February 2017

POST-CONSTRUCTION MONITORING AND MITIGATION PLAN

Halkirk 2 Wind Power Project

Submitted to:
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REPORT

Project Number: 1543760

Golder Associates

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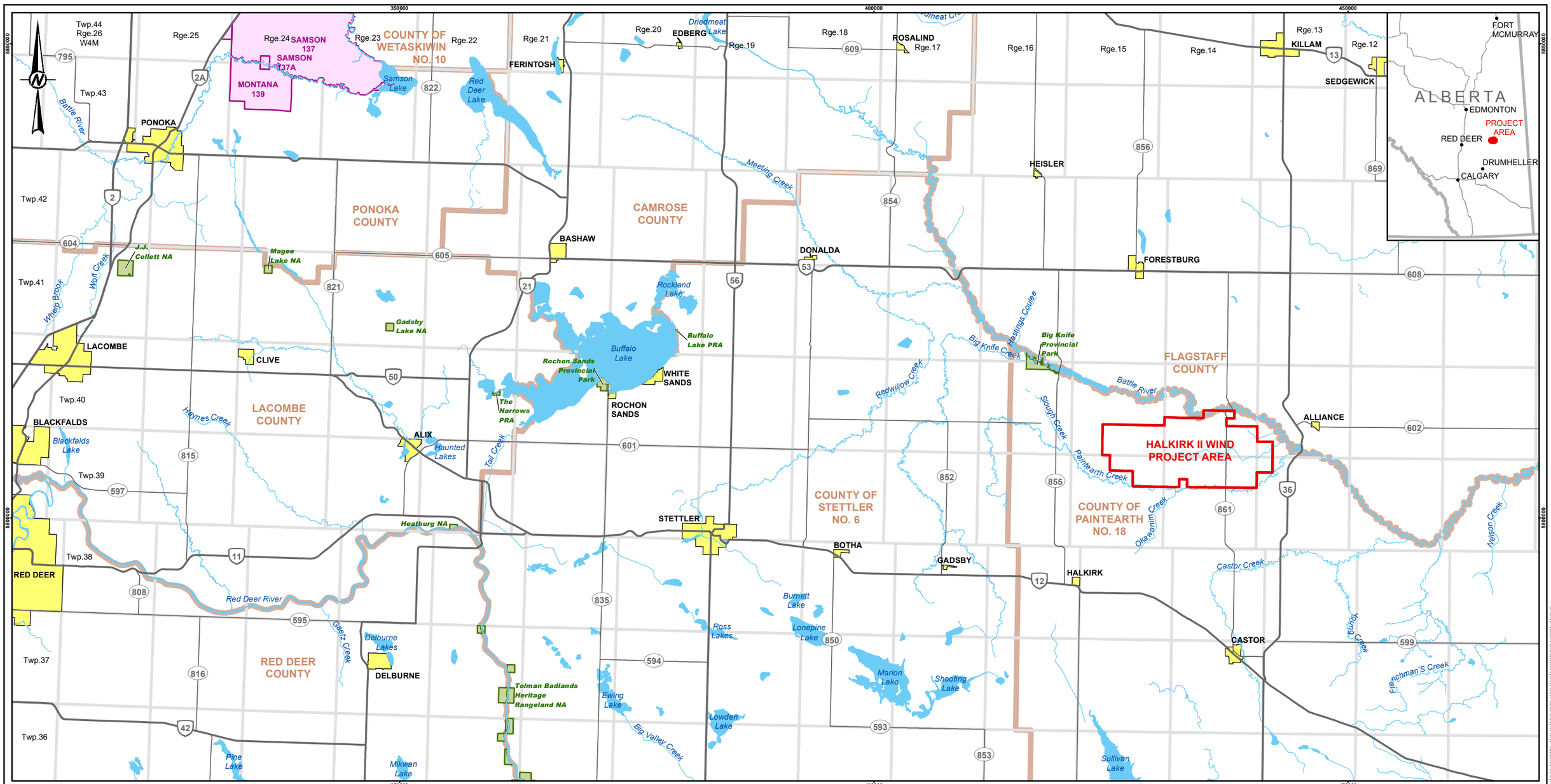
1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Capital Power Corporation (Capital Power) to prepare a Post-Construction Monitoring and Mitigation Plan (PCMMP) for their proposed Halkirk 2 Wind Power Project (the Project) located within the County of Paintearth and Flagstaff County, approximately 12 kilometres (km) northeast of Halkirk, Alberta. The Project is located within portions of Townships 39 and 40, Ranges 13, 14 and 15, W4M (Figure 1). The Project will consist of 74 Vestas V110 2.0 megawatt (MW) wind turbines, for a total installed nameplate capacity of 148 MW. The project will also include access roads, an underground electrical collector system, and a substation.

