitat should be identified and retained in the project area to continue to support existing summer colonies/populations of bats. Retention of these bat habitat resources should be in a spatial manner that provides connectivity in the project area and with the larger landscape to ensure foraging and roosting areas remain well connected. Consideration of the potential for fragmentation of bat habitat resources should also be taken with regards to the development of road networks and transmission lines in the project area.

3. *Minimize project footprint* – To the extent possible, minimize the direct loss of bat habitat resources (e.g., wetlands, riparian areas, mature deciduous-dominated forest stands), and minimize the extent of bat habitat impacted by the development.

4. *Return to pre-project state upon decommissioning* – The project area should be returned to the state that existed prior to the development of the site once the project is decommissioned. This should include planning to ensure the continuity of forest stand succession to provide and maintain appropriate roosting areas well into the future as existing roost trees die off. Retention of forest stands of a range of ages will provide mature trees for bat roosting resources in the future.

5. *Develop an operations fatality mitigation plan* – Recent experimental case studies in Alberta and the United States have demonstrated dramatic reductions in bat fatalities at operational wind energy facilities can be made by changing operational parameters during the peak fatality period (Baerwald et al. 2009, Arnett et al. 2010). These include changes to when turbine rotors begin turning in low winds via alterations to wind-speed triggers and blade angles to lower rotor speed. These studies have found decreases in bat mortalities ranging from 44% to as high as 93% reductions on a nightly basis at relatively low cost to annual power production loss, at approximately ≤ 1%. This plan should be adaptive as operations continue through time and be in place prior to operations commencing such that if any bat mortalities be observed at the site once operational, the plan can be implemented immediately.

6. *Remain up to date with current research* –There is presently an abundance of on-going research aimed at determining the impacts of wind energy developments on populations of bats. Other studies are focusing on investigating the efficacy of potential mitigation measures, including the effects of weather on bat activity patterns and collisions with wind turbines, and possible bat deterrents (including acoustic and radar emissions). As these are active areas of research, it is essential that the most current studies and guidelines are used to guide management decisions and development plans for wind energy projects.

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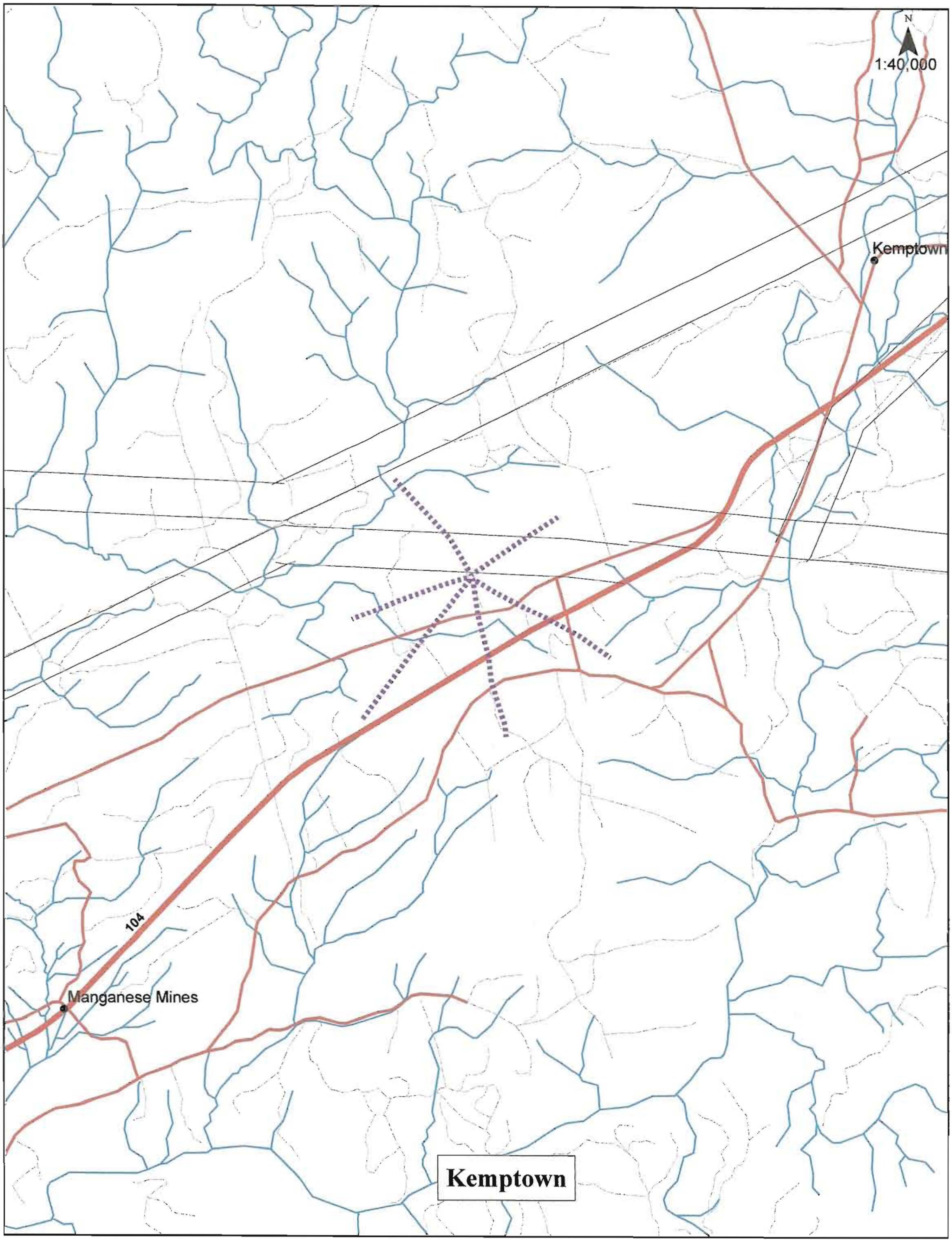
Appendix J

Mainland Moose PGI Study

Moose Pellet Survey
Proposed Wind Farm Kemptown

The following data was set up and conducted by Jody Hamper in the fall of 2011. These transects were set up using aerial photos and GIS maps showing the different stand and land types.

