Management Plan

Copper Mountain Wind Project

License of Occupation Application

IUP file no. 3412063



Purpose

The purpose of this License of Occupation (LOO) is to enable Wind Prospect British Columbia Inc (WPBCI) to install wind monitoring towers within IUP no. 3412063 to verify the wind resource and determine if this IUP area will support a commercial wind energy development. This management plan provides a description of WPBCI’s overall wind strategy for the project, a description of each individual mast location, information relating to the land use and access on site, a description of the met mast tower and its instrumentation, and an outline of the installation plan and tower operation. Although a permit is not required to install SODAR equipment on site, information about SODAR has been included within this plan as the equipment forms part of the wind monitoring strategy. Should this LOO application be successful, met tower installation would follow as soon as possible after.

Wind Monitoring Strategy

The Copper Mountain Wind Project consists of two IUP’s 3412063 (this application) and 3412188.

WPBCI has identified ten mast locations, five across each IUP, for us to monitor a gain an understanding of the wind regime across the entire 2 IUP site. Although two LOO applications have been submitted separately, a selection of mast locations taken from both of the applications will constitute the collective wind monitoring strategy for the project. As such not all of the identified locations within each application will be utilized. The five locations that have been identified for this application are outlined in Table 1 within the Meteorological (met) tower locations section below.

It is WPBCI’s intention to deploy SODAR units on site as soon as possible to get an initial indication of the wind speed. Should the wind resource prove to be viable; met tower installation would follow shortly after accompanied by rotating SODAR units for correlation. Following the initial SODAR assessment, only one met mast will be installed on site initially for the first 3 – 6 months. After this initial period of monitoring, WPBCI will conduct a wind resource assessment to further determine the viability of the site for the development of a commercial wind energy development. Should the wind resource continue to prove viable results, WPBCI will continue to select further mast locations across the entire project area, including locations from this application and from IUP 3412188, for mast installation.

The total number of masts to be installed on the project will be determined as the wind monitoring strategy reveals results. Currently five mast locations, two locations from this application (COPW02, COPW04) and three from 3412188 (COPE01, COPE02, COPE04) have been highlighted as priority locations with COPW02 and COPE02 being the top two locations for initial install.

 Meteorological (met) Tower Locations

The five mast locations have been selected based on desktop GIS assessments and site visits where possible. No locations have been selected on the Northern portion of this project due to a radar constraint inhibiting wind turbine generators (WTG) from being installed there.

Table 1: Met Tower Locations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Easting** **(BC Albers)** | **Northing** **(BC Albers)** | **Priority in****Overall Strategy** | **Description** |
| COPW01 | 1,405,351.081 | 484,965.701 | TBD | Located in an existing plantation / cut block operated by Weyerhaeuser, adjacent to Young Creek FSR, section 49-Y1-02 at an approximate elevation of 1890m. Access to the mast location is currently via Willis Creek and young creek roads. It is expected that a small amount of tree removal will be required for the installation. Should this met tower locations be used in the future, an assessment of the locations at this time will take place and a free use permit will be applied for if necessary |
| COPW02 | 1,406,299.385 |  484,205.218 | 1 | Located within a cut block that has recently been or will be harvested by Aspen Planners (AP) this year 20ll. The mast is adjacent north of where Young Creek rd, section 49-Y1-02 and sections 49-Y1\_04 meet at an approximate elevation of 1960m. Access to the mast location is currently via Willis Creek and young creek roads. Dialogue with AP will take place over the next 6 months whilst this application is in process to determine both of our intentions for the land and what level of tree stump removal and ground clearing may be required for the mast installation.  |
| COPW03 | 1,407,942.82 | 484,680.367 | TBD | Located in an existing plantation adjacent to Young Creek rd, section 49-Y1-10 at an approximate elevation of 1990m. . Access to the mast location is currently via Willis Creek and young creek roads. Recent harvesting by AP has or is occurring all around this location. Should this met tower locations be used in the future, an assessment of the locations at this time will take place and a free use permit will be applied for if necessary. |
| COPW04 | 1,405,978.177 | 479,648.005 | 3 | Located in an existing plantation adjacent to road section P52720.43 at an approximate elevation of 1870m. Weyerhaeuser anticipate harvesting in this area within the next 3-5 years. It is expected that tree removal will be required for a mast installation at this location and an evaluation of the forestry will take place if this met mast location is utilized. A free use or license to cut permit will be applied for at that time. Access to both COPW04 & COPW05 I likely to change over the next couple of years due to the harvesting of pine beetle kill mentioned below. |
| COPW05 | 1,408,059.665 | 479,559.645 | TBD | Located in a mature pine forest containing beetle adjacent to road section P52720.40 at an approximate elevation of 1910m. Weyerhaeuser anticipate harvesting in this area within the next 1-3 years. Il is unlikely that WPBCI will want to install a mast on this location prior to the harvesting taking place. If required, an evaluation of the forestry and a free use or license to cut permit will be applied for prior to installation.  |

