

# Memo

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: May 30, 2023

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

Our File: File # 21-3049

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## Introduction

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

## Surface Water Sampling

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

- Week 1: April 7, 2023
- Week 2: April 13, 2023
- Week 3: April 19, 2023
- Week 4: April 28, 2023

### 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

April water sampling program. The RPD results could not be calculated due to both of the results being below the laboratory detection limit. Therefore, the data satisfies the quality objectives for the monitoring program.

## Water Level Monitoring

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Water levels were downloaded on April 19, 2023; due to equipment malfunctioning, only data from the three potable wells were downloaded. Water levels from the perimeter monitoring wells were successfully downloaded on May 11, 2023. No data was lost due to the equipment malfunction. The data retrieved from the dataloggers are depicted on a time series plot in Figure 3. The dataloggers allow for continuous coverage of water levels in the wells. Data was retrieved from the dataloggers on a regular basis and depicted as time-series plots.

### *Methodology*

Data loggers were retrieved via Solinst Levelogger Software 4.5. The dataloggers were then reset to continue to record the water level every 5 minutes.

### *Water Level Results*

The data for perimeter monitoring wells (Figure 4) and potable monitoring wells (Figures 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 almost all of the perimeter monitoring wells has remained consistent with seasonal fluctuations. The potable wells all 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 April monitoring period, there does not appear to be a negative impact on water levels in perimeter and potable wells as a result of quarry operations.

## **Environmental Accidents and Malfunctions**

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

## **Ambient Air Quality Monitoring – Total Suspended Particulate**

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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 April, there were 5 air quality monitoring events, April 2, 8, 14, 20, and 26, 2023. The results are provided in Table 3. There were no exceedances of the 120 µg/m<sup>3</sup> 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**

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Four blasts occurred during the April 2023 monitoring period, occurring on April 4, 13, 19, and 25 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**

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There was one public complaint during the April 2023 monitoring period.

On April 11, 2023 a resident of the area texted in that a driver was using their Jake Brakes when entering the site. In response, Hammond River Holdings followed up with the trucking contractor and asked them to refrain from using their Jake Brakes.



## Summary

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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.

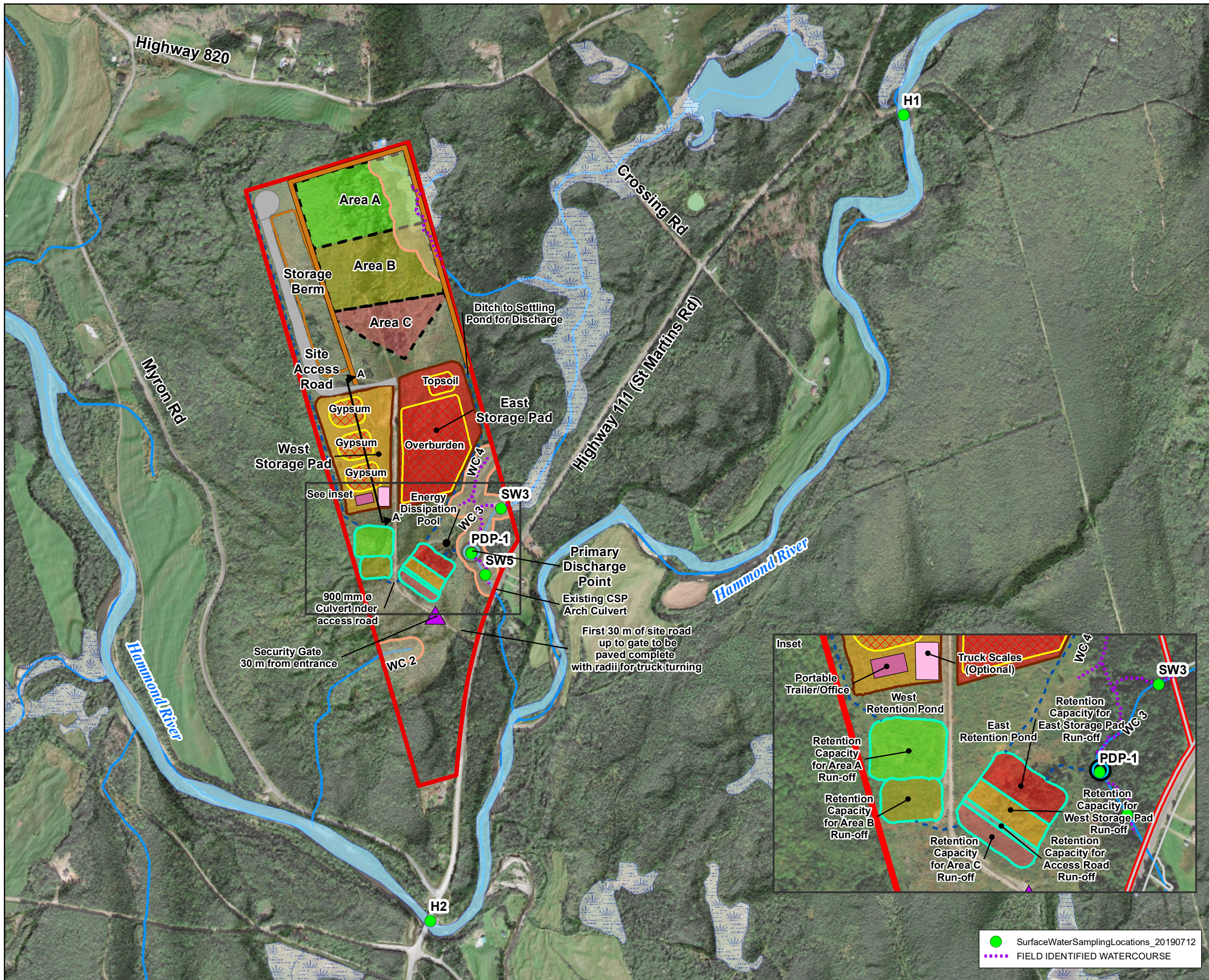
## References

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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.

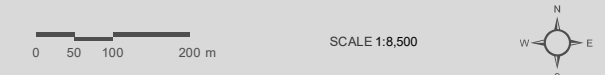




HAMMOND RIVER HOLDINGS LIMITED  
PROPOSED UPHAM EAST GYPSUM QUARRY

**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



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

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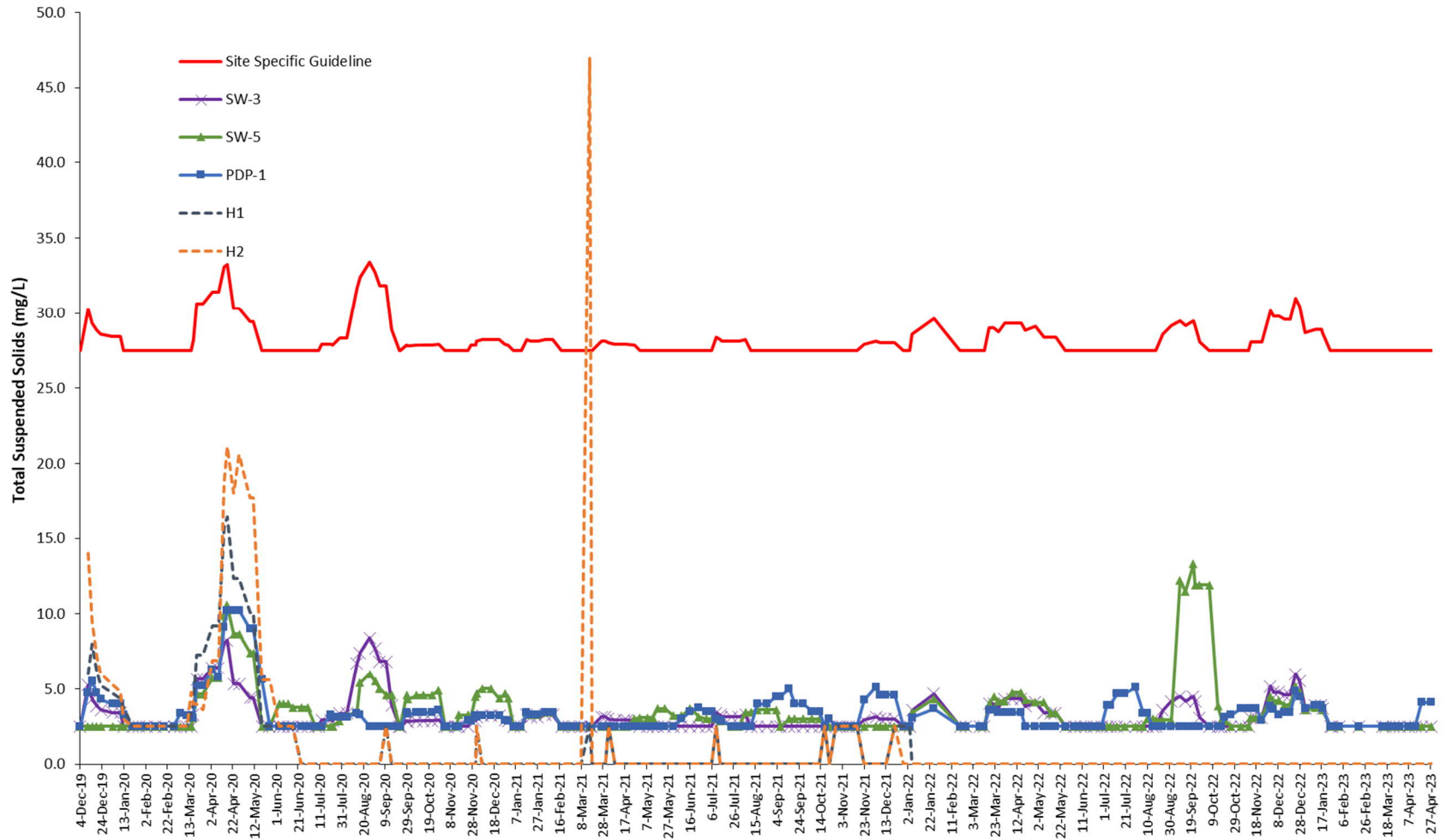


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DATE: 2020/01/06

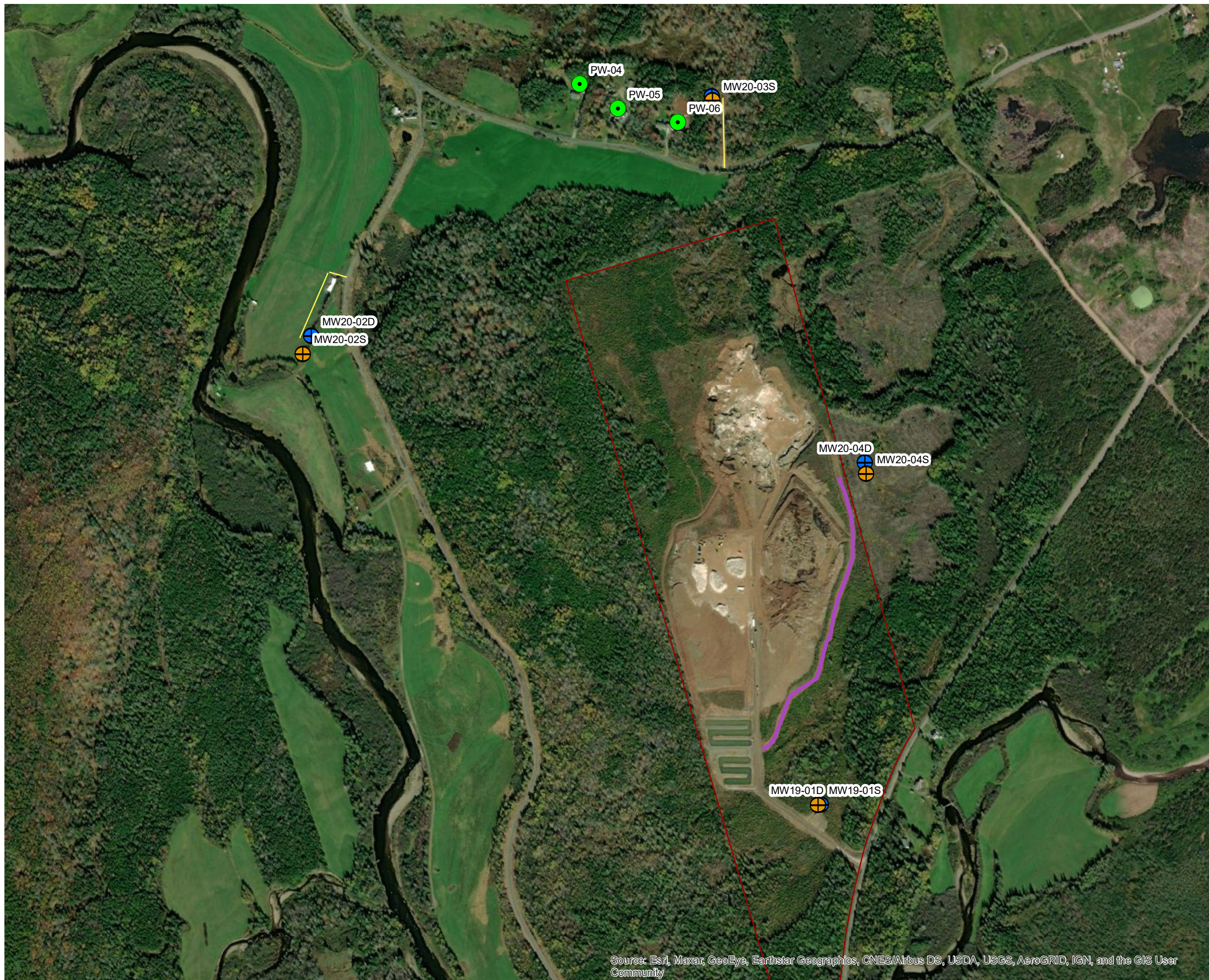
- SurfaceWaterSamplingLocations\_20190712
- FIELD IDENTIFIED WATERCOURSE



Figure 2: TSS Monthly Average







HAMMOND RIVER HOLDINGS  
UPHAM EAST GYPSUM QUARRY

**GROUNDWATER MONITORING LOCATIONS**  
FIGURE 3

- Potable Well Levelloggers
- 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 STEREOGRAPHIC

