Appendix A

Nova Scotia Registry of Joint Stocks
Nova Construction Co. Ltd.

Profile

Printer Version

Profile Info | People Info | Activites Info | Related Reg's Info

PROFILE - NOVA CONSTRUCTION CO. LTD. - as of: 2014-08-08 09:51 AM

Business/Organization Name:	NOVA CONSTRUCTION CO. LTD.
Registry ID:	1022074
Type:	N.S. Limited Company
Nature of Business:	
Status:	Active
Jurisdiction:	Nova Scotia
Registered Office:	3098 POST ROAD, BOX 1328 ANTIGONISH NS Canada B2G 2L7
Mailing Address:	
Previous Name:	NOVA CONSTRUCTION COMPANY LIMITED

PEOPLE

Name	Position	Civic Address	Mailing Address
JOHN W. CHISHOLM	Director	R.R. 4 ANTIGONISH NS B2G 2L2	
PAUL F. WHITE	VP, ENGINEERING	156 COLDSTREAM TRURO NS B2N 5B2	
JOHN W. CHISHOLM	CHAIRMAN	R.R. 4 ANTIGONISH NS B2G 2L2	
DONALD W. CHISHOLM	PRESIDENT	2030 ROUTE 337, HARBOUR CENTRE ANTIGONISH NS B2G 2L2	
CARL HARTIGAN	ASSISTANT SECRETARY	81 ARBOR DRIVE EXTENSION ANTIGONISH NS B2G 1S8	
GERALD W. DUGGAN	SEC, VP & CFO	192 ST. JOSEPH'S ROAD ANTIGONISH NS B2G 2K8	

GERALD W. DUGGAN	Recognized Agent	192 ST. JOSEPH'S ROAD ANTIGONISH NS B2G 2K8	192 ST. JOSEPH'S ROAD ANTIGONISH NS B2G 2K8

ACTIVITIES

Activity	Date
Appoint an Agent	2013-12-04
Change of Directors	2013-12-04
Annual Renewal	2013-09-06
Annual Statement Filed	2013-09-06
Annual Renewal	2012-09-24
Annual Statement Filed	2012-09-24
Special Resolution	2012-06-11
Filed Document	2012-06-11
Annual Renewal	2011-08-16
Annual Statement Filed	2011-08-16
Annual Renewal	2010-09-14
Annual Statement Filed	2010-09-14
Annual Renewal	2009-09-14
Annual Statement Filed	2009-09-11
Annual Renewal	2008-08-19
Annual Statement Filed	2008-08-19
Change of Directors	2008-08-07
Special Resolution	2008-02-06
Filed Name Change	2008-01-08
Effective Date of Name Change	2008-01-08
Annual Renewal	2007-09-26
Annual Statement Filed	2007-09-25
Annual Statement Filed	2007-09-25
Annual Renewal	2006-09-25
Annual Statement Filed	2006-09-25

Annual Statement Filed	2005-09-21
Annual Renewal	2005-09-19
Annual Statement Filed	2005-09-16
Annual Renewal	2004-09-28
Annual Statement Filed	2004-09-24
Annual Renewal	2003-09-15
Annual Statement Filed	2003-09-15
Annual Statement Filed	2003-09-15
Annual Renewal	2002-08-19
Annual Statement Filed	2002-08-19
Annual Renewal	2001-08-17
Annual Statement Filed	2001-08-17
Annual Renewal	2000-08-14
Annual Statement Filed	2000-08-14
Annual Statement Filed	1999-09-22
Annual Renewal	1999-09-10
Annual Renewal	1998-08-18
Annual Statement Filed	1998-08-18
Annual Renewal	1997-08-22
Filed Debenture Supplement	1997-06-20
Special Resolution	1997-05-26
Filed Document	1997-03-19
Special Resolution	1997-03-19
Filed Debenture	1996-11-04
Annual Renewal	1996-08-30
Annual Statement Filed	1996-08-30
Annual Report Filed	1995-09-13
Change of Directors	1990-07-13
Special Resolution	1990-07-13
Registered Office Change	1988-11-21
Agent Filed	1984-07-17
Status Report Filed	1963-09-26

	1963-09-20
Certificate not produced by REGIS Filed	1963-09-20
Incorporated	1963-09-20
Old System Documents	1963-09-20

Show All Collapse

RELATED REGISTRATIONS

This Company ...	
RIVERSIDE SPEEDWAY	Registered
ANTIGONISH MALL	Registered

Appendix B

Public Consultation Information

Appendix C

Biological Field Report

Appendix D

Archaeological Screening & Reconnaissance

BRIERLY BROOK QUARRY EXPANSION
ARCHAEOLOGICAL SCREENING AND RECONNAISSANCE
ANTIGONISH COUNTY, NOVA SCOTIA

ARCHAEOLOGICAL SCREENING & RECONNAISSANCE REPORT

Submitted to:

Nova Construction Company Ltd.
and the
Special Places Program

Submitted by:

Stephen G. Garcin & Sara J. Beanlands
Project #13-004

October 2013

HERITAGE RESEARCH PERMIT: A2013NS063

BOREAS
Heritage Consulting Inc.

PROJECT PERSONNEL

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

EXECUTIVE SUMMARY

Nova Construction Company Ltd. (NCCL) is proposing to expand their existing quarry operations located in Brierly Brook, Antigonish County. In order to address the potential for encountering archaeological resources during the expansion, Conestoga-Rovers & Associates (CRA) retained Boreas Heritage Consulting Inc. (BHCI), on behalf of NCCL, in July 2013 to undertake archaeological screening and reconnaissance of the proposed disturbance footprint as part of the environmental assessment (EA) process.

The archaeological assessment of the Brierly Brook quarry expansion property, including historical background research and a visual inspection of the study area, was conducted according to the terms of Heritage Research Permit A2013NS063, issued to BHCI Senior Archaeologist Stephen Garcin by the Special Places Program (SPP). No evidence of archaeological resources or areas of elevated archaeological potential were encountered and no indication of significant historic cultural modification was identified. Based on the results of the background study and reconnaissance, BHCI determined the study area to exhibit low potential for encountering Precontact and/or early historic Native archaeological resources, as well as historic Euro-Canadian archaeological resources. It is therefore recommended that the study area be cleared of any requirement for further archaeological investigation.

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LIST OF PLATES

1.0 INTRODUCTION

Nova Construction Company Ltd. (NCCL) is proposing to expand their existing quarry operations located in Brierly Brook, Antigonish County. In order to address the potential for encountering archaeological resources during the expansion, Conestoga-Rovers & Associates (CRA) retained Boreas Heritage Consulting Inc. (BHCI), on behalf of NCCL, in July 2013 to undertake archaeological screening and reconnaissance of the proposed disturbance footprint as part of the environmental assessment (EA) process.

The archaeological assessment was directed by BHCI Principal and Senior Archaeologist Stephen Garcin and conducted according to the terms of Heritage Research Permit A2013NS063, issued to Garcin by the Special Places Program (SPP). Background research and technical support were provided by Sara Beanlands. The field component of the archaeological assessment was carried out on August 1, 2013.

This report describes the archaeological assessment of the Brierly Brook Quarry Expansion study area, presents the results of this investigation and offers cultural resource management recommendations.

2.0 STUDY AREA

The NCCL Brierly Brook property is located in Antigonish County, approximately 5 kilometres southwest of the Town of Antigonish (***Plate 1; Figure 1***). The proposed quarry expansion area, generally situated to the north and east of the existing Brierly Brook quarry, comprises approximately 25 hectares (***Figure 2***). The study area can be accessed from Brierly Brook Road by travelling southwest from Antigonish on Trunk Highway Route #4.

PLATE 1: Existing quarry at Brierly Brook; facing southwest.

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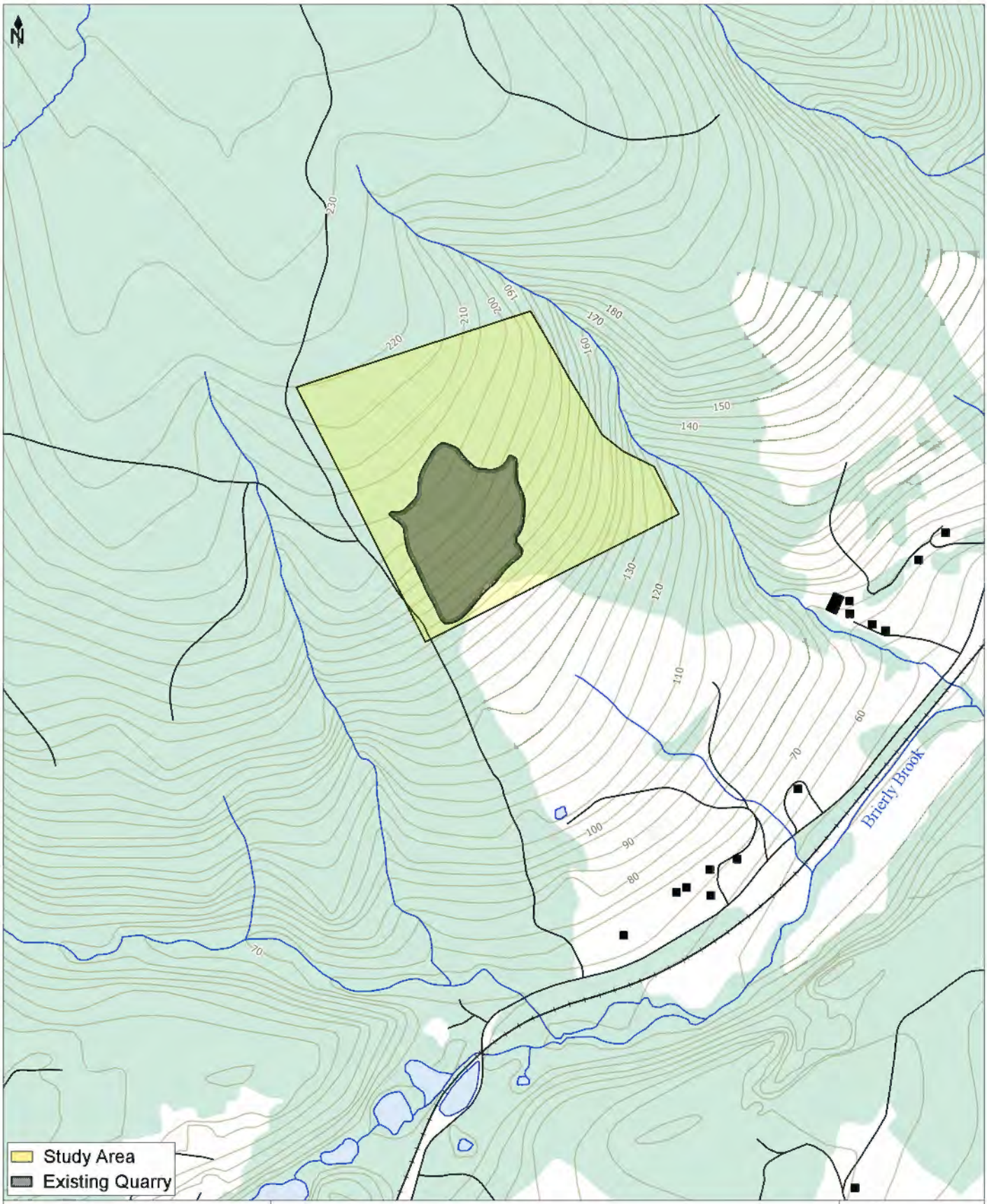
Legend:
- Study Area
- Existing Quarry

Scale 1:50,000

Figure 1:
Study Area

Archaeological Screening and
Reconnaissance
Brierly Brook Quarry
Antigonish County, Nova Scotia

Notes:
NAD 83 UTM Zone 20 T
Base Map: NRCan



BOREAS
Heritage Consulting Inc.

