Appendix 7 Archaeology Report and Approvals

KETCH HARBOUR WIND FARM
ARCHAEOLOGICAL SCREENING AND RECONNAISSANCE
HALIFAX REGIONAL MUNICIPALITY

INTERIM REPORT

Submitted to:

Eon WindElectric
and the
Special Places Program

Submitted by:

Boreas Heritage Consulting Inc.
and
Strum Consulting

February 2015

HERITAGE RESEARCH PERMIT: A2015NS004

Strum CONSULTING

BOREAS Heritage Consulting Inc.

PROJECT PERSONNEL

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PROJECT MANAGEMENT:	Sara J. Beanlands, M.A. Stephen G. Garcin, M.A.
BACKGROUND STUDY:	Sara J. Beanlands, M.A. Stephen G. Garcin, M.A.
REPORT PREPARATION:	Stephen G. Garcin, M.A. Sara J. Beanlands, M.A.
GIS/DRAFTING:	Stephen G. Garcin, M.A.

EXECUTIVE SUMMARY

Eon WindElectric is proposing to develop a three turbine wind farm, located in Halifax Regional Municipality, approximately 4 kilometres southeast of the community of Harrietsfield and 7 kilometres northwest of Ketch Harbour. In order to evaluate the potential for impacting archaeological resources during the proposed development, Strum Consulting retained Boreas Heritage Consulting Inc. (BHCI), on behalf of Eon WindElectric, to conduct archaeological screening and reconnaissance of the proposed study area. Although winter weather conditions have precluded the completion of the reconnaissance stage of the assessment at this time, the archaeological screening has been completed, the results of which are presented in this interim report.

The archaeological assessment was directed by BHCI Principal and Senior Archaeologist Stephen Garcin and conducted according to the terms of Heritage Research Permit A2015NS004, issued by the Nova Scotia Department of Communities, Culture and Heritage - Special Places Program (SPP). Background research was provided by BHCI Principal and Senior Archaeologist Sara Beanlands.

Based on the various components of the background study, including environmental setting, Native land use, property history and the results of the archaeological potential modelling, the majority of the study area is ascribed low potential for encountering Precontact and/or early historic Native archaeological resources, as well as historic Euro-Canadian archaeological resources. Archaeological reconnaissance is recommended, however, in order to confirm the findings of the initial screening and to determine the potential of archaeologically sensitive areas identified as a result of the archaeological potential modelling.

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This interim report describes the archaeological assessment (screening) of the Ketch Harbour Wind Farm study area, presents the results of this investigation and offers preliminary cultural resource management recommendations.

2.0 STUDY AREA

The archaeological study area for the proposed Ketch Harbour Wind Farm is located in Halifax Regional Municipality, approximately 4 kilometres southeast of the community of Harrietsfield and 7 kilometres northwest of Ketch Harbour (***Figure 1***).

Comprising a total area of approximately 6 hectares, the study area includes three wind turbine footprints, each measuring approximately 100 metres by 100 metres, as well as a proposed 2.2 kilometre access road. The study area can be accessed from Fraser Road off Highway 306 in the Halifax Regional Municipality.

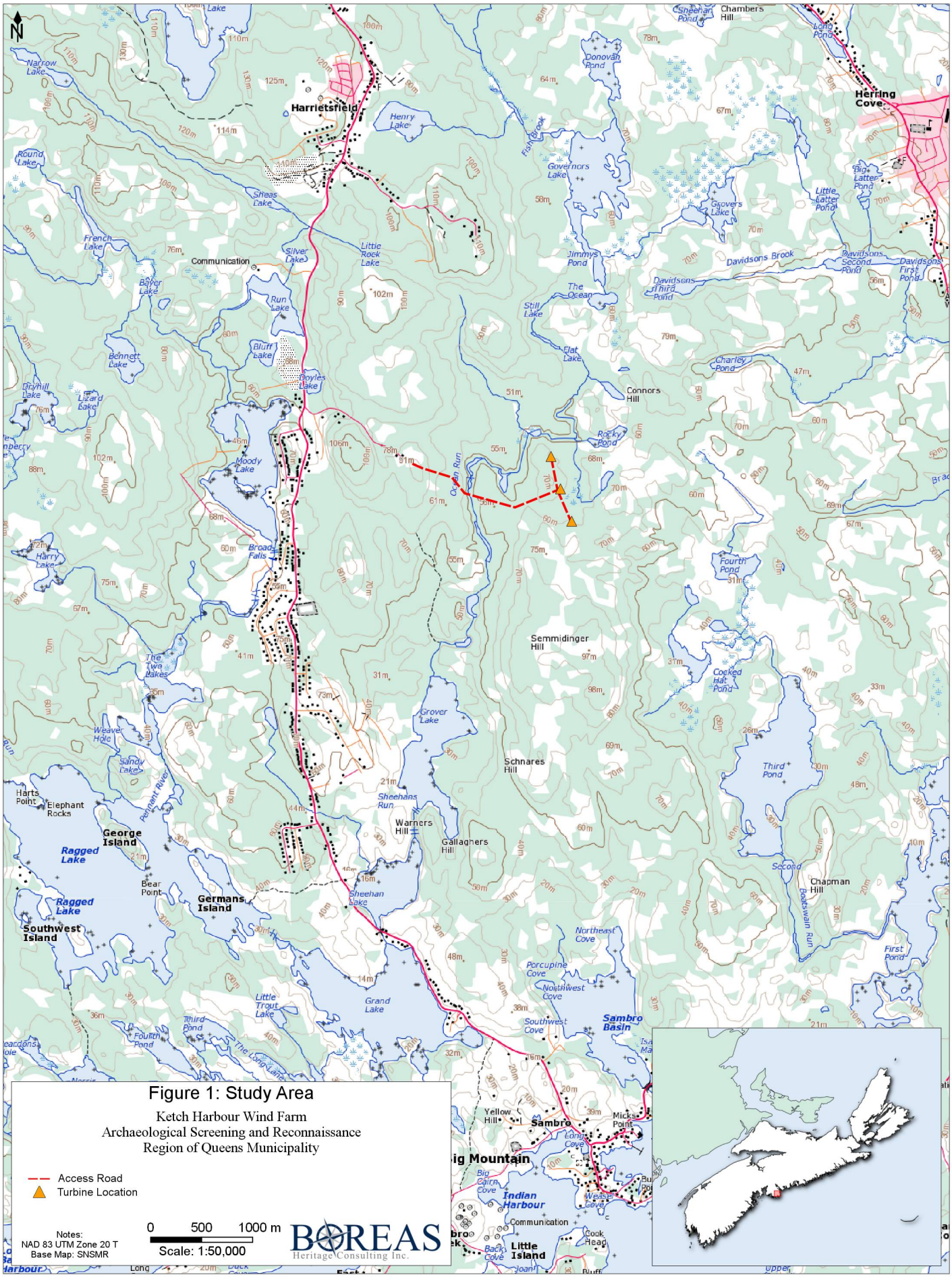
Figure 1: Study Area
Ketch Harbour Wind Farm
Archaeological Screening and Reconnaissance
Region of Queens Municipality
Access Road
Turbine Location
Notes:
NAD 83 UTM Zone 20 T
Base Map: SNSMR
0 500 1000 m
Scale: 1:50,000
BOREAS
Heritage Consulting Inc.
Harrietsfield
Herring Cove
Communication
Connors Hill
Semmidinger Hill
Schnares Hill
Warners Hill
Gallaghers Hill
Grover Lake
Sambro
Sambro Basin
Indian Harbour
Little Island
George Island
Germans Island
Southwest Island
Ragged Lake
Chapman Hill
Davidsons Brook
Ocean Run
Pennant River

