

Memo



To: Director of NBDELG's Authorizations Branch
From: Hammond River Holdings Ltd.
Cc: Director of the Environmental Impact Assessment
Date: February 11, 2020
Subject: Upham Surface Water Sampling – January 2020
Our File: File # 18-8346

Introduction

Site preparation activities for the Upham gypsum quarry began with vegetation clearing starting on December 4, 2019. First ground disturbance commenced on December 11, 2019 and hauling of material beginning on December 12, 2019. Developing the storage pads continued for the month of January. During these activities, gypsum bedrock was not exposed. As a result of these earthworks activities, total suspended solids (TSS) is the only constituent of potential concern.

As required by the approval to operate, surface water sampling of the watercourse that crosses the site and in the Hammond River began immediately. Weekly compliance monitoring was conducted on January 10, January 13, January 21, and January 27, 2020. There were no major rain events requiring additional sampling.

Field Methods

Field parameters were measured using a calibrated multimeter. Field parameters included pH, temperature, specific conductivity, dissolved oxygen, and turbidity. Due to excessive ice build-up, sampling site H2 could not be safely accessed on January 13 and January 20 and therefore field parameters were not recorded and a sample was not collected. On January 20, the water depth was not sufficient to collect field parameters; however, a water sample was able to be collected.

Surface water samples were collected from five locations (**Figure 1**). They are as follows:

- PDP-1 was collected at the discharge point from the site, which is located before the confluence with the unnamed tributary to the Hammond River. This is the point of compliance;
- SW3 was the background sample. It was collected within the unnamed tributary approximately 100 m upstream from the PDP-1;
- SW5 was collected within the unnamed tributary approximately 100m downstream from PDP-1, at SW5.
- Two additional samples are collected in the Hammond River; H1 is collected upstream and H2 is downstream from the project site.

Surface water samples were collected using laboratory supplied bottles. The bottles were rinsed three times in the watercourse and then submerged below the water surface. The samples were submitted to the Research Productivity Council (RPC) in Fredericton, NB. RPC is accredited by the Canadian

Association for Laboratory Accreditation Inc. (CALA) for each of the laboratory analytical methods utilized and have in-house QA/QC programs to govern sample analysis and analytical data quality assurance.

Compliance Monitoring Results

Results of the surface water compliance monitoring are provided in **Table 1**. Analytical certificates are attached. Total suspended solids (TSS) and turbidity were within their limits in downstream samples compared to background, with one exception. On January 27, 2020, turbidity at SW5 and H2 exceeded the maximum allowable concentration of 8 NTU when compared to the background samples, SW3 and H1, respectively. Field staff noted that runoff was high, with surrounding vegetation entering the stream at all sampling locations. In addition, the colour at all sampling locations was brown, indicating vegetation and organic input from the immediate surroundings. Chloride was below the CCME guidelines for protection of aquatic life.

During each sampling event in January, pH was below the 6.5 lower limit for the protection of aquatic life. The earthworks activities occurring on site would not have an impact on the pH. It is likely that, despite the multimeter being calibrated prior to sample collection, the pH probe was not functioning accurately. This is likely due to the colder temperatures experienced in January.

Dillon implemented a QA/QC program to evaluate whether the data collected was of suitable quality to characterize the surface water conditions observed. This program required the collection of field duplicates and the calculation of the relative percent difference (RPD). The calculation method and acceptance level of 40% are discussed in CCME (2016). Two duplicate samples were collected during the January water sampling program. The RPD results ranged from 0% to 20% (**Table 2**). Therefore, the data satisfies the quality objectives for the monitoring program.

Environmental Accidents and Malfunctions

On January 17, 2020, a slow drip from an excavators was noticed. The leak was estimated to have lasted for 1 to 2 days, releasing approximately 20 litres of hydraulic oil. Once the leak was noticed, it was promptly addressed by securing the leak and removing the snow and soil with hydraulic oil. The leak did not occur near surface water, nor did the hydraulic oil enter a watercourse or pond. Field personnel from Dillon was onsite on January 21, 2020; no signs of hydraulic oil on surface was observed.