The PCMMP describes the proposed post construction monitoring activities and mitigation measures Capital Power proposes to implement during construction and operation of the Project and focuses on understanding direct impacts to birds and bats over a three-year period, as detailed within the following sections.

The PCMMP accompanies the submission of the Environmental Evaluation, as per requirements identified in *The Approach* section of the updated Alberta Environment and Parks (AEP) *Wildlife Directive for Alberta Wind Energy Projects* (the Directive), dated January 27, 2017 (AEP 2017). Ultimately, the Environmental Evaluation will support Capital Power's application to the Alberta Utilities Commission (AUC) for a permit to construct and a licence to operate the Project.

This PCMMP follows the recommendations outlined in the Directive, the Canadian Wildlife Service's (CWS's) Wind Turbines and Birds: A Guidance Document for Environmental Assessment (CWS 2007a), and the Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (CWS 2007b).



LEGEND

- PROJECT AREA
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- INDIAN RESERVE
- MUNICIPAL BOUNDARY
- PARK / PROTECTED AREA
- POPULATED PLACE
- WATERBODY

0 15 30

1:400,000 KILOMETRES

CLIENT

Capital Power

CONSULTANT

Golder Associates

YYYY-MM-DD	2017-01-27
DESIGNED	CS
PREPARED	SK
REVIEWED	CS
APPROVED	JM

REFERENCE(S)

1. PARKS AND PROTECTED AREAS OBTAINED FROM ALBERTA PARKS, GOVERNMENT OF ALBERTA.
2. OTHER ALBERTA DIGITAL BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED, ALTALIS LTD.© GOVERNMENT OF ALBERTA 2016. ALL RIGHTS RESERVED. OR IHS ENERGY INC.

PROJECTION: UTM ZONE 12 DATUM: NAD 83

PROJECT

HALKIRK 2 WIND PROJECT

TITLE

REGIONAL AREA

PROJECT NO.	CONTROL	REV.	FIGURE
1543760		0	1

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2.0 POST CONSTRUCTION MONITORING

The post-construction monitoring program has been designed to document direct effects of Project operations on wildlife, primarily birds and bats, by duplicating pre-construction inventory surveys and conducting mortality searches. The post-construction monitoring program will assess the effectiveness of mitigation efforts and determine whether additional or modified mitigation measures are warranted.

Post-construction monitoring for the Project will be carried out during the first three years of Project operation, and will consist of the following:

- duplication of select pre-construction wildlife inventory surveys;
- weekly bird and bat mortality searches at one-third of the turbines (25 of the 74 turbines), between March 1 and October 30. The same plots will be used for both bird and bat mortality searches;
- three searcher efficiency trials each season (i.e., spring, summer and fall) for each search technician;
- three scavenger impact trials, equally spaced out (i.e., early, middle and late), during each season; and
- preparation and submission of annual reports that document the results of the searches and total mortality of birds and bats within the search areas.

Prior to starting the post-construction monitoring program, wildlife research and collection permits will be obtained and discussions with AEP area biologists will be completed, if necessary.

2.1 Duplication of Pre-Construction Wildlife Inventory Surveys

Select pre-construction baseline wildlife inventory surveys will be duplicated during the first two years of operation, as part of the post-construction monitoring program, to assess the potential wildlife displacement, due to the Project. A subset of the pre-construction baseline wildlife inventory surveys will be conducted, which will provide data for comparison between pre- and post-construction wildlife inventories.

Proposed post-construction wildlife inventory surveys will include the following:

- bat surveys;
- breeding bird surveys; and
- Avian Use Surveys.

No Project infrastructure will be sited within the setback distances of any sensitive species features (e.g., sharp-tailed grouse leks) identified during the pre-construction surveys, and all turbines will be sited in agricultural/pasture land, cultivated land, or modified pasture land cover types, which provide low suitability habitat for most wildlife species, particularly for species of special concern. Consequently, specific post-construction surveys for sensitive species are not proposed the Project.

