Memo

HAMMOND RIVER HOLDINGS

To: Mike Cormier, P.Eng. – Director, Authorizations Branch, New Brunswick Department of Environment and Local Government

From: Daniel Guest, Hammond River Holdings Ltd.

Cc: Justin Chase – Environmental Impact Assessment Branch, New Brunswick Department of Environment and Local Government

Date: November 8, 2023

Subject: Monthly Monitoring Report – Upham East Gypsum Quarry – February 2023

Our File: File # 21-3049

Introduction

This monthly report details activities associated with the Upham East Gypsum Quarry operations for the month of February 2023, in accordance with the Approval to Operate I-10936 conditions. Activities included surface water monitoring, groundwater level monitoring, air monitoring, and blasting. For previous monthly activities, refer to the monthly reports provided from December 2019 through January 2023.

Weekly compliance surface water monitoring in February was conducted as per the following:

- Week 1: February 2, 2023
- Week 2: February 20, 2023

Due to frozen watercourse conditions during the weeks of February 5, 12 and 26, 2022, surface water samples were not collected during those weeks.

Surface Water Sampling

Field Methods

Field parameters were measured using a calibrated turbidity meter and probe. Field parameters are temperature, conductivity, and turbidity. These parameters were measured at three sampling locations as per the Environmental Management Plan (EMP) for Operation (Dillon 2020). All samples were submitted for lab analysis of total suspended solids (TSS).

Surface water samples were collected from three 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

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

Surface water compliance monitoring results are provided in Table 1. Analytical certificates are attached. The monthly average of grab samples for TSS was calculated for each site, presented in Table 2. The monthly averages for TSS were all below the site-specific guideline for each site laid out in the Approval to Operate, displayed in Figure 2.

A QA/QC program was implemented 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). One duplicate sample was collected during the February water sampling program. The RPD results could not be calculated due to one of the results being below the laboratory detection limit. Therefore, the data satisfies the quality objectives for the monitoring program.

Groundwater Monitoring

Methodology

Water levels were retrieved from the dataloggers installed in the 8 perimeter monitoring wells and 3 potable wells (Figure 3) via Solinst Levelogger Software 4.5 on March 3, 2023 and have been included in the February monthly report. The dataloggers were then reset to collect readings at 5 minute intervals.

Results

Data for the perimeter monitoring wells (Figure 4) and potable wells (Figure 5, 6 and 7) are presented as time series plots. Total precipitation (mm) is also presented within each figure, representing periods of recharge. The overall trend in the perimeter monitoring wells has remained consistent with seasonal fluctuations. The potable wells experienced short-term fluctuations, as is expected with normal well use and predictable longer-term fluctuations typical of seasonal variations. Based on the available data as described for the February 2023 monitoring period, there does not appear to be a negative impact on water levels in the perimeter and potable wells as a result of quarry operations.

Environmental Accidents and Malfunctions

There were no reported environmental accidents or malfunctions during the February 2023 monitoring period.

Ambient Air Quality Monitoring – Total Suspended Particulate

24-hour air samples are collected every 6 days in accordance with the National Air Pollution Surveillance (NAPS) schedule. The air quality monitor used to conduct the monitoring is a BGI PQ100 air sampler, a high-volume sampler for total suspended particulate matter. In February, there were 5 air quality monitoring events, February 1, 7, 13, 19, and 25, 2023. The results are provided in Table 3. There were no exceedances of the 120 $\mu g/m^3$ maximum permissible ground level concentration of total suspended particulate that is specified in Schedule B of the New Brunswick *Air Quality Regulation – Clean Air Act*.

Blasting

Two blasts occurred during the February 2023 monitoring period, occurring on February 7 and 16, 2023. There were no exceedances of the Approval to Operate limits for maximum velocity and sound pressure for the blasting events. Blast reports are attached.

Public Complaints

There were no complaints received during the February 2023 monitoring period.

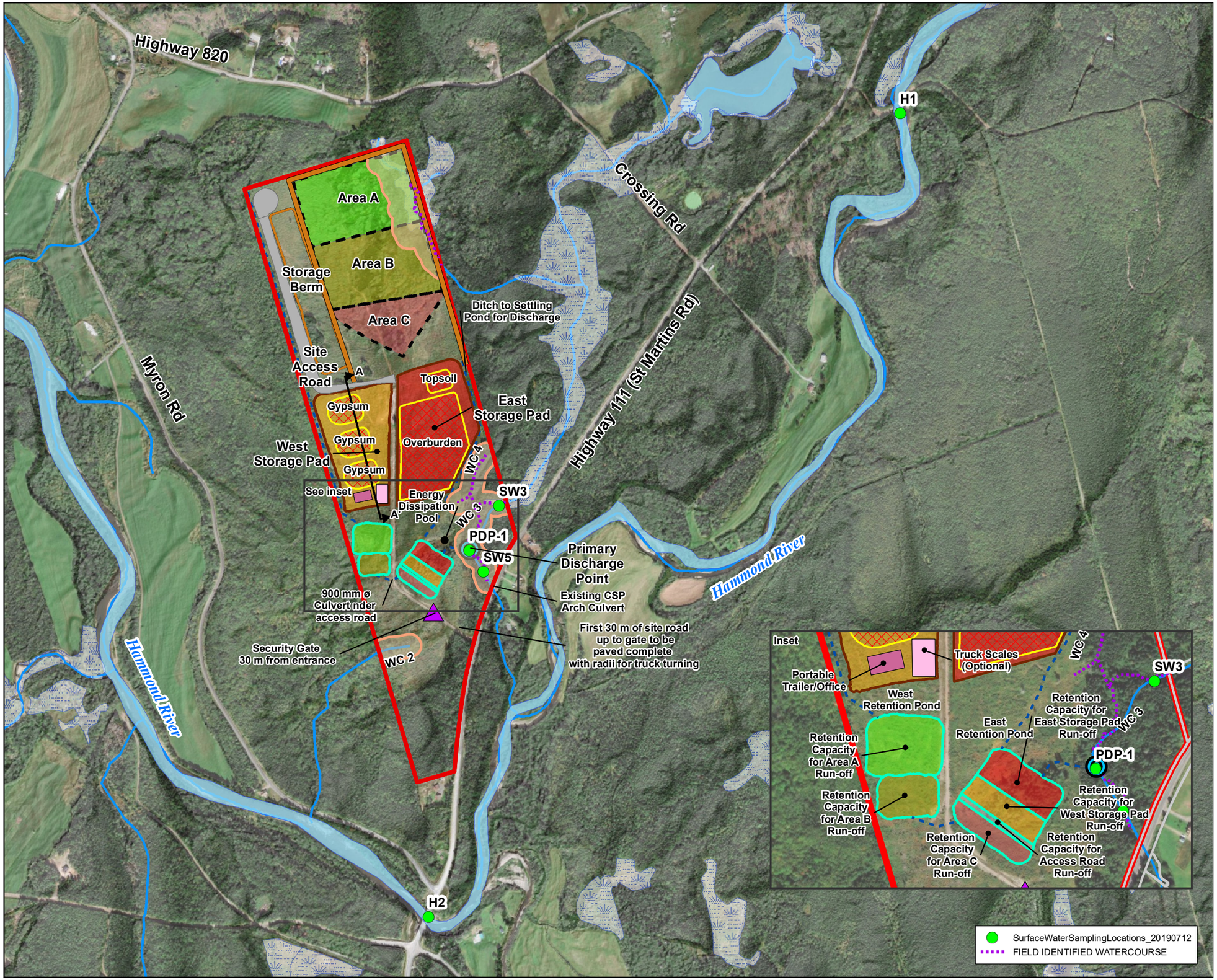
Summary

Since extraction activities began in July 2020 at the Upham East Gypsum Quarry, the water chemistry at the discharge point into the unnamed tributary has remained comparable to background, groundwater measured in the perimeter monitoring wells remains comparable to pre-operation conditions, air quality monitoring has remained below guidelines, and decibel levels have remained generally below guidelines.

References

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.

Dillon (Dillon Consulting Limited). 2020 Environmental Management Plan (EMP) for Operation. Upham East Gypsum Quarry Project, Upham New Brunswick. Prepared for Hammond River Holdings Limited by Dillon Consulting Limited, Fredericton, New Brunswick. Project 18-8346. June 2020.



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

0 50 100 200 m

SCALE 1:8,500

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

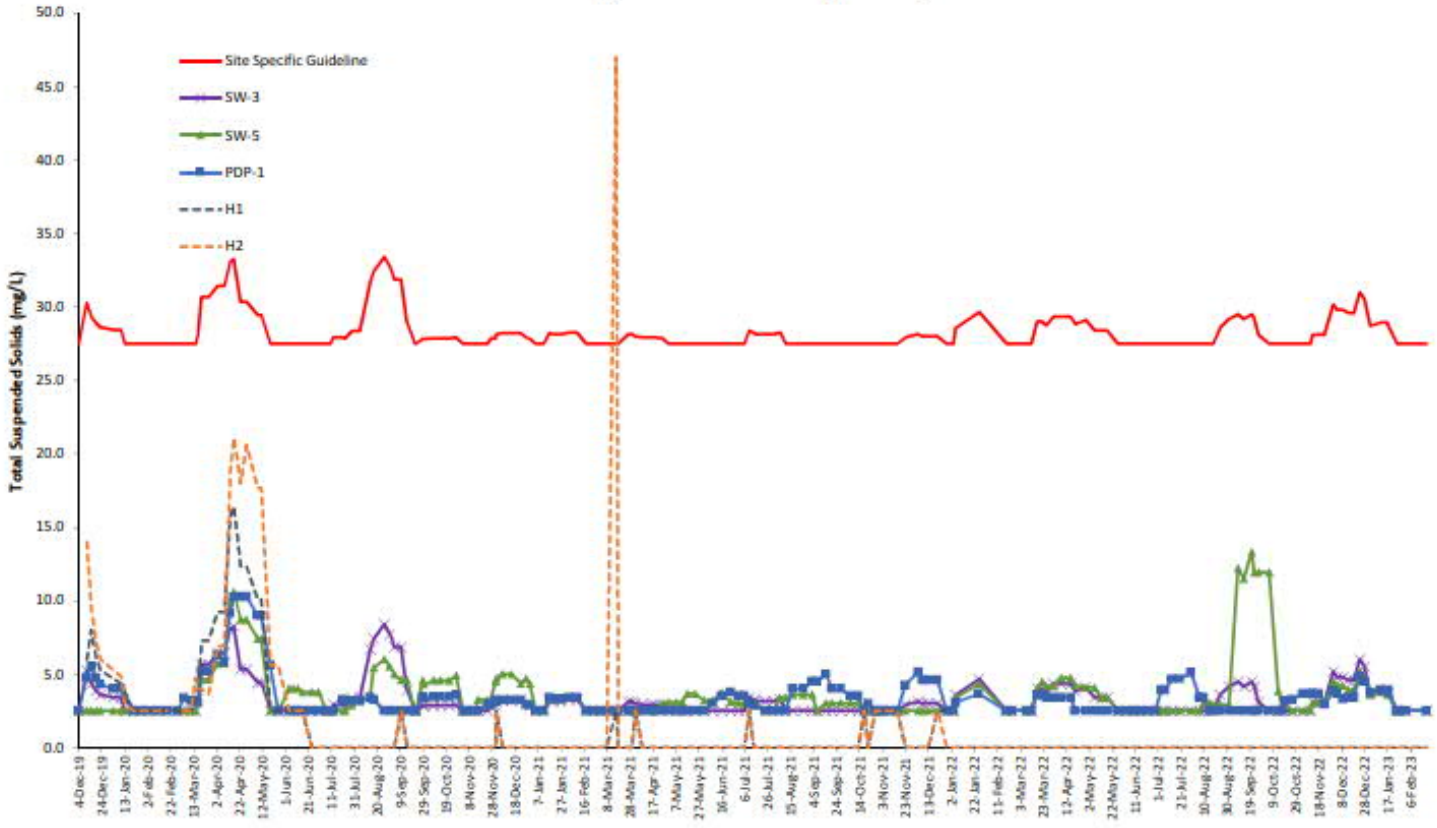
MAP CREATED BY: JH
MAP REVISED BY: JO
MAP CHECKED BY: GA
MAP PROJECTION: NAD_1983_CSRS_NEW_BRUNSWICK_STEREOGRAPHIC

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

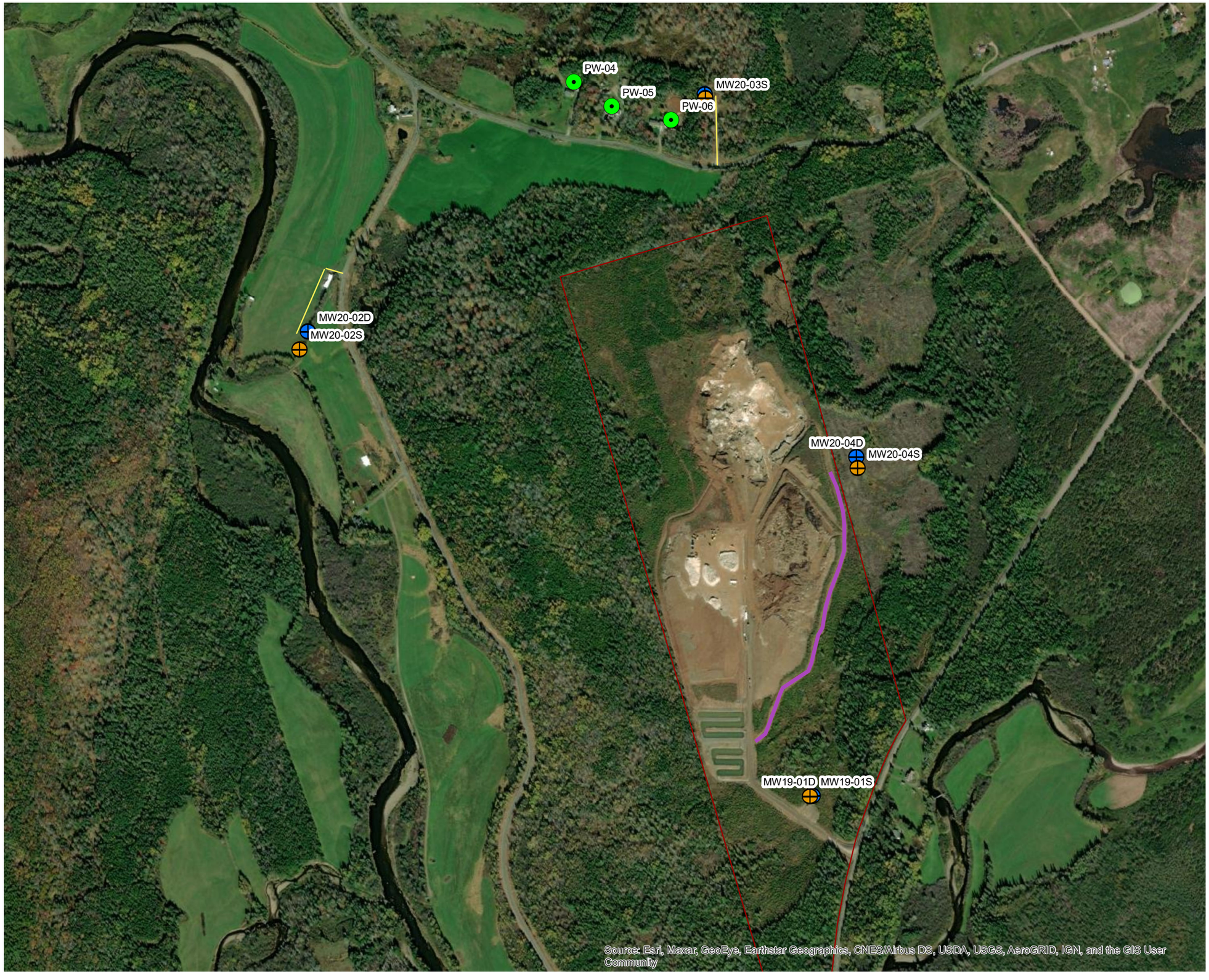
DILLON CONSULTING

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

Figure 2: TSS Monthly Average



Notes:
The detection limit for TSS is 5 mg/L; for results <5 mg/L, half the detection limit was used.
Monthly average is calculated based on results from the previous 30 days.
Site specific guideline is 25 mg/L above the monthly average.