Public Complaints

There were no public complaints regarding the on-site operations during the January 2020 monitoring period.

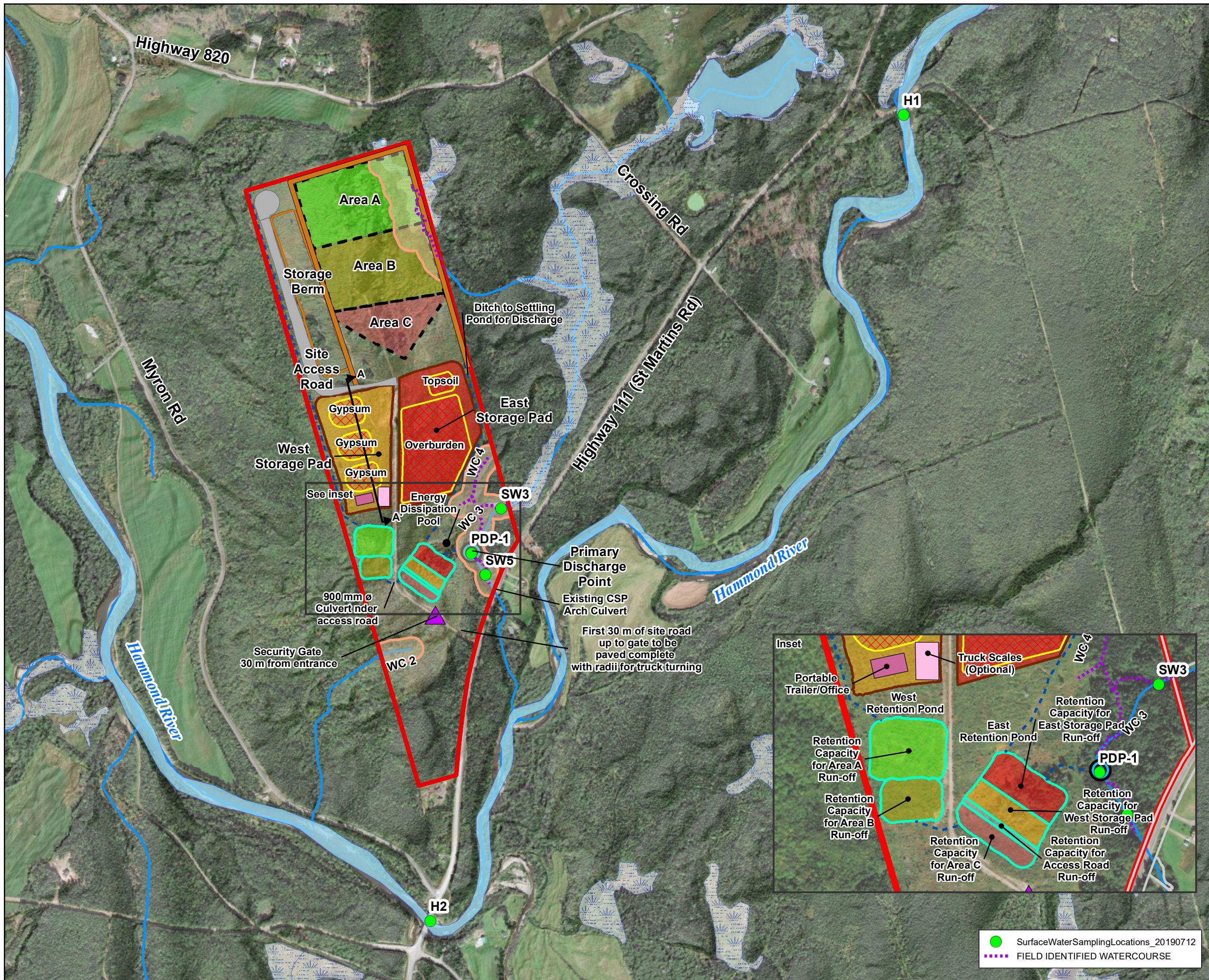
Summary

The water chemistry at the discharge point into WC3 is comparable to background. Based on the results provided in **Table 1**, the earthworks activities being conducted on site have not had a negative impact on WC3 and subsequently the Hammond River.

