Post-Construction Follow-Up Plan for Bird and Bat Resources for the Wolfe Island Wind Plant (the "Plan")

FINAL DRAFT

November 2008

Developed Among

Canadian Renewable Energy Corporation ("CREC")

Environment Canada / Canadian Wildlife Service ("EC")

Natural Resources Canada ("NRCan")

Ontario Ministry of Natural Resources ("MNR") and

Ducks Unlimited Canada ("DUC")

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ATTACHMENT A: Letter of Commitment – CREC to the Ontario Ministry of the Environment

1.0 Introduction

1.1 BACKGROUND

Canadian Hydro Developers, Inc. ("Canadian Hydro"), through its wholly owned subsidiary CREC, is developing a 197.8 megawatt ("MW") wind plant on Wolfe Island, Township of Frontenac Islands, Frontenac County, Province of Ontario. Eighty-six 2.3 MW wind turbine generators ("WTG") and ancillary facilities will be placed strategically over the western portion of Wolfe Island with additional supporting electrical infrastructure on the Kingston mainland (the "Project"). This Plan has been designed in consideration of the unique environment surrounding the Wolfe Island Wind Plant.

BirdLife International, in cooperation with Bird Studies Canada and Nature Canada has identified Wolfe Island as an Important Bird Area ("IBA") due to the presence of globally and continentally significant numbers of "congregatory" waterfowl species that gather offshore during the spring migration, specifically Greater Scaup and Canvasback (~ 2% and 1% of their respective North American populations), and Canada Goose (≥1% of combined biogeographic populations) (information is available at www.bsc-eoc.org/iba/site.jsp?siteID=ON037). In addition, Wolfe Island supports notable landbird populations (albeit not in numbers of global or continental importance) including wintering raptors and Tree Swallows. The high quality grassland habitat that attracts wintering raptors also supports a high abundance and diversity of grassland breeding bird species of conservation priority (Cadman et al. 2007; Ontario Partners in Flight 2006). As discussed in Section 7.9.1 of the Project's Environmental Review Report ("ERR"), Wolfe Island is a Category 4 Level of Concern[1] project from the perspective of bird use, based on criteria provided in Environment Canada's *Wind Turbines and Birds: A Guidance Document for Environmental Assessment* (April, 2007).

Recognizing the IBA designation related to waterfowl, as documented in the Project's ERR, and the importance of the area to wintering raptors and breeding grassland birds, extensive primary data was collected through multiple-year bird and bat baseline studies on Wolfe Island pre-construction. This data was further augmented with secondary data from published and unpublished sources to generate a robust data set from which to assess the potential effects of the Project.

Wolfe Island would be a Sensitivity Rating 3 (High) project for bats based on the criteria provided in the Ontario Ministry of Natural Resources *Guideline to Assist in the Review of Wind Power Proposals: Potential Impacts to Bats and Bat Habitats* (August 2007). Potential concerns with bats are generally associated with the Projects proximity to the shoreline of Lake Ontario as an area that could potentially act as a corridor or channeling feature for migrating bats.

The potential environmental effects to birds and bats and associated mitigation measures, based upon this dataset, ornithological advice, and professional opinion, among other factors, are provided in ERR Section 7. Additionally, bird and bat post-construction monitoring commitments are provided in ERR Section 9. These commitments provide the first step of

[1] Projects in this category are considered to present a relatively high level of potential risk to birds.

confirming the ERR predictions noted in ERR Section 7 and provide the basis from which actions contained in the Plan may stem.

As stated in ERR Section 7, the environmental effects of Project components are predicted to be limited on birds and bats during construction and operation of the wind plant. The level of impact to birds and bats (excluding species at risk) after protection and mitigation measures have been employed is rated as low (i.e., slight decline in these species over the life of the Project).

Potential mortality, habitat fragmentation, and disturbance effects to Short-eared Owls, a species of federal and provincial Special Concern, may result in fewer owls being present in the study area[2] during Project operation. Short-eared Owl appears to be at some risk at the McBride Wind Farm in Alberta (Brown and Hamilton, 2004) so to account for this uncertainty, the level of impact to the Short-eared Owl after protection and mitigation measures have been employed is rated as medium (i.e., potential decline in this species to lower than baseline).

Upon finalization of the ERR there was some concern regarding the level of certainty in these predictions. The mitigation measures contained in the adaptive management section of this Plan were developed to address this situation.

1.2 RATIONALE FOR THE PLAN

The implementation of this Plan will verify the predictions of the environmental assessment ("EA") reports prepared in accordance with the Ontario *Environmental Assessment Act* ("EAA") and the *Canadian Environmental Assessment Act* (the "CEA Act"). Should any unanticipated potentially significant adverse environmental effects be identified, the provisions of this Plan will mitigate those effects so they do not become significant.

The rationale for the Plan relevant to both provincial and federal requirements is outlined below. Given these requirements and the importance of Wolfe Island and the surrounding area to waterfowl, as well as wintering raptors and grassland birds, and particularly the placement of a wind plant on the Island, CREC has actively participated with EC, MNR, NRCan and DUC in the development of this Plan. This plan was developed in consideration of the unique features of Wolfe Island.

The Plan has been designed by CREC to achieve all of the provincial and federal requirements.

Ontario Environmental Assessment Act

As part of the Project's Environmental Screening Process under Ontario Regulation 116/01 the *Electricity Projects Regulation* ("Regulation 116/01"), CREC committed to developing this Plan with the MNR and EC who have specialist or expert information with respect to the Project. This is documented in a letter of commitment sent from CREC to the Ontario Ministry of the Environment on March 14, 2008. A copy of this letter is provided in Attachment A.

[2] Please refer to section 1.6.1 of the ERR for a description of the study area.

Canadian Environmental Assessment Act

NRCan, as a Responsible Authority for the Project under the CEA Act, S.C. 1992, c. 37, determined pursuant to section 38 of the CEA Act that a follow-up program for the Project is appropriate in the circumstances.

The CEA Act defines “follow-up program” as a program for:

a. verifying the accuracy of the environmental assessment of a project, and

b. determining the effectiveness of any measures taken to mitigate adverse environmental effects of the project.

The CEA Act also provides that the results of a follow-up program may be used for implementing adaptive management measures or for improving the quality of future environmental assessments.

In addition to the above, the adaptive management strategy contained in Section 3.0 of this Plan outlines mitigation measures that will be implemented should certain unanticipated adverse environmental effects occur.

1.3 ROLES AND RESPONSIBILITIES

CREC:

As the proponent of the Project, CREC is responsible for designing and implementing the Plan, for implementing the post-construction bird and bat monitoring program and, if necessary, implementing the adaptive management measures or mitigation measures described in the Plan.

In all cases the Parties will work in a collaborative manner in designing and carrying out this Plan.

CREC is also responsible for reporting results to NRCan, EC and MNR, and DUC as appropriate, and preparing material for dissemination to parties and to stakeholders according to the Plan or as may reasonably be requested by NRCan.

NRCan:

As a Responsible Authority for this Project under the CEA Act, NRCan determined that a follow up program was required. Under subsection 17(1) of the CEA Act, NRCan delegated the design and implementation of this plan to CREC. The design and implementation of the plan must be done to the satisfaction of NRCan.

NRCan is responsible for ensuring the implementation of the Plan as per subsection 38(1) of the CEA Act. In its role of ensuring the implementation of the Plan, NRCan will draw on the expertise of EC and the MNR in accordance with their jurisdiction.

NRCan is also responsible for including on the Canadian Environmental Assessment Registry internet site, a description summarizing the Plan and its results or an indication of how a full description of the program and its results may be obtained.

NRCan will receive all reports and notifications required according to this Plan from the proponent and will ensure that these are disseminated to EC and the MNR as appropriate. NRCan will be included in any correspondence between the proponent and EC or the MNR related to the Plan, should this occur.

