APPENDIX E

Materials Generated for Consultation

Pugwash Wind Farm: Environmental Assessment

WORKBOOK

Focus Group Consultation

CBCL LIMITED
Consulting Engineers

June 2007

CONSULTANT TEAM

CBCL Limited is a multidisciplinary consulting company headquartered in Halifax that provides expertise in environmental engineering, in land use and environmental planning and in environmental and socio-economic impact assessment. The Land Use and Environmental team has extensive public consultation and facilitation experience at the local, national and international levels. All programs are designed to ensure that the client, stakeholders and relevant special interest groups have input into and an understanding of the objectives of the work being undertaken. The techniques used are determined by the circumstances of the specific project, but may include open houses, workshops, group facilitation, newsletters, surveys, liaison committees and public meetings.

WHO ARE WE WORKING FOR?

The Atlantic Wind Power Corporation has hired CBCL Limited on behalf of Cobequid Area Wind Farms Inc. to facilitate the preparation of the environmental assessment that is required for the Pugwash Wind Farm.

BIOS OF FACILITATORS

Ann Wilkie, M.A., MSc., LLB., CIP *VP Environment, CBCL Limited*

Ann has over 35 years of experience in the public and private sectors and in teaching at a graduate level in both Canada and Northern Ireland. She has managed multidisciplinary teams in Canada, Europe and Asia, has been the principle investigator for several of the largest environmental impact assessments undertaken and has provided substantial leadership to the development and execution of effective stakeholder consultation in Atlantic Canada. She managed the environmental impact assessment for the Sable Offshore Energy Project, played a lead role in the routing and assessment of the natural gas pipeline through Nova Scotia and New Brunswick, provided strategic support to El Paso Pipelines as they considered the development of a subsea pipeline from this region to the US and is currently providing expertise to Xstrata as they undertake their environmental studies to open a subsea coal mine at Donkin.

Annabelle Singleton, B.Sc. *Environmental Planner*

Annabelle's expertise lies in environmental and socio-economic impact analysis and community consultation. She has facilitated stakeholder open houses, presentations and workshops in each of the Atlantic Provinces; she is currently responsible for the execution of Xstrata's Community Engagement Strategy in Cape Breton where she has helped to facilitate numerous community meetings, the establishment of a community liaison committee, open houses and a project newsletter. She has a sound understanding of the environmental assessment process and has been instrumental in the preparation of EAs to meet the requirements of both federal and provincial legislation.

David Burton, B.B.A. *Research Student*

Having attained his degree in business administration from Acadia University, David has completed his first year of law and is currently working with the Environmental and Land Use team at CBCL Limited as a research student. He is involved in compiling data related to a number of topics including issues associated with the development and operation of wind farms, electrical transmission lines, and the mechanisms available to municipalities to control development on land owned by the higher levels of government. He will work with CBCL Limited until his return to law school in the fall.

THE PROJECT

The federal and provincial governments have introduced strategies to facilitate the development of alternate energy sources in a bid to reduce the emission of "green house gases". The conversion of wind power into electricity is an acknowledged means of meeting this objective. Further, Nova Scotia Power Inc. (NSPI) has established mechanisms by which they will buy "clean energy", i.e., wind power, from selected producers in an effort to meet its emission targets.

In recognition of this context, Cobiquid Area Wind Farms Inc. are planning the development of a Wind Farm on lands to the east of Pugwash lying between the Irishtown Road and the Gulf Shore Road to generate electricity for sale to NSPI. Depending on the size and configuration of the turbines, the development could involve the construction and operation of up to 27 turbines, but there will likely be less. Although the detailed engineering has not yet been undertaken, a possible configuration of the proposed wind farm, based on preliminary site assessment work, has been mapped.

In determining the scope of the Project for the environmental assessment the Proponent must give consideration to what is involved in the construction of the principal structural elements including the towers, the necessary cable linkages to the grid and the substation, the operation of the wind turbines and their eventual decommissioning.