This area has been heavily logged over the years and there were no big stands of mature to overmature wood, only small pockets encountered throughout. There were various stages of young spruce and fir with occasional hardwood saplings. The ground was mostly flat with wet areas scattered through each transect. One major waterway was crossed.



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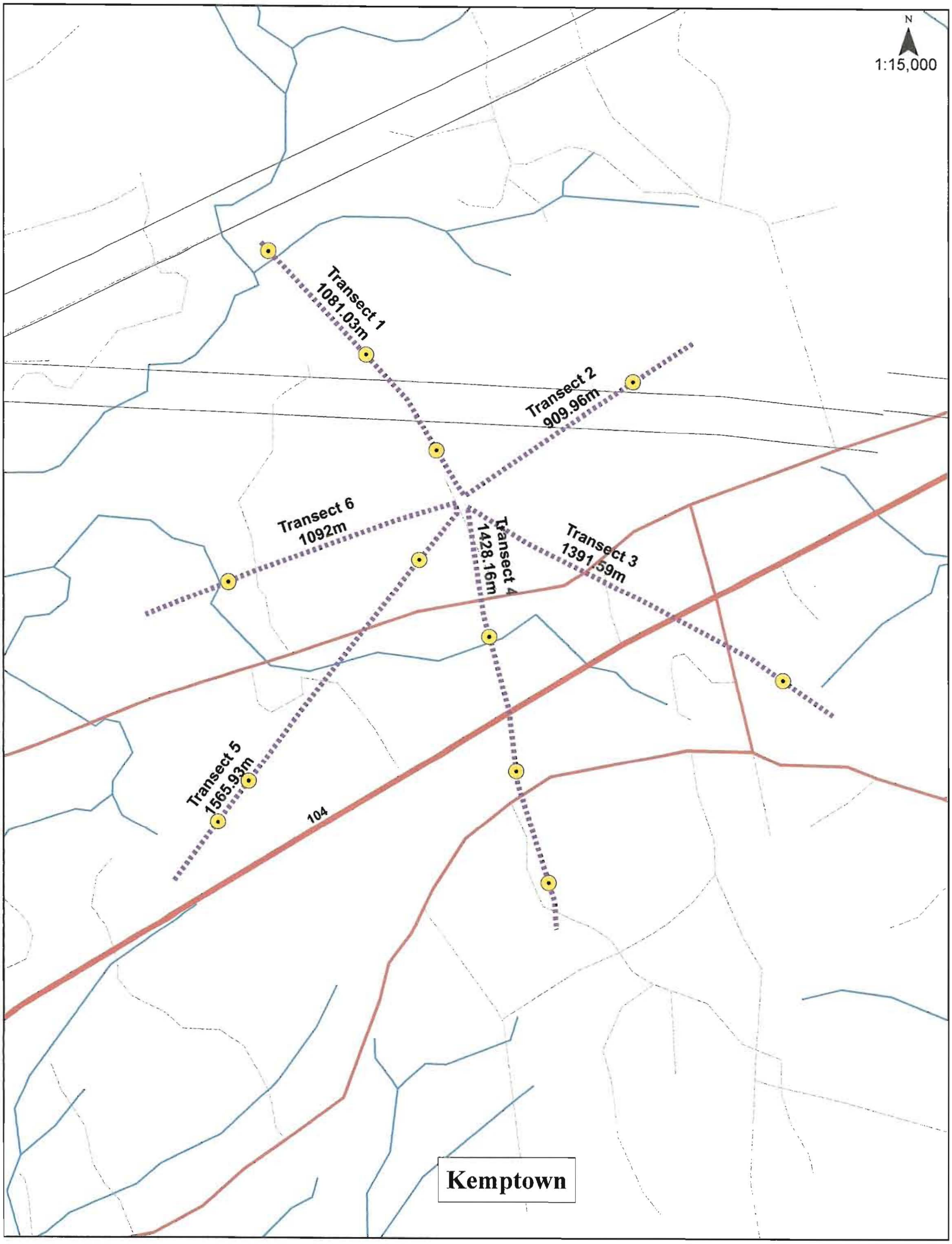

*all deer, No moose

BALEFILL FACILITY, KEMPTOWN Colchester Co

Appendix K

Colchester Municipal Wind Turbine Bylaw

Municipality of the County of Colchester

Chapter 56
Wind Turbine Development By-law

1. Title and Scope

1.1. This By-law is enacted pursuant to Section 172 of the *Municipal Government Act*, SNS 1998, c.18 and shall be known and may be cited as the “Wind Turbine Development By-law” of the Municipality of the County of Colchester and shall apply to all lands within the Municipality.