Detailed Study Area

Archaeological Screening and Reconnaissance
Brierly Brook Quarry
Antigonish County, Nova Scotia

Figure 2

Scale:
1:10,000

3.0 METHODOLOGY

The objectives of the assessment are to evaluate archaeological potential within the area that could potentially be disturbed by activities associated with the development of the Brierly Brook quarry, 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 an examination of extant records relating to historic settlement and development activities within the study area, and a review of 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. Topographic maps and aerial photographs are consulted in order to identify geomorphological and hydrological features that contribute to the archaeological potential of the study area. 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.

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 will involve 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 sufficiently documented for registration within the Maritime Archaeological Resource Inventory (MARI), a provincial archaeological site database maintained by the Nova Scotia Museum.

PLATE 2: Field reconnaissance of Brierly Brook study area; facing north.

4.0 RESULTS

4.1 Background Study

The following discussion details the environmental and cultural setting of the Brierly Brook study area. This background study provides a framework for the initial interpretation of any resources encountered during the field component of the assessment.

4.1.1 Environmental Setting

Water Sources
Proximity to water is a significant factor in identifying Precontact and historic Native, as well as early Euro-Canadian, archaeological potential. The Brierly Brook Quarry Expansion property contains no significant water sources, although an unnamed tributary of Brierly Brook, for which the community is named, runs along the eastern boundary of the study area. Brierly Brook flows east to the West River at Antigonish. There are a number of small watercourses in the greater vicinity of the study area, however these are considered to have had minimal influence on the suitability of the area for settlement.

Topography
The study area is located within the greater terrestrial region known as the Avalon Uplands – Pictou-Antigonish Highlands (312) (Davis & Browne 1996:30-32; Roland 1982:239-243). Underlain by a block of crustal rocks, which are bounded and transacted by numerous faults, the region is dissected into steep-sided hills and valleys where faults cut across the resistant massif (Davis & Browne 1996:30). The area is underlain by Precambrian and Carboniferous era geological deposits. Within the study area, elevation ranges from 115 metres in the southeast to 220 metres in the northwestern corner. Elevated areas may have provided important vantage points for viewing the surrounding region and for sighting large game.

Soils
The study area is covered primarily by *Thom* series soils, a brown gravelly sandy loam over light yellowish brown sandy loam, developed from a dark greyish-brown sandy loam till derived from shales, gray conglomerate and metamorphic material (Cann & Hilchey 1954:31). The till is generally shallow and drainage is usually good due to the porous nature of the soil. Although *Thom* soils can support a good forest growth, there is sufficient stone to be a serious handicap to cultivation within the study area.

Flora and Fauna
The typical forest growth in this region consists mainly of shade-tolerant hardwood, such as Yellow Birch, Sugar Maple and American Beech. Red Spruce, White Spruce, Eastern Hemlock and Balsam Fir are also common on the upland surfaces (Davis & Browne 1996:31). At the time

of reconnaissance, vegetation within the study area comprised a mixed regenerated forest, consisting primarily of white and yellow birch, maple, spruce and fir. Based on the nature of the forest in this area, it is assumed that wildlife is relatively abundant.

4.1.2 Native Land Use

The study area lies within the greater Mi'kmaq territory known as *Sipekne'katik*, meaning 'Wild Potato Area'. A review of the MARI database determined that there are no registered archaeological sites within the immediate 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. Indeed, two registered Precontact sites are located approximately 12 kilometres east-northeast of the study area. BjCl-01 is situated on an island off William's Point in Antigonish Harbour and BjCl-02 is situated near the community of Lanark, located on the western shore of Antigonish Harbour.

As Hugh Fletcher noted in his 1887 *Report on Geological Surveys and Explorations in the Counties of Guysborough, Antigonish, Pictou and Colchester, and Halifax, Nova Scotia*, "Brierly Brook flows with two fine falls of ten feet each, through a narrow gorge with high perpendicular walls" (Fletcher 1887:109). Although unnavigable, it is possible that Brierly Brook was used for fishing by the Native population.

Based on the environmental setting and potential for Native land use, the Brierly Brook Quarry Expansion property is ascribed low potential for encountering Precontact and/or early historic Native archaeological resources.

4.1.3 Property History

Brierly Brook was named after an early settler, Ensign John Brierly (or Briley or Brearly, as it was variously spelled) (PANS 1967:84). Brierly was among the soldiers who arrived in Antigonish with Colonel Timothy Hierlihy in 1784. Hierlihy and the other officers and men of the Nova Scotia Volunteers received a grant of 21,600 acres around Antigonish Harbour, later known as the "Soldiers Grant" (PANS 1967:12). Brierly settled a tract of land at Antigonish Intervale, which included the eastern part of what is now the Town of Antigonish (Whidden 1934:9). His house was located on the western side of Church Street, where he lived until about 1800, when his wife died. Leaving his children with friends, he left Nova Scotia and travelled to Ireland on business, where he himself died (PANS 1967:84).

In 1898, the Brierly Brook area was considered a farming district, with a population of 150, a post office and two limestone quarries. When the Eastern Extension Railway began operating in 1890, the first station west of Antigonish became Brierly Brook (PANS 1967:84). The population in 1956 was 286. Exploratory drilling by NCCL led to the development of a gypsum

quarry in the area, which went into intermittent production in late 1986 (Adams 1991:20). An examination of available historical mapping, including the 1864 A.F. Church map of Antigonish County and the 1893 Faribault/Fletcher map (***Figures 3 & 4***), revealed that nineteenth-century settlement was concentrated along the Brierly Brook Road. There are no historic structures identified within the study area.

Based on the historical setting and property history, the Brierly Brook Quarry Expansion property is ascribed low potential for encountering historic Euro-Canadian archaeological resources.

4.1.4 Archaeological Potential

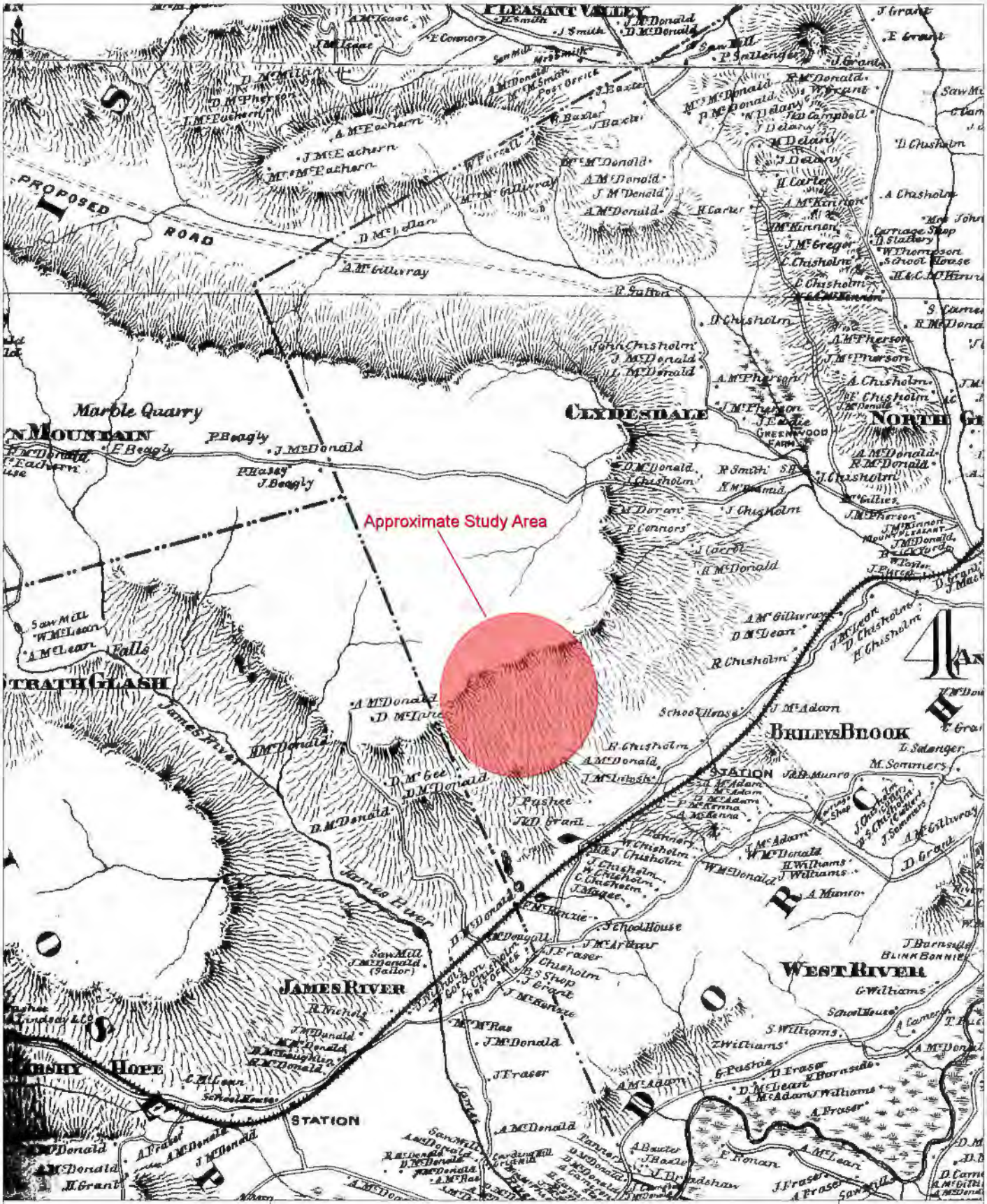
Based on the various components of the background study, including environmental setting, Native land use and property history, the Brierly Brook Quarry Expansion property is ascribed low potential for encountering Precontact and/or early historic Native archaeological resources, as well as historic Euro-Canadian archaeological resources.