\*TBD- to be Determined

Land Use & Access

The primary industry in the area is forestry and there are a number of active forestry operators within the IUP boundary. Prior to submitting this LOO application, WPBCI submitted the proposed met mast locations to all known operators to determine their harvesting intentions and the status of road infrastructure and access in the vicinity of the met mast locations. What became apparent through the feedback was that road infrastructure on site can change quite rapidly as new roads get built and others decommissioned, as such, the access roads detailed in the descriptions of the masts locations above are based on current conditions. WPBCI is in dialogue with the operators and Ministry of Forests, Lands and Natural Resource Operations to determine how to maintain the active status of these roads should they be scheduled for restoration. A detailed access assessment will take place prior to any mast installations to determine the exact routes to be used closer to the time of tenure approval. Relevant road works permits will be applied for if road work is necessary. Further information relating to access can be provided to you on request during this application processing time.

Where tree removal is required, WPBCI will come to an agreement with the concerned operator prior to install to ensure adequate compensation and to determine replanting obligations.

Tower description

The met tower to be installed will be an 80m triangular lattice tower supported by guy wires at several heights along the tower. The base of the mast will have a footprint up to 5m x 5m and concrete to a depth of approximately 2.5m. The mast will be surrounded by three anchor points located 120° apart at approximately 65m from the base. A geotechnical report will be carried out to determine the specific type of anchors required on site. For normal soil conditions dead man anchors will be used which will leave a footprint of approximately 1m x 1m and contain concrete up to a depth of 2.5m. For softer soils the use of piles will be required and for rocky soils, rock anchors will be utilized. The mast will support one vertical and nine horizontal booms to which wind direction and speed measuring instrumentation will be mounted. A sample drawing has been included with this application for illustrative purposes only.

Installation Method

An experienced contractor will install each met tower with a crew of four technicians over a period of three days via the use of a boom truck. If any ground clearing is required, this will be completed followed by the digging of holes for the three anchors and foundation. The holes will then be filled with concrete by a cement truck and the tower built up once the concrete has set. Once the tower sections have been stacked to their full height, booms supporting instrumentation will be attached as the technician makes their way down the tower. Once installed, the tower will take up an area of approximately 1ha. The installation will be documented to ensure that our collected data is accurate and bankable. All provincial health and safety regulations will be adhered to. A road use permit will be obtained for the cement truck as advised by the Ministry of Forests, Lands and Natural Resource Operations.

Operation

Data recorded at the tower will be sent to WPBCI via a solar powered satellite link. This information will be quality checked weekly to ensure accurate operation. Data collection will commence upon installation and will continue for a minimum of 12 months and potentially up to three years. Maintenance will occur bi-annually at a minimum, in addition to any occurrences of suspected malfunctioning equipment.

SODAR Description

The SODAR unit has a 2m x 3m footprint and is 2m high. The equipment emits sound waves which are measured to calculate wind speed and direction at several heights up to 200m. Weighing less than 500kg, the unit would be equipped with a small heater to melt snow that would otherwise accumulate on the solar panels and prevent the unit from powering itself.

The SODAR unit will be transported to site either by helicopter or truck, depending on access route viability. It will be secured to the ground by meter-long anchor screws at each corner of the unit.

Similar to the met tower, the SODAR unit’s recorded data will be sent via satellite link and quality checked weekly to ensure accurate operation. After an initial period of calibration in close proximity to a met tower, the SODAR unit will be relocated several times across the project area to gain a better understanding of the wind regime on site.

The Licence of Occupation Management plan was generated by Mellissa Warren of Wind Prospect British Columbia Inc on the 15th June 2011

Signature:  Date: 15/06/2011

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