1.2. This By-law does not exempt any person from complying with the requirements of other by-laws or regulations in force within the Municipality of the County of Colchester and from obtaining any licence, permission, permit, authority or approval as otherwise required by the Municipality, the Province of Nova Scotia, and/or the Government of Canada.

1.3. This By-law shall apply to all Large Scale Wind Turbines and all Small Scale Wind Turbines including those existing prior to the effective date of this By-law, except Section 5 of this By-law which shall not apply so as to invalidate the location of any Large Scale Wind Turbine or Small Scale Wind Turbine existing prior to the effective date of this By-law.

1.4. This By-law shall not apply to Micro Scale Wind Turbines.

2. Definitions

For the purposes of this By-law:

2.1. “**A-Weighted Decibel**” or “**dB(A)**” means a measurement of Environmental Noise, whereby A-frequency weighting is used to compensate for the varying sensitivity of the human ear to sounds at different frequencies;

2.2. “**Ambient Degradation Noise Standard**” means the average noise level over a specified period of time, usually composed of sound from many sources, near and far;

2.3. “**Camp**” means a recreational shelter typically used for weekend or short term activities such as hunting, fishing or snowmobiling, which is not intended for regular human occupation or living;

2.4. “**Cottage**” means a seasonal home, which is typically but not necessarily serviced with running water, onsite sewage disposal system and electricity, and which is equipped to accommodate an extended period of stay of regular human occupation and living;

2.5. “**Council**” means the Council for the Municipality of the County of Colchester;

2.6. “**Decibel**” or “**dB**” means a measurement of sound, namely the scale in which sound pressure level is expressed. When measuring Environmental Noise, a weighting network is used which filters the frequency of sound, and is expressed as “**dB(A)**”;

2.7. “**Decommission Plan**” means a plan approved for the Decommissioning of a Wind Power Project as part of the successful application for a License;

2.8. “**Decommissioning**” means the final closing down and dismantling of a Wind Power Project and associated infrastructure once a Wind Power Project has reached the end of its operation life;

2.9. “**Development Officer**” means the Development Officer appointed by the Council of the Municipality of the County of Colchester or their designate;

2.10. “**Dwelling**” means all structures intended for regular human occupation and living, such as a house or cottage but not a camp or an accessory structure such as a shed or storage area;

2.11. “**Environmental Assessment**” means all documentation required under the *Canadian Environmental Assessment Act* of Canada and any Regulations thereto and *Environment Act* of Nova Scotia and any Regulations thereto;

2.12. “**Environmental Noise**” means a measurement of the noise level already present within an environment in the absence of a Wind Power Project;

2.13. “**External Property Line**” means a common boundary with any parcel of land which is adjacent to those parcels of land which form part of a Wind Power Project;

2.14. “**kW**” means kilowatt;

2.15. “**Large Scale Wind Turbine**” means any Wind Turbine which has a Nameplate Capacity greater than 100 kW, which may be developed as a stand-alone Wind Turbine or in combination with other Wind Turbines in a Wind Farm;

2.16. “**Licence**” means a Licence issued pursuant to this By-law permitting the installation and operation of a Wind Power Project;

2.17. “**Nacelle**” means the frame and housing at the top of the tower that is part of a Wind Turbine which encloses components such as the gearbox and generator, protecting them from the weather;

2.18. “**Nameplate Capacity**” means the manufacturer’s maximum rated output of the Wind Turbine expressed in kilowatts;

2.19. “**Micro Scale Wind Turbine**” means a Wind Turbine which has a Nameplate Capacity of less than 1 kW;

2.20. “**Municipality**” means the Municipality of the County of Colchester;

2.21. “**Owner**” and “**Operator**” mean respectively any owner or operator of a Wind Turbine licensed under this By-law;

2.22. “**Small Scale Wind Turbine**” means a Wind Turbine which has a Nameplate Capacity equal to or less than 100 kW but not less than 1 kW, which may be developed as a stand-alone Wind Turbine or in combination with other Wind Turbines in a Wind Farm;

2.23. “**Setback**” means the measured distance from the base of the Wind Turbine to any point referenced in this By-law;

2.24. “**Temporary Test Tower Facilities**” means temporary measurement towers for the assessment of potential wind energy resources;

2.25. “**Wind Farm**” means two or more Large Scale Wind Turbines electrically connected to the transmission grid or local distribution network;

2.26. “**Wind Power Project**” means a Wind Turbine or Wind Farm and associated property, substations and other utility systems;

2.27. “**Wind Turbine**” means a wind energy conversion system erected to produce electrical power by capturing the kinetic energy in wind and converting it into electricity;

2.28. “**Wind Turbine Height**” means the distance measured from grade to the highest point of the rotor blade’s arc.

3. License Required to Install or Operate Wind Turbine in Municipality

3.1. No individual or organization shall install or operate a Wind Turbine in the Municipality without first having obtained a Licence from the Development Officer.

3.2. No individual or organization who obtains a License pursuant to this By-law shall install or operate a Wind Turbine except in accordance with the provisions of this By-law and with the terms of the License issued pursuant to this By-law.