4.2 Archaeological Reconnaissance

Fieldwork, consisting of a visual inspection of the Brierly Brook study area, was conducted on August 1, 2013, under clear, warm conditions. The primary purpose of the visual assessment was to evaluate the archaeological potential of the proposed development area and to investigate any topographical or cultural features identified during the background study. A cursory examination of the proposed development area revealed that the active quarry operation has created a disturbed area within the western portion of the property (***Plate 1; Figure 5***). As a result, visual inspection was focused on areas that had not been previously disturbed by extraction activities. A wide circuit was made through the property, resulting in extensive coverage of the study area.

Vegetation within the study area is characterized by a mixed regenerated forest, consisting primarily of white and yellow birch, maple, spruce and fir. In areas that displayed evidence of previous clearing and tree-harvesting activity, thick undergrowth, consisting of young birch and maple, as well as various ferns and shrubs, was noted. The presence of raspberry bushes was observed in several areas.

With the exception of the northwestern corner, which was generally level to gently sloping, the majority of the study area can be described as moderate to steeply sloping, particularly in the southeastern portion of the property (***Figure 5***). At the eastern edge of the study area, the terrain sloped steeply to the east, down to a small, shallow, unnamed stream (***Plates 3 & 4***). Visual inspection also revealed that the majority of the study area constituted a mix of undulating and hummocky woodland that would have been unsuitable for occupation and/or work areas associated with resource exploitation by Precontact peoples.

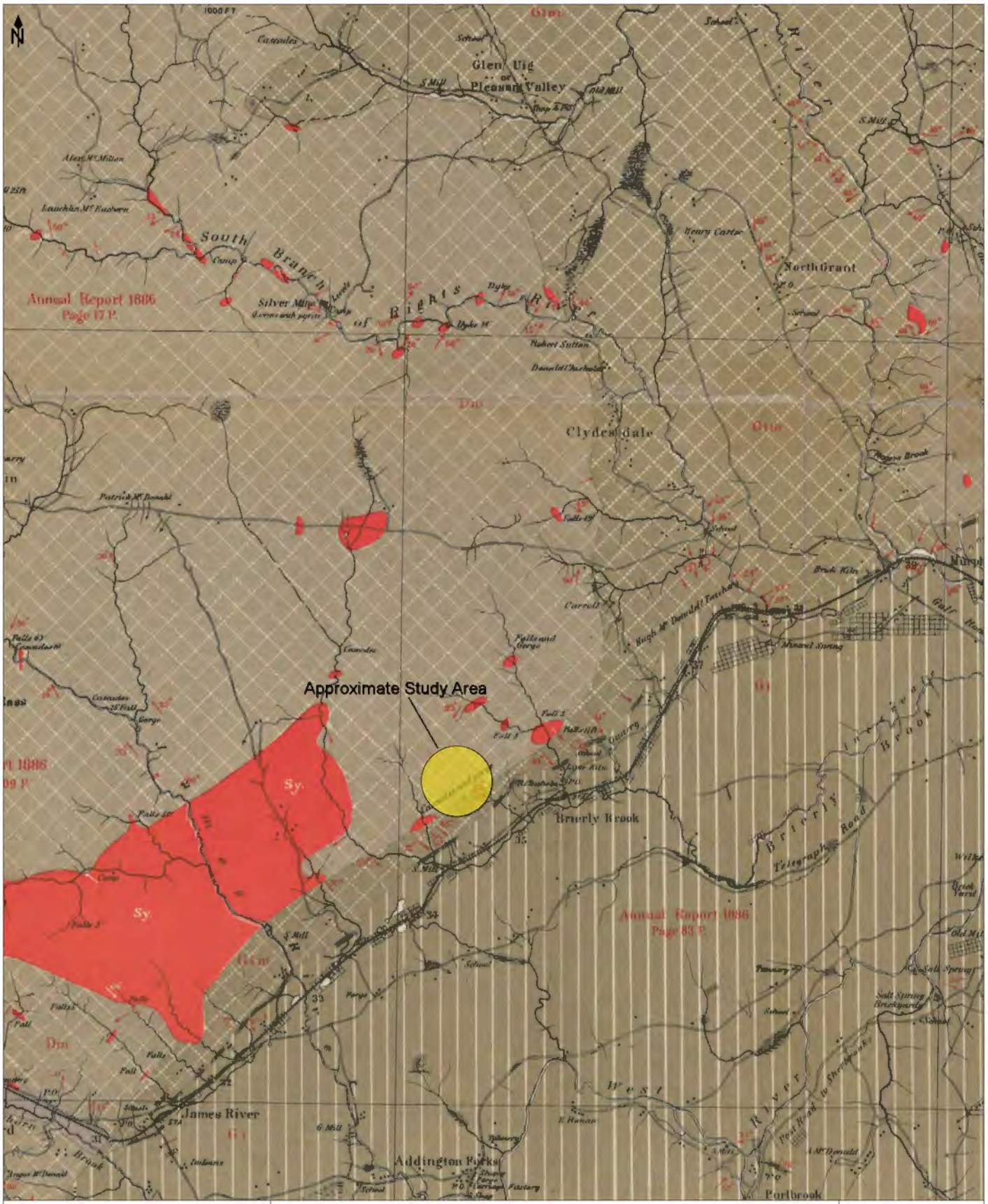


A.F. Church Map - 1864

BOREAS Heritage Consulting Inc.

Archaeological Screening and Reconnaissance
Brierly Brook Quarry
Antigonish County, Nova Scotia

Figure 3

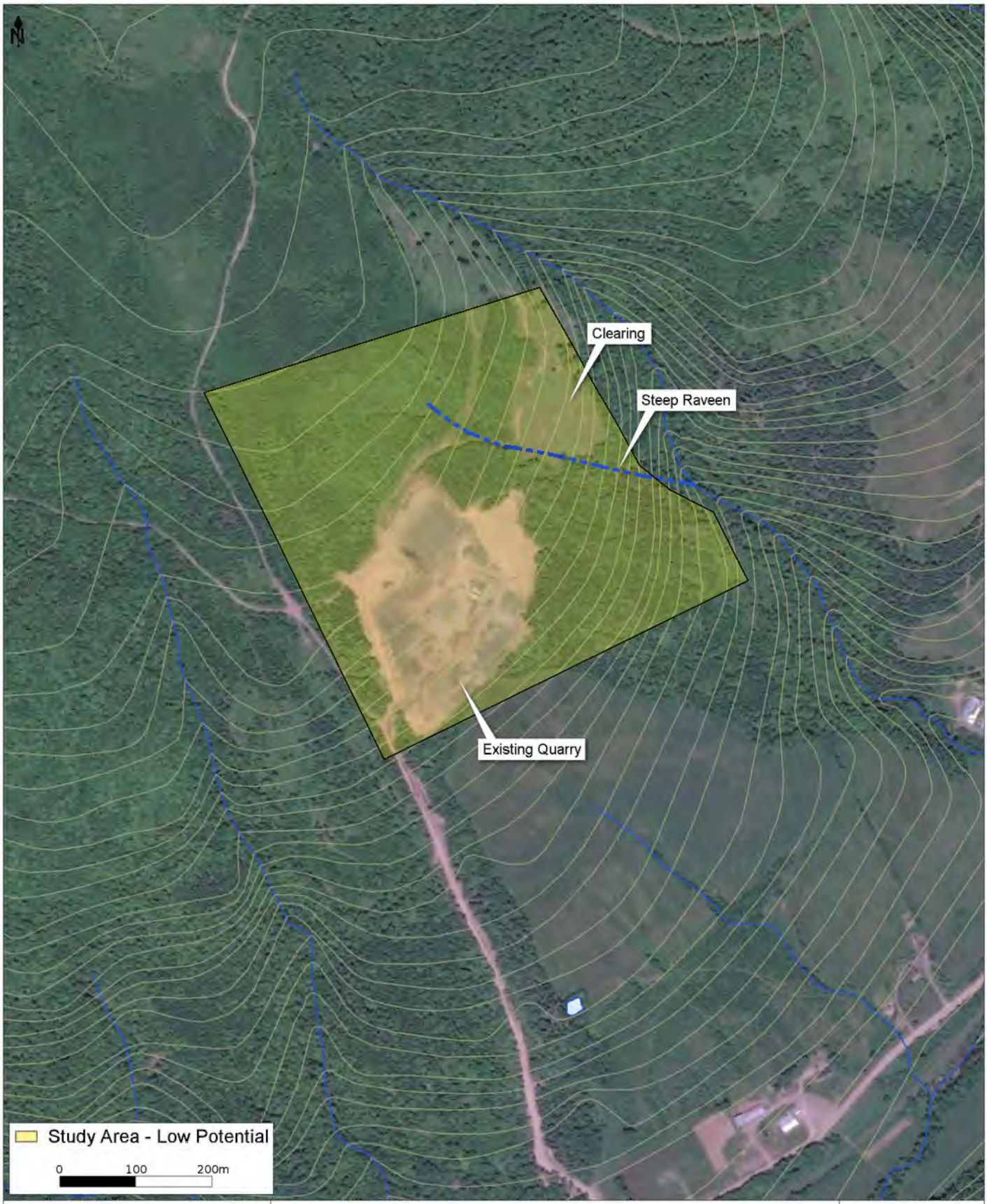


Faribault & Fletcher - 1893

Archaeological Screening and Reconnaissance
Brierly Brook Quarry
Antigonish County, Nova Scotia

BOREAS Heritage Consulting Inc.

Figure 4



BOREAS
Heritage Consulting Inc.

