Appendix F
Water Quality Data
(September 2019 / March 2020)

Sporting Mtn. Surface Water Chemistry Monitoring Results, September 2019

Parameter	Units	SP-1	SW-1	SW-2	CCME/FWAL
Anion Sum	me/L	4.68	0.530	0.540	---
Bicarb. Alk. (calc. as CaCO3)	mg/L	150	9.4	9.6	---
Calculated TDS	mg/L	260	30	31	---
Carb. Alk. (calc. as CaCO3)	mg/L	1.9	ND	ND	---
Cation Sum	me/L	4.73	0.490	0.500	---
Hardness (CaCO3)	mg/L	180	15	14	---
Ion Balance (% Difference)	%	0.530	3.92	3.85	---
Langelier Index (@ 20C)	NA	0.700	-2.76	-3.33	---
Langelier Index (@ 4C)	NA	0.450	-3.01	-3.58	---
Nitrate (N)	mg/L	ND	ND	ND	13
Saturation pH (@ 20C)	NA	7.42	9.64	9.68	---
Saturation pH (@ 4C)	NA	7.67	9.90	9.93	---
Total Alk. (Total as CaCO3)	mg/L	160	9.4	9.6	---
Dissolved Chloride (Cl)	mg/L	28	12	12	120
Colour	TCU	29	13	38	---
Nitrate + Nitrite	mg/L	ND	ND	ND	---
Nitrite (N)	mg/L	ND	ND	ND	0.06
Nitrogen (Ammonia Nitrogen)	mg/L	ND	ND	ND	---
Total Organic Carbon (C)	mg/L	16	3.4	5.9	---
Orthophosphate (P)	mg/L	ND	ND	ND	---
pH	pH	8.12	6.88	6.35	6.5 - 9.0
Reactive Silica (SiO2)	mg/L	4.4	2.5	2.3	---
Total Suspended Solids	mg/L	2.5	ND	12	---
Dissolved Sulphate (SO_4)	mg/L	37	ND	ND	---
Turbidity	NTU	6.6	0.38	3.9	---
Conductivity	µS/cm	440	51	49	---
Aluminum (Al)	mg/L	0.1	0.042	0.082	0.005 - 0.1[1]
Antimony (Sb)	mg/L	ND	ND	ND	---
Arsenic (As)	mg/L	ND	ND	ND	0.005
Barium (Ba)	mg/L	0.02	0.0052	0.015	---
Beryllium (Be)	mg/L	ND	ND	ND	---
Bismuth (Bi)	mg/L	ND	ND	ND	---
Boron (B)	mg/L	ND	ND	ND	1.5
Cadmium (Cd)	mg/L	ND	0.000016	0.000015	0.00009
Calcium (Ca)	mg/L	63	4.7	4.3	---
Chromium (Cr)	mg/L	ND	ND	ND	---
Cobalt (Co)	mg/L	ND	ND	ND	---
Copper (Cu)	mg/L	0.0049	0.00073	ND	0.002 - 0.004[2]
Iron (Fe)	mg/L	1.1	ND	0.67	0.3
Lead (Pb)	mg/L	ND	ND	ND	0.001 - 0.007[2]
Magnesium (Mg)	mg/L	5.2	0.81	0.88	---
Manganese (Mn)	mg/L	0.059	0.033	0.22	---
Molybdenum (Mo)	mg/L	ND	ND	ND	0.073
Nickel (Ni)	mg/L	ND	ND	ND	0.025 - 0.15[2]
Phosphorus (P)	mg/L	ND	ND	ND	---
Potassium (K)	mg/L	2.7	0.41	0.51	---
Selenium (Se)	mg/L	ND	ND	ND	0.001
Silver (Ag)	mg/L	ND	ND	ND	0.00025
Sodium (Na)	mg/L	24	4.2	4.0	---
Strontium (Sr)	mg/L	0.086	0.012	0.013	---
Thallium (Tl)	mg/L	ND	ND	ND	0.0008
Tin (Sn)	mg/L	ND	ND	ND	---
Titanium (Ti)	mg/L	0.003	ND	0.0021	---
Uranium (U)	mg/L	0.0045	ND	ND	0.015
Vanadium (V)	mg/L	ND	ND	ND	---
Zinc (Zn)	mg/L	ND	ND	ND	0.03

Temps:		
	SP-1	16.7°C
	SW-1	12.8°C
	SW-2	13.5°C

Notes:		
	CCME	Canadian Council of Ministers of the Environment
	FWAL	Fresh Water Aquatic Life
	---	No Guideline
	ND	Not Detected
	NA	Not Applicable
	"1"	Guideline Based on Water pH and Temperature
	"2"	Guideline Based on Water Hardness
		pH, Al, Cu, Fe, exceedance

Your P.O. #: 552
Your Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN

Attention: Leigh O'Toole

Nova Construction Pioneer Coal
PO Box 929
1535 Drummond Rd
Westville, NS
CANADA B0K 2A0

Report Date: 2019/09/30
Report #: R5901443
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9Q0812
Received: 2019/09/18, 11:25

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide (1)	3	N/A	2019/09/24	N/A	SM 23 4500-CO2 D
Alkalinity (1)	3	N/A	2019/09/25	ATL SOP 00013	EPA 310.2 R1974 m
Chloride (1)	3	N/A	2019/09/26	ATL SOP 00014	SM 23 4500-Cl- E m
Colour (1)	3	N/A	2019/09/25	ATL SOP 00020	SM 23 2120C m
Conductance - water (1)	3	N/A	2019/09/24	ATL SOP 00004	SM 23 2510B m
Hardness (calculated as CaCO3) (1)	3	N/A	2019/09/23	ATL SOP 00048	Auto Calc
Metals Water Total MS (1)	2	2019/09/20	2019/09/21	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS (1)	1	2019/09/20	2019/09/25	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference) (1)	3	N/A	2019/09/26	N/A	Auto Calc.
Anion and Cation Sum (1)	1	N/A	2019/09/24	N/A	Auto Calc.
Anion and Cation Sum (1)	2	N/A	2019/09/25	N/A	Auto Calc.
Nitrogen Ammonia - water (1)	1	N/A	2019/09/23	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen Ammonia - water (1)	2	N/A	2019/09/24	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	3	N/A	2019/09/26	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite (1)	3	N/A	2019/09/26	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	3	N/A	2019/09/26	ATL SOP 00018	ASTM D3867-16
pH (1, 2)	3	N/A	2019/09/24	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho (1)	3	N/A	2019/09/26	ATL SOP 00021	SM 23 4500-P E m
Sat. pH and Langelier Index (@ 20C) (1)	3	N/A	2019/09/26	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	3	N/A	2019/09/26	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	3	N/A	2019/09/25	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	3	N/A	2019/09/26	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc) (1)	3	N/A	2019/09/26	N/A	Auto Calc.
Organic carbon - Total (TOC) (1, 3)	1	N/A	2019/09/26	ATL SOP 00203	SM 23 5310B m
Organic carbon - Total (TOC) (1, 3)	2	N/A	2019/09/27	ATL SOP 00203	SM 23 5310B m
Total Suspended Solids	3	N/A	2019/09/19	SYD SOP 00165	SM 22 2540D m
Turbidity (1)	3	N/A	2019/09/24	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

Your P.O. #: 552
Your Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN

Attention: Leigh O'Toole

Nova Construction Pioneer Coal
PO Box 929
1535 Drummond Rd
Westville, NS
CANADA B0K 2A0

Report Date: 2019/09/30
Report #: R5901443
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9Q0812
Received: 2019/09/18, 11:25

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by BV Labs Bedford
(2) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Natalie MacAskill, Key Account Specialist
Email: Natalie.MacAskill@bvlabs.com
Phone# (902)567-1255 Ext:17
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: B9Q0812
Report Date: 2019/09/30

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

RESULTS OF ANALYSES OF WATER

BV Labs ID		KUR354			KUR359		KUR360		
Sampling Date		2019/09/15 13:00			2019/09/15 13:30		2019/09/15 14:40		
	UNITS	**SP-1 (SEP 15)**	**RDL**	**QC Batch**	**SW1 (SEP 15)**	**QC Batch**	**SW2 (SEP 15)**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	me/L	4.68	N/A	6338402	0.530	6338402	0.540	N/A	6338402
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	150	1.0	6338398	9.4	6338398	9.6	1.0	6338398
Calculated TDS	mg/L	260	1.0	6338407	30	6338407	31	1.0	6338407
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.9	1.0	6338398	ND	6338398	ND	1.0	6338398
Cation Sum	me/L	4.73	N/A	6338402	0.490	6338402	0.500	N/A	6338402
Hardness (CaCO3)	mg/L	180	1.0	6338400	15	6338400	14	1.0	6338400
Ion Balance (% Difference)	%	0.530	N/A	6338401	3.92	6338401	3.85	N/A	6338401
Langelier Index (@ 20C)	N/A	0.700		6338405	-2.76	6338405	-3.33		6338405
Langelier Index (@ 4C)	N/A	0.450		6338406	-3.01	6338406	-3.58		6338406
Nitrate (N)	mg/L	ND	0.050	6338403	ND	6338403	ND	0.050	6338403
Saturation pH (@ 20C)	N/A	7.42		6338405	9.64	6338405	9.68		6338405
Saturation pH (@ 4C)	N/A	7.67		6338406	9.90	6338406	9.93		6338406
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	160	25	6350957	9.4	6350948	9.6	5.0	6350948
Dissolved Chloride (Cl-)	mg/L	28	1.0	6350959	12	6350949	12	1.0	6350949
Colour	TCU	29	5.0	6350962	13	6350953	38	5.0	6350953
Nitrate + Nitrite (N)	mg/L	ND	0.050	6350964	ND	6350955	ND	0.050	6350955
Nitrite (N)	mg/L	ND	0.010	6350965	ND	6350956	ND	0.010	6350956
Nitrogen (Ammonia Nitrogen)	mg/L	ND	0.050	6346797	ND	6348687	ND	0.050	6348687
Total Organic Carbon (C)	mg/L	16 (1)	5.0	6354561	3.4	6351137	5.9	0.50	6356312
Orthophosphate (P)	mg/L	ND	0.010	6350963	ND	6350954	ND	0.010	6350954
pH	pH	8.12	N/A	6348626	6.88	6348626	6.35	N/A	6348626
Reactive Silica (SiO2)	mg/L	4.4	0.50	6350961	2.5	6350951	2.3	0.50	6350951
Total Suspended Solids	mg/L	2.5	2.0	6340969	ND	6340969	12	2.0	6340969
Dissolved Sulphate (SO4)	mg/L	37	2.0	6350960	ND	6350950	ND	2.0	6350950
Turbidity	NTU	6.6	0.10	6348769	0.38	6348773	3.9	0.10	6348773
Conductivity	uS/cm	440	1.0	6348627	51	6348627	49	1.0	6348627

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected
(1) Elevated reporting limit due to sample matrix.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: B9Q0812
Report Date: 2019/09/30

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		KUR354	KUR359	KUR360		
Sampling Date		2019/09/15 13:00	2019/09/15 13:30	2019/09/15 14:40		
	UNITS	**SP-1 (SEP 15)**	**SW1 (SEP 15)**	**SW2 (SEP 15)**	**RDL**	**QC Batch**
Metals						
Total Aluminum (Al)	ug/L	100	42	82	5.0	6343571
Total Antimony (Sb)	ug/L	ND	ND	ND	1.0	6343571
Total Arsenic (As)	ug/L	ND	ND	ND	1.0	6343571
Total Barium (Ba)	ug/L	20	5.2	15	1.0	6343571
Total Beryllium (Be)	ug/L	ND	ND	ND	1.0	6343571
Total Bismuth (Bi)	ug/L	ND	ND	ND	2.0	6343571
Total Boron (B)	ug/L	ND	ND	ND	50	6343571
Total Cadmium (Cd)	ug/L	ND	0.016	0.015	0.010	6343571
Total Calcium (Ca)	ug/L	63000	4700	4300	100	6343571
Total Chromium (Cr)	ug/L	ND	ND	ND	1.0	6343571
Total Cobalt (Co)	ug/L	ND	ND	ND	0.40	6343571
Total Copper (Cu)	ug/L	4.9	0.73	ND	0.50	6343571
Total Iron (Fe)	ug/L	1100	ND	670	50	6343571
Total Lead (Pb)	ug/L	ND	ND	ND	0.50	6343571
Total Magnesium (Mg)	ug/L	5200	810	880	100	6343571
Total Manganese (Mn)	ug/L	59	33	220	2.0	6343571
Total Molybdenum (Mo)	ug/L	ND	ND	ND	2.0	6343571
Total Nickel (Ni)	ug/L	ND	ND	ND	2.0	6343571
Total Phosphorus (P)	ug/L	ND	ND	ND	100	6343571
Total Potassium (K)	ug/L	2700	410	510	100	6343571
Total Selenium (Se)	ug/L	ND	ND	ND	0.50	6343571
Total Silver (Ag)	ug/L	ND	ND	ND	0.10	6343571
Total Sodium (Na)	ug/L	24000	4200	4000	100	6343571
Total Strontium (Sr)	ug/L	86	12	13	2.0	6343571
Total Thallium (Tl)	ug/L	ND	ND	ND	0.10	6343571
Total Tin (Sn)	ug/L	ND	ND	ND	2.0	6343571
Total Titanium (Ti)	ug/L	3.0	ND	2.1	2.0	6343571
Total Uranium (U)	ug/L	4.5	ND	ND	0.10	6343571
Total Vanadium (V)	ug/L	ND	ND	ND	2.0	6343571
Total Zinc (Zn)	ug/L	ND	ND	ND	5.0	6343571

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

GENERAL COMMENTS

Results relate only to the items tested.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: B9Q0812
Report Date: 2019/09/30