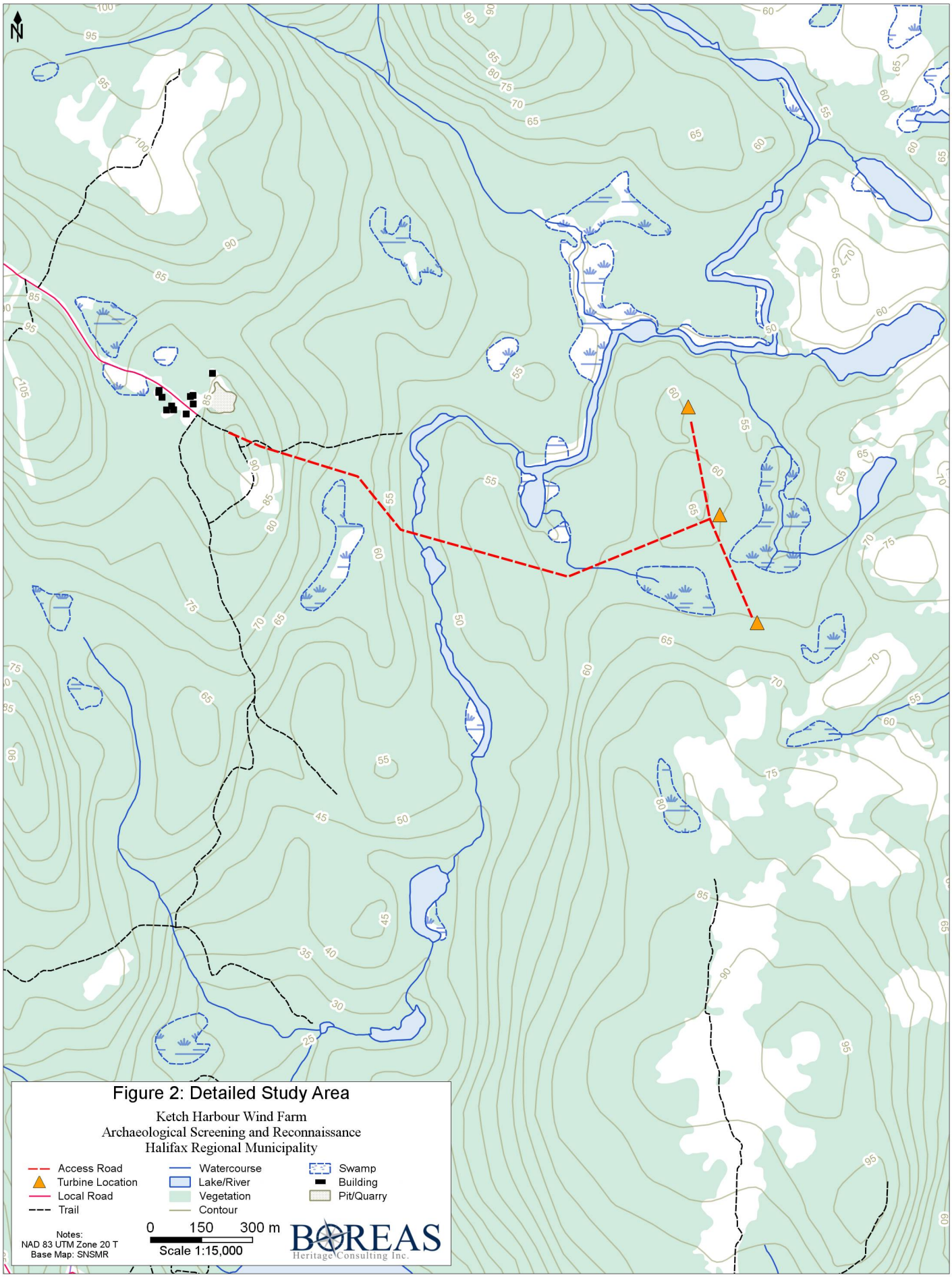
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Figure 2: Detailed Study Area
Ketch Harbour Wind Farm
Archaeological Screening and Reconnaissance
Halifax Regional Municipality
Access Road
Turbine Location
Local Road
Trail
Watercourse
Lake/River
Vegetation
Contour
Swamp
Building
Pit/Quarry
0 150 300 m
Scale 1:15,000
Notes:
NAD 83 UTM Zone 20 T
Base Map: SNSMR
BOREAS
Heritage Consulting Inc.