Survey Results

Archaeological Screening and Reconnaissance
Brierly Brook Quarry
Antigonish County, Nova Scotia

Figure 5

Scale:
See Scale Bar

PLATE 3: **Steeply sloping terrain on eastern edge of study area; facing northwest.**

PLATE 4: **View of watercourse along eastern edge of study area; facing northwest.**

This watercourse, a small unnamed tributary to Brierly Brook, flows southeast just outside the eastern limits of the study area. Another, small, ephemeral stream was observed in the northeastern portion of the property (***Plate 5***). Originating as a dry, stony streambed, it flows southeast and turns into a deeply cut ravine before merging with the above-mentioned watercourse. Both streams are unnavigable and are considered to have had minimal influence on the suitability of the area for settlement. Furthermore, the terrain in the vicinity of these streams is steeply sloping with low archaeological potential.

As previously noted, visual inspection of the northwestern portion of the study area revealed generally level to gently sloping terrain, in contrast to the eastern and southeastern areas. Careful attention was paid to areas adjacent to a historic woods road alignment, leading to a large clearing overgrown with dense vegetation (***Plate 6***). Although signs of past tree-harvesting activity (***Plates 7 & 8***) were observed throughout the study area, no evidence of archaeological resources or areas of elevated archaeological potential were encountered and no indication of significant historic cultural modification was identified. Given the poorly drained nature of the soil and the distance to any significant watercourse, the potential for encountering significant archaeological resources in this area is considered to be low.

4.2.1 Archaeological Potential

Based on the undulating and generally sloped nature of the terrain and poorly drained soils, the distance to a significant water source, and the lack of evidence indicating significant cultural modification, the Brierly Brook Quarry Expansion study area is considered to exhibit low potential for encountering significant archaeological resources.

PLATE 5: **Ephemeral stream observed within study area; facing northwest.**

PLATE 6: **View of clearing in northeastern corner of study area; facing northeast.**

PLATE 7: **Young regrowth observed throughout study area; facing east.**

PLATE 8: **Evidence of previous tree-harvesting activity.**

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2013 archaeological screening and reconnaissance of the Brierly Brook Quarry Expansion property consisted of a detailed background study and visual assessment of the proposed development area. It did not involve sub-surface testing. No evidence of archaeological resources or areas of elevated archaeological potential were encountered and no indication of significant historic cultural modification was identified. Based on the results of the background study and the archaeological field reconnaissance, it was concluded that the study area exhibited low potential for encountering Precontact and/or early historic Native archaeological resources, as well as historic Euro-Canadian archaeological resources.

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

1. It is recommended that the study area be cleared of any future requirement for archaeological investigation.

2. In the event that archaeological resources are encountered during construction activities associated with development of the Brierly Brook Quarry, immediate contact should be made with Sean Weseloh McKeane, Coordinator of Special Places, Communities Culture and Heritage, at 902-424-6475.

6.0 REFERENCES

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NOVA SCOTIA

Communities, Culture & Heritage

1741 Brunswick Street
Halifax, Nova Scotia
B3J 2R5

Tel: (902) 424-6475
Fax: (902) 424-0710

December 4, 2013

Stephen G. Garcin
Boreas Heritage Consulting Inc.
1465 Brenton St. Box 24
Halifax, NS B3J 3T4

Dear Mr. Garcin:

RE: Heritage Research Permit Report
A2013NS063 – Brierly Brook Quarry Expansion

We have received and reviewed your report on work conducted under the terms of Heritage Research Permit A2013NS063 for an archaeological resource impact assessment for the proposed quarry expansion at Brierly Brook in Antigonish County.

The report details the archaeological screening and reconnaissance of the proposed Brierly Brook Quarry expansion area near Brierly Brook, Antigonish County, by Boreas Heritage Consulting, in August 2013. The screening and reconnaissance was undertaken to address the potential for encountering archaeological resources during the expansion. The screening and reconnaissance included background and historical research as well as field inspection of the proposed project study area. No shovel testing was undertaken during the assessment.

Based on the various components of the background study, including environmental settling, Native land use and property history, the quarry expansion study area was ascribed low potential for encountering pre-contact , early historic Native, or Euro-Canadian archaeological resources. Based on the undulating and generally sloped nature of the terrain and the poorly drained soils, the distance to a significant water course, and the lack of evidence indicating significant cultural modification, the quarry expansion study area was considered to exhibit low potential for encountering significant archaeological resources.

Considering the above, the reporter recommends that the study area be cleared of any future requirement for archaeological investigation. In the event that archaeological resources are encountered during construction activities associated with the development of the quarry, all activity should stop and contact made with the Coordinator of Special Places.

CCH staff agrees with the recommendations and finds the report acceptable as submitted. Please do not hesitate to contact me should you have any questions or concerns.

Sincerely,

Sean Weseloh McKeane
Coordinator, Special Places

Appendix E

Noise and Particulate Monitoring Information

TABLE E1: CALCULATED PARTICULATE RESULTS

Brierly Brook Results for Total Suspended Particulate Monitoring (TSP)

Sample ID	Sampler Used	Sample Date	Sample Time (min)	Flow (m^3/min)	Flow (CFM)	Total Volume (m^3)	Total Suspended Particulate (TSP) (Total ug)	Total Suspended Particulate (TSP) (ug/m^3)	Nova Scotia Air Quality Regulation - 24 hour sample
Location 1	GRAS WOO-01	October 9-10, 2013	1463	1.166	41.19	1705.86	180000	105.5	120 ug/m^3
Location 2	HV #2	October 9-10, 2013	1447	1.175	41.51	1700.23	9700	5.7	
Location 3	HV #2	October 9-10, 2013	1415	1.133	40.00	1603.20	15000	9.4	
Blank	N/A	October 10, 2013	NA	NA	NA	NA	600	NA	

TABLE E2: AVERAGE Leq VALUES
Brierly Brook Results for Noise Monitoring

Location	Date	Time	Average Leq Value	NSEL Criteria
Location #1	1-Oct-13	10:15-10:59	59.5	
		11:00-11:59	59.1	
		12:00-12:59	57.1	
		13:00-13:59	59.9	
		14:00-14:59	57.4	0700-1900 ≤65 dBA
		15:00-15:59	54.3	
		16:00-16:59	50.3	
		17:00-17:59	50.0	
		18:00-18:59	50.6	
average			55.4	
		19:00-19:59	49.3	
		20:00-20:59	49.6	1900-2300 ≤60 dBA
		21:00-21:59	49.6	
		22:00-22:59	49.7	
average			49.6	
		23:00-23:59	49.8	
	2-Oct-13	0:00-0:59	49.7	
		01:00-01:59	50.1	
		02:00-02:59	50.0	2300-0700 ≤55 dBA
		03:00-03:59	49.8	
		04:00-04:59	50.0	
		05:00-05:59	50.5	
		06:00-06:59	58.3	
average			51.0	
		07:00-07:59	47.9	
		08:00-08:59	59.9	0700-1900 ≤65 dBA
		09:00-09:59	62.1	
		10:00-10:20	57.5	
average			56.9	

TABLE E2: AVERAGE Leq VALUES
Brierly Brook Results for Noise Monitoring

Location	Date	Time	Average Leq Value	NSEL Criteria
Location #2	2-Oct-13	10:35-10:59	46.4	
		11:00-11:59	45.6	
		12:00-12:59	39.8	
		13:00-13:59	37.2	
		14:00-14:59	38.9	0700-1900 ≤65 dBA
		15:00-15:59	41.4	
		16:00-16:59	41.7	
		17:00-17:59	42.6	
		18:00-18:59	38.2	
average			41.3	
		19:00-19:59	39.3	
		20:00-20:59	37.6	1900-2300 ≤60 dBA
		21:00-21:59	36.6	
		22:00-22:59	34.0	
average			36.9	
		23:00-23:59	34.3	
	3-Oct-13	0:00-0:59	31.8	
		01:00-01:59	31.8	
		02:00-02:59	33.1	2300-0700 ≤55 dBA
		03:00-03:59	35.1	
		04:00-04:59	36.0	
		05:00-05:59	44.5	
		06:00-06:59	48.3	
average			36.9	
		07:00-07:59	50.0	
		08:00-08:59	49.8	0700-1900 ≤65 dBA
		09:00-09:59	50.2	
		10:00-10:30	53.2	
average			50.8	

TABLE E2: AVERAGE Leq VALUES
Brierly Brook Results for Noise Monitoring

Location	Date	Time	Average Leq Value	NSEL Criteria
Location #3	3-Oct-13	11:00-11:59	56.2	
		12:00-12:59	53.2	
		13:00-13:59	50.8	
		14:00-14:59	48.1	0700-1900 ≤65 dBA
		15:00-15:59	45.5	
		16:00-16:59	44.5	
		17:00-17:59	40.2	
		18:00-18:59	34.4	
average			46.6	
		19:00-19:59	33.8	
		20:00-20:59	32.6	1900-2300 ≤60 dBA
		21:00-21:59	32.5	
		22:00-22:59	33.8	
average			33.2	
		23:00-23:59	37.6	
	4-Oct-13	0:00-0:59	32.4	
		01:00-01:59	38.3	
		02:00-02:59	39.5	2300-0700 ≤55 dBA
		03:00-03:59	36.2	
		04:00-04:59	33.9	
		05:00-05:59	50.8	
		06:00-06:59	50.8	
average			39.9	
		07:00-07:59	50.5	
		08:00-08:59	50.0	0700-1900 ≤65 dBA
		09:00-09:59	51.0	
		10:00-10:59	54.9	
average			51.6	

Conestoga-Rovers & Associates
Ambient Air Monitoring Field Calibration Data
Hivol TSP & PM10 Samplers

SITE INFORMATION

Location:	Location 1	Date:	09-Oct-13
Sampler S/N:	GRAS W00-01	Tech:	A McPherson

METEOROLOGICAL CONDITIONS

Sampler Elevation (feet):	64		
Daily Average Pressure (in Hg):	30.09	Corrected Pressure (mm Hg):	763
Daily Average Temperature (deg C):	10.2	Temperature (deg K):	283
Seasonal Press. (in Hg):	30.09	Corrected Seasonal (mm Hg):	763
Seasonal Temp. (deg C):	10.2	Seasonal Temp. (deg K):	283

** Calibrated to standard temperature and pressure** Calibrated to standard temperature and pressure

CALIBRATION ORIFICE DATA

Make:	Tisch Environmental	Qstd Slope:	1.56815
Model:		Qstd Intercept:	-0.01025
Serial#:	GRAS W00-01	Date Certified:	26-Mar-07