4. Licensing

4.1. A Licence for a Wind Turbine shall be issued by the Development Officer subject to the following requirements:

a. The Owner or Operator shall submit a completed application in such form as is approved from time to time by the Development Officer;

b. The application shall be co-signed by the registered property owner if the land upon which a Wind Turbine is proposed to be installed and operated is not owned by the Owner and/or Operator of the Wind Turbine;

c. The completed application shall be accompanied with an application fee in an amount determined by Council from time to time by Policy;

d. The requirements contained in clauses 4, 5 and 7 of this By-law shall be satisfied by the applicant in their completed application, and no application shall be considered complete for the purposes of clause 4.3 until such time as clauses 4, 5 and 7 are satisfied by an applicant.

4.2. Duration of Licence:

a. A Licence issued under this By-law will be in effect for twenty-five (25) years unless otherwise cancelled or suspended. If a License is not renewed pursuant to this By-law before the License expires, a License shall automatically terminate at the end of the twenty-five (25) year period of the License.

b. An Owner or Operator may apply to renew a Licence by way of:

i. submitting a completed application to the Development Officer no less than thirty (30) days prior to the expiry date of the Licence in the same form and with the same requirements as set out in clause 4.1 of this By-law.

ii. submitting an application fee in an amount determined by Council from time to time by Policy.

c. An application for renewal of a License shall be considered by the Development Officer in accordance with the By-law in effect at the time that a completed application for renewal of such License is submitted.

d. If the renewal application is approved by the Development Officer, the License shall be renewed for a period of twenty (25) years.

e. A Licence issued or renewed under this By-law shall be automatically terminated if, in the opinion of the Development Officer:

i. construction of the Wind Power Project has not commenced within eighteen (18) months of the date the Licence was issued;

ii. substantial completion of the Wind Power Project has not occurred within five (5) years of the date that the Licence was issued;

iii. following the issuance of a Licence, new or corrected information that materially affects the application is brought to the attention of the Development Officer;

iv. the applicant fails to meet the requirements of Section 7 of this By-law; or

4.3. the entire Wind Power Project has ceased operation for a period of at least one (1) year, unless the Owner or Operator thereof can reasonably establish that additional time is needed to repair or rebuild part or all of the Wind Power Project if the repair is delayed as a result of circumstances beyond his control.

4.4. Notice of Decision:

a. Within a reasonable amount of time of receiving a completed application for a Licence or renewal of a License, the Development Officer shall either issue or renew the Licence or notify the applicant of a decision to refuse the issuance or renewal of the License.

b. A decision to refuse an application for a Licence or renewal of a License shall be made in writing and delivered to the applicant by ordinary mail to the mailing address designated in the application, and shall include the Development Officer's reasons for not issuing or renewing the License.

5. Location Conditions

A Wind Power Project shall meet the following conditions:

5.1. The minimum Setback for a Large Scale Wind Turbine from an External Property Line and public roads is one (1) times the Wind Turbine Height. This minimum Setback shall not apply where the adjoining property is part of the Wind Power Project, in which case there shall be provided to the Development Officer a letter of agreement from the adjoining property owner if different than the applicant.

5.2. The minimum Setback for the location of a Large Scale Wind Turbine from an existing Dwelling on a neighbouring property is 1,000 metres, subject to clause 5.3 of this By-law.

5.3. An increased setback may be required for certain Large Scale Wind Turbines, in excess of the minimum Setback of 1,000 metres as set out in clause 5.2 of this By-law, if an increased minimum Setback is necessary to satisfy the maximum Ambient Degradation Noise Standard in accordance with clause 5.4 of this By-law.

5.4. Large Scale Wind Turbines must not have an Ambient Degradation Noise Standard greater than 36 dB(A) as measured at existing Dwellings.

5.5. a) Subject to 5.5 (b), an applicant may request a reduction of the 1,000 metres minimum Setback provided by clause 5.2 of this By-law, to a minimum Setback of 700 metres, with written permission from all landowners who own parcels of land that share a common boundary with any parcels of land which form part of the Wind Power Project, in a form approved by the Development Officer from time to time. The Development Officer may, in their discretion, grant or refuse such request after considering whether the reduced Setback would be injurious or potentially injurious to any parcels of land or its occupants for any reason.

b) No request pursuant to Section 5.5 (a) shall be granted if it has the impact of reducing the protection of the Location Conditions for any other landowner who has not provided written permission.

5.6. a) Subject to 5.6 (b), an applicant may request a waiver of the maximum Ambient Degradation Noise Standard provided by clause 5.4 of this By-law, to a maximum Ambient Degradation Noise Standard of 40 dB(A), with written permission from all landowners who own parcels of land that share a common boundary with any parcels of land which form part of the Wind Power Project, in a form approved by the Development Officer from time to time. The Development Officer may, in their discretion, grant or refuse such request after considering whether the reduced Setback would be injurious or potentially injurious to any parcels of land or its occupants for any reason.

b) No request pursuant to Section 5.6 (a) shall be granted if it has the impact of reducing the protection of the Location Conditions for any other landowner who has not provided written permission.

5.7. The minimum Setback for the location of a Small Scale Wind Turbine from an External Property Line is two (2) times the Wind Turbine Height. This minimum Setback shall not apply where the adjoining property is part of the Wind Power Project, in which case there shall be provided to the Development Officer written permission from the adjoining property owner, if different than the applicant, in a form approved by the Development Officer from time to time.

6. Conditions of Operation

6.1. Finish

a. A Wind Turbine shall have a non-reflective matte finish in an unobtrusive colour.

6.2. Lettering and Signage

a. A Wind Turbine shall not contain any commercial advertising.

b. The Nacelle of a Wind Turbine may display the name or logo of the manufacturer of the Wind Turbine or the name or the logo of the Owner or Operator of the Wind Turbine.

c. Site signs will be limited to those which identify the Wind Power Project, those which locate access points and those which provide safety and educational information.