EC:

EC's jurisdictional responsibilities relate to the protection of migratory birds and species at risk as mandated by the *Migratory Birds Convention Act, 1994, and the Species at Risk Act (SARA).* As a Federal Authority under the CEA Act with specialist or expert information or knowledge with respect to this Project, EC will be responsible for providing, on request, to NRCan specialist or expert information or knowledge in its possession. EC will also be responsible for providing any assistance requested by NRCan concerning the implementation of the Plan on which NRCan and EC have agreed.

MNR:

MNR's jurisdictional scope is related to bird and bat species as mandated by the *Fish and Wildlife Conservation Act.* MNR's jurisdiction also includes species under the *Endangered Species Act, 2007.* MNR will be responsible for providing, on request, to NRCan specialist or expert information or knowledge in its possession. MNR will also be responsible for providing any advice requested by NRCan concerning the implementation of the Plan on which NRCan and MNR have agreed.

For any issues associated with a species identified under both the federal *Species at Risk Act, 2003* and the Ontario *Endangered Species Act, 2007*, discussions will take place with EC or MNR or both as each of those agencies considers appropriate.

DUC:

As per DUC's original invitation from CREC to participate in the development of the Plan, DUC will be consulted on issues related to waterfowl.

Canadian Environmental Assessment Agency ("CEAA"):

The CEAA will continue in its role as Federal Environmental Assessment coordinator for the duration of the implementation of the Plan.

1.4 DECISION MAKING

CREC, NRCan, EC and the MNR (collectively 'the Parties') will work together in an open and honest manner, with the goal of making decisions collectively on matters related to this Plan. In the case where a collective decision cannot be achieved, NRCan will consider the expert advice of MNR and EC as appropriate and reasonably determine what is required on the part of the proponent, which may include the implementation of mitigation measures that are technically and economically feasible, in order to ensure that the Project does not cause significant adverse environmental effects.

1.5 GUIDANCE DOCUMENTS

Where applicable, the following guidance documents have been considered in the preparation of this Plan:

- EC's "Wind Turbines and Birds – A Guidance Document for Environmental Assessment" (Environment Canada, 2007a) and "Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds" (Environment Canada, 2007b). Hereafter referred to as 'EC's Guidance.'
- MNR's "Guideline to Assist in the Review of Wind Power Proposals, Potential Impacts to Bats and Bat Habitats" (Ontario Ministry of Natural Resources, 2007a), and the "Guideline to Assist in the Review of Wind Power Proposals, Potential Impacts to Birds and Bird Habitats" (Ontario Ministry of Natural Resources, 2007b).

1.6 PLAN PROVISIONS

The provisions of this Plan set out the following items regarding bird and bat resources:

- the purpose of the post-construction monitoring program as described in ERR Section 9;
- the data to be collected under the post-construction monitoring program and the timing of data collection;
- timing of when data and analysis will be delivered to NRCan, EC, MNR and DUC for review as necessary;
- identification of the Party(ies) who will be responsible for the review of specific information;
- determining how, what, if, and when information will be made available to the public;
- the criteria that will be used to make mitigation decisions (i.e., adaptive management strategies) based upon the post-construction monitoring data;
- identification of the decisions that can be made (e.g., implementation of mitigation measures); and,

- the factors that will be used to decide if the post construction monitoring program or aspects of the program should be extended, shortened, or otherwise altered.

Each of the above items is described in the following sections.

2.0 Post-Construction Monitoring Program

2.1 PURPOSE AND TIMING

The purpose of the bird and bat post-construction monitoring program is, in part, to verify the accuracy of the predicted effects documented in the ERR and to determine the effectiveness of the measures taken to mitigate adverse environmental effects of the Project documented in the ERR. Furthermore, any unanticipated potentially significant adverse environmental effects discovered during the post-construction monitoring program will be mitigated as described in Section 3.0. Post-construction monitoring for birds and bats can be conducted in conjunction with each other to improve the efficiency of field monitoring. Therefore, the methods outlined below have been designed to address both birds and bats. Section 9 of the ERR identifies post-construction bird and bat monitoring elements to be conducted during the first three years of plant operation. These elements have since been refined through consultation with NRCan, EC, MNR, and DUC, and are listed below. Note that the timing and frequency of these surveys is described in greater detail in Section 2.2. The monitoring program has been designed to capture the peak periods of activity for each species group.

- *mortality monitoring:* at representative WTGs year round during every month. Searcher efficiency and scavenger trials will be conducted as appropriate each year according to EC's Guidance
- *raptor use surveys:* during December-March. Protocols will match the pre-construction baseline survey protocols used in 2006-2007
- *bi-weekly aerial waterfowl habitat use surveys:* of the Wolfe Island study area shoreline during spring throughout the months of March-May and the autumn from September 1st to freeze-up
- *potential disturbance effects to grassland breeding birds survey:* The surveys will include as many pre-construction point count locations as practicable, and the establishment of new point count locations to ensure adequate sampling to assess effects. Point count surveys will use the same protocols as the pre-construction surveys
- *marsh point counts and area searches: survey marshes* within 500 m of representative wind turbines. Routes, point counts, locations, and survey protocols will be the same as the pre-construction surveys.
- *woodland point counts and area searches*: point count and area search surveys in two woodlots greater than 10 ha in proximity to WTGs (i.e., forested area associated with the Big Sandy Bay ANSI, and the woodlot along the south side of the Sand Bay Wetland).[3]
- *grassland point counts and area searches*: area searches in the two large grassland areas that were surveyed pre-construction

[3] Pre-construction baseline surveys, consistent with EC's monitoring protocols, were conducted in these woodlots during the breeding bird season in 2008. The same point count and area search locations will be surveyed post–construction.

- *wetland point counts and area searches*: breeding waterfowl surveys at random sites located close to WTGs and at comparable sites located further away from WTGs
- *waterfowl inland foraging surveys*: field-feeding geese and ducks surveys.

2.2 PRIMARY DATA COLLECTION

Data collection will be conducted by field personnel skilled at identifying birds by song and sight and bats by sight. To the extent possible, the same field personnel who carried out the pre-construction baseline studies will carry out the post-construction monitoring works to assist in standardizing the datasets.

The detailed monitoring methodologies, including duration and frequency, as developed in collaboration with NRCan, EC, and the MNR are discussed below. DUC has also participated in the development of the post-construction monitoring program with regard to waterfowl. The post-construction monitoring program will be reassessed by NRCan, EC, MNR, CREC, and, as necessary, DUC at the end of each monitoring year. Pending the reassessment results, the program methodologies, frequencies, and durations may be reasonably modified by the Parties to better reflect the findings, and this Plan will be updated accordingly. In the event that other wind energy facilities are developed in the vicinity of the Wolfe Island Wind Plant, CREC will discuss with EC, MNR, and NRCan whether this Plan should be revised as appropriate.

Specifically, the three year post-construction monitoring program will include:

2.2.1 Bird Mortality Monitoring

Background

The Project is a Category 4 Level of Concern project from the perspective of bird use, based on criteria provided in EC's Guidance. As noted in this guidance document, projects in this category present a relatively high level of potential risk to birds and require the highest level of effort with respect to environmental assessment, including follow-up monitoring. The project has been subject to intense public, interest group, and government agency scrutiny, in part because of its importance to a diverse group of bird communities that in sum inhabit the island year-round. Additionally, it is important to address stakeholder concerns over potential significant adverse environmental effects to birds and bats by conducting a comprehensive post-construction monitoring program.

Monitoring

Mortality monitoring within a 60 m search area radius from the base of all WTGs will be conducted year-round from January to December. EC's Guidance suggests that a subset of turbines at large facilities be initially visited twice-weekly. Given the importance of the study area to swallows in late July and August, and to raptors and other bird groups during spring and fall migration, twice-weekly surveys are justified during these periods to assess the magnitude of mortality effects.

