

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

From: Daniel Guest, Hammond River Holdings Ltd.

Date: June 28, 2023

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

## Surface Water Sampling

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

- Week 1: May 2, 2023
- Week 2: May 9, 2023
- Week 3: May 18, 2023
- Week 4: May 22, 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 May 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 June 14, 2023. 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 Levellogger 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 May 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 May, there were 5 air quality monitoring events, May 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 May 2023 monitoring period, occurring on May 3, 10, 23, 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 were no public complaints during the May 2023 monitoring period.

### **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

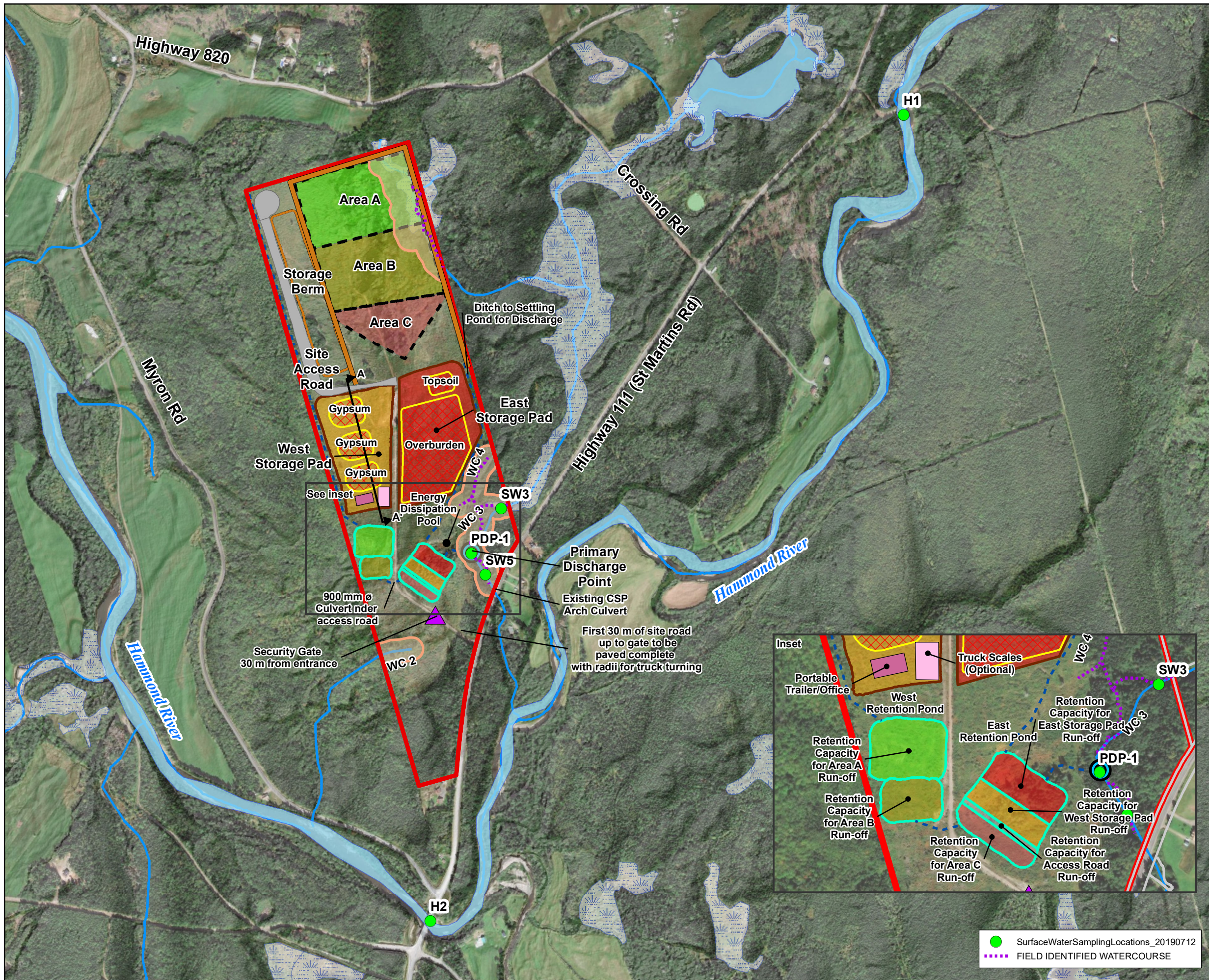
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Canadian Council of Ministers of the Environment (CCME). 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment: Volume 1 Guidance Manual. Canadian environmental quality guidelines.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