References

Canadian Council of Ministers of the Environment (CCME). 2015. Canadian environmental quality guidelines. Available online at: <http://cegg-rcqe.ccme.ca/en/index.html#void>

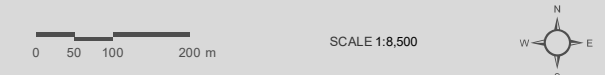
Canadian Council of Ministers of the Environment (CCME). 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment: Volume 1 Guidance Manual. Canadian environmental quality guidelines. ISBN 978-1-77202-026-7.



HAMMOND RIVER HOLDINGS LIMITED
PROPOSED UPHAM EAST GYPSUM QUARRY

SURFACE WATER SAMPLING LOCATIONS
FIGURE 1

- PROPERTY BOUNDARY
 - PROJECT DEVELOPMENT AREA
 - WATERBODY
 - WATERCOURSE
 - REGULATED WETLAND
 - 30 METRE WETLAND/WATERCOURSE BUFFER
- PROPOSED SITE FEATURES**
- DITCH
 - TRUCK SCALE (OPTIONAL)
 - SITE AREAS
 - DISCHARGE POINT
 - ▲ SECURITY GATE
 - PORTABLE TRAILER/OFFICE
 - ACCESS ROAD
 - STORAGE PAD
 - STOCKPILE
 - RETENTION POND
 - CROSS SECTION
 - QUARRY BERM CONSTRUCTED FROM TOPSOIL AND OVERBURDEN (OFFSET MINIMUM 7m FROM PROPERTY BOUNDARY)
 - HATCHING INDICATES MATERIAL STOCKPILE AREA ON TOP OF STORAGE PAD



MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED, CANVEC SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISS TOPO, OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
MAP CREATED BY: JH
MAP REVISED BY: JO
MAP CHECKED BY: GA
MAP PROJECTION: NAD_1983_CSRS_NEW_BRUNSWICK_STEREOGRAPHIC

FILE LOCATION: \\DILLON.CAD\DILLON_DFS\FREDERICTON\FREDERICTON CAD\CAD\GIS\188346 UPHAM GYPSUM QUARRY\MXD

- SurfaceWaterSamplingLocations_20190712
- ⋯ FIELD IDENTIFIED WATERCOURSE



PROJECT: 18-8346
STATUS: DRAFT
DATE: 2020/01/06

Table 1
Surface Water Monitoring
Upham East Gypsum Project
Upham, New Brunswick
Project No. 18-8346