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6340969	TML	Spiked Blank	Total Suspended Solids	2019/09/19		99	%	75 - 125
6340969	TML	Method Blank	Total Suspended Solids	2019/09/19	ND, RDL=2.0		mg/L	
6340969	TML	RPD [KUR354-05]	Total Suspended Solids	2019/09/19	22		%	25
6343571	MLB	Matrix Spike	Total Aluminum (Al)	2019/09/25		102	%	80 - 120
			Total Antimony (Sb)	2019/09/25		102	%	80 - 120
			Total Arsenic (As)	2019/09/25		97	%	80 - 120
			Total Barium (Ba)	2019/09/25		98	%	80 - 120
			Total Beryllium (Be)	2019/09/25		101	%	80 - 120
			Total Bismuth (Bi)	2019/09/25		100	%	80 - 120
			Total Boron (B)	2019/09/25		103	%	80 - 120
			Total Cadmium (Cd)	2019/09/25		98	%	80 - 120
			Total Calcium (Ca)	2019/09/25		103	%	80 - 120
			Total Chromium (Cr)	2019/09/25		96	%	80 - 120
			Total Cobalt (Co)	2019/09/25		98	%	80 - 120
			Total Copper (Cu)	2019/09/25		99	%	80 - 120
			Total Iron (Fe)	2019/09/25		102	%	80 - 120
			Total Lead (Pb)	2019/09/25		99	%	80 - 120
			Total Magnesium (Mg)	2019/09/25		NC	%	80 - 120
			Total Manganese (Mn)	2019/09/25		97	%	80 - 120
			Total Molybdenum (Mo)	2019/09/25		104	%	80 - 120
			Total Nickel (Ni)	2019/09/25		100	%	80 - 120
			Total Phosphorus (P)	2019/09/25		103	%	80 - 120
			Total Potassium (K)	2019/09/25		102	%	80 - 120
			Total Selenium (Se)	2019/09/25		99	%	80 - 120
			Total Silver (Ag)	2019/09/25		101	%	80 - 120
			Total Sodium (Na)	2019/09/25		98	%	80 - 120
			Total Strontium (Sr)	2019/09/25		99	%	80 - 120
			Total Thallium (Tl)	2019/09/25		102	%	80 - 120
			Total Tin (Sn)	2019/09/25		104	%	80 - 120
			Total Titanium (Ti)	2019/09/25		100	%	80 - 120
			Total Uranium (U)	2019/09/25		106	%	80 - 120
			Total Vanadium (V)	2019/09/25		102	%	80 - 120
			Total Zinc (Zn)	2019/09/25		99	%	80 - 120
6343571	MLB	Spiked Blank	Total Aluminum (Al)	2019/09/21		100	%	80 - 120
			Total Antimony (Sb)	2019/09/21		101	%	80 - 120
			Total Arsenic (As)	2019/09/21		95	%	80 - 120
			Total Barium (Ba)	2019/09/21		98	%	80 - 120
			Total Beryllium (Be)	2019/09/21		101	%	80 - 120
			Total Bismuth (Bi)	2019/09/21		99	%	80 - 120
			Total Boron (B)	2019/09/21		104	%	80 - 120
			Total Cadmium (Cd)	2019/09/21		98	%	80 - 120
			Total Calcium (Ca)	2019/09/21		104	%	80 - 120
			Total Chromium (Cr)	2019/09/21		97	%	80 - 120
			Total Cobalt (Co)	2019/09/21		98	%	80 - 120
			Total Copper (Cu)	2019/09/21		98	%	80 - 120
			Total Iron (Fe)	2019/09/21		103	%	80 - 120
			Total Lead (Pb)	2019/09/21		99	%	80 - 120
			Total Magnesium (Mg)	2019/09/21		105	%	80 - 120
			Total Manganese (Mn)	2019/09/21		99	%	80 - 120
			Total Molybdenum (Mo)	2019/09/21		103	%	80 - 120
			Total Nickel (Ni)	2019/09/21		101	%	80 - 120
			Total Phosphorus (P)	2019/09/21		103	%	80 - 120

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Potassium (K)	2019/09/21		106	%	80 - 120
			Total Selenium (Se)	2019/09/21		96	%	80 - 120
			Total Silver (Ag)	2019/09/21		98	%	80 - 120
			Total Sodium (Na)	2019/09/21		100	%	80 - 120
			Total Strontium (Sr)	2019/09/21		101	%	80 - 120
			Total Thallium (Tl)	2019/09/21		102	%	80 - 120
			Total Tin (Sn)	2019/09/21		102	%	80 - 120
			Total Titanium (Ti)	2019/09/21		101	%	80 - 120
			Total Uranium (U)	2019/09/21		106	%	80 - 120
			Total Vanadium (V)	2019/09/21		101	%	80 - 120
			Total Zinc (Zn)	2019/09/21		100	%	80 - 120
6343571	MLB	Method Blank	Total Aluminum (Al)	2019/09/23	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2019/09/23	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2019/09/23	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2019/09/23	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2019/09/23	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Boron (B)	2019/09/23	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2019/09/23	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2019/09/23	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2019/09/23	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2019/09/23	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2019/09/23	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2019/09/23	ND, RDL=50		ug/L	
			Total Lead (Pb)	2019/09/23	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2019/09/23	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Phosphorus (P)	2019/09/23	ND, RDL=100		ug/L	
			Total Potassium (K)	2019/09/23	ND, RDL=100		ug/L	
			Total Selenium (Se)	2019/09/23	ND, RDL=0.50		ug/L	

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Silver (Ag)	2019/09/23	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2019/09/23	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2019/09/23	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2019/09/23	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2019/09/23	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2019/09/23	ND, RDL=5.0		ug/L	
6343571	MLB	RPD	Total Aluminum (Al)	2019/09/24	4.6		%	20
			Total Antimony (Sb)	2019/09/24	NC		%	20
			Total Arsenic (As)	2019/09/24	NC		%	20
			Total Barium (Ba)	2019/09/24	1.8		%	20
			Total Beryllium (Be)	2019/09/24	NC		%	20
			Total Bismuth (Bi)	2019/09/24	NC		%	20
			Total Boron (B)	2019/09/24	NC		%	20
			Total Cadmium (Cd)	2019/09/24	NC		%	20
			Total Calcium (Ca)	2019/09/24	0.24		%	20
			Total Chromium (Cr)	2019/09/24	9.7		%	20
			Total Cobalt (Co)	2019/09/24	14		%	20
			Total Copper (Cu)	2019/09/24	NC		%	20
			Total Iron (Fe)	2019/09/24	NC		%	20
			Total Lead (Pb)	2019/09/24	NC		%	20
			Total Magnesium (Mg)	2019/09/24	0.28		%	20
			Total Manganese (Mn)	2019/09/24	0.79		%	20
			Total Molybdenum (Mo)	2019/09/24	NC		%	20
			Total Nickel (Ni)	2019/09/24	NC		%	20
			Total Phosphorus (P)	2019/09/24	NC		%	20
			Total Potassium (K)	2019/09/24	0.80		%	20
			Total Selenium (Se)	2019/09/24	NC		%	20
			Total Silver (Ag)	2019/09/24	NC		%	20
			Total Sodium (Na)	2019/09/24	0.29		%	20
			Total Strontium (Sr)	2019/09/24	2.7		%	20
			Total Thallium (Tl)	2019/09/24	NC		%	20
			Total Tin (Sn)	2019/09/24	NC		%	20
			Total Titanium (Ti)	2019/09/24	NC		%	20
			Total Uranium (U)	2019/09/24	2.1		%	20
			Total Vanadium (V)	2019/09/24	NC		%	20
			Total Zinc (Zn)	2019/09/24	6.6		%	20
6346797	MCN	Matrix Spike [KUR354-03]	Nitrogen (Ammonia Nitrogen)	2019/09/23		93	%	80 - 120
6346797	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/09/23		95	%	80 - 120
6346797	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/09/23	ND, RDL=0.050		mg/L	
6346797	MCN	RPD [KUR354-03]	Nitrogen (Ammonia Nitrogen)	2019/09/23	NC		%	20

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6348626	JMV	QC Standard	pH	2019/09/24		101	%	97 - 103
6348626	JMV	RPD	pH	2019/09/24	0.84		%	N/A
6348627	JMV	Spiked Blank	Conductivity	2019/09/24		103	%	80 - 120
6348627	JMV	Method Blank	Conductivity	2019/09/24	1.1, RDL=1.0		uS/cm	
6348627	JMV	RPD	Conductivity	2019/09/24	0		%	10
6348687	MCN	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/09/24		NC	%	80 - 120
6348687	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/09/24		100	%	80 - 120
6348687	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/09/24	ND, RDL=0.050		mg/L	
6348687	MCN	RPD	Nitrogen (Ammonia Nitrogen)	2019/09/24	1.6		%	20
6348769	JMV	QC Standard	Turbidity	2019/09/24		102	%	80 - 120
6348769	JMV	Spiked Blank	Turbidity	2019/09/24		98	%	80 - 120
6348769	JMV	Method Blank	Turbidity	2019/09/24	ND, RDL=0.10		NTU	
6348769	JMV	RPD	Turbidity	2019/09/24	0.15		%	20
6348773	JMV	QC Standard	Turbidity	2019/09/24		100	%	80 - 120
6348773	JMV	Spiked Blank	Turbidity	2019/09/24		97	%	80 - 120
6348773	JMV	Method Blank	Turbidity	2019/09/24	ND, RDL=0.10		NTU	
6348773	JMV	RPD	Turbidity	2019/09/24	1.9		%	20
6350948	MCN	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/09/25		NC	%	80 - 120
6350948	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/09/25		107	%	80 - 120
6350948	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2019/09/25	ND, RDL=5.0		mg/L	
6350948	MCN	RPD	Total Alkalinity (Total as CaCO3)	2019/09/25	0.19		%	25
6350949	MCN	Matrix Spike	Dissolved Chloride (Cl-)	2019/09/26		93	%	80 - 120
6350949	MCN	Spiked Blank	Dissolved Chloride (Cl-)	2019/09/26		100	%	80 - 120
6350949	MCN	Method Blank	Dissolved Chloride (Cl-)	2019/09/26	ND, RDL=1.0		mg/L	
6350949	MCN	RPD	Dissolved Chloride (Cl-)	2019/09/26	1.0		%	25
6350950	MCN	Matrix Spike	Dissolved Sulphate (SO4)	2019/09/26		106	%	80 - 120
6350950	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2019/09/26		106	%	80 - 120
6350950	MCN	Method Blank	Dissolved Sulphate (SO4)	2019/09/26	ND, RDL=2.0		mg/L	
6350950	MCN	RPD	Dissolved Sulphate (SO4)	2019/09/26	0.74		%	25
6350951	MCN	Matrix Spike	Reactive Silica (SiO2)	2019/09/25		NC	%	80 - 120
6350951	MCN	Spiked Blank	Reactive Silica (SiO2)	2019/09/25		103	%	80 - 120
6350951	MCN	Method Blank	Reactive Silica (SiO2)	2019/09/25	ND, RDL=0.50		mg/L	
6350951	MCN	RPD	Reactive Silica (SiO2)	2019/09/25	0.99		%	25
6350953	MCN	Spiked Blank	Colour	2019/09/25		109	%	80 - 120
6350953	MCN	Method Blank	Colour	2019/09/25	ND, RDL=5.0		TCU	
6350953	MCN	RPD	Colour	2019/09/25	NC		%	20
6350954	MCN	Matrix Spike	Orthophosphate (P)	2019/09/26		94	%	80 - 120
6350954	MCN	Spiked Blank	Orthophosphate (P)	2019/09/26		91	%	80 - 120
6350954	MCN	Method Blank	Orthophosphate (P)	2019/09/26	ND, RDL=0.010		mg/L	
6350954	MCN	RPD	Orthophosphate (P)	2019/09/26	NC		%	25
6350955	MCN	Matrix Spike	Nitrate + Nitrite (N)	2019/09/26		96	%	80 - 120
6350955	MCN	Spiked Blank	Nitrate + Nitrite (N)	2019/09/26		99	%	80 - 120

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6350955	MCN	Method Blank	Nitrate + Nitrite (N)	2019/09/26	ND, RDL=0.050		mg/L	
6350955	MCN	RPD	Nitrate + Nitrite (N)	2019/09/26	NC		%	25
6350956	MCN	Matrix Spike	Nitrite (N)	2019/09/26		102	%	80 - 120
6350956	MCN	Spiked Blank	Nitrite (N)	2019/09/26		101	%	80 - 120
6350956	MCN	Method Blank	Nitrite (N)	2019/09/26	ND, RDL=0.010		mg/L	
6350956	MCN	RPD	Nitrite (N)	2019/09/26	NC		%	20
6350957	MCN	Matrix Spike [KUR354-01]	Total Alkalinity (Total as CaCO3)	2019/09/25		NC	%	80 - 120
6350957	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/09/25		111	%	80 - 120
6350957	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2019/09/25	ND, RDL=5.0		mg/L	
6350957	MCN	RPD [KUR354-01]	Total Alkalinity (Total as CaCO3)	2019/09/25	2.6		%	25
6350959	MCN	Matrix Spike [KUR354-01]	Dissolved Chloride (Cl-)	2019/09/26		89	%	80 - 120
6350959	MCN	Spiked Blank	Dissolved Chloride (Cl-)	2019/09/26		100	%	80 - 120
6350959	MCN	Method Blank	Dissolved Chloride (Cl-)	2019/09/26	ND, RDL=1.0		mg/L	
6350959	MCN	RPD [KUR354-01]	Dissolved Chloride (Cl-)	2019/09/26	0.80		%	25
6350960	MCN	Matrix Spike [KUR354-01]	Dissolved Sulphate (SO4)	2019/09/26		101	%	80 - 120
6350960	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2019/09/26		106	%	80 - 120
6350960	MCN	Method Blank	Dissolved Sulphate (SO4)	2019/09/26	ND, RDL=2.0		mg/L	
6350960	MCN	RPD [KUR354-01]	Dissolved Sulphate (SO4)	2019/09/26	1.2		%	25
6350961	MCN	Matrix Spike [KUR354-01]	Reactive Silica (SiO2)	2019/09/25		102	%	80 - 120
6350961	MCN	Spiked Blank	Reactive Silica (SiO2)	2019/09/25		105	%	80 - 120
6350961	MCN	Method Blank	Reactive Silica (SiO2)	2019/09/25	ND, RDL=0.50		mg/L	
6350961	MCN	RPD [KUR354-01]	Reactive Silica (SiO2)	2019/09/25	1.1		%	25
6350962	MCN	Spiked Blank	Colour	2019/09/25		103	%	80 - 120
6350962	MCN	Method Blank	Colour	2019/09/25	ND, RDL=5.0		TCU	
6350962	MCN	RPD [KUR354-01]	Colour	2019/09/25	2.9		%	20
6350963	MCN	Matrix Spike [KUR354-01]	Orthophosphate (P)	2019/09/26		92	%	80 - 120
6350963	MCN	Spiked Blank	Orthophosphate (P)	2019/09/26		96	%	80 - 120
6350963	MCN	Method Blank	Orthophosphate (P)	2019/09/26	ND, RDL=0.010		mg/L	
6350963	MCN	RPD [KUR354-01]	Orthophosphate (P)	2019/09/26	NC		%	25
6350964	MCN	Matrix Spike [KUR354-01]	Nitrate + Nitrite (N)	2019/09/26		93	%	80 - 120
6350964	MCN	Spiked Blank	Nitrate + Nitrite (N)	2019/09/26		100	%	80 - 120
6350964	MCN	Method Blank	Nitrate + Nitrite (N)	2019/09/26	ND, RDL=0.050		mg/L	
6350964	MCN	RPD [KUR354-01]	Nitrate + Nitrite (N)	2019/09/26	NC		%	25
6350965	MCN	Matrix Spike [KUR354-01]	Nitrite (N)	2019/09/26		99	%	80 - 120
6350965	MCN	Spiked Blank	Nitrite (N)	2019/09/26		103	%	80 - 120
6350965	MCN	Method Blank	Nitrite (N)	2019/09/26	ND, RDL=0.010		mg/L	
6350965	MCN	RPD [KUR354-01]	Nitrite (N)	2019/09/26	NC		%	20
6351137	SSI	Matrix Spike	Total Organic Carbon (C)	2019/09/26		98	%	85 - 115
6351137	SSI	Spiked Blank	Total Organic Carbon (C)	2019/09/25		102	%	80 - 120
6351137	SSI	Method Blank	Total Organic Carbon (C)	2019/09/25	ND, RDL=0.50		mg/L	
6351137	SSI	RPD	Total Organic Carbon (C)	2019/09/26	4.3		%	15
6354561	SSI	Matrix Spike	Total Organic Carbon (C)	2019/09/27		95	%	85 - 115