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



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



Figure 4: Upham East - Perimeter Monitoring Water Levels

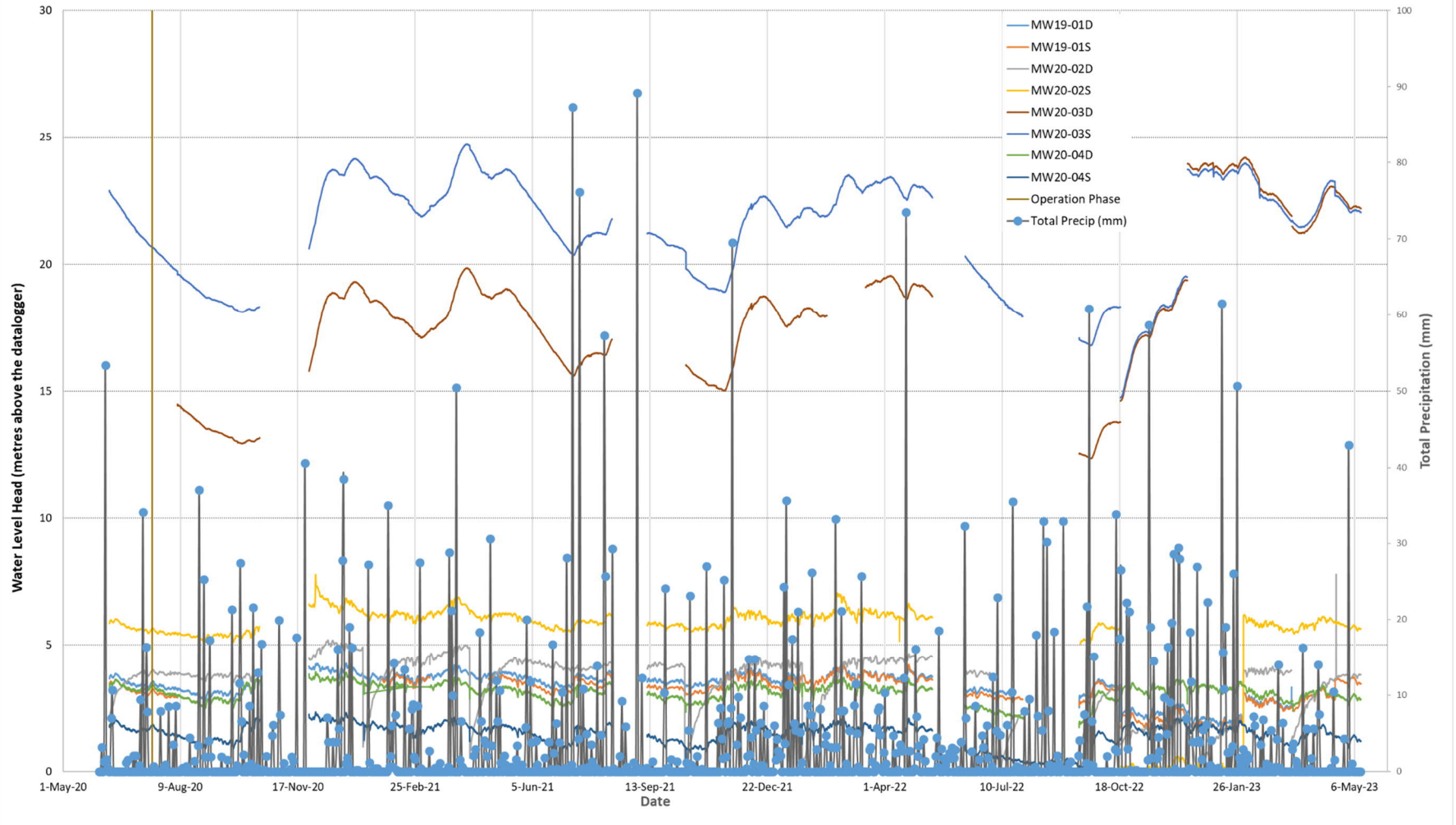


Figure 5: PW-04 Water Levels

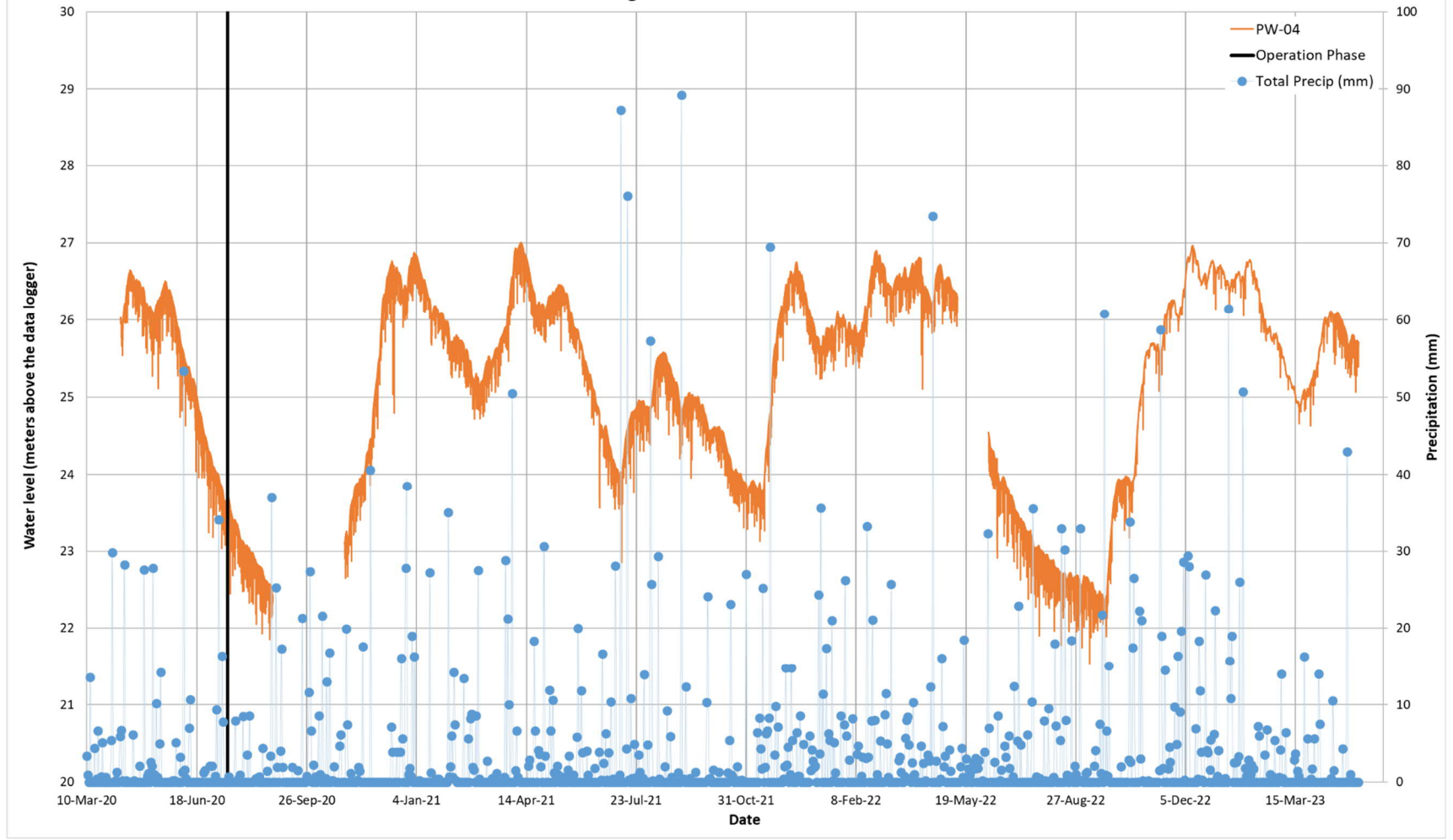


Figure 6: PW-06 Water Levels

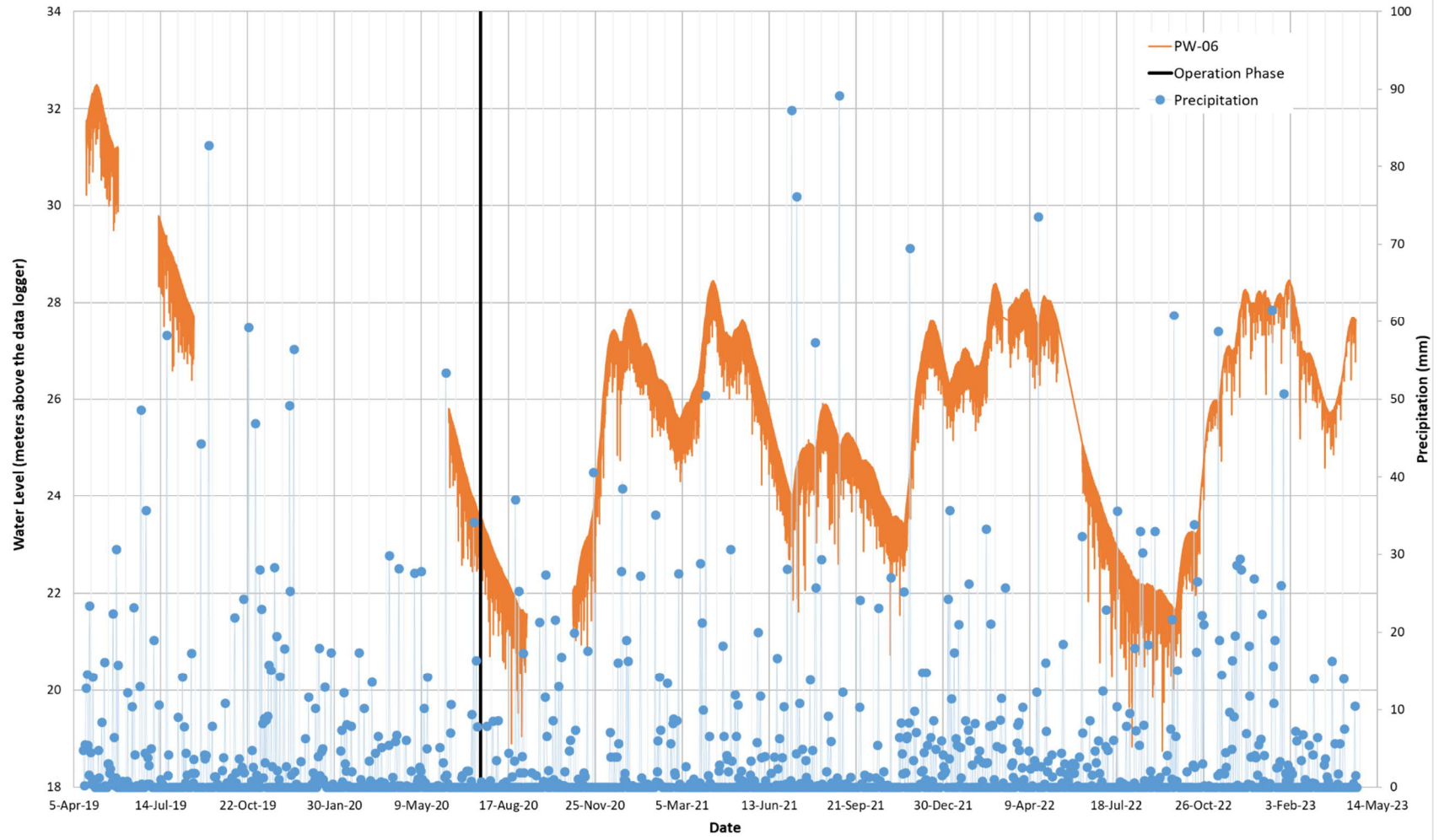
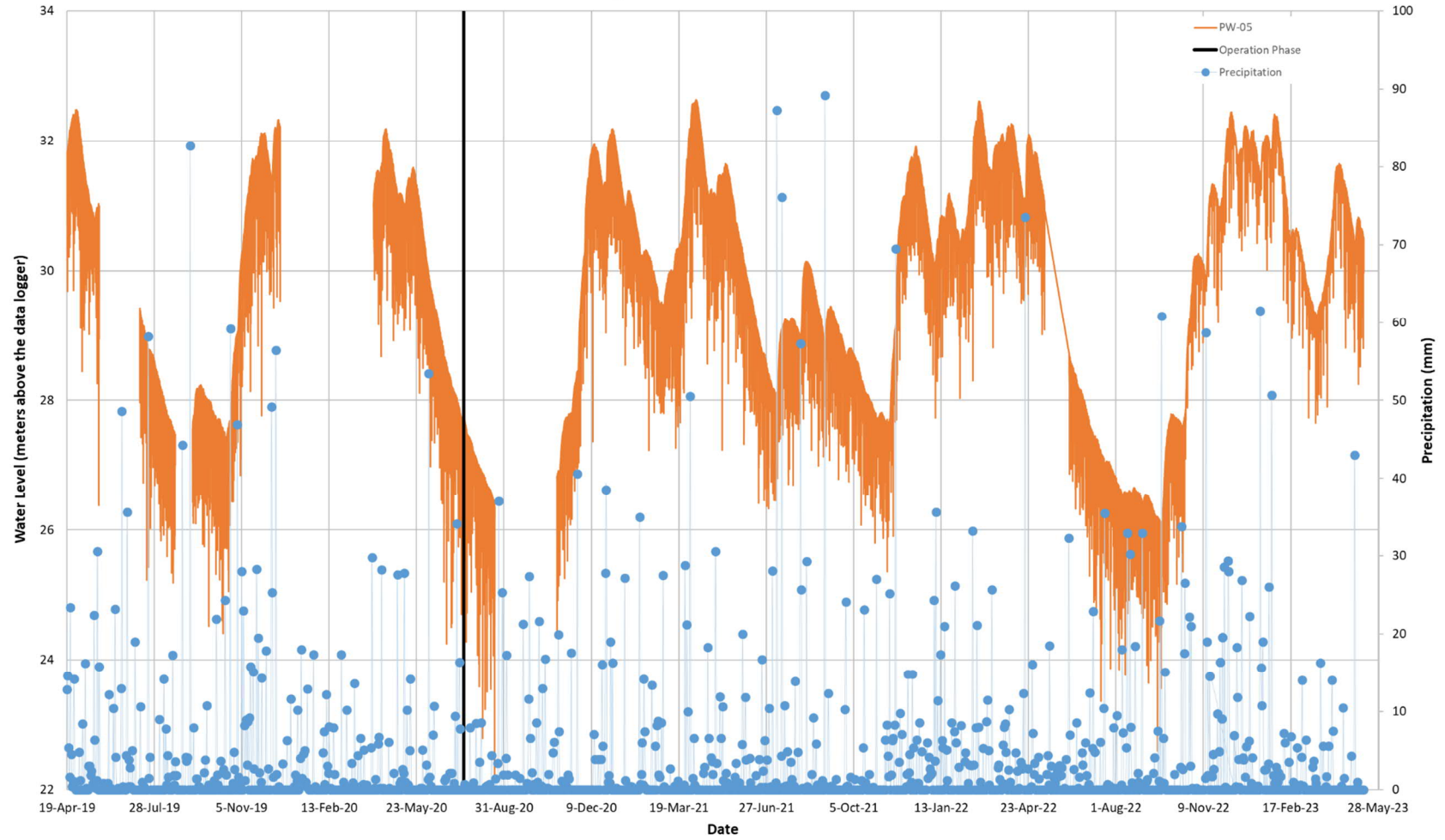


Figure 7: PW-05 Water Levels





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

Parameter	Ambient Air Temperature <sup>a</sup>	Precipitation 48 hours prior to sample collection <sup>b</sup>	Water Temperature	Specific Conductivity	Turbidity	Total Suspended Solids <sup>c</sup>	
Units	°C	mm	°C	mS/cm	NTU	mg/L	
Sample ID	Date						
SW3	7-Apr-2023	8.7	21.5	4.1	495	4.29	5
PDP-1				3.1	249	3.43	<5
SW5				3.0	248	3.75	<5
SW3	13-Apr-2023	14	0.0	6.4	339	1.92	<5
PDP-1				7.4	358	1.53	<5
SW5				6.3	375	2.91	<5
PDP-1 duplicate				7.5	358	1.34	<5
SW3	19-Apr-2023	8.8	11.0	7.7	197	1.81	<5
PDP-1				7.1	228	3.81	21
SW5				7.3	230	2.89	<5
SW3	28-Apr-2023	15.1	4.3	9.9	1880	1.58	<5
PDP-1				10.5	2115	1.82	<5
SW5				10.7	2174	2.14	<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](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](https://climate.weather.gc.ca/historical_data/search_historic_data_e.html)

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

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
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

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
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

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
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
14-Mar-23	27.5	2.5	-	2.5	2.5	2.5
17-Mar-23	27.5	-	-	2.5	2.5	2.5
24-Mar-23	27.5	-	-	2.5	2.5	2.5
30-Mar-23	27.5	-	-	2.5	2.5	2.5
7-Apr-23	27.5	-	-	2.5	2.5	2.5
13-Apr-23	27.5	-	-	2.5	2.5	2.5
19-Apr-23	27.5	-	-	2.5	4.1	2.5
28-Apr-23	27.5	-	-	2.5	4.1	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  
Project 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 <sup>3</sup> )	(mm Hg)	(°C)	(g)	(g)	(µg)	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
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 <sup>a</sup>	22.82 <sup>a</sup>	753 <sup>a</sup>	12.3 <sup>a</sup>	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

Table 3  
Air Quality Reporting  
Upham East Gypsum Quarry  
Upham, New Brunswick  
Project 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 <sup>3</sup> )	(mm Hg)	(°C)	(g)	(g)	(µg)	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
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 <sup>b</sup>	21.08	17.42	21.08	750	8.8	14.840	14.850	10100	19.96	120
2021-05-12 <sup>b</sup>	-	17.49	25.19	748	7.1	14.822	14.830	7800	12.90	120
2021-05-18 <sup>b</sup>	19.21	17.53	20.35	757	9.8	14.830	14.838	8700	17.81	120
2021-05-27 <sup>c</sup>	-	-	-	-	-	-	-	-	-	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 <sup>d</sup>	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



Table 3  
Air Quality Reporting  
Upham East Gypsum Quarry  
Upham, New Brunswick  
Project 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 <sup>3</sup> )	(mm Hg)	(°C)	(g)	(g)	(µg)	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
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
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 <sup>e</sup>	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 <sup>c</sup>	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

Table 3  
Air Quality Reporting  
Upham East Gypsum Quarry  
Upham, New Brunswick  
Project 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 <sup>3</sup> )	(mm Hg)	(°C)	(g)	(g)	(µg)	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
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

Table 3  
Air Quality Reporting  
Upham East Gypsum Quarry  
Upham, New Brunswick  
Project 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 <sup>3</sup> )	(mm Hg)	(°C)	(g)	(g)	(µg)	(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
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
2022-02-25	24 hours	19.29	27.77	757	-15.8	14.8061	14.8096	3500	5.2515	120
2022-03-03	24 hours	18.29	26.33	745	-5.8	14.8121	14.8128	700	1.1077	120
2022-03-09	24 hours	18.15	26.13	750	-2.4	14.8113	14.8218	10500	16.7432	120
2022-03-15	24 hours	17.75	25.56	736	-1.1	14.8158	14.8232	7400	12.0631	120
2022-03-21	24 hours	18.14	26.12	755	-0.1	14.8191	14.821	1900	3.0309	120
2023-03-27	24 hours	17.97	25.87	750	0	14.8189	14.8275	8600	13.8513	120
2023-04-02	24 hours	16.7	26.05	739	0.9	14.8275	14.8327	5200	8.3173	120
2023-04-08	24 hours	18.27	26.34	756	-1.8	14.8468	14.8785	31700	50.1455	120
2023-04-14	24 hours	17.34	24.97	747	9.4	14.8419	14.8581	16200	27.0324	120
2023-04-20	24 hours	17.61	25.36	751	6.3	14.8514	14.8526	1200	1.9716	120
2023-04-26	24 hours	17.73	25.54	757	6.6	14.8493	14.8509	1600	2.6103	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: 478863-IAS  
Report Date: 13-Apr-23  
Date Received: 11-Apr-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:	478863-1	478863-2	478863-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	7-Apr-23	7-Apr-23	7-Apr-23
<b>Analytes</b>	<b>Units</b>	<b>RL</b>	
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: 478863-IAS  
Report Date: 13-Apr-23  
Date Received: 11-Apr-23

## CERTIFICATE OF ANALYSIS

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



921 College Hill Rd  
Fredericton NB  
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>
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 479546-IAS  
Report Date: 20-Apr-23  
Date Received: 17-Apr-23

## CERTIFICATE OF ANALYSIS

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



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:	479546-1	479546-2	479546-3	479546-4
Client Sample ID:	SW3	SW5	PDP-1	PDP-1 Duplicate
Date Sampled:	13-Apr-23	13-Apr-23	13-Apr-23	13-Apr-23
<b>Analytes</b>	<b>Units</b>	<b>RL</b>		
Solids - Total Suspended	mg/L	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: 479546-IAS  
Report Date: 20-Apr-23  
Date Received: 17-Apr-23

## CERTIFICATE OF ANALYSIS

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



921 College Hill Rd  
Fredericton NB  
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>
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 480037-IAS  
Report Date: 25-Apr-23  
Date Received: 20-Apr-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:	480037-1	480037-2	480037-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	19-Apr-23	19-Apr-23	19-Apr-23
<b>Analytes</b>	<b>Units</b>	<b>RL</b>	
Solids - Total Suspended	mg/L	5	< 5 < 5 21

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: 480037-IAS  
Report Date: 25-Apr-23  
Date Received: 20-Apr-23

## CERTIFICATE OF ANALYSIS

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



921 College Hill Rd  
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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>
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 480984-IAS  
Report Date: 10-May-23  
Date Received: 01-May-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:	480984-1	480984-2	480984-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	28-Apr-23	28-Apr-23	28-Apr-23
<b>Analytes</b>	<b>Units</b>	<b>RL</b>	
Solids - Total Suspended	mg/L	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: 480984-IAS  
Report Date: 10-May-23  
Date Received: 01-May-23

## CERTIFICATE OF ANALYSIS

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



921 College Hill Rd  
Fredericton NB  
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>
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry



April 5, 2023

Project No.: 234601.00

Mr. Daniel Guest

**Hammond River Holdings**Via email: [Guest.Daniel@AtlanticWallboard.com](mailto:Guest.Daniel@AtlanticWallboard.com)**Re: Blast Vibration Monitoring – Blast No. 2023-08 – 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 15:00 on April 4, 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. 2023-08 – April 4, 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)	15:00	1,250 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		820 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		660 m SE	1.11 mm/s @ 73 Hz	106	-
4. Civic No. 2447 Route 820 (PW-07)		940 m NE	< 0.5 mm/s	<120	Units were not triggered
5. PW-03 - Cottage Route 820		690 m N	< 0.5 mm/s	<120	
6. Civic No. 2341 Route 820 (PW-05)		745 m N	< 0.5 mm/s	<120	
7. Civic No. 50 Myron Road (PW-15)		1,010 m NW	0.95 mm/s @ 43 Hz	105	-
8. Civic No. 86 Myron Road (PW-16)		870 m W	< 0.5 mm/s	<120	Units were not triggered
9. Civic No. 220 Myron Road (PW-01)		1,310 m SW	< 0.5 mm/s	<120	
10. Civic No. 2337 Route 820 (PW-04)		830 m NW	< 0.5 mm/s	<120	
11. Civic No. 4140 Route 111 (PW-12)		739 m SE	1.58 mm/s @ 47 Hz	107	-
<b>maximum limits as per Approval to Operate</b>			<b>12.5 mm/s</b>	<b>128 dB</b>	

*Mr. Daniel Guest - Hammond River Holdings*

*April 5, 2023*

*Project No.: 234601.00 - Blast No.: 2023-08*

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**

A handwritten signature in blue ink, appearing to read "Robert Y. Cyr", with a stylized flourish at the end.

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

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

## Attachment A

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### *Blast Record*

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### IDENTIFICATION:

<b>Blasting Contractor:</b>	<u>Gulf Operators Ltd.</u>		
<b>Blaster's Certification No.:</b>	<u>1318</u>	<b>Blaster's Name:</b>	<u>Daniel Blanchard</u>
<b>Blast Location:</b>	<u>N 45°28.848' W 65°37.953' (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>14,719 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Partly cloudy</u>	<b>Air Temp.:</b>	<u>14°C</u>
<b>Est. Wind Speed :</b>	<u>≈15 km/h</u>	<b>Wind Direction:</b>	<u>NE</u>
<b>Cloud Cover:</b>	<u>Partly</u>	<b>Precipitation:</b>	<u>No</u>

### BLAST DESIGN:

<b>Total No. Holes:</b>	<u>154</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>5.3 m – 6.5 m</u>	<b>Spacing:</b>	<u>10 ft x 10 ft</u>
<b>No. Holes per Delay:</b>	<u>3</u>	<b>Collar Length:</b>	<u>7 ft</u>
<b>Delay between Holes:</b>	<u>25 ms</u>	<b>Delay between Rows:</b>	<u>42, 59 &amp; 84 ms</u>
<b>Initiation Method:</b>	<u>Non-Electric</u>		
<b>Weight of Explosives per Delay:</b>	<u>Max.: 97 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>6,185 kg – Titan XL-1000</u>		

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



### BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>690 m</u>
<b>Direction to the Nearest Structure:</b>	<u>North</u>
<b>Structure Type:</b>	<u>Cottage</u>
<b>Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):</b>	<u>70.1</u>

### SAFETY:

<b>Type of Warning Signal Used:</b>	<u>Siren</u>
<b>Blasting Mats Used (yes or no):</b>	<u>No</u>
<b>Airblast Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Vibration Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Warning Signs Posted ( yes or no ):</b>	<u>Yes</u>
<b>Accesses Guarded ( yes or no ):</b>	<u>Yes</u>
<b>Flyrock Damage ( yes or no ):</b>	<u>No</u>
<b>If Yes, Describe:</b>	
<hr/>	
<b>Misfire ( yes or no ):</b>	<u>No</u>

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



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>InstanTel Micromate, Serial #5632</u>
Calibration Date:	<u>November 16, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,250 m South</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #2

Make, Model and Serial # of unit:	<u>InstanTel Micromate, Serial #5487</u>
Calibration Date:	<u>January 16, 2023</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>820 m South</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #20203</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>660 m Southeast</u>
Transverse Particle Velocity:	<u>0.63 mm/s @ 39 Hz</u>
Vertical Particle Velocity:	<u>1.11 mm/s @ 73 Hz</u>
Longitudinal Particle Velocity:	<u>0.69 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>1.11 mm/s @ 73 Hz</u>
Maximum Airblast:	<u>106 dB(L)</u>

### Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #20205</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>940 m Northeast</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>690 m North</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #5371</u>
Calibration Date:	<u>July 27, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>745 m North</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #20204</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>1,010 m Northwest</u>
Transverse Particle Velocity:	<u>0.95 mm/s @ 43 Hz</u>
Vertical Particle Velocity:	<u>0.16 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.69 mm/s @ 43 H45</u>
Peak Particle Velocity:	<u>0.95 mm/s @ 43 Hz</u>
Maximum Airblast:	<u>105 dB(L)</u>

### Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>870 m West</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #20206</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,310 m Southwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #10

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>830 m Northwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 4, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>15:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-08</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>InstanTel Micromate, Serial #18193</u>
Calibration Date:	<u>April 11, 2022</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>739 m Southeast</u>
Transverse Particle Velocity:	<u>1.58 mm/s @ 47 Hz</u>
Vertical Particle Velocity:	<u>1.34 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>1.30 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>1.58 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>107 dB(L)</u>

## Attachment B

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### *Blast and Seismograph Location Plan*



# Blast and Seismograph Location Plan

**Blast No:** 2023-08

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay



## Legend

- ★ Blast 2023-08
- Seismograph Location

**Date:** April 4, 2023  
**Project No.:** 234601.00





## Attachment C

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### *Blast Event Reports*

**Date/Time** Vert at 15:00:55 April 4, 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

**Serial Number** UM20203 V 10-90GC Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20203\_20230404150055.IDFW

**Notes**

**Post Event Notes**

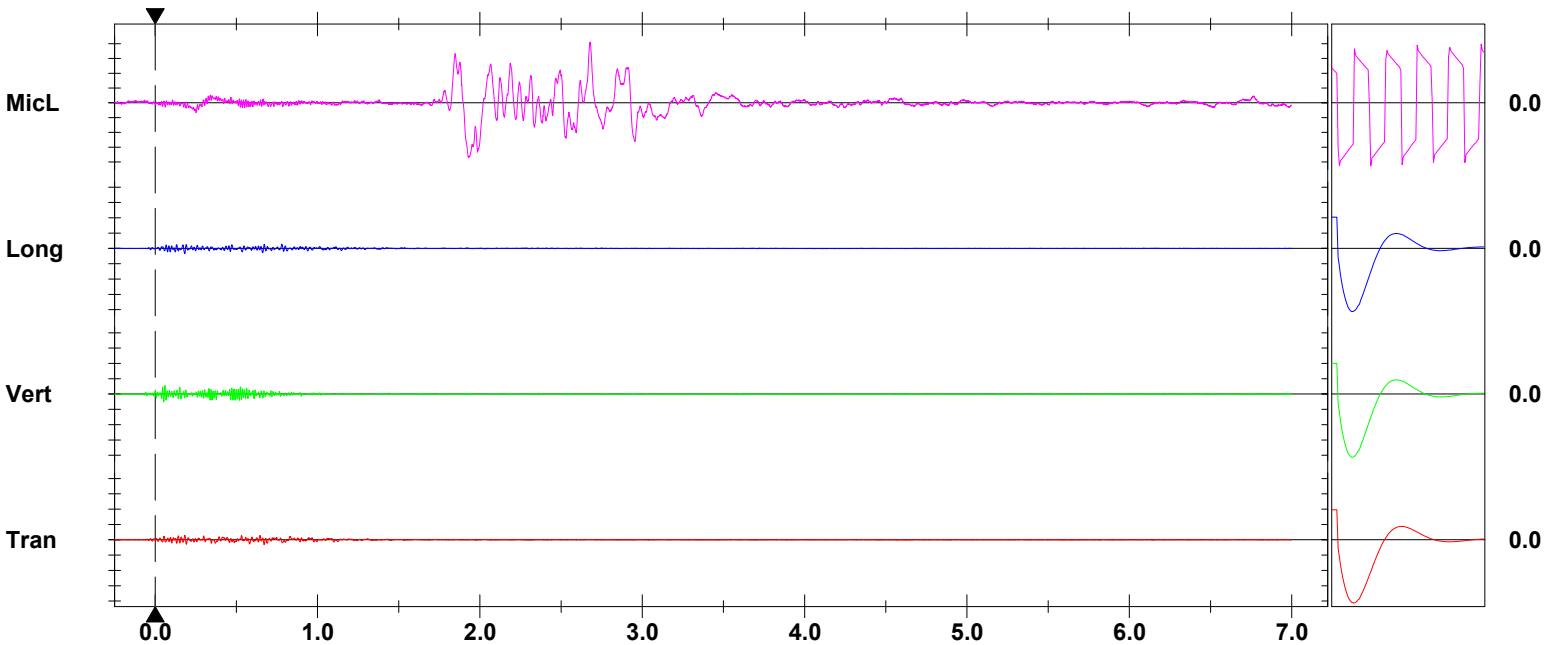
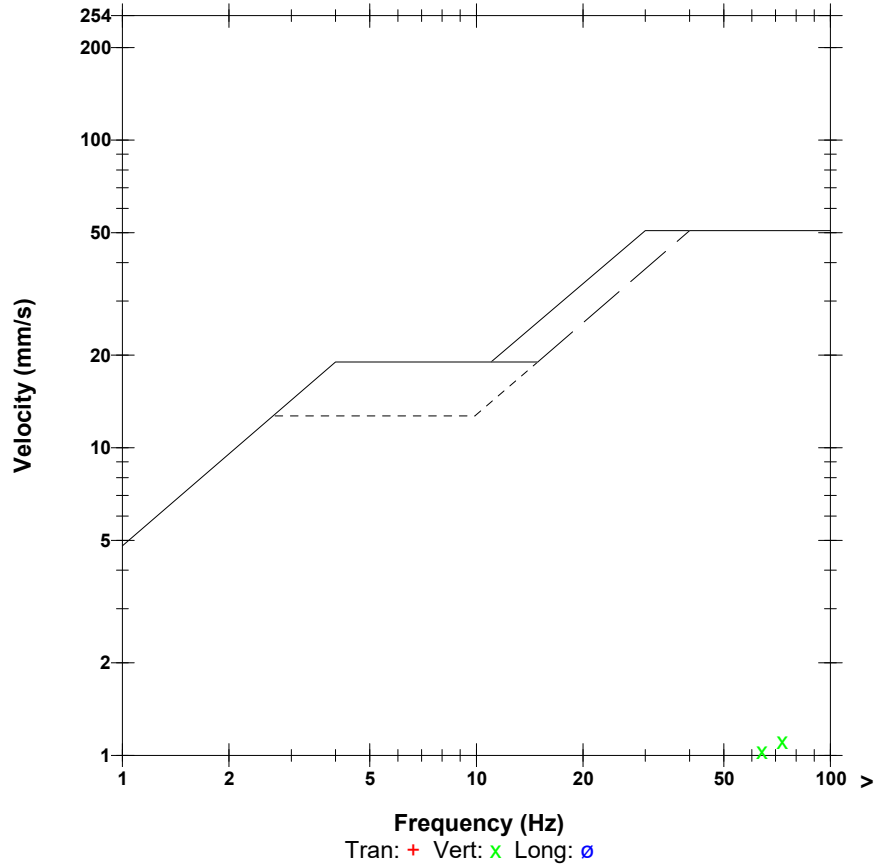
Location: Civic Number 4150 Route 111 (PW-13)  
 Blast No.: 2023-08  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 106.3 dB(L) 4.112 pa.(L) at 2.679 sec  
**ZC Freq** 7.0 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1405 mv )