6.3. Lighting

a. A Wind Turbine shall not have artificial lighting, except for lighting that is required by Transport Canada or other Provincial or Federal regulatory authorities.

6.4. Access and Safety

a. A Wind Power Project shall be protected from unauthorized access by:

i. having a security fence, which shall have a minimum height of 1.8 metres and a lockable gate; or

ii. having any ladder or permanent tower access located no closer to the ground than 3.7 metres; or

iii. for monopole designs with internal access only, a lockable door.

b. The minimum ground clearance for a rotor blade shall be 7.5 metres.

6.5. Temporary Test Tower Facilities

a. Temporary Test Tower Facilities may remain erected for a maximum of two (2) years after the issuance of a License, after which time any such Temporary Test Tower Facilities must be dismantled unless an Owner and/or Operator satisfies the Development Officer that the Temporary Test Tower Facilities continue to be necessary. The Development Officer may, in their discretion, permit the Temporary Test Tower Facilities to remain erected for such period of time as the Development Officer deems appropriate.

b. For the purposes of clarity, a failure to dismantle Temporary Test Tower Facilities as directed by clause 6.5(a) of this By-law shall be an offence punishable pursuant to Part 10 of this By-law.

6.6. Outdoor Storage

a. Outdoor storage shall be considered an accessory use to a Wind Power Project, and any such outdoor storage occurring after the completion of installation or construction of the Wind Power Project shall be screened from the view from adjacent Dwellings and public highways.

7. Information Required at Time of Application

7.1. Along with the application for a Licence, an applicant shall provide, both in hard copy and in digital format:

a. A site plan, drawn to scale by an engineer or surveyor who is licensed to practice in the Province of Nova Scotia, showing the proposed location of the Wind Turbines and accessory components of the Wind Power Project;

b. A plan, drawn to scale by an engineer or surveyor who is licensed to practice in the Province of Nova Scotia, showing the location of adjacent structures and land parcels and identifying all dwellings, structures and public roads within two (2) kilometres of any proposed Wind Turbine. The plan must also demonstrate compliance with the required minimum Setbacks, where applicable, for the entire Wind Power Project. The plan must also include tables which provide the distance, in metres, from each Wind Turbine to External Property Lines, public roads, Dwellings, Cottages and Camps;

c. The results of a Wind Turbine Noise Modelling Study or an equivalent study deemed satisfactory to the Development Officer, which demonstrates that the Wind Power Project will have an Ambient Degradation Noise Standard as required by clause 5 of this By-law;

d. If applicable, a copy of an Environmental Assessment and notice of the issuance of any Federal and/or Provincial approvals, along with any changes, comments or conditions imposed by Federal and/or Provincial regulatory authorities;

e. A certified copy of the complete manufacturer's specifications for all proposed Wind Turbines;

f. A copy of the applicant's Decommission Plan, which must identify the following:

   i. any above ground components of the Wind Power Project to be removed from the site along with any site remediation, excluding roads, required to return the site to a natural state;

   ii. confirmation that Decommissioning will commence within one (1) year after the Owner or Operator has surrendered the License or the Owner or Operator's License has been terminated;

   iii. confirmation that Decommissioning will be completed within twelve (12) months after commencement; and

   iv. a cost estimate for carrying the Decommission Plan through to completion, prepared by an engineer who is licensed to practice in the Province of Nova Scotia or by another professional individual who has been deemed appropriate by the Development Officer to prepare the requisite cost estimate;

g. Written acknowledgement from the landowner(s) of the parcel(s) of land which form part of the proposed Wind Power Project that the Municipality shall not be liable for any costs, fees or expenses of any kind which may be incurred by the landowner in relation to the Decommissioning of the Wind Power Project in the event that the Decommission Plan is not completed to the landowner's satisfaction or in accordance with any agreement that may have been entered into between the landowner and the applicant;

h. If applicable, confirmation that the applicant has given notice to, and has received approval from, any Federal or Provincial regulatory authorities including but not limited to the Department of National Defense, Natural Resources Canada, Transportation Canada, NAV Canada and any other applicable department or agency with respect to any potential radio, telecommunications, radar and seismoacoustic interference that may result from the proposed Wind Power Project. Copies of all such approvals must be obtained and provided to the Development Officer before an application will be considered complete for the purposes of clause 4.3;

i. any other information that may be requested by the Development Officer to ensure compliance with the requirements of this By-law, including any other information that the Development Officer deems necessary as a result of any community meetings; and

j. demonstration that public notification has been, and will be, complied with as required by clause 9 of this By-law.

8. Requirements of the Applicant During the Construction Phase

The following shall be conditions of any License issued under this By-law:

8.1. Once determined, the applicant shall submit to the Development Officer drawings which demonstrate that the foundations to support a Wind Turbine will satisfy both manufacturer's specifications for the Wind Turbine as well as industry standards for foundations for the Wind Turbine, to be prepared by an engineer who is licensed to practice in the Province of Nova Scotia; and

8.2. Within two (2) months of the installation of a Wind Turbine or the completion of a phase in a multi-phased Wind Power Project, the applicant will submit a Location Certificate prepared by a surveyor who is licensed to practice in the Province of Nova Scotia or a drawing prepared by an engineer who is licensed to practice in the Province of Nova Scotia which confirms that the location of installed Wind Turbine(s), or preparation for the installation of Wind Turbine(s), is in compliance with the minimum Setbacks as required in this By-law.