CALIBRATION DATA

Manometer Reading

Plate or Test #	H2O (inches)	Qstd (m3/min)	Flow (CFM)	Difference from 40CFM (MOE guideline)
1	3.18	1.165	41.15	0.7%
2	3.22	1.173	41.41	0.9%
3	3.16	1.162	41.02	0.6%
Avg.		1.166	41.19	

Flow Adjustment Requir	
YES	NO

Comments:

Calibrated on site

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
Qstd = standard flow rate
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 293 deg K
Pstd = 760 mm Hg

Conestoga-Rovers & Associates
Ambient Air Monitoring Field Calibration Data
Hivol TSP & PM10 Samplers

SITE INFORMATION

Location:	Location 2	Date:	09-Oct-13
Sampler S/N:	ACU W96-01	Tech:	A McPherson

METEOROLOGICAL CONDITIONS

Sampler Elevation (feet):	64		
Daily Average Pressure (in Hg):	30.09	Corrected Pressure (mm Hg):	763
Daily Average Temperature (deg C):	10.2	Temperature (deg K):	283
Seasonal Press. (in Hg):	30.09	Corrected Seasonal (mm Hg):	763
Seasonal Temp. (deg C):	10.2	Seasonal Temp. (deg K):	283

** Calibrated to standard temperature and pressure** Calibrated to standard temperature and pressure

CALIBRATION ORIFICE DATA

Make:	Tisch Environmental	Qstd Slope:	1.56815
Model:		Qstd Intercept:	-0.01025
Serial#:	ACU W96-01	Date Certified:	26-Mar-07

CALIBRATION DATA

Manometer Reading

Plate or Test #	H2O (inches)	Qstd (m3/min)	Flow (CFM)	Difference from 40CFM (MOE guideline)	Flow Adjustment Requir	
1	3.19	1.167	41.21	0.7%		
2	3.23	1.174	41.47	0.9%	YES	NO
3	3.29	1.185	41.85	1.1%		
Avg.		1.175	41.51			

Comments:

Calibrated on site

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
Qstd = standard flow rate
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 293 deg K
Pstd = 760 mm Hg

Conestoga-Rovers & Associates
Ambient Air Monitoring Field Calibration Data
Hivol TSP & PM10 Samplers

SITE INFORMATION

Location:	Location 3	Date:	09-Oct-13
Sampler S/N:	HV#2	Tech:	A McPherson

METEOROLOGICAL CONDITIONS

Sampler Elevation (feet):	64		
Daily Average Pressure (in Hg):	30.09	Corrected Pressure (mm Hg):	763
Daily Average Temperature (deg C):	10.2	Temperature (deg K):	283
Seasonal Press. (in Hg):	30.09	Corrected Seasonal (mm Hg):	763
Seasonal Temp. (deg C):	10.2	Seasonal Temp. (deg K):	283

** Calibrated to standard temperature and pressure** Calibrated to standard temperature and pressure

CALIBRATION ORIFICE DATA

Make:	Tisch Environmental	Qstd Slope:	N/A
Model:		Qstd Intercept:	N/A
Serial#:	HV#2	Date Certified:	26-Mar-07

CALIBRATION DATA

Plate or Test #	Manometer Reading H2O (inches)	Qstd (m3/min)	Flow (CFM)	Difference from 40CFM (MOE guideline)
1			40.00	0.0%
2			40.00	0.0%
3			40.00	0.0%
Avg.			40.00	

1 Cubic Foot = 0.0283168466 Cubic Meters

Flow Adjustment Requir	
YES	NO

Comments:

Calibrated on site

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
Qstd = standard flow rate
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 293 deg K
Pstd = 760 mm Hg

Your Project #: 081464-03
Site Location: BRIERLY BROOK

Attention: Joyce MacDonald
Conestoga-Rovers and Associates Ltd
Dartmouth
45 Akerley Blvd
Dartmouth , NS
B3B 1J7

Report Date: 2013/10/23

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B3H5768
Received: 2013/10/16, 13:26

Sample Matrix: Air
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Particulate Matter in Air	4	N/A	2013/10/22	SYD SOP 00172	Based on EPAIO-2.1

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key Natalie MacAskill
23 Oct 2013 11:56:08 -03:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Natalie MacAskill, Sr. Project Manager
Email: NMacAskill@maxxam.ca
Phone# (902) 567-1255 Ext:17

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B3H5768
Report Date: 2013/10/23

Conestoga-Rovers and Associates Ltd
Client Project #: 081464-03
Site Location: BRIERLY BROOK

RESULTS OF ANALYSES OF AIR

Maxxam ID		TM2778	TM2779	TM2780	TM2782		
Sampling Date		2013/10/10	2013/10/10	2013/10/10	2013/10/10		
	Units	**LOCATION 1**	**LOCATION 2**	**LOCATION 3**	**BLANK**	**RDL**	**QC Batch**
Inorganics							
Total Suspended Particulate	mg	180	9.7	15	0.60	0.50	3393744

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 465 George St., Unit G Sydney, NS B1P 1K5 Tel: (902) 567-1255 Toll-Free: (888) 535-7770 Fax: (902) 539-6504 www.maxxam.ca

Validation Signature Page

Maxxam Job #: B3H5768

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Michelle Mombourquette, Laboratory Manager

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Analytics Inc
200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax902-420-8612 Toll Free 1-800-565-7227
www.maxxamanalytics.com e-mail: customerservicebedford@maxxamanalytics.com

Chain of Custody Record
Form TS.1002-1

INVOICE INFORMATION:	REPORT INFORMATION (if differs from invoice):		
Company Name: Conestoga-Rovers and Associates	Company Name:	PO#:	16276
Contact Name: Joyce Macdonald	Contact Name:	Project # : 081464-03	B3H5768
Address: 45 Akerley Blvd. CC: amcpherson, mblanchard	Address:	Proj. Name:	
Dartmouth, NS		Location: Brierly Brook	
Email: jmacdonald@craworld.com	Email:	Quotation #:	
Ph: 468-1248 Fax: 468-2207	Ph:	Submitted By: AM	
		Site :	

Specify Guideline Requirements;

STANDARD : X

* Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Seawater
Potable/NonPotable/Tissue/Soil/Sludge/Metal

Sample Identification	Matrix *	Date/Time Sampled	# & type of bottles		Total Suspended Particulate				Other Analysis or Comments/Hazards
Location 1	Particulate	Oct 9-10, 2013	Air Filter		X				Filter ppr # 23241
Location 2	Particulate	Oct 9-10, 2013	Air Filter		X				Filter ppr # 23240
Location 3	Particulate	Oct 9-10, 2013	Air Filter		X				Filter ppr # 23289
Blank	Particulate	10-Oct-13	Air Filter		X				Filter ppr # 23285

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	PURPOSE OF CHANGE / REMARKS	TEMP @ Maxxam Receipt
Amanda McPherson	13/10/16 12:50		
Amanda McPherson			INTEGRITY Init:____
14-Oct-13 10:00			Yes No

Meterological Data Tracadie For Particulate Monitoring Dates

Date	Time	Temperature °C	Relative Humidity %	Wind Direction 10's deg	Wind Speed km/h	Barometric Pressure kPa	Weather	Max Wind Gust (Daily) Km/hr	Direction of Max Wind Gust (Daily) 10's deg
9-Oct-13	0:00	11.4	72	33	20	101.61	NA		
9-Oct-13	1:00	10.4	65	33	22	101.7	NA		
9-Oct-13	2:00	10.4	63	34	22	101.73	Clear		
9-Oct-13	3:00	10	58	34	19	101.75	NA		
9-Oct-13	4:00	9.8	61	34	17	101.79	NA		
9-Oct-13	5:00	9.1	70	31	13	101.85	Clear		
9-Oct-13	6:00	6.8	81	27	9	101.88	NA		
9-Oct-13	7:00	7.4	80	25	11	101.96	NA		
9-Oct-13	8:00	8.9	80	27	9	102.01	Mainly Clear		
9-Oct-13	9:00	11	73	31	15	102.07	NA		
9-Oct-13	10:00	11.9	70	33	19	102.07	NA		
9-Oct-13	11:00	12.3	68	32	17	102.06	Mainly Clear		
9-Oct-13	12:00	12.2	70	34	19	102.02	NA	33	34
9-Oct-13	13:00	12.6	68	35	17	101.96	NA		
9-Oct-13	14:00	12.8	64	33	13	101.95	Clear		
9-Oct-13	15:00	13.2	64	33	15	101.96	NA		
9-Oct-13	16:00	12.7	66	33	15	101.96	NA		
9-Oct-13	17:00	11.7	73	32	7	101.97	Clear		
9-Oct-13	18:00	9.2	86	23	6	101.95	NA		
9-Oct-13	19:00	8.5	85	20	6	101.98	NA		
9-Oct-13	20:00	7.8	85	21	7	101.97	Clear		
9-Oct-13	21:00	8	80	21	7	101.99	NA		
9-Oct-13	22:00	8.4	78	20	11	101.95	NA		
9-Oct-13	23:00	8.3	78	20	13	101.92	Clear		
10-Oct-13	0:00	9.1	73	21	17	101.88	NA		
10-Oct-13	1:00	8.7	71	21	15	101.87	NA		
10-Oct-13	2:00	8.7	72	20	17	101.82	Clear		
10-Oct-13	3:00	8.7	79	21	17	101.78	NA		
10-Oct-13	4:00	9.2	75	23	17	101.76	NA		
10-Oct-13	5:00	9.4	71	22	20	101.7	Clear		
10-Oct-13	6:00	8.8	72	21	13	101.69	NA		
10-Oct-13	7:00	9.5	70	21	22	101.69	NA		
10-Oct-13	8:00	12	64	22	22	101.66	Mainly Clear		
10-Oct-13	9:00	13.6	59	22	20	101.64	NA		
10-Oct-13	10:00	14.8	55	23	24	101.62	NA		
10-Oct-13	11:00	16.5	47	22	20	101.57	Mostly Cloudy		
10-Oct-13	12:00	18.1	42	22	22	101.47	NA	37	24
10-Oct-13	13:00	19.1	38	25	19	101.42	NA		
10-Oct-13	14:00	19.8	38	23	17	101.39	Mostly Cloudy		
10-Oct-13	15:00	18.8	41	24	19	101.35	NA		
10-Oct-13	16:00	17.1	50	23	17	101.32	NA		
10-Oct-13	17:00	15.4	62	21	7	101.33	Mostly Cloudy		
10-Oct-13	18:00	12.2	74	23	4	101.37	NA		
10-Oct-13	19:00	14.8	58	24	13	101.36	NA		
10-Oct-13	20:00	14.2	60	23	17	101.35	Mainly Clear		
10-Oct-13	21:00	13.3	53	23	11	101.37	NA		
10-Oct-13	22:00	12	54	23	11	101.35	NA		
10-Oct-13	23:00	11.4	53	21	9	101.34	Mainly Clear		