This rigorous survey schedule is also initially targeted during the winter months (i.e., November through March) to determine whether wintering raptors are also subject to mortality due to the Project. During these survey periods, half the WTGs (i.e., 43 WTGs) will be searched twice a week and the other half once a week, and the two groups will be rotated so that one week they receive the less intensive treatment, the next week the more intensive. Although all reasonable efforts will be made to conduct surveys as scheduled, surveys will not be conducted if snowfall and snow drift would limit the effectiveness of searches or if weather presents safety concerns. Weather and snow depth conditions will be noted when surveys were not conducted as scheduled.

Searcher efficiency and scavenger trials will be conducted in accordance with EC guidelines. Searcher efficiency trials will typically be conducted once each year, but will be repeated if searchers change during the year.

Searcher efficiency trials are designed to correct for carcasses that may be overlooked by surveyors during the survey periods. Search efficiency will vary for each individual based upon their own unique characteristics. Searcher efficiency trials involve a "tester" that places bird and bat carcasses under WTGs prior to the standard carcass searches to test the searcher's detection rate. Environment Canada (2007b) provides detailed recommendations on determining searcher efficiency, expressed as a proportion of carcasses expected to be found by individual searchers. Searcher efficiency (Se) is calculated for each searcher as follows:

$$Se = \frac{\text{number of test carcasses found}}{\text{number of test carcasses placed}}$$

Scavenger trials will be conducted six times per year (i.e., early winter, and monthly through spring, summer and early fall). The frequency of monitoring may be adjusted seasonally based on the results of these scavenger trials, and in consultation with EC and MNR. Scavenging trials may show that it is not necessary to visit each WTGs twice weekly during alternating weeks from April to October. Based on results from other Ontario wind plants, mortality during the migration period and during the breeding season are likely to be fairly low. If scavenging rates are low, the searches may be scaled back to once a week for all of the WTGs, and if mortality levels are low in Year 1, the number of WTGs searched during the non-winter months in subsequent years may be reduced as well.

Scavenger trials are designed to correct for carcasses that are removed by predators before the search period. These trials involve the distribution of carcasses in known locations at each wind turbine generator, followed by periodic checking to determine the rate of removal. Proportions of carcasses remaining after each search interval are pooled to calculate the overall scavenger correction factors:

$$Sc = \frac{n_{visit1} + n_{visit2} + n_{visit3},,}{n_{visit0} + n_{visit1} + n_{visit2}} \quad \text{where}$$

Sc is the proportion of carcasses not removed by scavengers over the search period

$\mathbf{n_{visit0}}$ is the total number of carcasses placed

$\mathbf{n_{visit1} - n_{visit3}}$ are the numbers of carcasses remaining on visits 1 through 3

EC staff observed many predators (e.g., coyotes and foxes) during a February 2007 visit to the study area. Accordingly, as noted above, there will be a scavenging trial early in the winter search period. These trials will include raptor carcasses if at all possible since raptors might have lower scavenging rates in comparison to chickens, for example, because of an inherent bias in scavengers.

D. Strickland (2008) reported that eagles and large hawks were rarely scavenged in Oregon and Washington because of what appeared to be an intrinsic aversion of foxes, coyotes, etc. to these birds. If scavenging rates are calculated to be low in the study area, the winter searches may be adjusted to once every week at all WTGs, and ultimately once every two weeks at all WTGs.

There are numerous published and unpublished approaches to incorporating these corrective factors into an overall assessment of total bird and bat mortality. Currently, EC's protocols suggest the use of the following correction formula (Environment Canada, 2008):

C = c / (Se x Sc x Ps), where

C is the corrected number of bird or bat fatalities

c is the number of carcasses found

Se is the proportion of carcasses expected to be found by searchers (searcher efficiency)

Sc is the proportion of carcasses not removed by scavengers over the search period

Ps is the percent of the area searched.

Although not prescribed in any guideline, EC has indicated that most birds and bats will fall within 50 m of the wind turbine generator base. This value will be used to determine the percent of area searched (Ps). With the 60 m radius search area, Ps will equal 100%.

This approach to mortality monitoring will facilitate any potential correlation between mortality occurrences, WTG location, habitat/land use features, and season. Data collected during the mortality monitoring surveys will also be analyzed to determine if mortality rates are different at lit versus unlit (i.e., aviation safety lights) WTGs.

Bird carcasses in good condition may be collected for use in searcher efficiency trials. Persons handling bird carcasses should take reasonable precautions (e.g. gloves, tools etc.) to protect their personal health. Bird carcasses will be placed in heavy-duty plastic bags and transported that day to a freezer, where they will be stored until required for the trials. Carcasses of any species covered under the new *Endangered Species Act, 2007* ("ESA") or the federal *Species*

at Risk Act ("SARA") will be collected in a manner consistent with the conditions of applicable permits (see below) and turned over to the relevant agency. All other bird carcasses will be left in place.

The discovery of injured birds is a rare occurrence (Jain et al., 2007); however, if found, they will be transported to a licensed migratory bird care centre.

As of 30 June 2008, species that are extirpated, endangered, or threatened are protected under the new *ESA (2007)*. Consequently, unless otherwise authorized, possession and transport of species at risk is prohibited under the ESA. In order to carry out the various activities contemplated in this Plan, and to ensure consistency with ESA clause 17(2)b, the MNR will allow CREC and its agents to collect, possess, and transport species at risk as obtained from the study area once a 17(2)b permit has been issued under the ESA. Any conditions attached to the permit relating to handling of injured birds, including raptors and species at risk, will be adhered to.

Additionally, in support of the activities contemplated in this Plan, CREC will apply for a scientific collector's permit under the *Fish and Wildlife Conservation Act* ("FWCA") from the MNR that would allow the CREC and its agents to possess and transport a species protected by this legislation, as obtained from the Plant

Finally, CREC will apply to EC (Canadian Wildlife Service) for a scientific collector's permit under the *Migratory Bird Convention Act, 1994* ("MBCA") that would allow CREC and its agents to collect, possess, and to utilize for scientific research purposes, deceased specimens of migratory birds obtained from the study area.

Other permits, approvals, authorizations, etc, are not likely to be required from the MNR or EC to permit the various activities contemplated in this Plan.

2.2.2 Bat Mortality Monitoring

Background

The Project is considered to have a Sensitivity Rating 3 (High) for bats based on the criteria provided in MNR's *Guideline to Assist in the Review of Wind Power Proposals: Potential Impacts to Bats and Bat Habitats* (August 2007). Potential concerns with bats are generally associated with the Project's proximity to the shoreline of Lake Ontario as an area that could potentially act as a corridor or channeling feature for migrating bats.

Bat mortality has been documented at wind power facilities in a variety of habitats across North America. Nearly every monitored wind power facility in the United States and Canada has reported bat mortality with minimum annual mortality varying between < 1 and 50 bat mortalities/WTG/year (MNR 2006). The majority of bat mortalities at wind power facilities occur in the late summer and fall, and the long-distance migratory bats (i.e., hoary bat, eastern red bat, silver-haired bat) appear to be most vulnerable to collisions with moving turbine blades.

Specific factors causing bat mortality and affecting species vulnerability to wind turbine mortality remain unclear, although recent evidence from Alberta suggests that air pressure differences in the blade vortices may contribute to bat mortality. Ontario specific data is relatively sparse at this time.