3.0 METHODOLOGY

The objectives of the assessment are to evaluate archaeological potential within the study area, to delineate areas considered to exhibit high potential for encountering archaeological resources, and to provide the most comprehensive information possible so that appropriate resource management strategies can be devised in light of the proposed development and before project implementation. To achieve these ends, BHCI designed a research strategy consisting of the following components:

3.1 Background Study

The objectives of the background study are to identify known archaeological and historic sites, delineate areas of archaeological potential, and provide a context for resources identified during the course of the assessment. The background study includes a review of previous archaeological research undertaken in the area, an examination of extant records and archival sources relating to historic settlement and development activities within the study area, and a review of relevant geomorphological research and environmental features that may have influenced human settlement and resource processing patterns.

Research is focussed on the identification of areas considered to exhibit high potential for encountering archaeological resources and includes a review of relevant documentation and inventory files, such as available land records, historic maps, and local and/or regional histories. A review of previous archaeological research in the greater area is conducted in order to determine the range and nature of archaeological remains that might be anticipated within the study area. Topographic maps and aerial photographs are consulted in order to identify geomorphological and hydrological attributes that correlate with high archaeological potential (e.g. waterfalls, rapids and marine terraces representing former coastal locations). The historical and cultural information is integrated with the environmental and physiographic data to identify areas of archaeological potential within the study area and to provide a framework for the initial interpretation of any resources encountered during the field component of the assessment.

The background study also includes the development of an archaeological potential model using environmental and cultural factors identified during background research, which facilitates the identification of areas of high archaeological potential within the defined study area. Modelling is based on 1:10,000 mapping, historic mapping, aerial photographs (both historic and modern) and inventories of known archaeological and historic sites. The model is developed through the analysis of a range of natural and cultural attributes including proximity to water (essential for drinking and transportation), slope, aspect and elevation, as well as proximity to known archaeological and historic sites. The result of the modeling is a visual depiction of archaeologically sensitive areas within the proposed development area.

3.2 Archaeological Reconnaissance

The objectives of the archaeological field reconnaissance are to conduct a visual inspection of the study area, to delineate areas exhibiting high archaeological potential, as identified during the background study and/or encountered during the course of the field survey, and to document any archaeological resources identified during the background study and/or the field survey.

In order to achieve comprehensive coverage of the property, the archaeological reconnaissance involves pedestrian transects throughout the study area in an effort to evaluate archaeological potential and identify any surface features or other signs of human occupation. Particular attention is paid to geomorphological features deemed to have potentially influenced human settlement and resource processing patterns, and topographic and/or vegetative anomalies that might indicate the presence of buried archaeological resources. All areas of exposure, including tree falls, are visually examined for artifacts and cultural features. During the course of the survey, strategies will be identified for the appropriate methodology and scope of more detailed assessment for areas considered to exhibit high archaeological potential.

The process and results of the field reconnaissance are documented in field notes and with photographs. A hand-held Global Positioning System (GPS) unit is used to record UTM coordinates within the study area. All coordinates are UTM projection with NAD 83 as datum. Any archaeological resources encountered during the course of the archaeological reconnaissance will be evaluated and documented for registration within the Maritime Archaeological Resource Inventory (MARI), a provincial archaeological site database maintained by the Nova Scotia Museum.

As previously stated, the archaeological reconnaissance will be conducted at a later date, once the ground surface is clear of snow cover.

4.0 RESULTS

4.1 Background Study

The following discussion details the environmental and cultural setting of the study area, which serves to identify locations that may be predicted to have high archaeological potential and provides a framework for the initial interpretation of any resources encountered during the field component of the assessment.

4.1.1 Environmental Setting

A number of environmental, topographic and hydrographic factors, such as water sources, physiographic attributes, soil types and vegetation, have influenced settlement patterns and contribute to the archaeological potential of the area.

Postglacial and Sea-level History

Changes in sea level in Nova Scotia have resulted from the interaction between the discharge of glacial meltwater from the late Quaternary ice sheets and isostatic adjustments of the crust (Shaw, Taylor & Forbes 1993:223). Deglaciation of Nova Scotia appears to have been virtually complete by 11,000 BP (Stea & Mott 1898:184). Relative seal level rose rapidly during the early Holocene period (approximately 8,000 BP – 6,000 BP) at a rate of approximately 1.2 metres per century (or approximately 12 millimetres per year) until about 6,000 years ago, at which time it diminished to approximately 1.8 millimetres per year (until the last few decades) (Force 2013:34). The highest rate of increase during the Holocene was approximately 11 metres per kiloannus around 7,500 BP (Shaw, Taylor & Forbes 1993:223). The eustatic rise in Atlantic Canada was complicated by post-glacial crustal rebound, which resulted in sea-level rise on the order of 2.5 millimetres per year in some parts of Nova Scotia (Force 2013:34). These and other factors, such as storm events and erosion have led to the reconfiguration and/or submergence of coastal areas and, in many cases, the entire disappearance of coastal landforms.