Construction, and preparation for construction, will involve a number of activities including:

- Undertaking of a number of surveys including a site survey and a geotechnical survey;
- Preparation of the site for construction including the upgrading of the Irishtown Road, preparation of the turbine pads and the mobilization of construction equipment;
- The development and implementation of an erosion control plan to mitigate against sediment transfer during construction activities;
- Excavation to accommodate the concrete foundations;
- Preparations of the building forms for the foundation, the pouring of the reinforced concrete foundation and the attachment of the mounting ring for the tower;
- The transportation of the wind turbine, including the tower, to the site by the supplier on flatbed trucks;
- The lifting by crane of the tower sections which will be bolted into place. The nacelle, which contains the operating mechanisms, will then be placed on top of the tower;
- The rotor, i.e., the blades of the turbine, will be assembled, or partially assembled, on the ground and then lifted to the nacelle and bolted into place; and
- Demobilization and site remediation which will include the restoration of vegetation around the towers and the remediation of the construction areas.

The wind turbines will be operational on a continual basis except under circumstances of mechanical breakdown, extreme weather conditions or maintenance activities.

The design life of a wind turbine is typically 20 -30 years and capital improvement and replacement programs can extend safe and efficient operations well beyond 40 years. At the end of their useful life, the wind turbines will be

decommissioned, and all equipment will be dismantled and disposed of in a manner that meets all regulatory requirements. The site itself would be restored to a state similar to what currently exists through regrading and revegetation.

THE REGULATORY PROCESS

In Canada, the federal and provincial governments share responsibility for the environment which necessitates that a project proponent must have due regard to the requirements of both the *Canadian Environmental Assessment Act (CEAA)* and the *Nova Scotia Environment Act* when determining the scope of the environmental assessment required for a wind project. A federal assessment is triggered whenever a federal authority exercises one of the following powers or performs one of the following duties:

i) Is the proponent of the project and does any act or thing that commits it to carrying out the project in whole or in part;
ii) Makes or authorizes payments or provides a guarantee for a loan or any form of financial assistance to the proponent for the purpose of enabling the project to be carried out in whole or in part;
iii) Sells, leases or otherwise disposes of federal lands or any interests in those lands, for the purpose of enabling the project to be carried out in whole or in part;
iv) Exercises a regulatory duty such as issuing a permit or license that is included in the *Law List Regulations,* grants an approval or takes any other action for the purpose of enabling the project to be carried out in whole or in part.

The proponent will be accessing the ecoEnergy Renewable Energy Program administered by Natural Resources Canada and must therefore undertake an environmental assessment at a screening level that meets the requirements of *CEAA.* At the same time the *Nova Scotia Environment Act* pursuant to the Environmental Assessment Regulations requires that a Class I assessment be undertaken for "an electric generating facility that has a production rating of 2 megawatts or more derived from wind energy". The Pugwash Wind Project will therefore be subject to a joint federal provincial environmental impact assessment process. The first step in this process will be the submission of a project description to the regulatory agencies; it is anticipated that this will take place sometime in July.

In May of this year the Nova Scotia Department of Environment and Labour (NSDEL) released a document entitled "Proponent's Guide to Wind Power Projects: Guide for Preparing an Environmental Assessment Registration Document". This is a useful reference document not only for the proponent, but for all who have an interest in a wind power project subject to the environmental assessment process. Of interest is the introduction of a categorization mechanism for projects that takes account of a project's size (small, medium, large and very large) and the sensitivity of the project site (low, medium, high and very high). Based on the criteria provided, the proposed Project at Pugwash would be categorized as medium in size, i.e., having 11-40 turbines, in a location of high sensitivity, i.e., is located in an area less than 5 km. inland from coastal waters.