Parameter	Ambient Air Temperature ^a	Precipitation 48 hours prior to sample collection ^b	Field Parameters					General Chemistry										
			pH	Water Temperature	Specific Conductivity	Dissolved Oxygen	Turbidity	Alkalinity (as CaCO ₃)	Calcium	Chloride	Hardness	Magnesium	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Suspended Solids ^c	
Units	°C	mm	-	°C	mS/cm	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CCME PAL ^d			6.5 - 9.0	-	-	-	8 ^e	-	-	640 (short term) 120 (long term)	-	-	-	-	-	-	-	
Sample ID	Date																	
SW-3 ^f	03-Jan-20	5.10	0.00	7.20	-	0.535	-	1.8	27	97.6	10.1	248	1.15	0.59	5.08	220	378	<5
SW-5 ^f	03-Jan-20			7.30	-	0.505	-	1.5	27	91.2	8.6	232	1.08	0.58	4.91	200	358	<5
PDP-1 ^f	03-Jan-20			7.20	-	0.508	-	1.4	25	91.9	9	234	1.10	0.58	4.81	200	354	<5
H1 ^f	03-Jan-20			7.30	-	0.114	-	0.7	21	14.2	7.7	38.8	0.81	0.36	4.07	18	74	<5
H2 ^f	03-Jan-20			7.30	-	0.122	-	0.6	20	15.5	7.5	42	0.81	0.37	4.06	21	80	<5
SW-3	10-Jan-20	3.00	1.30	6.75	0.23	0.565	6.51	0.2	39	152	8.7	386	1.58	0.75	6.21	300	521	<5
SW-5	10-Jan-20			5.98	0.28	0.502	7.71	0.2	36	125	10.1	318	1.38	0.66	5.08	250	449	<5
PDP-1	10-Jan-20			6.30	0.31	0.527	6.77	0.7	36	131	8.9	333	1.43	0.69	5.19	280	466	<5
H1	10-Jan-20			5.95	0.41	0.106	9.66	0.2	23	18.1	8.3	48.9	0.91	0.41	4.73	25	81	<5
H2	10-Jan-20			5.63	0.54	0.083	11.90	0.1	17	12.8	6.3	35.4	0.83	0.31	3.72	18	66	<5
SW-3	13-Jan-20	-5.30	1.50	5.18	2.16	0.222	7.84	10.0	15	39.1	12.2	101	0.73	0.54	5.71	79	168	<5
SW-5	13-Jan-20			5.28	2.27	0.214	8.43	10.7	14	37.6	13.5	96.9	0.73	0.53	5.64	76	163	<5
PDP-1	13-Jan-20			5.48	2.25	0.214	-	10.9	14	37.3	10.8	96.1	0.72	0.53	5.50	75	162	<5
H1	13-Jan-20			5.29	2.06	0.074	10.75	3.7	14	9.55	7.2	26.4	0.62	0.39	3.86	10	54	<5
H2 ^g	13-Jan-20			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW-3	21-Jan-20	-13.20	0.00	6.31	1.89	0.547	3.86	12.8	34	124	10.6	315	1.31	0.70	5.63	270	452	<5
SW-5 ^g	21-Jan-20			-	-	-	-	-	32	114	10.9	289	1.27	0.70	5.42	260	425	<5
PDP-1	21-Jan-20			6.41	1.88	0.550	0.00	9.1	33	119	10.6	301	1.28	0.68	5.36	260	427	<5
H1	21-Jan-20			5.92	1.87	0.102	0.06	6.9	22	15.4	8.9	41.7	0.81	0.49	4.13	20	70	<5
H2 ^g	21-Jan-20			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW-3	27-Jan-20	3.10	0.20	6.76	1.95	0.171	6.71	12.5	12	26.2	9	67.8	0.58	0.48	5.17	48	144	<5
SW-5	27-Jan-20			6.17	2.20	0.151	6.75	24.2	10	23.4	9	60.7	0.55	0.45	4.86	42	127	<5
PDP-1	27-Jan-20			6.14	2.14	0.164	6.26	14.7	11	25.2	10.4	65.3	0.57	0.54	4.90	45	123	<5
H1	27-Jan-20			6.24	2.03	0.074	7.65	10.7	14	9.16	7.4	25.2	0.57	0.48	4.21	10	53	<5
H2	27-Jan-20			6.33	2.08	0.077	8.03	22.4	13	9.55	8	26.1	0.55	0.51	4.11	11	54	<5

a) Temperature based on data from the climate station at the Saint John airport. Temperature is the value recorded at 12:00pm on the day of sampling. Data available at: https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

b) Precipitation based on data from the climate station at the Saint John airport. Data available at: https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

c) Site specific guideline, TSS cannot exceed 25 mg/L above background.

d) Canadian Council of Ministers of Environment (CCME) for the Protection of Aquatic Life.

e) Guideline for turbidity is for short-term exposure (e.g. 24 hour period) above background.

f) Multimeter was not functioning properly. Results for pH on December 4, 2019, and pH, conductivity, and turbidity on December 15, 2019 and January 3, 2020 were measured in the laboratory.

g) Sample and/or field parameters could not be collected due to ice build-up.