HAMMOND RIVER HOLDINGS
UPHAM EAST GYPSUM QUARRY

GROUNDWATER MONITORING LOCATIONS
FIGURE 3

- Potable Well Leveloggers
- Deep
- Shallow
- Upham Outline

SCALE 1:XXX

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: JTO
MAP CHECKED BY: GA
MAP PROJECTION: NB DOUBLE STEROGRAPHIC

FILE LOCATION: \\DILLON.CA\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DI\MXD TEMPLATES\BEIGE - 11X17 LANDSCAPE - LEGEND RIGHT.MXD

DILLON CONSULTING

PROJECT: 18-8346
STATUS: DRAFT
DATE: 06/15/2021

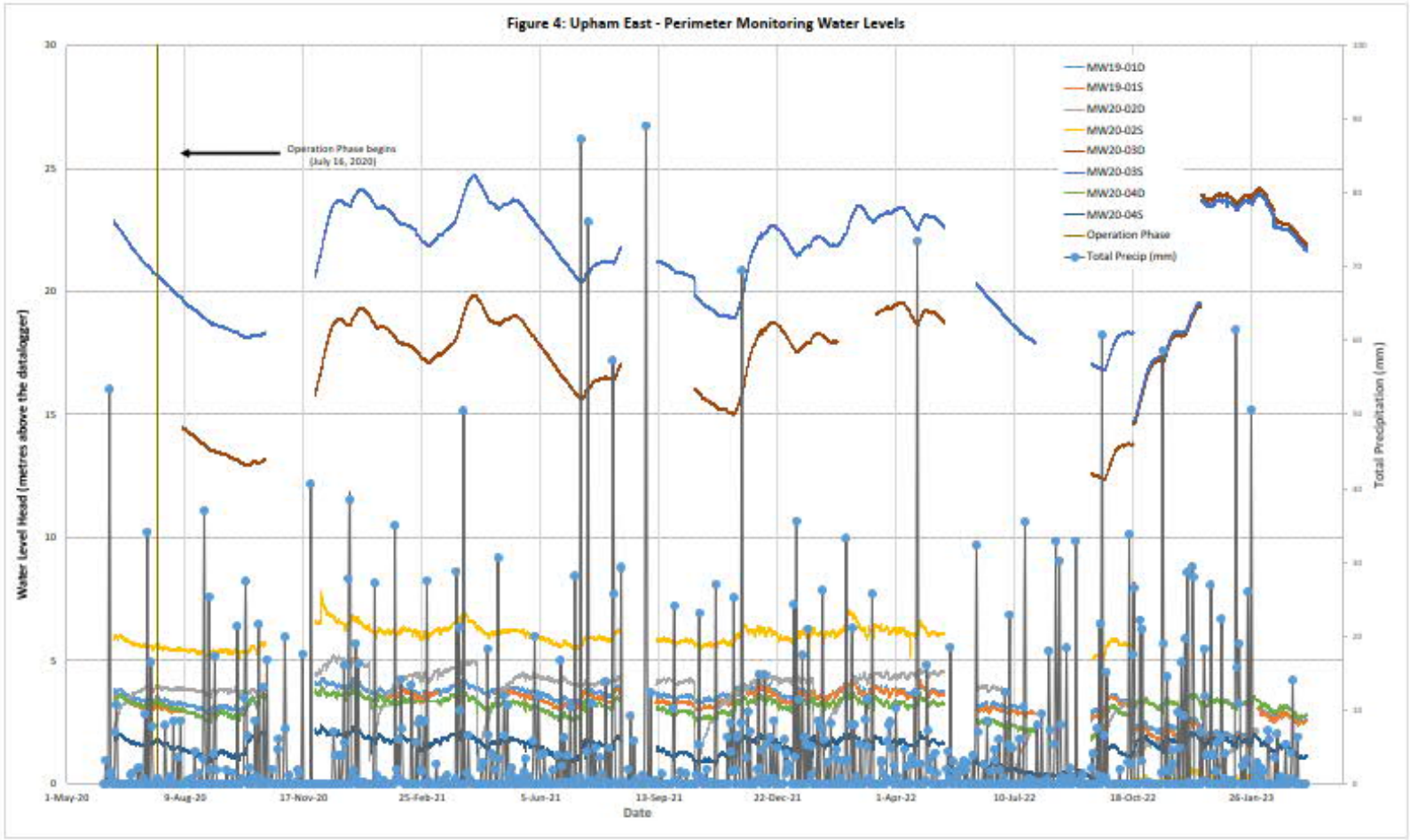


Figure 4: Upham East - Perimeter Monitoring Water Levels
Operation Phase begins
(July 16, 2020)
MW19-01D
MW19-01S
MW20-02D
MW20-02S
MW20-03D
MW20-03S
MW20-04D
MW20-04S
Operation Phase
Total Precip (mm)
Water Level Head (metres above the datalogger)
Total Precipitation (mm)
Date
1-May-20
9-Aug-20
17-Nov-20
25-Feb-21
5-Jun-21
13-Sep-21
22-Dec-21
1-Apr-22
10-Jul-22
18-Oct-22
26-Jan-23

Figure 5: PW-04 Water Levels

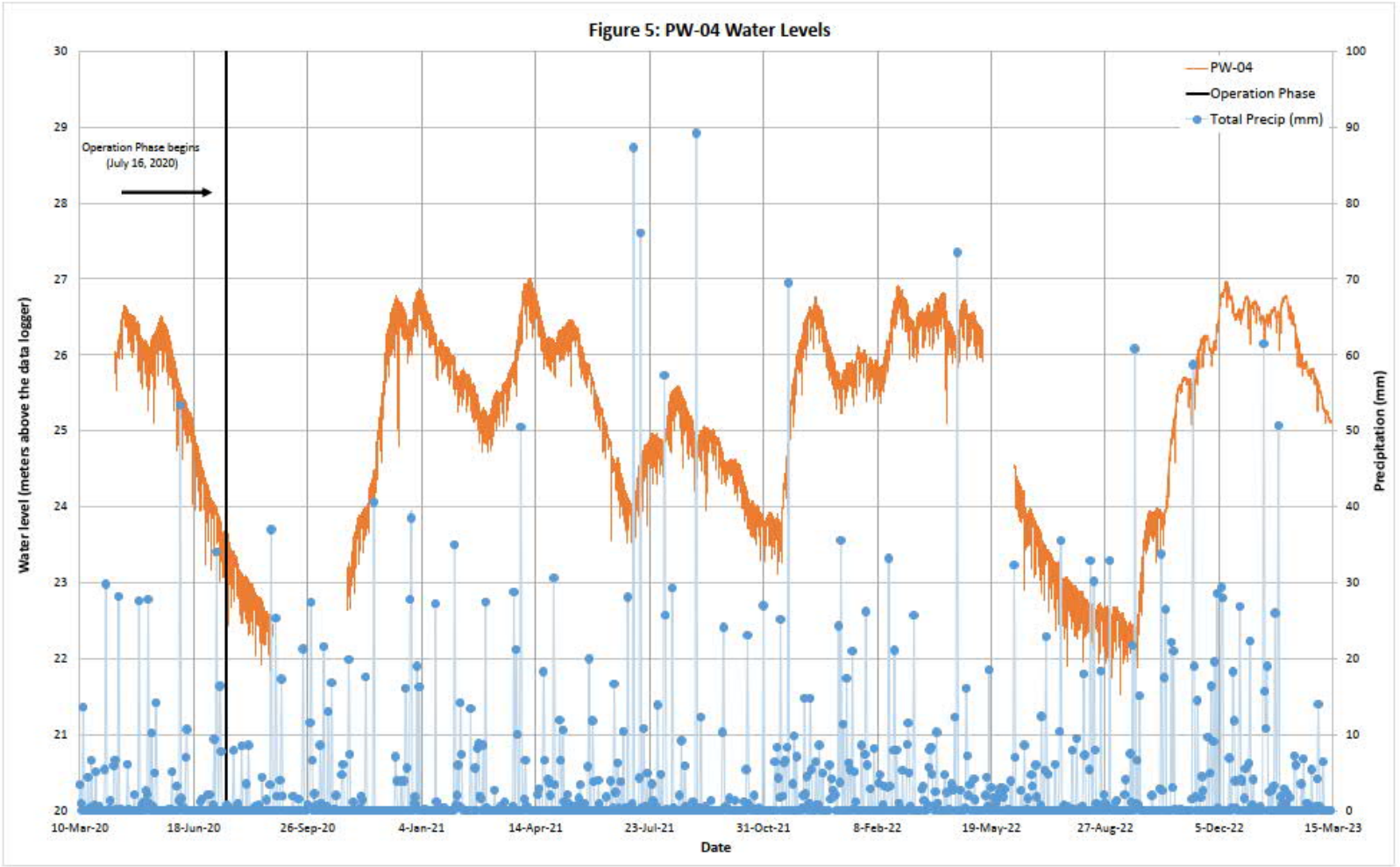
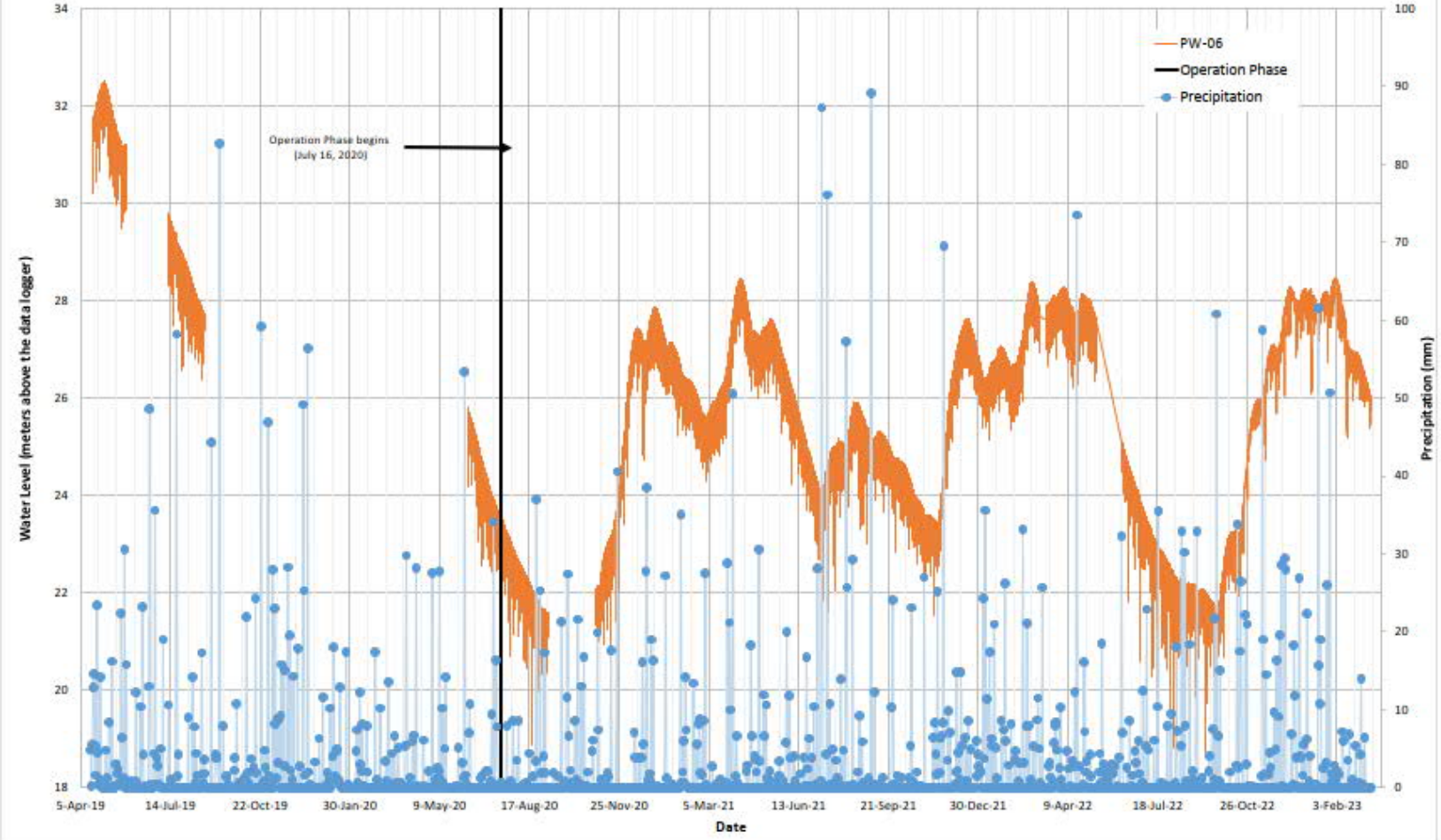


Figure 6: PW-06 Water Levels



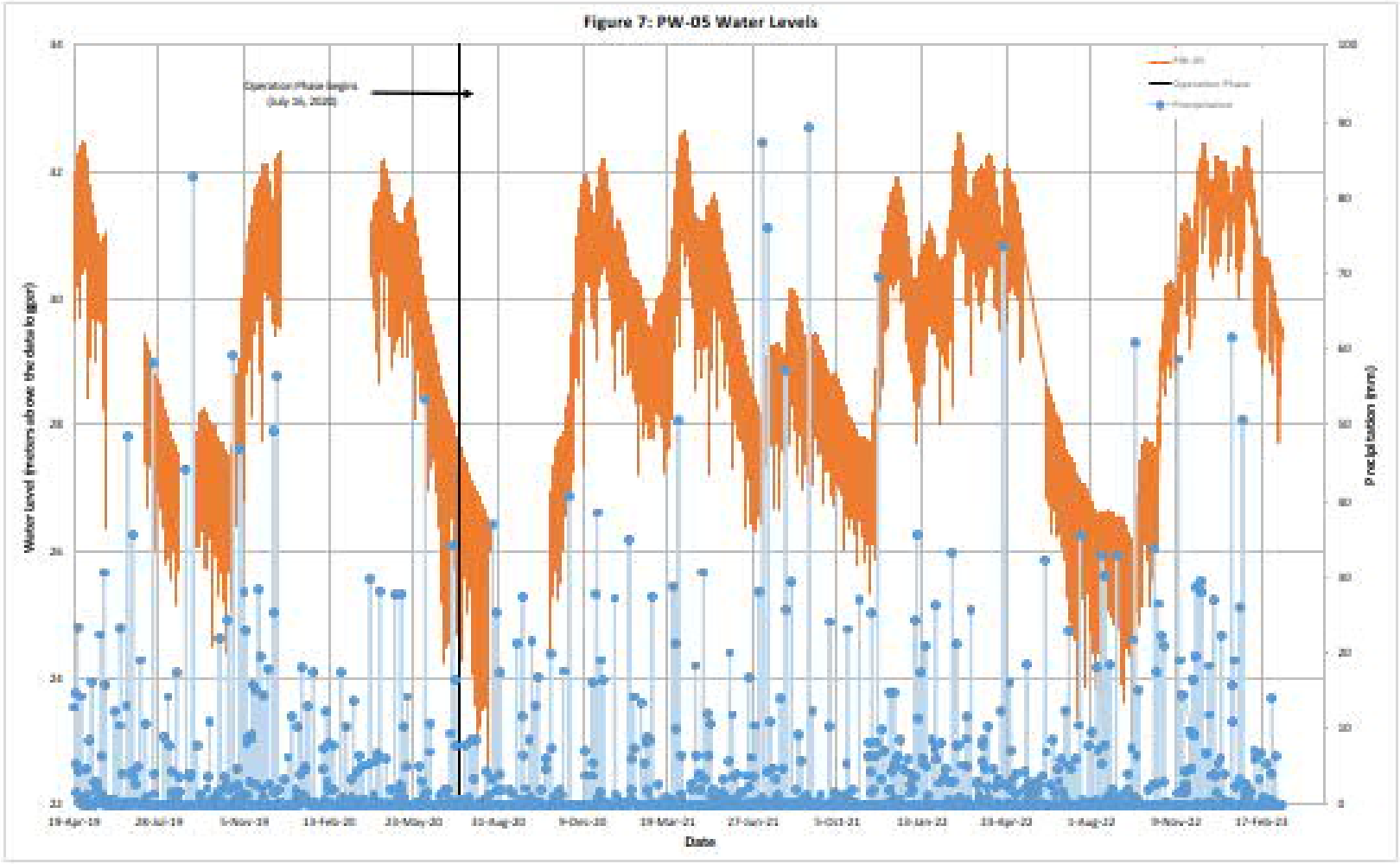


Figure 7: PW-05 Water Levels
Operation Phase begins
(July 16, 2020)
Water Level (meters above the datum geoid)
Precipitation (mm)
Date

Table 1
February 2023 Surface Water Monitoring
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Parameter		Ambient Air Temperature[a]	Precipitation 48 hours prior to sample collection[b]	Water Temperature	Specific Conductivity	Turbidity	Total Suspended Solids[c]
Units		°C	mm	°C	mS/cm	NTU	mg/L
Sample ID	Date						
SW3	02/02/2023/10:22	-10.9	2.9	0.6	495	1.84	<5
PDP-1	02/02/2023/10:32			0.2	541	1.44	<5
SW5	02/02/2023/10:38			0.1	544	1.40	<5
PDP-1 duplicate	02/02/2023/10:33			0.2	539	1.49	6
SW3	2-20-23 11:25	-10.9	0.0	1.0	380	3.74	<5
PDP-1	2-20-23 11:32			1.0	563	2.34	<5
SW5	2-20-23 11:40			0.8	580	3.23	<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) Preciptitation 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 the background monthly average.