	Tran	Vert	Long	
PPV	0.631	1.111	0.694	mm/s
PPV	46.99	51.92	47.82	dB
ZC Freq	39	73	47	Hz
Time (Rel. to Trig)	0.671	0.061	0.182	sec
Peak Acceleration	0.034	0.063	0.039	g
Peak Displacement	0.004	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	6.7	7.5	7.5	Hz
Overswing Ratio	4.7	4.5	4.2	

**Peak Vector Sum** 1.141 mm/s at 0.061 sec

**USBM RI8507 And OSMRE**



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

Sensor Check

**Date/Time** Tran at 15:00:19 April 4, 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

**Serial Number** UM20204 V 10-90GC Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20204\_20230404150019.IDFW

### Post Event Notes

Location: Civic Number 50 Myron Road (PW-15)  
 Blast No.: 2023-08  
 Project No: 234601.00

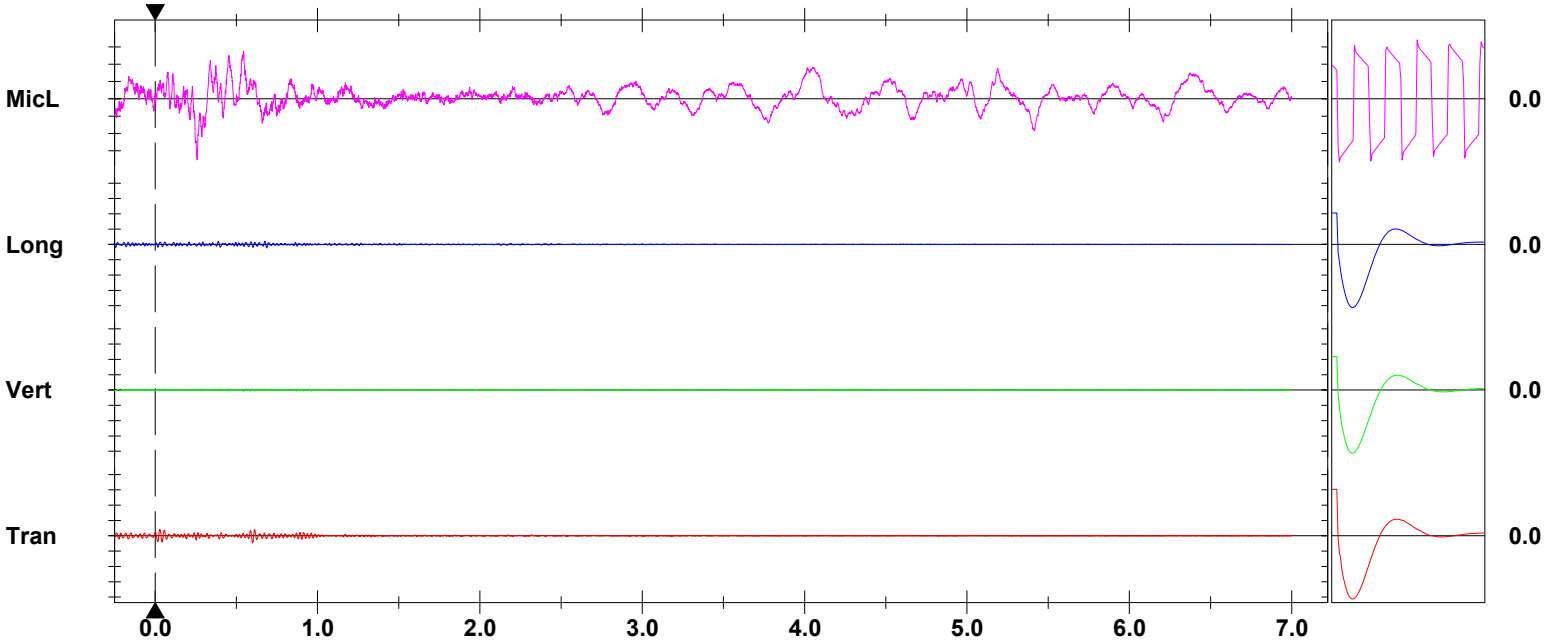
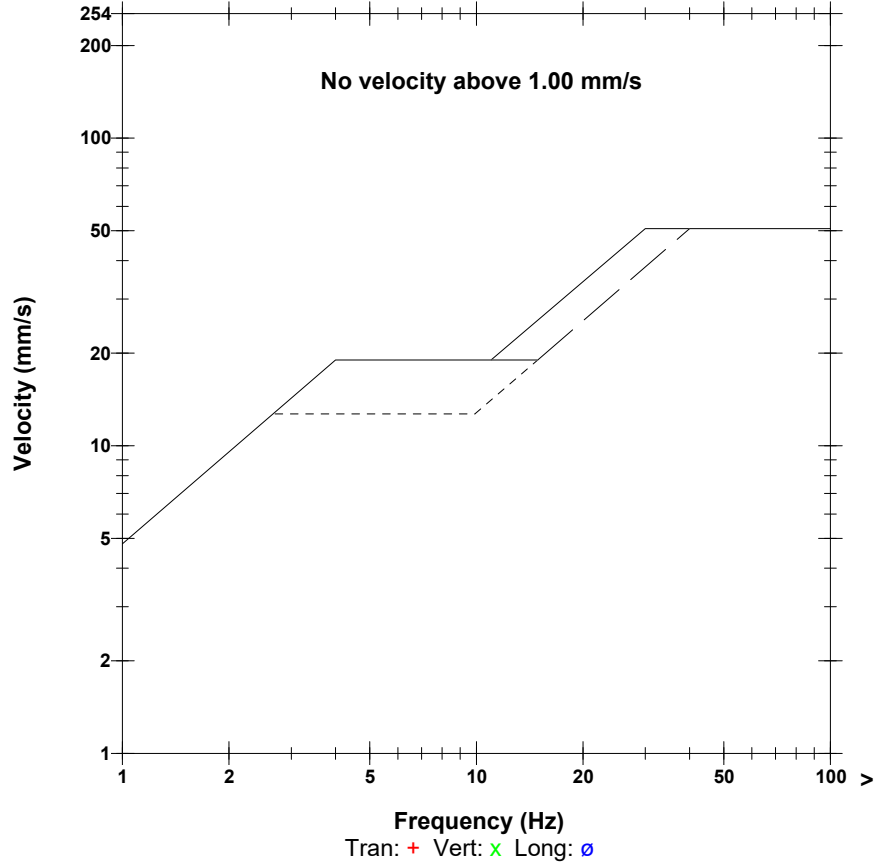
### Notes

**Microphone** Linear Weighting  
**PSPL** 104.9 dB(L) 3.522 pa.(L) at 0.259 sec  
**ZC Freq** 5.7 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1454 mv )

	Tran	Vert	Long	
PPV	0.946	0.158	0.449	mm/s
PPV	50.52	34.95	44.05	dB
ZC Freq	43	57	43	Hz
Time (Rel. to Trig)	0.600	0.456	0.688	sec
Peak Acceleration	0.041	0.010	0.013	g
Peak Displacement	0.004	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.5	Hz
Overswing Ratio	3.8	4.3	4.1	

**Peak Vector Sum** 0.988 mm/s at 0.600 sec

### USBM RI8507 And OSMRE



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

Sensor Check

**Date/Time** Vert at 15:00:55 April 4, 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/CARVER.MMB

**Serial Number** UM18193 V 10-90GC Micromate ISEE  
**Battery Level** 3.7 Volts  
**Unit Calibration** April 11, 2022 by InstanTel  
**File Name** UM18193\_20230404150055.IDFW

### Post Event Notes

Location: Civic Number 4140 Route 111 (PW-12)  
 Blast No.: 2023-08  
 Project No: 234601.00

### Notes

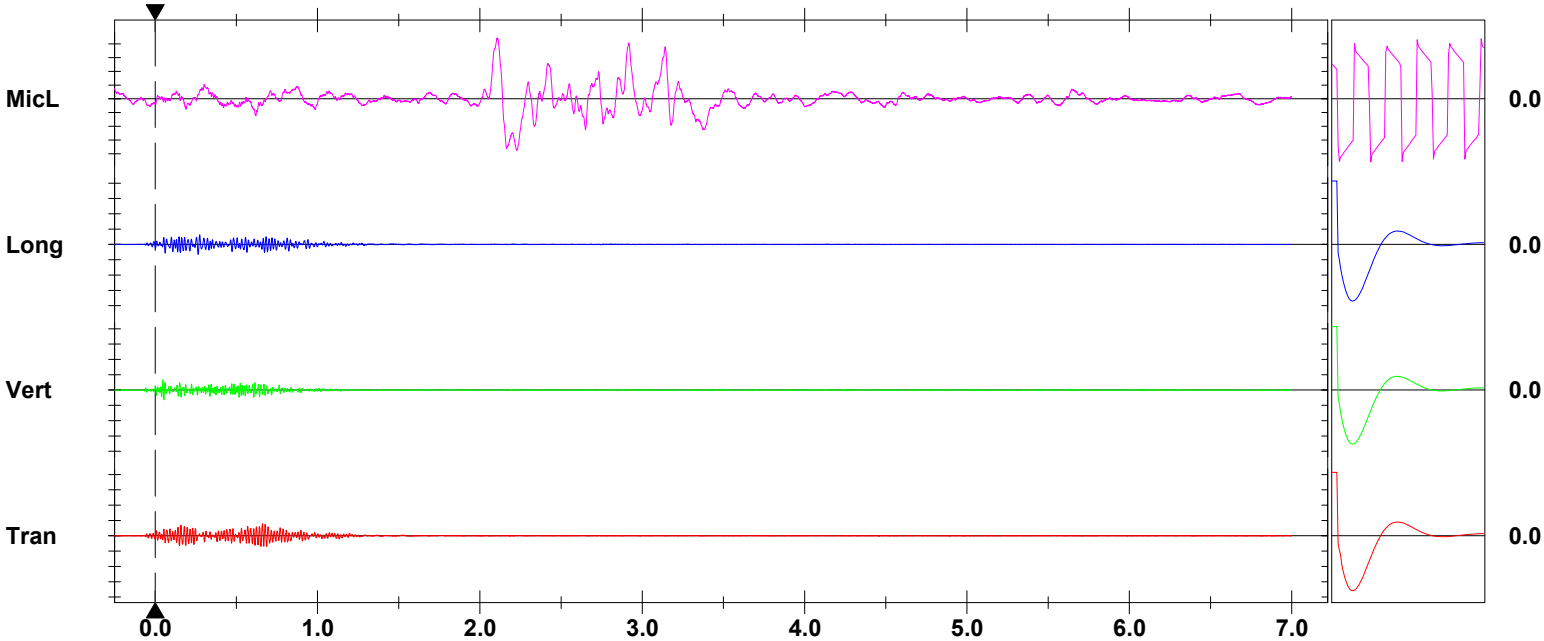
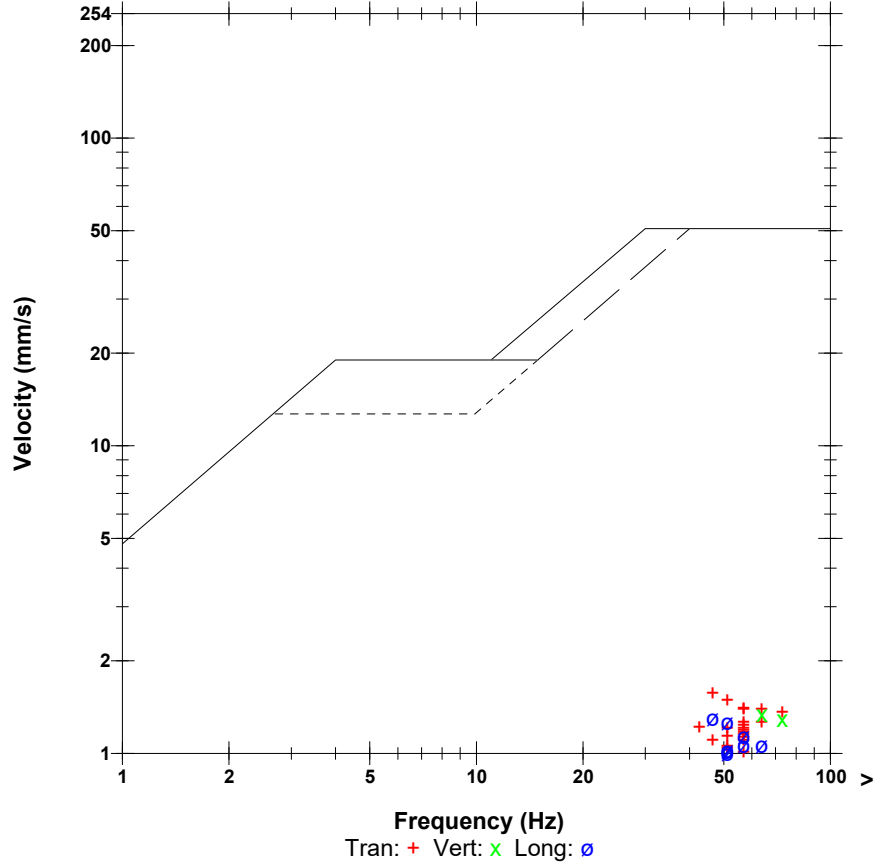
Location:  
 Client:  
 User Name:  
 General:

**Microphone** Linear Weighting  
**PSPL** 106.9 dB(L) 4.422 pa.(L) at 2.107 sec  
**ZC Freq** 6.0 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1439 mv )

	Tran	Vert	Long	
PPV	1.576	1.340	1.301	mm/s
PPV	54.95	53.54	53.28	dB
ZC Freq	47	64	47	Hz
Time (Rel. to Trig)	0.660	0.047	0.265	sec
Peak Acceleration	0.098	0.072	0.080	g
Peak Displacement	0.005	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.3	Hz
Overswing Ratio	4.0	3.9	4.2	

**Peak Vector Sum** 1.801 mm/s at 0.054 sec

### USBM RI8507 And OSMRE



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

Sensor Check



April 14, 2023

Project No.: 234601.00

Mr. Daniel Guest

**Hammond River Holdings**Via email: [Guest.Daniel@AtlanticWallboard.com](mailto:Guest.Daniel@AtlanticWallboard.com)**Re: Blast Vibration Monitoring – Blast No. 2023-09 – 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 14:54 on April 13, 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. 2023-09 – April 13, 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)	14:54	1,360 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		950 m S	0.83 mm/s @ 57 Hz	114	-
3. Civic No. 4150 Route 111 (PW-13)		778 m SE	0.57 mm/s @ 51 Hz	119	-
4. Civic No. 2447 Route 820 (PW-07)		890 m NE	0.54 mm/s @ 26 Hz	126	-
5. PW-03 - Cottage Route 820		620 m N	0.70 mm/s @ 21 Hz	128	-
6. Civic No. 2341 Route 820 (PW-05)		640 m N	0.76 mm/s @ 39 Hz	128	-
7. Civic No. 50 Myron Road (PW-15)		895 m NW	0.57 mm/s @ 57 Hz	120	-
8. Civic No. 86 Myron Road (PW-16)		820 m W	1.77 mm/s @ 47 Hz	113	-
9. Civic No. 220 Myron Road (PW-01)		1,380 m SW	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 2337 Route 820 (PW-04)		720 m NW	< 0.5 mm/s	<120	
11. Civic No. 4140 Route 111 (PW-12)		865 m SE	1.13mm/s @ 57 Hz	113	-
<b>maximum limits as per Approval to Operate</b>			<b>12.5 mm/s</b>	<b>128 dB</b>	

*Mr. Daniel Guest – Hammond River Holdings*

*April 14, 2023*

*Project No.: 234601.00 – Blast No.: 2023-09*

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**

A handwritten signature in blue ink, appearing to read "Robert Y. Cyr", with a stylized flourish at the end.

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

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## Attachment A

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### *Blast Record*

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### IDENTIFICATION:

<b>Blasting Contractor:</b>	<u>Gulf Operators Ltd.</u>		
<b>Blaster's Certification No.:</b>	<u>1318</u>	<b>Blaster's Name:</b>	<u>Daniel Blanchard</u>
<b>Blast Location:</b>	<u>N 45°28.902' W 65°38.004' (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>21,962 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Sunny</u>	<b>Air Temp.:</b>	<u>18°C</u>
<b>Est. Wind Speed :</b>	<u>≈20 km/h</u>	<b>Wind Direction:</b>	<u>SE</u>
<b>Cloud Cover:</b>	<u>No</u>	<b>Precipitation:</b>	<u>No</u>

### BLAST DESIGN:

<b>Total No. Holes:</b>	<u>190</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>5.9 m – 6.9 m</u>	<b>Spacing:</b>	<u>10 ft x 10 ft</u>
<b>No. Holes per Delay:</b>	<u>4</u>	<b>Collar Length:</b>	<u>7 ft</u>
<b>Delay between Holes:</b>	<u>25 ms</u>	<b>Delay between Rows:</b>	<u>42, 59 &amp; 84 ms</u>
<b>Initiation Method:</b>	<u>Non-Electric</u>		
<b>Weight of Explosives per Delay:</b>	<u>Max.: 217 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>10,274 kg – Titan XL-1000</u>		

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





## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

## BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>620 m</u>
<b>Direction to the Nearest Structure:</b>	<u>North</u>
<b>Structure Type:</b>	<u>Cottage</u>
<b>Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):</b>	<u>42.1</u>

## SAFETY:

<b>Type of Warning Signal Used:</b>	<u>Siren</u>
<b>Blasting Mats Used (yes or no):</b>	<u>No</u>
<b>Airblast Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Vibration Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Warning Signs Posted ( yes or no ):</b>	<u>Yes</u>
<b>Accesses Guarded ( yes or no ):</b>	<u>Yes</u>
<b>Flyrock Damage ( yes or no ):</b>	<u>No</u>
<b>If Yes, Describe:</b>	
<hr/>	
<b>Misfire ( yes or no ):</b>	<u>No</u>

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

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>InstanTel Minimate, Serial #5632</u>
Calibration Date:	<u>November 16, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,360 m South</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #2

Make, Model and Serial # of unit:	<u>InstanTel Micromate, Serial #20205</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>950 m South</u>
Transverse Particle Velocity:	<u>0.83 mm/s @ 57 Hz</u>
Vertical Particle Velocity:	<u>0.54 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.37 mm/s @ 37 Hz</u>
Peak Particle Velocity:	<u>0.83 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>114 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5371</u>
Calibration Date:	<u>July 27, 2022</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>778 m Southeast</u>
Transverse Particle Velocity:	<u>0.45 mm/s @ 47 Hz</u>
Vertical Particle Velocity:	<u>0.38 mm/s @ 73 Hz</u>
Longitudinal Particle Velocity:	<u>0.57 mm/s @ 51 Hz</u>
Peak Particle Velocity:	<u>0.57 mm/s @ 51 Hz</u>
Maximum Airblast:	<u>119 dB(L)</u>

### Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #20206</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>890 m Northeast</u>
Transverse Particle Velocity:	<u>0.54 mm/s @ 26 Hz</u>
Vertical Particle Velocity:	<u>0.28 mm/s @ 21 Hz</u>
Longitudinal Particle Velocity:	<u>0.32 mm/s @ 22 Hz</u>
Peak Particle Velocity:	<u>0.54 mm/s @ 26 Hz</u>
Maximum Airblast:	<u>126 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5487</u>
Calibration Date:	<u>January 16, 2023</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>620 m North</u>
Transverse Particle Velocity:	<u>0.45 mm/s @ 43 Hz</u>
Vertical Particle Velocity:	<u>0.45 mm/s @ 47 Hz</u>
Longitudinal Particle Velocity:	<u>0.70 mm/s @ 21 Hz</u>
Peak Particle Velocity:	<u>0.70 mm/s @ 21 Hz</u>
Maximum Airblast:	<u>128 dB(L)</u>

### Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>640 m North</u>
Transverse Particle Velocity:	<u>0.64 mm/s @ 73 Hz</u>
Vertical Particle Velocity:	<u>0.76 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.76 mm/s @ 39 Hz</u>
Peak Particle Velocity:	<u>0.76 mm/s @ 39 Hz</u>
Maximum Airblast:	<u>128 dB(L)</u>



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #20203</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>895 m Northwest</u>
Transverse Particle Velocity:	<u>0.50 mm/s @ 37 Hz</u>
Vertical Particle Velocity:	<u>0.57 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.47 mm/s @ 32 Hz</u>
Peak Particle Velocity:	<u>0.57 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>120 dB(L)</u>

### Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #20204</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>820 m West</u>
Transverse Particle Velocity:	<u>1.62 mm/s @ 32 Hz</u>
Vertical Particle Velocity:	<u>0.99 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>1.77 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>1.77 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>113 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #18193</u>
Calibration Date:	<u>April 11, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,380 m Southwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #10

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>720 m Northwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 13, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:54</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-09</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>865 m Southeast</u>
Transverse Particle Velocity:	<u>0.74 mm/s @ 64 Hz</u>
Vertical Particle Velocity:	<u>0.82 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>1.13 mm/s @ 57 Hz</u>
Peak Particle Velocity:	<u>1.13 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>113 dB(L)</u>

## Attachment B

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### *Blast and Seismograph Location Plan*



# Blast and Seismograph Location Plan

**Blast No:** 2023-09

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay



**Date:** April 13, 2023  
**Project No.:** 234601.00





## Attachment C

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### *Blast Event Reports*

**Date/Time** Vert at 14:54:02 April 13, 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

**Serial Number** UM20205 V 10-90GC Micromate ISEE  
**Battery Level** 3.6 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20205\_20230413145402.IDFW

**Post Event Notes**

Location: Civic Number 4126 Route 111 (PW-10)  
 Blast No.: 2023-09  
 Project No: 234601.00