Based on the above criteria, the Project can be categorized as a Category 3 project: in the guide Category 3 projects are described as follows:

> *Projects in this category present an elevated level of risk to wild species and/or their habitats, and require comprehensive surveys to gather baseline information. These will normally need to be done over the course of one calendar year unless additional concerns are identified in the process, e.g., an unexpected species at risk is found to*

be present, which would extend the time period. The proponent must apply standards and protocols for bird monitoring specified for "Category 3" projects as defined by Environment Canada and the Canadian Wildlife Service. Preconstruction surveys need to quantify what species are using the area and obtain measures of their relative abundance.

If the site contains concentrations of birds, or species thought to be particularly vulnerable to colliding with turbines, or that have potential to be negatively affected by the presence of turbines then more detailed studies may be required. Such information may help to inform placement of turbines, or to determine the need for other mitigation measures. Post-construction follow-up surveys, spread over at least two years, are required to determine changes in wildlife use of the area associated with installation of the turbines. Regular carcass searches will normally be required to monitor the impact to breeding and migrating bats and birds. Given the potential for fragmenting habitat and the resulting loss of landscape connectivity by large (42 -100 turbines) and very large (over 101 turbine) projects, these sites will require consideration and analysis of potential landscape scaled impacts.

FIELD WORK DONE, UNDERWAY OR PLANNED

i) Habitat Analysis and Wetland Delineation

Based on aerial photographs, ecological mapping, ground truthing and examination of secondary data bases, the CBCL Limited team will identify and categorize the habitats and wetlands within the study area. This provides an important reference for the more specific ornithological and flora work undertaken.

ii) Ornithological

Breeding bird surveys were conducted in July 2006 and again in the spring of 2007. Mandatory bird counts were also undertaken through September and October 2006. Watch points for shorebirds, waterfowl and raptors transiting the study area were established. Final reports are anticipated in early July and will be incorporated into the environmental assessment.

iii) Bat

This work is currently underway.

iv) Plants

The field work was undertaken in the summer of 2006. All but two of the turbine sites fell into one of the following plant community groupings:

- Actively cultivated pasture/hay field;
- Recently retried pasture/hay field;
- Young forest of thicket, i.e., 20 – 50 years old, and presumed to be regenerated from cleared agricultural land;
- Young forest or thicket regenerating from clear cutting or heavy selection cutting some 10 -20 years ago; and
- More mature, natural forest stands clear cut in the past one to two years.

One site was characterized by an alder dominated swamp with about 25% tree cover. The plants found in this area, including white and black ash and American elm, suggest that the soil is likely somewhat less acidic than it is in other parts of the study area, and the site supported three provincially rare plants, including a very

significant population of the *Halberd – Leaved Tearthumb* probably representing the largest occurrence of this species in Nova Scotia.

Another site was characterized by a stand of mature hemlock, yellow birch, red maple and red spruce along a small permanent, or nearly permanent, stream. The trees in this location are likely to be over 100 years old, judging by similar or smaller cut stumps on the site aged between 115 and 127 years.

These factors will be taken into account in the determination of the final siting of the turbine locations.

v) Archaeology

This work is currently underway.

FOCUS GROUP CONSULTATION

The objectives of the focus group meetings that have been scheduled are:

- To provide information on the environmental assessment process for the Pugwash Wind Farm and on the regulatory requirements for that process;
- To talk about the Project parameters;
- To reference the field work that has been done and is planned; and
- To discuss issues that have been raised including, but not necessarily limited to, the following: the potential aesthetic impact, noise, flicker, property values and ecological concerns.

AESTHETIC IMPACT

The aesthetic impact of any new development form, such as a large wind turbine, is cause for reflection and local interest. Aesthetic pleasure and appreciation of a landscape is derived by how human beings experience their surroundings and for many that experience is associated with the known and the familiar. Topography, vegetation patterns, colour, the presence or absence of water, are perhaps the essential building blocks and contribute to how we see and value landscapes.