Based on research conducted by the Geological Survey of Canada, Bedford Institute of Oceanography, a palaeogeographic reconstruction of the postglacial geography of Atlantic Canada has been produced (Shaw, Gareau & Courtney 2002:1862), offering a visual depiction of the distribution of land and sea in Atlantic Canada from 13,000 BP onward. In order to better understand the geography of the study area, two reconstructions are reproduced below, illustrating the palaeogeography of Atlantic Canada in 9,000 BP and 6,000 BP (***Figures 3 & 4***). A review of the mapping reveals that the emergent areas in the vicinity of Ketch Harbour reached their greatest extent by about 9,000 BP (***Figure 3***). By 6,000 BP, however, the geography is very similar to the modern landscape and much of this former coastline is submerged (***Figure 4***).

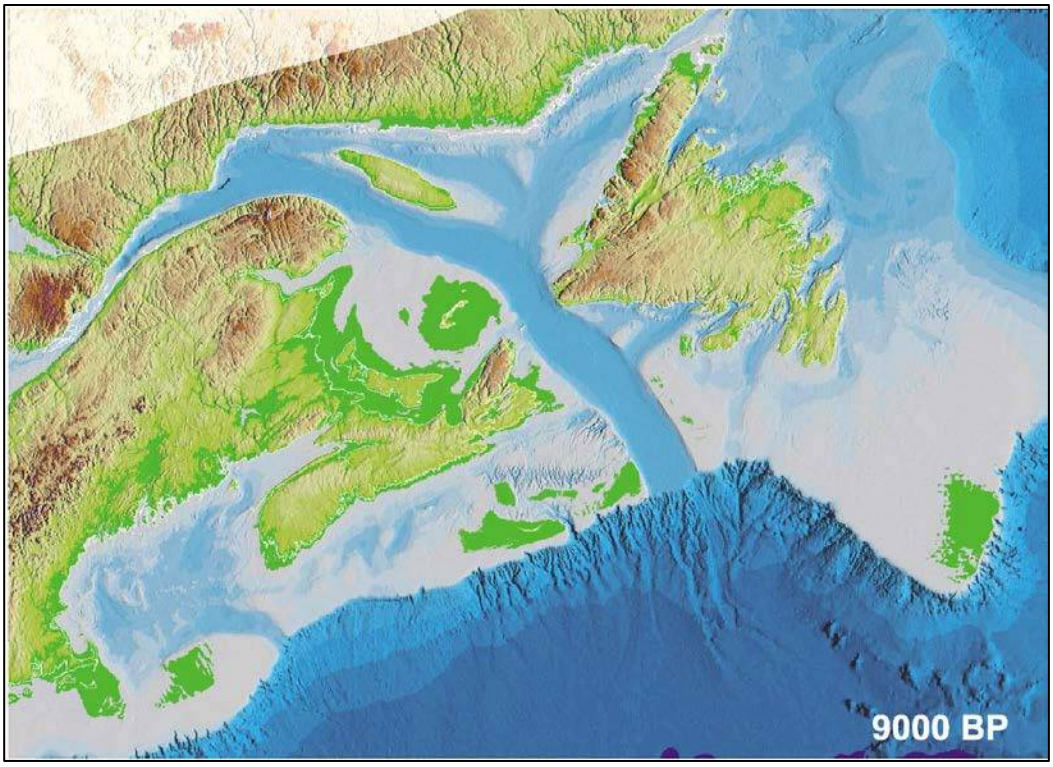

FIGURE 3: 9kyr Palaeogeography (J. Shaw et al. *Quaternary Science Reviews* 21, 2002).