# Attachment A

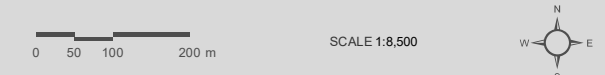
## *Figures*



HAMMOND RIVER HOLDINGS LIMITED  
PROPOSED UPHAM EAST GYPSUM QUARRY

**SURFACE WATER SAMPLING LOCATIONS**  
FIGURE 1

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



MAP DRAWING INFORMATION:  
 DATA PROVIDED BY DILLON CONSULTING LIMITED, CANVEC  
 SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, INTERMAP, INCREMENT  
 P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL,  
 ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISS  
 TOPO, OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY  
 MAP CREATED BY: JH  
 MAP REVISED BY: JO  
 MAP CHECKED BY: GA  
 MAP PROJECTION: NAD\_1983\_CSRS\_NEW\_BRUNSWICK\_STEREOGRAPHIC

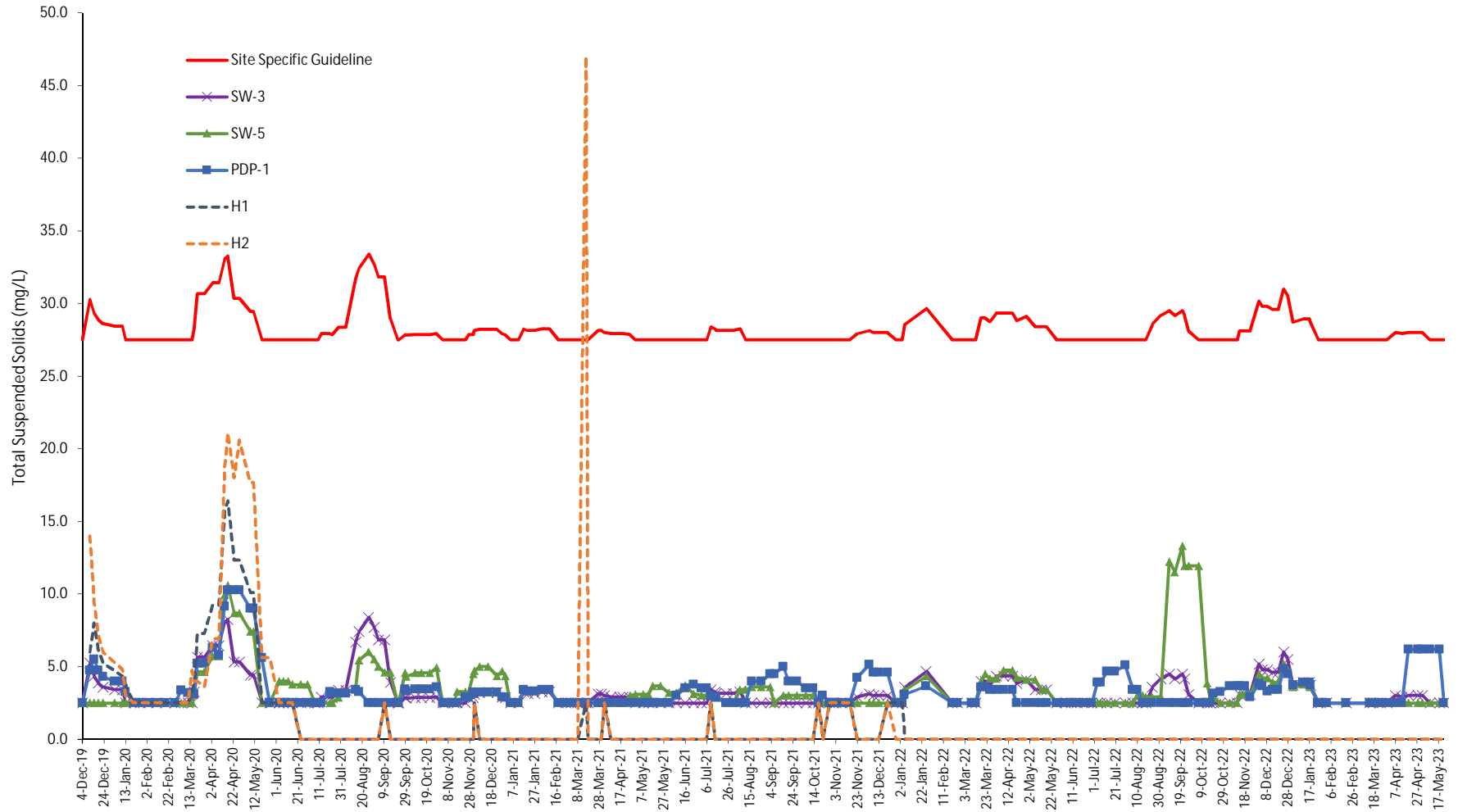
FILE LOCATION: \\DILLON.CAD\DILLON\_DFS\FREDERICTON\FREDERICTON CAD\CAD\GIS\188346 UPHAM GYPSUM QUARRY\MXD