Modern wind turbines are large and a relatively recent introduction into the Nova Scotian landscape. When evaluating the visual impacts of wind turbines, the essential question is not only whether an individual finds them inherently beautiful or not, but to what degree they may affect important visual amenities in the area. The gulf shore is beautiful and has attracted visitors and seasonal residents for many reasons. The traditional agricultural and fishing economy, for example, is augmented by the expenditures made by the cottagers and visitors who help to support the shops and services in the community including those developed for their need and enjoyment, e.g., the Northumberland Links Golf Course, numerous camp grounds, the Fox Harbour Provincial Park and other recreational destinations. Tourism is important to the local economy, and the scenic beauty and tranquility of the area is one of the attributes that supports that economy. The affect of the proposed wind farm on the landscape characteristics that are important to this segment of the economy must and will be taken into account in the environmental assessment process.

QUESTIONS

1. Given your use and enjoyment of your property and the area please indicate which views are the most important to you, when and why.
   a. View to the Northumberland Strait _____
   _____
   _____

   b. Views east along the shore _____
   _____
   _____

   c. Views westward along the shore _____
   _____
   _____

   d. Other _____
   _____
   _____

NOISE

Expressed community concern with respect to possible noise pollution brought about by the introduction of wind-turbines to the area is in part a result of the appreciation of, and dependence upon, not just the tranquil nature of the local environment, but of the nature of the noises heard. The perception of noise depends in large part on the individual – on their ability to hear and upon their subjective tolerance or intolerance towards the particular noise. The important issue for the community is whether the noise pollution emanating from the proposed project has the potential to cause annoyance.

The sources of noise from turbines maybe mechanical and/or aerodynamic, i.e., the 'swooshing', which arises as the blades cut through the air. Noise levels are subject to many factors which, in turn, affect their ability to cause annoyance. These factors include the 'hearers' distance from the turbine, the effects of wind, local topography and atmospheric pressure. Wind powered turbines are, in fact, very quiet when compared to industrial activities, or indeed to farm machinery. Ambient noise levels in and around Pugwash are likely lower than in urban or industrial areas, but possibly not as low as some might expect. Wind, waves, rural traffic, farm activity, people on the beach, etc., can generate appreciable noise. There are many factors which contribute to the evaluation of calculating the noise pollution emanating from a proposed wind-energy project. To address community concerns regarding possible noise pollution, reliable projections must be made that demonstrate that the proposed project won't jeopardize the tranquil nature of the Pugwash environment.

QUESTIONS

1 What noises do you typically hear on your front deck or your yard on a calm summer day? Please describe:

2 What noises can currently disturb your enjoyment of your property?

3 What noises do you associate with your property and that you particularly enjoy?

4 Describe your apprehension with respect to the noise generated by a wind turbine, or wind turbines:

FLICKER

A phenomenon referred to as 'shadow flicker' has the potential to impact, at a given point in time, the ability for residents to enjoy their surroundings. In sunny conditions the rotating blades of a wind turbine cast a moving shadow on the ground which results in alternating changes in light intensity; this phenomenon, when it occurs, can cause annoyance. This is of concern to some in the area as it can be difficult to work, read or relax in a room if this shadow flicker is perceptible. The problem is of increasing relevance the higher the latitude of the site because of the lower angle of the sun, especially in the winter months.

Even in the worst case circumstances, however, shadow flicker is only observed for a very short period each day and only for a few weeks of the year. Further, any affects of shadow flicker can be mitigated in the planning phase and during operation. In the planning phase, site selection can ensure that computed shadow paths avoid nearby sensitive locations. During operation, there are tools which not only compute shadow flicker in real time, but can also signal the control system if the flicker becomes especially problematic causing a temporary shut down.

QUESTIONS

1. Do you have any concern that flicker, as described, may cause you disturbance? If so, why? _____

2. How far approximately is your property from the nearest wind turbine? In what direction? _____

PROPERTY VALUE

There is a mix of property types within the study area, especially along the coast. There are older, traditional homes; there are mobile homes; there are unwinterized cottages, and there are an increasing number of larger, more expensive, residential properties. There are also a number of new subdivisions, particularly on the coastal side of the Gulf Shore Road, where building lots are being advertised. The issue is twofold: firstly will the development of the Project affect the present resale value of existing properties? If so, in what area, or areas? Secondly, will the development of the Project affect the sale of land for new development on the shore side of the main road?