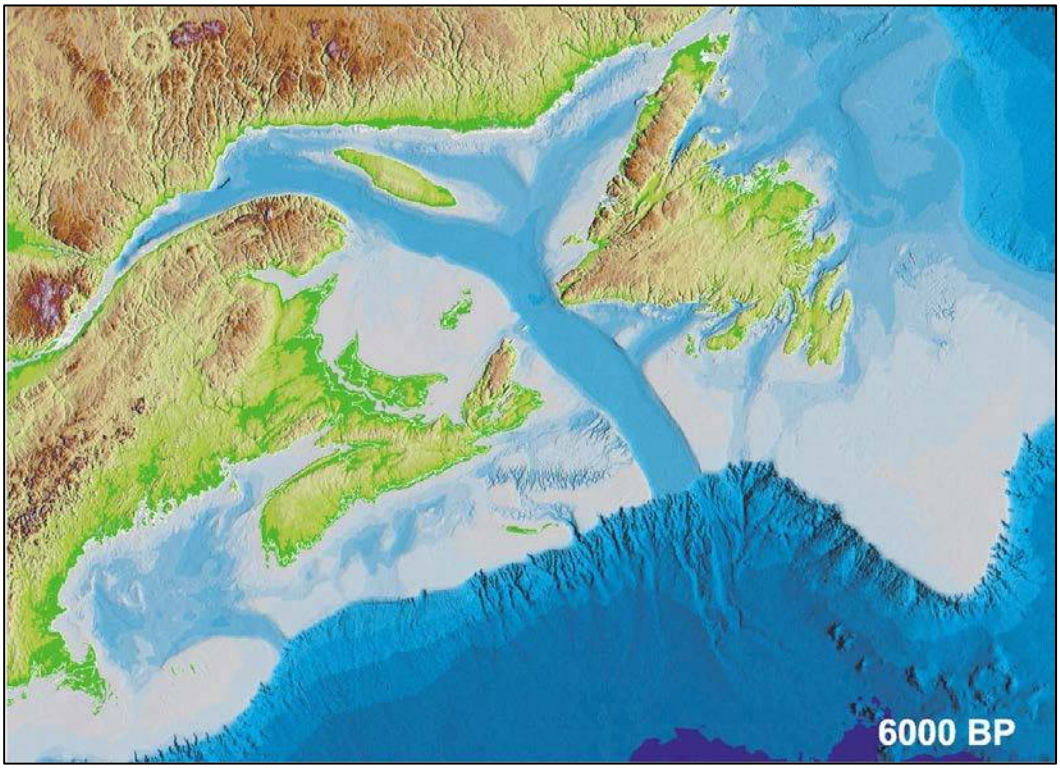

FIGURE 4: 6kyr Palaeogeography (J. Shaw et al. *Quaternary Science Reviews* 21, 2002).

The submerged shoreline within the greater region is highly irregular, characterized by drowned estuaries and headlands producing an indented coast fringed by islands (Davis & Browne 1996:182). The study area is located approximately 5 kilometres north of the existing shoreline. As a result, the potential for encountering intact archaeological resources associated with Precontact coastal occupation and/or utilization is considered to be low.

Water Sources

Proximity to water is a significant factor in determining Precontact and historic Native, as well as early Euro-Canadian, archaeological potential. The study area contains no significant water sources. Although a number of small streams and wetlands are present in the greater area, these are considered to have had minimal influence on the suitability of the area for settlement. The most significant watercourse in the vicinity of the study area is Ocean Run, which is situated within the northern and western portions of the property and is intersected by the proposed access road. This small river flows south into a series of small lakes and eventually becomes the Pennant River that flows into Pennant Harbour. Fresh water in this area tends to be slightly acidic, ranging between 5.0 and 6.5 (Davis & Browne 1996:211).

Topography

The study area is located within the St. Margaret's Bay Ecodistrict - Western Ecoregion (Neily et al. 2005:56). Underlain by Meguma slate and quartzite, as well as the extensive granitic South Mountain batholith, the greater region is sloping in a south to southeasterly direction towards St. Margaret's Bay. The topography, described as a gently tilting upland, ranges from approximately 150 metres above sea level at its northern edge down to sea level at the Atlantic Coast (Neily et al. 2005:56-57). The study area is underlain entirely by Devonian-period granite with elevations ranging from 90 metres above sea level at the western end of the proposed access road to 50 metres above sea level where the access road crosses Ocean Run. In the vicinity of the proposed turbine locations, elevations are in the range of 60 to 65 metres above sea level (***Figure 2***). Elevated areas within the study area may have provided important vantage points for viewing the surrounding area and sighting large game.

Soils and Vegetation

Soils within the study area are comprised primarily of *Gibraltar* series soils. Typically found in undulating to rolling terrain, *Gibraltar* soils are described as brown sandy loam over strong-brown sandy loam. These soils, which are well to excessively drained, shallow, stony, with a sandy loam texture derived from granite, can support forest vegetation of mainly spruce, fir, maple and birch (MacDougall & Cann 1963:34). *Wolfville* series soils are also found within the study area. Described as dark reddish-brown loam to sandy clay loam over strong-brown loam to sandy clay loam, these soils are derived from shale, sandstone and mudstone of Carboniferous age. Typically supporting vegetation comprised of red spruce, balsam fir, birch, maple, hemlock and alder, *Wolfville* soils are stony but suitable for agriculture (MacDougall & Cann 1963:23-24).

4.1.2 Native Land Use

The land within the study area was once part of the greater Mi'kmaw territory known as known as *Eskikewa'kik*, meaning 'Skin Dressers Territory'. The surrounding area is relatively dense with lakes and watercourses that would have been important transportation corridors, providing a resource base for the Mi'kmaq, their ancestors and predecessors for millennia prior to the arrival of European settlers. The Mi'kmaq seasonally moved throughout the greater region between areas where shelter and resources, including food and medicinal plants, were available and annually migrated between hunting and fishing grounds (Chute 1999). Most cultural use of region was likely related to shore-based activities, although continually rising sea levels has likely submerged many archaeological sites along the original coastline (now several kilometres offshore). Indeed, according to the French missionary and orthographer, Capucin Pacifique, the Mi'kmaw name for Ketch Harbour was *Nemegaganeg*, meaning 'Fishing Place' (Pacifique 1934:275), likely derived from *Nĕmāāgâkŭnŭk*, which Silas Rand referred to as 'a [good] fishing place' (Rand 1875: 90). It is also interesting to note that Indian Harbour is located just south of the community of Sambro, the harbor of which was known as *Oetsetagtjeg*, meaning 'Breaking the Waves' (Pacifique 1934:275).