- SurfaceWaterSamplingLocations\_20190712
- FIELD IDENTIFIED WATERCOURSE



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

Figure 2: TSS Monthly Average

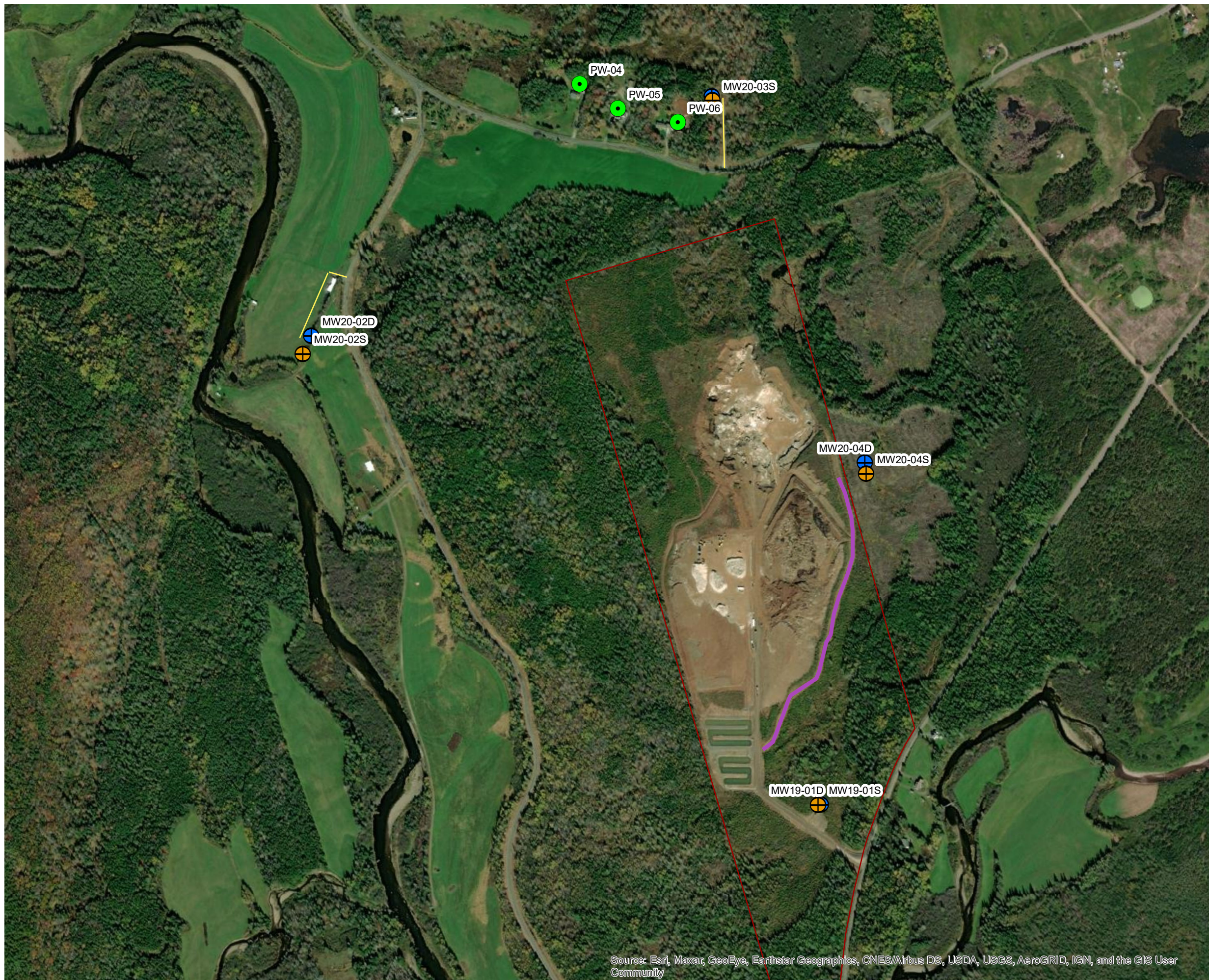


Notes:

The detection limit for TSS is 5 mg/L; for results <5 mg/L, half the detection limit was used.