NOTES: NA Not Applicable of Not Available

Meterological Data Tracadie For Noise Monitoring Dates

Date	Time	Temperature °C	Relative Humidity %	Wind Direction 10's deg	Wind Speed km/h	Barometric Pressure kPa	Weather	Max Wind Gust (Daily) Km/hr	Direction of Max Wind Gust (Daily) 10's deg
1-Oct-13	0:00	13.1	87	8	4	100.85	NA		
1-Oct-13	1:00	14	82	14	13	100.83	NA		
1-Oct-13	2:00	14.1	85	14	13	100.79	Cloudy		
1-Oct-13	3:00	14	86	14	9	100.73	NA		
1-Oct-13	4:00	14	87	12	7	100.67	Rain Showers		
1-Oct-13	5:00	13.9	87	9	7	100.65	Rain Showers,Fog		
1-Oct-13	6:00	13.5	89	9	4	100.6	Rain Showers,Fog		
1-Oct-13	7:00	13.6	91		0	100.57	Rain Showers,Fog		
1-Oct-13	8:00	14.3	82	8	6	100.54	Rain Showers,Fog		
1-Oct-13	9:00	15.5	80	6	7	100.48	Rain Showers		
1-Oct-13	10:00	16.2	75	8	11	100.41	Rain Showers		
1-Oct-13	11:00	15.8	83	8	11	100.35	Rain Showers,Fog		
1-Oct-13	12:00	15.3	91	6	11	100.26	Rain,Fog	<31	NA
1-Oct-13	13:00	14.4	92	9	11	100.2	Rain,Fog		
1-Oct-13	14:00	14.1	91	6	7	100.13	Rain,Fog		
1-Oct-13	15:00	13.5	89	7	11	100.09	Rain,Fog		
1-Oct-13	16:00	12.8	94	5	11	100.04	Rain,Fog		
1-Oct-13	17:00	12.3	95	4	17	100.01	Rain,Fog		
1-Oct-13	18:00	12.5	95	2	11	99.95	Rain,Fog		
1-Oct-13	19:00	12.8	93	2	13	99.93	Rain,Fog		
1-Oct-13	20:00	12.8	94	36	17	99.91	Rain,Fog		
1-Oct-13	21:00	12.5	96	35	15	99.89	Rain,Fog		
1-Oct-13	22:00	12.6	96	34	15	99.86	Rain,Fog		
1-Oct-13	23:00	12.5	95	35	15	99.83	Rain,Fog		
2-Oct-13	0:00	12.5	96	35	15	99.79	Rain,Fog		
2-Oct-13	1:00	12.8	96	34	11	99.76	NA		
2-Oct-13	2:00	12.9	96	34	15	99.73	Fog		
2-Oct-13	3:00	12.8	96	34	17	99.73	NA		
2-Oct-13	4:00	12.9	96	34	19	99.75	NA		
2-Oct-13	5:00	13	94	33	15	99.76	Clear		
2-Oct-13	6:00	13	94	32	15	99.78	NA		
2-Oct-13	7:00	13	94	30	13	99.83	NA		
2-Oct-13	8:00	12.9	93	30	11	99.84	Mainly Clear		
2-Oct-13	9:00	14.5	89	30	13	99.83	NA		
2-Oct-13	10:00	15.8	81	28	11	99.82	NA		
2-Oct-13	11:00	17.2	77	32	11	99.79	Mainly Clear		
2-Oct-13	12:00	17.5	65	32	11	99.7	NA	33	24
2-Oct-13	13:00	19.2	58	26	11	99.61	NA		
2-Oct-13	14:00	20.8	60	26	11	99.54	Mainly Clear		
2-Oct-13	15:00	21.7	56	26	11	99.49	NA		
2-Oct-13	16:00	21.6	56	26	11	99.46	NA		
2-Oct-13	17:00	20.3	62	26	17	99.46	Clear		
2-Oct-13	18:00	18.4	69	25	17	99.5	NA		
2-Oct-13	19:00	17.6	74	24	19	99.51	NA		
2-Oct-13	20:00	17.4	74	23	19	99.48	Mainly Clear		
2-Oct-13	21:00	17.2	75	23	19	99.51	NA		
2-Oct-13	22:00	16.2	79	24	17	99.54	NA		
2-Oct-13	23:00	16.3	80	26	15	99.58	Clear		

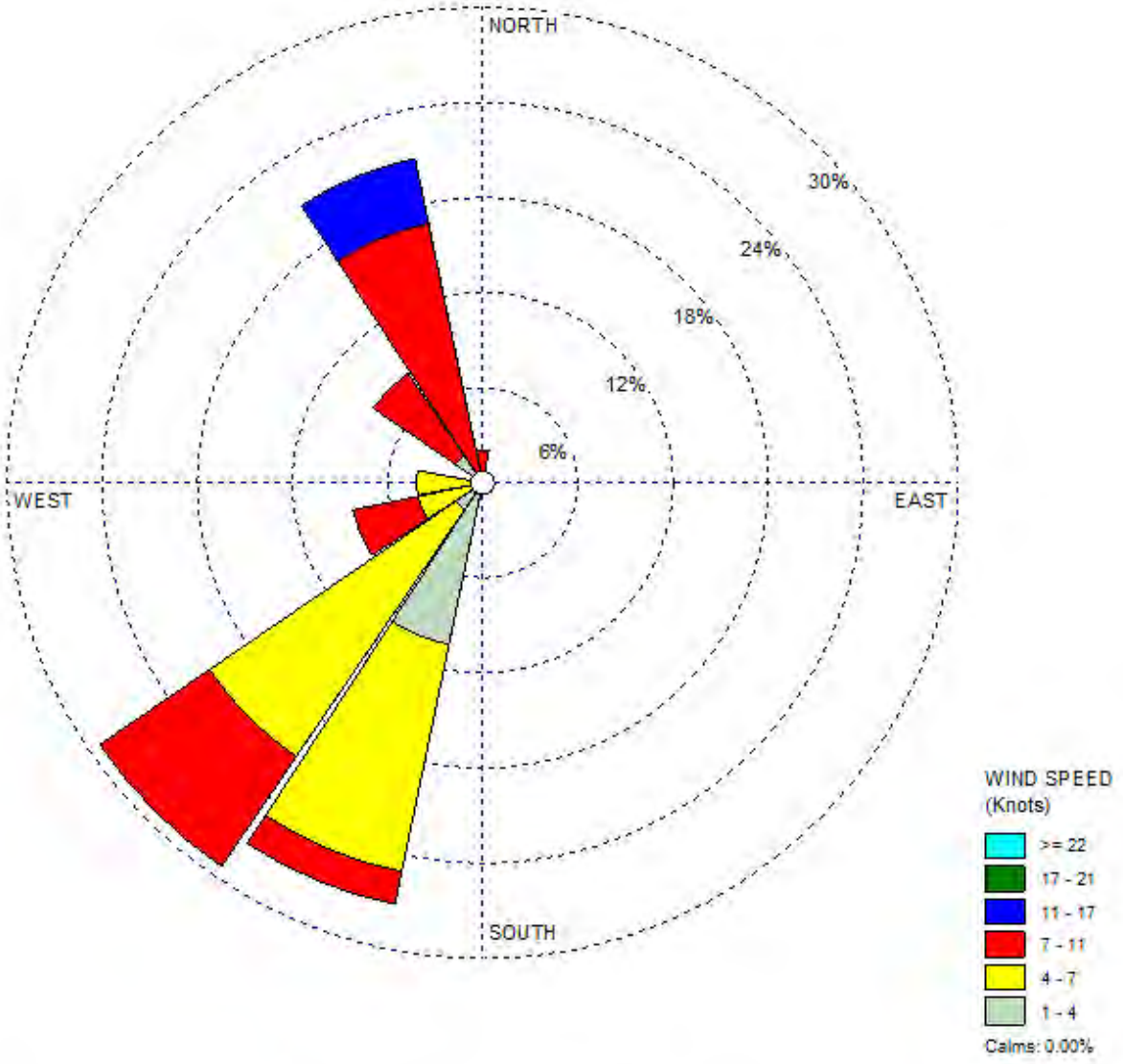
Meterological Data Tracadie For Noise Monitoring Dates