Monitoring

Bat mortality monitoring will be conducted according to MNR's *Guideline to Assist in the Review of Wind Power Proposals: Potential Impacts to Bats and Bat Habitats* (August 2007). In general, the mortality monitoring requirements for bats will be captured in conjunction with bird mortality monitoring (described above) to improve field and data collection efficiencies. There are a few notable exceptions because bird and bat mortality monitoring is being conducted in tandem:

- Bat mortality monitoring is normally required by MNR for the first two years of wind turbine operation at a site with a High Sensitivity Rating for bats. However, because bird mortality monitoring is generally planned for a 3rd year, any bat mortalities in the 3rd year of monitoring will also be documented.
- Bat mortality monitoring is normally required during the core season when bats are active (i.e., May 1st to September 30th; resident and migratory bats) at a site with a High Sensitivity Rating. However, because bird mortality monitoring is generally planned year-round, any bat mortalities outside this monitoring timeframe will also be documented.
- Bat mortality monitoring will be conducted generally every three days during the core period of activity (May 1st through September 30th) in keeping with MNR guidelines for a site categorized as High Sensitivity. Bat mortality monitoring will be conducted in conjunction with other monitoring activities (birds) for efficiency. The frequency of mortality monitoring for the first two years within the core period of activity for bats, may be increased based on collected data, results, and scavenging rates. MNR guidelines prescribe two years of post-construction mortality monitoring for a site categorized as High Sensitivity, however this Plan will monitor bat mortality for the three year period. The frequency of mortality monitoring for the third year within the core period of activity for bats may be increased or decreased based on collected data, results and scavenging rates. During bat mortality monitoring, half the turbines will be searched twice a week and the other half once a week, and the two groups will be rotated so that one week they receive the less intensive treatment, the next week the more intensive.
- Searcher efficiency and carcass removal trials will be conducted once a month during the core bat season, from May 1st to September 30th. Searcher efficiency and carcass removal rates are known to be more variable for bats than for birds throughout the year and depending on habitat (in part due to the relative size of the species). Frequency of these trials may be reduced based on collected data and results.

Persons handling bat carcasses will take reasonable precautions (e.g., gloves, tools etc.) to protect their personal health. All searchers will ensure they have updated rabies pre-exposure vaccinations. Biological material will be disposed of in a way to ensure that it does not pose a public or environmental health risk and in accordance with any applicable federal, provincial, and municipal laws.

2.2.3 Winter Raptor Use Surveys

Background

Pre-construction baseline winter raptor surveys were conducted to establish areas of raptor use and general flight heights in the study area. The purpose of the post-construction winter raptor use surveys is to assess potential displacement or disturbance effects (i.e., distribution and abundance) to these species compared to pre-construction conditions.

Monitoring

The post-construction surveys will be carried out using the same survey protocols as the pre-construction baseline surveys conducted in 2006-2007. Survey methodologies are described in ERR Technical Appendix C5. The post-construction surveys will be conducted using two vehicles, each containing an experienced surveyor and a driver. On each survey date, a late afternoon survey will be conducted for raptors and an early evening survey (i.e., from just before sunset to dusk) will be conducted for Short-eared Owls.

All north-south roads and most east-west roads within the study area will be driven at slow speeds. The fields and woodlots will be scanned using binoculars to detect any raptors, and a spotting scope will be used for closer inspection of stationary birds. All raptors and owls will be recorded, their locations mapped, and density estimates provided (e.g., # of raptors /km of road traveled). The winter raptor surveys will be conducted once every two weeks, beginning in early December and will extend to late March.

2.2.4 Aerial Waterfowl Surveys

Background

Pre-construction baseline aerial waterfowl surveys of the Wolfe Island study area shoreline were conducted once every two weeks through April and May, 2008 and in an expanded, regional study area in October through freeze-up, 2008, and will be conducted in March through May, 2009. EC and DUC have actively participated in these surveys. The purpose of the aerial surveys was to estimate the abundance, distribution, and diversity of waterfowl species that utilize the shoreline and bay areas for staging purposes.

Monitoring

Bi-weekly aerial waterfowl surveys of the Wolfe Island study area shoreline will be conducted post-construction using the same survey protocols as the pre-construction surveys (Stantec, in prep.). Data collected at Wolfe Island will be used to provide a comparison of waterfowl abundance, distribution, and species diversity between pre-construction and post-construction conditions. The aerial surveys will be conducted in spring from the time the bays are largely free of ice through to the end of May, and in autumn from early September to freeze-up. As with the pre-construction aerial surveys, EC and DUC representatives are invited to participate in the post-construction surveys.

If a potentially significant decline in waterfowl is noted during the spring or autumn surveys, additional surveys will be conducted at the nearby shorelines of Wolfe Island (east end), Amherst Island, Howe Island and the Cataraqui River north to Highway 401. These areas will be surveyed on the same days as the Wolfe Island study area shoreline. Data collected at Wolfe Island (east end), Amherst Island, Howe Island, and the Cataraqui River will be compared to long term trends observed in data collected during previous CWS surveys (Environment Canada. 1999. Waterfowl Day Totals, 1999 Surveys. Personal Communication, Ken Ross, April 25, 2005), to assist in determining if waterfowl are re-distributing themselves from Wolfe Island to other nearby locations, perhaps as a result of disturbance effects.

2.2.5 Grassland Point Counts and Area Searches

Background

A post-construction point count-based study will be implemented to assess any actual disturbance effects to breeding grassland bird species. In 2006, 30 point counts were conducted in different habitat types within the study area. In 2007, the 30 points were resurveyed and 14 new point counts were added. Of the 44 point counts completed in 2007, 27 were situated in field (grassland) habitat.

Monitoring

All of the previously surveyed points that were situated in suitable grassland habitat will be resurveyed using the same protocols used during the pre-construction surveys as described in ERR Technical Appendix C5. Each of the surveys will include a ten-minute point count at each location and each point will be surveyed twice in June, during the peak of the breeding season.

Ten-minute paired counts at 20 WTGs that are in prime grassland habitat will also be surveyed twice in June, during the peak of the breeding season. This will be accomplished by conducting 20 counts at the bases of the 20 WTGs, and 20 counts at 200 m from the bases of the same WTGs. Birds in distance bands of 50 m will be carefully recorded (e.g. from the turbine base, birds in distance band 0-50 and 51-100 m will be recorded; for the surveys centred at 200m away from the turbine, birds will be recorded separately on the sides towards and away from the turbine, again in two distance bands of 50 m on each side, This sampling design, in conjunction with a repeat of the point count stations (above) and area searches (below), should provide good information on possible disturbance effects, and the distance bands to which they extend.

In addition to the point counts, area searches will be repeated in the same areas that were surveyed using area searches during pre-construction baseline surveys in 2007. For continued reference, these areas are shown on Figure 2.2 of ERR Technical Appendix C5 (Bird Report). The two tracts of land in which area searches will be conducted include a 195 ha block in the southeast portion of the wind plant and a 199 ha block in the northwest portion. These area searches will be conducted twice at each location during the peak of the breeding season in June and will follow the same protocol as used for the pre-construction area searches.

2.2.6 Wetland Point Counts and Area Searches

Background

Area searches within five lakeshore marshes in the study area were conducted on foot and by canoe during June, 2007. For continued reference, the area search routes are shown on Figure 2.3 of ERR Technical Appendix C5.

Monitoring

To obtain a measure of breeding waterfowl density, the pre-construction area searches will be repeated as pairs surveys in early May. Pairs surveys will provide an accurate estimate of breeding effort if timed correctly. The survey dates will therefore be adjusted based on pair chronology to ensure they are conducted at optimal times.

All wetland point counts and area searches will be conducted twice in June in the same locations as the pre-construction surveys using the same survey protocols, timing, and frequency, once the wind plant becomes operational. As such, data collected during the post-construction surveys will be directly comparable to pre-construction data and can be used to verify whether predictions were accurate regarding any disturbance/displacement effects on other breeding wetland birds that may be associated with the wind plant.

2.2.7 Inland Waterfowl Foraging Surveys

Background

Inland pre-construction foraging waterfowl surveys were conducted weekly from the first week in April to mid-May, 2007 and from the first week in September to mid-December, 2007. The methods used for the pre-construction inland waterfowl foraging surveys are described in ERR Technical Appendix C5. These daytime surveys consisted of two experienced surveyors driving all major roads in the study area at slow speeds (i.e., 30-40 km/hr) scanning the fields with binoculars. Information on species, numbers, location, and activity of geese and ducks observed in inland agricultural fields was recorded.