2.1.1 Bat Surveys

Bat monitoring will follow recommendations within the Alberta Bat Action Team (ABAT) endorsed Post-Construction Wind Energy Protocol for Bats (Barclay and Baerwald 2015) for two years of post-construction monitoring. The protocol calls for annual acoustic monitoring during periods of peak bat activity as observed during the pre-construction surveys. It is recommended that acoustic monitoring be completed with fatality monitoring activities and at the same detector sites used during the pre-construction monitoring.

Eight AnaBat® bat detection / recording units will be set-up, using the same configuration as for pre-construction monitoring. Four bat detector units will be set-up on the two meteorological towers, with two detectors positioned 2 m above ground and two detectors 30 m above ground. The remaining four bat detectors will be positioned approximately 2 m above ground and affixed to the same vertical structures (e.g., fence posts, trees or shrubs) used during pre-construction monitoring, if available.

Bat activity (i.e., high frequency auditory signals) will be digitally recorded by the AnaBat® SD1 onto compact flash one gigabite (1 GB) memory cards. The memory cards will be downloaded during weekly maintenance checks of the AnaBat® units.

Data analysis methods will be consistent with the methods used during pre-construction monitoring. Analyses will consist of a tally of all bat 'passes', and assigning the passes to bat species or species group based on characteristics of the echolocation recording (Lausen 2008). A bat 'pass' will be attributed to a bat flying through the detection radius of the bat detector. Because an individual bat may be recorded making multiple passes, the data presented will be a measure of bat activity in the vicinity of the bat detectors, not a direct measure of the numbers of bats within or passing through the Project Area/region.

2.1.2 Breeding Bird Surveys

Breeding bird surveys (BBS) will be conducted twice during the breeding season, for two years of post-construction monitoring. The two annual survey rounds will be a minimum of 10 days apart and will follow the protocol used for the pre-construction BBS, which is a standardized BBS point count method adapted from the North American Breeding Bird Survey (Ralph 1993) and the Sensitive Species Inventory Guidelines for grassland birds (AEP 2013).

Each point count will be conducted from one half hour before sunrise through until 10 a.m. Each point-count will consist of a five-minute survey; habitat type, and all birds heard and/or seen will be recorded within a 100 m radius of the plot centre.

A total of 85 BBS plots were established in previous pre-construction monitoring programs; a subset of these BBS plots will be sampled during the post-construction monitoring period. Representative post-construction BBS survey plots will be selected in areas of native habitat, where species of special concern were observed during the pre-construction BBS.

2.1.3 Avian Use Surveys

Avian use surveys (AUS) will be conducted monthly during the spring, summer and fall, for two years of post-construction monitoring. The AUS will follow the protocol used for pre-construction AUS, which is similar to protocols used at numerous other wind power developments throughout North America (Golder 2001, 2005, 2010a,b; Johnson et al. 2003; Erickson et al. 1999; Erickson et al. 2000; Strickland et al. 2001; Strickland et al. 2003).

A total of 28 circular AUS plots were established during the pre-construction surveys; a subset of these AUS plots will be sampled during the post-construction monitoring program. Representative post-construction AUS survey plots will be selected based on actual turbine locations and the collision mortality indices calculated during the pre-construction environmental evaluation.

All birds observed within or flying over the 800 m radius plot will be recorded during 20-minute sample events, twice daily at each location (morning and afternoon), during three survey rounds in the spring, two survey rounds in the summer, and three survey rounds in the fall. Each observation will be assigned a unique observation number, and will consist of species (or species group), number of individuals, sex and age class, distance from plot centre (first observed and closest), altitude above-ground (first observed, lowest, and highest), activity, and habitat(s) (observed in or flying over).

2.2 Bird and Bat Mortality

Bird and bat mortality monitoring will be conducted by experienced wildlife biologists, as defined by the Directive, during the first three years of Project operation. Mortality monitoring will consist of weekly searches around 25 of the 74 turbines, coupled with searcher efficiency and scavenger impact trials. Only birds and bats found within the search plots (i.e., assumed to have been killed as a result of a collision with the turbines) will be used to estimate mortality rates. If incidental mortalities are found (i.e., mortality related to traffic collisions and/or found outside of search area) they will be recorded and reported, but not used to estimate annual turbine collision mortality.

The primary objectives of the mortality monitoring are to estimate avian and bat mortality rates across the entire Project footprint and to determine whether the estimated mortality is lower, similar, or higher than the average mortality rates observed at other regional projects with similar wildlife habitat features. The mortality analysis will consider the following three factors:

- Number of annual avian and bat mortalities per turbine, per megawatt, and across the Project;
- Disproportionate representation of a particular species; and
- Comparison to existing data on wind farm mortality.