Date	Time	Temperature °C	Relative Humidity %	Wind Direction 10's deg	Wind Speed km/h	Barometric Pressure kPa	Weather	Max Wind Gust (Daily) Km/hr	Direction of Max Wind Gust (Daily) 10's deg
3-Oct-13	0:00	15.6	83	27	15	99.56	NA		
3-Oct-13	1:00	15.2	84	25	17	99.59	NA		
3-Oct-13	2:00	14.7	84	24	17	99.61	Clear		
3-Oct-13	3:00	14.7	78	25	17	99.65	NA		
3-Oct-13	4:00	14.2	77	24	19	99.69	NA		
3-Oct-13	5:00	13.5	79	25	15	99.74	Clear		
3-Oct-13	6:00	13.2	77	26	13	99.84	NA		
3-Oct-13	7:00	13.4	75	26	13	99.9	NA		
3-Oct-13	8:00	14.8	69	28	15	99.94	Clear		
3-Oct-13	9:00	15.6	68	29	24	100.01	NA		
3-Oct-13	10:00	15.6	63	30	26	100.04	NA		
3-Oct-13	11:00	16.3	62	29	22	100.03	Mainly Clear	<31	NA
3-Oct-13	12:00	NA	NA	NA	NA	NA	NA		
3-Oct-13	13:00	16.7	60	30	26	100.05	NA		
3-Oct-13	14:00	16.3	61	30	20	100.07	Mainly Clear		
3-Oct-13	15:00	16.7	57	28	22	100.1	NA		
3-Oct-13	16:00	16.7	57	29	20	100.11	NA		
3-Oct-13	17:00	16.1	59	27	17	100.14	Clear		
3-Oct-13	18:00	14.6	65	27	13	100.17	NA		
3-Oct-13	19:00	13.7	71	24	15	100.24	NA		
3-Oct-13	20:00	13.4	72	25	13	100.29	Clear		
3-Oct-13	21:00	12.9	71	26	13	100.3	NA		
3-Oct-13	22:00	12.4	78	25	15	100.32	NA		
3-Oct-13	23:00	11.1	83	27	7	100.38	Clear		
4-Oct-13	0:00	11.6	81	27	11	100.36	NA		
4-Oct-13	1:00	11.2	82	27	15	100.37	NA		
4-Oct-13	2:00	12.7	66	29	19	100.36	Mainly Clear		
4-Oct-13	3:00	12.1	65	27	15	100.35	NA		
4-Oct-13	4:00	11.2	74	25	15	100.35	NA		
4-Oct-13	5:00	10.7	78	24	17	100.31	Clear		
4-Oct-13	6:00	10.1	76	24	19	100.3	NA		
4-Oct-13	7:00	10.4	74	25	19	100.31	NA		
4-Oct-13	8:00	12.2	70	26	19	100.33	Clear		
4-Oct-13	9:00	13.6	60	29	28	100.33	NA		
4-Oct-13	10:00	13.8	57	30	32	100.3	NA		
4-Oct-13	11:00	14.4	56	29	24	100.27	Clear	54	30
4-Oct-13	12:00	14	53	30	30	100.25	NA		
4-Oct-13	13:00	13.3	57	30	28	100.27	NA		
4-Oct-13	14:00	14	57	33	24	100.3	Mainly Clear		
4-Oct-13	15:00	12	61	33	28	100.36	NA		
4-Oct-13	16:00	12.3	58	32	28	100.38	NA		
4-Oct-13	17:00	11.9	58	32	30	100.46	Mostly Cloudy		
4-Oct-13	18:00	11.4	57	32	28	100.54	NA		
4-Oct-13	19:00	11.1	62	32	26	100.57	NA		
4-Oct-13	20:00	11.4	65	32	22	100.59	Clear		
4-Oct-13	21:00	11.4	70	31	20	100.61	NA		
4-Oct-13	22:00	11.5	67	32	24	100.65	NA		
4-Oct-13	23:00	11.4	70	33	20	100.67	Clear		

NOTES: NA Not Applicable or Not Available

WIND ROSE PLOT:
Tracadie Station
Noise and Particulate Monitoring

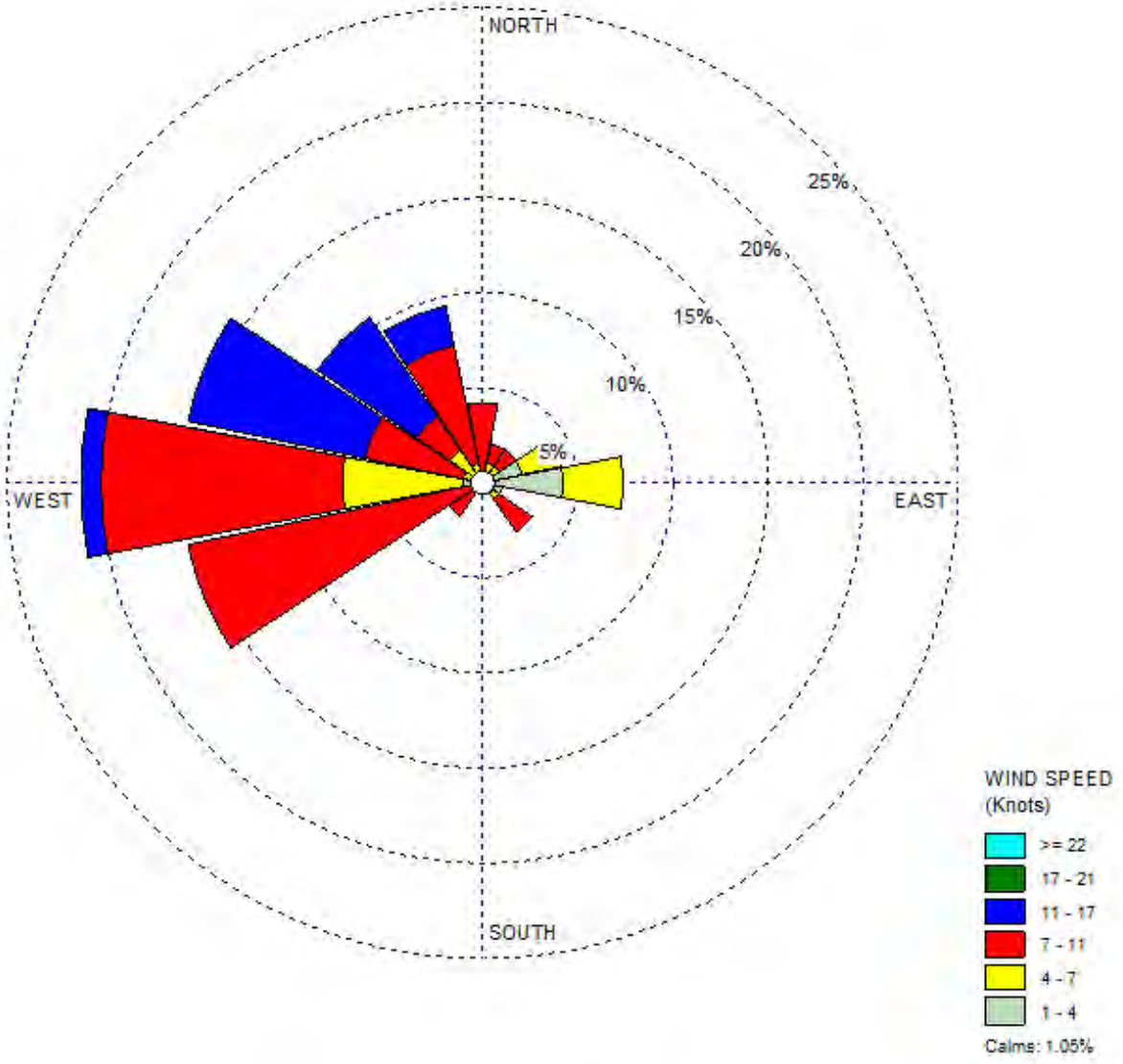
DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/09/2013 - 00:00 **End Date: 10/10/2013 - 23:00**	**Conestoga Rovers and Associates**	
		MODELER: **Joyce Mac Donald**	
	CALM WINDS: **0.00%**	TOTAL COUNT: **48 hrs.**	
	AVG. WIND SPEED: **6.69 Knots**	DATE: **04/16/2014**	PROJECT NO.: **081464-03**

WIND ROSE PLOT:
Tracadie Station
Noise and Particulate Monitoring

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/01/2013 - 00:00 **End Date: 10/04/2013 - 23:00**	**Conestoga Rovers and Associates**	
		MODELER: **Joyce Mac Donald**	
	CALM WINDS: **1.05%**	TOTAL COUNT: **95 hrs.**	
	AVG. WIND SPEED: **8.62 Knots**	DATE: **04/16/2014**	PROJECT NO.: **081464-03**

Appendix F

Acid Rock Analysis

6-Jan-14

Nova Construction Pioneer Coal
PO Box 929
Westville, N.S.,
B0K 2A0
Attention: Ed Gillis

Re: Results of analysis on submitted samples.

			kg/t	
		Wt. %	Acid Producing	Acid Consuming
Sample	pH	S (Total)	Potential	Ability
Brierly Brook	8.20	0.010	0.30	65.3
Brierly Brook Dup.		0.004	0.13	

Reference Sample:

	Wt. %
Sample	S (Total)
NBM-1 (0.28% Sulphur)	0.282

Daniel Chevalier, MASc
Manager, Minerals Engineering Centre

Appendix G

Surface and Groundwater Data

Table 1: Groundwater Chemistry of Select Wells in the Vicinity of the Brierly Brook Quarry