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: B9Q0812
Report Date: 2019/09/30

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6354561	SSI	Spiked Blank	Total Organic Carbon (C)	2019/09/27		104	%	80 - 120
6354561	SSI	Method Blank	Total Organic Carbon (C)	2019/09/27	ND, RDL=0.50		mg/L	
6354561	SSI	RPD	Total Organic Carbon (C)	2019/09/27	5.0		%	15
6356312	SSI	Matrix Spike	Total Organic Carbon (C)	2019/09/27		97	%	85 - 115
6356312	SSI	Spiked Blank	Total Organic Carbon (C)	2019/09/27		104	%	80 - 120
6356312	SSI	Method Blank	Total Organic Carbon (C)	2019/09/27	ND, RDL=0.50		mg/L	
6356312	SSI	RPD	Total Organic Carbon (C)	2019/09/27	NC (1)		%	15

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Elevated reporting limit due to turbidity.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: B9Q0812
Report Date: 2019/09/30

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

VALIDATION SIGNATURE PAGE

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

Eric Dearman, Scientific Specialist

Michelle Mombourquette, Laboratory Manager

Mike MacGillivray, Scientific Specialist (Inorganics)

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

Sporting Mtn. Surface Water Chemistry Monitoring Results, March 2020

Parameter	Units	SW-1	SW-2	CCME/FWAL
Anion Sum	me/L	0.170	0.190	---
Bicarb. Alk. (calc. as CaCO3)	mg/L	ND	ND	---
Calculated TDS	mg/L	15	16	---
Carb. Alk. (calc. as CaCO3)	mg/L	ND	ND	---
Cation Sum	me/L	0.270	0.280	---
Hardness (CaCO3)	mg/L	6.7	5.7	---
Ion Balance (% Difference)	%	22.7	19.2	---
Langelier Index (@ 20C)	NA	NC	NC	---
Langelier Index (@ 4C)	NA	NC	NC	---
Nitrate (N)	mg/L	ND	ND	13
Saturation pH (@ 20C)	NA	NC	NC	---
Saturation pH (@ 4C)	NA	NC	NC	---
Total Alk. (Total as CaCO3)	mg/L	ND	ND	---
Dissolved Chloride (Cl)	mg/L	4.2	5.0	120
Colour	TCU	24	49	---
Nitrate + Nitrite	mg/L	ND	ND	---
Nitrite (N)	mg/L	ND	ND	0.06
Nitrogen (Ammonia Nitrogen)	mg/L	0.060	0.061	---
Total Organic Carbon (C)	mg/L	5.1	6.9	---
Orthophosphate (P)	mg/L	ND	ND	---
pH	pH	6.43	6.25	6.5 - 9.0
Reactive Silica (SiO2)	mg/L	2.1	2.2	---
Total Suspended Solids	mg/L	ND	ND	---
Dissolved Sulphate (SO_4)	mg/L	2.7	2.5	---
Turbidity	NTU	0.12	0.24	---
Conductivity	µS/cm	31	32	---
Mercury	mg/L	ND	ND	
Aluminum (Al)	mg/L	0.07	0.26	0.005 - 0.1[1]
Antimony (Sb)	mg/L	ND	ND	---
Arsenic (As)	mg/L	ND	ND	0.005
Barium (Ba)	mg/L	0.0017	0.0034	---
Beryllium (Be)	mg/L	ND	ND	---
Bismuth (Bi)	mg/L	ND	ND	---
Boron (B)	mg/L	ND	ND	1.5
Cadmium (Cd)	mg/L	0.000012	0.000016	0.00009
Calcium (Ca)	mg/L	2.1	1.5	---
Chromium (Cr)	mg/L	ND	ND	---
Cobalt (Co)	mg/L	ND	ND	---
Copper (Cu)	mg/L	0.00068	ND	0.002 - 0.004[2]
Iron (Fe)	mg/L	ND	0.25	0.3
Lead (Pb)	mg/L	0.0051	ND	0.001 - 0.007[2]
Magnesium (Mg)	mg/L	0.38	0.46	---
Manganese (Mn)	mg/L	0.0042	0.019	---
Molybdenum (Mo)	mg/L	ND	ND	0.073
Nickel (Ni)	mg/L	ND	ND	0.025 - 0.15[2]
Phosphorus (P)	mg/L	ND	ND	---
Potassium (K)	mg/L	0.26	0.23	---
Selenium (Se)	mg/L	ND	ND	0.001
Silver (Ag)	mg/L	ND	ND	0.00025
Sodium (Na)	mg/L	2.9	3.4	---
Strontium (Sr)	mg/L	0.0063	0.0049	---
Thallium (Tl)	mg/L	ND	ND	0.0008
Tin (Sn)	mg/L	ND	ND	---
Titanium (Ti)	mg/L	ND	0.002	---
Uranium (U)	mg/L	ND	ND	0.015
Vanadium (V)	mg/L	ND	ND	---
Zinc (Zn)	mg/L	ND	ND	0.03

Temps: SW-1 0.9°C
SW-2 1.2°C

Notes:

CCME	Canadian Council of Ministers of the Environment
FWAL	Fresh Water Aquatic Life
---	No Guideline
ND	Not Detected
NA	Not Applicable
NC	Not Calculable
"1"	Guideline Based on Water pH and Temperature
"2"	Guideline Based on Water Hardness
	SP-1 not sampled due to ice/snow cover
	pH, Al, Pb, exceedance

Your P.O. #: 552
Your Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN

Attention: Leigh O'Toole

Nova Construction Pioneer Coal
PO Box 929
1535 Drummond Rd
Westville, NS
CANADA B0K 2A0

Report Date: 2020/04/02
Report #: R6132865
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C079109
Received: 2020/03/26, 11:00

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Carbonate, Bicarbonate and Hydroxide (1)	2	N/A	2020/03/31	N/A	SM 23 4500-CO2 D
Alkalinity (1)	2	N/A	2020/04/01	ATL SOP 00013	EPA 310.2 R1974 m
Chloride (1)	2	N/A	2020/04/02	ATL SOP 00014	SM 23 4500-Cl- E m
Colour (1)	2	N/A	2020/04/01	ATL SOP 00020	SM 23 2120C m
Conductance - water (1)	2	N/A	2020/03/31	ATL SOP 00004	SM 23 2510B m
Hardness (calculated as CaCO3) (1)	2	N/A	2020/04/01	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL) (1)	2	2020/04/01	2020/04/02	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS (1)	2	2020/03/31	2020/03/31	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference) (1)	2	N/A	2020/04/02	N/A	Auto Calc.
Anion and Cation Sum (1)	2	N/A	2020/04/02	N/A	Auto Calc.
Nitrogen Ammonia - water (1)	2	N/A	2020/04/01	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	2	N/A	2020/04/01	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite (1)	2	N/A	2020/04/01	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	2	N/A	2020/04/02	ATL SOP 00018	ASTM D3867-16
pH (1, 2)	2	N/A	2020/03/31	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho (1)	2	N/A	2020/04/01	ATL SOP 00021	SM 23 4500-P E m
Sat. pH and Langelier Index (@ 20C) (1)	2	N/A	2020/04/01	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	2	N/A	2020/04/01	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	2	N/A	2020/04/01	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	2	N/A	2020/04/01	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc) (1)	2	N/A	2020/04/02	N/A	Auto Calc.
Organic carbon - Total (TOC) (1, 3)	2	N/A	2020/03/31	ATL SOP 00203	SM 23 5310B m
Total Suspended Solids	2	N/A	2020/03/30	SYD SOP 00165	SM 22 2540D m
Turbidity (1)	2	N/A	2020/03/31	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless

Your P.O. #: 552
Your Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN

Attention: Leigh O'Toole

Nova Construction Pioneer Coal
PO Box 929
1535 Drummond Rd
Westville, NS
CANADA B0K 2A0

Report Date: 2020/04/02
Report #: R6132865
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C079109
Received: 2020/03/26, 11:00

indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by BV Labs Bedford
(2) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Natalie MacAskill, Key Account Specialist
Email: Natalie.MacAskill@bvlabs.com
Phone# (902)567-1255 Ext:17
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: C079109
Report Date: 2020/04/02

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

RESULTS OF ANALYSES OF WATER

BV Labs ID		MIF284	MIF300		
Sampling Date		2020/03/23 14:00	2020/03/23 14:30		
	UNITS	**SW1(MAR23)**	**SW2(MAR23)**	**RDL**	**QC Batch**
Calculated Parameters					
Anion Sum	me/L	0.170	0.190	N/A	6655090
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	ND	ND	1.0	6655084
Calculated TDS	mg/L	15	16	1.0	6655101
Carb. Alkalinity (calc. as CaCO3)	mg/L	ND	ND	1.0	6655084
Cation Sum	me/L	0.270	0.280	N/A	6655090
Hardness (CaCO3)	mg/L	6.7	5.7	1.0	6655086
Ion Balance (% Difference)	%	22.7	19.2	N/A	6655088
Langelier Index (@ 20C)	N/A	NC	NC		6655096
Langelier Index (@ 4C)	N/A	NC	NC		6655098
Nitrate (N)	mg/L	ND	ND	0.050	6655092
Saturation pH (@ 20C)	N/A	NC	NC		6655096
Saturation pH (@ 4C)	N/A	NC	NC		6655098
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	ND	ND	5.0	6662021
Dissolved Chloride (Cl-)	mg/L	4.2	5.0	1.0	6662023
Colour	TCU	24	49	5.0	6662033
Nitrate + Nitrite (N)	mg/L	ND	ND	0.050	6662039
Nitrite (N)	mg/L	ND	ND	0.010	6662041
Nitrogen (Ammonia Nitrogen)	mg/L	0.060	0.061	0.050	6662122
Total Organic Carbon (C)	mg/L	5.1	6.9	0.50	6661562
Orthophosphate (P)	mg/L	ND	ND	0.010	6662035
pH	pH	6.43	6.25	N/A	6661362
Reactive Silica (SiO2)	mg/L	2.1	2.2	0.50	6662028
Total Suspended Solids	mg/L	ND	ND	2.0	6660468
Dissolved Sulphate (SO4)	mg/L	2.7	2.5	2.0	6662026
Turbidity	NTU	0.12	0.24	0.10	6661459
Conductivity	uS/cm	31	32	1.0	6661363

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: C079109
Report Date: 2020/04/02

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

MERCURY BY COLD VAPOUR AA (WATER)

BV Labs ID		MIF284	MIF300		
Sampling Date		2020/03/23 14:00	2020/03/23 14:30		
	UNITS	**SW1(MAR23)**	**SW2(MAR23)**	**RDL**	**QC Batch**
Metals					
Total Mercury (Hg)	ug/L	ND	ND	0.013	6663701

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: C079109
Report Date: 2020/04/02

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

ELEMENTS BY ICP/MS (WATER)

BV Labs ID		MIF284	MIF300		
Sampling Date		2020/03/23 14:00	2020/03/23 14:30		
	UNITS	**SW1(MAR23)**	**SW2(MAR23)**	**RDL**	**QC Batch**
Metals					
Total Aluminum (Al)	ug/L	70	260	5.0	6661368
Total Antimony (Sb)	ug/L	ND	ND	1.0	6661368
Total Arsenic (As)	ug/L	ND	ND	1.0	6661368
Total Barium (Ba)	ug/L	1.7	3.4	1.0	6661368
Total Beryllium (Be)	ug/L	ND	ND	1.0	6661368
Total Bismuth (Bi)	ug/L	ND	ND	2.0	6661368
Total Boron (B)	ug/L	ND	ND	50	6661368
Total Cadmium (Cd)	ug/L	0.012	0.016	0.010	6661368
Total Calcium (Ca)	ug/L	2100	1500	100	6661368
Total Chromium (Cr)	ug/L	ND	ND	1.0	6661368
Total Cobalt (Co)	ug/L	ND	ND	0.40	6661368
Total Copper (Cu)	ug/L	0.68	ND	0.50	6661368
Total Iron (Fe)	ug/L	ND	250	50	6661368
Total Lead (Pb)	ug/L	5.1	ND	0.50	6661368
Total Magnesium (Mg)	ug/L	380	460	100	6661368
Total Manganese (Mn)	ug/L	4.2	19	2.0	6661368
Total Molybdenum (Mo)	ug/L	ND	ND	2.0	6661368
Total Nickel (Ni)	ug/L	ND	ND	2.0	6661368
Total Phosphorus (P)	ug/L	ND	ND	100	6661368
Total Potassium (K)	ug/L	260	230	100	6661368
Total Selenium (Se)	ug/L	ND	ND	0.50	6661368
Total Silver (Ag)	ug/L	ND	ND	0.10	6661368
Total Sodium (Na)	ug/L	2900	3400	100	6661368
Total Strontium (Sr)	ug/L	6.3	4.9	2.0	6661368
Total Thallium (Tl)	ug/L	ND	ND	0.10	6661368
Total Tin (Sn)	ug/L	ND	ND	2.0	6661368
Total Titanium (Ti)	ug/L	ND	2.0	2.0	6661368
Total Uranium (U)	ug/L	ND	ND	0.10	6661368
Total Vanadium (V)	ug/L	ND	ND	2.0	6661368
Total Zinc (Zn)	ug/L	ND	ND	5.0	6661368