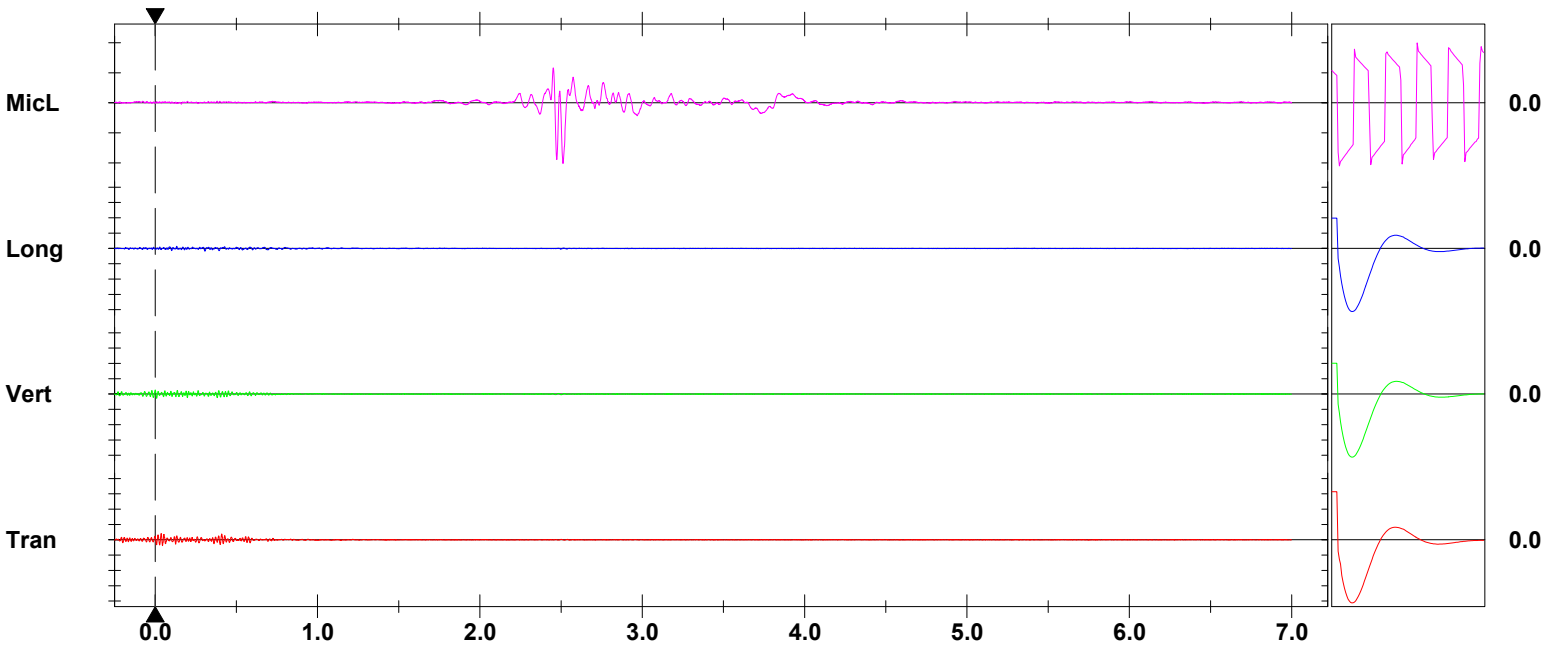
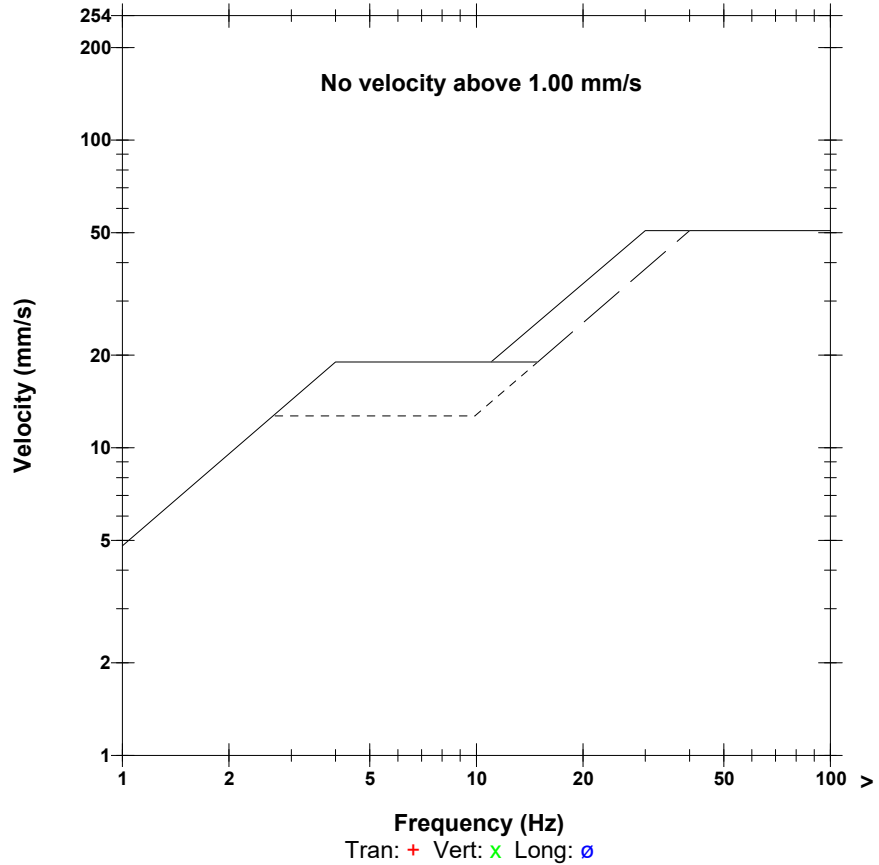
**Notes**

**Microphone** Linear Weighting  
**PSPL** 114.1 dB(L) 10.12 pa.(L) at 2.512 sec  
**ZC Freq** 13 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1441 mv )

	Tran	Vert	Long	
PPV	0.828	0.544	0.370	mm/s
PPV	49.36	45.71	42.37	dB
ZC Freq	57	57	37	Hz
Time (Rel. to Trig)	0.037	0.008	0.307	sec
Peak Acceleration	0.044	0.030	0.015	g
Peak Displacement	0.002	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.3	7.5	Hz
Overswing Ratio	5.0	5.0	4.8	

**Peak Vector Sum** 0.852 mm/s at 0.037 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Long at 14:54:12 April 13, 2023  
**Trigger Source** Geo: 0.492 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5371 V 2.61 MiniMate  
**Battery Level** 6.5 Volts  
**Unit Calibration** July 27, 2022 by InstanTel  
**File Name** G371JZ9Q.QC0

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: April 13, 2023 17:17:42 (V10.72.1)

**Post Event Notes**  
 Location: Civic Number 4150 Route 111 (PW-13)  
 Blast No.: 2023-09  
 Project No: 234601.00

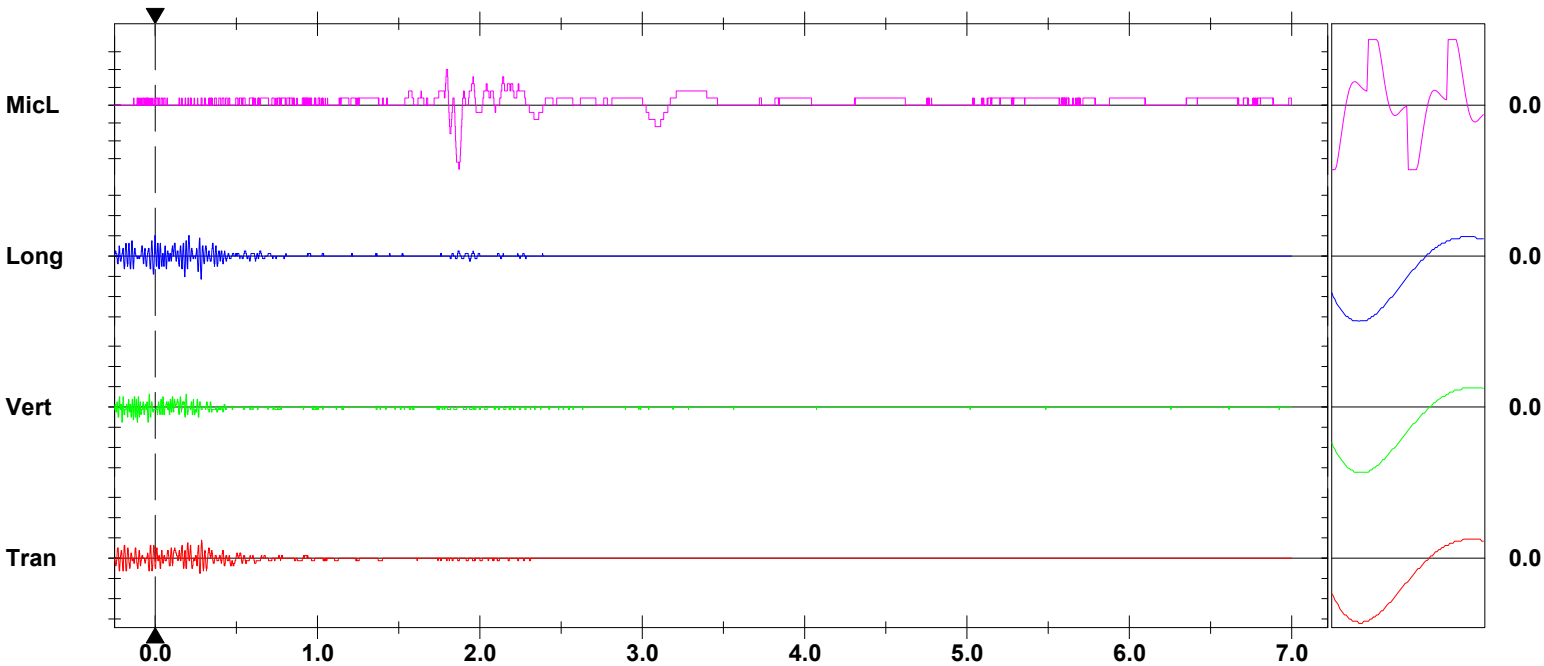
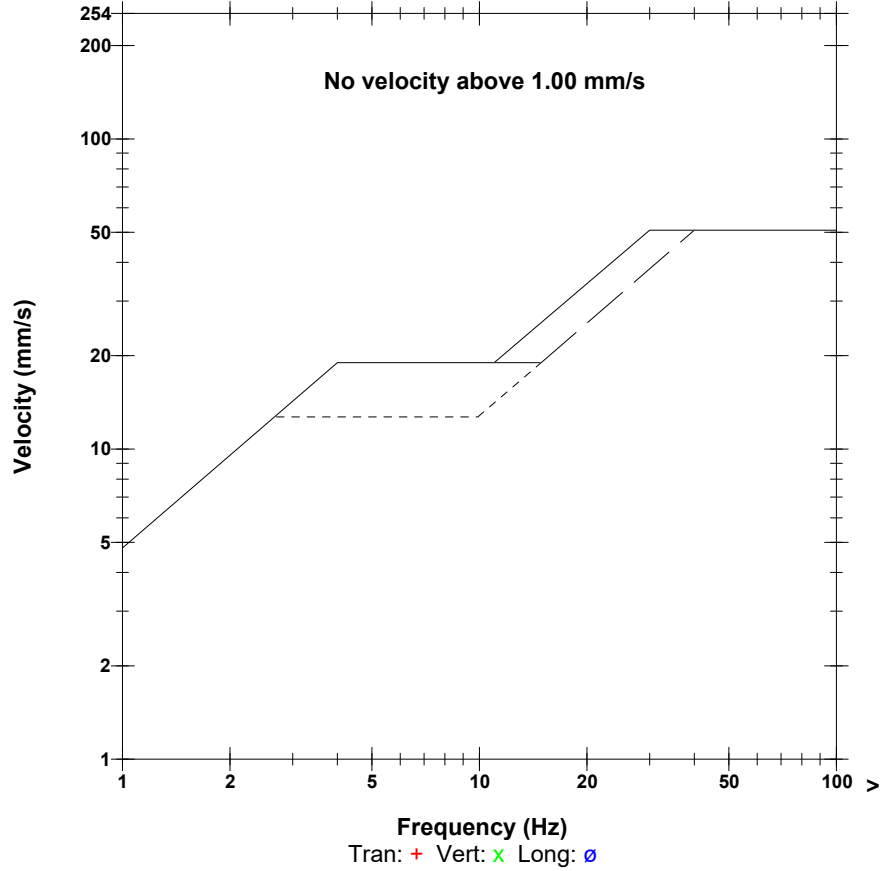
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 119.1 dB(L) 18.00 pa.(L) at 1.872 sec  
**ZC Freq** 10 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 307 mv )

	Tran	Vert	Long	
PPV	0.445	0.381	0.572	mm/s
PPV	43.96	42.62	46.14	dB
ZC Freq	47	73	51	Hz
Time (Rel. to Trig)	0.287	-0.042	0.284	sec
Peak Acceleration	0.013	0.020	0.020	g
Peak Displacement	0.001	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	8.2	Hz
Overswing Ratio	3.6	3.6	3.5	

**Peak Vector Sum** 0.635 mm/s at 0.284 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Tran at 14:54:03 April 13, 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

**Serial Number** UM20206 V 10-90GC Micromate ISEE  
**Battery Level** 3.6 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20206\_20230413145403.IDFW

**Notes**

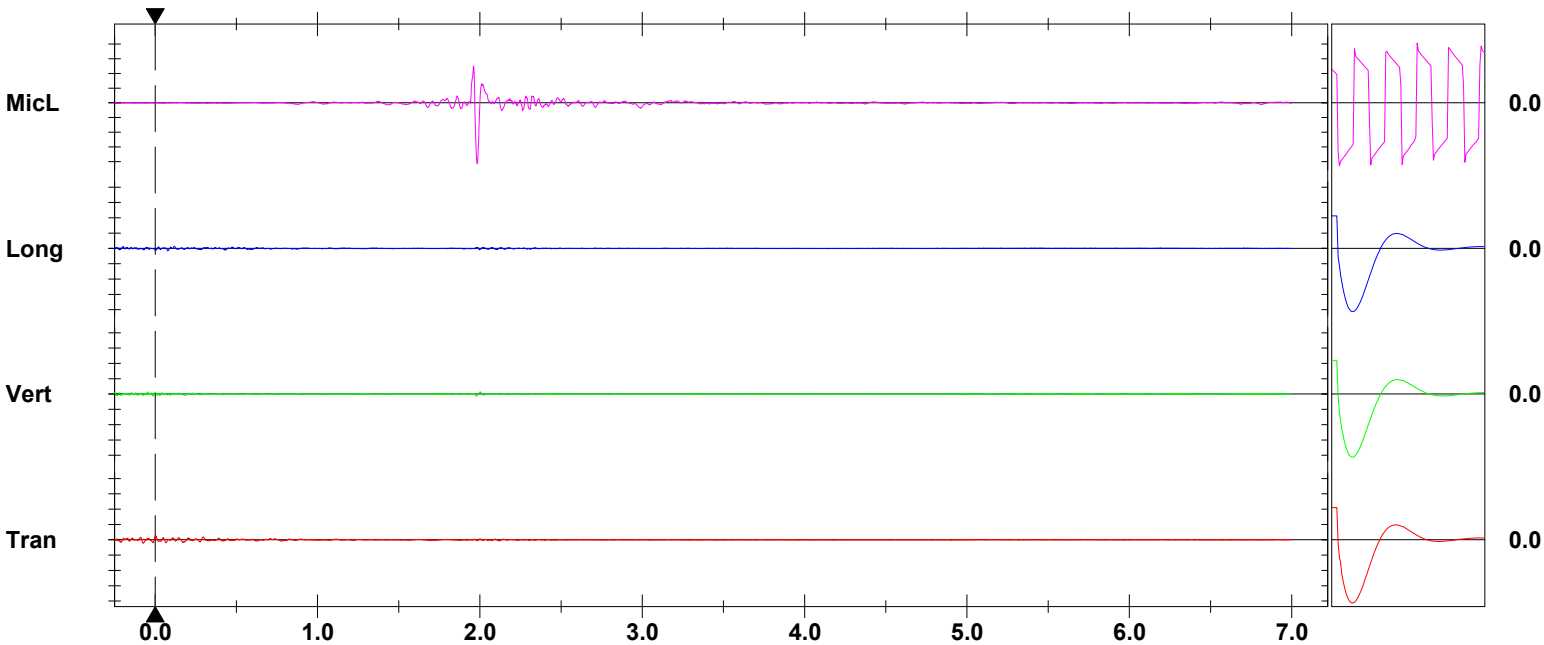
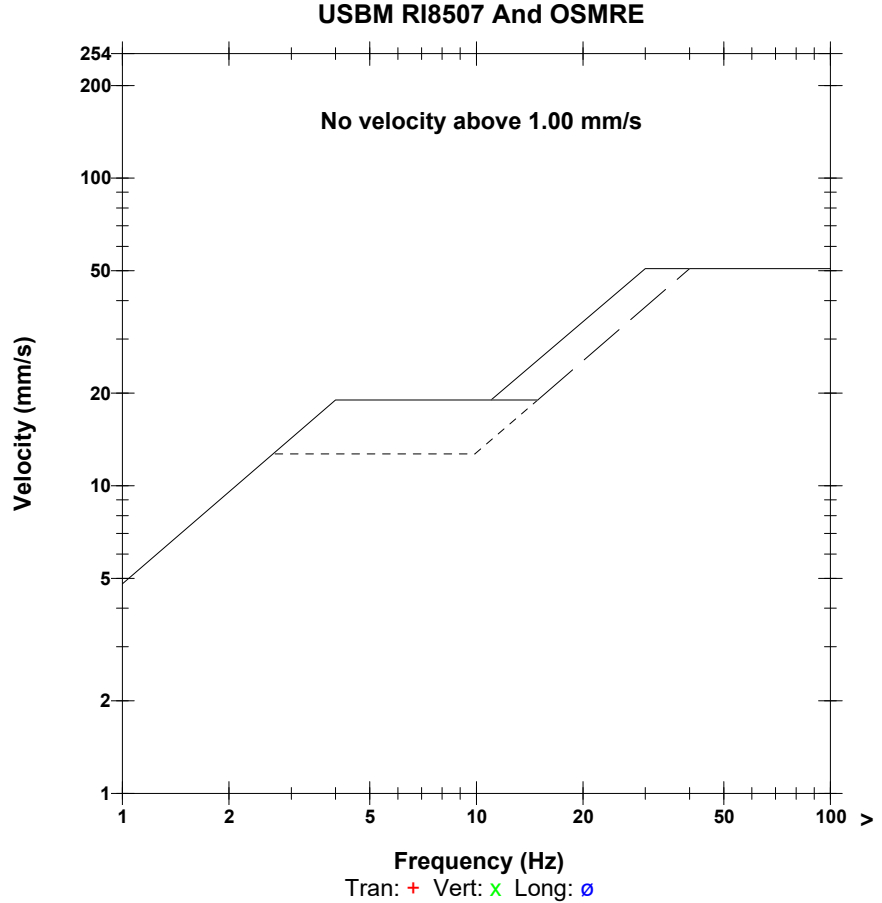
**Post Event Notes**

Location: Civic Number 2447 Route 820 (PW-07)  
 Blast No.: 2023-09  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 126.3 dB(L) 41.33 pa.(L) at 1.983 sec  
**ZC Freq** 16 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1405 mv )

	Tran	Vert	Long	
PPV	0.544	0.284	0.315	mm/s
PPV	45.71	40.06	40.97	dB
ZC Freq	26	21	22	Hz
Time (Rel. to Trig)	0.002	2.001	0.077	sec
Peak Acceleration	0.020	0.008	0.008	g
Peak Displacement	0.003	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.3	7.5	Hz
Overswing Ratio	4.2	4.4	4.2	

**Peak Vector Sum** 0.601 mm/s at 0.002 sec



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

Sensor Check

**Date/Time** Long at 14:54:03 April 13, 2023  
**Trigger Source** Geo: 0.492 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5487 V 2.61 MiniMate  
**Battery Level** 6.1 Volts  
**Unit Calibration** January 16, 2023 by InstanTel  
**File Name** G487JZ9Q.Q30

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: April 13, 2023 17:21:52 (V10.72.1)

**Post Event Notes**  
 Location: Civic Number Cottage - Route 820 (PW-03)  
 Blast No.: 2023-09  
 Project No: 234601.00

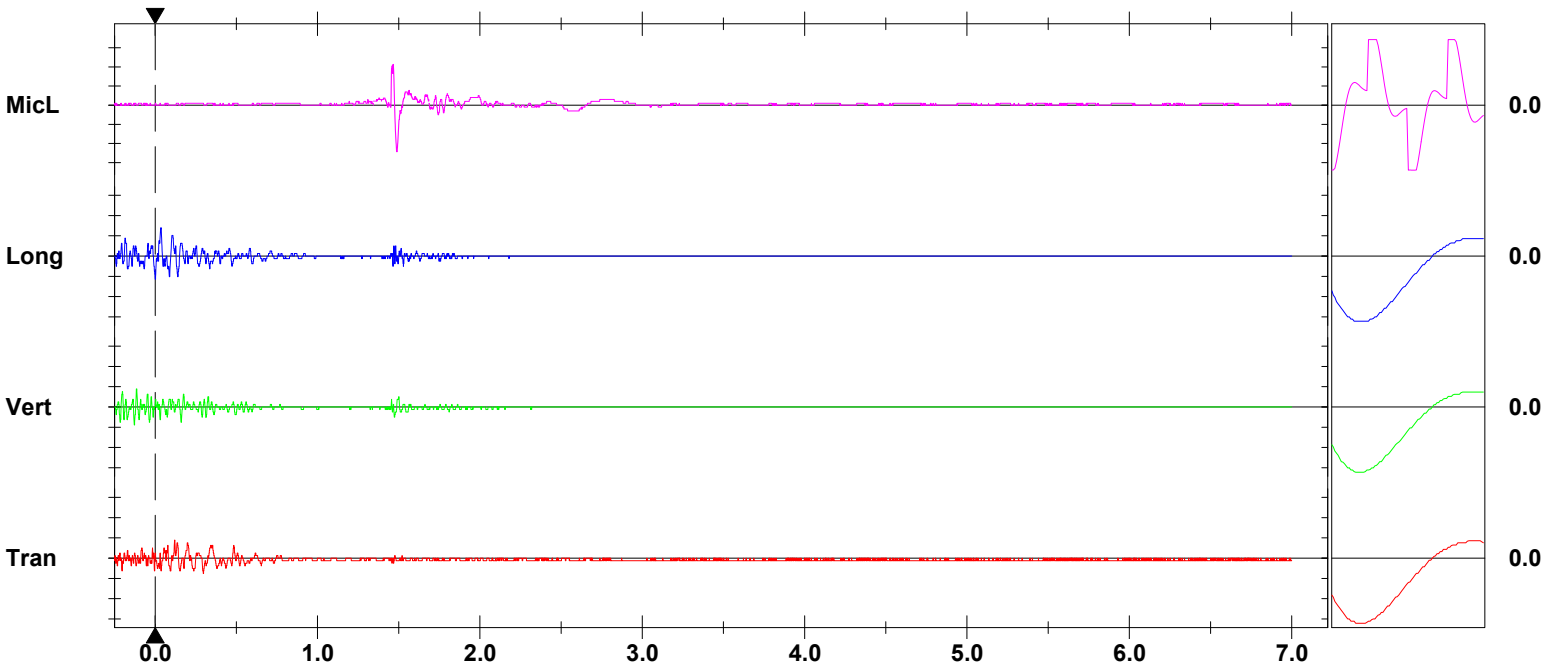
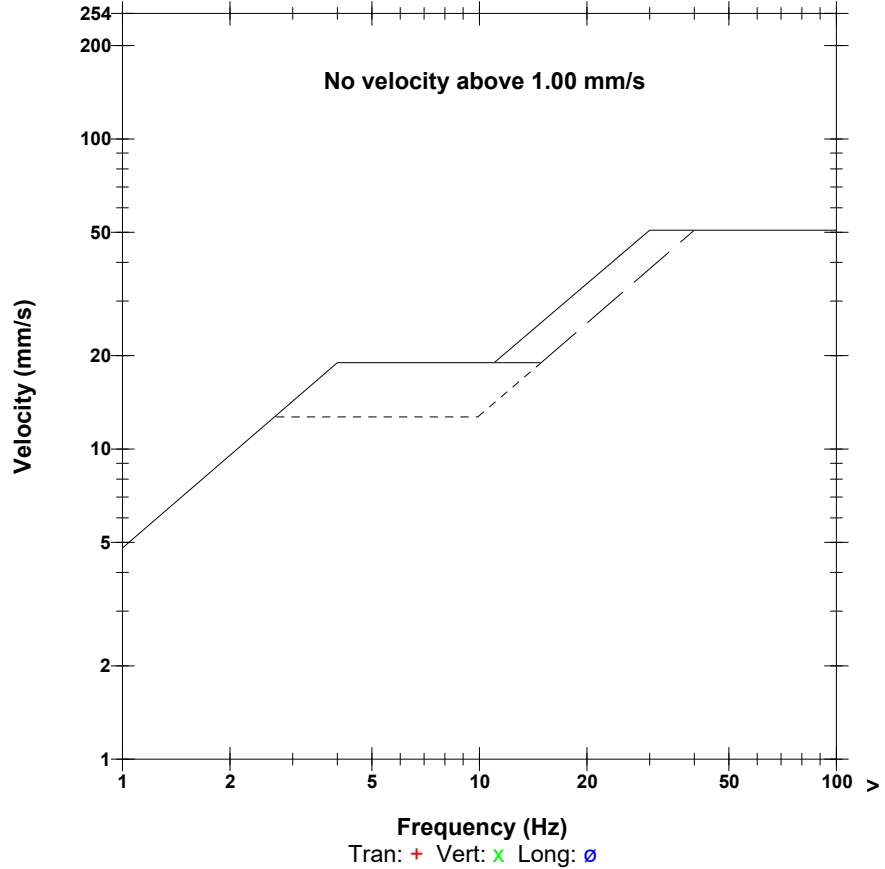
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 128.1 dB(L) 50.82 pa.(L) at 1.488 sec  
**ZC Freq** 10 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 288 mv )