PARAMETER	UNITS	CDWQG	House 1		House 2	House 3	House 4	House 5		House 6
			Aug. 20/11	Aug. 20/11	Aug. 20/11	Aug. 20/11	Aug. 20/11	Aug. 20/11	Sep. 5/13	Aug. 20/11
Inorganic			**Barn**	**House**						
Alkalinity (Total as CaCO3)	mg/L	---	93	42	100	170	87	260	180	99
Sulphate (SO4)	mg/L	<500 (AO)	9.7	ND	6.2	20	31	15	3.0	ND
Chloride (Cl)	mg/L	<250 (AO)	3.9	1.8	3.8	7.3	5.6	180	7.0	5.1
Silica (SiO2)	mg/L	---	8.8	6.0	8.8	6.5	10	6.4	12	5.5
Orthophosphate (P)	mg/L	---	ND	0.014	0.012	ND	0.057	ND	0.012	0.023
Nitrogen (Ammonia Nitrogen)	mg/L	---	ND	ND	ND	ND	ND	0.058	ND	0.18
Nitrate (N)	mg/L	10 (MAC)	0.24	ND	0.34	1.9	0.46	0.055	0.72	ND
Nitrite (N)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Organic Carbon (C)	mg/L	---	ND	2.6	ND	ND	0.70	1.5	0.73	0.80
Colour	TCU	<15 (AO)	ND	16	ND	ND	ND	7.7	ND	ND
Turbidity	NTU	1 (MAC)	**55**	0.50	0.24	0.11	0.18	0.45	**1.2**	0.62
Conductivity	uS/cm	---	210	86	230	410	250	1100	350	220
pH	pH	6.5 - 8.5 (AO)	8.18	6.79	7.98	7.81	7.78	7.67	7.97	7.70
Metals										
Aluminum (Al)	mg/L	0.100	0.0062	0.0505	ND	ND	0.007	0.0055	0.0069	0.0056
Antimony (Sb)	mg/L	0.006 (IMAC)	ND	ND	ND	ND	ND	ND	ND	ND
Barium (Ba)	mg/L	1.0 (MAC)	0.117	0.156	0.11	0.337	0.0516	0.342	**1.09**	0.0961
Beryllium (Be)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Boron (B)	mg/L	5 (MAC)	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium (Cd)	mg/L	0.005 (MAC)	ND	0.000037	ND	ND	ND	ND	ND	0.00002
Chromium (Cr)	mg/L	0.05 (MAC)	ND	ND	ND	ND	ND	ND	0.0011	ND
Cobalt (Co)	mg/L	---	ND	0.00129	ND	ND	ND	ND	ND	ND
Calcium (Ca)	mg/L	---	33.1	10.9	40.3	72.4	38.2	93.4	55.7	36.7
Copper (Cu)	mg/L	<1.0 (AO)	ND	0.0063	0.0701	0.0043	0.0152	0.0054	0.0231	0.0615
Iron (Fe)	mg/L	<0.3 (AO)	ND	0.289	ND	ND	ND	0.07	ND	ND
Lead (Pb)	mg/L	0.010 (MAC)	ND	0.00229	ND	ND	ND	ND	ND	ND
Lithium (Li)	mg/L	---								
Manganese (Mn)	mg/L	<0.05 (AO)	ND	0.7	ND	ND	ND	**1.26**	ND	0.0153
Molybdenum (Mo)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Nickel (Ni)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Silver (Ag)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (Na)	mg/L	<200 (AO)	3.65	2.78	3.86	4.13	5.25	94.1	9.81	4.82
Thallium (Tl)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Tin (Sn)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Uranium (U)	mg/L	0.02 (MAC)	0.0014	ND	0.00053	0.00178	0.00024	0.0014	0.00089	0.00032
Vanadium (V)	mg/L	---	0.0023	ND	ND	ND	ND	ND	0.0047	ND
Zinc (Zn)	mg/L	<5 (AO)	ND	ND	0.0159	0.0094	ND	ND	0.0092	0.0113
Strontium (Sr)	mg/L	---	0.0814	0.0323	0.12	0.117	0.117	0.105	0.12	0.0581
Magnesium (Mg)	mg/L	---	2.13	1.35	1.73	2.1	4.57	13.5	5.81	1.75
Potassium (K)	mg/L	---	0.289	0.568	0.396	2.3	0.768	1.13	1.12	0.409
Sulphur (S)	mg/L	---								
Arsenic (As)	mg/L	0.01 (MAC)	ND	ND	ND	ND	ND	ND	0.0041	ND
Selenium (Se)	mg/L	0.01 (MAC)	ND	ND	ND	ND	ND	ND	ND	ND
Bismuth (Bi)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Phosphorus (P)	mg/L	---								
Titanium (Ti)	mg/L	---	ND	ND	ND	ND	ND	ND	ND	ND
Calculated Parameters										
Hardness (CaCO3)	mg/L	---	91	33	110	190	110	290	160	99
Ion Balance (% Difference)	%	---	4.78	5.33	1.53	2.07	0.980	4.25	1.33	1.84
Anion Sum	me/L	---	2.19	0.890	2.26	4.20	2.58	10.8	3.82	2.13
Cation Sum	me/L	---	1.99	0.800	2.33	4.03	2.53	9.91	3.72	2.21
Langelier Index (@ 20C)	N/A	---	0.310	-1.86	0.225	0.508	-0.0670	0.579	0.569	-0.0910
Langelier Index (@ 4C)	N/A	---	0.0590	-2.11	-0.0260	0.258	-0.317	0.332	0.319	-0.342
Saturation pH (@ 20C)	N/A	---	7.87	8.65	7.76	7.30	7.85	7.09	7.4	7.79
Saturation pH (@ 4C)	N/A	---	8.12	8.90	8.01	7.55	8.10	7.34	7.65	8.04
Calculated TDS	mg/L	---	119	50.0	127	226	150	568	203	114
Escherichia coli	MPN/100ml	---	ND	10	3	ND	ND			14
Total Coliforms	MPN/100ml	---	12	>200	>200	110	70			>200

Notes:

---	No Guideline
CDWQG	Canadian Drinking Water Quality Guidelines
MAC	Maximum Acceptable Concentration
AO	Aesthetic Objective
ND	not detected
1.26	Exceeds guidelines

Table 2: Well Parameters of Selected Wells

PARAMETER	House 1		House 2	House 3	House 4		House 5	House 6
	Barn	House			Well 1	Well 2		
No. of persons		2	1	1		5	4	2
Estimated daily usage (L)		700	350	340		1500	1500	350
Type	drilled	dug	dug	dug	dug	dug	dug	dug
Installed	1980	1969	1980	2003 (rehab)	1988	1993	1993	1983
Depth (m)	57.9	4.4	4.6	4.6	8.2	5.5	5.45	3.9
diameter (m)	0.15	1.2	2.3	0.9	0.9	0.76	1.1	0.9
Casing (length if Drilled / Height AG if dug) m	33.5	-	0 (Flush)	0.6	0.46	0.2	0.4	0.6
Water level (m)			3.1	near surface	3.9	3.1	2.21	level with nearby brook

Table 3: Surface Water Chemistry Results

PARAMETER	UNITS	CCME-FWAL	SW1	SW1	SW2	SW2	SW3	SW4	SW5
Inorganic			**2013/8/13**	**2013/11/19**	**2013/8/13**	**2013/11/19**	**2013/11/19**	**2013/8/13**	**2013/08/22**
Alkalinity (Total as CaCO3)	mg/L	---	14	<5.0	86	20	15	14	98
Sulphate (SO4)	mg/L	---	<2.0	<2.0	5	<2.0	<2.0	<2.0	8.7
Chloride (Cl)	mg/L	120	5	4.7	19	5.9	5.1	6.3	11
Silica (SiO2)	mg/L	---	5	3.3	5.8	4.1	3.7	4.3	7.5
Orthophosphate (P)	mg/L	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
Nitrogen (Ammonia Nitrogen)	mg/L	---	0.058	<0.05	<0.05	<0.05	<0.05	0.093	ND
Nitrate (N)	mg/L	13	0.39	0.088	0.57	0.15	0.07	0.19	5.9
Nitrite (N)	mg/L	---	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
Organic Carbon (C)	mg/L	---	2.3	8.5	1.3	4.2	4.8	1.6	1.3
Colour	TCU	---	14	65	<5.0	29	26	6.6	7.1
Turbidity	NTU	---	0.44	0.50	<0.1	0.84	0.99	0.23	0.36
Conductivity	uS/cm	---	54	29	230	62	48	56	290
pH	pH	6.5 - 9.0	7.25	**6.14**	7.85	7.23	6.91	7.24	8.12
Metals									
Aluminum (Al)	ug/L	100	53.5	**280**	19.8	**130**	**110**	30.2	25.4
Antimony (Sb)	ug/L	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
Arsenic (As)	ug/L	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
Barium (Ba)	ug/L	---	11.8	8.5	112	24	27	18.1	169
Beryllium (Be)	ug/L	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
Bismuth (Bi)	ug/L	---	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
Boron (B)	ug/L	1500	<50	<50	<50	<50	<50	<50	ND
Cadmium (Cd)	ug/L	0.09	0.149	0.012	**0.096**	<0.01	<0.01	0.048	**0.13**
Calcium (Ca)	ug/L	---	3890	1700	30700	6900	5300	4150	39400
Chromium (Cr)	ug/L	---	1.4	<1.0	1.3	<1.0	<1.0	1.2	ND
Cobalt (Co)	ug/L	---	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	ND
Copper (Cu)	ug/L	Variable[1]	**3.6**	**2.4**	<2.0	<2.0	<2.0	<2.0	ND
Iron (Fe)	ug/L	300	<50	140	<50	66	58	<50	ND
Lead (Pb)	ug/L	Variable[1]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ND
Magnesium (Mg)	ug/L	---	1170	630	2790	1100	850	1090	5860
Manganese (Mn)	ug/L	---	5	6.3	2.2	2.3	2.1	3.8	ND
Molybdenum (Mo)	ug/L	73	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
Nickel (Ni)	ug/L	Variable[1]	<2.0	2.3	<2.0	2.4	2.5	<2.0	ND
Phosphorus (P)	ug/L	---	<100	<100	<100	<100	<100	<100	ND
Potassium (K)	ug/L	---	632	380	1670	480	450	591	1740
Selenium (Se)	ug/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	ND
Silver (Ag)	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Sodium (Na)	ug/L	---	4880	2800	11800	4100	3600	4910	9980
Strontium (Sr)	ug/L	---	13.7	6.5	70.4	15	12	12.8	95.9
Thallium (Tl)	ug/L	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Tin (Sn)	ug/L	---	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
Titanium (Ti)	ug/L	---	<2.0	3.8	<2.0	3.8	3.5	<2.0	ND
Uranium (U)	ug/L	15	<0.1	<0.1	0.46	<0.1	<0.1	<0.1	0.43
Vanadium (V)	ug/L	---	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2
Zinc (Zn)	ug/L	30	14.4	<5.0	9.7	<5.0	<5.0	7.2	ND
Calculated Parameters									
Hardness (CaCO3)	mg/L	---	15	6.8	88	22	17	15	1020
Ion Balance (% Difference)	%	---	8.33	31.7	1.69	5	7.37	4.95	1.03
Anion Sum	me/L	---	0.44	0.140	2.4	0.57	0.440	0.48	2.87
Cation Sum	me/L	---	0.52	0.270	2.32	0.63	0.510	0.53	2.93
Langelier Index (@ 20C)	N/A	---	-2.320	NC	-0.09	-1.94	-2.48	-2.27	0.327
Langelier Index (@ 4C)	N/A	---	-2.5700	NC	-0.3410	-2.19	-2.74	-2.5300	0.077
Saturation pH (@ 20C)	N/A	---	9.57	NC	7.94	9.17	9.39	9.51	7.79
Saturation pH (@ 4C)	N/A	---	9.82	NC	8.19	9.42	9.65	9.77	8.04
Calculated TDS	mg/L	---	30	14.0	131	35	28.0	31	169

[1]Variable Guidelines:

		Copper	Lead	Nickel
SW1	2013/8/13	**2**	**1**	**25**
SW1	2013/11/19	**2**	**1**	**25**
SW2	2013/8/13	**2.12**	**2.7**	**86.73**
SW2	2013/11/19	**2**	**1**	**25**
SW3	2013/11/19	**2**	**1**	**25**
SW4	2013/8/13	**2**	**1**	**25**
SW5	2013/08/22	**4**	**7**	**150**

Notes:

---	No Guideline
CCME-FWAQ	Canadian Council of Ministers of the Environment - Fresw Freshwater Aquatic Quality Guideline
1.26	Exceeds guidelines
ND	not detected