SW3 is the background sample for Watercourse 3; H1 is the background for the Hammond River.

' - ' denotes no guideline, not analyzed, or not applicable; FD = field duplicate.

75 bold/shaded value denotes concentration exceeds CCME criteria or TSS background.

Table 2
 Surface Water Monitoring - QA/QC Results
 Upham East Gypsum Project
 Upham, New Brunswick
 Project No. 18-8346

Parameter	General Chemistry										
	Alkalinity (as CaCO ₃)	Calcium	Chloride	Hardness	Magnesium	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Suspended Solids	
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Sample ID	Date										
SW5	13-Jan-20	14	37.6	13.5	97	0.73	0.53	5.64	76	163	<5
SW5 (FD)	13-Jan-20	14	36.8	11.0	95	0.70	0.52	5.46	75	162	<5
RPD value		0%	2%	20%	2%	4%	2%	3%	1%	1%	-
PDP-1	27-Jan-20	13	9.6	8.0	26	0.55	0.51	4.11	11	54	<5
PDP-1 (FD)	27-Jan-20	11	9.5	7.4	26	0.56	0.48	3.90	11	54	<5
RPD value		17%	1%	8%	1%	2%	6%	5%	0%	0%	-

RPD calculations and acceptance criteria based on CCME (2016).

' - ' denotes RPD could not be calculated because one or more parameters was below detection limit.

75 bold/shaded value denotes RPD above criteria of 40%.

Report ID: 341223-IAS
Report Date: 17-Jan-20
Date Received: 03-Jan-20

CERTIFICATE OF ANALYSIS

for
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Attention: Jonathan Oliver

Project #: 18-8346

Location: Upham

Analysis of Water

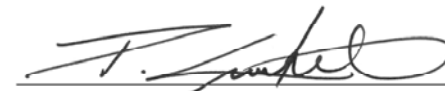
RPC Sample ID:			341223-1	341223-2	341223-3	341223-4	341223-5
Client Sample ID:			SW-3	SW-5	PDP-1	H1	H2
Date Sampled:			3-Jan-20	3-Jan-20	3-Jan-20	3-Jan-20	3-Jan-20
Analytes	Units	RL					
pH	units	-	7.2	7.3	7.2	7.3	7.3
Alkalinity (as CaCO ₃)	mg/L	2	27	27	25	21	20
Chloride	mg/L	0.5	10.1	8.6	9.0	7.7	7.5
Sulfate	mg/L	1	220	200	200	18	21
Turbidity	NTU	0.1	1.8	1.5	1.4	0.7	0.6
Solids - Total Dissolved	mg/L	5	378	358	354	74	80
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5	< 5	< 5
Conductivity	µS/cm	1	535	505	508	114	122
Hardness (as CaCO ₃)	mg/L	0.05	248.	232.	234.	38.8	42.0

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit



Ross Kean
Department Head
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Peter Crowhurst
Analytical Chemist
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WATER CHEMISTRY

Page 1 of 3

Report ID: 341223-IAS
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Attention: Jonathan Oliver

Project #: 18-8346

Location: Upham

Analysis of Metals in Water

RPC Sample ID:			341223-1	341223-2	341223-3	341223-4	341223-5
Client Sample ID:			SW-3	SW-5	PDP-1	H1	H2
Date Sampled:			3-Jan-20	3-Jan-20	3-Jan-20	3-Jan-20	3-Jan-20
Analytes	Units	RL					
Calcium	mg/L	0.05	97.6	91.2	91.9	14.2	15.5
Magnesium	mg/L	0.01	1.15	1.08	1.10	0.81	0.81
Potassium	mg/L	0.02	0.59	0.58	0.58	0.36	0.37
Sodium	mg/L	0.05	5.08	4.91	4.81	4.07	4.06