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

SW3 is the background sample for Watercourse 3.

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

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	PDP-1	SW5
04-Dec-19	27.5	-	-	2.5	2.5	2.5
11-Dec-19	30.3	6.0	14.0	5.3	4.8	2.5
15-Dec-19	29.3	8.0	9.5	4.3	5.5	2.5
19-Dec-19	28.9	6.2	7.2	3.9	4.8	2.5
23-Dec-20	28.6	5.3	6.0	3.6	4.3	2.5
03-Jan-20	28.4	4.7	5.3	3.4	4.0	2.5
10-Jan-20	28.4	4.3	4.8	3.4	4.0	2.5
13-Jan-20	27.5	3.8	3.0	2.5	3.3	2.5
21-Jan-20	27.5	2.5	2.5	2.5	2.5	2.5
27-Jan-20	27.5	2.5	2.5	2.5	2.5	2.5
03-Feb-20	27.5	2.5	2.5	2.5	2.5	2.5
11-Feb-20	27.5	2.5	2.5	2.5	2.5	2.5
19-Feb-20	27.5	2.5	2.5	2.5	2.5	2.5
28-Feb-20	27.5	2.5	0.0	2.5	2.5	2.5
05-Mar-20	27.5	2.5	2.5	2.5	3.4	2.5
11-Mar-20	27.5	2.5	2.5	2.5	3.2	2.5
15-Mar-20	27.5	3.4	4.8	2.5	3.2	2.5
17-Mar-20	28.3	4.0	4.0	3.3	3.1	3.1
20-Mar-20	30.6	7.3	4.0	5.6	5.2	4.6
26-Mar-20	30.6	7.3	3.6	5.6	5.2	4.6
03-Apr-20	31.4	9.2	6.9	6.4	6.3	5.7
09-Apr-20	31.4	9.2	6.9	6.4	5.8	5.7
14-Apr-20	33.1	15.7	18.8	8.1	9.1	9.9
17-Apr-20	33.3	16.4	21.1	8.3	10.3	10.6
23-Apr-20	30.3	12.3	18.0	5.3	10.3	8.7
28-Apr-20	30.3	12.3	20.6	5.3	10.3	8.7
08-May-20	29.1	9.0	15.5	4.1	9.0	6.7
11-May-20	29.1	9.0	15.5	4.1	8.1	6.7
19-May-20	27.5	2.5	5.1	2.5	5.1	2.5
26-May-20	27.5	2.5	5.1	2.5	2.5	2.5
04-Jun-20	27.5	2.5	2.5	2.5	2.5	10.0
08-Jun-20	27.5	2.5	2.5	2.5	2.5	2.5
12-Jun-20	27.5	2.5	2.5	2.5	2.5	2.5
16-Jun-20	27.5	2.5	2.5	2.5	2.5	2.5
24-Jun-20	27.5	-	-	2.5	2.5	2.5
30-Jun-20	27.5	-	-	2.5	2.5	2.5
07-Jul-20	27.5	-	-	2.5	2.5	2.5
10-Jul-20	27.5	-	-	2.5	2.5	2.5
13-Jul-20	27.9	-	-	5.0	2.5	2.5
21-Jul-20	27.9	-	-	2.5	7.0	2.5
23-Jul-20	27.8	-	-	2.5	2.5	2.5
29-Jul-20	28.3	-	-	6	2.5	5
05-Aug-20	28.4	-	-	3.4	3.1	3.2
14-Aug-20	31.7	-	-	6.7	3.4	3.5

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Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	PDP-1	SW5
17-Aug-20	32.4	-	-	7.4	3.3	5.4
26-Aug-20	33.4	-	-	8.4	2.5	6.0
31-Aug-20	32.7	-	-	7.7	2.5	5.5
04-Sep-20	31.8	-	-	6.8	2.5	5.0
10-Sep-20	31.8	2.5	2.5	6.8	2.5	4.6
15-Sep-20	28.9	-	-	3.9	2.5	4.6
22-Sep-20	27.5	-	-	2.5	2.5	2.5
23-Sep-20	27.5	-	-	2.5	2.5	2.5
29-Sep-20	27.9	-	-	2.9	3.4	4.6
30-Sep-20	27.8	-	-	2.8	3.3	4.3
08-Oct-20	27.9	-	-	2.5	2.5	2.5
14-Oct-20	27.9	-	-	2.5	2.5	2.5
22-Oct-20	27.9	-	-	2.5	2.5	2.5
28-Oct-20	27.9	-	-	2.5	2.5	2.5
03-Nov-20	27.5	-	-	2.5	2.5	2.5
05-Nov-20	27.5	-	-	2.5	2.5	2.5
13-Nov-20	27.5	-	-	2.5	2.5	2.5
16-Nov-20	27.5	-	-	2.5	2.5	7.0
24-Nov-20	27.5	-	-	2.5	5.0	2.5
27-Nov-20	27.9	-	-	5	2.5	2.5
01-Dec-20	27.9	-	-	2.9	3.2	4.5
02-Dec-20	28.1	2.5	2.5	3.1	3.1	4.7
07-Dec-20	28.2	-	-	3.2	3.2	5.0
15-Dec-20	28.2	-	-	3.2	3.2	5.0
23-Dec-20	28.2	-	-	3.2	3.2	4.4
28-Dec-20	27.9	-	-	2.9	2.9	4.7
31-Dec-20	27.9	-	-	2.9	2.9	4.4
05-Jan-21	27.5	-	-	2.5	2.5	2.5
12-Jan-21	27.5	-	-	2.5	2.5	2.5
17-Jan-21	28.3	-	-	3.3	3.4	3.4
21-Jan-21	28.1	-	-	3.1	3.3	3.3
27-Jan-21	28.1	-	-	3.1	3.3	3.3
03-Feb-21	28.3	-	-	3.3	3.4	3.4
10-Feb-21	28.3	-	-	3.3	3.4	3.4
18-Feb-21	27.5	-	-	2.5	2.5	2.5
25-Feb-21	27.5	-	-	2.5	2.5	2.5
02-Mar-21	27.5	-	-	2.5	2.5	2.5
08-Mar-21	27.5	-	-	2.5	2.5	2.5
16-Mar-21	27.5	-	-	2.5	2.5	2.5
18-Mar-21	27.5	2.5	-	2.5	-	2.5
26-Mar-21	27.5	-	47.0	-	2.5	-
27-Mar-21	28.1	-	-	3.1	2.5	2.5
30-Mar-21	28.1	-	-	3.1	2.5	2.5
02-Apr-21	28.0	-	-	3.0	2.5	2.5

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Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
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Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	PDP-1	SW5
08-Apr-21	27.9	-	-	2.9	2.5	2.5
16-Apr-21	27.9	-	-	2.9	2.5	2.5
19-Apr-21	27.9	-	-	2.9	2.5	2.5
26-Apr-21	27.9	-	-	2.9	2.5	3.0
01-May-21	27.5	-	-	2.5	2.5	3.1
08-May-21	27.5	-	-	2.5	2.5	3.1
13-May-21	27.5	-	-	2.5	2.5	3.1
17-May-21	27.5	-	-	2.5	2.5	3.7
24-May-21	27.5	-	-	2.5	2.5	3.7
01-Jun-21	27.5	-	-	2.5	2.5	3.2
08-Jun-21	27.5	-	-	2.5	3.0	3.2
16-Jun-21	27.5	-	-	2.5	3.5	3.7
24-Jun-21	27.5	-	-	2.5	3.8	3.1
01-Jul-21	27.5	-	-	2.5	3.5	3.0
06-Jul-21	27.5	-	-	2.5	3.5	3.0
10-Jul-21	28.4	-	-	3.4	3.0	3.0
14-Jul-21	28.3	-	-	3.3	2.9	2.9
15-Jul-21	28.1	-	-	3.1	2.9	2.9
24-Jul-21	28.1	-	-	3.1	2.5	2.5
31-Jul-21	28.1	-	-	3.1	2.5	2.5
6-Aug-21	28.3	-	-	3.3	2.5	2.5
11-Aug-21	27.5	-	-	2.5	2.5	2.5
17-Aug-21	27.5	-	-	2.5	4.0	10.0
26-Aug-21	27.5	-	-	2.5	4.0	2.5
3-Sep-21	27.5	-	-	2.5	4.5	5.0
7-Sep-21	27.5	-	-	2.5	4.5	2.5
15-Sep-21	27.5	-	-	2.5	5.0	5.0
20-Sep-21	27.5	-	-	2.5	4.0	5.0
28-Sep-21	27.5	-	-	2.5	4.0	2.5
6-Oct-21	27.5	-	-	2.5	3.5	2.5
13-Oct-21	27.5	2.5	2.5	2.5	3.5	2.5
18-Oct-21	27.5	-	-	2.5	3.0	2.5
22-Oct-21	27.5	-	-	2.5	2.5	2.5
28-Oct-21	27.5	-	-	2.5	2.5	2.5
01-Nov-21	27.5	-	-	2.5	2.5	2.5
03-Nov-21	27.5	-	-	2.5	2.5	2.5
09-Nov-21	27.5	-	-	2.5	2.5	2.5
16-Nov-21	27.5	-	-	2.5	2.5	2.5
23-Nov-21	27.9	-	-	2.9	4.3	2.5
4-Dec-21	28.1	-	-	3.1	5.1	2.5
8-Dec-21	28.0	-	-	3.0	4.6	2.5
13-Dec-21	28.0	-	-	3.0	4.6	2.5
21-Dec-21	28.0	-	-	3.0	4.6	2.5
29-Dec-21	27.5	-	-	2.5	2.5	2.5

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Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	PDP-1	SW5
4-Jan-22	27.5	-	-	2.5	2.5	2.5
6-Jan-22	28.6	-	-	9.0	6.0	8.0
26-Jan-22	29.7	2.5	2.5	-	-	-
19-Feb-22	27.5	-	-	2.5	2.5	2.5
24-Feb-22	27.5	-	-	2.5	2.5	2.5
9-Mar-22	27.5	-	-	2.5	2.5	2.5
13-Mar-22	27.5	-	-	2.5	2.5	2.5
18-Mar-22	29.0	-	-	4.0	4.0	3.6
22-Mar-22	29.0	-	-	4.0	4.5	3.6
26-Mar-22	28.8	-	-	3.8	4.2	3.4
1-Apr-22	29.3	-	-	4.3	3.4	4.2
8-Apr-22	29.3	-	-	4.3	3.4	4.8
16-Apr-22	29.3	-	-	4.3	3.4	4.8
20-Apr-22	28.8	-	-	3.8	2.5	4.3
29-Apr-22	29.1	-	-	4.1	2.5	4.1
7-May-22	28.4	-	-	2.5	2.5	2.5
13-May-22	28.4	-	-	2.5	2.5	2.5
18-May-22	28.4	-	-	2.5	2.5	2.5
27-May-22	27.5	-	-	2.5	2.5	2.5
4-Jun-22	27.5	-	-	2.5	2.5	2.5
10-Jun-22	27.5	-	-	2.5	2.5	2.5
15-Jun-22	27.5	-	-	2.5	2.5	2.5
22-Jun-22	27.5	-	-	2.5	2.5	2.5
29-Jun-22	27.5	-	-	2.5	2.5	2.5
04-Jul-22	27.5	2.5	2.5	2.5	2.5	3.9
7-Jul-22	27.5	-	-	2.5	2.5	3.9
13-Jul-22	27.5	-	-	2.5	2.5	4.7
20-Jul-22	27.5	-	-	2.5	2.5	4.7
30-Jul-22	27.5	-	-	2.5	2.5	5.1
6-Aug-22	27.5	-	-	2.5	3.4	2.5
10-Aug-22	27.5	-	-	2.5	3.4	3.0
15-Aug-22	27.5	-	-	2.5	2.5	3.0
18-Aug-22	27.5	-	-	2.5	2.5	2.9
24-Aug-22	28.6	-	-	3.6	2.5	2.9

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	PDP-1	SW5
1-Sep-22	29.2	-	-	4.2	2.5	2.9
9-Sep-22	29.5	-	-	4.5	2.5	12.2
14-Sep-22	29.2	2.5	2.5	4.2	2.5	11.5
21-Sep-22	29.5	-	-	4.5	2.5	13.3
23-Sep-22	29.2	-	-	4.2	2.5	11.9
27-Sep-22	28.1	-	-	3.1	2.5	11.9
06-Oct-22	27.5	-	-	2.5	2.5	11.9
14-Oct-22	27.5	-	-	2.5	2.5	3.8
17-Oct-22	27.5	-	-	2.5	2.5	2.9
20-Oct-22	27.5	-	-	2.5	3.1	2.9
26-Oct-22	27.5	-	-	2.5	3.3	2.5
4-Nov-22	27.5	-	-	2.5	5.0	2.5
11-Nov-22	27.5	-	-	2.5	2.5	2.5
13-Nov-22	28.1	-	-	3.1	2.5	3.1
18-Nov-22	28.1	-	-	3.1	2.5	3.1
23-Nov-22	28.1	-	-	3.1	2.5	3.1
1-Dec-22	30.2	-	-	5.2	3.8	4.5
4-Dec-22	29.8	-	-	4.8	3.6	4.2
9-Dec-22	29.8	2.5	-	4.8	3.3	4.2
14-Dec-22	29.6	-	-	4.6	3.4	3.9
19-Dec-22	29.6	-	-	4.6	3.4	3.9
24-Dec-22	31.0	-	-	6.0	4.8	5.2
28-Dec-22	30.5	-	-	5.5	4.5	4.8
2-Jan-23	28.7	-	-	3.7	3.7	3.6
11-Jan-23	28.9	-	-	3.9	3.9	3.8
17-Jan-23	28.9	-	-	3.9	3.9	3.8
18-Jan-23	28.7	-	-	3.7	3.7	3.6
25-Jan-23	27.5	-	-	2.5	2.5	2.5
27-Jan-23	27.5	-	-	2.5	2.5	2.5
2-Feb-23	27.5	-	-	2.5	2.5	2.5
20-Feb-23	27.5	-	-	2.5	2.5	2.5

Notes:
The detection limit for TSS is 5 mg/L; for results <5 mg/L, half the detection limit was used.
Dashed line indicates monthly average could not be calculated.
Site specific guideline is 25 mg/L above the monthly average.
Monthly average is calculated based on results from the previous 30 days.
The background sample is SW3.
Samples above the site specific guideline are bolded in red.