	Tran	Vert	Long	
PPV	0.445	0.445	0.699	mm/s
PPV	43.96	43.96	47.88	dB
ZC Freq	43	47	21	Hz
Time (Rel. to Trig)	0.120	-0.113	0.035	sec
Peak Acceleration	0.020	0.013	0.020	g
Peak Displacement	0.003	0.001	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.7	7.7	Hz
Overswing Ratio	3.4	4.2	3.8	

**Peak Vector Sum** 0.762 mm/s at 0.037 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 20.00 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Vert at 14:53:06 April 13, 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

**Serial Number** BE21348 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.0 Volts  
**Unit Calibration** July 21, 2022 by InstanTel  
**File Name** W348JZ7W.010

**Notes**

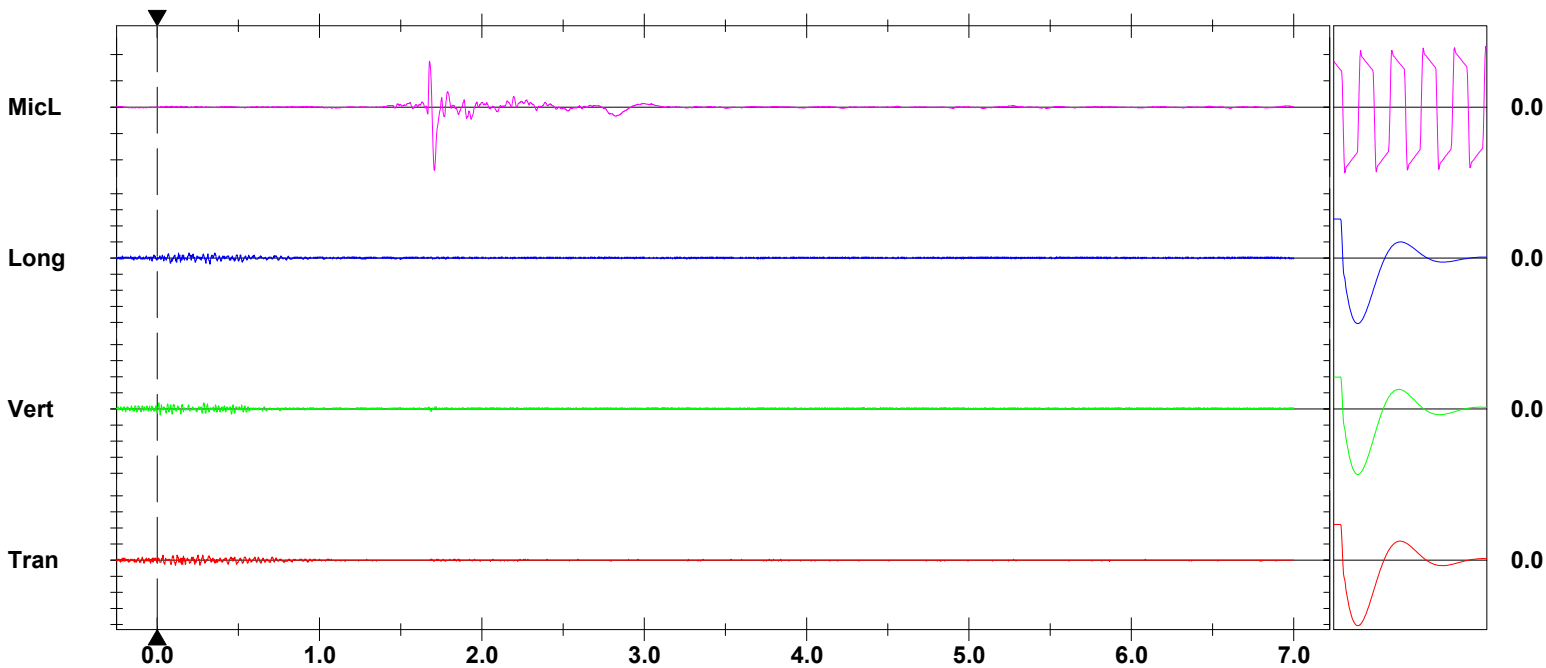
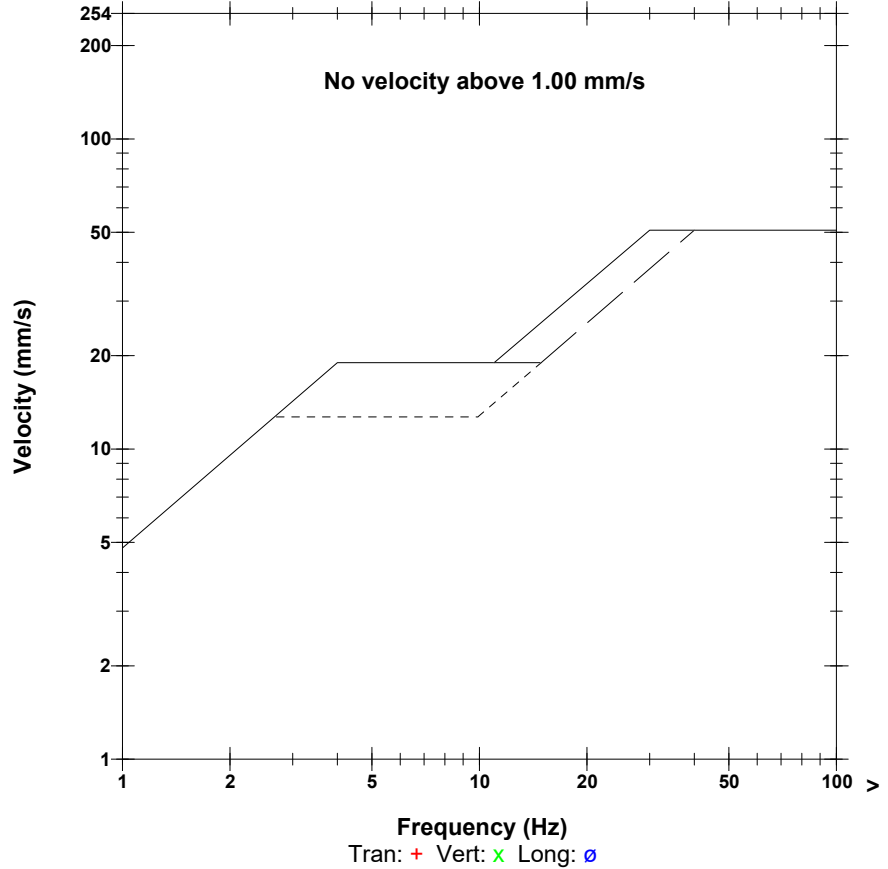
**Post Event Notes**  
 Location: Civic Number 2341 Route 820 (PW-05)  
 Blast No.: 2023-09  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 127.6 dB(L) 48.00 pa.(L) at 1.707 sec  
**ZC Freq** 9.5 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 512 mv)

	Tran	Vert	Long	
PPV	0.635	0.762	0.762	mm/s
PPV	47.06	48.64	48.64	dB
ZC Freq	73	57	39	Hz
Time (Rel. to Trig)	0.036	0.009	0.324	sec
Peak Acceleration	0.040	0.040	0.027	g
Peak Displacement	0.003	0.003	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.4	Hz
Overswing Ratio	3.5	3.4	4.1	

Peak Vector Sum 0.959 mm/s at 0.083 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 20.00 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Vert at 14:54:02 April 13, 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

**Serial Number** UM20203 V 10-90GC Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20203\_20230413145402.IDFW

**Notes**

**Post Event Notes**

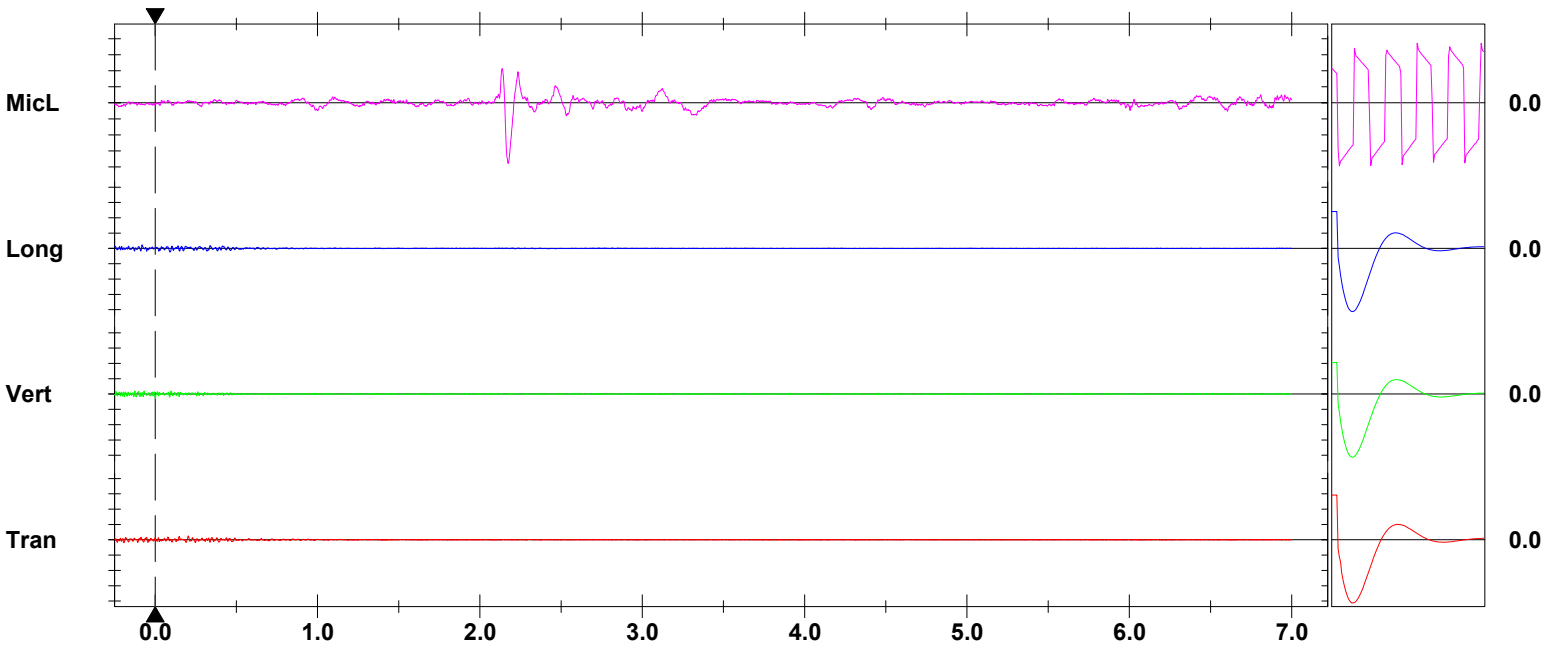
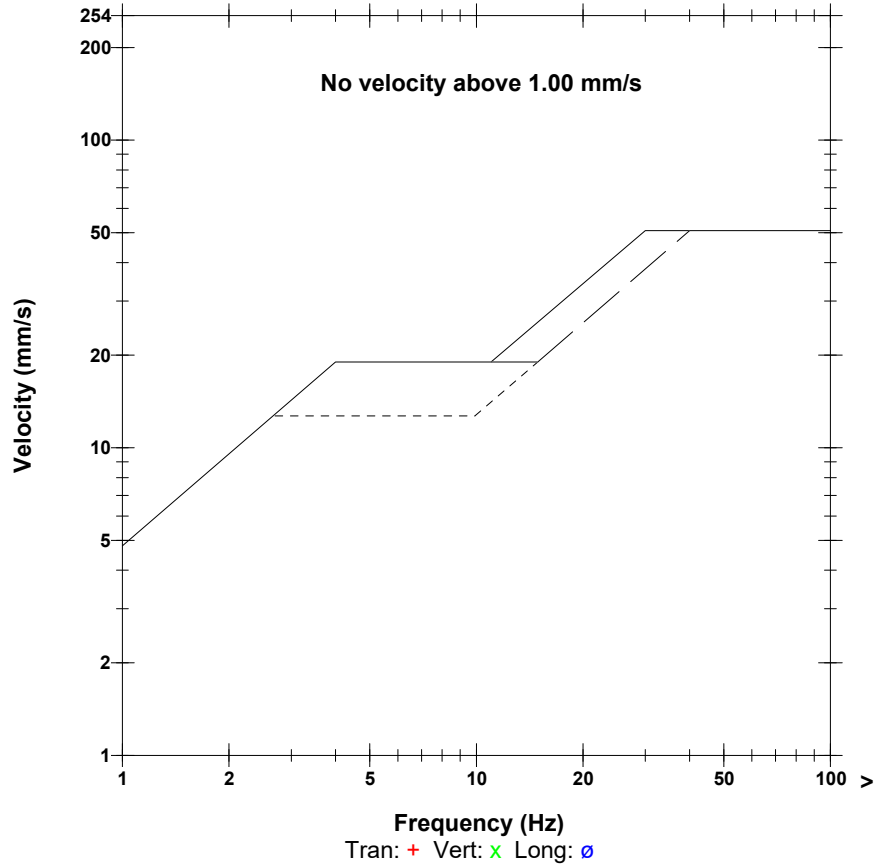
Location: Civic Number 50 Myron Road (PW-15)  
 Blast No.: 2023-09  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 119.5 dB(L) 18.98 pa.(L) at 2.173 sec  
**ZC Freq** 8.8 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1383 mv )

	Tran	Vert	Long	
PPV	0.504	0.567	0.473	mm/s
PPV	45.06	46.08	44.50	dB
ZC Freq	37	57	32	Hz
Time (Rel. to Trig)	0.204	0.001	0.091	sec
Peak Acceleration	0.025	0.025	0.023	g
Peak Displacement	0.002	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.1	4.4	4.0	

**Peak Vector Sum** 0.644 mm/s at 0.149 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check



**Date/Time** Long at 14:54:02 April 13, 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

**Serial Number** UM20204 V 10-90GC Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20204\_20230413145402.IDFW

### Post Event Notes

Location: Civic Number 86 Myron Road (PW-16)  
 Blast No.: 2023-09  
 Project No: 234601.00

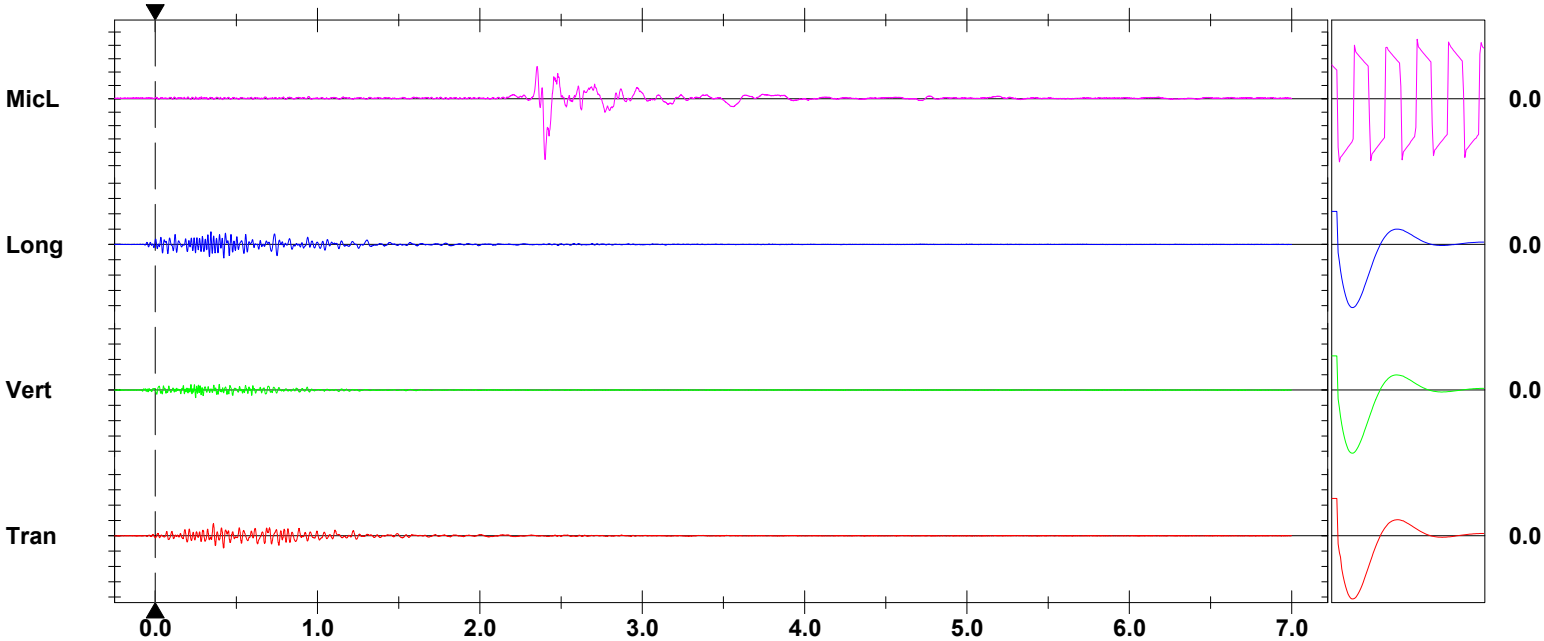
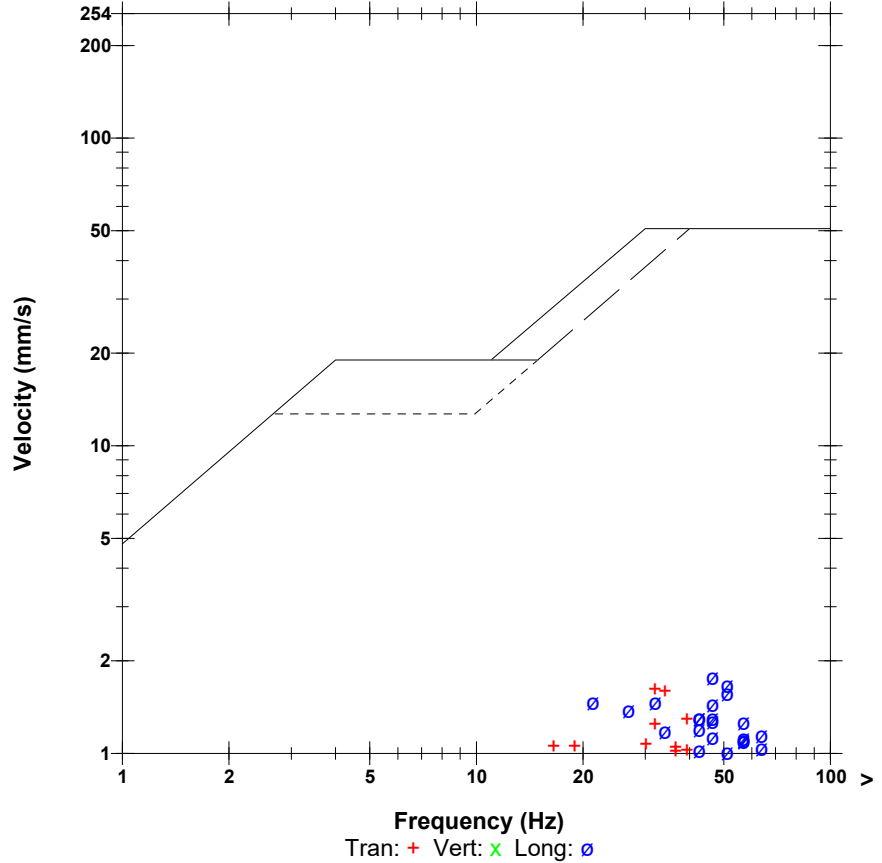
### Notes

**Microphone** Linear Weighting  
**PSPL** 113.2 dB(L) 9.092 pa.(L) at 2.401 sec  
**ZC Freq** 8.8 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1378 mv )

	Tran	Vert	Long	
PPV	1.616	0.993	1.766	mm/s
PPV	55.17	50.94	55.94	dB
ZC Freq	32	64	47	Hz
Time (Rel. to Trig)	0.359	0.249	0.422	sec
Peak Acceleration	0.072	0.058	0.064	g
Peak Displacement	0.010	0.003	0.008	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.5	Hz
Overswing Ratio	3.9	4.2	4.1	

**Peak Vector Sum** 2.365 mm/s at 0.422 sec

### USBM RI8507 And OSMRE



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

Sensor Check

**Date/Time** Long at 14:54:02 April 13, 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

**Serial Number** UM18187 V 10-90GC Micromate ISEE  
**Battery Level** 3.6 Volts  
**Unit Calibration** May 5, 2022 by InstanTel  
**File Name** UM18187\_20230413145402.IDFW

### Post Event Notes

Location: Civic Number 4140 Route 111 (PW-12)  
 Blast No.: 2023-09  
 Project No: 234601.00

### Notes

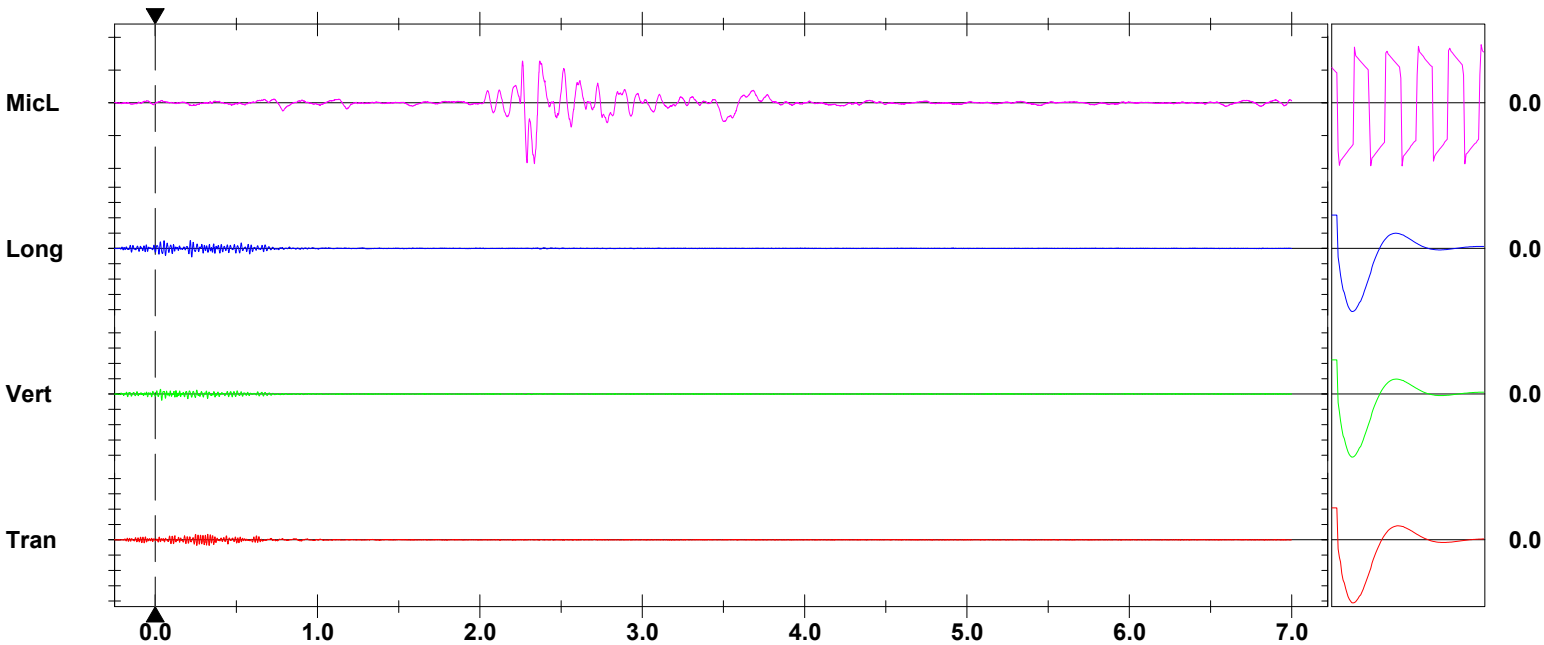
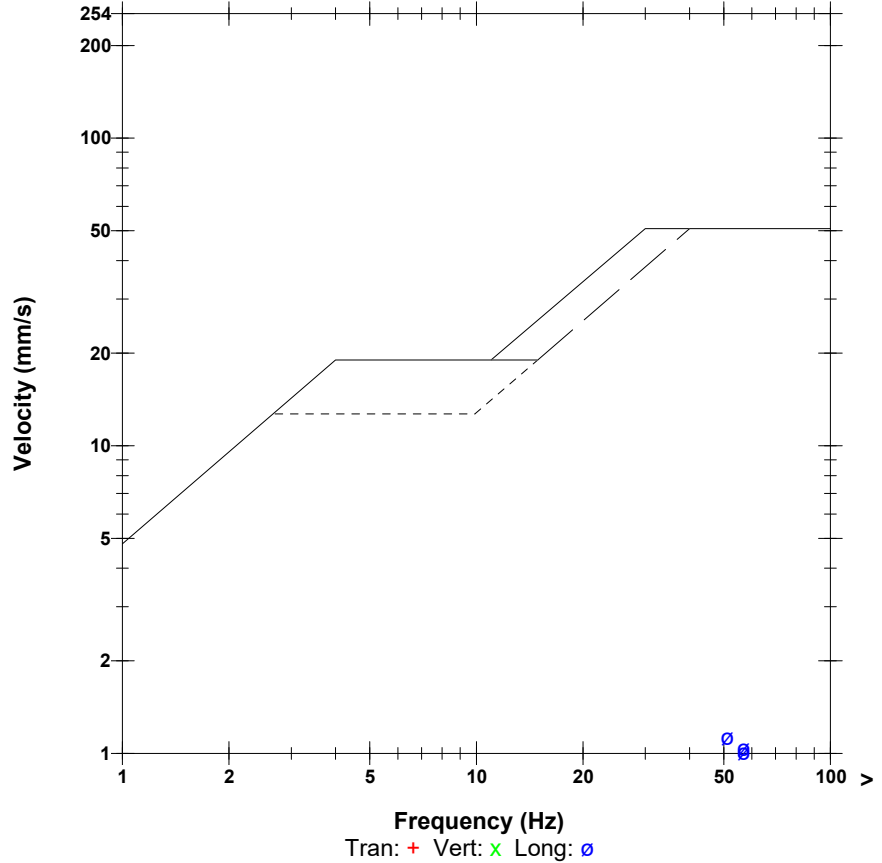
Location:  
 Client:  
 User Name:  
 General:

**Microphone** Linear Weighting  
**PSPL** 113.3 dB(L) 9.278 pa.(L) at 2.336 sec  
**ZC Freq** 6.1 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1375 mv )

	Tran	Vert	Long	
PPV	0.741	0.820	1.127	mm/s
PPV	48.40	49.27	52.04	dB
ZC Freq	64	57	51	Hz
Time (Rel. to Trig)	0.257	0.041	0.225	sec
Peak Acceleration	0.058	0.039	0.046	g
Peak Displacement	0.002	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.5	4.2	4.2	

**Peak Vector Sum** 1.210 mm/s at 0.225 sec

### USBM RI8507 And OSMRE



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check



April 19, 2023

Project No.: 234601.00

Mr. Daniel Guest

**Hammond River Holdings**Via email: [Guest.Daniel@AtlanticWallboard.com](mailto:Guest.Daniel@AtlanticWallboard.com)**Re: Blast Vibration Monitoring – Blast No. 2023-10 – 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 14:05 on April 19, 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. 2023-10 – April 19, 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)	14:54	1,360 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		845 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		755 m SE	0.51 mm/s @ 37 Hz	112	-
4. Civic No. 2447 Route 820 (PW-07)		845 m NE	0.61 mm/s @ 30 Hz	106	-
5. PW-03 - Cottage Route 820		615 m N	0.64 mm/s @ 43 Hz	112	-
6. Civic No. 2341 Route 820 (PW-05)		645 m N	0.70 mm/s @ 22 Hz	110	-
7. Civic No. 50 Myron Road (PW-15)		945 m NW	< 0.5 mm/s	<120	Units were not triggered
8. Civic No. 86 Myron Road (PW-16)		895 m W	< 0.5 mm/s	<120	
9. Civic No. 220 Myron Road (PW-01)		1,420 m SW	< 0.5 mm/s	<120	
10. Civic No. 2337 Route 820 (PW-04)		745 m NW	< 0.5 mm/s	<120	
11. Civic No. 4140 Route 111 (PW-12)		845 m SE	1.21mm/s @ 47 Hz	112	-
<b>maximum limits as per Approval to Operate</b>			<b>12.5 mm/s</b>	<b>128 dB</b>	

*Mr. Daniel Guest – Hammond River Holdings*

*April 19, 2023*

*Project No.: 234601.00 – Blast No.: 2023-10*

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**

A handwritten signature in blue ink, appearing to read "Robert Y. Cyr", with a stylized flourish at the end.

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

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

## Attachment A

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### *Blast Record*

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### IDENTIFICATION:

<b>Blasting Contractor:</b>	<u>Gulf Operators Ltd.</u>		
<b>Blaster's Certification No.:</b>	<u>1318</u>	<b>Blaster's Name:</b>	<u>Daniel Blanchard</u>
<b>Blast Location:</b>	<u>N 45°28.909' W 65°37.951' (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>13,819 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Overcast with light rain</u>	<b>Air Temp.:</b>	<u>10°C</u>
<b>Est. Wind Speed :</b>	<u>≈20 km/h</u>	<b>Wind Direction:</b>	<u>SE</u>
<b>Cloud Cover:</b>	<u>Overcast</u>	<b>Precipitation:</b>	<u>Light rain</u>

### BLAST DESIGN:

<b>Total No. Holes:</b>	<u>120</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>5.6 m – 7.2 m</u>	<b>Spacing:</b>	<u>10 ft x 10 ft</u>
<b>No. Holes per Delay:</b>	<u>3</u>	<b>Collar Length:</b>	<u>7 ft</u>
<b>Delay between Holes:</b>	<u>25 ms</u>	<b>Delay between Rows:</b>	<u>42, 67 &amp; 84 ms</u>
<b>Initiation Method:</b>	<u>Non-Electric</u>		
<b>Weight of Explosives per Delay:</b>	<u>Max.: 153 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>5,752 kg – Titan XL-1000</u>		

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



### BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>615 m</u>
<b>Direction to the Nearest Structure:</b>	<u>North</u>
<b>Structure Type:</b>	<u>Cottage</u>
<b>Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):</b>	<u>49.7</u>

### SAFETY:

<b>Type of Warning Signal Used:</b>	<u>Siren</u>
<b>Blasting Mats Used (yes or no):</b>	<u>No</u>
<b>Airblast Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Vibration Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Warning Signs Posted ( yes or no ):</b>	<u>Yes</u>
<b>Accesses Guarded ( yes or no ):</b>	<u>Yes</u>
<b>Flyrock Damage ( yes or no ):</b>	<u>No</u>
<b>If Yes, Describe:</b>	<u></u>
<hr/>	
<b>Misfire ( yes or no ):</b>	<u>No</u>

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

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>InstanTEL Micromate, Serial #20206</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,360 m South</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #2

Make, Model and Serial # of unit:	<u>InstanTEL Minimate, Serial #5489</u>
Calibration Date:	<u>April 25, 2022</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>845 m South</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5632</u>
Calibration Date:	<u>November 16, 2022</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>755 m Southeast</u>
Transverse Particle Velocity:	<u>0.45 mm/s @ 37 Hz</u>
Vertical Particle Velocity:	<u>0.45 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.51 mm/s @ 37 Hz</u>
Peak Particle Velocity:	<u>0.51 mm/s @ 37 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>

### Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>845 m Northeast</u>
Transverse Particle Velocity:	<u>0.61 mm/s @ 30 Hz</u>
Vertical Particle Velocity:	<u>0.29 mm/s @ 39 Hz</u>
Longitudinal Particle Velocity:	<u>0.59 mm/s @ 26 Hz</u>
Peak Particle Velocity:	<u>0.61 mm/s @ 30 Hz</u>
Maximum Airblast:	<u>106 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>615 m North</u>
Transverse Particle Velocity:	<u>0.51 mm/s @ 28 Hz</u>
Vertical Particle Velocity:	<u>0.38 mm/s @ 39 Hz</u>
Longitudinal Particle Velocity:	<u>0.64 mm/s @ 43 Hz</u>
Peak Particle Velocity:	<u>0.64 mm/s @ 43 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>

### Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5371</u>
Calibration Date:	<u>July 27, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>645 m North</u>
Transverse Particle Velocity:	<u>0.70 mm/s @ 27 Hz</u>
Vertical Particle Velocity:	<u>0.51 mm/s @ 51 Hz</u>
Longitudinal Particle Velocity:	<u>0.70 mm/s @ 22 Hz</u>
Peak Particle Velocity:	<u>0.70 mm/s @ 22 Hz</u>
Maximum Airblast:	<u>110 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #20203</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>945 m Northwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5372</u>
Calibration Date:	<u>February 28, 2023</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>895 m West</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #20204</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,420 m Southwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #10

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5676</u>
Calibration Date:	<u>March 8, 2023</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>745 m Northwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 19, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:05</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-10</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>InstanTEL Minimate, Serial #5487</u>
Calibration Date:	<u>January 16, 2023</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>845 m Southeast</u>
Transverse Particle Velocity:	<u>0.70 mm/s @ 43 Hz</u>
Vertical Particle Velocity:	<u>0.64 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>1.21 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>1.21 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>

## Attachment B

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### *Blast and Seismograph Location Plan*



# Blast and Seismograph Location Plan

**Blast No:** 2023-10

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay



**Date:** April 19, 2023  
**Project No.:** 234601.00





## Attachment C

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### *Blast Event Reports*



**Date/Time** Long at 14:05:25 April 19, 2023  
**Trigger Source** Geo: 0.492 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5632 V 2.61 MiniMate  
**Battery Level** 6.4 Volts  
**Unit Calibration** November 16, 2022 by InstanTel  
**File Name** G632JZKS.H10  
**Post Event Notes**  
 Location: Civic Number 4150 Route 111 (PW-13)  
 Blast No.: 2023-10  
 Project No: 234601.00

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: April 19, 2023 16:21:05 (V10.72.1)

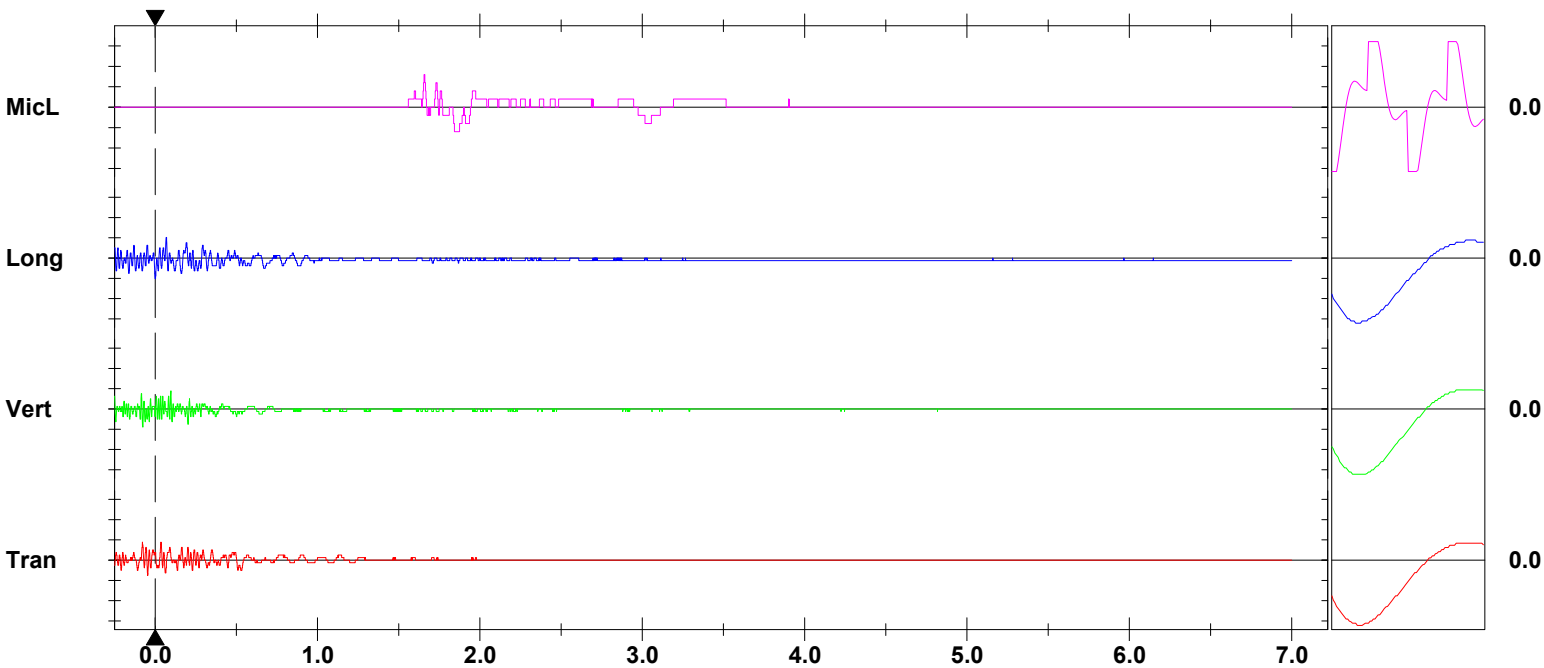
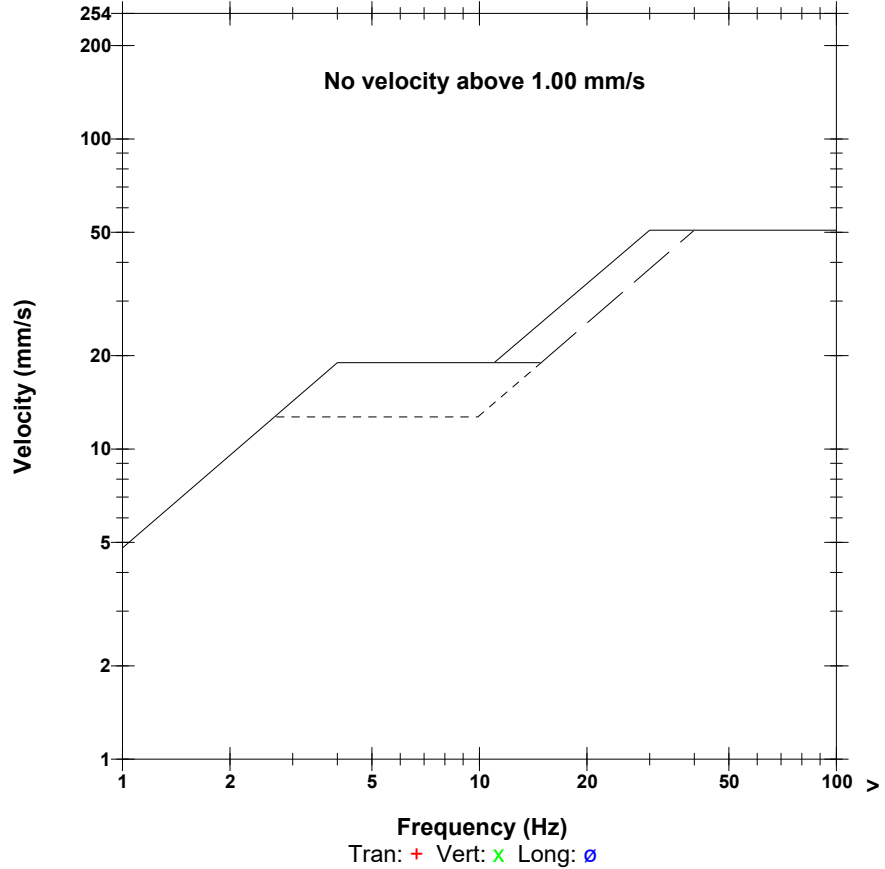
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 112.0 dB(L) 8.000 pa.(L) at 1.657 sec  
**ZC Freq** 20 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 298 mv )

	Tran	Vert	Long	
PPV	0.445	0.445	0.508	mm/s
PPV	43.96	43.96	45.12	dB
ZC Freq	37	64	37	Hz
Time (Rel. to Trig)	-0.077	-0.074	0.002	sec
Peak Acceleration	0.013	0.020	0.013	g
Peak Displacement	0.002	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	8.2	8.0	Hz
Overswing Ratio	3.9	3.5	3.7	

**Peak Vector Sum** 0.667 mm/s at -0.077 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Tran at 14:05:25 April 19, 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

**Serial Number** UM18187 V 10-90GC Micromate ISEE  
**Battery Level** 3.5 Volts  
**Unit Calibration** May 5, 2022 by InstanTel  
**File Name** UM18187\_20230419140525.IDFW

**Notes**  
 Location:  
 Client:  
 User Name:  
 General:

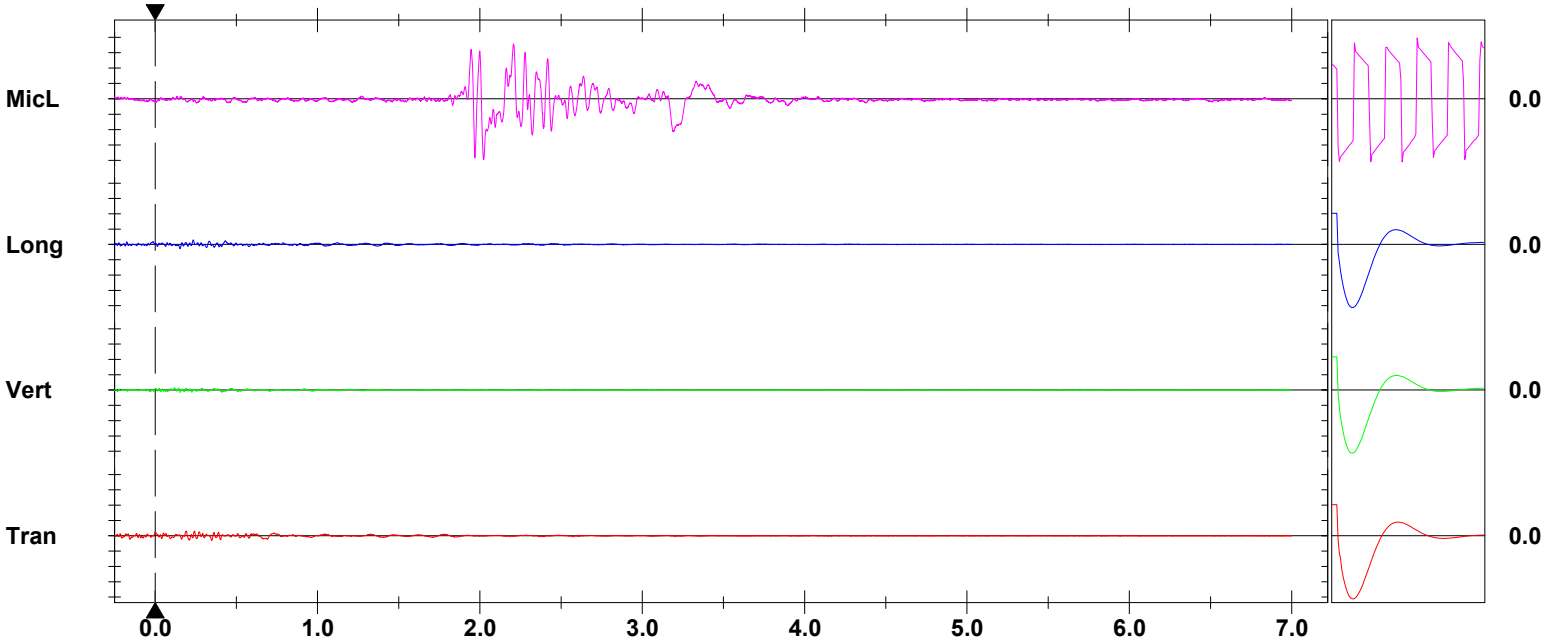
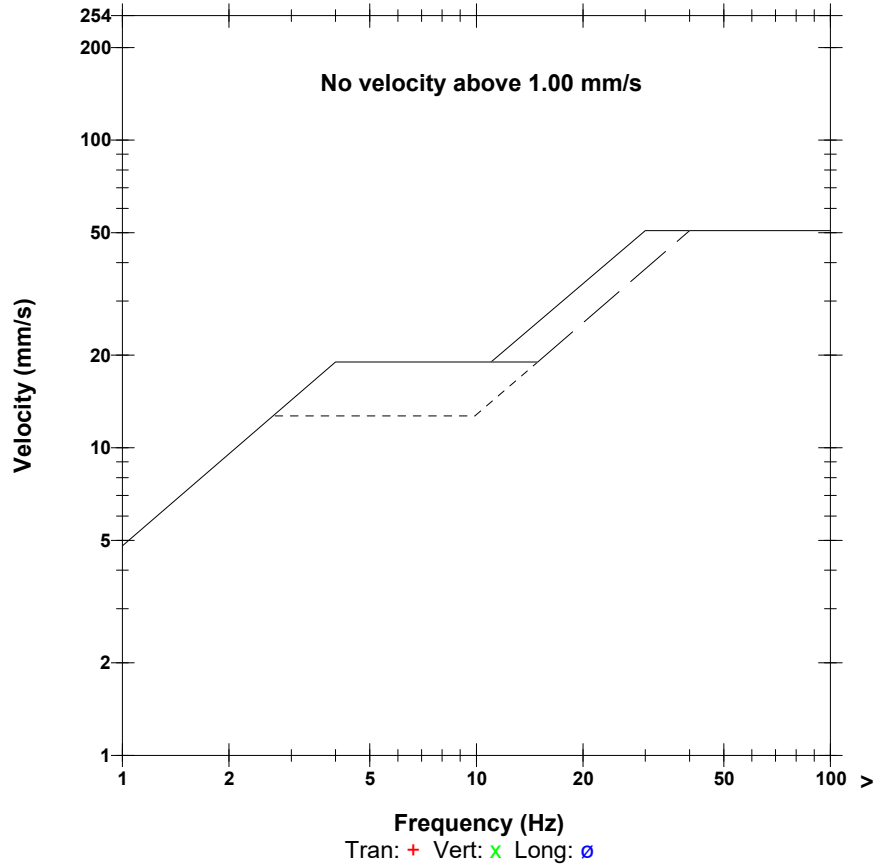
**Post Event Notes**  
 Location: Civic Number 2447 Route 820 (PW-07)  
 Blast No.: 2023-10  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 105.9 dB(L) 3.957 pa.(L) at 2.022 sec  
**ZC Freq** 3.5 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1524 mv )

	Tran	Vert	Long	
PPV	0.607	0.292	0.591	mm/s
PPV	46.66	40.30	46.43	dB
ZC Freq	30	39	26	Hz
Time (Rel. to Trig)	0.190	0.153	0.234	sec
Peak Acceleration	0.026	0.015	0.018	g
Peak Displacement	0.009	0.004	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.6	4.3	4.3	

**Peak Vector Sum** 0.690 mm/s at 0.190 sec

### USBM RI8507 And OSMRE



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

Sensor Check

**Date/Time** Long at 14:05:17 April 19, 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

**Serial Number** BE21348 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** July 21, 2022 by InstanTel  
**File Name** W348JZIX.ST0  
**Post Event Notes**  
 Location: Cottage - Route Route 820 (PW-03)  
 Blast No.: 2023-10  
 Project No: 234601.00