Monthly average is calculated based on results from the previous 30 days.

Site specific guideline is 25 mg/L above the monthly average.



HAMMOND RIVER HOLDINGS  
UPHAM EAST GYPSUM QUARRY

**GROUNDWATER MONITORING LOCATIONS**  
FIGURE 3

- Potable Well 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

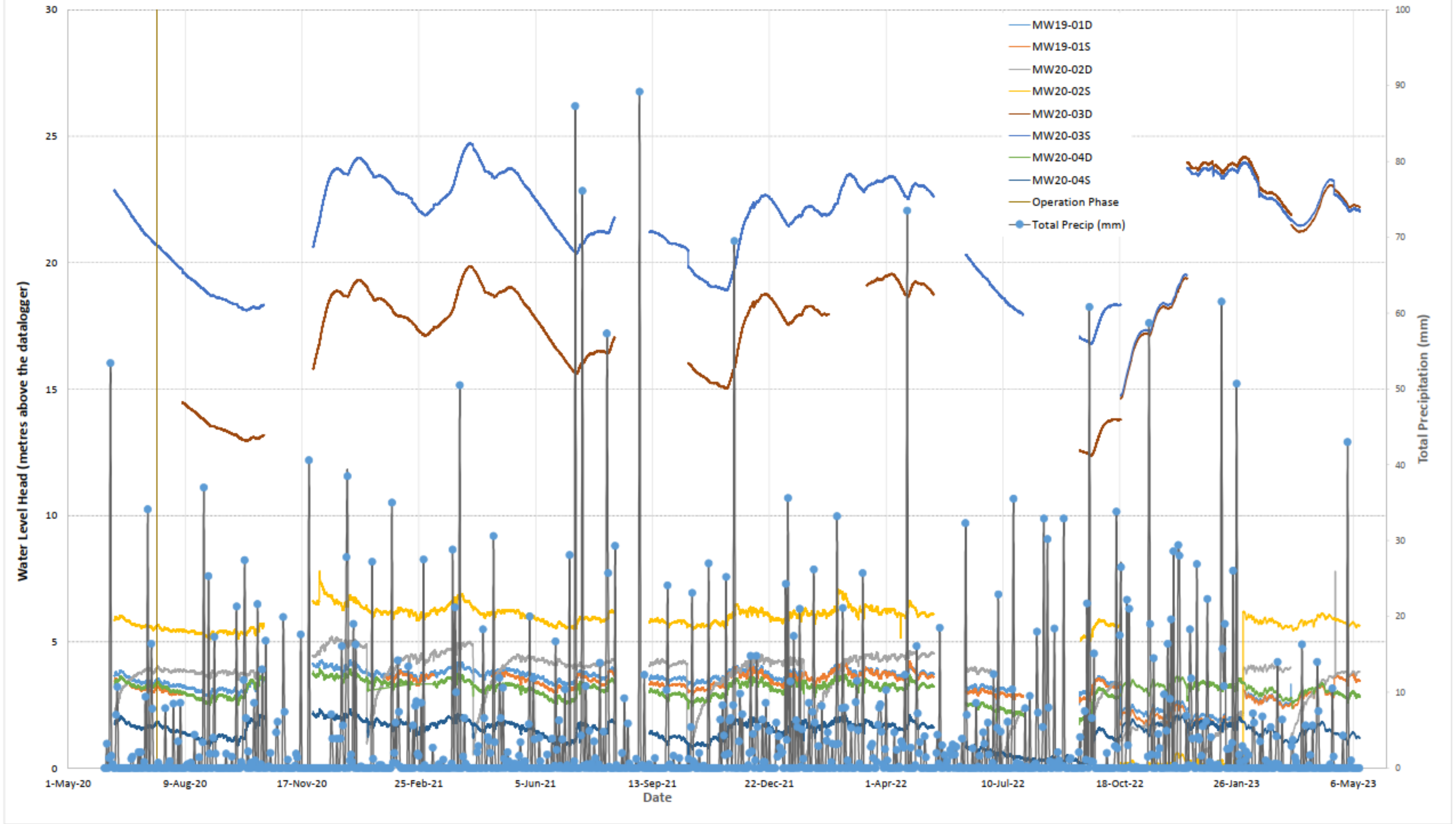