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry
Solids - Total Dissolved	-	APHA 2540 G	Evaporation, Gravimetry
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 342322-IAS
Report Date: 27-Jan-20
Date Received: 15-Jan-20

CERTIFICATE OF ANALYSIS

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Attention: Geoff Allaby
Project #: 17-5121-4100
Location: Upham
Analysis of Water

RPC Sample ID:	342322-1	342322-2	342322-3	342322-4	342322-5		
Client Sample ID:	H1	H2	SW3	PDP-1	SW5		
Date Sampled:	13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20		
Analytes	Units	RL					
Alkalinity (as CaCO ₃)	mg/L	2	23	17	39	36	36
Chloride	mg/L	0.5	8.3	6.3	8.7	8.9	10.1
Sulfate	mg/L	1	25	18	300	280	250
Solids - Total Dissolved	mg/L	5	81	66	521	466	449
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5	< 5	< 5
Hardness (as CaCO ₃)	mg/L	0.2	48.9	35.4	386.	333.	318.

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WATER CHEMISTRY

Page 1 of 3



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Report ID: 342322-IAS
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CERTIFICATE OF ANALYSIS

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Attention: Geoff Allaby
Project #: 17-5121-4100
 Location: Upham

Analysis of Metals in Water

RPC Sample ID:			342322-1	342322-2	342322-3	342322-4	342322-5
Client Sample ID:			H1	H2	SW3	PDP-1	SW5
Date Sampled:			13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20
Analytes	Units	RL					
Calcium	µg/L	50	18100	12800	152000	131000	125000
Magnesium	µg/L	10	910	830	1580	1430	1380
Potassium	µg/L	20	410	310	750	690	660
Sodium	µg/L	50	4730	3720	6210	5190	5080

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry
Solids - Total Dissolved	-	APHA 2540 G	Evaporation, Gravimetry
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

WATER METHODS

Report ID: 342325-IAS
Report Date: 27-Jan-20
Date Received: 15-Jan-20

CERTIFICATE OF ANALYSIS

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Attention: Geoff Allaby
Project #: 17-5121-4100
Location: Upham
Analysis of Water

RPC Sample ID:	342325-1	342325-2	342325-3	342325-4	342325-5		
Client Sample ID:	H1	SW3	SW5	PDP-1	SW18-3		
Date Sampled:	13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20		
Analytes	Units	RL					
Alkalinity (as CaCO ₃)	mg/L	2	14	15	14	14	14
Chloride	mg/L	0.5	7.2	12.2	13.5	10.8	11.0
Sulfate	mg/L	1	10	79	76	75	75
Solids - Total Dissolved	mg/L	5	54	168	163	162	162
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5	< 5	< 5
Hardness (as CaCO ₃)	mg/L	0.2	26.4	101.	96.9	96.1	94.8

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Brannen Burhoe

Brannen Burhoe
Chemical Technician
Inorganic Analytical Services

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Page 1 of 3

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Attention: Geoff Allaby
Project #: 17-5121-4100
 Location: Upham

Analysis of Metals in Water

RPC Sample ID:			342325-1	342325-2	342325-3	342325-4	342325-5
Client Sample ID:			H1	SW3	SW5	PDP-1	SW18-3
Date Sampled:			13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20	13-Jan-20
Analytes	Units	RL					
Calcium	µg/L	50	9550	39100	37600	37300	36800
Magnesium	µg/L	10	620	730	730	720	700
Potassium	µg/L	20	390	540	530	530	520
Sodium	µg/L	50	3860	5710	5640	5500	5460

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Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry
Solids - Total Dissolved	-	APHA 2540 G	Evaporation, Gravimetry
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 343170-IAS
Report Date: 06-Feb-20
Date Received: 23-Jan-20