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

GENERAL COMMENTS

Sample MIF284 [SW1(MAR23)] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample MIF300 [SW2(MAR23)] : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Results relate only to the items tested.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: C079109
Report Date: 2020/04/02

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6660468	TML	Spiked Blank	Total Suspended Solids	2020/03/30		95	%	75 - 125
6660468	TML	Method Blank	Total Suspended Solids	2020/03/30	ND, RDL=2.0		mg/L	
6660468	TML	RPD	Total Suspended Solids	2020/03/30	24		%	25
6661362	SHW	QC Standard	pH	2020/03/31		101	%	97 - 103
6661362	SHW	RPD	pH	2020/03/31	0.52		%	N/A
6661363	SHW	Spiked Blank	Conductivity	2020/03/31		101	%	80 - 120
6661363	SHW	Method Blank	Conductivity	2020/03/31	1.1, RDL=1.0		uS/cm	
6661363	SHW	RPD	Conductivity	2020/03/31	0.89		%	10
6661368	BAN	Matrix Spike	Total Aluminum (Al)	2020/03/31		93	%	80 - 120
			Total Antimony (Sb)	2020/03/31		102	%	80 - 120
			Total Arsenic (As)	2020/03/31		95	%	80 - 120
			Total Barium (Ba)	2020/03/31		93	%	80 - 120
			Total Beryllium (Be)	2020/03/31		95	%	80 - 120
			Total Bismuth (Bi)	2020/03/31		96	%	80 - 120
			Total Boron (B)	2020/03/31		94	%	80 - 120
			Total Cadmium (Cd)	2020/03/31		96	%	80 - 120
			Total Calcium (Ca)	2020/03/31		95	%	80 - 120
			Total Chromium (Cr)	2020/03/31		93	%	80 - 120
			Total Cobalt (Co)	2020/03/31		96	%	80 - 120
			Total Copper (Cu)	2020/03/31		94	%	80 - 120
			Total Iron (Fe)	2020/03/31		101	%	80 - 120
			Total Lead (Pb)	2020/03/31		97	%	80 - 120
			Total Magnesium (Mg)	2020/03/31		98	%	80 - 120
			Total Manganese (Mn)	2020/03/31		95	%	80 - 120
			Total Molybdenum (Mo)	2020/03/31		99	%	80 - 120
			Total Nickel (Ni)	2020/03/31		95	%	80 - 120
			Total Phosphorus (P)	2020/03/31		98	%	80 - 120
			Total Potassium (K)	2020/03/31		98	%	80 - 120
			Total Selenium (Se)	2020/03/31		95	%	80 - 120
			Total Silver (Ag)	2020/03/31		96	%	80 - 120
			Total Sodium (Na)	2020/03/31		NC	%	80 - 120
			Total Strontium (Sr)	2020/03/31		98	%	80 - 120
			Total Thallium (Tl)	2020/03/31		97	%	80 - 120
			Total Tin (Sn)	2020/03/31		101	%	80 - 120
			Total Titanium (Ti)	2020/03/31		95	%	80 - 120
			Total Uranium (U)	2020/03/31		104	%	80 - 120
			Total Vanadium (V)	2020/03/31		94	%	80 - 120
			Total Zinc (Zn)	2020/03/31		91	%	80 - 120
6661368	BAN	Spiked Blank	Total Aluminum (Al)	2020/03/31		95	%	80 - 120
			Total Antimony (Sb)	2020/03/31		102	%	80 - 120
			Total Arsenic (As)	2020/03/31		94	%	80 - 120
			Total Barium (Ba)	2020/03/31		93	%	80 - 120
			Total Beryllium (Be)	2020/03/31		95	%	80 - 120
			Total Bismuth (Bi)	2020/03/31		99	%	80 - 120
			Total Boron (B)	2020/03/31		97	%	80 - 120
			Total Cadmium (Cd)	2020/03/31		97	%	80 - 120
			Total Calcium (Ca)	2020/03/31		98	%	80 - 120
			Total Chromium (Cr)	2020/03/31		94	%	80 - 120
			Total Cobalt (Co)	2020/03/31		97	%	80 - 120
			Total Copper (Cu)	2020/03/31		94	%	80 - 120
			Total Iron (Fe)	2020/03/31		100	%	80 - 120

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Lead (Pb)	2020/03/31		99	%	80 - 120
			Total Magnesium (Mg)	2020/03/31		99	%	80 - 120
			Total Manganese (Mn)	2020/03/31		96	%	80 - 120
			Total Molybdenum (Mo)	2020/03/31		98	%	80 - 120
			Total Nickel (Ni)	2020/03/31		96	%	80 - 120
			Total Phosphorus (P)	2020/03/31		99	%	80 - 120
			Total Potassium (K)	2020/03/31		97	%	80 - 120
			Total Selenium (Se)	2020/03/31		97	%	80 - 120
			Total Silver (Ag)	2020/03/31		96	%	80 - 120
			Total Sodium (Na)	2020/03/31		93	%	80 - 120
			Total Strontium (Sr)	2020/03/31		99	%	80 - 120
			Total Thallium (Tl)	2020/03/31		98	%	80 - 120
			Total Tin (Sn)	2020/03/31		102	%	80 - 120
			Total Titanium (Ti)	2020/03/31		96	%	80 - 120
			Total Uranium (U)	2020/03/31		104	%	80 - 120
			Total Vanadium (V)	2020/03/31		94	%	80 - 120
			Total Zinc (Zn)	2020/03/31		95	%	80 - 120
6661368	BAN	Method Blank	Total Aluminum (Al)	2020/03/31	ND, RDL=5.0		ug/L	
			Total Antimony (Sb)	2020/03/31	ND, RDL=1.0		ug/L	
			Total Arsenic (As)	2020/03/31	ND, RDL=1.0		ug/L	
			Total Barium (Ba)	2020/03/31	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2020/03/31	ND, RDL=1.0		ug/L	
			Total Bismuth (Bi)	2020/03/31	ND, RDL=2.0		ug/L	
			Total Boron (B)	2020/03/31	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2020/03/31	ND, RDL=0.010		ug/L	
			Total Calcium (Ca)	2020/03/31	ND, RDL=100		ug/L	
			Total Chromium (Cr)	2020/03/31	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2020/03/31	ND, RDL=0.40		ug/L	
			Total Copper (Cu)	2020/03/31	ND, RDL=0.50		ug/L	
			Total Iron (Fe)	2020/03/31	ND, RDL=50		ug/L	
			Total Lead (Pb)	2020/03/31	ND, RDL=0.50		ug/L	
			Total Magnesium (Mg)	2020/03/31	ND, RDL=100		ug/L	
			Total Manganese (Mn)	2020/03/31	ND, RDL=2.0		ug/L	
			Total Molybdenum (Mo)	2020/03/31	ND, RDL=2.0		ug/L	
			Total Nickel (Ni)	2020/03/31	ND, RDL=2.0		ug/L	

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Phosphorus (P)	2020/03/31	ND, RDL=100		ug/L	
			Total Potassium (K)	2020/03/31	ND, RDL=100		ug/L	
			Total Selenium (Se)	2020/03/31	ND, RDL=0.50		ug/L	
			Total Silver (Ag)	2020/03/31	ND, RDL=0.10		ug/L	
			Total Sodium (Na)	2020/03/31	ND, RDL=100		ug/L	
			Total Strontium (Sr)	2020/03/31	ND, RDL=2.0		ug/L	
			Total Thallium (Tl)	2020/03/31	ND, RDL=0.10		ug/L	
			Total Tin (Sn)	2020/03/31	ND, RDL=2.0		ug/L	
			Total Titanium (Ti)	2020/03/31	ND, RDL=2.0		ug/L	
			Total Uranium (U)	2020/03/31	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2020/03/31	ND, RDL=2.0		ug/L	
			Total Zinc (Zn)	2020/03/31	ND, RDL=5.0		ug/L	
6661368	BAN	RPD	Total Aluminum (Al)	2020/03/31	0.21		%	20
6661459	SHW	QC Standard	Turbidity	2020/03/31		101	%	80 - 120
6661459	SHW	Spiked Blank	Turbidity	2020/03/31		101	%	80 - 120
6661459	SHW	Method Blank	Turbidity	2020/03/31	ND, RDL=0.10		NTU	
6661459	SHW	RPD	Turbidity	2020/03/31	7.7		%	20
6661562	SSI	Matrix Spike	Total Organic Carbon (C)	2020/03/31		99	%	85 - 115
6661562	SSI	Spiked Blank	Total Organic Carbon (C)	2020/03/31		98	%	80 - 120
6661562	SSI	Method Blank	Total Organic Carbon (C)	2020/03/31	ND, RDL=0.50		mg/L	
6661562	SSI	RPD	Total Organic Carbon (C)	2020/03/31	7.7		%	15
6662021	EMT	Matrix Spike	Total Alkalinity (Total as CaCO3)	2020/04/01		98	%	80 - 120
6662021	EMT	Spiked Blank	Total Alkalinity (Total as CaCO3)	2020/04/01		96	%	80 - 120
6662021	EMT	Method Blank	Total Alkalinity (Total as CaCO3)	2020/04/01	ND, RDL=5.0		mg/L	
6662021	EMT	RPD	Total Alkalinity (Total as CaCO3)	2020/04/01	5.0		%	25
6662023	EMT	Matrix Spike	Dissolved Chloride (Cl-)	2020/04/02		93	%	80 - 120
6662023	EMT	Spiked Blank	Dissolved Chloride (Cl-)	2020/04/02		103	%	80 - 120
6662023	EMT	Method Blank	Dissolved Chloride (Cl-)	2020/04/02	ND, RDL=1.0		mg/L	
6662023	EMT	RPD	Dissolved Chloride (Cl-)	2020/04/02	3.2		%	25
6662026	EMT	Matrix Spike	Dissolved Sulphate (SO4)	2020/04/01		98	%	80 - 120
6662026	EMT	Spiked Blank	Dissolved Sulphate (SO4)	2020/04/01		109	%	80 - 120
6662026	EMT	Method Blank	Dissolved Sulphate (SO4)	2020/04/01	ND, RDL=2.0		mg/L	
6662026	EMT	RPD	Dissolved Sulphate (SO4)	2020/04/01	3.0		%	25
6662028	EMT	Matrix Spike	Reactive Silica (SiO2)	2020/04/01		95	%	80 - 120
6662028	EMT	Spiked Blank	Reactive Silica (SiO2)	2020/04/01		92	%	80 - 120
6662028	EMT	Method Blank	Reactive Silica (SiO2)	2020/04/01	ND, RDL=0.50		mg/L	

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6662028	EMT	RPD	Reactive Silica (SiO2)	2020/04/01	1.6		%	25
6662033	EMT	Spiked Blank	Colour	2020/04/01		103	%	80 - 120
6662033	EMT	Method Blank	Colour	2020/04/01	ND, RDL=5.0		TCU	
6662033	EMT	RPD	Colour	2020/04/01	NC		%	20
6662035	EMT	Matrix Spike	Orthophosphate (P)	2020/04/01		NC	%	80 - 120
6662035	EMT	Spiked Blank	Orthophosphate (P)	2020/04/01		89	%	80 - 120
6662035	EMT	Method Blank	Orthophosphate (P)	2020/04/01	ND, RDL=0.010		mg/L	
6662035	EMT	RPD	Orthophosphate (P)	2020/04/01	0.63		%	25
6662039	EMT	Matrix Spike	Nitrate + Nitrite (N)	2020/04/01		99	%	80 - 120
6662039	EMT	Spiked Blank	Nitrate + Nitrite (N)	2020/04/01		103	%	80 - 120
6662039	EMT	Method Blank	Nitrate + Nitrite (N)	2020/04/01	ND, RDL=0.050		mg/L	
6662039	EMT	RPD	Nitrate + Nitrite (N)	2020/04/01	NC		%	25
6662041	EMT	Matrix Spike	Nitrite (N)	2020/04/01		77 (1)	%	80 - 120
6662041	EMT	Spiked Blank	Nitrite (N)	2020/04/01		108	%	80 - 120
6662041	EMT	Method Blank	Nitrite (N)	2020/04/01	ND, RDL=0.010		mg/L	
6662041	EMT	RPD	Nitrite (N)	2020/04/01	NC		%	20
6662122	EMT	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2020/04/01		NC	%	80 - 120
6662122	EMT	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2020/04/01		101	%	80 - 120
6662122	EMT	Method Blank	Nitrogen (Ammonia Nitrogen)	2020/04/01	ND, RDL=0.050		mg/L	
6662122	EMT	RPD	Nitrogen (Ammonia Nitrogen)	2020/04/01	1.1		%	20
6663701	NHU	Matrix Spike	Total Mercury (Hg)	2020/04/02		90	%	80 - 120
6663701	NHU	Spiked Blank	Total Mercury (Hg)	2020/04/02		99	%	80 - 120
6663701	NHU	Method Blank	Total Mercury (Hg)	2020/04/02	ND, RDL=0.013		ug/L	
6663701	NHU	RPD	Total Mercury (Hg)	2020/04/02	2.8		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Poor spike recovery due to probable matrix interference, result confirmed by repeat analysis.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

BV Labs Job #: C079109
Report Date: 2020/04/02

Nova Construction Pioneer Coal
Client Project #: SPORTING MTN AGGREGATE QUARRY
Site Location: SPORTING MOUNTAIN
Your P.O. #: 552

VALIDATION SIGNATURE PAGE

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

Eric Dearman, Scientific Specialist

Michelle Mombourquette, Laboratory Manager

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 465 George St., Unit G, Sydney, NS, B1P 1K5 Tel:902 567 1255 Toll Free: 888 535 7770 Fax: 902 539 6504 www.bvlabs.com