Mortality monitoring consists of short-term intensive surveys involving standardized carcass searches and bias trials for searcher efficiency and carcass removal, conducted by trained biologists. The overall Project fatality estimation is based on the number of carcasses found during carcass searches conducted under operating turbines. Both the probability that a carcass persists on-site long enough to be detected by searchers (carcass persistence) and the ability of searchers to detect carcasses (searcher efficiency) can lead to imperfect detection of carcasses during standardized searches. Consequently, mortality monitoring will include (1) standardized carcass searches to monitor potential injuries or fatalities associated with Project operation; (2) searcher efficiency trials to assess observer efficiency in finding carcasses; and (3) carcass removal trials to assess seasonal, site-specific carcass persistence time. Annual fatality rates will then be calculated by correcting for the bias (i.e., underestimation) due to searcher efficiency and scavenging rates by using an equation that accounts for the number of turbines searched, the carcass persistence, and searcher efficiency.

2.2.1 Mortality Searches

The survey protocols described below may be adapted for the second and third year of monitoring, based on the first and second year survey results.

Prior to starting the post-construction mortality monitoring program, wildlife research and collection permits will be obtained from CWS and AEP, as required.

2.2.1.1 Turbine Selection

As required by the Directive, mortality search plots will be established at one-third of the turbine locations (i.e., at 25 of the 74 turbines). The 25 turbines selected for mortality surveys will be used for both the bird and bat mortality monitoring, and will be surveyed for all three years of the post-construction monitoring program. The 25 turbine locations (Figure 2) were selected using a stratified random selection method, allowing for representation of all habitat types and including a mix of footprint edge and internal turbines (AEP 2017).

The following criteria were used to select turbines for mortality searches:

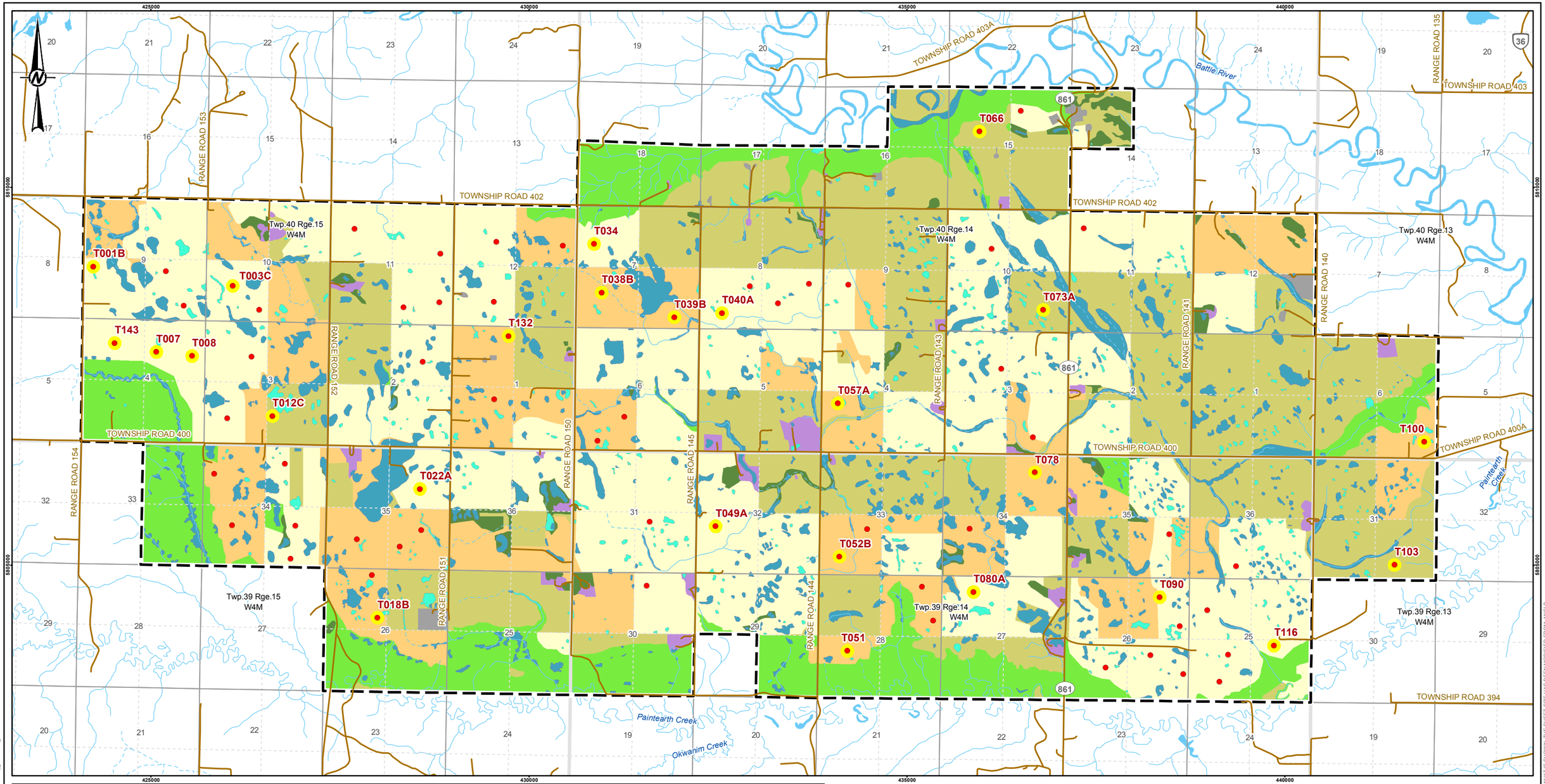
- Proximity to natural features such as coulees and large permanent waterbodies;
- Land cover type placement of turbine (e.g., agricultural/cultivated, modified pasture); and
- Proximity to baseline survey locations where high abundance of bats and/or birds were observed.