Monitoring

The same protocols, timing, and frequency will be used to conduct the field-feeding surveys during post-construction conditions. Data collected will be used to compare post-construction inland foraging numbers and areas with those observed during pre-construction, baseline conditions.

2.2.8 Woodland Point Counts and Area Searches in Woodlots Larger Than 10 Ha

Background

Pre-construction breeding bird surveys were conducted in two woodlots greater than 10 ha that are located in proximity to WTGs. These baseline surveys consisted of ten minute point counts beginning at or within half an hour after sunrise. Baseline area searches have also been completed. The survey protocols were consistent with EC's Guidance. Each woodlot was surveyed twice during the breeding season. For continued reference, these forested areas include the woodlot immediately south of the Sand Bay Wetland (16.4 ha) and the wooded area associated with the Big Sandy Bay ANSI (101 ha). One point count location was surveyed in the forested area south of the Sand Bay Wetland and six points were surveyed in the Big Sandy Bay woodlot in June 2008.

Monitoring

The same point count and area search locations will be resurveyed post–construction to facilitate an assessment of the accuracy of predictions of potential disturbance/displacement effects.

2.3 DATA DELIVERY, REVIEW, AND AVAILABILITY

2.3.1 Report Submission and Review

Bi-annual post-construction monitoring reports will summarize and analyze the results of all bird and bat survey types. Each report will be submitted to NRCan, EC and the MNR within three months of the bi-annual dates of June and December. Personnel at EC and/or the MNR will conduct reviews of the post-construction monitoring report(s) and report back to NRCan within three months of receipt of the reports. DUC will be circulated the bi-annual monitoring reports for review and comment.

2.3.2 Information Availability

The Final Draft of the Plan will be posted on CREC's Wolfe Island Wind Plant website at www.wolfeislandwind.com. This posting will allow members of the public and other stakeholders an opportunity to review and comment on the Plan. CREC, NRCan, EC and the MNR will consider any such comments and make appropriate changes to the monitoring program, if warranted.

Additionally, the final version of all bi-annual monitoring reports shall be posted on the Project's website for stakeholder review. The final version of the bi-annual monitoring reports will also be submitted to the joint Canadian Wildlife Service – Canadian Wind Energy Association – Bird Studies Canada – Ontario Ministry of Natural Resources Wind Power and Birds Monitoring Database. Access to the data will be restricted to agency staff and authorized agents, as determined by the database steering committee. This database will be used to assess the potential effects of future wind farm proposals.

3.0 Adaptive Management Program

The adaptive management program described in this section outlines mitigation measures that will be implemented should potentially significant unanticipated adverse environmental effects be observed, so that they do not become significant. Wind projects are a relatively new type of development in Ontario and the adaptive management measures set out below are meant to support the documentation submitted in the ERR.

An adaptive management program allows mitigation measures to be implemented in the event that unanticipated potentially significant adverse environmental effects are observed. Should a potentially significant adverse environmental effect be discovered during the post-construction monitoring program, the Parties will be notified by CREC during the survey period, prior to the completion of the surveys and reporting period. As circumstances permit, immediate mitigative action may be taken prior to contacting the Parties if it is deemed necessary by CREC. Responses to unanticipated adverse environmental effects through mitigation will be decided upon collectively by CREC, NRCan, EC, and the MNR per corresponding area of regulation.

The following sections identify potential management responses and mitigation measures available to the Project over the three year post-construction monitoring program or as otherwise may be reasonably extended or shortened as may be collectively decided by the parties.

3.1 BACKGROUND - NORTH AMERICAN MORTALITY EXPERIENCE

3.1.1 North American Wind Plants

Arnett et al (2007) reviewed avian fatality rates from 14 wind plants across North America with modern WTGs, where recent standardized mortality monitoring was conducted using a systematic survey process for a minimum of one year and incorporating scavenging and searcher efficiency bias corrections. The results of this evaluation indicated fatality rates ranged from 0.63 to 7.7 birds/WTG/year (0.95 to 11.67 birds/MW/year). The highest value was derived from a site with only three WTGs, thus comprising a very small sample size (Arnett et al. 2007; National Research Council 2007). The average annual fatality rate at two sites in eastern North America was 4.27 birds/WTG (2.96 birds/MW) (Arnett et al., 2007). Average annual fatality rates were slightly lower at three other regions in North America (e.g. 2.2 birds/WTG or 3.5 birds/MW) in the Upper Midwest which included wind farms in Wisconsin, Minnesota, and Iowa.

Annual raptor mortality estimates at newer wind energy facilities in North America but outside of California, ranged from 0 to 0.07 birds/WTG (0 to 0.09 birds/MW), with an average annual raptor fatality rate at 14 sites of 0.03 raptors/WTG (0.04 raptors/MW (Arnett et al. 2007; National Research Council 2007). By contrast, annual fatality rates for raptors at four older generation turbines in California were generally higher than for newer turbines and ranged from 0.01 to 1.0 raptors/MW.

At the Maple Ridge facility, located approximately 75 km southeast of the Wolfe Island Wind Plant, the annual avian mortality rate was estimated at 5.81 birds/MW (Jain et al. 2007). This rate, although above the North American mean, was well below the upper recorded rate, and occurred at a wind plant that has 195, 1.65 MW WTGs. Jain et al. (2007) concluded that such a rate, provided that it did not involve endangered or threatened species at risk, was not likely to lead to significant adverse effects on a population level, "even with respect to cumulative impacts of fatalities from many wind plants." Arnett et al (2007) similarly concluded that the fatality of passerines, which comprise the majority of collision victims at wind facilities, has been so low that it "is not significant at the population level."

Annual mortality levels at existing wind plants in southern Ontario have been low (approximately 2 birds/MW/year). This estimate is based on the following studies:

- R. James (2008) estimated annual avian mortality at the 66-turbine Erie Shores Wind Farm to be 2 - 2.5 birds/turbine (1.3 – 1.6 birds/MW).
- James (2003) estimated annual avian mortality at a single turbine along the Lake Ontario shoreline at Pickering to be 3-4 birds/turbine (1.7 – 2.2 birds/MW).
- James and Coady (2004) estimated annual avian mortality at a single turbine at Exhibition Place in Toronto to be ~3 birds/turbine (~4 birds/MW).
- Natural Resource Solutions Inc. (2008) estimated annual avian mortality at the 126-turbine Prince Wind Power Project to be 0.39 birds/turbine (0.26 birds/MW).
- Stantec Consulting Ltd. (2008) estimated the 2007 annual mortality rate at the Melancthon 1 Wind Plant, based on 12 weeks of monitoring in spring and fall, was 1.4 birds/WTG (0.9 birds/MW).

Large-scale, multiple fatality events that occur in one night or one day, at the scale of those previously recorded at communications towers or high-rise buildings, have not been reported at wind facilities in North America. The two principal mortality events involve a total of 33 fatalities at three wind turbines on a single night in West Virginia, and a total of 14 fatalities at two turbines on a single night in Minnesota (Erickson et al. 2005).

Arnett et al (2007) reviewed bat fatality rates from 22 wind plants across North America with modern WTGs, where recent standardized mortality monitoring was conducted using a systematic survey process for a minimum of one year and incorporating scavenging and searcher efficiency bias corrections. The results of this evaluation indicated fatality rates ranged from 0.1 to 69.6 bats/WTG/year (0.3 to 53.3 bats/MW/year).

3.1.2 Ontario Wind Plants

As discussed above, results of post-construction studies from other sites in southern Ontario in recent years suggest that annual avian mortality is approximately 2 birds/MW. The sample size

of Ontario studies is still small, however, and results from additional areas such as Wolfe Island, conducted by different sets of observers, will help to confirm whether this pattern of low mortality is widespread. Pre-construction surveys indicate that large numbers of raptors migrate through the Wolfe Island Study Area (Northern Harriers in particular, which may have flight patterns similar to resident Short-eared Owls) and that large numbers of swallows congregate in late summer (swallows have been one of the most common casualties, albeit in relatively low number, at another wind facility in Ontario).