Table 3
Air Quality Reporting
Upham East Gypsum Quarry
Upham, New Brunswick
Proejct No. 21-3049

Test Start	Duration	Flow Rate	Air Volume	Pressure	Temperature	Initial Filter Weight	Final Filter Weight	TSP Mass	TSP	Site Guideline
		(L/min)	(m^3)	(mm Hg)	(°C)	(g)	(g)	(µg)	(µg/m3)	(µg/m^3)
2020-07-22	24 hours	16.70	24.05	752	20.3	14.842	14.865	23000	39.85	120
2020-07-28	24 hours	16.46	23.70	747	24.4	14.826	14.828	1700	2.99	120
2020-08-04	24 hours	16.66	23.99	753	22.8	14.826	14.830	3100	5.38	120
2020-08-09	24 hours	16.74	24.10	752	21.2	14.842	14.844	2200	3.80	120
2020-08-15	24 hours	16.88	24.30	754	19.8	14.824	14.836	11600	19.89	120
2020-08-21	24 hours	16.87	24.30	749	17.9	14.839	14.842	2100	3.60	120
2020-08-27	24 hours	17.06	24.57	743	12.4	14.823	14.845	21700	36.80	120
2020-09-02	24 hours	16.75	24.12	747	18.8	14.842	14.861	19700	34.03	120
2020-09-08	24 hours	17.02	24.51	759	19.1	14.859	14.871	12100	20.57	120
2020-09-14	24 hours	17.62	25.37	756	8.0	14.828	14.837	9300	15.27	120
2020-09-20	24 hours	18.03	25.97	764	4.8	14.835	14.852	17100	27.44	120
2020-09-26	24 hours	17.10	24.62	753	15.3	14.856	14.859	3300	5.59	120
2020-10-02	24 hours	14.43	25.10	753	9.6	14.972	14.959	-12800	-21.25	120
2020-10-08	24 hours	17.69	25.48	748	3.8	14.861	14.889	28800	47.10	120
2020-10-14	24 hours	17.56	25.29	753	7.8	14.883	14.891	8300	13.68	120
2020-10-20	19:31	17.63	20.66	760	9.1	14.875	14.858	-17100	-34.49	120
2020-10-23	21:55	17.34	22.82	750	10.1	14.859	14.865	5600	11.20	120
2020-10-26	21:02	17.71	22.35	752	4.8	14.854	14.864	10100	21.52	120
2020-11-01	24 hours	17.19	24.75	732	5.9	14.873	14.880	7300	12.29	120
2020-11-07	24 hours	17.84	25.68	759	5.9	14.869	14.872	3100	5.03	120
2020-11-13	24 hours	17.79	25.62	748	1.9	14.860	14.861	600	0.98	120
2020-11-19	24 hours	17.63	25.22	756	7.3	14.848	14.850	2200	3.64	120
2020-11-25	24 hours	17.83	25.68	756	4.4	14.850	14.856	6700	10.87	120
2020-12-01	24 hours	17.48	25.18	748	7.0	14.843	14.861	18300	30.28	120
2020-12-07	24 hours	17.88	25.75	740	-2.1	14.834	14.836	1900	3.07	120
2020-12-13	24 hours	17.98	25.90	746	-1.3	14.831	14.839	8300	13.35	120
2020-12-19	24 hours	18.37	26.45	756	-3.6	14.837	14.843	5700	8.98	120
2020-12-25	24 hours	17.34[a]	22.82[a]	753[a]	12.3[a]	14.840	14.850	10000	18.26	120
2020-12-31	24 hours	18.58	26.76	759	-5.8	14.845	14.850	4800	7.47	120
2021-01-06	24 hours	18.00	24.73	744	-2.7	14.836	14.852	16300	27.46	120
2021-01-12	24 hours	16.70	24.74	749	-6.7	14.854	14.872	18200	30.65	120
2021-01-18	24 hours	17.52	25.52	737	-0.8	14.868	14.877	8600	14.04	120
2021-01-24	24 hours	16.70	24.03	737	-8.0	14.823	14.827	4200	7.28	120
2021-01-30	24 hours	16.70	24.03	750	-11.2	14.829	14.833	3600	6.24	120
2021-02-05	24 hours	17.90	25.80	744	-0.9	14.850	14.866	15800	25.52	120
2021-02-11	24 hours	16.70	24.05	750	-12.6	14.829	14.834	5300	9.18	120
2021-02-17	24 hours	16.70	24.05	755	-9.9	14.818	14.821	2800	4.85	120
2021-02-23	24 hours	17.70	25.49	737	-0.6	14.891	14.897	6000	9.81	120
2021-03-01	24 hours	17.87	25.74	741	-1.6	14.858	14.866	7700	12.46	120
2021-03-07	24 hours	16.70	24.05	753	-8.9	14.840	14.851	11800	20.44	120
2021-03-13	24 hours	17.92	25.81	743	-1.3	14.828	14.835	6900	11.14	120
2021-03-19	24 hours	16.70	24.05	750	-5.3	14.819	14.823	4600	7.97	120
2021-03-25	24 hours	17.52	24.23	754	8.9	14.820	14.826	6100	10.49	120
2021-03-31	24 hours	16.70	24.05	756	6.8	14.823	14.831	8600	14.90	120
2021-04-06	24 hours	16.70	24.05	746	4.1	14.822	14.835	13400	23.22	120
2021-04-12	24 hours	17.64	25.55	749	5.2	14.812	14.817	5100	8.32	120
2021-04-18	24 hours	16.70	24.05	742	2.6	14.815	14.825	10000	17.33	120
2021-04-24	24 hours	17.27	24.05	743	8.8	14.815	14.826	10400	18.02	120
2021-04-30	24 hours	17.24	24.82	735	6.4	14.814	14.921	107000	11.75	120
2021-05-06[b]	21.08	17.42	21.08	750	8.8	14.840	14.850	10100	19.96	120
2021-05-12[b]	-	17.49	25.19	748	7.1	14.822	14.830	7800	12.90	120
2021-05-18[b]	19.21	17.53	20.35	757	9.8	14.830	14.838	8700	17.81	120
2021-05-27[c]	-	-	-	-	-	-	-	-	-	120
2021-05-31	24 hours	16.70	24.05	753	14.2	14.829	14.835	5800	10.05	120
2021-06-04	33.46	16.79	34.02	746	18.1	14.831	14.839	7900	9.68	120
2021-06-10	24 hours	17.42	25.09	754	10.4	14.840	14.844	4300	7.14	120
2021-06-16	24 hours	17.48	25.18	743	5.6	14.849	14.854	5600	9.27	120
2021-06-22[d]	24 hours	17.23	24.82	744	9.7	14.870	14.879	9100	15.28	120
2021-06-24	24 hours	17.94	25.83	762	5.4	14.846	14.847	1200	1.94	120
2021-06-30	24 hours	17.01	24.29	746	14.4	14.885	14.889	4200	7.20	120
2021-07-06	24 hours	17.30	24.91	746	9.3	14.866	14.868	1700	2.84	120
2021-07-12	24 hours	17.60	24.05	759	9.5	14.848	14.851	3000	5.20	120
2021-07-18	24 hours	16.70	24.05	753	11.8	14.847	14.852	5200	9.01	120
2021-07-24	24 hours	17.51	25.21	753	8.8	14.831	14.838	6900	11.40	120
2021-07-30	24 hours	17.43	25.10	742	5.6	14.830	14.840	10000	16.60	120
2021-08-05	24 hours	17.47	25.15	755	10.0	14.821	14.835	13900	23.03	120
2021-08-10	24 hours	17.21	24.78	753	13.5	14.822	14.830	8100	13.62	120
2021-08-11	24 hours	17.18	23.42	752	13.6	14.878	14.890	12000	21.35	120
2021-08-17	24 hours	17.43	24.05	756	11.2	14.825	14.836	10200	17.67	120
2021-08-23	24 hours	17.19	24.75	750	12.4	14.844	14.859	14500	24.41	120
2021-08-29	24 hours	17.49	25.18	755	9.8	14.824	14.830	6100	10.09	120
2021-09-04	24 hours	16.70	24.05	745	3.1	14.822	14.832	10600	18.36	120
2021-09-09	24 hours	17.15	24.70	747	11.9	14.818	14.824	5600	9.45	120
2021-09-16	24 hours	18.05	24.05	759	2.7	14.844	14.859	15700	27.20	120
2021-09-22	24 hours	18.68	25.46	757	7.4	14.821	14.832	11700	19.15	120
2021-09-28	24 hours	17.45	25.13	746	7.2	14.821	14.830	9100	15.09	120
2021-10-04	24 hours	18.30	26.35	755	-2.6	14.820	14.824	3700	5.85	120
2021-10-10	24 hours	17.98	25.89	757	2.7	14.818	14.823	5000	8.05	120
2021-10-16	24 hours	17.16	24.70	747	12.1	14.815	14.822	6600	11.13	120
2021-10-22	24 hours	17.10	24.63	747	13.2	14.816	14.820	3200	5.41	120
2021-10-28	24 hours	17.61	25.36	749	5.8	14.837	14.838	1200	1.97	120
2021-11-03	24 hours	18.17	26.17	754	-1.1	14.825	14.835	10000	15.92	120
2021-11-09	24 hours	17.76	25.58	751	3.6	14.821	14.836	14400	23.46	120
2021-11-15	24 hours	17.67	25.45	739	0.8	14.831	14.837	5700	9.33	120
2021-11-21	24 hours	17.06	25.72	756	3.9	14.834	14.838	3800	6.16	120
2021-11-27	24 hours	17.98	25.90	737	-4.7	14.839	14.846	7400	11.90	120

Table 3
Air Quality Reporting
Upham East Gypsum Quarry
Upham, New Brunswick
Proejct No. 21-3049

Test Start	Duration	Flow Rate	Air Volume	Pressure	Temperature	Initial Filter Weight	Final Filter Weight	TSP Mass	TSP	Site Guideline
		(L/min)	(m^3)	(mm Hg)	(°C)	(g)	(g)	(µg)	(µg/m3)	(µg/m^3)
2021-12-03	24 hours	18.26	26.29	742	-6.8	14.840	14.849	9800	15.53	120
2021-12-09	24 hours	19.23	27.69	755	-15.9	14.823	14.824	1000	1.50	120
2021-12-15	24 hours	18.55	26.72	760	-4.7	14.626	14.841	215300	335.73[e]	120
2021-12-17	24 hours	17.98	25.89	748	-0.6	14.819	14.829	9600	15.45	120
2021-12-23	24 hours	18.90	27.22	747	-14.2	14.835	14.839	3800	5.82	120
2021-12-29	24 hours	18.23	26.25	750	-3.6	14.842	14.850	7700	12.22	120
2022-01-04	24 hours	18.89	27.20	755	-11.2	14.843	14.853	10300	15.78	120
2022-01-10	24 hours	19.19	27.63	749	-17.2	14.825	14.831	6600	9.95	120
2022-01-16	24 hours	18.70	26.08	755	-19.9	14.842	14.865	23300	37.23	120
2022-01-22	24 hours	19.18	25.97	752	-15.5	14.829	14.851	21300	34.17	120
2022-01-28	24 hours	18.59	26.78	753	-7.8	14.833	14.861	28600	44.50	120
2022-02-03	24 hours	18.24	26.26	755	-1.7	14.894	14.940	45300	71.88	120
2022-02-09	24 hours	18.11	26.07	748	-2.5	14.856	14.858	2100	3.36	120
2022-02-15	24 hours	19.70	28.37	762	-19.5	14.843	14.844	1700	2.50	120
2022-02-21[c]	9.5 hours	-	-	-	-	-	-	-	-	120
2022-02-23	24 hours	18.41	26.51	749	-6.4	14.837	14.844	7100	11.16	120
2022-03-01	24 hours	18.43	26.28	751	-5.9	14.827	14.831	3300	5.23	120
2022-03-08	24 hours	18.37	26.45	748	-6.2	14.834	14.834	500	0.79	120
2022-03-14	24 hours	18.11	26.08	756	0.2	14.814	14.818	4300	6.87	120
2022-03-20	24 hours	17.53	25.24	741	3.9	14.830	14.833	3800	6.27	120
2022-03-26	24 hours	17.51	25.22	735	2.0	14.839	14.847	7500	12.39	120
2022-04-01	24 hours	17.34	24.98	735	4.4	14.847	14.852	5200	8.67	120
2022-04-07	24 hours	17.77	25.59	753	4.4	14.848	14.849	200	0.33	120
2022-04-13	24 hours	17.59	25.53	752	6.6	14.855	14.856	600	0.98	120
2022-04-19	24 hours	17.69	25.47	746	3.4	14.840	14.872	31700	51.86	120
2022-04-25	24 hours	17.65	25.42	757	7.8	14.831	14.845	14800	24.26	120
2022-05-01	24 hours	17.84	25.70	754	3.7	14.825	14.848	22700	36.80	120
2022-05-07	24 hours	17.82	25.67	755	4.4	14.823	14.832	9600	15.58	120
2022-05-13	24 hours	17.06	24.57	754	16.3	14.821	14.857	36200	61.39	120
2022-05-19	24 hours	17.20	24.77	749	12.0	14.816	14.829	13300	22.37	120
2022-05-25	24 hours	17.44	25.11	760	12.4	14.828	14.829	700	1.16	120
2022-05-31	24 hours	17.46	25.14	751	8.8	14.850	14.851	900	1.49	120
2022-06-06	24 hours	17.39	25.04	753	10.5	14.813	14.826	13800	22.96	120
2022-06-12	24 hours	16.92	24.36	752	18.3	14.825	14.833	7200	12.32	120
2022-06-18	24 hours	16.81	24.21	739	15.2	14.843	14.848	5600	9.64	120
2022-06-24	24 hours	16.93	24.38	751	17.4	14.828	14.858	30300	51.78	120
2022-06-30	24 hours	16.95	24.41	752	18.0	14.826	14.839	12900	22.02	120
2022-07-06	24 hours	17.10	24.63	747	13.0	14.829	14.829	400	0.68	120
2022-07-12	24 hours	16.59	24.29	750	17.7	14.826	14.836	9200	15.78	120
2022-07-18	24 hours	16.57	23.85	746	22.1	14.821	14.840	18500	32.32	120
2022-07-24	24 hours	16.70	24.05	749	24.4	14.861	14.862	1500	2.60	120
2022-07-30	24 hours	16.73	24.10	749	20.4	14.831	14.832	1000	1.73	120
2022-08-05	24 hours	16.66	24	755	23.9	14.8283	14.8427	14400	25.00	120
2022-08-11	24 hours	16.76	24.13	750	19.9	14.8321	14.8358	3700	6.39	120
2022-08-17	24 hours	16.95	24.41	749	16.5	14.8601	14.8771	17000	29.02	120
2022-08-23	24 hours	16.89	24.33	749	17.2	14.8649	14.8726	7700	13.19	120
2022-08-29	24 hours	16.7	24.05	753	17.3	14.8706	14.8811	10500	18.19	120
2022-09-04	24 hours	17.11	24.64	755	16.2	14.8635	14.8653	1800	3.04	120
2022-09-10	24 hours	17.03	24.52	755	17.6	14.8454	14.8544	9000	15.29	120
2022-09-16	24 hours	17.32	24.95	749	10.3	14.8614	14.8654	4000	6.68	120
2022-09-22	24 hours	16.93	24.38	741	13.6	14.8603	14.8822	21900	37.43	120
2022-09-28	24 hours	17.12	24.65	750	13.9	14.8503	14.8595	9200	15.55	120
2022-10-04	24 hours	17.89	25.76	757	4.3	14.8573	14.8668	9500	15.37	120
2022-10-10	24 hours	17.92	25.8	755	2.7	14.8456	14.8551	9500	15.34	120
2022-10-16	24 hours	17.04	24.54	749	14.8	14.8455	14.8589	13400	22.75	120
2022-10-22	24 hours	17.75	25.56	758	6.6	14.859	14.8611	2100	3.42	120
2022-10-28	24 hours	18.17	26.17	762	1.6	14.8436	14.8609	17300	27.54	120
2022-11-03	24 hours	17.95	25.85	758	3.8	14.8588	14.8684	9600	15.47	120
2022-11-09	24 hours	18.24	26.27	762	0.7	14.8484	14.857	8600	13.64	120
2022-11-15	24 hours	18.38	26.42	759	-2	14.8242	14.8295	5300	8.36	120
2022-11-21	24 hours	18.51	26.66	752	-7.2	14.8173	14.8216	4300	6.72	120
2022-11-27	24 hours	17.89	25.66	743	0.1	14.8212	14.8304	9200	14.94	120
2022-12-03	24 hours	18.02	25.95	756	1.9	14.8070	14.8185	11500	18.46	120
2022-12-09	24 hours	18.36	26.16	753	-1.5	14.8096	14.8232	13600	21.66	120
2022-12-15	24 hours	18.25	26.36	752	-3.2	14.8244	14.8284	4000	6.32	120
2022-12-21	24 hours	18.65	26.86	763	-5.4	14.8111	14.8211	10000	15.51	120
2022-12-27	24 hours	18.5	26.05	752	-8.1	14.8281	14.838	9900	15.83	120
2023-01-02	24 hours	18.14	26.12	749	-2.5	14.8257	14.8346	8900	14.1973	120
2023-01-08	24 hours	18.65	26.85	752	-9.2	14.8261	14.8401	14000	21.7256	120
2023-01-14	24 hours	18	25.05	745	-2.3	14.8136	14.8289	15300	25.4491	120
2023-01-20	24 hours	18.1	26.05	743	-4.2	14.8156	14.8251	9500	15.1951	120
2023-01-26	24 hours	17.76	25.57	740	-0.2	14.8216	14.8254	3800	6.1922	120
2023-02-01	24 hours	17.93	25.83	742	-17	14.8256	14.8318	6200	10.0013	120
2023-02-07	24 hours	18.05	26.86	756	-7.5	14.8227	14.8464	23700	36.7647	120
2023-02-13	24 hours	18.2	26.05	744	-5.3	14.8097	14.8137	4000	6.3980	120
2023-02-19	24 hours	18.43	26.53	757	-4	14.8066	14.8448	38200	59.9950	120
2023-02-25	24 hours	19.29	27.77	757	-15.8	14.8061	14.8096	3500	5.2515	120

Notes

24 hour sample collected by BGI PQ-100 air sampler every sixth day for the duration of the quarry operation each year.

a) Values were not recorded; temperature and pressure calculated based on Environment Canada data recorded at the Saint John airport weather station. Flow rate and Air Volume were approximated based on a previous day's recording with similar temperature and pressure.

b) Battery was low in machine, full run was not completed.

c) Run was not completed. Battery was replaced.

d) 24 hour air sample recorded at 2349 Route 820, Upham, NB.

e) Result was above the maximum allowable limit due to operator error. The sample was recollected on December 17, 2021.