Figure 5: PW-04 Water Levels

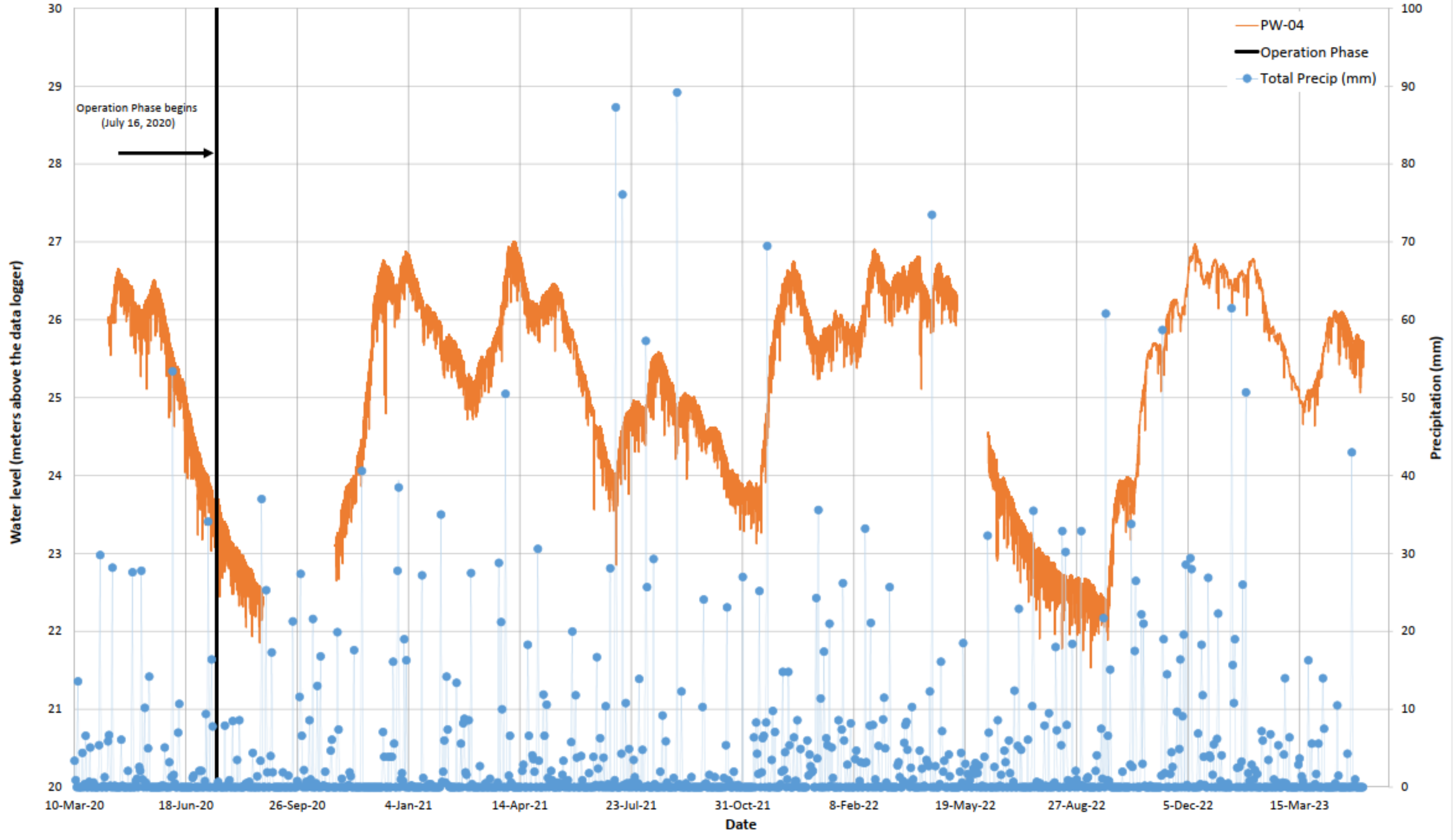


Figure 6: PW-06 Water Levels

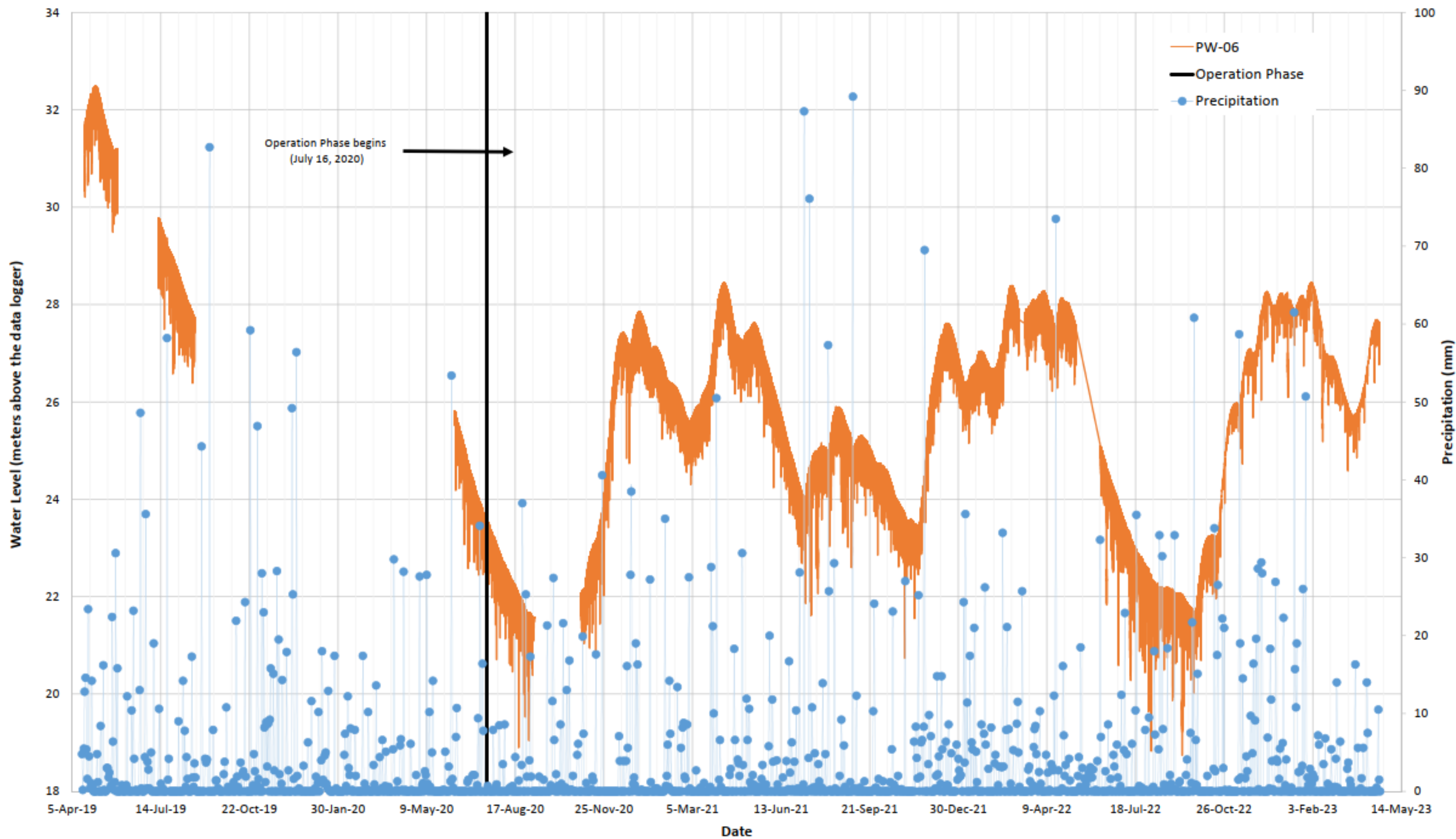
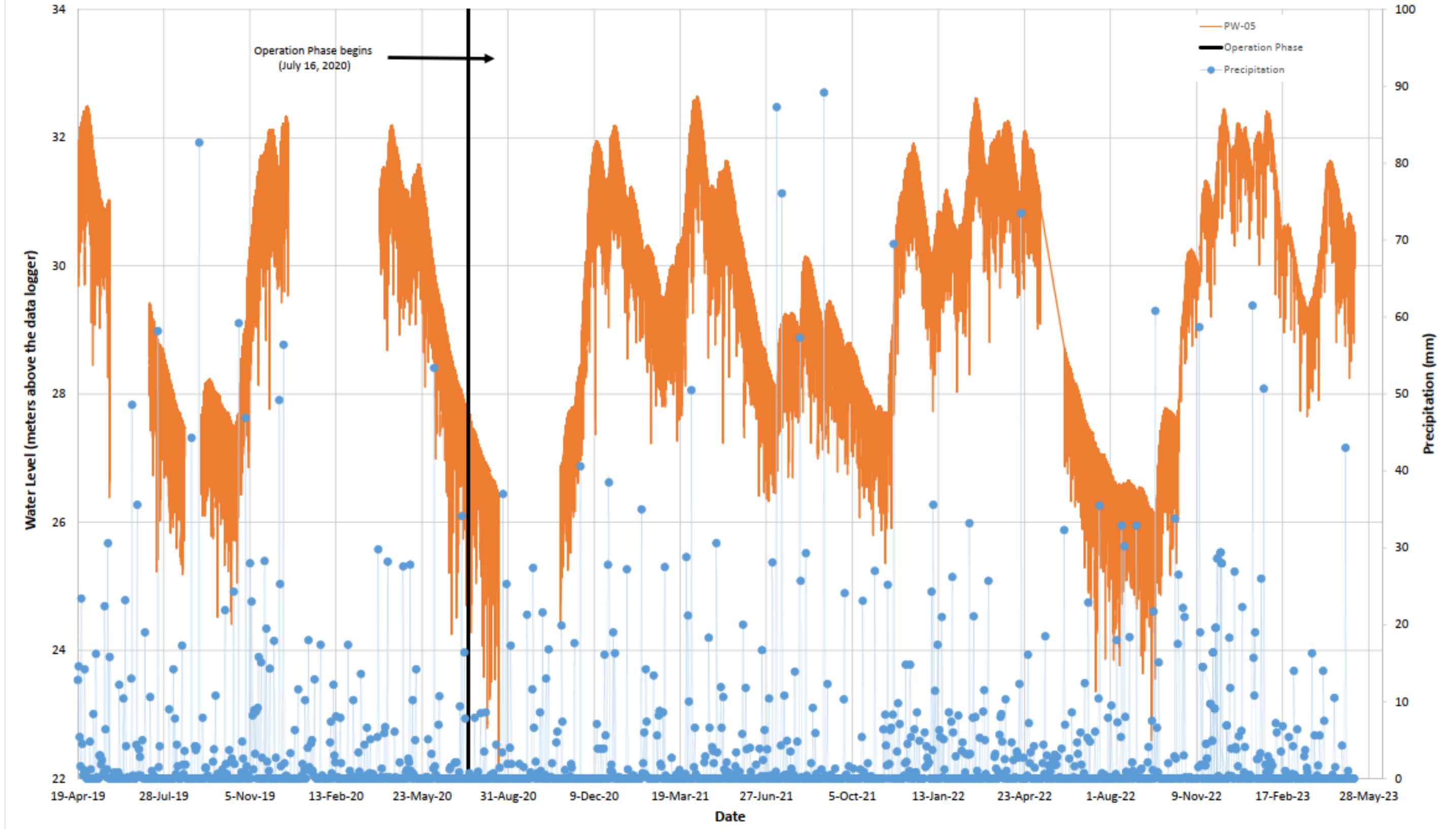