3.1.3 Other Sources of Collision Mortality

The following table has been extracted from Erickson (2005) in order to provide additional context around the limited effects of wind generation facilities when compared to other anthropogenic structures on annual avian mortality throughout the USA:

Type of Structure	Bird Deaths per Year
Power Lines	174 million
Buildings and Windows	98 million to 980 million
Vehicles	60 million to 80 million
Communication Towers	4 million to 50 million
Wind Turbine Generators	10,000 to 40,000

3.1.4 Other Sources of Mortality - House and Free-Roaming Cats

Additionally, BirdWatch Canada (2007), a publication of Bird Studies Canada, provides insight into the annual impact on birds from domestic cats. BirdWatch Canada (2007) cites a 1992 Virginia study that closely monitored five cats over a period of 11 months, counting confirmed kills for each cat. The study conservatively estimated that each domestic cat killed about 26 birds per year in urban areas, and about 83 birds per year in rural areas – representing over 26 million birds per year in Virginia alone.

In another example presented in the same article, a four-year study estimated that rural free-roaming cats kill at least 7.8 million and perhaps as many as 219 million birds per year in Wisconsin.

3.2 MORTALITY MONITORING – REPORTING, NOTIFICATIONS AND ADAPTIVE MANAGEMENT

All bird and bat mortality will be reported in biannual submissions. Mortality rate is usually expressed as the number of fatalities per WTG or per MW of nameplate generation capacity, each year. Because different WTG models have different generation capacities (typically ranging from 0.75 to 2.3 MW), fatalities per MW are often used in the published literature to allow a standardized comparison of mortality between sites. In the follow-up program reporting, and where possible in this document, mortality rates will be expressed both as birds/WTG/year and birds/MW/year. Mortality of priority species in Bird Conservation Region ("BCR") 13 and mortality of all species of conservation concern, such as raptors and declining grassland species, will be highlighted in the bi-annual post-construction monitoring reports.

Within the bi-annual report, projected annual avian mortality levels will be compared to levels reported at other wind power plants in North America (e.g., summarized in Arnett et al. 2007, National Research Council 2007). If the projected annual mortality levels are at the low or middle end of the reported scale, no immediate action is required. If projected mortality levels approach the higher reported levels, CREC will work with EC, MNR and DUC as necessary to implement additional reporting and/or monitoring activities as described in section 3.2.2 to further investigate why the mortality levels may be at the higher end of the reported scale, and as necessary, develop options for mitigation.

Should a potentially significant adverse environmental effect be discovered during the post-construction monitoring program, the Parties will be notified by CREC during the survey period, prior to the completion of the surveys and reporting period as described in the following section.

3.2.1 Thresholds for Notifications

As circumstances permit, immediate mitigative action may be taken prior to contacting the Parties if it is deemed necessary by CREC. The sections below describe when NRCan, EC, and MNR shall be immediately contacted.

3.2.1.1 Birds

Single Mortality Event - Birds

NRCan, EC and MNR will be immediately informed if 10 or more birds are found at any one WTG, or if 33 or more birds[4] (excluding raptors) are found at multiple WTGs during a single mortality monitoring survey. The distribution and species composition of the fatalities will be considered in determining whether actions are required. The Parties to this plan will be immediately contacted whenever any species at risk are involved (see Section 3.2.1.3).

Single Mortality Event – Raptors

NRCan, EC and MNR will be immediately informed if 2 or more raptors are found during a single mortality monitoring survey. The distribution and species composition of the fatalities will be considered in determining whether actions are required. The Parties to this plan will be immediately contacted whenever any species at risk are involved (see Section 3.2.1.3).

High Annual Mortality Rates - Birds

NRCan, EC, and MNR will be immediately informed if the projected annual mortality level of all birds, including raptors, at Wolfe Island, derived from three consecutive weeks of surveys, is greater than or equal to 11.7 birds/MW[5]. In the context of the Wolfe Island Wind Plant, this means that NRCan, EC and MNR will be contacted if 65 bird fatalities[6] are noted

[4] This number represents the largest observed single mortality event in North America, at the Mountaineer site (a wind plant half the size of the Wolfe Island Wind Plant) (Kerns and Kerlinger, 2004)
[5] 11.7 birds/MW is the highest rate of bird mortality recorded in North America, at the Buffalo Mountain facility in Tennessee (Arnett et al., 2007)
[6] corrected for projected scavenger removal and searcher efficiency

over a three-week period. DUC will also be informed of any unexpected high weekly waterfowl mortality rates and consulted if the events involve a large proportion of waterfowl.

High Annual Mortality Rates - Raptors

NRCan, EC, and MNR will be immediately informed if the projected annual mortality rate at Wolfe Island, derived from six consecutive weeks of surveys, is greater than or equal to 0.09 raptors/MW[7]. In the context of the Wolfe Island Wind Plant, this means that NRCan, EC and MNR will be contacted if 2 raptor fatalities are noted over a six-week period.

3.2.1.2 Bats

Single Mortality Event

NRCan, the MNR, and EC will be immediately informed if there is any large-scale, multiple fatality event at an individual WTG or among a number of WTGs over a relatively short period of time (e.g., ≥84 bat fatalities per week[8])

High Annual Mortality Rates

NRCan, the MNR, and EC will be immediately informed if the projected annual mortality level of all bats, derived from three consecutive weeks of surveys, is greater than or equal to 20 bats/WTG[9], or high incidence of bat mortality such that projected annual mortality rate would approach significance levels according to MNR's *Guideline to Assist in the Review of Wind Power Proposals: Potential Impacts to Bats and Bat Habitats*. In the context of the Wolfe Island Wind Plant, this means that NRCan, EC and MNR will be contacted if 49 bat fatalities[10] are noted over a three-week period.

3.2.1.3 Species at Risk

Any and all mortality of species at risk (i.e., a species listed as Endangered, Threatened or Special Concern under Schedule 1 of the federal *Species at Risk Act* or a species listed on the Species at Risk in Ontario list as Extirpated, Endangered, Threatened, or Special Concern under the provincial *Endangered Species Act*, 2007) that occurs will be reported immediately to NRCan, EC and the MNR.

3.2.2 Adaptive Management

The following section describes the response that the Parties will undertake if one of the events requiring notification (section 3.2.1) occurs or if within the bi-annual report, projected annual

[7] 0.09 raptors/MW is the highest rate of raptor mortality recorded In North America, outside California, at the Stateline, Oregon facility (Arnett et al., 2007)
[8] This number is representative of 20 bats/WTG/year, pro-rated for seasonal concentration. 20 bats/WTG/year is the highest documented Ontario mortality.
[9] 20 bats/WTG/year is the highest documented Ontario mortality
[10] corrected for projected scavenger removal and searcher efficiency

avian mortality levels are at the high end of the scale compared to levels reported at other wind power plants in North America.

3.2.2.1 Birds

If, with due consideration of seasonal abundance and species composition, annual mortality levels are projected to exceed the thresholds noted above, NRCan, EC, and the MNR will be engaged to initiate an appropriate response plan, which may include some or all of the following (or alternate plan reasonably agreed to among the Parties[11]):

- initiation of research to identify those factors that are contributing to the high levels of mortality (e.g., weather conditions, time of year when bird density is particularly high).
- increasing survey frequency
- increasing reporting frequency to speed decision-making
- adding behavioural or movement surveys (depending on the species involved)

After exhausting reasonable efforts to determine the cause of mortality, as determined through discussions with the Parties, and if unanticipated potentially significant adverse environmental effects persist that cannot be mitigated by managing those factors, CREC is committed to implementing technically and economically feasible operational mitigation that includes blade feathering and, if necessary, shutdown of problematic WTGs. If required, this mitigation will be reasonably developed with NRCan and the Party or Parties responsible for the species.