A review of the Maritime Archaeological Resource Inventory, a provincial archaeological site database maintained by the Nova Scotia Museum, determined that there are no registered Precontact archaeological sites located within the general vicinity of the study area. The lack of archaeological data for the area may reflect a lack of archaeological investigation, rather than an absence of archaeological sites. The closest registered site, BdCv-03, situated approximately 2 kilometres west of the study area, on the western shore of Moody Lake, represents the location of two Late Archaic gouges that were recovered while uprooting tree stumps. Situated approximately 2.5 kilometres to the northwest, archaeological site BdCv-02 is located on the eastern shore of Run Lake and is classified as an isolated find of a single projectile point, dating to the Ceramic period. Archaeological site BdCv-01, situated approximately 9 kilometres to the northeast, represents a collection of three projectile points while BcCv-04 is a scatter of lithic artifacts situated on the shore of Big Cairn Cove in Indian Harbour, located approximately 7 kilometres south of the study area. It is noted that, as per Heritage Research Permit requirements, the Kwilmu'kw Maw-klusuaqn Negotiation Office was contacted on February 19, 2015 as part of the background study for this project.

4.1.3 Property History

Situated between the communities of Harrietsfield and Williamswood, the study area is located on the eastern side of Highway 306, known as the Old Sambro Road. The community of Harrietsfield was most likely named for the wife of Colonel William Thompson, who owed land in the area and was issued a warrant of survey for 100 acres in 1787(PANS 1967:281). Ketch Harbour, located

approximately 7 kilometres southeast of the study area, developed into an important fishing station soon after Halifax was founded in 1749. A cursory examination of historic mapping revealed that the study area occupies portions of lands granted to George and Alexander Fraser in the second half of the nineteenth century (Grant Index Sheet 57). An examination of the 1865 Church map of Halifax County (***Figure 5***) reveals an absence of historic structures and indicates that G. and A. Fraser were settled just beyond the western edge of the study area, at the eastern end of Fraser Road. Similarly, a 1907 geologic map by E.R. Faribault (***Figure 6***) also identifies a structure associated with G. Fraser to the west of the study area, with the majority of the proposed development area situated within land labeled as barrens. Additional historic mapping depicts no historic features within the study area, thereby diminishing the potential for encountering significant historic/Euro-Canadian archaeological resources.

4.1.4 Archaeological Potential Modelling

An archaeological potential model, designed to facilitate the identification of areas of high archaeological potential within the defined study area, was developed using environmental and cultural factors identified during background research. Modelling is based on 1:10,000 mapping, historic mapping, and inventories of known archaeological and historic sites. The model is developed through the analysis of a range of natural and cultural attributes that display archaeological potential across the landscape, including proximity to water (essential for drinking and transportation), slope, aspect and elevation, as well as proximity to known archaeological and historic sites. The result of the modeling is a continuous depiction of archaeological potential across the entire landscape, with areas of highest archaeological potential highlighted in red (***Figure 7***). The model indicates that the areas of highest archaeological potential within the Ketch Harbour Wind Farm study area are located where the proposed access road intersects Ocean Run and its associated tributary.

4.1.5 Archaeological Potential

Based on the various components of the background study, including environmental setting, Native land use, property history and the results of the archaeological potential modelling, the greater study area, apart from those small areas adjacent to identified watercourses, is ascribed low potential for encountering Precontact and/or early historic Native archaeological resources, as well as historic Euro-Canadian archaeological resources. Archaeological reconnaissance is recommended, however, in order to confirm the findings of the initial screening and to determine the potential of archaeologically sensitive areas identified as a result of the archaeological potential modelling.