9. Public Consultation and Notification

Public Notice prior to Installation of Temporary Test Tower Facilities

9.1. Prior to the installation of any Temporary Test Tower Facilities, the applicant must provide written notice to all land owners who own land within two (2) kilometres of the location on which Temporary Test Tower Facilities are intended to be installed, by way of regular mail to the registered address of the land owner, no later than three (3) weeks prior to the commencement of construction. Such written notice must identify:

a. What Temporary Test Tower Facilities are to be installed;

b. Where the Temporary Test Tower Facilities will be located;

c. When the Temporary Test Tower Facilities will installed and when the Temporary Test Tower Facilities will be active;

d. The purpose of the Temporary Test Tower Facilities, including but not limited to the purpose of completing testing in contemplation of a future Wind Power Project and a general description of such future Wind Power Project.

9.2. A copy of the written notice prescribed by clause 9.1 shall also be sent to the Mayor and all Councillors of the Municipality, no later than three (3) weeks prior to the commencement of construction.

9.3. Citizen Monitoring Committee

a. Upon receiving notice of the installation of Temporary Test Tower Facilities, Council may establish a Citizen Monitoring Committee which will be established with respect to the Temporary Test Tower Facilities, which may remain in existence for the life of the Temporary Test Tower Facilities, or for a shorter period if deemed necessary by Council.

b. A Citizen Monitoring Committee established pursuant to clause 9.3(a) may be continued pursuant to clause 9.6(a) in the event that Temporary Test Tower Facilities give rise to an application for a Wind Power Project.

c. The Citizen Monitoring Committee shall be chaired by the Municipal Councillor for the area in which the Temporary Test Tower Facilities are being installed.

d. The function of a Citizen Monitoring Committee established pursuant to clause 9.3(a) of this By-law shall be as determined from time to time by Policy.

Public Notice and Consultation as part of application for Wind Power Project

9.4. As part of the application for a Wind Power Project, the applicant must demonstrate that it has made plans to conduct a community meeting in accordance with this clause, held in the community where the proposed Wind Power Project is to be installed, where the applicant will present to the community on the application it has submitted to the Municipality to install and operate a Wind Power Project, including showing the site plan included with its application and answering any questions concerning the Wind Power Project for which the License has been applied for. This community meeting shall be held at the convenience of the applicant, however the applicant's application shall not be considered complete for the purposes of clause 4.3 of the By-law until such time as this community meeting is held.

9.5. Notice of Community Meeting

a. The applicant shall schedule the community meeting in consultation with the Development Officer and the Chair of the Citizen Monitoring Committee, no later than three (3) weeks before the applicant wishes to hold such community meeting. Immediately after the applicant, the Development Officer and the and the Chair of the Citizen Monitoring Committee reach agreement as to the date, time and location of the community meeting, the applicant shall give written notice of the community meeting to the Mayor and all Councillors of the Municipality, which notice shall include the date, time and location of the community meeting along with an explanation as to which proposed Wind Power Project the community meeting pertains.

b. The applicant shall provide written notice of a community meeting held pursuant to this clause to all land owners who own land within two (2) kilometres of the boundaries of the proposed Wind Power Project by way of regular mail to the registered address of the land owner, no later than three (3) weeks prior to any scheduled community meeting. This written notice shall include the date and time of the community meeting. The applicant shall provide the Development Officer with a complete list of land owners to whom written notice was given pursuant to this clause within two (2) days of such written notices being given.

c. Notice of a community meeting held pursuant to this clause will be advertised in the local daily newspaper at least two (2) times, the first notice to be published at least fourteen (14) days before the date of the meeting and the second notice being at least seven (7) days before the date of the meeting.

d. At the time of publishing a first notice pursuant to clause 9.5(c) of this By-law, the applicant shall provide to the Development Officer a copy of the newspaper in which the first notice was published.

e. At the time of publishing a second notice pursuant to clause 9.5(c) of this By-law, the applicant shall provide to the Development Officer a copy of the newspaper in which the second notice was published.

9.6. Citizen Monitoring Committee

a. During the community meeting, Council may give notice of the continuation of, or the establishment of, a Citizen Monitoring Committee which will be continued or established with respect to the proposed Wind Power Project after the issuance of the License or renewal of a License, which may remain in existence for five (5) years or for a different time period if deemed necessary by the Chair of the Citizen Monitoring Committee.

b. The Citizen Monitoring Committee shall be chaired by the Municipal Councillor for the area in which in which the proposed Wind Power Project will be located.

c. The function of a Citizen Monitoring Committee continued or established pursuant to clause 9.6(a) of this By-law shall be as determined from time to time by Policy.

9.7. Notice of Approval

a. Notice of an approval of a License shall be sent by the Development Officer to those land owners who own land within two (2) kilometres of the boundaries of the approved Wind Power Project, by way of regular mail within five (5) days following the issuance of the License.

10. Enforcement

10.1. Right of Inspection

a. The Development Officer may, for the purpose of ensuring compliance with this By-law and the terms of a License issued pursuant to this By-law, enter in or upon any land or premises at any reasonable time upon reasonable notice.

b. If any individual or organization attempts to interfere or interferes with the Development Officer in the exercise of a power pursuant to this By-law, the Development Officer may apply to a judge of the Supreme Court of Nova Scotia for an order to allow the Development Officer to enter in or upon the premises for the purpose of ensuring compliance with this By-law and the terms of a License issued pursuant to this By-law and for an order restraining the individual or organization from further interference.