Blade feathering consists of changing the pitch of the turbine blades such that the reduced aerodynamics preclude efficient operation of the WTG. This slows WTG rotation, while reducing energy output of the unit. This would be the approach taken to manage turbine operations at certain times of day, under certain meteorological conditions, or for short periods that may be considered to present high risk.

Turbine shutdown includes the temporary removal from service of a WTG for a set period of time, until the perceived period presenting risk has passed (e.g., the core migration period). The WTG will produce no electricity during the shutdown period.

Blade feathering will be the first operational control considered if unanticipated potentially significant adverse environmental effects remain after exhausting all the potential responses identified above. Should the unanticipated potentially significant adverse environmental effects remain after blade feathering, turbine shutdown will be considered for the duration of the period of risk (to be reasonably determined collectively by the Parties). Both blade feathering and turbine shutdown will be considered on a turbine-by-turbine basis, based on the results of the monitoring program.

[11] An alternate plan maintains flexibility within the Plan to consider alternative response ideas that may arise over the course of the Plan (e.g., changes in technology).

Appropriate operational controls in response to a large mortality event will vary according to the species involved, behaviour implicated (e.g., migrating, foraging, etc.), and geographical extent of the observed mortality. Any operational controls will be reasonably determined collectively by the Parties on a case-by-case basis tailored to individual circumstances.

As technology develops, continuous remote monitoring and sensoring may be used as an integrated approach to controlling WTGs in the unlikely event of significant mortality (e.g., web reference: http://www.technologyreview.com/Energy/18167/). Such technology is currently in its infancy and requires further research and development, but as necessary CREC would consider the possibility of utilizing this type of technology when it is commercially viable, available, and demonstrated effective.

3.2.2.2 Bats

If, with due consideration of seasonal abundance and species composition, annual mortality levels are projected to exceed the thresholds noted in section 3.2.1.2, NRCan and the MNR will be engaged to initiate an appropriate response plan, which may include some or all of the following (or alternate plan reasonably agreed to among the Parties[12]):

- initiation of research to identify those factors that are contributing to the high levels of mortality (e.g., weather conditions, time of year when bat activity is particularly high).
- increasing survey frequency for decision support
- increasing reporting frequency to speed decision-making
- CREC may consider retrofitting problematic WTGs with ultrasonic deterrent devices or similar-purpose device. Such devices are being studied or developed by third parties, and CREC would consider the possibility of utilizing this type of technology when or if it is commercially viable, available, and demonstrated effective
- increase of rotor “cut-in” wind speed of specific WTGs, as bats are more active at lower wind speeds

After exhausting reasonable efforts to determine the cause of mortality, and if unanticipated potentially significant adverse environmental effects persist that cannot be mitigated by managing those factors, CREC is committed to exploring and developing an operational control protocol as per Section 3.2.2.1 above.

3.2.2.3 Species at Risk

Monitoring and immediate reporting of any and all mortality of species at risk (e.g., Short-eared Owl) will enable the MNR and EC and NRCan to track effects, if any, and determine if any additional study and/or mitigation is required. Should any species at risk mortality be recorded during the field surveys, NRCan, EC, and MNR will be immediately contacted to determine if additional actions are required. Such measures may include:

[12] An alternate plan maintains flexibility within the Plan to consider alternative response ideas that may arise over the course of the Plan (e.g., changes in technology).

- initiation of research to identify those factors that are contributing to the mortality (e.g., weather conditions, time of year)
- increasing survey frequency
- increasing reporting frequency to speed decision-making
- adding behavioural or movement surveys (depending on the species involved)
- consultation with the appropriate agency or agencies to reasonably determine if operational control protocols as Section 3.2.2.1 are required.

3.3 DISTURBANCE TO WINTERING RAPTORS - NOTIFICATION AND ADAPTIVE MANAGEMENT

NRCan, MNR and EC shall be contacted in the event of:

Potentially significant decline of wintering raptors in large portions of the areas identified during the pre-construction baseline studies over a period of more than one month as compared to the pre-construction survey results.

Significant decline is considered to be a decrease in population to an extent that direct intervention may be required to halt further decline. Significance will be evaluated and considered at the site level. A potentially significant decline of wintering raptors will be defined by an absence of raptors in 50% or more of the areas observed to support raptors during pre-construction surveys.

Assuming there are no other external factors contributing to low numbers (e.g., a year at the low end of the vole population cycle, natural variation, etc.), potential responses include:

- *expand survey:* to adjacent areas (e.g., to determine if the effect on wintering raptors is localized). Results will be reviewed amongst the Parties to determine if the effect is localized.
- *mitigation banking:* building upon a successful approach applied in the United States of America, this strategy involves providing a financial contribution toward a mitigation bank or Environmental Non-Government Organization ("ENGO") specialized in habitat protection, restoration, and enhancement. The mitigation bank or ENGO would then utilize the contribution to manage an existing habitat site(s) with high wildlife value, restore degraded sites, or create new sites with desirable habitat features.

  One of the main advantages of this holistic approach is that the mitigation bank or ENGO can facilitate the employment of specialists with expertise in habitat management, which greatly improves the chances of restoration / enhancement success. Additionally, the mitigation bank or ENGO can take on the long-term

responsibility of managing and maintaining habitat and facilitate the restoration and protection of large parcels of land.

Any contribution to a mitigation bank or ENGO would be species / habitat specific to the avian fauna impacted by the wind plant.

- *land donation:* similar to mitigation banking, this strategy involves the contribution towards the purchase of an off-island land parcel by CREC for habitat protection or enhancement, and possibly a subsequent donation to an ENGO (or similar organization) with demonstrated expertise in habitat management. This would involve a specific tract of land, but unlike mitigation banking, there may not be the opportunity to aggregate resources across several third parties.

  Should this strategy ultimately be pursued, the focus of donation or land stewardship (e.g. conservation easements) shall be within the regional landscape. In identifying a potential land parcel(s), first consideration will be given based upon similar habitats for the species of interest. The size and location of the parcel(s) will be determined through discussion amongst the Parties.

- *financial contribution:* from CREC to an independent, qualified third party to further expand the knowledge base related to raptor conservation. For example, the Migration Research Foundation is undertaking a long-term research program to address conservation concerns regarding the Short-eared Owl, including toxicology, habitat management, site fidelity, and dispersal/migration patterns. This knowledge could be further developed and/or utilized by agencies and/or ENGOs to provide information for future renewable energy projects. An Ontario-based academic institution may also be considered as the potential beneficiary of a financial contribution.

3.4 DISTURBANCE TO STAGING WATERFOWL - NOTIFICATION AND ADAPTIVE MANAGEMENT

NRCan, EC, and MNR shall be contacted in the event of:

A potentially significant decline in the total waterfowl use days of offshore staging and inland foraging waterfowl in previously used areas over a period of more than one month as compared to pre-construction survey results.

In this context, a potentially significant decline is a reduction in staging waterfowl of 30% or more compared to pre-construction survey results. Waterfowl guilds (i.e., geese, dabblers, sea ducks, and bay ducks) will be considered individually.

Assuming there are no other external factors contributing to low numbers (e.g., early freeze in staging bays, large scale crop changes in foraging areas, other development, natural variation, etc.), potential responses are indicated below. The results of waterfowl monitoring, will be reviewed collectively as to the effect of external factors on the monitoring results.

- for offshore staging waterfowl, expanding survey to adjacent areas (e.g., to determine if the effect on waterfowl is localized)
- for inland foraging waterfowl, initiating a study to determine the relative effect of turbines and other independent factors
- for inland foraging waterfowl, mitigation banking or land donation may be considered (Section 3.3). Primary funding consideration would be intended for restoration, enhancement, and management of waterfowl habitat locally (e.g., DUC)
- a financial contribution from CREC to an independent, qualified third party (e.g. university) to further expand the knowledge base related to waterfowl conservation through research (e.g., to study the energetic consequences to birds of displacement from preferred habitats).