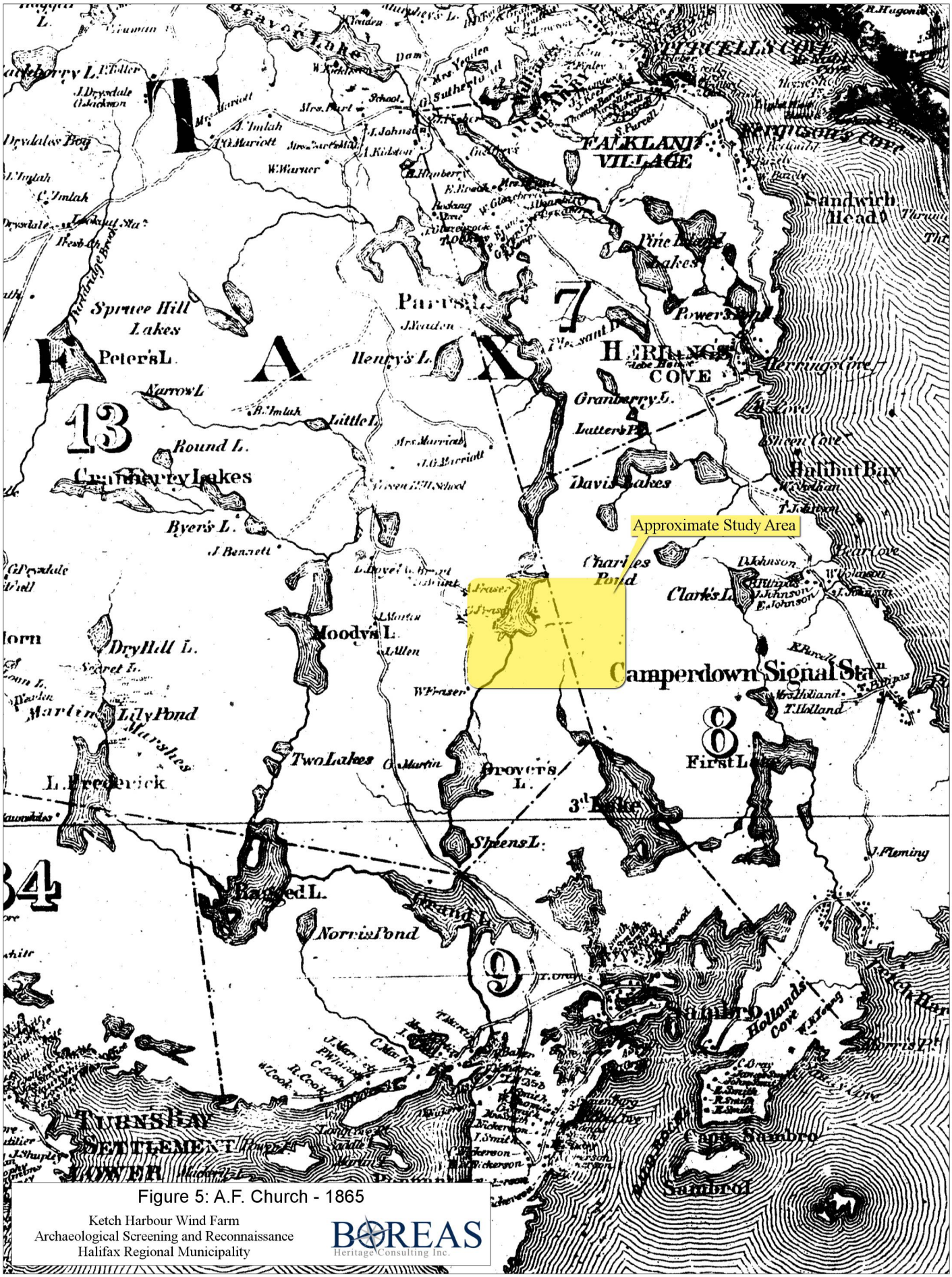

Figure 5: A.F. Church - 1865

Ketch Harbour Wind Farm
Archaeological Screening and Reconnaissance
Halifax Regional Municipality

BOREAS Heritage Consulting Inc.

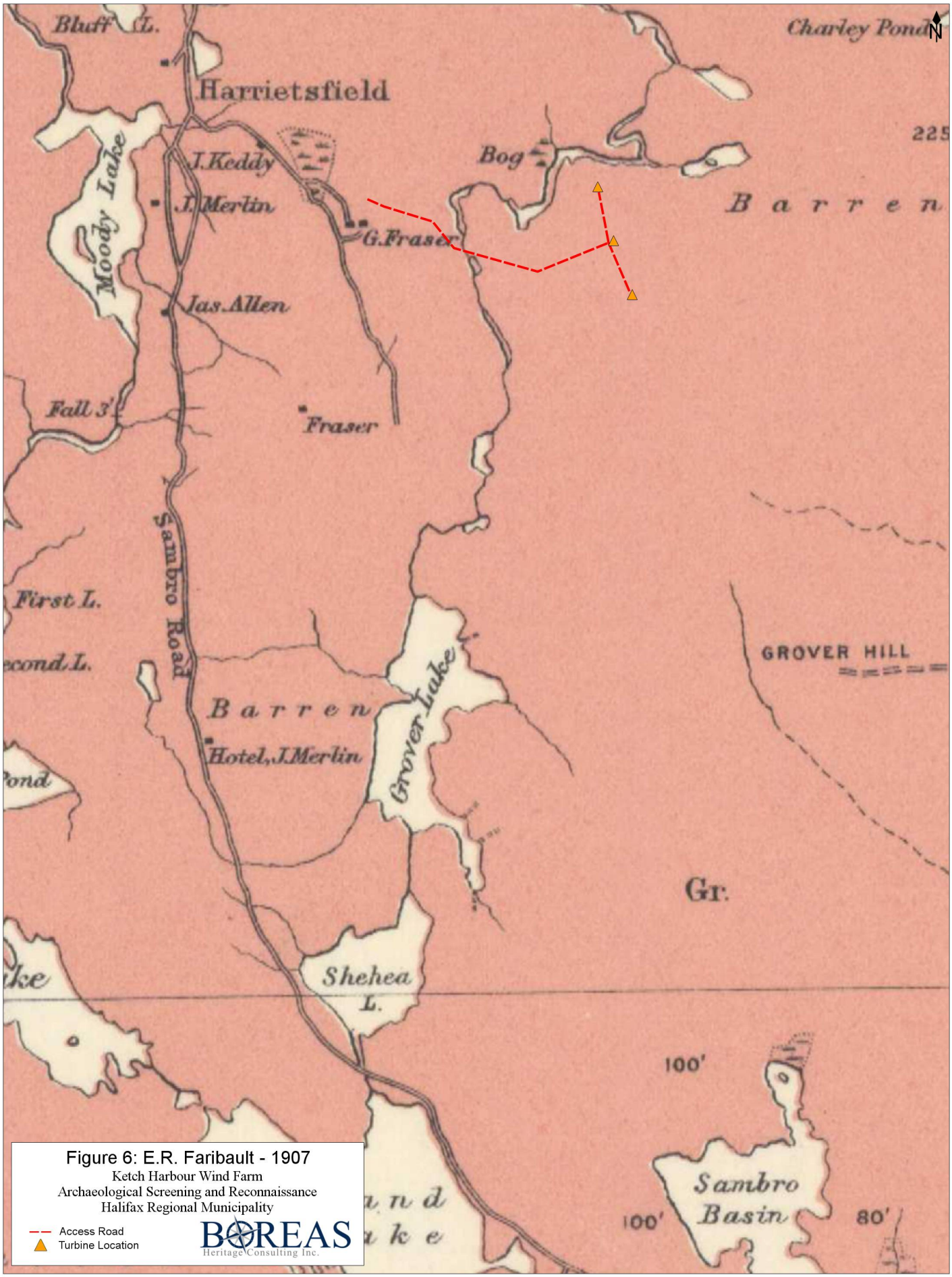

Figure 6: E.R. Faribault - 1907
Ketch Harbour Wind Farm
Archaeological Screening and Reconnaissance
Halifax Regional Municipality