CERTIFICATE OF ANALYSIS

for
Dillon Consulting Ltd
274 Sydney Street, Suite 200
Saint John, NB E2L 0A8

rpc

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Attention: Jonathan Oliver

Project #: 17-5121-4100

Location: Upham

Analysis of Water

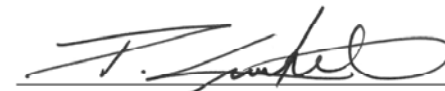
RPC Sample ID:	343170-1	343170-1 Dup	343170-2	343170-3	343170-4		
Client Sample ID:	H1	Lab Duplicate	SW3	PDP-1	SW5		
Date Sampled:	21-Jan-20	21-Jan-20	21-Jan-20	21-Jan-20	21-Jan-20		
Analytes	Units	RL					
Alkalinity (as CaCO ₃)	mg/L	2	22	-	34	33	32
Chloride	mg/L	0.5	8.9	-	10.6	10.6	10.9
Sulfate	mg/L	1	20	-	270	260	260
Solids - Total Dissolved	mg/L	5	70	75	452	427	425
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5	< 5	< 5
Hardness (as CaCO ₃)	mg/L	0.2	41.7	-	315.	301.	289.

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit



Ross Kean
Department Head
Inorganic Analytical Chemistry



Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

WATER CHEMISTRY

Page 1 of 3

Report ID: 343170-IAS
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Attention: Jonathan Oliver

Project #: 17-5121-4100

Location: Upham

Analysis of Metals in Water

RPC Sample ID:			343170-1	343170-2	343170-3	343170-4
Client Sample ID:			H1	SW3	PDP-1	SW5
Date Sampled:			21-Jan-20	21-Jan-20	21-Jan-20	21-Jan-20
Analytes	Units	RL				
Calcium	mg/L	0.05	15.4	124.	119.	114.
Magnesium	mg/L	0.01	0.81	1.31	1.28	1.27
Potassium	mg/L	0.02	0.49	0.70	0.68	0.70
Sodium	mg/L	0.05	4.13	5.63	5.36	5.42

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Solids - Total Dissolved	-	APHA 2540 G	Evaporation, Gravimetry
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 343615-IAS
Report Date: 05-Feb-20
Date Received: 28-Jan-20

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Attention: Jonathan Oliver

Project #: 17-5121-4100

Location: Upham

Analysis of Water

RPC Sample ID:	343615-1	343615-2	343615-3	343615-4	343615-5	343615-6		
Client Sample ID:	H1	H2	SW3	SW5	PDP-1	SW8		
Date Sampled:	27-Jan-20	27-Jan-20	27-Jan-20	27-Jan-20	27-Jan-20	27-Jan-20		
Analytes	Units	RL						
Alkalinity (as CaCO ₃)	mg/L	2	14	13	12	10	11	11
Chloride	mg/L	0.5	7.4	8.0	9	9.0	10.4	7.4
Sulfate	mg/L	1	10	11	48	42	45	11
Solids - Total Dissolved	mg/L	5	53	54	144	127	123	54
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5	< 5	< 5	< 5
Hardness (as CaCO ₃)	mg/L	0.2	25.2	26.1	67.8	60.7	65.3	25.9

This report relates only to the sample(s) and information provided to the laboratory.

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Ross Kean

Ross Kean
Department Head
Inorganic Analytical Chemistry

Brannen Burhoe

Brannen Burhoe
Chemical Technician
Inorganic Analytical Services

WATER CHEMISTRY

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Attention: Jonathan Oliver

Project #: 17-5121-4100

Location: Upham

Analysis of Metals in Water

RPC Sample ID:			343615-1	343615-2	343615-3	343615-4	343615-5	343615-6
Client Sample ID:			H1	H2	SW3	SW5	PDP-1	SW8
Date Sampled:			27-Jan-20	27-Jan-20	27-Jan-20	27-Jan-20	27-Jan-20	27-Jan-20
Analytes	Units	RL						
Calcium	µg/L	50	9160	9550	26200	23400	25200	9450
Magnesium	µg/L	10	570	550	580	550	570	560
Potassium	µg/L	20	480	510	480	450	540	480
Sodium	µg/L	50	4210	4110	5170	4860	4900	3900

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