Report ID: 473003-IAS
Report Date: 13-Feb-23
Date Received: 03-Feb-23

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
Saint John, NB E2J 0A9

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest
Project #: 17-5121
Location: Upham

Analysis of Water

RPC Sample ID:			473003-1	473003-2	473003-3	473003-4
Client Sample ID:			SW3	SW5	PDP-1	PDP-1 Duplicate
Date Sampled:			2-Feb-23	2-Feb-23	2-Feb-23	2-Feb-23
Analytes	**Units**	**RL**				
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5	6

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

RL = Reporting Limit

Matthew Norman
Interim Director
Inorganic Analytical Chemistry

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 473003-IAS
Report Date: 13-Feb-23
Date Received: 03-Feb-23

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
Saint John, NB E2J 0A9

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 474613-IAS
Report Date: 01-Mar-23
Date Received: 22-Feb-23

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
Saint John, NB E2J 0A9

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest
Project #: 17-5121
Location: Upham

Analysis of Water

RPC Sample ID:			474613-1	474613-2	474613-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			20-Feb-23	20-Feb-23	20-Feb-23
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5

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

RL = Reporting Limit

Matthew Norman
Interim Director
Inorganic Analytical Chemistry

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 474613-IAS
Report Date: 01-Mar-23
Date Received: 22-Feb-23

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
Saint John, NB E2J 0A9

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

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February 8, 2023

Project No.: 234601.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2023-04 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated by Gulf Operators Ltd. at 15:10 on February 7, 2023. For the monitoring we positioned eleven (11) digital seismographs in the area.

The location of each monitoring point is noted in the following table.

Blast No. 2023-04 – February 7, 2023

Seismograph Location	Time	Approx. dist. from shot to seismograph (m)	Maximum Velocity (mm/s)	Sound Pressure (dB(L))	Remarks
1. Civic No. 4079 Route 111 (PW-09)	15:10	900 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		495 m S	0.71 mm/s @ 64 Hz	103	-
3. Civic No. 4150 Route 111 (PW-13)		438 m SE	0.69 mm/s @ 51 Hz	108	-
4. Civic No. 2447 Route 820 (PW-07)		1,280 m NE	0.64 mm/s @ 37 Hz	107	-
5. PW-03 - Cottage Route 820		1,035 m N	< 0.5 mm/s	<120	Unit was not triggered
6. Civic No. 2341 Route 820 (PW-05)		1,060 m N	0.58 mm/s @ 26 Hz	109	-
7. Civic No. 50 Myron Road (PW-15)		1,260 m NW	< 0.5 mm/s	<120	Unit was not triggered
8. Civic No. 86 Myron Road (PW-16)		840 m W	0.59 mm/s @ 10 Hz	107	-
9. Civic No. 220 Myron Road (PW-01)		965 m SW	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 2337 Route 820 (PW-04)		1,140 m NW	< 0.5 mm/s	<120	
11. Civic No. 4140 Route 111 (PW-12)		465 m SE	< 0.5 mm/s	<120	
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

The monitors did not detect any vibrations that exceeded the maximum allowable peak particle velocity of 12.5 mm/s (1.25 cm/s) or the maximum air overpressure of 128 dB(L) as established in the Approval to Operate (I-10936).

We trust this information is sufficient at this time. If you have any questions, please do not hesitate to contact us.

Best regards,
CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Technical Specialist

Attachments: Blast Record
Blast and Seismograph Location Plan
Blast Event Reports

Project No: 234601.00

Attachment A

Blast Record

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28.656' W 65º37.993' (see attached sketch)		
Type of Rock:	Anhydrate/Gypsum	**Est. Vol. or Tonnage:**	14,993 tonnes
Weather at time of Blast:	Clear	**Air Temp.:**	-2ºC
Est. Wind Speed :	≈5 km/h	**Wind Direction:**	NW
Cloud Cover:	No	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	160	**Hole Diameter:**	4.5"
Average Depth:	4.6 m – 6.3 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	2	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	8, 42, 84 ms
Initiation Method:	Non-Electric		
Weight of Explosives per Delay:	Max.: 100 kg		
Type and weight of Explosives for Blast:	6,500 kg – Titan XL-1000		

Sketch of shot location, hole layout, timing sequence, free face etc. if available.

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	438 m
Direction to the Nearest Structure:	SE
Structure Type:	House
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	43.8

SAFETY:

Type of Warning Signal Used:	Siren
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No

If Yes, Describe:

Misfire (yes or no):	No

Reviewed By: Robert Y. Cyr, M.A.Sc., P.Eng.

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18193
Calibration Date:	April 11, 2022
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	900 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20205
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	495 m South
Transverse Particle Velocity:	0.54 mm/s @ 51 Hz
Vertical Particle Velocity:	0.71 mm/s @ 64 Hz
Longitudinal Particle Velocity:	0.54 mm/s @ 64 Hz
Peak Particle Velocity:	0.71 mm/s @ 64 Hz
Maximum Airblast:	103 dB(L)

BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20203
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	438 m Southeast
Transverse Particle Velocity:	0.33 mm/s @ 12 Hz
Vertical Particle Velocity:	0.69 mm/s @ 51 Hz
Longitudinal Particle Velocity:	0.22 mm/s @ 10 Hz
Peak Particle Velocity:	0.69 mm/s @ 51 Hz
Maximum Airblast:	108 dB(L)

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	July 20, 2022
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	1,280 m Northeast
Transverse Particle Velocity:	0.51 mm/s @ 43 Hz
Vertical Particle Velocity:	0.64 mm/s @ 37 Hz
Longitudinal Particle Velocity:	0.51 mm/s @ 26 Hz
Peak Particle Velocity:	0.64 mm/s @ 37 Hz
Maximum Airblast:	107 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	November 16, 2022
Location of seismograph:	Cottage - PW-03 - Route 820
Distance and Direction from Blast:	1,035 m North
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18187
Calibration Date:	May 5, 2022
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	1,060 m North
Transverse Particle Velocity:	0.36 mm/s @ 28 Hz
Vertical Particle Velocity:	0.52 mm/s @ 37 Hz
Longitudinal Particle Velocity:	0.58 mm/s @ 26 Hz
Peak Particle Velocity:	0.58 mm/s @ 26 Hz
Maximum Airblast:	109 dB(L)

BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20206
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	1,260 m Northwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20204
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	840 m West
Transverse Particle Velocity:	0.54 mm/s @ 10 Hz
Vertical Particle Velocity:	0.50 mm/s @ 34 Hz
Longitudinal Particle Velocity:	0.59 mm/s @ 10 Hz
Peak Particle Velocity:	0.59 mm/s @ 10 Hz
Maximum Airblast:	107 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	April 25, 2022
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	965 m Southwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5673
Calibration Date:	April 8, 2022
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	1,140 m Northwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 7, 2023
Project No.:	234601.00	**Time of Blast:**	15:10
Inspector:	M. MacLeod	**Blast No.:**	2023-04
Client:	Hammond River Holdings		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	July 23, 2022
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	465 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan
Blast No: 2023-04
Upham East Gypsum Quarry
Upham, NB

Date: February 7, 2023
Project No.: 234601.00

Attachment C

Blast Event Reports

Event Report

Date/Time Vert at 15:10:25 February 7, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/GAYTON.mmb

Notes

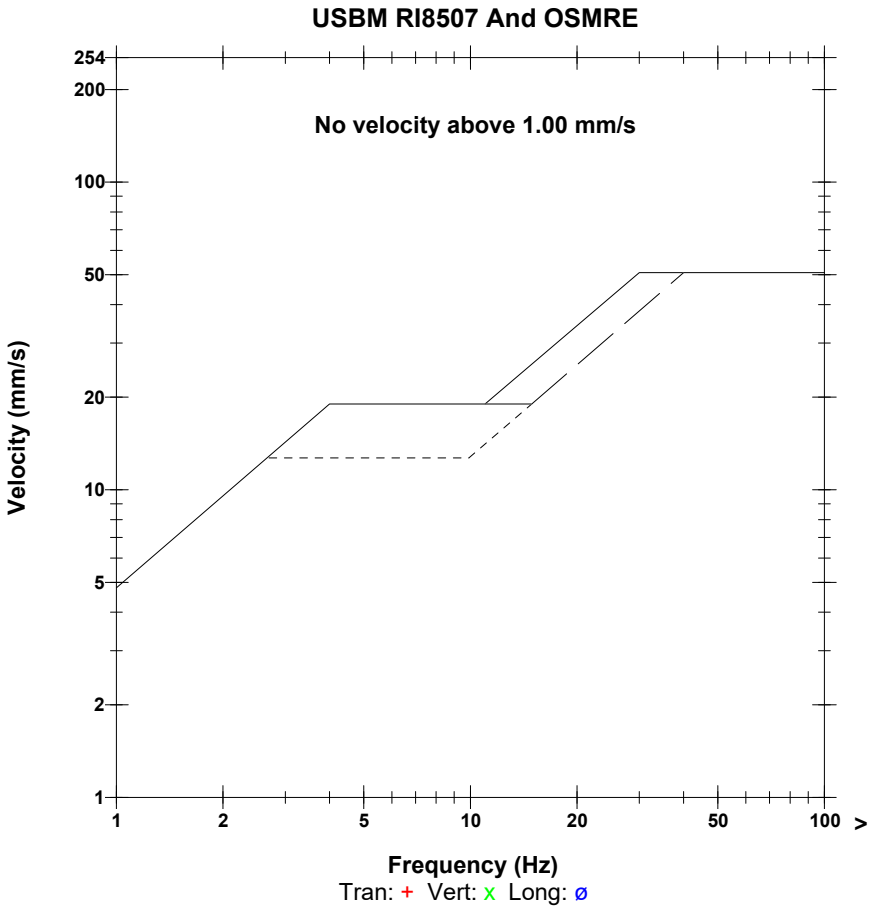
Serial Number UM20205 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20205_20230207151025.IDFW

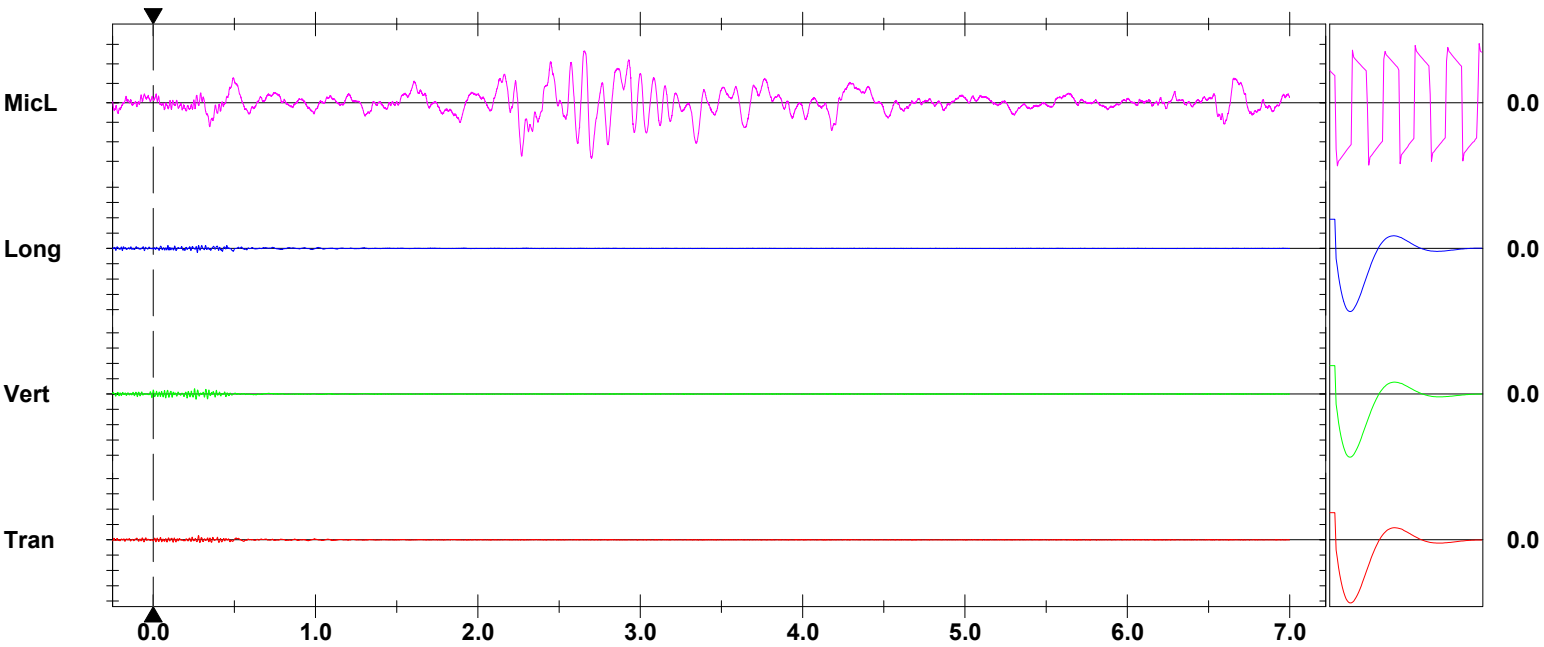
Post Event Notes
Location: Civic Number 4126 Route 111 (PW-10)
Blast No.: 2023-04
Project No: 234601.00

Microphone Linear Weighting
PSPL 103.1 dB(L) 2.855 pa.(L) at 2.699 sec
ZC Freq 7.9 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1728 mv)

	Tran	Vert	Long	
PPV	0.544	0.709	0.536	mm/s
PPV	45.71	48.02	45.58	dB
ZC Freq	51	64	64	Hz
Time (Rel. to Trig)	0.279	0.255	0.272	sec
Peak Acceleration	0.025	0.043	0.019	g
Peak Displacement	0.003	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.5	Hz
Overswing Ratio	5.3	5.3	5.0	

Peak Vector Sum 0.735 mm/s at 0.265 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time Vert at 15:10:25 February 7, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/GAYTON.mmb

Notes

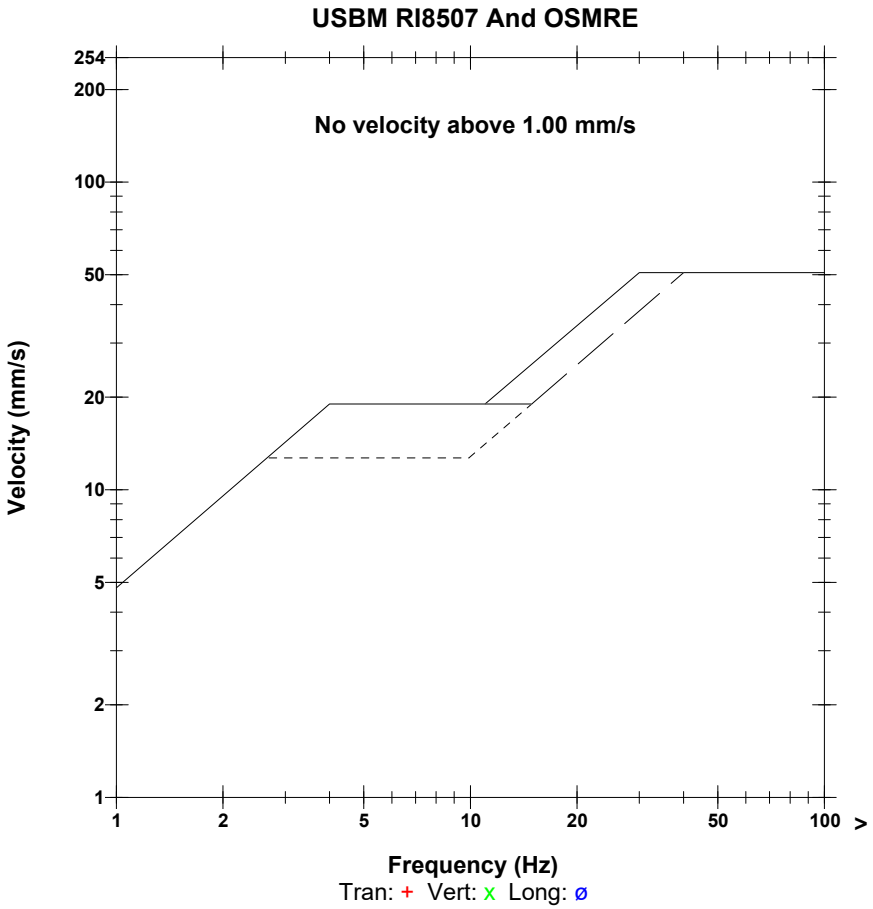
Serial Number UM20203 V 10-90GC Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20203_20230207151025.IDFW