10.2. Offence

It shall be an offence to:

a. contravene any provision of this By-law;

b. contravene any condition in a Licence issued or renewed pursuant to this By-law; or

c. fail to comply with any representations contained within an application upon which a Licence was issued or renewed pursuant to this By-law.

10.3. Punishment

a. Any individual or organization who commits an offence pursuant to clause 10.2 of this By-law shall be punishable on summary conviction as follows:

i. for a first offence, by a fine of not less than $1,000 and not more than $5,000 and to imprisonment of not more than two (2) months in default of payment thereof;

ii. for a second offence, by a fine of not less than $2,000 and not more than $10,000 and to imprisonment of not more than two (2) months in default of payment thereof; and

iii. for a third and subsequent offence, by a fine of not less than $5,000 and not more than $20,000 and to imprisonment of not more than two (2) months in default of payment thereof.

10.4. Additional Penalty

a. In addition to any penalty under clause 10.3 of this By-law, in the event of an offence under this By-law, the Development Officer may:

   i. suspend a Licence for a period of up to three (3) months for a first conviction, and

   ii. revoke a Licence for a second conviction within any three (3) year period.

b. A suspension or revocation shall preclude any individual or organization from

   i. in the event of a suspension, receiving a Licence or renewal of a License for the period of the suspension, and

   ii. in the event of a revocation, receiving a License or renewal of a License for five (5) years,

in respect of the same Wind Power Project in relation to which the offence was committed.

10.5. Enforcement of Decommission Plan

a. At the end of the operational life of a Wind Power Project or part thereof, occurring either at the choice of the Owner and/or Operator or for any other reason contemplated in this By-law, and upon a finding by the Development Officer that the Decommission Plan has not been carried out in a way satisfactory to the Development Officer, the Development Officer may:

   i. give notice to the Owner and/or Operator advising them of any steps necessary to complete the Decommission Plan and directing the Owner and/or Operator to take such steps to complete Decommissioning of the Wind Power Project within a reasonable period of time and at the Owner and/or Operator's expense;

   ii. if the Owner and/or Operator does not abide by direction of the Development Officer within a reasonable period of time after notice is given pursuant to clause 10.5(a)(i) of this By-law, carry out any steps the Development Officer had deemed necessary to complete Decommission of the Wind Power Project on behalf of the Owner and/or Operator. All costs incurred in the course of such Decommissioning undertaken by the Development Officer shall be the responsibility of the Owner and/or Operator and shall be immediately payable by the Owner and/or Operator to the Development Officer upon demand.

b. This Section shall operate in addition to the provisions contained on clause 10.3 of this By-law.

10.6. Appeals

a. Any applicant whose application for a Licence or renewal of a License has been refused may, within thirty (30) days from the date of the Development Officer’s decision, file an appeal to Council or to a Committee designated by Council from time to time by Policy, in writing and in such form as is approved from time to time by Council by Policy.

b. Any individual or organization whose License has been suspended or revoked may, within thirty (30) days from the date of the Development Officer’s decision, file an appeal to Council or to a Committee designated by Council from time to time by Policy, in writing and in such form as is approved from time to time by Council by Policy.

c. Council or the Committee designated by Council from time to time by Policy shall hear an appeal commenced pursuant to clauses 10.6(a) or 10.6(b) at a hearing held within a reasonable period of time after the filing of the appeal and Council may dismiss the appeal, allow the appeal and reverse the decision under appeal, or vary the decision under appeal.

d. The filing of an appeal pursuant this clauses 10.6(a) and 10.6(b) does not vary, suspend or stay the decision of the Development Officer, and decision of the Development Officer shall remain in full force and effect unless and until it is reversed or varied by Council or the Committee designated by Council.

e. The right of appeal provided by clauses 10.6(a) and 10.6(b) shall expire thirty (30) days after the date of the Development Officer’s decision.

f. All other decisions made by the Development Officer pursuant to this By-law shall be final.

11. Transition

11.1. Any application for a License or renewal of a License submitted prior to the date of the coming into force of this By-law, and which is undecided as of the coming into force of this By-law, shall be deemed to be a new application for a License or renewal of a License submitted as of the date of the coming into force of this By-law, and shall be decided in accordance with this By-law.

12. Severability

12.1 Each and every of the foregoing clauses of this By-law is severable and that if any provision of this By-law should for any reason be declared invalid by any court, it is the intention and desire of the Council of the Municipality that each and every of the then remaining provisions hereof should remain in full force and effect.

THIS IS TO CERTIFY, that By-law # 56, Wind Turbine Development By-law, was duly approved at a duly called meeting of the Municipal Council of the Municipality of the County of Colchester, duly convened and held on the 30th day of October, A.D., 2013.

GIVEN under the hand of the Municipal Clerk and under the corporate seal of said Municipality this 6th day of November, A.D., 2013.

____

Ramesh Ummat
Municipal Clerk

I, Ramesh Ummat, Municipal Clerk of the Municipality of the County of Colchester, do hereby certify that the adjacent Notice of Approval is a true copy of the Notice of Approval of Chapter 56 – Wind Turbine Development By-law, duly advertised in the Wednesday, November 6, 2013 issue of the Truro Daily News.