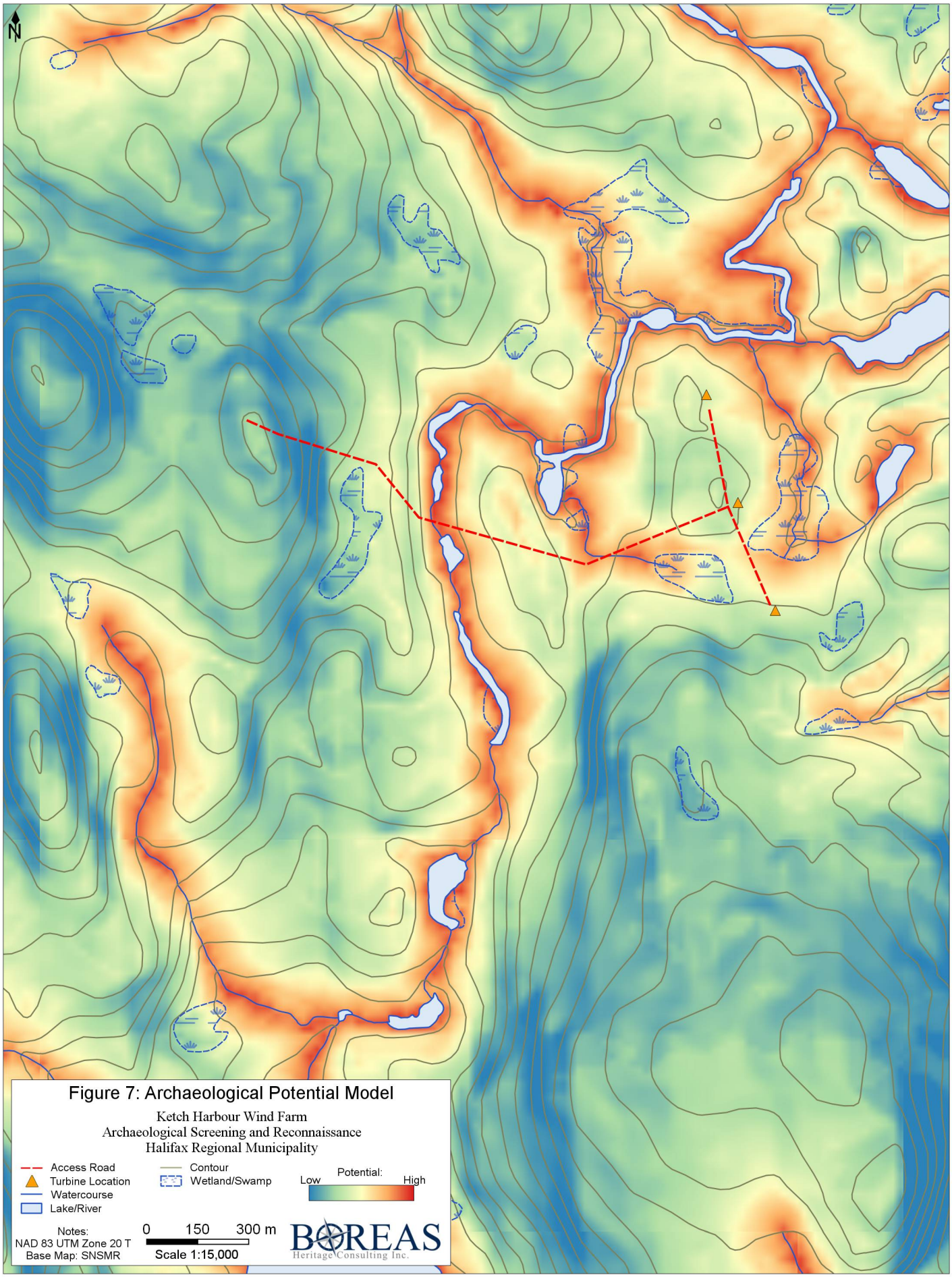

Figure 7: Archaeological Potential Model

Ketch Harbour Wind Farm
Archaeological Screening and Reconnaissance
Halifax Regional Municipality

5.0 CONCLUSIONS AND RECOMMENDATIONS

This interim report for the proposed Ketch Harbour Wind Farm study area presents the results of a archaeological screening (background study) undertaken for the property. Based on the various components of the background study, including environmental setting, Native land use, property history and the results of the archaeological potential modelling, the majority of the study area is ascribed low potential for encountering Precontact and/or early historic Native archaeological resources, as well as historic Euro-Canadian archaeological resources. Archaeological reconnaissance is recommended, however, in order to confirm the findings of the initial screening and to determine the potential of archaeologically sensitive areas identified as a result of the archaeological potential modelling.

Based on the above results, Boreas Heritage Consulting Inc. offers the following management recommendations:

1. It is recommended that archaeological reconnaissance be undertaken once the ground surface is clear of snow cover in order to to confirm the findings of the initial screening and to determine the potential of archaeologically sensitive areas identified as a result of the archaeological potential modelling.

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