Figure 7: PW-05 Water Levels



# Attachment B

## *Tables*

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
Sample ID	Date						
SW3	2-May-2023	10.2	43.0	9.7	312	6.88	<5
PDP-1	2-May-2023			9.6	527	2.14	<5
PDP-1 D	2-May-2023			9.4	528	4.62	<5
SW5	2-May-2023			9.4	534	4.50	<5
SW3	9-May-2023	9.9	0.0	10.9	654	2.22	<5
PDP-1	9-May-2023			9.6	776	1.15	<5
SW5	9-May-2023			9.6	773	1.41	<5
SW3	18-May-2023	9.1	5.6	7.4	483	0.87	<5
PDP-1	18-May-2023			6.5	589	0.53	<5
SW5	18-May-2023			6.2	609	0.63	<5
SW3	22-May-2023	13.2	40.8	13.8	277	4.40	<5
PDP-1	22-May-2023			13.8	370	3.58	<5
SW5	22-May-2023			13.7	371	4.01	<5
SW5 Dupl	22-May-2023			13.7	370	4.35	<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

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



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 Total Suspended Solids - Monthly Average  
 Upham East Gypsum Project  
 Upham, New Brunswick  
 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

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 Upham East Gypsum Project  
 Upham, New Brunswick  
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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	28.0	-	-	3.0	2.5	2.5
13-Apr-23	27.9	-	-	2.9	2.5	2.5
19-Apr-23	28.0	-	-	3.0	6.2	2.5
28-Apr-23	28.0	-	-	3.0	6.2	2.5
2-May-23	28.0	-	-	3.0	6.2	2.5
9-May-23	27.5	-	-	2.5	6.2	2.5
18-May-23	27.5	-	-	2.5	6.2	2.5
22-May-23	27.5	-	-	2.5	2.5	2.5

Notes:

The detection limit for TSS is 5 mg/L; for results <5 mg/L, half the detection limit was used.