QUESTIONS

1. Please indicate your opinion on this difficult, but relevant topic: _____

2. What structural elements do you currently value in the landscape and that you believe add to the value of your property? Why? Please describe: _____

3. What structural elements in the landscape do you wish were removed because they detract from the value of your property? Why? Please describe: _____

ECOLOGICAL AND SOCIO-ECONOMICAL VALUES

The environmental assessment must identify the environmental systems and characteristics in and in proximity to the project area. Of particular interest, therefore, are the ecological and socioeconomic characteristics associated with those lands between the Irishtown Road and the Gulf Shore Road. As residents of the area, you are familiar with this area and in a better position than many to identify sites, birds, flora and fauna of particular interest. This information is of value to the assessment and will augment the research and fieldwork that is taking place.

QUESTIONS

1. Are you aware of any wetlands in this area and of any valued characteristics associated with them? Please identify on the map and describe the specific attributes: _____

2. What bird species do you know to frequent, nest, feed, or migrate through the lands in questions? Please identify: _____

3. Are you aware of any bat hibernacula in or within a 25 km radius of the lands in questions? Please identify: _____

4. Are you aware of any valued species of plant associated with the lands in question? Please identify: _____

5. What recreational activities take place in or in proximity to the lands in question, e.g., hunting, fishing, hiking, ATV use, other; Please describe: _____

6. Describe the uses to which this land is put: _____

7. Are you aware of any sites/areas of historical, archaeological or paleontological importance in or in proximity to the lands in questions, e.g., old cemeteries, farm steadings, etc.? Please describe: _____

8. Are you aware of any First Nation traditional or current use of the lands in questions? Please describe: _____

9. Are you aware of any other development, other than the continuation of current use, of the lands in question? Please describe: _____

10. What in your opinion would be the highest and best use of the lands in question? Please describe:_____

KEY ENVIRONMENTAL VALUES

The environmental assessment will examine both the natural and socio-economic environments that could be affected by the construction and operation of the proposed wind farm. To facilitate the analysis that will be undertaken, the project team have identified a first list of valued ecosystem components (VECs) and socio-economic issues that will be addressed in the assessment.

These components will be used to focus the analysis. This list will be added to and refined based on what we hear from you, further research, team discussions and debate.

Biophysical Components

- wetlands
- tree/forest stands
- fauna
- avian species
- flora
- bats

Socio-economic Components

- agricultural land
- recreational uses
- waterfront properties
- property value
- tourism
- physical and cultural heritage
- commerce and jobs
- valued landscapes and aesthetics
- noise
- flicker

QUESTIONS

1. Based on your knowledge and familiarity with the study area, do you think that we have included all the components that should be included in our evaluation? What have we missed? Please identify. _____

NOTES AND OBSERVATIONS

We would encourage you to provide additional information and observations pertaining to the matters raised and discussed:

Your input can be provided in this workbook and handed to one of the facilitators at this meeting, or send to our office in Halifax to the attention of:

Ann Wilkie
CBCL Limited, 1489 Hollis Street
PO Box 606, Halifax, NS B3J 2R7
Tel: (902) 492-6764 Fax: (902) 423-3938
Email: annw@cbcl.ca

Thank you very much for your participation in this focus group and for providing your ideas and recommendations. Your input is very much appreciated.

Thank you

Discover more about the revised Pugwash Wind Farm Project.

PUGWASH WIND FARM

PROJECT TEAM

THE PROPONENT

Pugwash
Wind Farm Inc.

North Cumberland
Wind Farm LP.