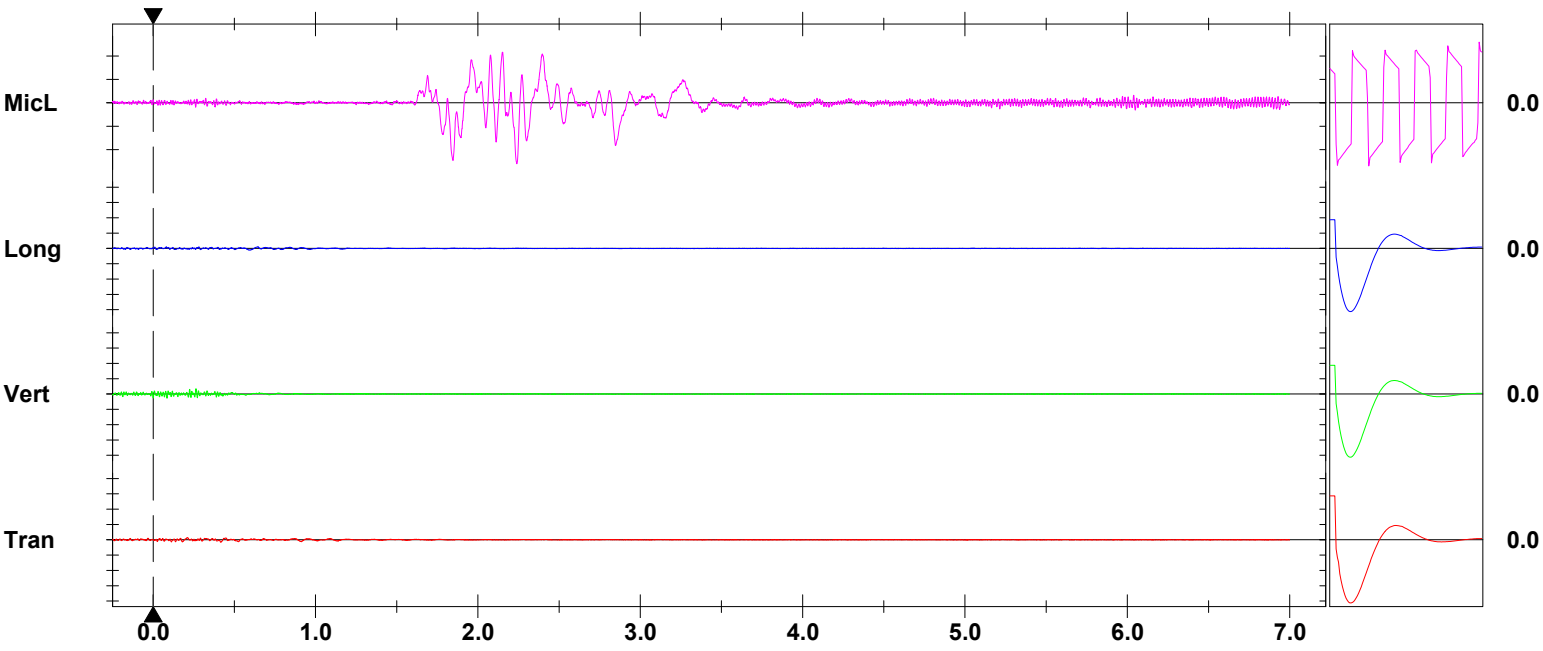
Post Event Notes
Location: Civic Number 4150 Route 111 (PW-13)
Blast No.: 2023-04
Project No: 234601.00

Microphone Linear Weighting
PSPL 108.3 dB(L) 5.198 pa.(L) at 2.239 sec
ZC Freq 10 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1639 mv)

	Tran	Vert	Long	
PPV	0.331	0.694	0.221	mm/s
PPV	41.40	47.82	37.88	dB
ZC Freq	12	51	10	Hz
Time (Rel. to Trig)	0.417	0.264	0.593	sec
Peak Acceleration	0.015	0.036	0.008	g
Peak Displacement	0.003	0.003	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.4	4.7	4.4	

Peak Vector Sum 0.698 mm/s at 0.264 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time Vert at 15:09:36 February 7, 2023
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps

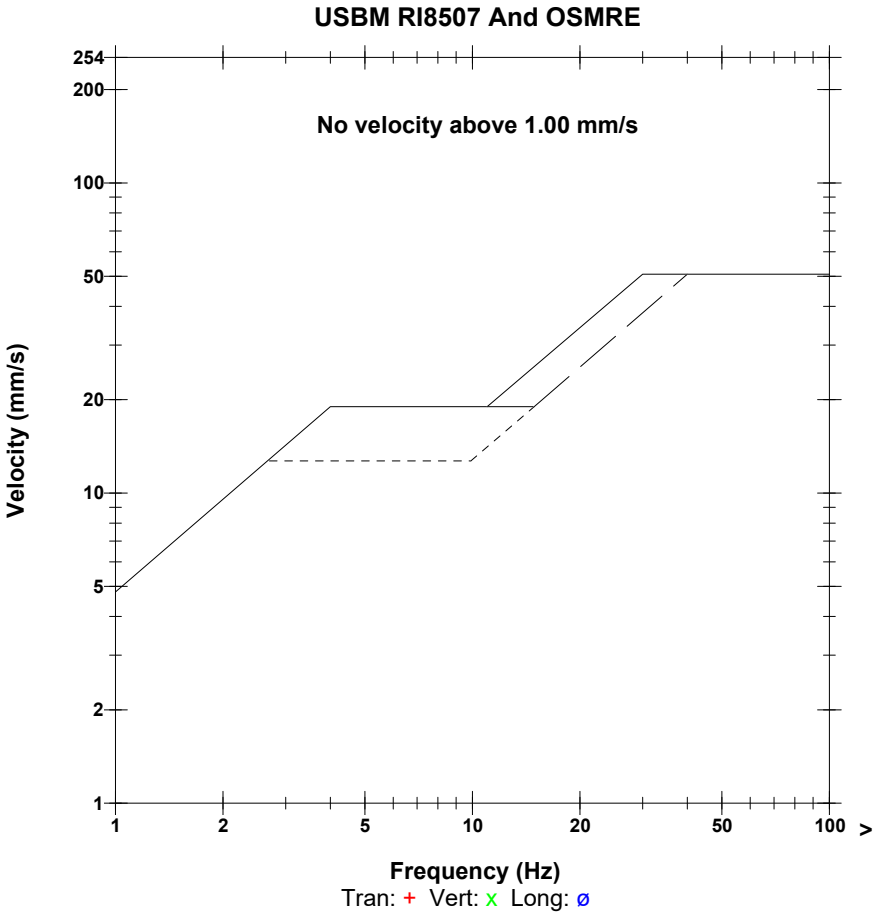
Notes

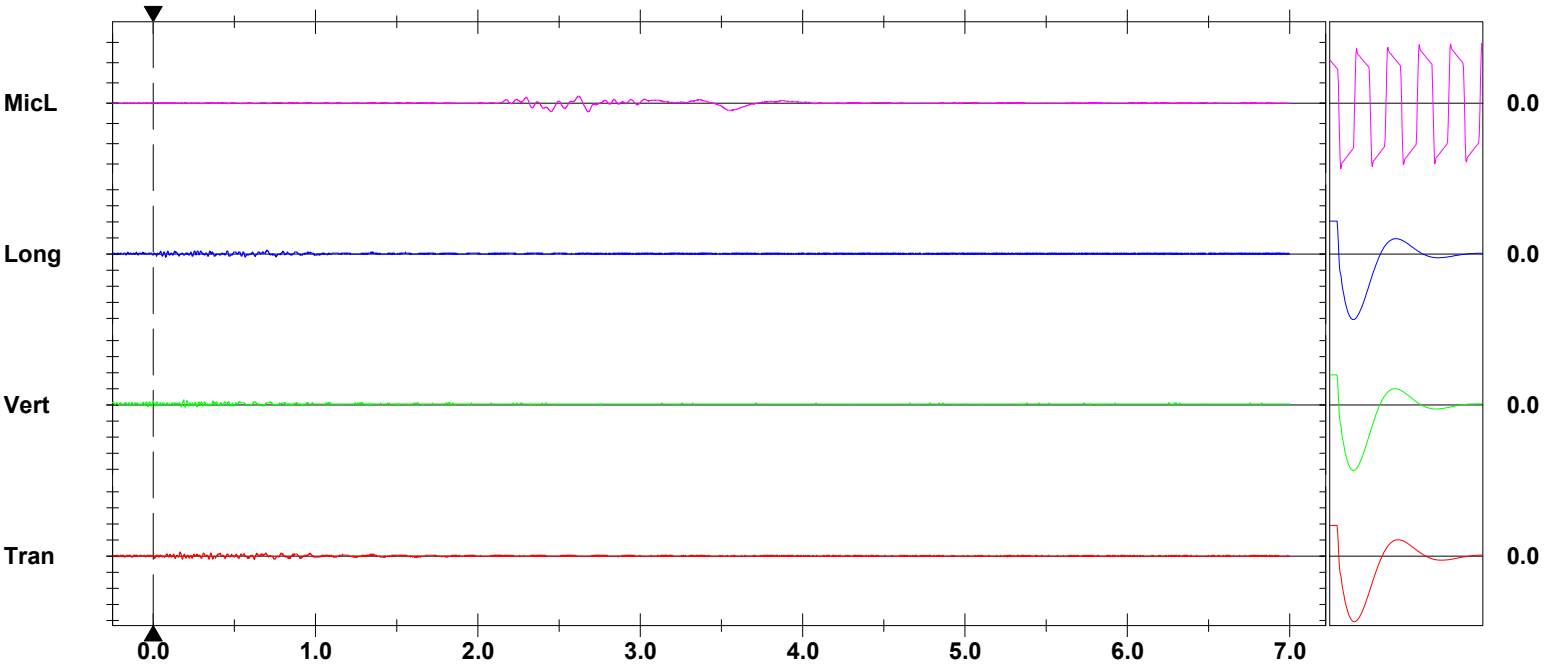
Serial Number BE21349 V 10.72-1.1 Minimate Blaster
Battery Level 6.0 Volts
Unit Calibration July 20, 2022 by Instantel
File Name W349JVVJ.G00
Post Event Notes
Location: Civic Number 2447 Route 820 (PW-07)
Blast No.: 2023-04
Project No: 234601.00

Microphone Linear Weighting
PSPL 106.5 dB(L) 4.250 pa.(L) at 2.677 sec
ZC Freq 7.9 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 704 mv)

	Tran	Vert	Long	
PPV	0.508	0.635	0.508	mm/s
PPV	45.12	47.06	45.12	dB
ZC Freq	43	37	26	Hz
Time (Rel. to Trig)	0.166	0.188	0.700	sec
Peak Acceleration	0.027	0.013	0.027	g
Peak Displacement	0.003	0.006	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.5	7.4	Hz
Overswing Ratio	4.0	4.1	4.3	

Peak Vector Sum 0.660 mm/s at 0.188 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time Vert at 15:10:28 February 7, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/factory.MMB

Notes
Location:
Client:
User Name:
General:

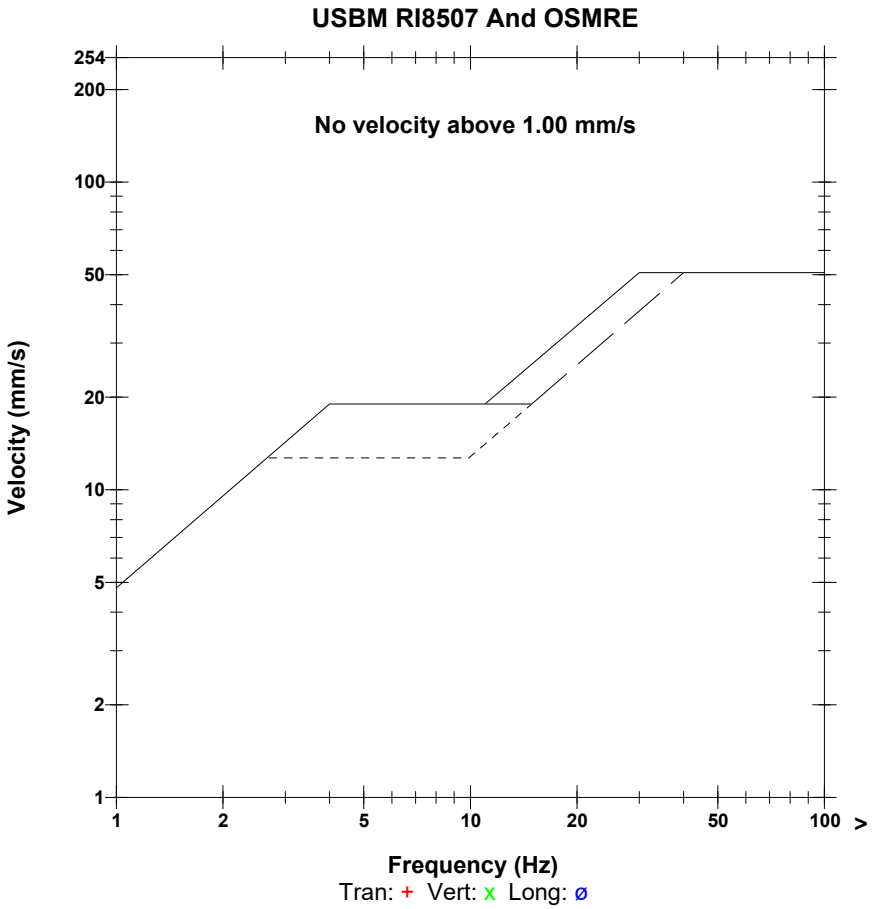
Serial Number UM18187 V 10-90GC Micromate ISEE
Battery Level 3.7 Volts
Unit Calibration May 5, 2022 by Instantel
File Name UM18187_20230207151028.IDFW

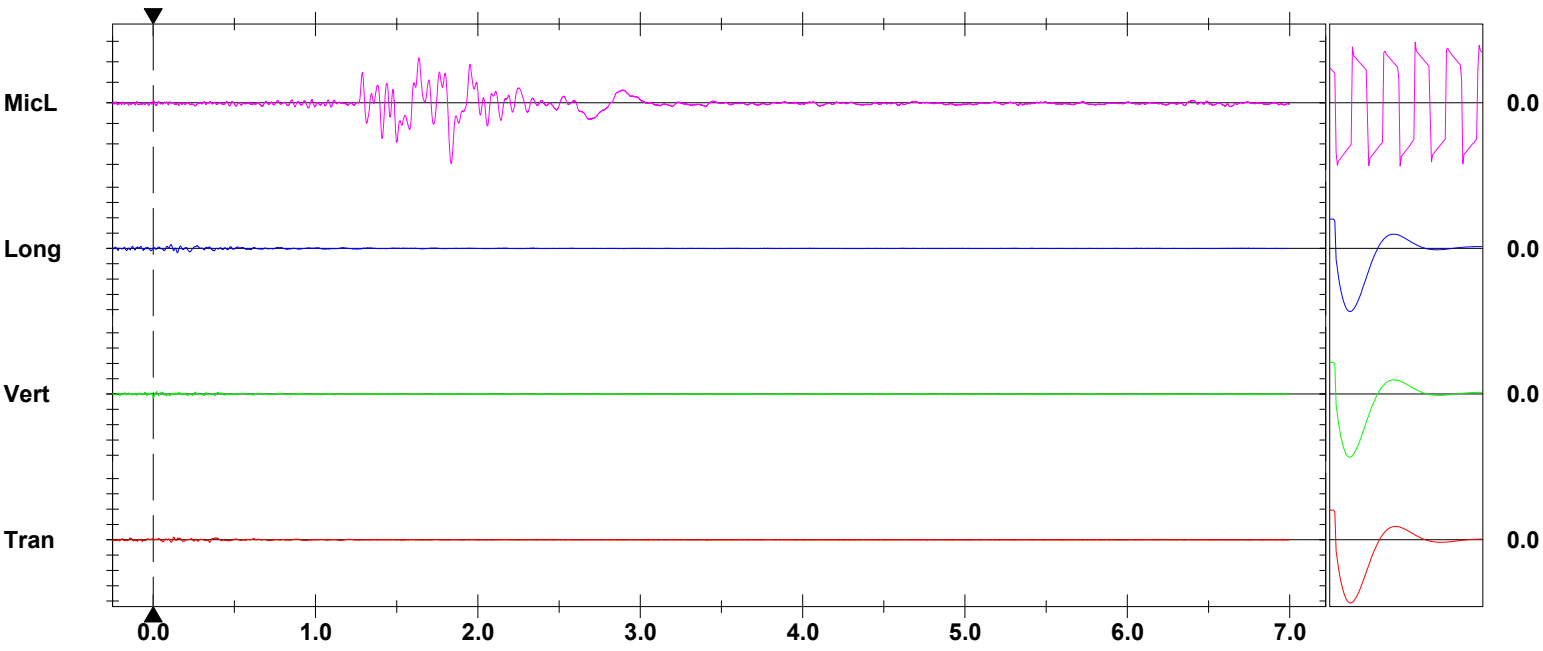
Post Event Notes
Location: Civic Number 2341 Route 820 (PW-05)
Blast No.: 2023-04
Project No: 234601.00