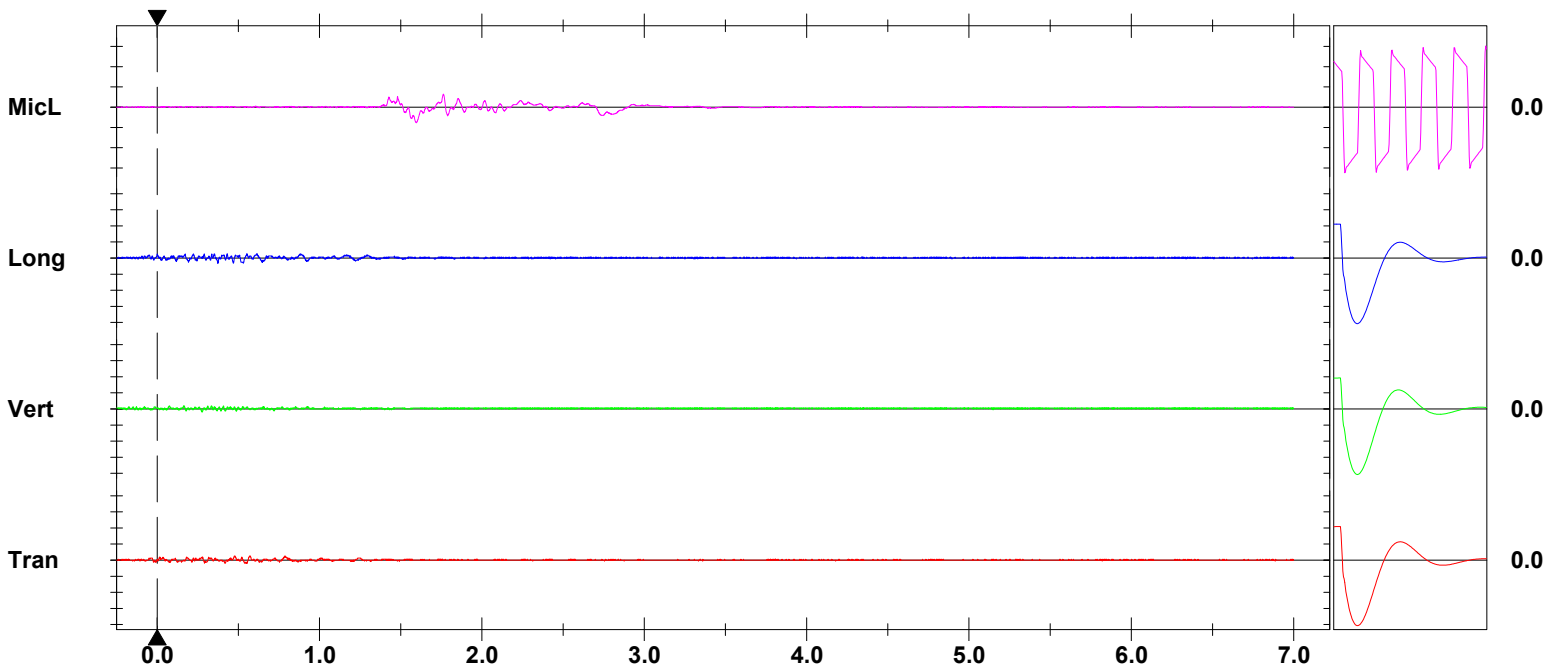
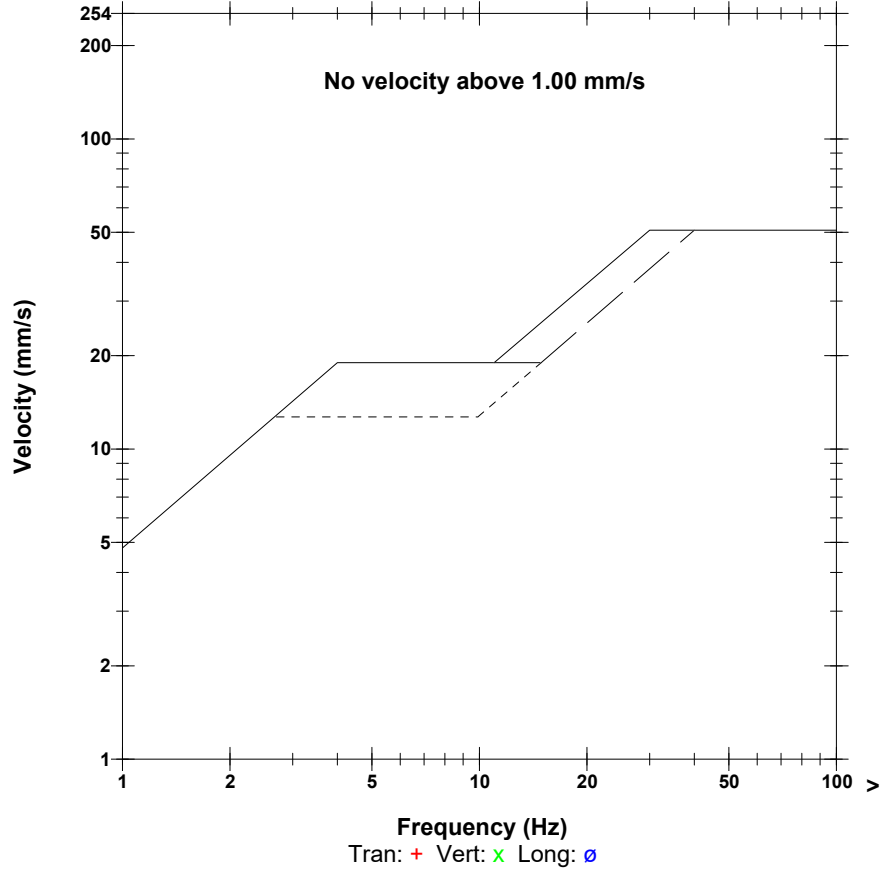
**Notes**

**Microphone** Linear Weighting  
**PSPL** 111.8 dB(L) 7.750 pa.(L) at 1.596 sec  
**ZC Freq** 4.8 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 582 mv)

	Tran	Vert	Long	
PPV	0.508	0.381	0.635	mm/s
PPV	45.12	42.62	47.06	dB
ZC Freq	28	39	43	Hz
Time (Rel. to Trig)	0.475	0.073	0.373	sec
Peak Acceleration	0.027	0.027	0.027	g
Peak Displacement	0.005	0.002	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.4	Hz
Overswing Ratio	3.6	3.5	4.2	

**Peak Vector Sum** 0.684 mm/s at 0.470 sec

**USBM RI8507 And OSMRE**



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

Sensor Check

**Date/Time** Vert at 14:05:47 April 19, 2023  
**Trigger Source** Geo: 0.492 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5371 V 2.61 MiniMate  
**Battery Level** 6.4 Volts  
**Unit Calibration** July 27, 2022 by InstanTel  
**File Name** G371JZKS.HN0

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: April 19, 2023 16:23:35 (V10.72.1)

**Post Event Notes**  
 Location: Civic Number 2341 Route 820 (PW-05)  
 Blast No.: 2023-10  
 Project No: 234601.00

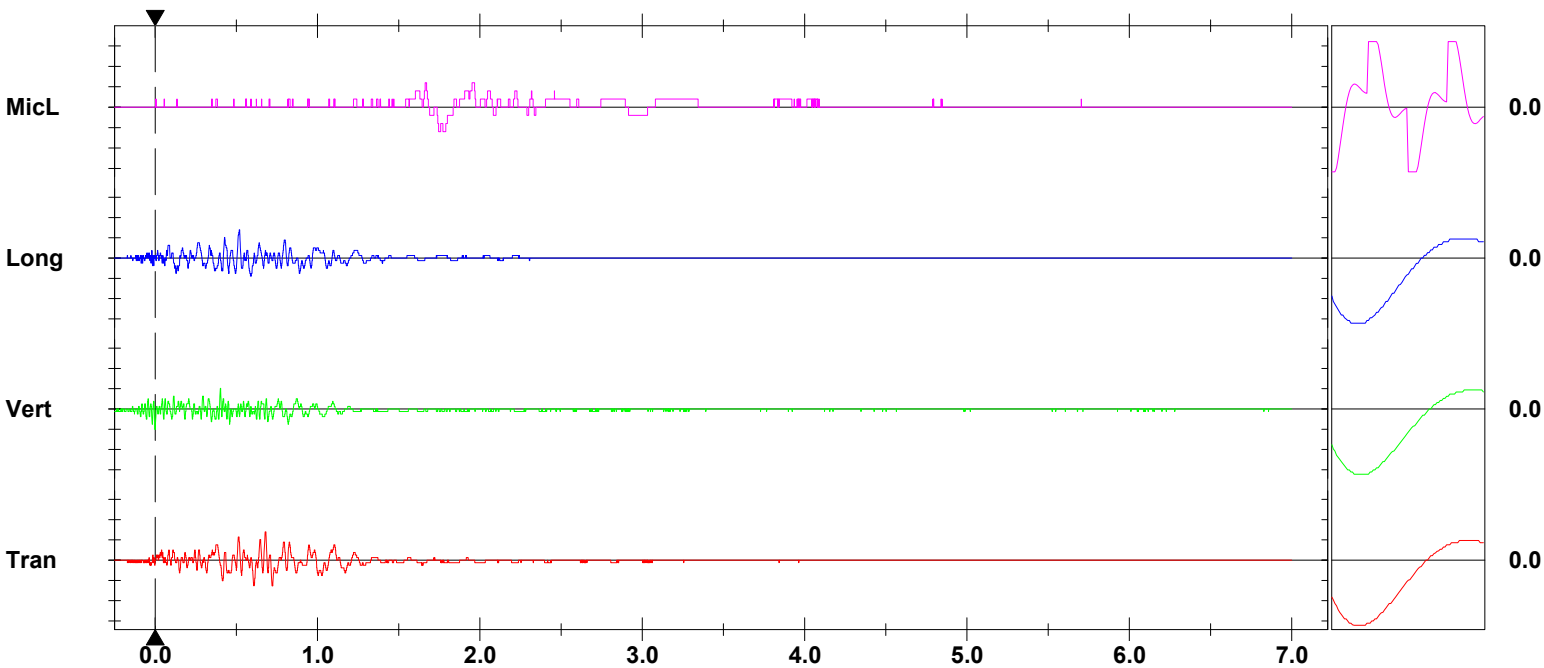
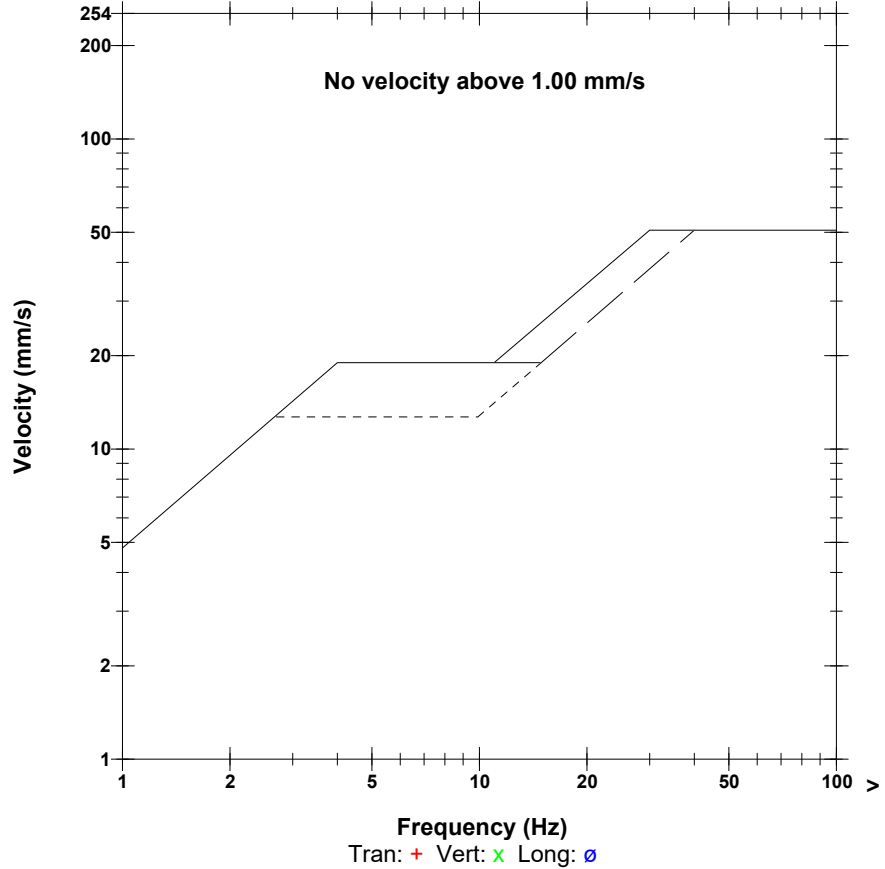
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 109.5 dB(L) 6.000 pa.(L) at 1.664 sec  
**ZC Freq** 17 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 305 mv )

	Tran	Vert	Long	
PPV	0.699	0.508	0.699	mm/s
PPV	47.88	45.12	47.88	dB
ZC Freq	27	51	22	Hz
Time (Rel. to Trig)	0.679	0.000	0.519	sec
Peak Acceleration	0.013	0.013	0.013	g
Peak Displacement	0.007	0.002	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.5	Hz
Overswing Ratio	3.5	3.6	3.4	

**Peak Vector Sum** 0.857 mm/s at 0.517 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div    **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Long at 14:05:26 April 19, 2023  
**Trigger Source** Geo: 0.492 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5487 V 2.61 MiniMate  
**Battery Level** 6.3 Volts  
**Unit Calibration** January 16, 2023 by InstanTel  
**File Name** G487JZKS.H20  
**Post Event Notes**  
 Location: Civic Number 4140 Route 111 (PW-12)  
 Blast No.: 2023-10  
 Project No: 234601.00

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: April 19, 2023 16:18:34 (V10.72.1)

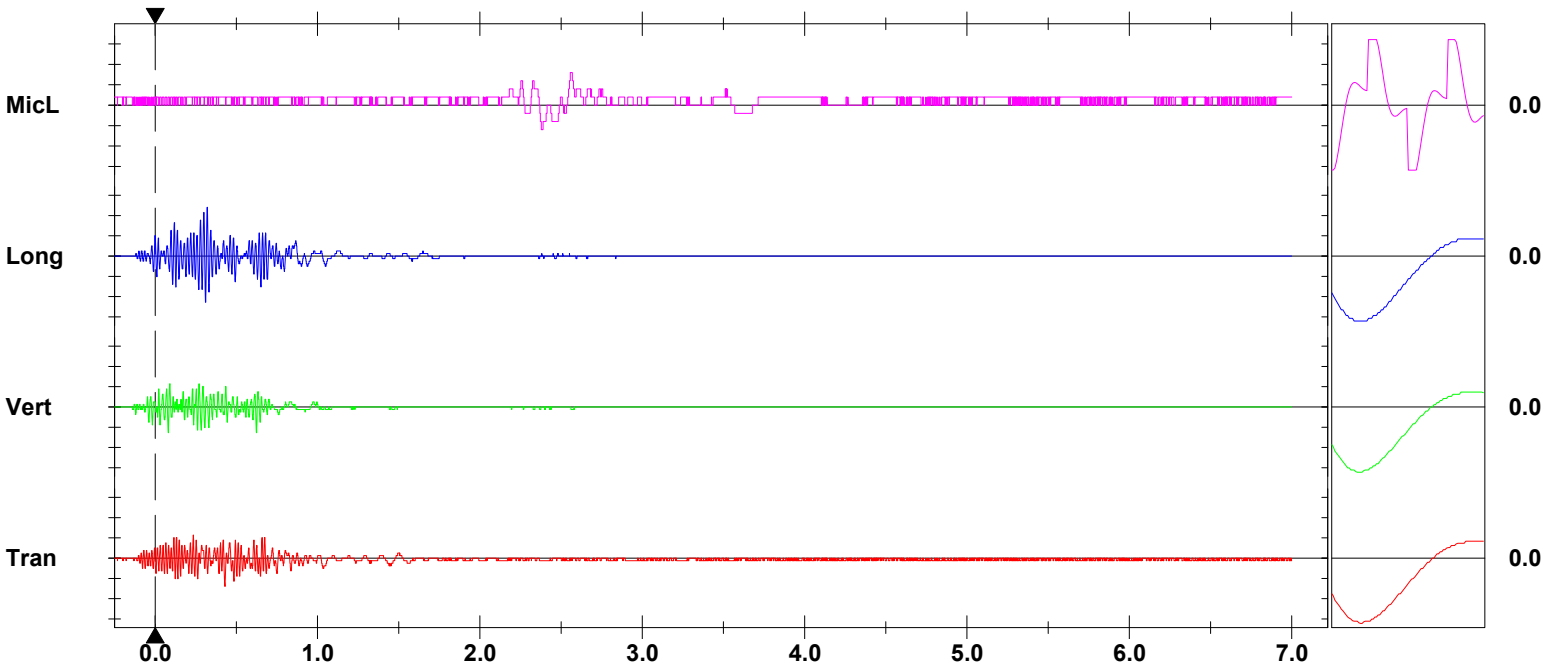
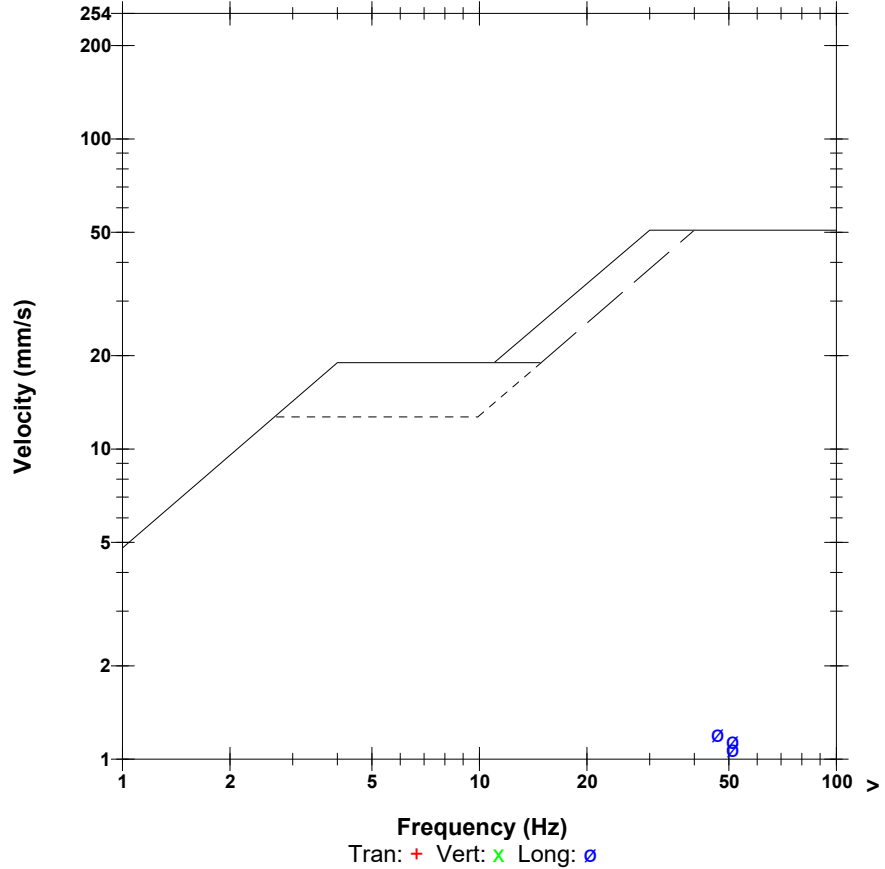
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 112.0 dB(L) 8.000 pa.(L) at 2.558 sec  
**ZC Freq** 5.0 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 288 mv )

	Tran	Vert	Long	
PPV	0.699	0.635	1.207	mm/s
PPV	47.88	47.06	52.63	dB
ZC Freq	43	57	47	Hz
Time (Rel. to Trig)	0.430	0.081	0.320	sec
Peak Acceleration	0.020	0.027	0.040	g
Peak Displacement	0.003	0.002	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.7	Hz
Overswing Ratio	3.5	4.2	4.1	

**Peak Vector Sum** 1.238 mm/s at 0.321 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =** ▶ ◀



April 25, 2023

Project No.: 234601.00

Mr. Daniel Guest

**Hammond River Holdings**Via email: [Guest.Daniel@AtlanticWallboard.com](mailto:Guest.Daniel@AtlanticWallboard.com)**Re: Blast Vibration Monitoring – Blast No. 2023-11 – 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 14:00 on April 25, 2023. For the monitoring we positioned ten (10) digital seismographs in the area.

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

**Blast No. 2023-11 – April 25, 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)	14:54	910 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		505 m S	0.51 mm/s @ 57 Hz	104	-
3. Civic No. 4150 Route 111 (PW-13)		425 m SE	0.95 mm/s @ 64 Hz	106	-
4. Civic No. 2447 Route 820 (PW-07)		1,300 m NE	< 0.5 mm/s	<120	Units were not triggered
5. PW-03 - Cottage Route 820		1,080 m N	< 0.5 mm/s	<120	
6. Civic No. 2341 Route 820 (PW-05)		1,155 m N	< 0.5 mm/s	<120	
7. Civic No. 50 Myron Road (PW-15)		1,260 m NW	< 0.5 mm/s	<120	-
8. Civic No. 86 Myron Road (PW-16)		840 m W	1.41 mm/s @ 34 Hz	101	
9. Civic No. 220 Myron Road (PW-01)		950 m SW	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 2337 Route 820 (PW-04)		1,130 m NW	< 0.5 mm/s	<120	
<b>maximum limits as per Approval to Operate</b>			<b>12.5 mm/s</b>	<b>128 dB</b>	

*Mr. Daniel Guest – Hammond River Holdings*

*April 25, 2023*

*Project No.: 234601.00 – Blast No.: 2023-11*

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**

A handwritten signature in blue ink, appearing to read "Robert Y. Cyr", with a stylized flourish at the end.