Land use cover types in the Project Area includes approximately 77% lands modified for agricultural purposes (i.e., agricultural/pasture, cultivated land, modified pasture), 12% native prairie, 8% wetlands, and a variety of other cover types including wooded at 1%, and miscellaneous developed areas. All permanent turbine locations were placed in modified land cover types for a total footprint disturbance of 13.0 ha. The majority of this footprint (i.e., 63%) occurs in cultivated land and 32% of the turbine footprint occurs in modified pasture. Consequently, stratifying the 25 turbines selected for mortality searches by habitat is difficult, as no natural habitats are affected by the turbine footprints. Therefore, representative turbine locations on cultivated land and modified pasture were selected.

Turbines were selected based on proximity to baseline AUS and bat survey plots so that baseline abundance levels could be correlated with post-construction mortality data, if any. In addition, the spring and fall AUS survey results were given slightly more weighting than the summer AUS survey results, as bird abundance was an order of magnitude higher for spring and fall than for summer (i.e., 13,618 and 11,677 birds in spring and fall, respectively and 2,623 birds in summer).

The turbine selection was first based on proximity of turbines to high abundance survey locations for AUS and bats, as mortality rates would be expected to be highest in these areas. Turbines were then selected based on habitat, and some turbines were selected where mortality is expected to be lower so that a more representative effect of the Project could be determined.

Table 1 lists the turbines selected for post-construction mortality searches and provides a description of criteria used to justify turbine selection.



LEGEND

- PROJECT AREA
- TURBINE SELECTED FOR POST-CONSTRUCTION MORTALITY SEARCHES
- TURBINE NOT SELECTED FOR POST-CONSTRUCTION MORTALITY SEARCHES
- ROAD/HIGHWAY
- WATERCOURSE
- INDEFINITE WATERCOURSE

LAND COVER [A,B]

- AGRICULTURAL/PASTURE
- CULTIVATED LAND
- MODIFIED PASTURE
- NATIVE PRAIRIE
- DEVELOPED
- FARM YARD / RURAL RESIDENTIAL
- WOODED
- WETLAND PERMANENCE CLASS I-II
- WETLAND PERMANENCE CLASS III-V

0 2 4

1:50,000 KILOMETRES

NOTE(S)

[A]LAND COVER TYPES MAY BE DESKTOP OR FIELD VERIFIED.
[B]STEWART AND KANTRUD (1971) WETLAND CLASSIFICATION SYSTEM. ALBERTA ENVIRONMENT AND SUSTAINABLE RESOURCE DEVELOPMENT. 2015. ALBERTA WETLAND CLASSIFICATION SYSTEM. WATER POLICY BRANCH, POLICY AND PLANNING DIVISION, EDMONTON, AB.