Appendix G
Domestic Well Water Records

Well Log No.	Community	Civic Address	Year of Record	Rate (L/min)	Well Type (Drilled/Dug)	Stratigraphic Log		Depth to Bedrock (m)	Water Bearing Fracture Zones Encountered at (m)	Depth to Static Level (m)	Total Depth Below Surface (m)	Estimate Yield (L/min)	Notes	Distance from Site / GPS (Northing Easting)
						Primary Lithology	Secondary Lithology							
Well records within 2 KM of Project Site														
861536	Oban	Oban Road	1986	60.6	Drilled	Clay (0-43.0 m), Gravel (43.0-43.3 m)	Unknown	N/A	N/A	4.0	43.3	N/A		5066612 661398
992826	Seaview	Seaview	1999	N/A	Dug	Topsoil (0-0.6 m), Shale (0.6-3.7 m)	Unknown	0.6	N/A	1.5	3.7	N/A		5061500 657500
801252	Seaview	N/A	1980	22.7	Drilled	Clay (0-5.5 m), Sandstone (5.5-9.1 m), Shale (9.1-24.1 m)	Unknown	N/A	15.2, 24.1	6.1	24.1	N/A		5060787 657895
Well records located in same geology (granodirite) as Project Site														
972037	The Points West Bay	Church Gallery Road	1997	378.5	Drilled	Clay (0-24.1 m), Gravel (24.1-25.6 m)	Sand / Lenses (24.1-25.6 m)	N/A	24.1, 25,6	N/A	25.6	N/A		5068862 657135
032284	Oban	N/A	2003	113.6	Drilled	Clay (0-2.7 m), Hardpan (2.7-9.1 m), Conglomerate (9.1-37.5 m)	Boulders (0-2.7 m)	9.1	32.3, 35.7	N/A	37.5	N/A		5065500 661500
981007	Oban	N/A	1998	151.4	Drilled	Clay (0-5.5 m), Shale (5.5-32.0 m)	Unknown	5.5	26.0, 31.4	12.2	32.0	N/A		5065796 661840
021244	Roberta	West Bay	2002	22.7	Drilled	Clay & Boulders (0-22.9 m), Gravel (22.9-23.8 m), Hard Granite (23.8-27.4 m), Medium Hard Shale (27.4-29.6 m)	N/A	23.8	N/A	-0.03	29.6	N/A	Assumed well finish open hole	5068500 662500
900313	Roberta	RR #2 West Bay	1990	22.7	Drilled	Clay (0-32.3 m), Shale (32.3-36.6 m)	Gravel (0-32.3 m)	32.3	33.5	N/A	36.6	N/A		5069500 662500
860826	Roberta	N/A	1986	30.3	Drilled	Clay (0-27.4 m), Shale (27.4-39.9 m)	Unknown	27.4	N/A	3.7	39.9	N/A	Gravel Pack 28.0-40.0 m	5069500 662500

Well Log No.	Community	Civic Address	Year of Record	Rate (igpm)	Well Type (Drilled/Dug)	Stratigraphic Log		Depth to Bedrock (ft.)	Water Bearing Fracture Zones Encountered at (ft.)	Depth to Static Level (ft.)	Depth Below Surface	Estimate Yield (igpm)	Notes	Distance from Site / GPS (Northing Easting)	Direction
						Primary Lithology	Secondary Lithology								
Well records within 2 KM of Project Site															
861536	Oban	Oban Road	1986	16	Drilled	Clay (0-141 ft.), Gravel (141-142 ft.)	Unknown	N/A	N/A	13	142	N/A		5066612 661398	
992826	Seaview	Seaview	1999	N/A	Dug	Topsoil (0-2 ft.), Shale (2-12 ft.)	Unknown	2	N/A	5	12	N/A		5061500 657500	
801252	Seaview	N/A	1980	6	Drilled	Clay (0-18 ft.), Sandstone (18-96 ft.), Shale (30-79 ft.)	Unknown	N/A	50, 79	20	79	N/A		5060787 657895	
Well records located in same geology (granodirite) as Project Site															
972037	The Points West Bay	Church Gallery Road	1997	100	Drilled	Clay (0-79 ft.), Gravel (79-84 ft.)	Unknown (0-79 ft.), Sand / Lenses (79-84 ft.)	N/A	79, 84	N/A	84	N/A		5068862 657135	
032284	Oban	N/A	2003	30	Drilled	Clay (0-9 ft.), Hardpan (9-30 ft.), Conglomerate (30-123 ft.)	Boulders (0-9 ft.)	30	106, 117	N/A	123	N/A		5065500 661500	
981007	Oban	N/A	1998	40	Drilled	Clay (0-18 ft.), Shale (18-105 ft.)	Unknown	18	85, 103	40	105	N/A		5065796 661840	
021244	Roberta	West Bay	2002	6	Drilled	Clay & Boulders (0-75 ft.), Gravel (75-78 ft.), Hard Granite (78-90 ft.), Medium Hard Shale (90-97 ft.)	N/A	78	N/A	-0.1	97	N/A	Assumed well finish open hole	5068500 662500	
900313	Roberta	RR #2 West Bay	1990	6	Drilled	Clay (0-106 ft.), Shale (106-120 ft.)	Gravel (0-106 ft.)	106	110	N/A	120	N/A		5069500 662500	
860826	Roberta	N/A	1986	8	Drilled	Clay (0-90 ft.), Shale (90-131 ft.)	Unknown	90	N/A	12	131	N/A	Gravel Pack 92-131'	5069500 662500	

igpm Imperial Gallon per Minute

Appendix H
Archaeological Screening and Reconnaissance Report

GHD

SPORTING MOUNTAIN QUARRY
ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019
RICHMOND COUNTY, NOVA SCOTIA

FINAL REPORT

Submitted to:
GHD
and the
Special Places Program of the
Nova Scotia Department of Communities, Culture & Heritage

Prepared by:
Cultural Resource Management Group Limited
Ten Mile House
1519 Bedford Highway
Bedford, Nova Scotia
B4A 1E3

Consulting Archaeologist: Kyle G. Cigolotti
Report Preparation: Kyle G. Cigolotti, Emily C. Redden and W. Bruce Stewart

Heritage Research Permit Number: A2019NS026

CRM Group Project Number: 2019-0006-01

August 2019

The following report may contain sensitive archaeological site data. Consequently, the report must not be published or made public without the written consent of Nova Scotia's Coordinator of Special Places Program, Department of Communities, Culture and Heritage.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PLATES

SPORTING MOUNTAIN QUARRY
ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019
RICHMOND COUNTY, NOVA SCOTIA

1.0 INTRODUCTION

Nova Construction Company Ltd (Nova Construction) is proposing the expansion of an existing quarry near Sporting Mountain, Richmond County. In order to investigate the potential for encountering archaeological resources during any development of the property, Cultural Resource Management (CRM) Group was retained by GHD on behalf of Nova Construction to undertake archaeological screening and reconnaissance of the proposed project area.

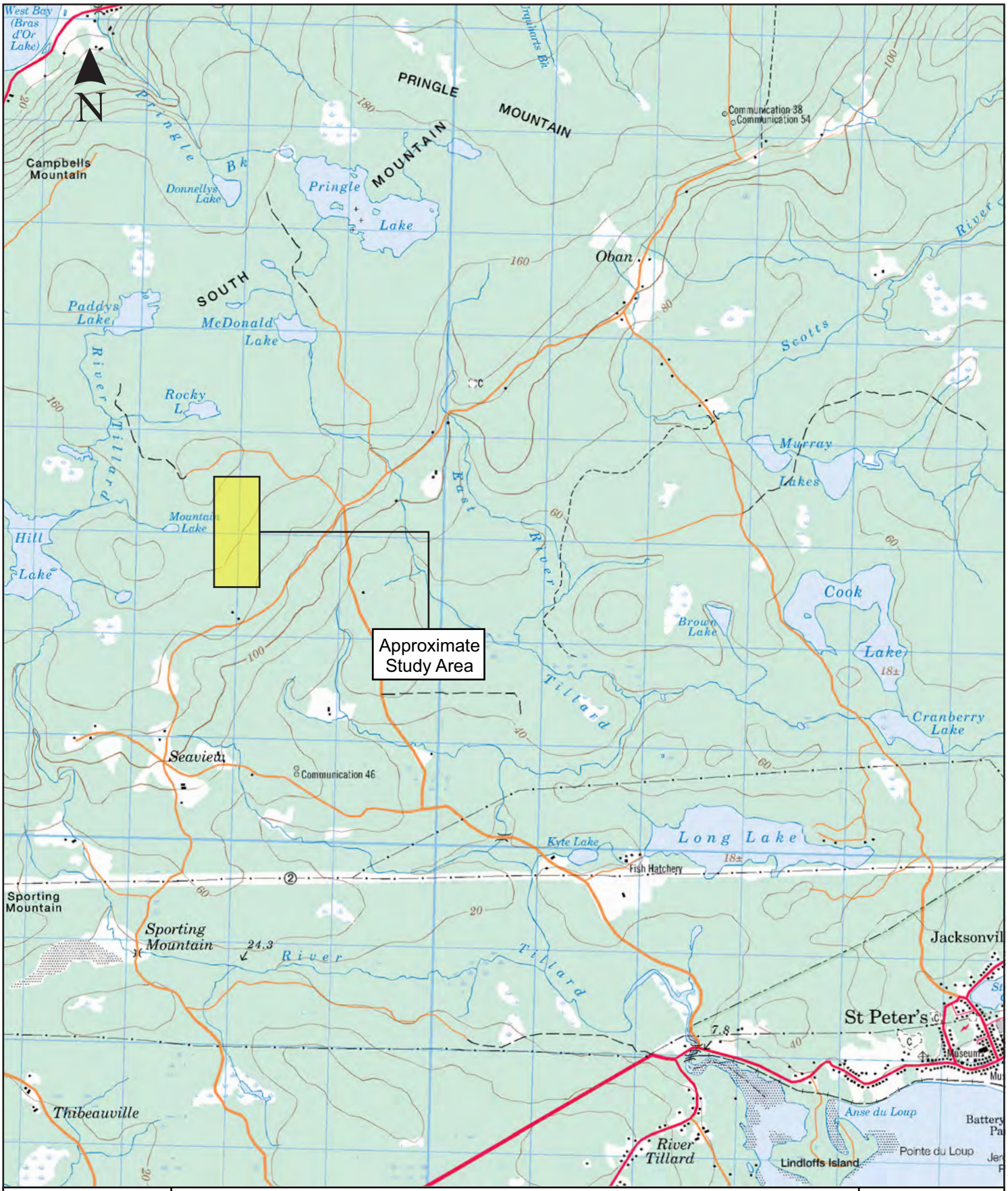
The archaeological screening and reconnaissance was directed by CRM Group Archaeologist Kyle G. Cigolotti. Cigolotti was assisted during the field reconnaissance by Archaeological Technician Shawn MacSween. Technical input on the project was provided by CRM Group President and Senior Technical Advisor W. Bruce Stewart.

The archaeological investigation was conducted according to the terms of Heritage Research Permit A2019NS026 (Category 'C'), issued to Cigolotti through the Special Places Program of the Nova Scotia Department of Communities, Culture and Heritage. This report describes the archaeological screening and reconnaissance of Nova Construction's proposed Sporting Mountain Quarry study area, presents the results of these efforts, and offers cultural resource management recommendations.

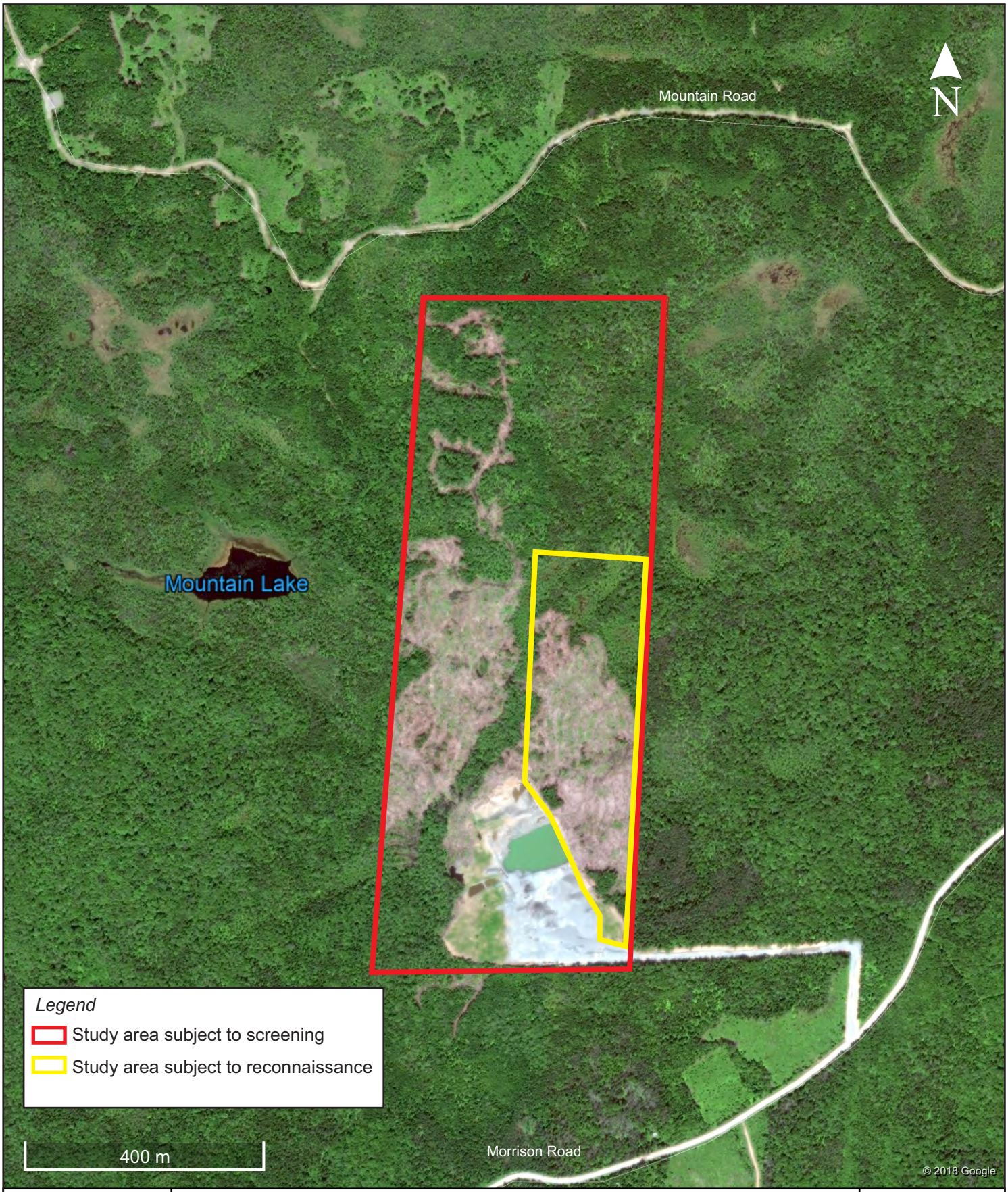
2.0 STUDY AREA

The Sporting Mountain Quarry study area is located approximately 400 metres north of Morrison Road, approximately 1.8 kilometres northeast of Seaview and approximately 9 kilometres northwest of St. Peter's on Cape Breton Island (***Figures 1)***. The survey addressed one property (PID 75044156), which comprised a proposed impact area of approximately 10 hectares with background screening addressing the approximately 43 hectare property (***Figure 2***). The 10 hectare area subjected to field reconnaissance is the only portion of the property slated to be impacted during the proposed quarry expansion. Access to the area was gained via a quarry access road on the north side of Morrison Road (***Plate 1***).