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

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

## Attachment A

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### *Blast Record*



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>C. Buckley</u>	<b>Blast No.:</b>	<u>2023-11</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### IDENTIFICATION:

<b>Blasting Contractor:</b>	<u>Gulf Operators Ltd.</u>		
<b>Blaster's Certification No.:</b>	<u>1318</u>	<b>Blaster's Name:</b>	<u>Daniel Blanchard</u>
<b>Blast Location:</b>	<u>N 45°28.657' W 65°37.995' (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>5,464 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Overcast</u>	<b>Air Temp.:</b>	<u>6°C</u>
<b>Est. Wind Speed :</b>	<u>≈10 km/h</u>	<b>Wind Direction:</b>	<u>N</u>
<b>Cloud Cover:</b>	<u>Overcast</u>	<b>Precipitation:</b>	<u>No</u>

### BLAST DESIGN:

<b>Total No. Holes:</b>	<u>60</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>4.9 m – 6.1 m</u>	<b>Spacing:</b>	<u>10 ft x 10 ft</u>
<b>No. Holes per Delay:</b>	<u>4</u>	<b>Collar Length:</b>	<u>7 ft</u>
<b>Delay between Holes:</b>	<u>25 ms</u>	<b>Delay between Rows:</b>	<u>17, 42, 59 &amp; 84 ms</u>
<b>Initiation Method:</b>	<u>Non-Electric</u>		
<b>Weight of Explosives per Delay:</b>	<u>Max.: 113 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>2,161 kg – Titan XL-1000</u>		

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



### BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>C. Buckley</u>	<b>Blast No.:</b>	<u>2023-11</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>425 m</u>
<b>Direction to the Nearest Structure:</b>	<u>South</u>
<b>Structure Type:</b>	<u>House</u>
<b>Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):</b>	<u>40.0</u>

### SAFETY:

<b>Type of Warning Signal Used:</b>	<u>Siren</u>
<b>Blasting Mats Used (yes or no):</b>	<u>No</u>
<b>Airblast Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Vibration Measurement ( yes or no ):</b>	<u>Yes</u>
<b>Warning Signs Posted ( yes or no ):</b>	<u>Yes</u>
<b>Accesses Guarded ( yes or no ):</b>	<u>Yes</u>
<b>Flyrock Damage ( yes or no ):</b>	<u>No</u>
<b>If Yes, Describe:</b>	<u></u>
<hr/>	
<b>Misfire ( yes or no ):</b>	<u>No</u>

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

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>C. Buckley</u>	<b>Blast No.:</b>	<u>2023-11</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>910 m South</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #2

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>505 m South</u>
Transverse Particle Velocity:	<u>0.25 mm/s @ &gt;100 Hz</u>
Vertical Particle Velocity:	<u>0.51 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.25 mm/s @ &gt;100 Hz</u>
Peak Particle Velocity:	<u>0.51 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>104 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>C. Buckley</u>	<b>Blast No.:</b>	<u>2023-11</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5487</u>
Calibration Date:	<u>January 16, 2023</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>425 m Southeast</u>
Transverse Particle Velocity:	<u>0.70 mm/s @ 64 Hz</u>
Vertical Particle Velocity:	<u>0.64 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.95 mm/s @ 64 Hz</u>
Peak Particle Velocity:	<u>0.95 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>106 dB(L)</u>

### Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial 5371</u>
Calibration Date:	<u>July 27, 2022</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>1,300 m Northeast</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>C. Buckley</u>	<b>Blast No.:</b>	<u>2023-11</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5372</u>
Calibration Date:	<u>February 28, 2023</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>1,080 m North</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #18193</u>
Calibration Date:	<u>April 11, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>1,155 m North</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>C. Buckley</u>	<b>Blast No.:</b>	<u>2023-11</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5676</u>
Calibration Date:	<u>March 8, 2023</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>1,260 m Northwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>840 m West</u>
Transverse Particle Velocity:	<u>0.95 mm/s @ 16 Hz</u>
Vertical Particle Velocity:	<u>0.53 mm/s @ 47 Hz</u>
Longitudinal Particle Velocity:	<u>1.41 mm/s @ 34 Hz</u>
Peak Particle Velocity:	<u>1.41 mm/s @ 34 Hz</u>
Maximum Airblast:	<u>101 dB(L)</u>



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>April 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>C. Buckley</u>	<b>Blast No.:</b>	<u>2023-11</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5635</u>
Calibration Date:	<u>March 8, 2023</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>950 m Southwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

### Data Collection – Seismometer #10

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5632</u>
Calibration Date:	<u>November 16, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>1,130 m Northwest</u>
Transverse Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u>&lt;0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u>&lt;120 dB(L) – Unit was not triggered</u>

## Attachment B

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### *Blast and Seismograph Location Plan*



# Blast and Seismograph Location Plan

**Blast No:** 2023-11

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay

### Legend

- ★ Blast 2023-11
- Seismograph Location



2447 Route 820 (PW-07)

4150 Route 111 (PW-13)

4126 Route 111 (PW-10)

4079 Route 111 (PW-09)

Cottage Route 820 (PW-03)

★ Blast 2023-11

2341 Route 820 (PW-05)

220 Myron Road (PW-01)

2337 Route 820 (PW-04)

50 Myron Road (PW-15)

86 Myron Road (PW-16)

Google Earth

600 m

**Date:** April 25, 2023

**Project No.:** 234601.00





## Attachment C

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### *Blast Event Reports*

**Date/Time** Vert at 13:59:47 April 25, 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

**Serial Number** BE21348 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** July 21, 2022 by InstanTel  
**File Name** W348JZU1.JN0

**Notes**

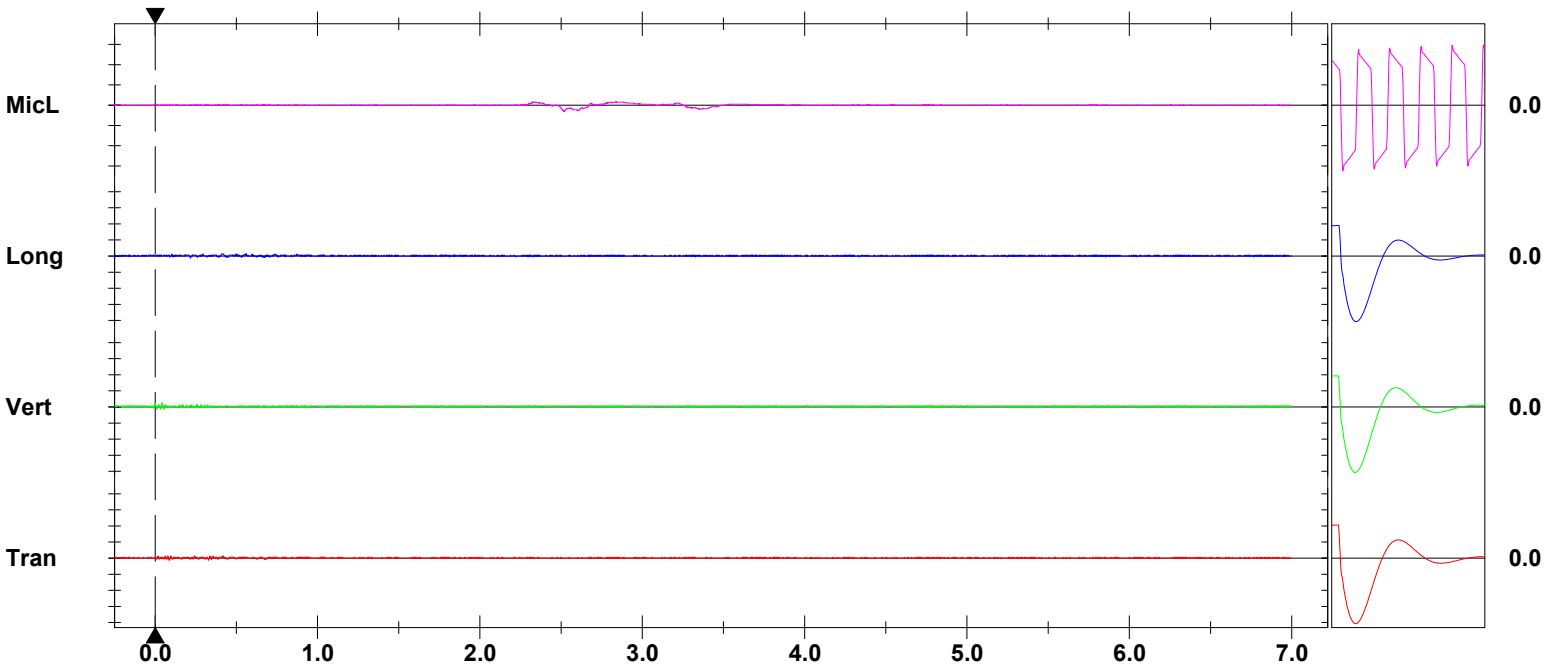
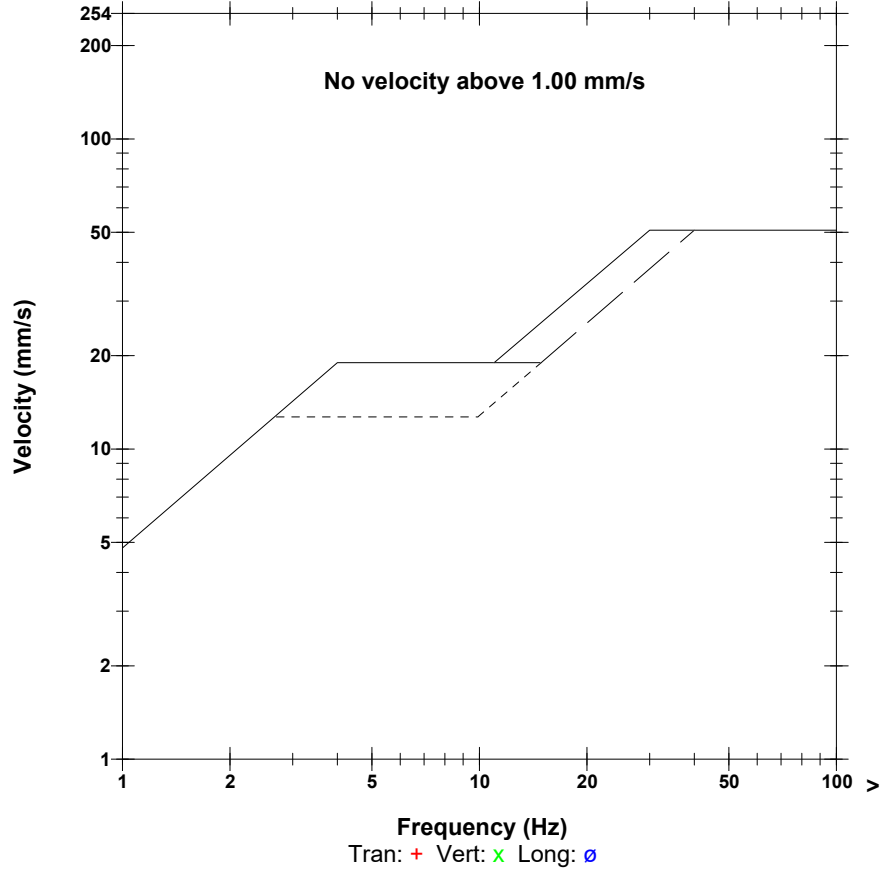
**Post Event Notes**  
 Location: Civic Number 4126 Route 111 (PW-10)  
 Blast No.: 2023-11  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 103.5 dB(L) 3.000 pa.(L) at 2.515 sec  
**ZC Freq** 2.7 Hz  
**Channel Test** Passed (Freq = 19.7 Hz Amp = 663 mv)

	Tran	Vert	Long	
PPV	0.254	0.508	0.254	mm/s
PPV	39.10	45.12	39.10	dB
ZC Freq	>100	57	>100	Hz
Time (Rel. to Trig)	0.017	0.000	0.101	sec
Peak Acceleration	0.013	0.027	0.027	g
Peak Displacement	0.001	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.7	7.3	Hz
Overswing Ratio	3.6	3.4	4.1	

Peak Vector Sum 0.508 mm/s at 0.000 sec

**USBM RI8507 And OSMRE**



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

Sensor Check

**Date/Time** Vert at 14:00:41 April 25, 2023  
**Trigger Source** Geo: 0.492 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5487 V 2.61 MiniMate  
**Battery Level** 6.0 Volts  
**Unit Calibration** January 16, 2023 by InstanTel  
**File Name** G487JZVW.950

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: April 25, 2023 16:14:27 (V10.72.1)

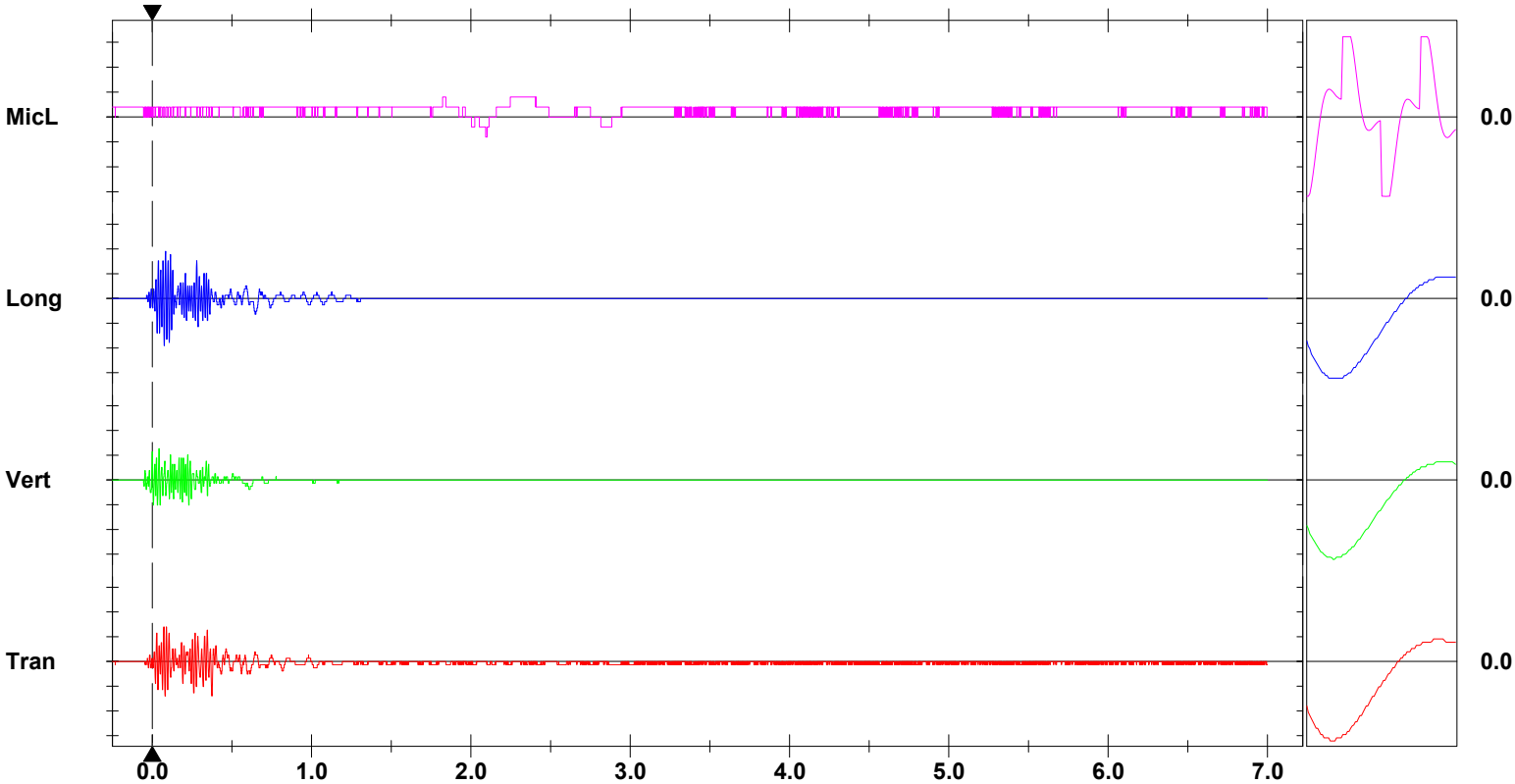
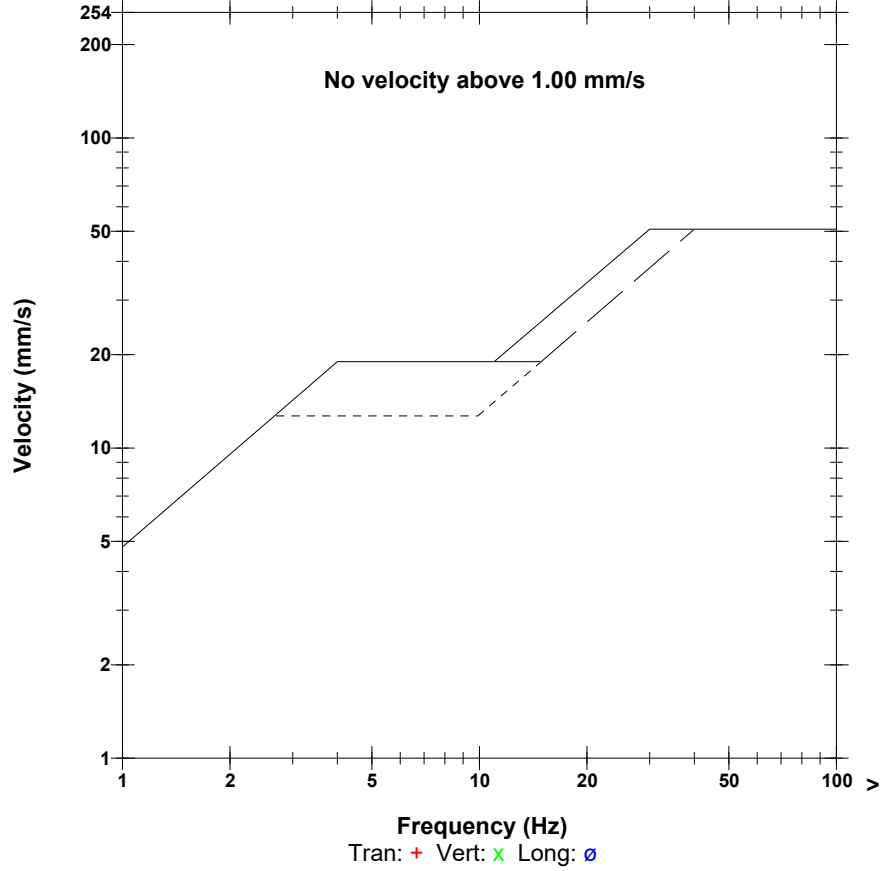
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 106.0 dB(L) 4.000 pa.(L) at 1.823 sec  
**ZC Freq** 3.0 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 288 mv )

	Tran	Vert	Long	
PPV	0.699	0.635	0.953	mm/s
PPV	47.88	47.06	50.58	dB
ZC Freq	64	57	64	Hz
Time (Rel. to Trig)	0.073	0.044	0.076	sec
Peak Acceleration	0.027	0.027	0.040	g
Peak Displacement	0.003	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.2	7.7	7.6	Hz
Overswing Ratio	3.2	4.2	3.8	

**Peak Vector Sum** 1.095 mm/s at 0.083 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check



**Date/Time** Tran at 14:00:38 April 25, 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

**Serial Number** UM18187 V 10-90GC Micromate ISEE  
**Battery Level** 3.5 Volts  
**Unit Calibration** May 5, 2022 by InstanTel  
**File Name** UM18187\_20230425140038.IDFW

**Notes**  
 Location:  
 Client:  
 User Name:  
 General:

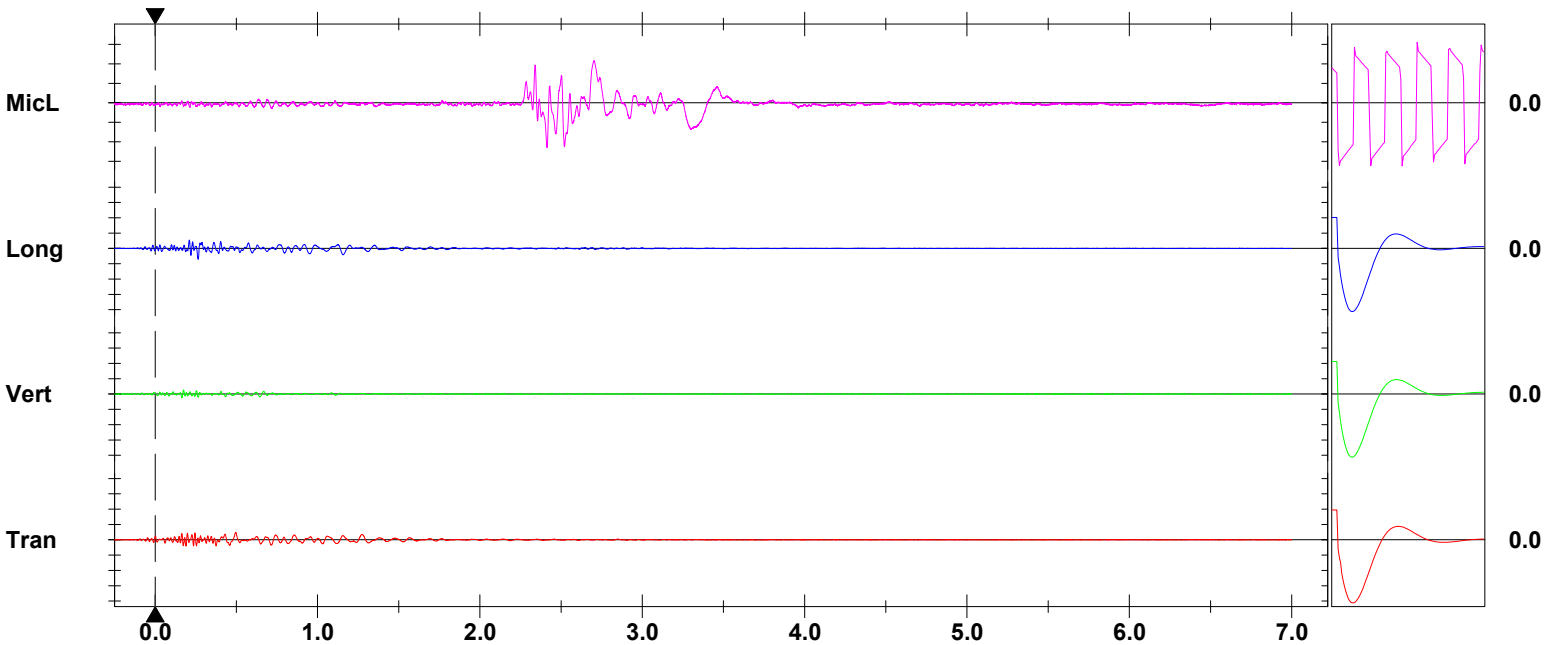
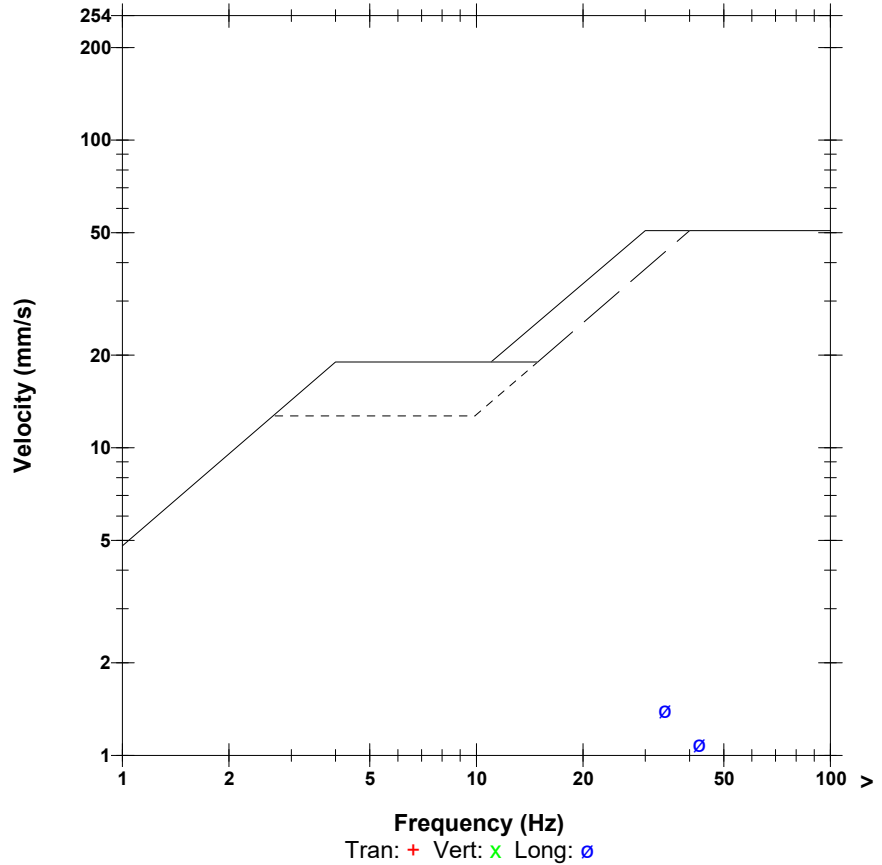
**Post Event Notes**  
 Location: Civic Number 86 Myron Road (PW-16)  
 Blast No.: 2023-11  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 101.2 dB(L) 2.296 pa.(L) at 2.413 sec  
**ZC Freq** 9.0 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1562 mv )

	Tran	Vert	Long	
PPV	0.954	0.528	1.411	mm/s
PPV	50.59	45.45	53.99	dB
ZC Freq	16	47	34	Hz
Time (Rel. to Trig)	0.496	0.175	0.265	sec
Peak Acceleration	0.056	0.027	0.062	g
Peak Displacement	0.009	0.003	0.010	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.5	7.5	Hz
Overswing Ratio	4.7	4.4	4.4	

**Peak Vector Sum** 1.479 mm/s at 0.265 sec

**USBM RI8507 And OSMRE**



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

Sensor Check