REFERENCE(S)

1. ALBERTA TOWNSHIP SYSTEM, HYDROGRAPHY AND TRANSPORTATION BASE DATA © GOVERNMENT OF ALBERTA 2015. ALL RIGHTS RESERVED.
DATUM: NAD83 PROJECTION: UTM ZONE 12

CLIENT
Capital Power

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-02-23
DESIGNED	CS
PREPARED	CH
REVIEWED	CS
APPROVED	JVC

PROJECT
HALKIRK 2 WIND PROJECT

TITLE
TURBINES SELECTED FOR POST-CONSTRUCTION MORTALITY SEARCHES

PROJECT NO.	CONTROL	REV.	FIGURE
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Table 1: Criteria and Selected Turbines for Post-Construction Mortality Searches

Turbines Selected for Mortality Searches	Criteria
T038B, T039B, T040A, T073A	Turbines in close proximity to a substantial waterbody and AUS plots 21 and 27.
T007, T008, T018B, T066, T100, T103, T116, T143	Turbines in close proximity to coulee system/native prairie and AUS plots 11 and 06.
T001B, T003C, T034, T051	Turbines in close proximity to bat detector locations with relatively higher bat passes and turbine T03C is also near a red-tailed hawk nest.
T012C, T022A, T049A, T052B, T057A, T078, T080A, T090, T132	Turbines representative of habitat and overall spatial distribution with some in proximity to native prairie.

2.2.1.2 Sample Size and Search Plot

Mortality searches will be conducted at the selected 25 turbines using one of two search pattern methodologies, a linear search pattern or a spiralling rope search pattern. Linear search patterns consist of traversing through a square shaped plot in a systematic manner along equally spaced transects. The spiralling rope pattern uses a length of rope, acting as the radius of a circular-like plot, which winds around the base of the turbine during the survey creating an equally spaced spiral transect. In each search pattern methodology, transects will be spaced a maximum of 7 m apart. The habitat type, vegetation, and terrain features will determine which methodology will be followed at each plot. In general, spirals are more efficient, but linear transects may be beneficial in cropland where vegetation could hinder the use of a rope to guide transects (Barclay and Baerwald 2015). Capital Power will also manage the vegetation, where feasible, within the mortality search plots, to increase searcher efficiency.

Based on the turbine height of 150 m from the tip of blade to the ground, the square linear search pattern plots will measure 150 m x 150 m (2.25 ha) and are to be centered around the base of the turbine. Plot boundaries will then be oriented with the four cardinal directions. The spiralling rope search pattern plot will extend starting at 75 m from the base of the turbine (approximately 1.77 ha). Using this methodology, the plot boundary and transects are dictated by the continuous loss of rope as it winds around the turbine. Both the linear and spiral pattern plot dimensions meet the minimum survey area of half the maximum height of the turbine, required by the Directive.

2.2.1.3 Search Method

Searches will be initiated as soon after sunrise as possible (Barclay and Baerwald 2015). The transects will be walked, as suggested by Barclay and Baerwald, at an approximate pace of 2.4 to 3.0 kilometres per hour (km/hr) (typical walking pace is 5 km/hr on broken ground) while searching 3.5 m on either side for bird and bat carcasses, or evidence of scavenged carcasses.

All carcasses, or evidence of carcasses, will be photographed in the position found, geo-referenced using a hand-held global positioning system (GPS), collected (conditional on permit approval), and recorded on a plot specific mortality search datasheet. For each carcass found, data recorded will include the unique carcass identification number, turbine plot number, observer, date and time collected, species, sex (when possible), age class (when possible), location in reference to nearest turbine, distance to and identity of other nearby structures (i.e., fence, power-line, substation), distance from observer at moment of detection, visibility class of where each carcass was

found, carcass condition, and any comments indicating the suspected cause or time of death. Each carcass will be classified according to condition criteria outlined in Table 2.

All carcasses will be collected in plastic bags, labelled, and frozen for future use during searcher efficiency or scavenger impact trials, and/or delivery to an appropriate agency for necropsy, as dictated by the appropriate CWS and AEP collection permits.

Table 2: Carcass Classification Descriptions

Carcass Condition Class	Carcass Description
Intact	A carcass that is completely intact, is not badly decomposed, and shows little or no sign of being fed upon by a predator or scavenger.
Scavenged	An entire carcass showing signs of being fed upon by a predator or scavenger or a dismembered carcass (portions) in one location (e.g., wings, skeletal remains, legs, pieces of skin, etc.).
Feather Spot	Ten or more feathers at one location indicating predation or scavenging. If only feathers are found, ten or more total feathers or two or more primaries must be discovered to consider the observation a casualty.