PLATE 1: Sporting Mountain Quarry study area overlooking existing quarry operations. Facing south; May 6, 2019.



CRM Group	*Approximate Study Area*	*Figure 1*
	SPORTING MOUNTAIN QUARRY ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019 RICHMOND COUNTY, NOVA SCOTIA	August 2019 Scale 1:50 000



CRM Group Cultural Resource Management Group Ltd.	*Detailed Study Area*	*Figure 2*
	SPORTING MOUNTAIN QUARRY ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019 RICHMOND COUNTY, NOVA SCOTIA	August 2019 Scale Bar

3.0 METHODOLOGY

In the spring of 2019, GHD retained CRM Group on behalf of Nova Construction to undertake archaeological screening and reconnaissance of the proposed expansion of the Sporting Mountain Quarry. The objective of the archaeological assessment was to evaluate archaeological potential within the area that may be disturbed by subsequent development activities. To address this objective, CRM Group developed a work plan consisting of the following components: a background study of relevant site documentation to identify areas of high archaeological potential; Mi'kmaw engagement; archaeological reconnaissance of the areas that may be impacted by development activities; and, preparation of a report summarizing the results of the background research and field survey, as well as providing cultural resource management recommendations.

3.1 Background Study

The archival research component of the archaeological screening and reconnaissance was designed to explore the land use history of the study area and provide information necessary to evaluate the area's archaeological potential. To achieve these goals, CRM Group utilized the resources of various institutions including documentation available through the Nova Scotia Archives, Nova Scotia Land Information Centre, the Department of Natural Resources, the Nova Scotia Registry of Deeds and the Nova Scotia Museum.

The background study included a review of relevant historic documentation incorporating land grant records, legal survey and historic maps, local and regional histories, and consultation with knowledgeable parties. Topographic maps and aerial photographs, both current and historic, were also used to evaluate the study area. This data facilitated the identification of environmental and topographic features that would have influenced human settlement and resource exploitation patterns. The historical and cultural information was integrated with the environmental and topographic data to identify potential areas of archaeological sensitivity.

3.2 Mi'kmaw Engagement

Although there was no specific Mi'kmaw association anticipated with this study area, CRM Group contacted the Kwilmu'lw Maw-klusuaqn Negotiation Office's Archaeological Research Division (KMKNO's ARD) to see if they have any information pertaining to traditional or historical Mi'kmaw use of the study area. CRM Group staff also engaged with Jason Googoo from Membertou Geomatics Solutions in reference to the production of a Mi'kmaw Ecological Knowledge Study (MEKS) and Traditional Land Use Study (TLUS) of the proposed Sporting Mountain Quarry project.

3.3 Field Reconnaissance

The goals of the archaeological field reconnaissance were to conduct a visual inspection of the study area, document any areas of archaeological sensitivity or archaeological sites identified during the course of either the background study or the visual inspection, and design a strategy for testing areas of archaeological potential, as well as any archaeological resources identified within the study area. Although the ground search did not involve sub-surface testing, the researchers were watchful for topographic or vegetative anomalies that might indicate the presence of buried archaeological resources. The process and results of the field reconnaissance were documented in field notes and photographs.

Hand-held Global Positioning System (GPS) units were used to record track logs and UTM coordinates for all survey areas, as well as any identified diagnostic artifacts, formal tools, isolated finds and site locations.

4.0 RESULTS

4.1 Background Study

The following discussion details the environmental and cultural setting of the study area, as well as previous archaeological research conducted in the general area. This background study provides a framework for the evaluation of archaeological potential and the initial interpretation of any resources encountered during the field component of the assessment.

4.1.1 Environmental Setting

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

Water Sources

The Sporting Mountain Quarry study area is located between two branches of the River Tillard, which flow southeast into St. Peters Bay. The study area is located to the southeast of several small lakes associated with the river system, the nearest of which is Mountain Lake, located approximately 400 metres to the west. Proximity to water, for both drinking and transportation, is a key factor in identifying Precontact and historic Mi'kmaq, as well as early Euro-Canadian, archaeological potential.

Topography

The study area is located within the ecoregion known as the *Nova Scotia Uplands (300)* (Neily, Basquill, Quigley & Keys 2018:67). This ecoregion is a geographically complex band of rounded summits and plateaus separated by lower elevation uplands and lowlands that extend across northern mainland Nova Scotia from Chignecto Bay to Cape Breton Island. Summits can reach 300 metres in elevation and are usually bordered by steep slopes (Neily et al. 2017: 67).

The study area's more specific ecodistrict is known as the *Cape Breton Hills* District (310) (Neily et al. 2017: 69). These hardwood covered hills and slopes are 150-300 metres above sea level, with elevations within the study area ranging from approximately 150 to 160 metres above sea level (Neily et al. 2017: 69). The higher steep-sloped hills are underlain with older, erosion resistant rocks. the lower more gradually sloping hills are underlain by coarse sandstone, shale and conglomerate (Neily et al. 2017: 70).

Soils

The soils within the study area are predominantly *Thom Series* soils (ST2, ST2-L & ST8) (Keys 2007: 8). ST2 is mainly associated with coarse-loamy soils dominated by sandy loam texture with moderate drainage. ST2 is generally poor to medium in fertility with moisture limited during the growing season (Keys, Neily & Quigley 2011: 36). ST2-L is a less common loamy phase of ST2 found predominantly in the Nova Scotia Uplands or Fundy Shore (Keys et al. 2011: 36). ST8 is mainly associated with coarse-loamy soils dominated by loam to sandy loam texture with good drainage. ST8 is generally medium to rich in fertility with moisture not limited during the growing season (Keys et al. 2011: 48).

Flora

Within the *Cape Breton Hills* ecodistrict, mixed stands of sugar maple, red maple, beech and yellow birch are predominant. Shade-tolerant hardwoods (Tolerant Hardwood Forest Group), typical of the Acadian Forest, although less common, are present (Neily et al. 2017: 71).

When the Scottish settlers arrived in the early 1800s they cleared and farmed significant areas of the tolerant hardwood forest on the rolling topography in areas such as River Denys Mountain and Skye Mountain. Beginning in the 1900s many rural families left their farms to live and work in urban areas. Their abandoned fields quickly reforested to white spruce (Neily et al. 2017: 73).

4.1.2 Mi'kmaw Land Use

The land within the study area was once part of the greater Mi'kmaw territory known as *Unama'kik*, a variation of the word *Mi'kma'kik*, meaning "Mi'kmaw territory" (Sable & Francis 2012: 21). There are relatively few lakes in the *Nova Scotia Uplands* ecoregion, but there are many rivers and streams (Neily et al. 2017: 67) 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. St. Peter's Bay, St. Peter's Inlet and the Bras d'Or Lakes would have likely held particular significance, as the seas and its products were of primary importance for the Mi'kmaq (Hoffman 1955). Nearby St. Peter's, directly translated as *Sin Pie'lk*, is located approximately nine kilometres southeast of the study area (Mi'kmaw Place Names). Oral tradition maintains that the Mi'kmaq utilized the isthmus of St. Peter's as a canoe portage between the Atlantic Ocean and Bras d'Or Lake (Johnson 2004: 15) (***Plate 2***).

Between the late sixteenth to the mid-eighteenth centuries, at least two Mi'kmaq villages were described on *Unama'kik.* One in the north, near Port Dauphin or Englishtown and the other in the southern region of the island, along the southern most areas of the Bras d'Or lakes (Wicken 1994: 109-110). The Bras d'Or lakes are known as *Petoobok* or *Pitawpo'q*, meaning "a long dish of salt water" or "inland sea" (Rand 1875: 83; Sylliboy).

In Nova Scotia, information regarding archaeological sites is stored in the Maritime Archaeological Resource Inventory (MARI), a provincial archaeological site database, maintained by the Nova Scotia Museum. This database contains information on archaeological sites registered with the province within the Borden system. The Borden system in Canada is based on a block of latitude and longitude. Each block is referenced by a four-letter designator. Sites within a block are numbered sequentially as they are recorded. The study area is located within the BkCf Borden Block.

A review of MARI determined that there are no registered Mi'kmaq archaeological sites within or close to 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 nearest registered archaeological sites with Mi'kmaq resources are BlCf-08 and BlCf-01, located on the opposite side of Bras d'Or Lake. BlCf-08 is located in an actively eroding area northeast of the community of Malagawatch, approximately 20 kilometres north of the study area. BlCf-08 represents a historic to modern cemetery with local accounts of quartz projectile points having been collected from oyster rakes. BlCf-01 is located approximately 32 kilometres north of the study area and represents a Mi'kmaq camp site near the eastern side of St. Patrick's Channel.

CRM Group contacted KMKNO's ARD requesting information regarding traditional or historic Mi'kmaq use of the study area and they provided information that was taken into consideration when preparing the archaeological assessment. This information is confidential in nature and cannot be reproduced in this report. CRM Group staff also engaged with Jason Googoo from Membertou Geomatics Solutions in reference to the production of a Mi'kmaw Ecological Knowledge Study (MEKS) and Traditional Land Use Study (TLUS) of the proposed Sporting Mountain Quarry project. Attempts were made to include Googoo in the field aspect of the archaeological assessment but scheduling conflicts prevented this.

Based on the environmental setting (non-arable land and low, wet area) and Mi'kmaw land use, the Sporting Mountain Quarry study area is ascribed low potential for encountering Precontact and/or early historic Mi'kmaw archaeological resources.

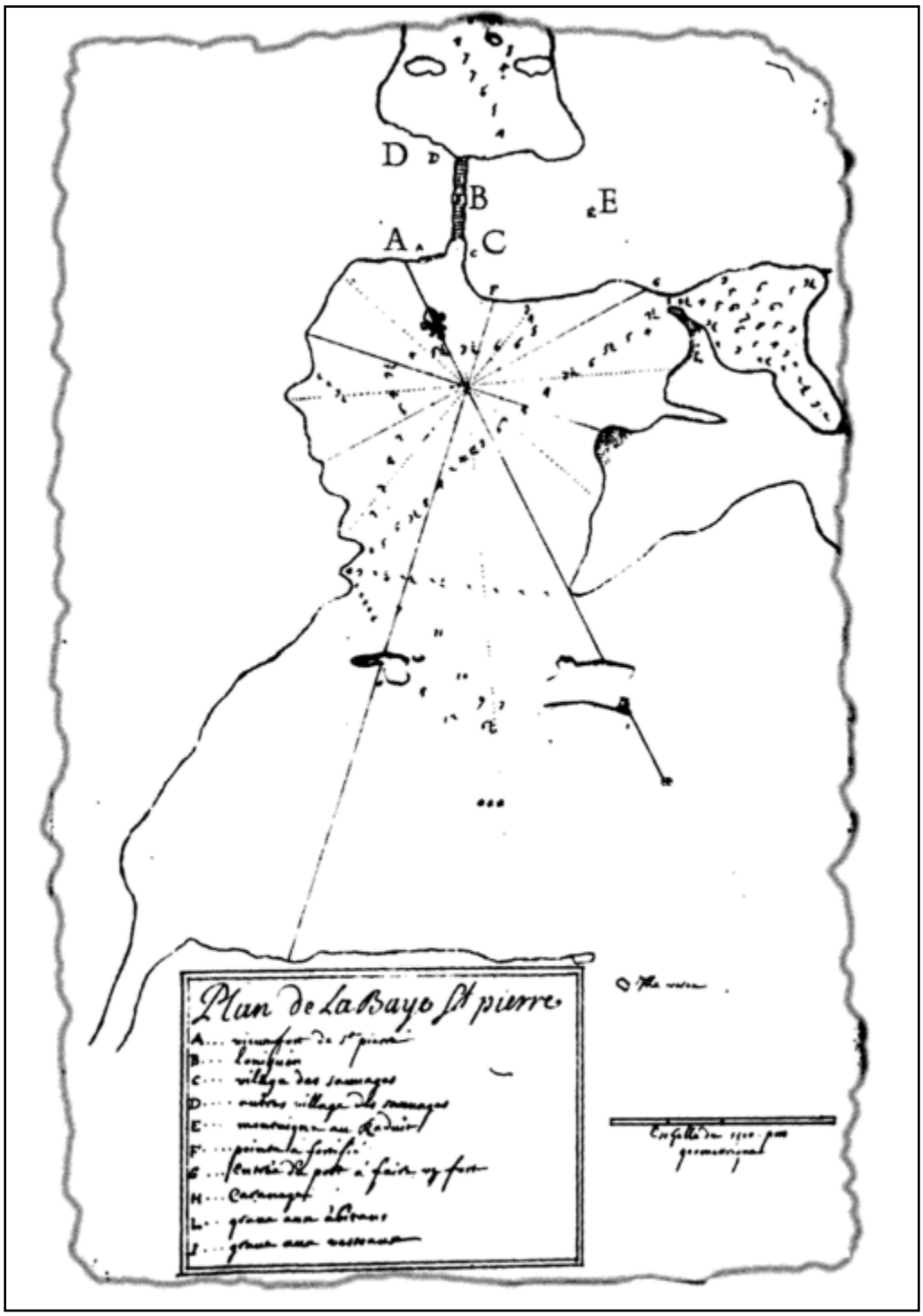


PLATE 2: **Map of Mi'kmaw villages (D & C) and portage crossing (B) at St. Peter's ca. 1714 (in Johnson 2004: 21)**

4.1.3 Historic Land Use

Although European mariners active in the trans-Atlantic fishery were familiar with the fishing banks and coasts of Cape Breton from the early sixteenth century, formal European settlement only began in the seventeenth century with the establishment of fishing stations at places such as St. Peter's and St. Ann's. French settlement continued in the eighteenth century with the founding of Louisbourg in 1713 and other secondary settlements such as Port Dauphin (Englishtown) and Boularderie Island. As a result, French presence on the island was divided between northern and southern portions, with communication between the two mostly by water, either by sea or through the Bras d'Or (Dawson 2009:116).