Microphone Linear Weighting
PSPL 109.4 dB(L) 5.927 pa.(L) at 1.835 sec
ZC Freq 4.3 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1692 mv)

	Tran	Vert	Long	
PPV	0.355	0.520	0.583	mm/s
PPV	42.00	45.32	46.32	dB
ZC Freq	28	37	26	Hz
Time (Rel. to Trig)	0.126	0.000	0.150	sec
Peak Acceleration	0.016	0.012	0.009	g
Peak Displacement	0.004	0.003	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.8	4.5	4.4	

Peak Vector Sum 0.623 mm/s at 0.150 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time Vert at 15:10:28 February 7, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/GAYTON.mmb

Notes

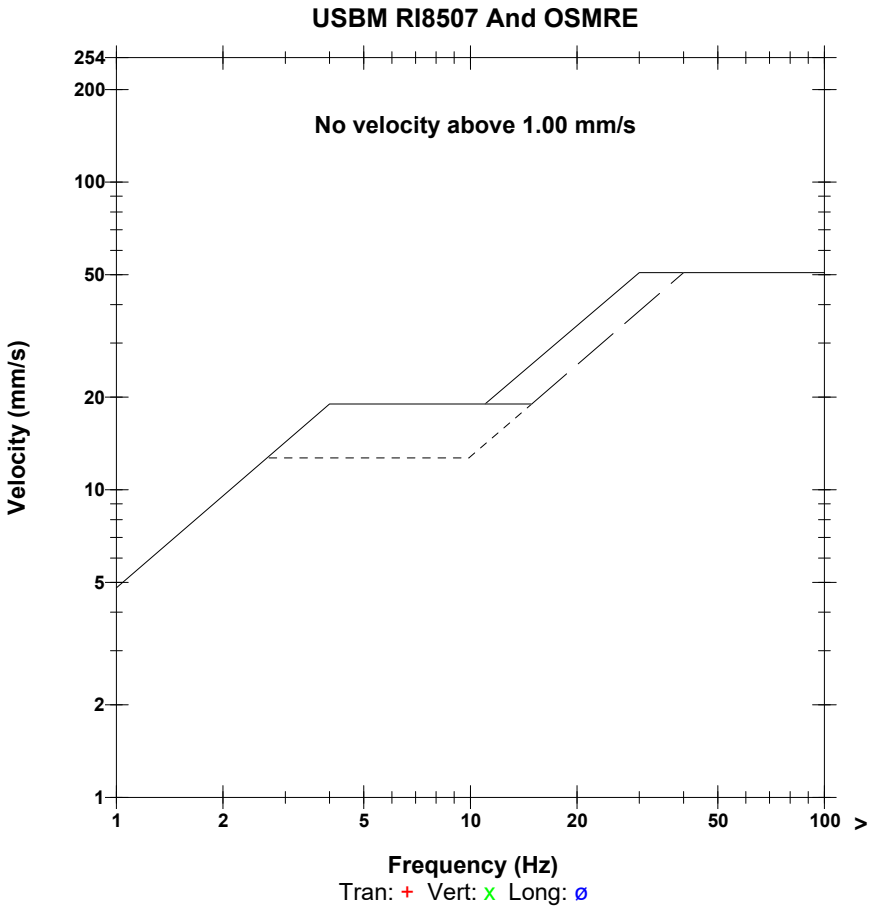
Serial Number UM20204 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20204_20230207151028.IDFW

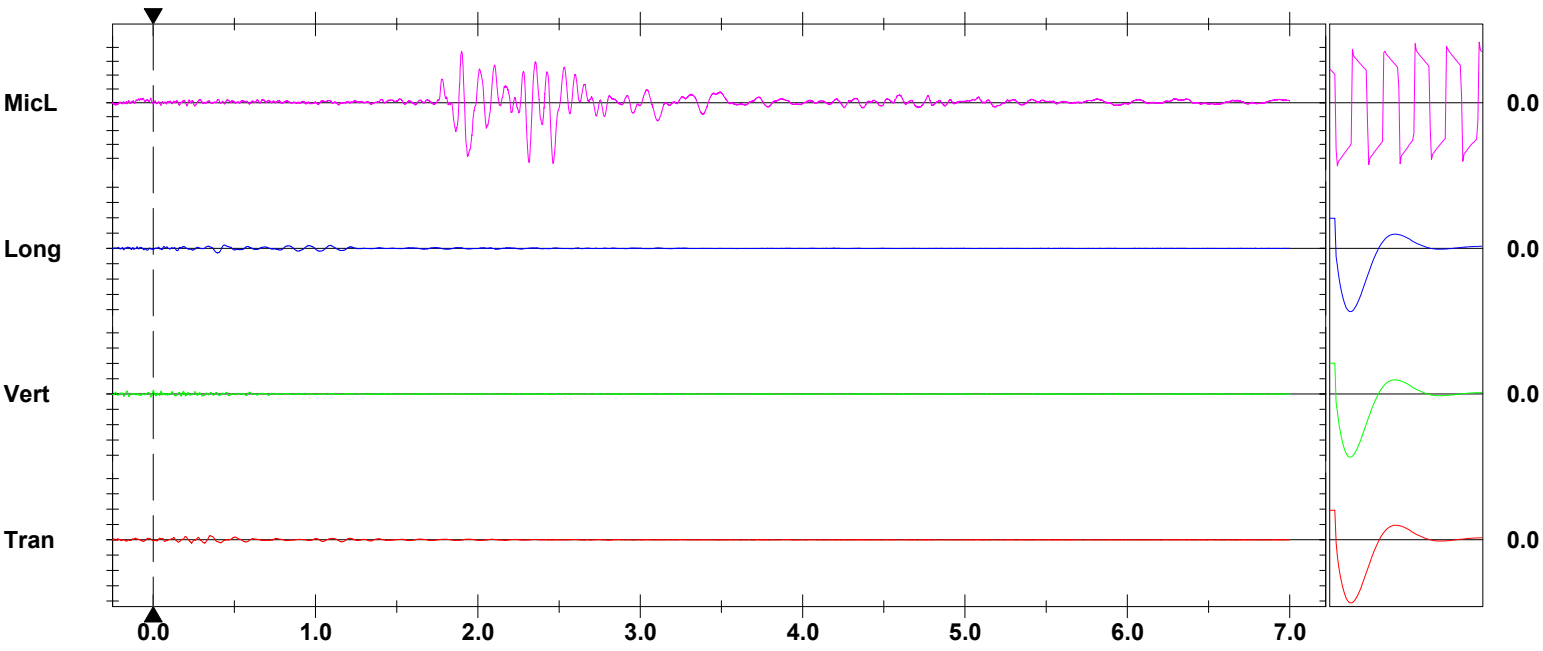
Post Event Notes
Location: Civic Number 86 Myron Road (PW-16)
Blast No.: 2023-04
Project No: 234601.00

Microphone Linear Weighting
PSPL 106.8 dB(L) 4.391 pa.(L) at 2.463 sec
ZC Freq 7.9 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1780 mv)

	Tran	Vert	Long	
PPV	0.536	0.504	0.591	mm/s
PPV	45.58	45.06	46.43	dB
ZC Freq	10	34	9.8	Hz
Time (Rel. to Trig)	0.349	0.001	0.396	sec
Peak Acceleration	0.010	0.016	0.012	g
Peak Displacement	0.008	0.002	0.010	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.3	4.5	4.4	

Peak Vector Sum 0.647 mm/s at 0.396 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div Sensor Check
Trigger =

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February 17, 2023

Project No.: 234601.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2023-05 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated by Gulf Operators Ltd. at 14:09 on February 16, 2023. For the monitoring we positioned eleven (11) digital seismographs in the area.

The location of each monitoring point is noted in the following table.

Blast No. 2023-05 – February 16, 2023

Seismograph Location	Time	Approx. dist. from shot to seismograph (m)	Maximum Velocity (mm/s)	Sound Pressure (dB(L))	Remarks
1. Civic No. 4079 Route 111 (PW-09)	14:09	1,400 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		945 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		790 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		870 m NE	< 0.5 mm/s	<120	
5. PW-03 - Cottage Route 820		540 m N	< 0.5 mm/s	<120	
6. Civic No. 2341 Route 820 (PW-05)		625 m N	0.53 mm/s @ 8 Hz	105	-
7. Civic No. 50 Myron Road (PW-15)		885 m NW	< 0.5 mm/s	<120	Unit was not triggered
8. Civic No. 86 Myron Road (PW-16)		855 m W	0.95 mm/s @ 10 Hz	106	-
9. Civic No. 220 Myron Road (PW-01)		1,400 m SW	< 0.5 mm/s	<120	Unit was not triggered
10. Civic No. 2337 Route 820 (PW-04)		750 m NW	0.89 mm/s @ 16 Hz	108	-
11. Civic No. 4140 Route 111 (PW-12)		880 m SE	< 0.5 mm/s	<120	Unit was not triggered
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

The monitors did not detect any vibrations that exceeded the maximum allowable peak particle velocity of 12.5 mm/s (1.25 cm/s) or the maximum air overpressure of 128 dB(L) as established in the Approval to Operate (I-10936).

We trust this information is sufficient at this time. If you have any questions, please do not hesitate to contact us.

Best regards,
CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Technical Specialist

Attachments: Blast Record
Blast and Seismograph Location Plan
Blast Event Reports

Project No: 234601.00

Attachment A

Blast Record

BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28.917' W 65º37.984' (see attached sketch)		
Type of Rock:	Anhydrate/Gypsum	**Est. Vol. or Tonnage:**	10,032 tonnes
Weather at time of Blast:	Clear	**Air Temp.:**	9ºC
Est. Wind Speed :	≈10 km/h	**Wind Direction:**	N
Cloud Cover:	No	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	86	**Hole Diameter:**	4.5"
Average Depth:	5.6 m – 7.2 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	4	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	84 ms
Initiation Method:	Non-Electric		
Weight of Explosives per Delay:	Max.: 179 kg		
Type and weight of Explosives for Blast:	4,022 kg – Titan XL-1000		

Sketch of shot location, hole layout, timing sequence, free face etc. if available.

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	540 m
Direction to the Nearest Structure:	North
Structure Type:	Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	40.4

SAFETY:

Type of Warning Signal Used:	Siren
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No

If Yes, Describe:

Misfire (yes or no):	No

Reviewed By: Robert Y. Cyr, M.A.Sc., P.Eng.

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	April 25, 2022
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,400 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18193
Calibration Date:	April 11, 2022
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	945 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20204
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	790 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5673
Calibration Date:	April 8, 2022
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	870 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	November 16, 2022
Location of seismograph:	Cottage - PW-03 - Route 820
Distance and Direction from Blast:	540 m North
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20203
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	625 m North
Transverse Particle Velocity:	0.53 mm/s @ 8 Hz
Vertical Particle Velocity:	0.32 mm/s @ 26 Hz
Longitudinal Particle Velocity:	0.52 mm/s @ 10 Hz
Peak Particle Velocity:	0.53 mm/s @ 8 Hz
Maximum Airblast:	105 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20206
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	885 m Northwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18187
Calibration Date:	May 5, 2022
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	855 m West
Transverse Particle Velocity:	0.95 mm/s @ 10 Hz
Vertical Particle Velocity:	0.42 mm/s @ 34 Hz
Longitudinal Particle Velocity:	0.46 mm/s @ 12 Hz
Peak Particle Velocity:	0.95 mm/s @ 10 Hz
Maximum Airblast:	106 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	July 20, 2022
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,400 m Southwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	July 23, 2022
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	750 m Northwest
Transverse Particle Velocity:	0.38 mm/s @ 37 Hz
Vertical Particle Velocity:	0.38 mm/s @ 37 Hz
Longitudinal Particle Velocity:	0.89 mm/s @ 16 Hz
Peak Particle Velocity:	0.89 mm/s @ 16 Hz
Maximum Airblast:	108 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	February 16, 2023
Project No.:	234601.00	**Time of Blast:**	14:09
Inspector:	C. Buckley	**Blast No.:**	2023-05
Client:	Hammond River Holdings		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20205
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	880 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan
Blast No: 2023-05
Upham East Gypsum Quarry
Upham, NB

Date: February 16, 2023
Project No.: 234601.00

Attachment C

Blast Event Reports

Event Report

Date/Time Long at 14:09:47 February 16, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/GAYTON.mmb

Notes

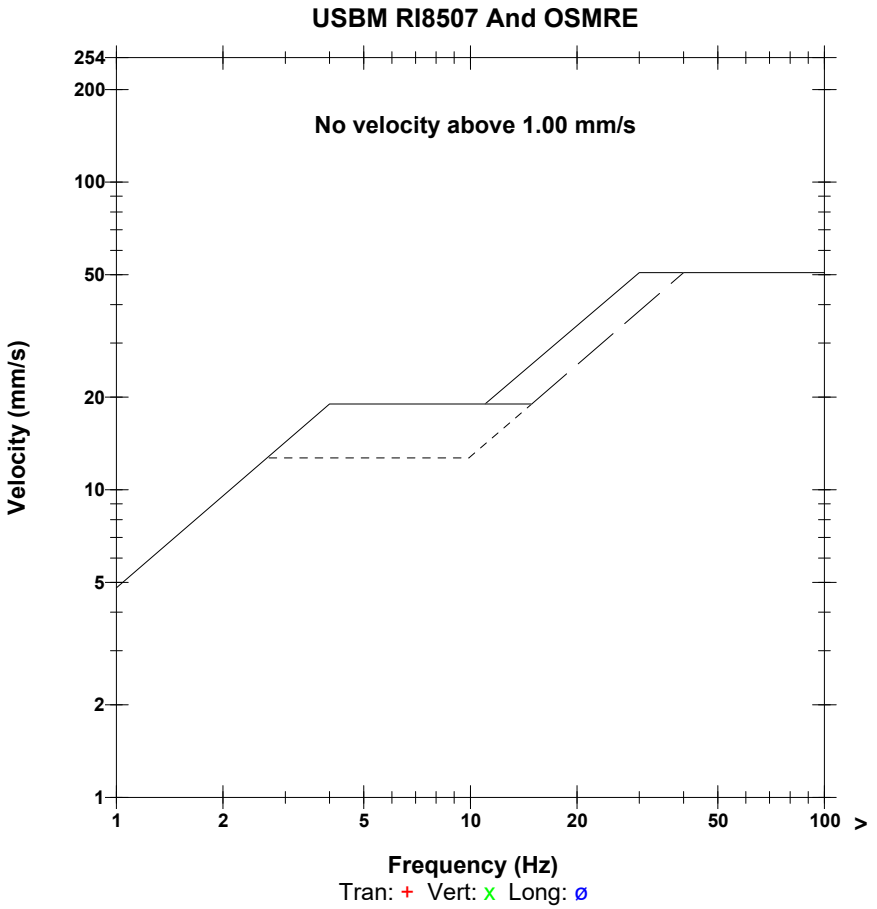
Serial Number UM20203 V 10-90GC Micromate ISEE
Battery Level 3.5 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20203_20230216140947.IDFW