Charles Demond
Joerg Losse
Clair Peters

LEAD CONSULTANT

CBCL LIMITED
Consulting Engineers

Ann Wilkie
Annabelle Singleton
Clinton Pinks
Steffen Käubler
Chris Kennedy

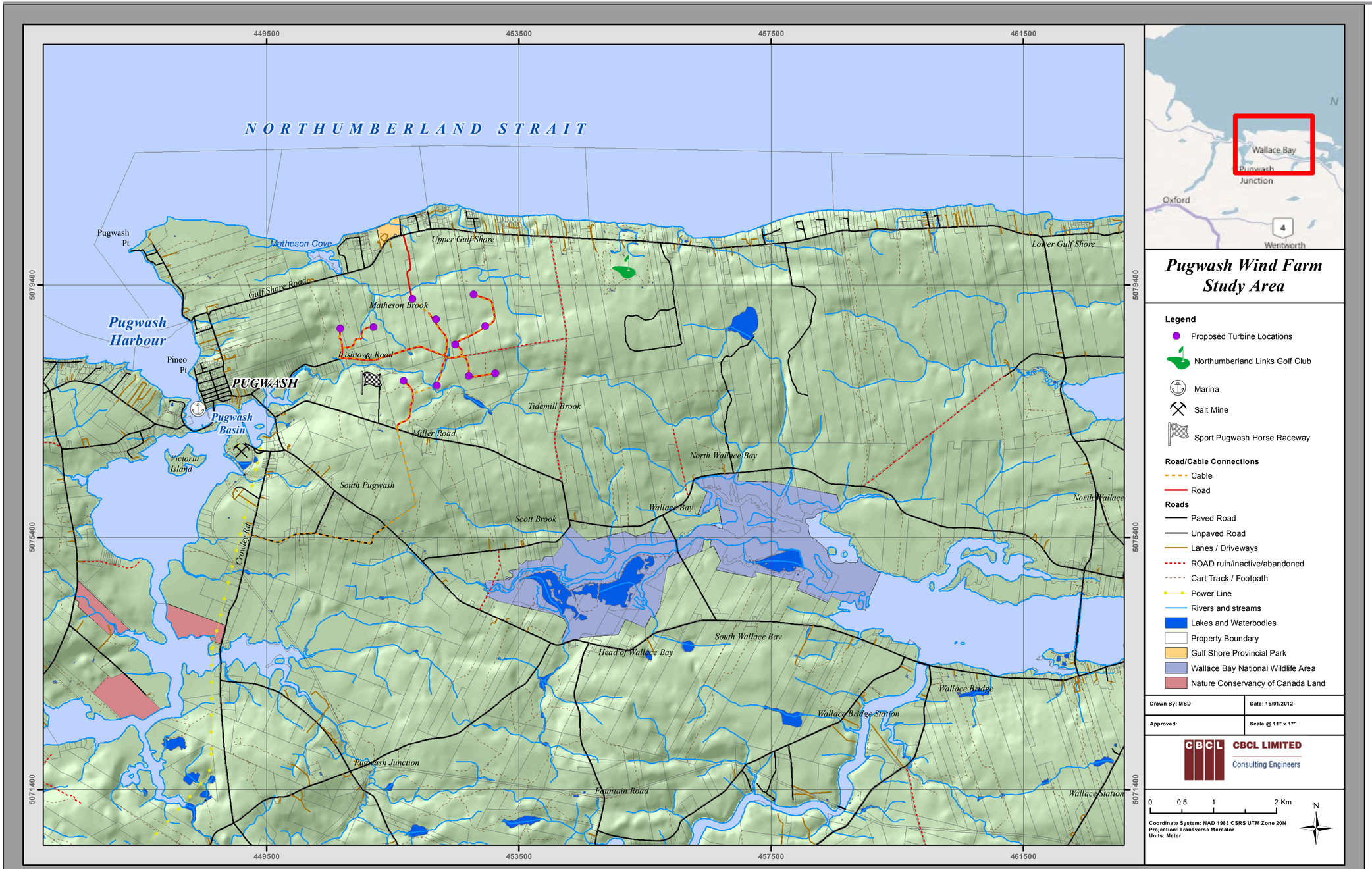
KEY SUB-CONSULTANTS

DAVIS MACINTYRE & ASSOCIATES
ARCHAEOLOGICAL CONSULTANTS

Membertou
GEOMATICS SOLUTIONS

GL Garrad Hassan

PROJECT AREA



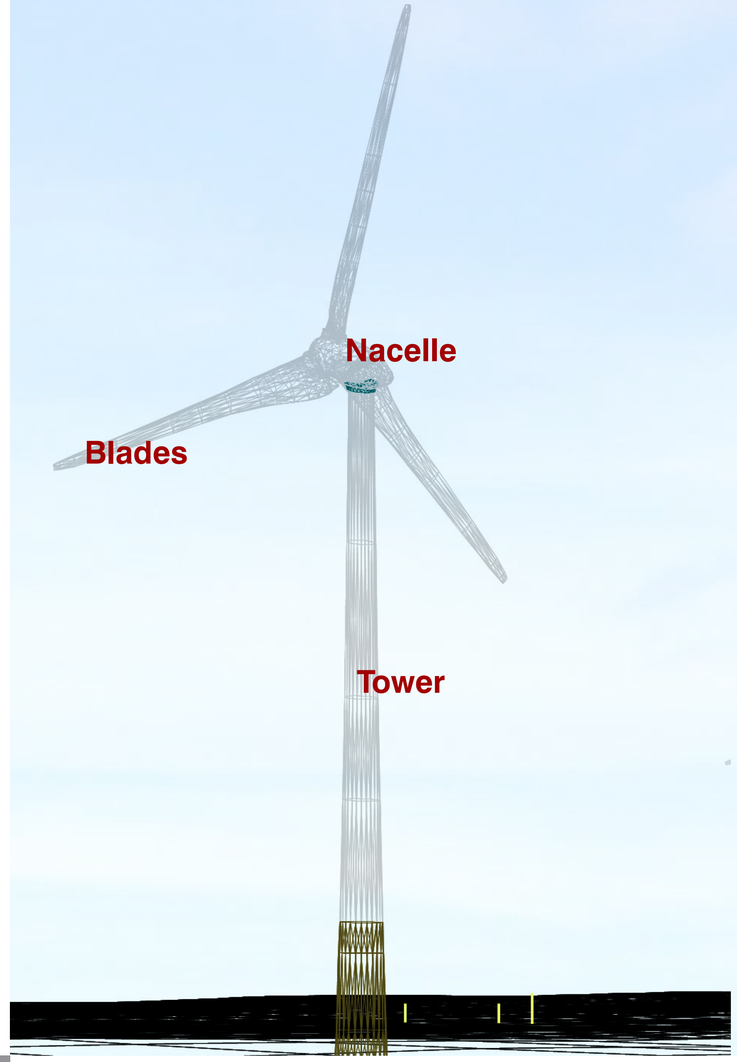
LOCATION:

The project site is located on land near the community of Pugwash in Cumberland County. The area is located on the east side of the Pugwash Basin and spans the north and south sides of the Irishtown Road.

PROJECT COMPONENTS

WIND TURBINE GENERATORS (WTGS):

- Tower: up to 99 m tall
- Nacelle: the housing for the operating parts
- Blades: 3 with a diameter of 101 – 113 m



FOUNDATIONS AND LAY-DOWN AREAS:

- Each WTG secured to a concrete foundation approximately 70 – 100 m^2
- An adjacent area will be cleared, grubbed and graded to allow for lay-down and erection of the WTG sections

ACCESS ROADS:

- Where possible existing roads will be used and upgraded
- Most WTG sites will be accessed from the Irishtown Road
- New access roads designed to avoid wetlands and brooks

CONNECTION TO THE ELECTRICAL GRID:

- Each WTG connected to a collection system
- Collection system goes down to substation
- New substation proposed at the intersection of the Rabbittown Road and Crowley Road
- Ties in to the existing NSPI 69 kV transmission line