Given under the hand of the Municipal Clerk and under the corporate seal of said Municipality this 6th day of November, 2013.

____

Municipal Clerk

The Municipality of Colchester
Notice of Approval
Wind Turbine Development By-law

TAKE NOTICE that on Wednesday, October 30, 2013, the Council of the Municipality of the County of Colchester approved amendments to Chapter 56 - Wind Turbine Development By-law.

The amendments to the By-law, effective immediately, increase the minimum setback requirement for large scale wind turbines, in combination with meeting an established maximum sound pressure level to determine location. Enhanced public consultation and communication requirements are also in place.

Copies of the By-law are available from the Community Development Office, 1 Church Street, Truro, or through the County's website at www.colchester.ca

Dated November 6, 2013

Ramesh Ummat
Chief Administrative Officer

Appendix L

COMFIT Approval and Certification

NOVA SCOTIA
Energy
Office of the Minister

Suite 400, 5151 George Street, PO Box 2664, Halifax, Nova Scotia, Canada B3J 3P7 • Telephone 902 424-7793 Fax 902 424-3265 • www.gov.ns.ca/energy

March 12, 2013

Reuben Burge
796 Dan Fraser Rd
Pictou, NS
B0K 2A0

Dear Affinity Renewables:

Re: Community Feed-In Tariff Approval

On June 12 2012 Nova Scotia Department of Energy, presented you with your Community Feed-In Tariff (COMFIT) approval for three 1.6 MW wind turbines (for a total of 4.8 MW) in Kemptown, Nova Scotia. Since that time more capacity has become available on the substation, and therefore the approval has been increased to 5.4 MW (Project Number 182). Attached to this letter is a certificate indicating your approval.

In order to maintain your COMFIT approval, you must comply with:

(1) The specifications of the proposed project as outlined in your COMFIT application and any supplemental information provided; any alterations to your proposal (e.g., technology type, ownership structure, specifications, etc.) requires prior approval by the Department. Alterations must be submitted in writing for approval.

(2) The Electricity Act and the Renewable Electricity Regulations. Amongst other things, section 34 of the Renewable Energy Regulations requires you to submit a report to the Department of Energy within 30 days of your project's connection to the distribution grid, failure to do so may result in revocation of your COMFIT approval.

As a condition of your approval, you must comply with any conditions set by Nova Scotia Power Incorporated.

As a further condition of approval, you must complete:

- Community Consultation: A minimum of two public information sessions must be held prior to commencing construction of the project. Results of the information sessions must be submitted to the Department of Energy, outlining any community concerns with the proposed project.

- Project Time Line and Milestones: As per S. 30 of the *Renewable Electricity Act and Regulations,* a detailed project schedule including timelines and key milestones must be submitted to the Department of Energy within 60 days of approval. You will be required to report on the progress of the project, in accordance with your submission.

- Detailed Business Plan and Financial Estimates: As per Section 6 of the COMFIT application, applicants must provide detailed information regarding the site's resource assessment and the project's financial viability, including the cost of unexpected sources of capital.

- Environmental Assessment.

- Wind Energy Mapping: The Department of Energy and Department of Natural Resources are endeavoring to map wind development within the province. All approved projects are required to submit the appropriate geographic information system data, and work collaboratively to address any recommendations emerging from an assessment of the cumulative impact of wind energy in the province. More information is provided in the guidance note.

These conditions are not an exhaustive list of the permits and approvals needed for your project. COMFIT approval does not supersede any additional regulations, permits or approval required by other government authorities as your project unfolds. Projects must still comply with all other conditions and milestones as set by government entities and Nova Scotia Power Inc. Failure to meet additional requirements may result in revocation of your COMFIT approval, even though they may not be an explicit condition at this time.

A COMFIT guidance note is attached with information pertaining to the implementation of your project. The guidance note is not a condition of approval, but information that may be useful to you as you implement your project. As per Directive 004: Annual Progress reports, the Department looks forward to receiving your annual reports on how COMFIT proceeds have assisted in meeting community sustainability goals.

Please note that you are also required to submit a report to the Department of Energy within 30 days of your project's connection to the distribution grid as identified in Section 34 of the Renewable Electricity Regulations. Failure to do so may result in revocation of your COMFIT approval.

If you have any questions about your approval, or if we can be of further assistance to you, please call COMFIT Clerk at (902) 424-5293 and a representative will be happy to assist you.

Yours sincerely,

Charlie Parker

Charlie Parker
Minister

Enclosure

№. Project 182 REISSUED

Community Feed-In Tariff Approval

This certifies that *Affinity Renewables* has received Community Feed-In Tariff Approval by the Nova Scotia Department of Energy for a 5.4 MW large wind project in Kemptown, Nova Scotia. Approval may be revoked should a project not meet the requirements of the Community Feed-In Tariff program or deviate from details specified in its Community Feed-In Tariff application.

NOVA SCOTIA
Department of Energy

Charlie Parker
Minister

№. Project 182

Community Feed-In Tariff Approval

This certifies that *Affinity Renewables* has received Community Feed-In Tariff Approval by the Nova Scotia Department of Energy for a 5.4 MW large wind project in Kemptown, Nova Scotia. Approval may be revoked should a project not meet the requirements of the Community Feed-In Tariff program or deviate from details specified in its Community Feed-In Tariff application.

NOVA SCOTIA
Department of Energy

Charlie Parker
Minister