Source: Young et al. 2003.

Upon completion of the plot search, the searcher will record the end time, document any incidental wildlife observations they made during the search, and then move to the next search plot to begin a new search.

2.2.1.4 Schedule and Frequency

Bird and bat mortality associated with turbine collisions has been found to vary with time of year, with the spring and fall migratory periods being times when the largest amounts of mortality are observed (CWS 2007a). Post-construction monitoring is required from March 1 to October 30 (AEP 2017), which includes the periods of peak spring (May and June) and fall (August and September) migration for the Project, corresponding with the highest levels of observed mortality associated with turbine collisions. Little to no mortality is observed during the winter months.

According to the Directive, surveys are required at each location on a weekly basis, between March 1 and October 30, for all three years of post-construction monitoring. This calculates to 35 surveys per year or a total of 105 surveys over the course of the three years.

2.2.2 Searcher Efficiency

Searcher efficiency may be influenced by several factors, including, but not limited to, habitat type, vegetation height, observer experience, observer fatigue, and lighting conditions. Searcher efficiency trials are necessary to adjust the number of carcasses found during searches, allowing for correction of detection biases (CWS 2007b). Efficiency trials will coincide with the standardized mortality searches by placing pre-marked Efficiency Trial Carcasses (ETC) within the search areas. The efficiency trials will be conducted on an ongoing basis during each search season (spring, summer, fall), and in distinct habitat types.

A total of 20 bat carcasses or surrogates are recommended per searcher during each season, or 100 carcasses in total depending on the situation (Barclay and Baerwald 2015).

Efficiency trials will be conducted in a blind manner, whereby the searchers do not know they are being tested (Young et al. 2003; Barclay and Baerwald 2015). During each site visit, one of the study members will be designated as the Efficiency Trial Supervisor (ETS) in charge of distributing the ETC throughout the search plots designated for other members of the search team. The ETC will be marked to distinguish from other carcases and typically, 5 to 10 ETC will be deployed during each trial. The ETS will record the location and number of all ETC deployed on a standardized searcher efficiency datasheet, for subsequent recovery should they be overlooked during the mortality search/efficiency trials. Immediately following the day of sampling, the ETS will determine if any ETC were overlooked by the search team, and collect them prior to leaving the Project area. The team member designated as the ETS will change between successive visits, so that all search team members are subject to efficiency trials during each season. As lighting conditions also influence carcass detection, cloud cover estimates will be recorded during each trial, and an attempt will be made to conduct trials in both overcast and clear conditions.

Searcher efficiency (SE) represents the probability of an observer to detect ETC, and is calculated as:

SE = # ETC detected / # ETC deployed

CWS and AEP research permits will be required for the collection and acquisition (if required) of ETC. Pending salvage permit approval, fresh or frozen carcasses collected during the mortality searches may be used as ETC. If there is a shortage of bat carcasses, dark mice, dark gerbils, or darkly feathered one-day old chicks are considered suitable surrogates.

Searchers

Search crews will consist of experienced wildlife biologists, as defined by the Directive. Search personnel will be provided with on-the-job training in the various tasks associated with the mortality plot searches, including plot layout, transect establishment, consistent search pacing, GPS and compass use, mortality documentation, and safe work practices.

Search personnel will be trained in the identification of specific sensitive wildlife species (e.g., Sprague's pipit, loggerhead shrike, short-eared owl), as they will be required to document incidental observations of these species during the course of the search programs. Training in the recognition of the sensitive species will include on-the-job training, listening to recordings of the species specific vocalization, and reference field-guide review.

Search personnel will be trained in the efficiency trial methodology so that they can assist with the efficiency trials of fellow search personnel and function as the ETS during alternate efficiency trials. The ETS training will consist of ETC deployment, documentation, and follow-up ETC recovery as detailed above.

2.2.3 Scavenger Impacts

Scavenger impact trials are necessary to adjust the number of carcasses found during mortality searches, allowing for correction of scavenger biases. Scavenger impact trials will be conducted approximately three times during each survey season to account for scavenger density changes (Barclay and Baerwald 2015). By determining the length of time taken for scavengers to completely remove the carcass, the total mortality count estimate will be adjusted.