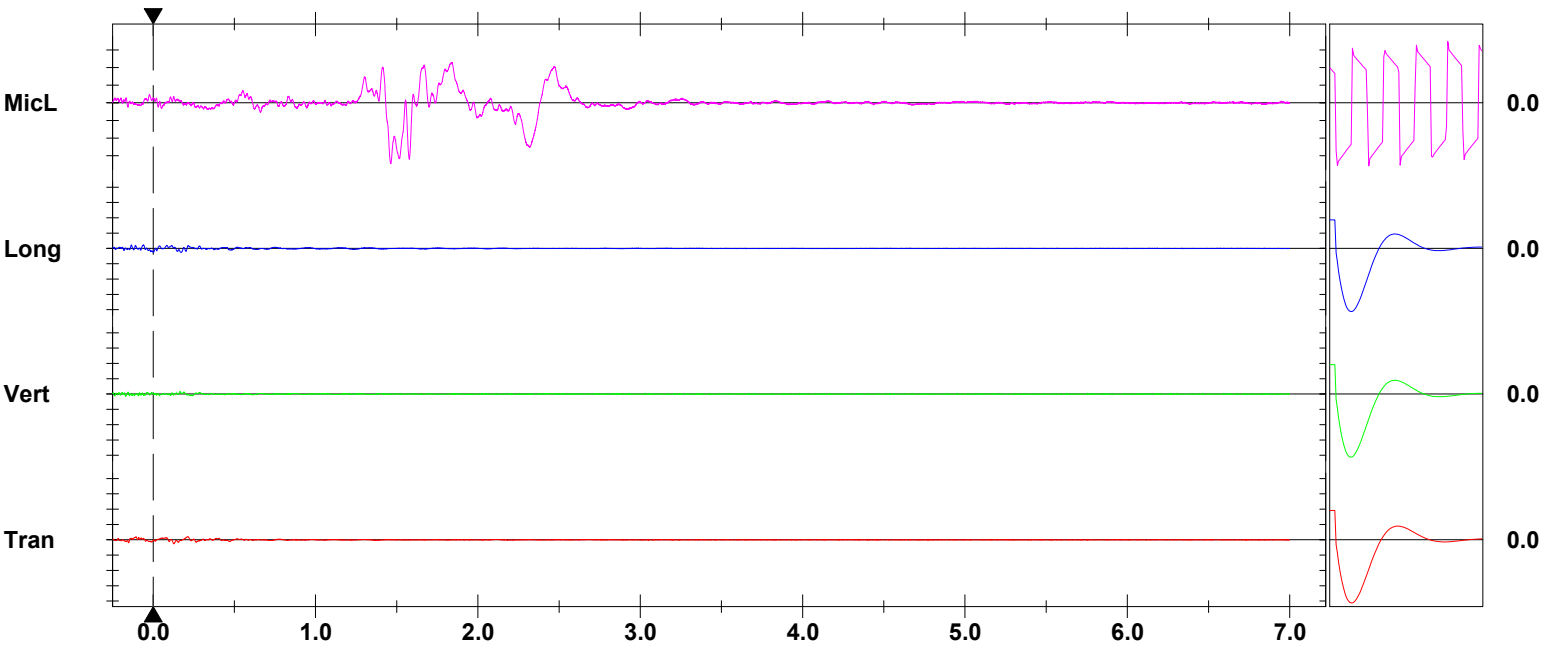
Post Event Notes
Location: Civic Number 2341 Route 820 (PW-05)
Blast No.: 2023-05
Project No: 234601.00

Microphone Linear Weighting
PSPL 104.7 dB(L) 3.444 pa.(L) at 1.463 sec
ZC Freq 4.2 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1530 mv)

	Tran	Vert	Long	
PPV	0.528	0.315	0.520	mm/s
PPV	45.45	40.97	45.32	dB
ZC Freq	7.5	26	9.8	Hz
Time (Rel. to Trig)	0.127	0.164	0.001	sec
Peak Acceleration	0.012	0.012	0.011	g
Peak Displacement	0.008	0.004	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.3	7.3	Hz
Overswing Ratio	4.6	4.6	4.4	

Peak Vector Sum 0.580 mm/s at 0.171 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time Tran at 14:09:47 February 16, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/factory.MMB

Notes
Location:
Client:
User Name:
General:

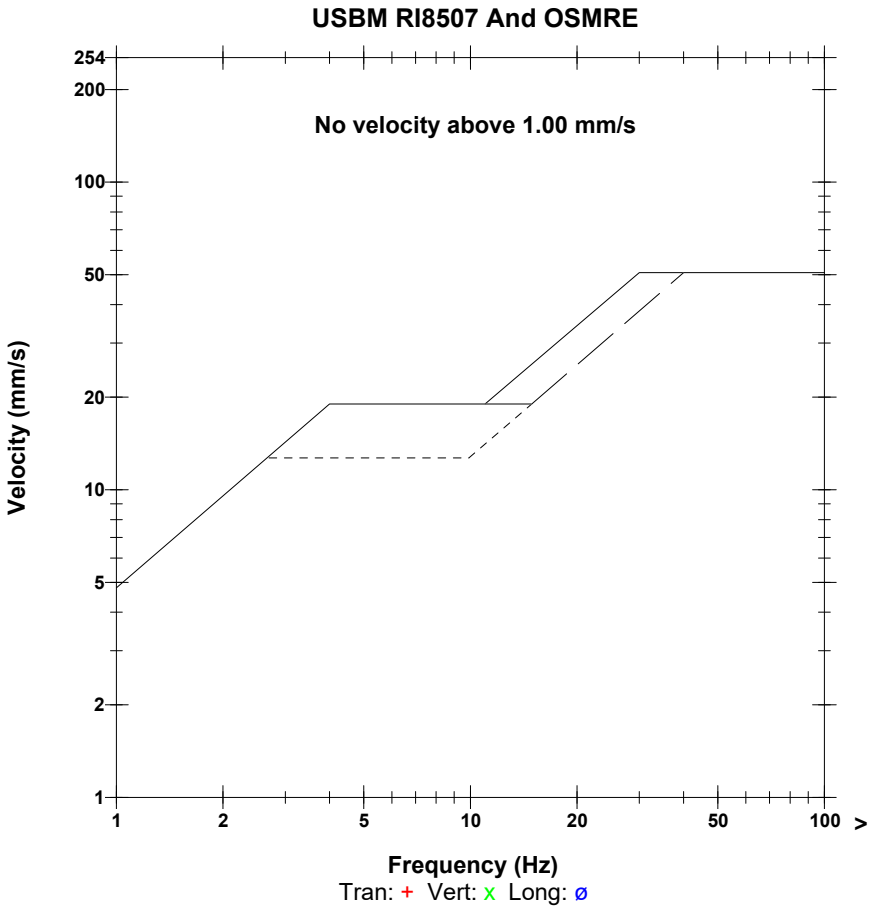
Serial Number UM18187 V 10-90GC Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration May 5, 2022 by Instantel
File Name UM18187_20230216140947.IDFW

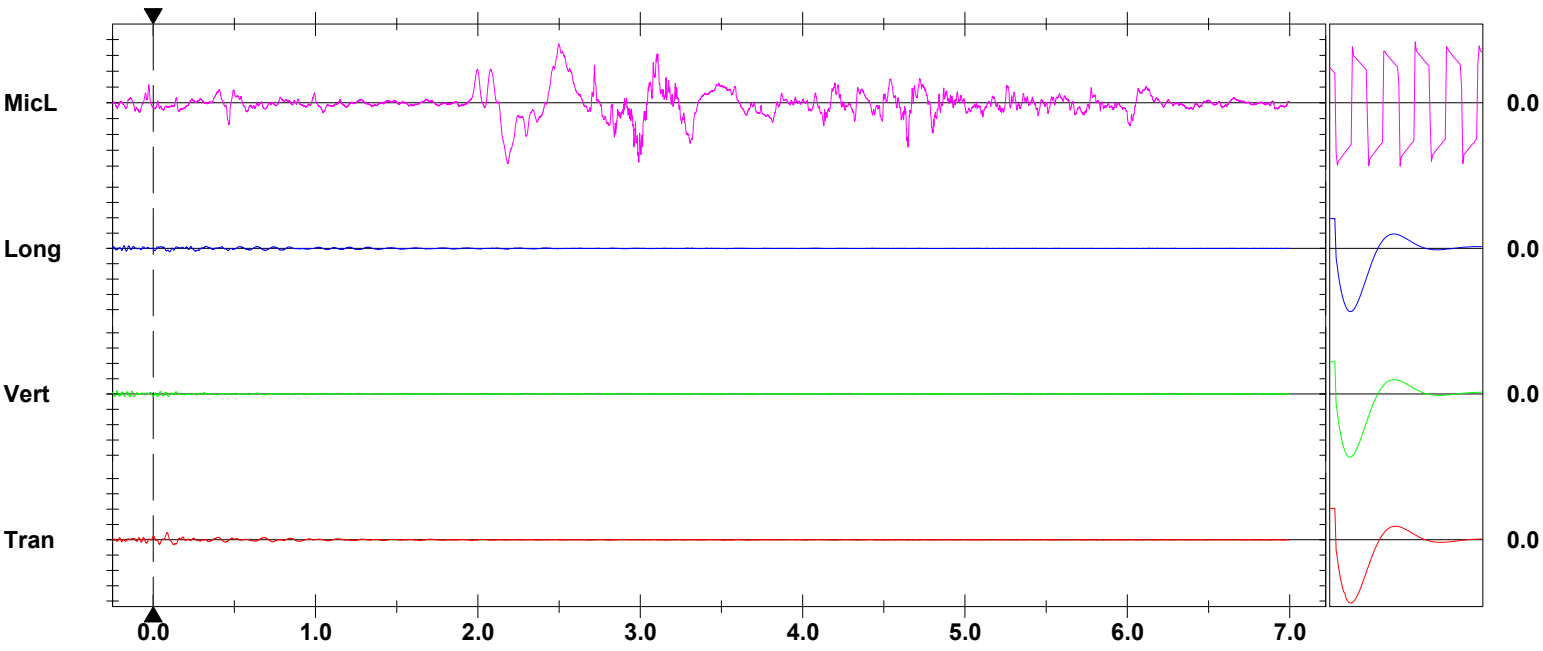
Post Event Notes
Location: Civic Number 86 Myron Road (PW-16)
Blast No.: 2023-05
Project No: 234601.00

Microphone Linear Weighting
PSPL 105.7 dB(L) 3.848 pa.(L) at 2.185 sec
ZC Freq 1.8 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1504 mv)

	Tran	Vert	Long	
PPV	0.946	0.418	0.457	mm/s
PPV	50.52	43.42	44.20	dB
ZC Freq	10	34	12	Hz
Time (Rel. to Trig)	0.085	-0.224	0.103	sec
Peak Acceleration	0.016	0.012	0.010	g
Peak Displacement	0.010	0.002	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.7	4.4	4.4	

Peak Vector Sum 0.995 mm/s at 0.085 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time Long at 14:08:56 February 16, 2023
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps

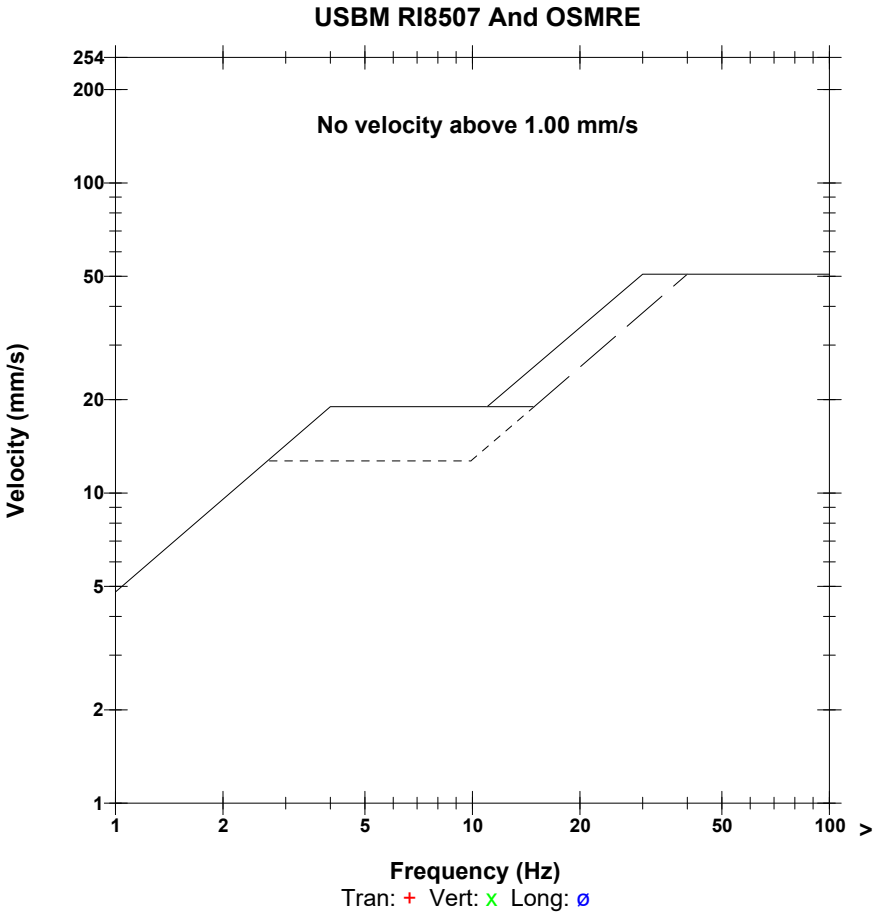
Notes

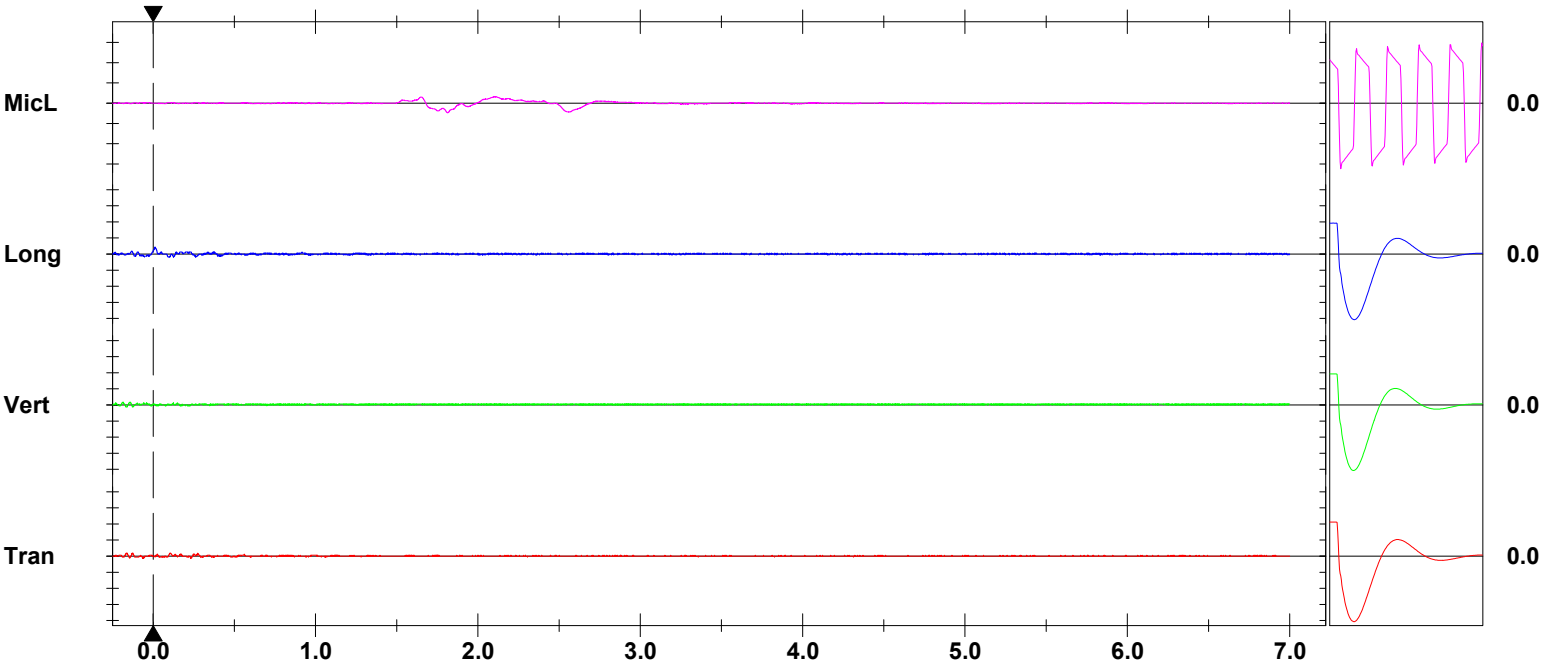
Serial Number BE21348 V 10.72-1.1 Minimate Blaster
Battery Level 5.9 Volts
Unit Calibration July 21, 2022 by Instantel
File Name W348JWC4.MW0
Post Event Notes
Location: Civic Number 2337 Route 820 (PW-04)
Blast No.: 2023-05
Project No: 234601.00

Microphone Linear Weighting
PSPL 107.5 dB(L) 4.750 pa.(L) at 1.811 sec
ZC Freq 2.4 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 629 mv)

	Tran	Vert	Long	
PPV	0.381	0.381	0.889	mm/s
PPV	42.62	42.62	49.98	dB
ZC Freq	37	37	16	Hz
Time (Rel. to Trig)	-0.167	-0.186	0.011	sec
Peak Acceleration	0.013	0.027	0.027	g
Peak Displacement	0.002	0.002	0.008	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.5	7.2	Hz
Overswing Ratio	4.0	4.0	4.2	

Peak Vector Sum 0.898 mm/s at 0.011 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check
Trigger =