The presence of the Mi'kmaq likely drew European mariners to the anchorage at St. Peter's during the sixteenth century. By 1630, French merchants had established a fortified trading post in the area, called Saint Pierre. Abandoned in 1669, Saint Pierre was replaced by Port Toulouse in 1713 (***Figure 3***). The new trading post became a supply centre for the Fortress of Louisbourg and attracted Acadian settlers to the St. Peter's area. Both the French fort and the settlement were captured by the British as part of their attacks on Louisbourg in 1745 and 1758. Following the capitulation of Louisbourg in 1758, Cape Breton fell under British military rule until 1763, when it was politically annexed to Nova Scotia. Richmond County was established in 1836 (Morgan 2000:107).

European settlement within the general vicinity of the study area began with the mass migration of Scottish settlers in the early nineteenth century. The first settlers to arrive tended to be relatively well-off tenant farmers and crofters. This group, arriving primarily between 1802 and 1820, received the best land, the most fertile of which lay mainly around the Bras D'Or Lake. By the 1820s, Scots were the dominant ethnic group on the island and farming had replaced the fishery as the leading economic activity (Hornsby 1992: 48).

The closest community to the Sporting Mountain Quarry study area is Seaview, located less than two kilometres to the southwest. Other nearby settlements include Grand Anse, Dundee, Oban and St. Peters. Part of the community of Seaview was formerly known as Sporting Mountain, with original grantees including Abraham, Fabian and Peter Fougere in 1861, and Mary McInnes in 1866. The area had its own school as of 1845. In 1890 part of the district was renamed Seaview (Fergusson 1967: 638). Within the area known as Seaview, crown leases were granted to Peter Landris in 1805 and Simon Fougere in 1806.

A review of MARI determined that there are no registered historic archaeological sites within or close to 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 nearest registered historic archaeological sites are BjCf-01 through BjCf-05, all of which are located approximately 9.5 kilometres southeast of the study area. BjCf-01 represents the remains of Fort St. Pierre, Nicholas Denys fur trade post, at the foot of the southern slope of Mount Granville. BjCf-02 represents the remains of Fort Toulouse. BjCf-03 represents multiple settlement features in Port Toulouse. BjCf-04 represents the remains of Fort Dorchester, on the summit of Mount Granville. BjCf-05 represents the late-eighteenth to nineteenth century remains of the Kavanagh houses, as well as the early twentieth century remains of the Richmond County Hospital in close proximity to Fort Toulouse. BjCf-02 through BjCf-05 are located within Battery Provincial Park. Registered site BjCf-06, located approximately 13 kilometres southeast of the study area, represents a late-nineteenth to early-twentieth century shipwreck.

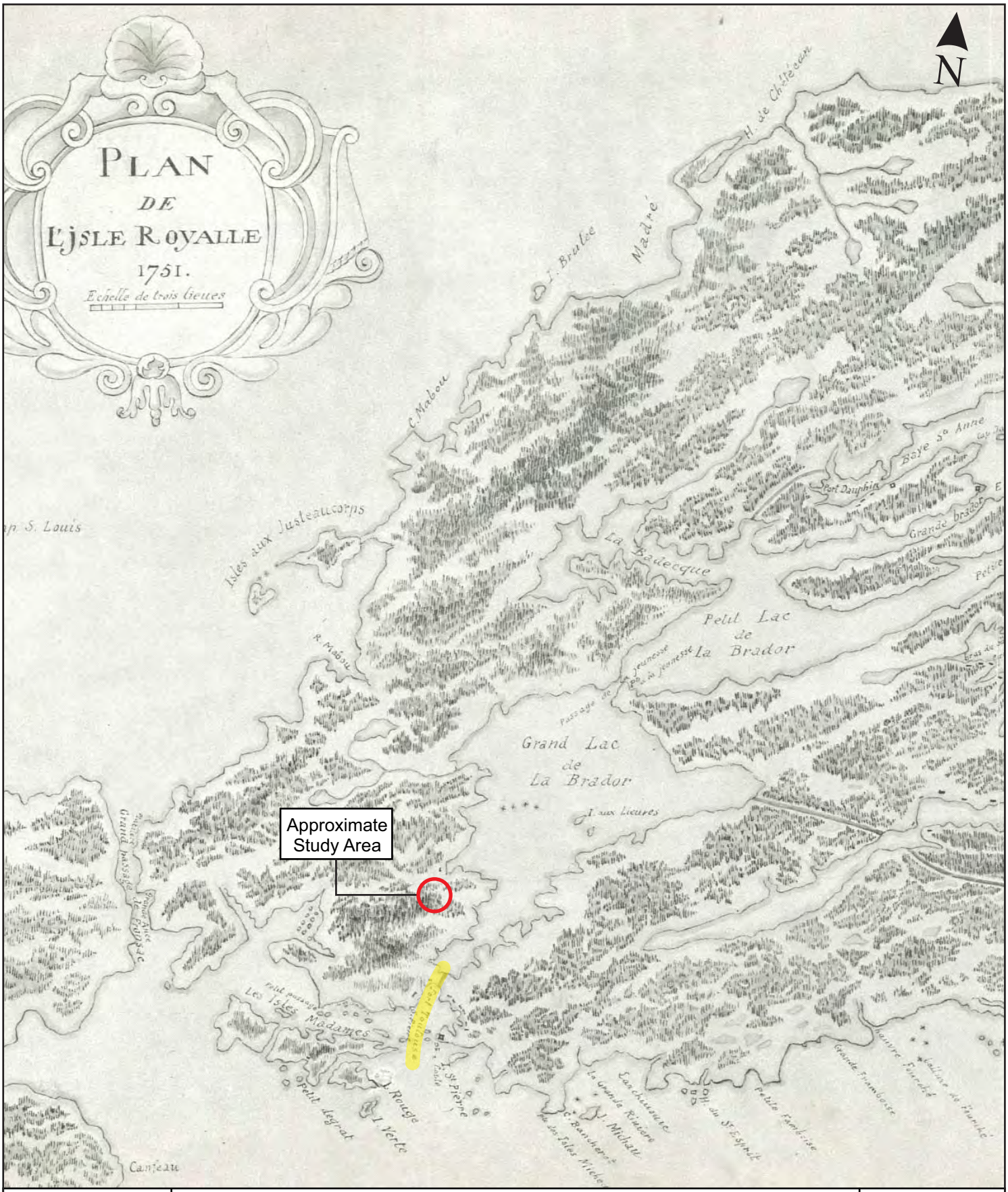
The 1884 geological survey of the area depicts the study area as devoid of settlement in the midst of surrounding communities (***Figure 4***). The nearest structures depicted are located along the

Morrison Road and Pringle Road (now Pringle Mountain Road), well outside the study area. The Pringle Road is shown as an active road leading from the Sporting Mountain area to the West Bay Highway. Today sections of Pringle Mount Road towards West Bay are more suitable for ATV traffic.

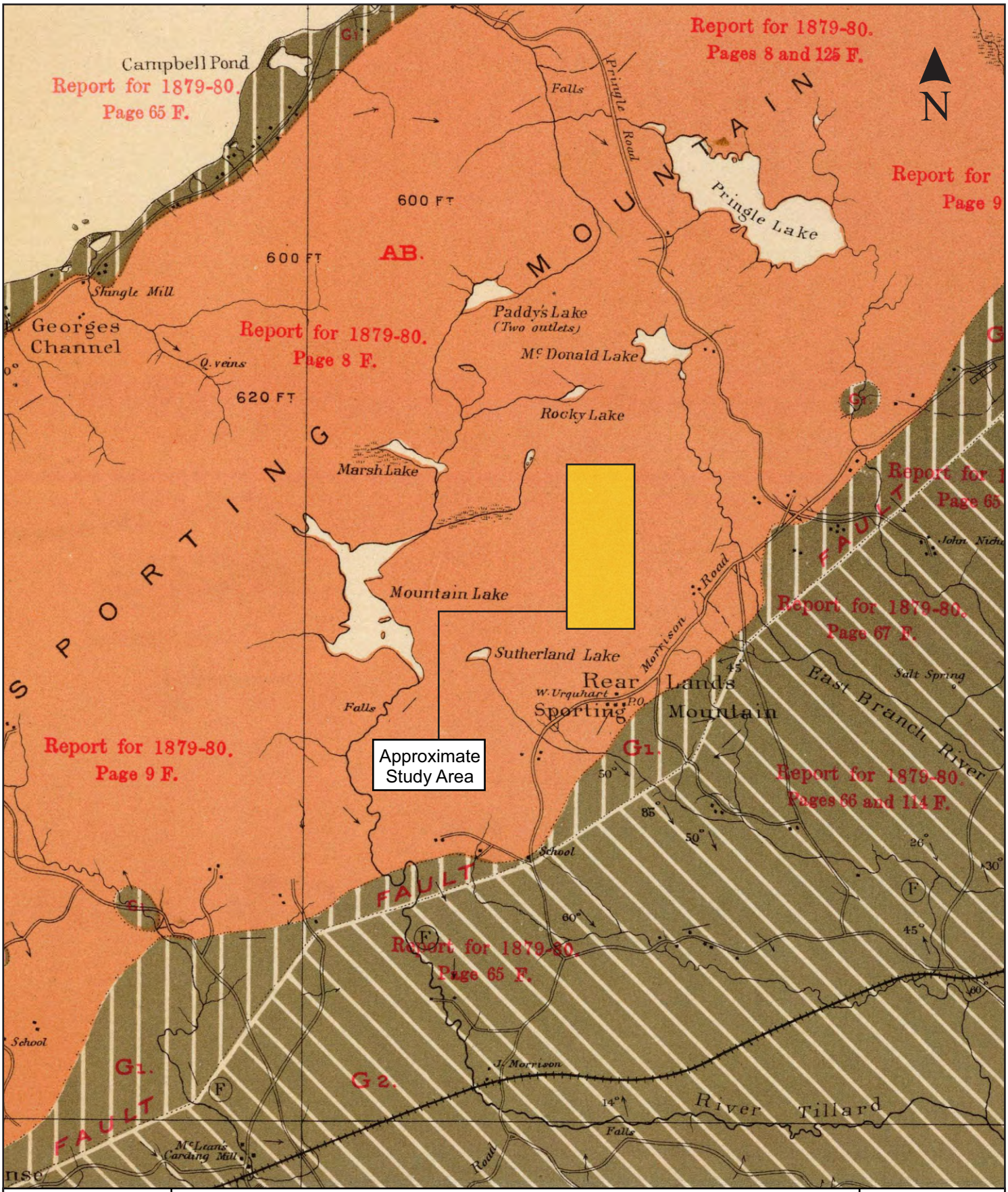
The 1885 A.F. Church map of Richmond County depicts a similar alignment to present day Morrison Road and Mountain Road, with no roads or structures within the study area (***Figure 5***).

An aerial photograph captured in 1945 does not show any signs of historic development within the area (***Figure 6***). The vicinity generally appears heavily forested with some wet areas.

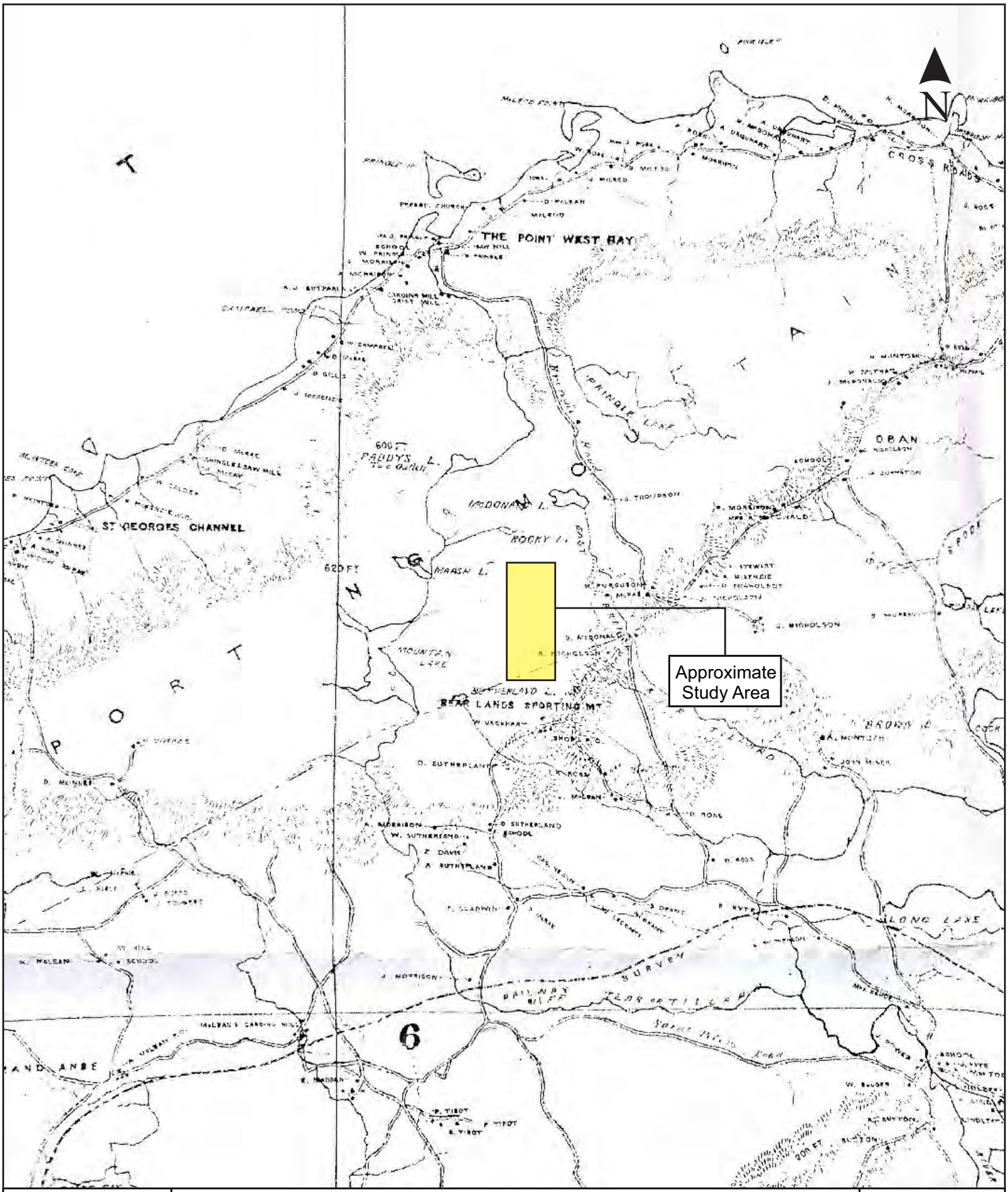
Based on the area being relatively low, wet and without the evidence of historic activity, the study area is ascribed low potential for encountering historic Euro-Canadian archaeological resources.