3.5 DISTURBANCE TO GRASSLAND BREEDING BIRDS REPORTING AND ADAPTIVE MANAGEMENT

Approximately 13% of grassland habitat in the study area lies within 300 m of a WTG. Strickland and Morrison (2008) concluded that "Displacement of grassland nesting birds is likely but the magnitude is uncertain and may range from near 0 to several 100 m for songbirds and even greater for other species (e.g. nesting effects may be much larger for prairie grouse)." Information from the 50 m distance band studies (Section 2.2.5) will be used to estimate the percentage of grassland habitat that has been subjected to a significant displacement effect.

The Parties will collectively review the results of the post-construction monitoring to determine if an ecologically significant displacement effect to grassland breeding birds is occurring, and whether such effect is attributed to the WTGs and access roads and not external factors. Discussions will determine whether mitigation is required to replace the habitat lost through displacement, and could include, for example:

- expanding survey to adjacent areas (e.g., to determine if the effect on grassland birds is localized)
- mitigation banking, land donation, or conservation easements may be considered as referenced above
- a reasonable financial contribution from CREC to an independent, qualified third party (e.g., university) to further expand the knowledge base related to grassland bird conservation through research
- promotion of land-use control (e.g., managing land-use effects on grassland birds). It is noted that CREC has Licence and Option to Lease Agreements with landowners participating in the Project, however, CREC has no such agreements with non-participating landowners. Recognizing the lands are privately held and controlled by the landowners, CREC can solicit and promote voluntary land-use controls around the WTGs from the participating landowners. It may also be possible for CREC to solicit land-use control with non-participating properties

For example, with landowner understanding, agreement, and participation, it is possible to modify land-use (e.g., crop type) or cropping practices (e.g., delaying hay cutting) around a specific WTGs and/or on properties without WTGs. While participation would be voluntary, it is recognized, at least with participating landowners, that some form of negotiated payment by CREC to the landowner would be required to compensate for lost agricultural revenue.

3.6 DISTURBANCE TO WETLAND BREEDING BIRDS AND WATERFOWL REPORTING AND ADAPTIVE MANAGEMENT

The Parties will collectively review the result of the post-construction monitoring to determine if an ecologically significant displacement effect to wetland breeding birds and waterfowl is occurring, and that such effect is attributed to the WTGs and not external factors. Discussions will determine whether mitigation is required to replace the habitat lost through displacement, and could include, for example:

Assuming there are no other external factors contributing to low numbers (e.g., low water levels, other development, natural variation, etc.), potential responses include:

- expanding survey to adjacent areas (e.g., to determine if the effect on wetland breeding birds is localized).
- mitigation banking or land donation may be considered as referenced in Section 3.3.
- a reasonable financial contribution from CREC to an independent, qualified third party (e.g., university) to further expand the knowledge base related to wetland bird conservation through research.

4.0 Project Resources

4.1 LENGTH OF PROGRAM

Any of the elements of the post-construction monitoring program described in Section 2 may be extended, altered or added to if unanticipated potentially significant adverse environmental effects related to mortality or disturbance are confirmed and additional study deemed necessary by the Parties.

Each element of the post-construction monitoring program will be treated independently. Extension of one survey type to an additional year does not imply the entire program will be extended. In other cases, where either mortality or disturbance is low, the program may be shortened or revised accordingly in these select areas.

Should any unanticipated potentially significant adverse environmental effects be incidentally observed once the post-construction monitoring program is complete, NRCan, EC, and the MNR shall continue to be notified.

4.2 CORPORATE CAPACITY

CREC is a wholly owned subsidiary of Canadian Hydro. Canadian Hydro, a publicly traded company (TSX:KHD), is the owner and operator of Canada's oldest wind plant (1993) – Cowley Ridge, Alberta. Canadian Hydro is also the owner and operator of Canada's second oldest wind plant (1998) – Le Nordais, Quebec.

At the time of Plan drafting, Canadian Hydro owned and operated 20 renewable energy facilities in Ontario, Quebec, Alberta, and British Columbia. Approximately 80% of the electricity sold by Canadian Hydro is under long-term contract with provincial governments; providing economic stability to the company.

At the time of Plan drafting, Canadian Hydro has an enterprise value of approximately $1.4 billion, with a BBB Dominion Bond Rating Service investment grade credit rating. As such CREC, through Canadian Hydro, has the corporate capacity to implement the post-construction monitoring program and adaptive management strategies identified herein.

5.0 Next Steps

This final draft will be posted on the Project website for stakeholder review and comment. It provides the Parties with the framework upon which to implement final discussions to advance the final draft to a final Post-Construction Follow-up Plan.

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ATTACHMENT A: Letter of Commitment – CREC to the Ontario Ministry of the Environment

Canadian Renewable Energy Corporation
A Wholly Owned Subsidiary of Canadian Hydro Developers, Inc.

SENT BY EMAIL:
Heather.Brown1@ontario.ca

14 March 2008

Ontario Ministry of the Environment
Environmental Assessment and Approvals Branch
Project Coordination Section
2 St. Clair Avenue West
Toronto, ONT
M4V 1L5

Attention: Heather Brown, Special Project Officer

Dear Ms. Brown,

RE: Letter of Commitment
Post-Construction Follow-Up Plan & Related Items
Wolfe Island Wind Project

Building upon the comprehensive Environmental Review Report ("ERR") for the above captioned renewable energy project, this letter sets out several commitments that Canadian Renewable Energy Corporation ("CREC") is making in addition to other activities and commitments already made as part of the project's Environmental Screening Process ("ESP"). Specifically, CREC agrees to:

- continue to work with Environment Canada / Canadian Wildlife Service ("EC") and the Ontario Ministry of Natural Resources ("MNR") to finalize the Post-Construction Follow-up Plan ("PCFP") subsequent to the completion of the ESP
- apply reasonable commercial efforts to finalize the PCFP[1] prior to commercial operation of the wind plant
- post the final version of the PCFP on the project website
- post the final version of monitoring reports that come from the PCFP on the project website
- carry out its obligations under the PCFP using reasonable commercial efforts.

CREC makes the above commitments with the understanding that they form part of the project's ESP and as such are enforceable under Ontario Regulation 116/01 and its governing act, the *Environmental Assessment Act*. The commitments also serve to increase the transparency of this unique project.

[1] The PCFP will be determined as final once all parties, acting reasonably, are satisfied with the plan as documented through acknowledgement letters (or similar).

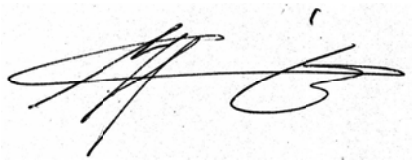
CREC notes that it has agreed to enter into the PCFP for this specific project due to several unique factors and considerations, the combination of which are distinct to this particular project, and include among others:

- the project is sited on an island with an Important Bird Area designation due to the presence of globally and continentally significant congregatory species and for continentally significant migratory waterfowl concentrations
- Species at Risk are present
- the potential effects of the wind plant have been carefully considered and examined in the ERR and are generally mitigable through well established practices, procedures, and measures as set out in ERR Section 7. Nevertheless, the commitments contained in this letter and the PCFP are meant to further minimize potential effects on bird and bat resources should any significant unanticipated adverse effects be encountered during initial operation activities. These commitments are made in recognition of the unique environment in which the project is situated.

With the above commitments in hand, coupled with the extensive work previously completed as part of the ESP, we look forward to receipt of the Director's Decision on this important renewable energy initiative on or before 27 March 2008, which coincides with the end of the Director's 30-day decision period under the ESP. Should you have any additional questions or comments please feel free to contact either Rob Miller or myself.

Sincerely,

CANADIAN HYDRO DEVELOPERS, INC.



Geoff Carnegie
Manager, Ontario Projects

ec: Rob Read, Environment Canada
Katie Griffiths, Ministry of Natural Resources
Rob Nadolny, Stantec Consulting Ltd.