Each scavenger impact trial will consist of placing 12 carcasses or surrogates (fresh or thawed) of different species within pre-selected scavenger impact plots located within the study area and recording the carcass details on a standardized scavenger impact datasheet (Barclay and Baerwald 2015). The scavenger impact trial plots will be located within representative habitat outside the mortality search plots, to prevent possible confusion with turbine related mortality. Each scavenger impact trial will last up to 15 days, in which time the scavenger impact trial carcasses will be monitored continuously with remote wildlife cameras and/or inspected on days when search crews are on site, or until completely removed by scavengers. At the end of the trial (i.e., after the 15 days), any remaining trial carcasses will be removed. An attempt will be made to use species normally occurring in the study area during the scavenger impact trials, as domestic species (i.e., chicken) may be more palatable and/or easily detected by scavengers. Pending salvage permit approval, fresh carcasses found during the mortality searches may be used as scavenger impact trial carcasses.

2.2.4 Fatality Estimates

Results of searcher efficiency and scavenger efficiency trials will be incorporated into the fatality estimates using the Huso (2010) estimator. The Huso estimator is the most common and most recommended by AEP (Barclay and Baerwald 2015).

2.2.5 Post-Construction Reporting

At the completion of each year of the bird and bat mortality monitoring, an annual report will be prepared that includes:

- detailed survey protocols and data analysis methodology;
- raw data, using the appropriate FWMIS datasheet for each turbine;
- results of searcher efficiency and scavenger trials;
- the uncorrected fatality rate for bats and birds expressed as number of mortalities/turbine/year and mortalities/megawatt/year;
- the corrected fatality rate/turbine/year and corrected mortalities/megawatt/year based on Huso (2010) or Shoenfeld (2004);
- a summary of species killed;
- results of pre-construction and post-construction wildlife surveys;
- a comparison of the pre- and post-construction survey results;
- a comparison of the estimated fatality rates from pre-construction surveys and the fatality rates from post-construction surveys for birds and bats; and
- a statement of Compliance with the Directive and signature of lead biologist.

The annual post-construction monitoring report will be submitted to the AUC for review.

3.0 POST CONSTRUCTION MITIGATION

Due to thoughtful planning and Project design, it is anticipated that operational mitigation will not be required. However, if required, the effectiveness of such mitigation measures on reducing bird and/or bat mortality will be assessed through an operational mitigation study, which will be conducted in conjunction with the post-construction monitoring program. Turbines selected for operational mitigation (i.e., the experimental group) will be located throughout the Project, including a mix of footprint edge and internal turbines. It is expected that an operational mitigation study with experimental and control turbines will reduce the influence of annual bat/bird activity variability on the assessment of operational mitigation measures. Carcass searchers will not be informed of the ongoing operational mitigation study nor which specific turbines are included, to avoid any potential bias in search effort at experimental or control turbines during the study.

Results of the operational mitigation study, if required, will be included in the annual post-construction monitoring report and will be submitted to the AUC for review. Capital Power will consult with the AUC (and AEP, as appropriate) to determine whether additional or different mitigation measures are warranted and whether the three-year post-construction monitoring program is satisfactory.

4.0 CLOSURE

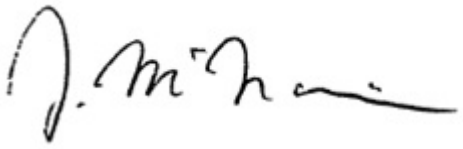
This PCMMP is intended to fulfill the requirements of the updated AEP *Wildlife Directive for Alberta Wind Energy Projects*, dated January 27, 2017 (AEP 2017).

The PCMMP includes the duplication of select pre-construction surveys, bird and bat mortality searches (including searcher efficiency and scavenger trials), and reporting commitments. After completion of the proposed 3-year mortality monitoring program, the results will be assessed by Capital Power, the AUC, and AEP to determine that wildlife mortalities are at acceptable levels and the program can be concluded.

Because of the rapid development of the wind energy industry in Alberta and the large amount of data still being collected, the body of knowledge on impacts to birds and bats from wind energy development is continually growing. Accordingly, Capital Power will consult with AUC/AEP during the post-construction monitoring phase for regular dialogue and feedback with provincial biologists.

GOLDER ASSOCIATES LTD.

Corey De La Mare, P.Biol.
Principal, Senior Biologist



Jacinta McNairn, P.Eng.
Associate

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