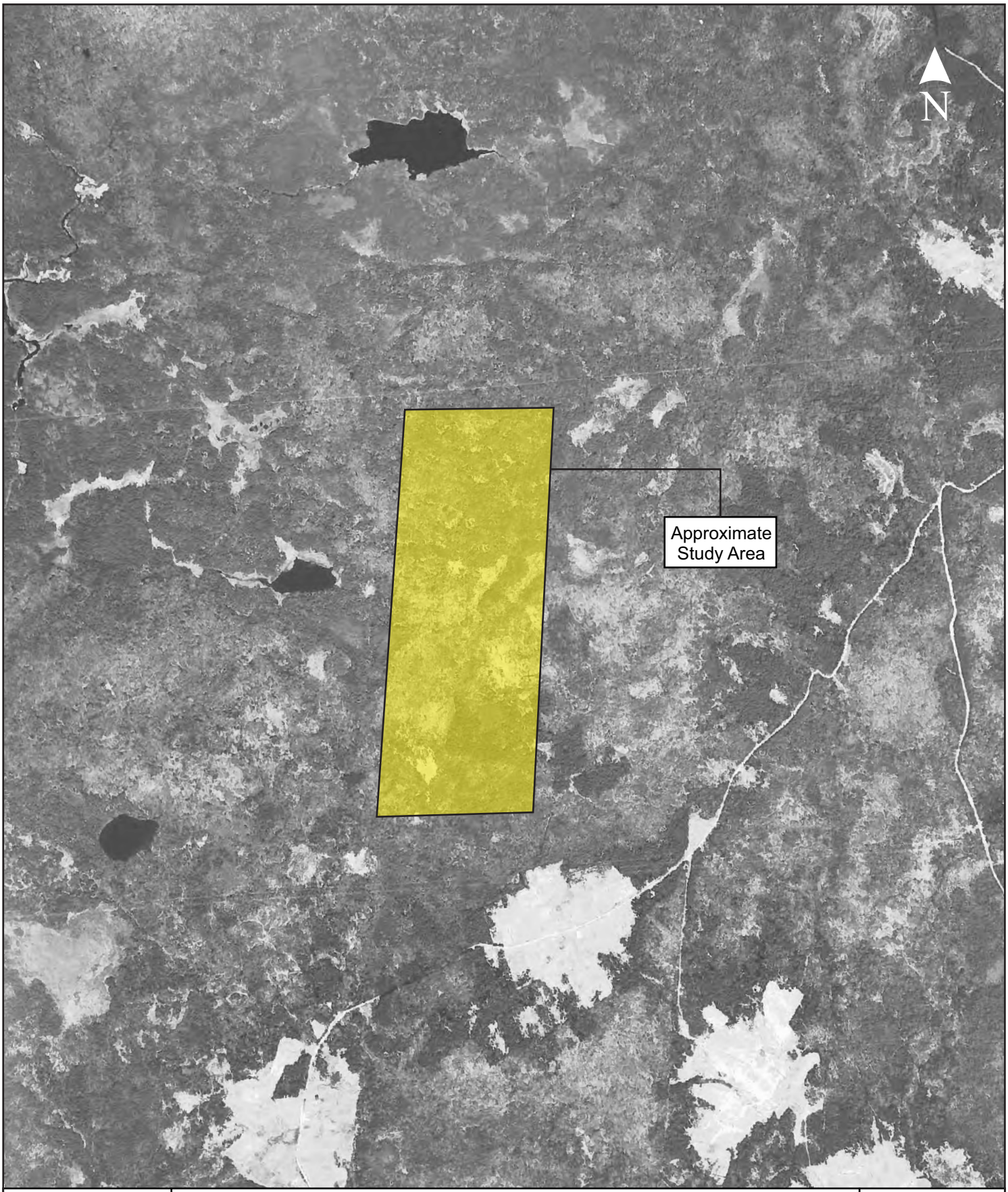
CRM Group Cultural Resource Management Group Ltd.	*"Plan de L'Isle Royale", Anonymous, 1751*	*Figure 3*
	SPORTING MOUNTAIN QUARRY ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019 RICHMOND COUNTY, NOVA SCOTIA	August 2019



CRM Group	*Fletcher, 1884*	*Figure 4*
	SPORTING MOUNTAIN QUARRY ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019 RICHMOND COUNTY, NOVA SCOTIA	August 2019



CRM Group	*A.F. Church, 1885*	*Figure 5*
	SPORTING MOUNTAIN QUARRY ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019 RICHMOND COUNTY, NOVA SCOTIA	August 2019



CRM Group Cultural Resource Management Group Ltd.	*Aerial Photograph, 1945*	*Figure 6*
	SPORTING MOUNTAIN QUARRY ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019 RICHMOND COUNTY, NOVA SCOTIA	August 2019

4.2 Field Reconnaissance

CRM Group archaeologists conducted fieldwork, consisting of a visual inspection of the study area, on May 6, 2019 (***Figure 7***). Weather conditions were overcast and warm. The primary purpose of the visit was to assess the area for archaeological potential and investigate any topographical and/or cultural features that had been identified as areas of elevated potential during the background research.

The terrain through the study area was a mix of low lying wet and marshy areas, undulating boulder fields and steep slopes (***Plate 3***). The study area gradually slopes down from north to south across the study area with an average slope of approximately two metres over every 100 metres (***Plate 4***).

Vegetation consisted of a mix of young to mature hardwood and softwood species typical of Nova Scotian forests, though much of the study area had previously been clear cut (***Plate 5***). Ground cover consisted of a mix of moss, ferns and small shrubs (***Plate 6***).

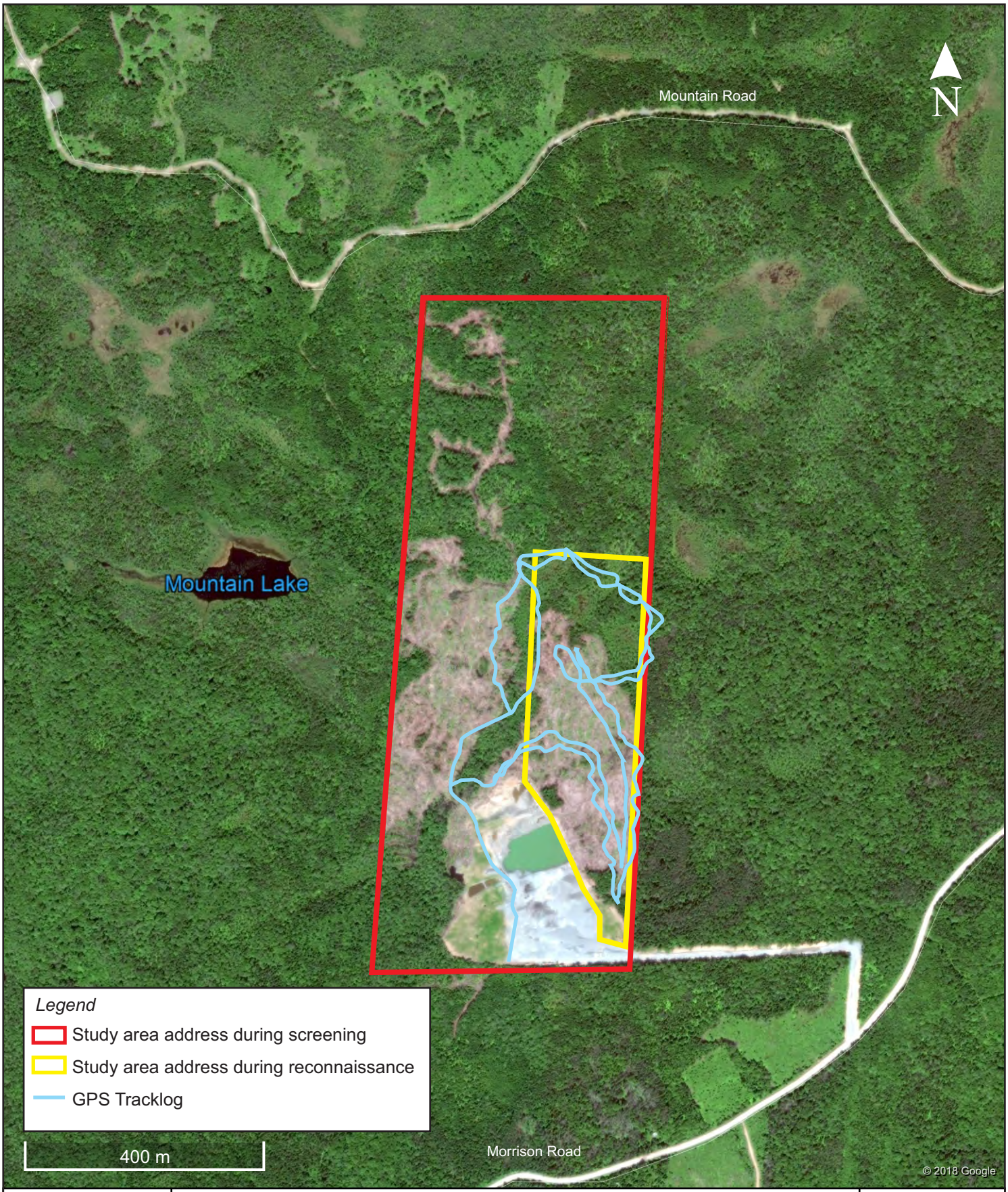
Based on the various components of the background study, including environmental setting, Mi'kmaw land use, property history and field reconnaissance, the proposed Sporting Mountain Quarry study area is ascribed low potential for encountering Precontact and/or early historic Mi'kmaw archaeological resources and low potential for encountering historic Euro-Canadian archaeological resources.

PLATE 3: Example of topography within study area. Facing east; May 6, 2019.

PLATE 4: Example of gradually sloping terrain within study area. Facing south; May 6, 2019.

PLATE 5: Example of vegetation within study area. Facing west; May 6, 2019.

PLATE 6: Example of ground cover within study area. Facing southeast; May 6, 2019.



CRM Group Cultural Resource Management Group Ltd.	*GPS Tracklog*	*Figure 7*
	SPORTING MOUNTAIN QUARRY ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2019 RICHMOND COUNTY, NOVA SCOTIA	August 2019 Scale Bar

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2019 archaeological screening and reconnaissance of the Sporting Mountain Quarry study area consisted of historical background research and a visual inspection. It did not involve sub-surface testing. The background research and field reconnaissance conducted by CRM Group determined the study area exhibits low potential for encountering either Mi'kmaq (both Precontact and historic) or historic Euro-Canadian archaeological resources. This determination is based on the area being relatively low, wet and without the evidence of historic activity.

Based on these results, CRM Group offers the following management recommendations for the study area:

1. It is recommended that the study area subjected to reconnaissance (***Figures 2 & 7***), as defined and depicted in this report, be cleared of any requirement for future archaeological investigation.

2. In the unlikely event that archaeological deposits or human remains are encountered during activities associated with the expansion of the Sporting Mountain Quarry, all work in the associated area(s) should be halted and immediate contact made with the Special Places Program (Sean Weseloh McKeane: 902-424-6475).

6.0 REFERENCES CITED

Church, Ambrose F.
1885 *Topographical Township Map of Richmond County, Nova Scotia.* A.F. Church & Co.: Halifax.

Dawson, Joan
2009 *Nova Scotia's Lost Highways: The Early Roads that Shaped the Province*. Halifax: Nimbus Publishing.

Department of Land and Forests
1946 *Crown Land Grant Index Sheet 118 – Richmond County*. Nova Scotia Department of Natural Resources.

Department of Natural Resources
1945 *Aerial Photo A7581-29.* Department of Energy, Mines and Resources

Fergusson, Bruce
1967 *Place-names and Places of Nova Scotia*. Halifax: PANS.

Fletcher, H.
1884 *Province of Nova Scotia, Cape Breton Island, Saint Peter Sheet.* Map No. 21. Geological Survey of Canada.

Hoffman, Bernard Gilbert
1955 *The Historical Ethnography of the Micmac of the Sixteenth and Seventeenth Centuries.* Excerpts from the Hoffman Thesis - Mi'kmaq of the 16th & 17th Centuries. Cape Breton University. https://www.cbu.ca/indigenous-affairs/unamaki-college/mikmaq-resource-centre/essays/exerpts-from-the-hoffman-thesis-mikmaq-of-the-16th-17th-centuries/

Hornsby, Stephen J.
1992 *Nineteenth Century Cape Breton: A Historical Geography*. Montreal: McGill-Queen's University Press.

Johnson, A.J.B.
2004 *Storied Shores: St. Peter's, Isle Madame and Chapel Island in the 17th and 18th Centuries.* Cape Breton University Press: Sydney, NS.

Keys, Kevin
2007 *Forest Soil Types of Nova Scotia: Identification, Description, and Interpretation*. Nova Scotia Department of Natural Resources, Manual FOR 2007-2.

Keys, Kevin & Peter Neily, Eugene Quigley
2010 *Forest Ecosystem Classification for Nova Scotia, Part II: Soil Types (2010).* Nova Scotia Department of Natural Resources Renewable Resources Branch, Report For 2011-3.

Morgan, Robert J.
2000 *Early Cape Breton: From Founding to Famine, 1784-1851*. Sydney: Breton Books.

Neily, Peter & Sean Basquill, Eugene Quigley, Kevin Keys
2017 *Ecological Land Classification for Nova Scotia. Nova Scotia*. Department of Natural Resources Renewable Resources Branch, Report for 2017-13

Rand, Silas T.
1875 *A First Reading Book in the Micmac Language*. Halifax: Nova Scotia Printing Company.

Sable, Trudy & Bernie Francis
2012 *The Language of this Land*, Mi'kma'ki. Sydney: Cape Breton University Press

Sylliboy, Helen
Mi'kmaw Place Names in Cape Breton. Cape Breton University. https://www.cbu.ca/indigenous-affairs/unamaki-college/mikmaq-resource-centre/miscellany/mikmaw-place-names-in-cape-breton/

Wicken, William C.
1994 *Encounters with Tall Sails and Tall Tales: Mi'kmaq Society, 1500-1760*. Ph.D. thesis submitted to Faculty of Graduate Studies. McGill University: Montreal.