Dashed line indicates monthly average could not be calculated.

Site specific guideline is 25 mg/L above the monthly average.

Monthly average is calculated based on results from the previous 30 days.

The background sample is SW3.

Samples above the site specific guideline are **bolded in red**.

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

Test Start	Duration	Flow Rate	Air Volume	Pressure	Temperature	Initial Filter Weight	Final Filter Weight	TSP Mass	TSP	Site Guideline
		(L/min)	(m <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	25 hours	17.76	25.57	740	-0.2	14.8216	14.8254	3800	6.1922	120
2023-02-01	26 hours	17.93	25.83	742	-17	14.8256	14.8318	6200	10.0013	120
2023-02-07	27 hours	18.05	26.86	756	-7.5	14.8227	14.8464	23700	36.7647	120
2023-02-13	28 hours	18.2	26.05	744	-5.3	14.8097	14.8137	4000	6.3980	120
2023-02-19	29 hours	18.43	26.53	757	-4	14.8066	14.8448	38200	59.9950	120
2022-02-25	30 hours	19.29	27.77	757	-15.8	14.8061	14.8096	3500	5.2515	120
2022-03-03	31 hours	18.29	26.33	745	-5.8	14.8121	14.8128	700	1.1077	120
2022-03-09	32 hours	18.15	26.13	750	-2.4	14.8113	14.8218	10500	16.7432	120
2022-03-15	33 hours	17.75	25.56	736	-1.1	14.8158	14.8232	7400	12.0631	120
2022-03-21	34 hours	18.14	26.12	755	-0.1	14.8191	14.821	1900	3.0309	120
2023-03-27	35 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
2023-05-02	24 hours	17.23	24.81	743	9.2	14.8552	14.8613	6100	10.2445	120
2023-05-08	24 hours	17.32	24.94	741	7.5	14.8542	14.8562	2000	3.3414	120
2023-05-14	24 hours	17.48	25.16	750	8.2	14.8438	14.8484	4600	7.6179	120
2023-05-20	24 hours	17.13	24.67	747	12.7	14.8406	14.8449	4300	7.2625	120
2023-05-26	24 hours	17.64	25.4	754	6.7	14.8725	14.8796	7100	11.6470	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.



# Attachment C

## *Analytical Certificates*

Report ID: 481318-IAS  
Report Date: 10-May-23  
Date Received: 03-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

Attention: Daniel Guest

**Project #: 17-5121**

Location: Upham

### Analysis of Water

RPC Sample ID:	481318-1	481318-2	481318-3	481318-4
Client Sample ID:	SW3	SW5	PDP-1	PDP-1 Duplicate
Date Sampled:	2-May-23	2-May-23	2-May-23	2-May-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: 481318-IAS  
Report Date: 10-May-23  
Date Received: 03-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

Report ID: 482020-IAS  
Report Date: 15-May-23  
Date Received: 10-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:	482020-1	482020-2	482020-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	9-May-23	9-May-23	9-May-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: 482020-IAS  
Report Date: 15-May-23  
Date Received: 10-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

Report ID: 483410-IAS  
Report Date: 30-May-23  
Date Received: 23-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:	483410-1	483410-2	483410-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	18-May-23	18-May-23	18-May-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: 483410-IAS  
Report Date: 30-May-23  
Date Received: 23-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

Report ID: 483720-IAS  
Report Date: 02-Jun-23  
Date Received: 24-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

Attention: Daniel Guest

**Project #: 17-5121**

Location: Upham

### Analysis of Water

RPC Sample ID:	483720-1	483720-2	483720-3	483720-4
Client Sample ID:	SW3	SW5	PDP-1	SW5 Duplicate
Date Sampled:	22-May-23	22-May-23	22-May-23	22-May-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: 483720-IAS  
Report Date: 02-Jun-23  
Date Received: 24-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

# Attachment D

## *Blast Reports*



May 3, 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. 2023-12 – 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 May 3, 2023. For the monitoring we positioned nine (9) digital seismographs in the area.

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

**Blast No. 2023-12 – May 3, 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)	14:00	1,390 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		1,020 m S	0.71 mm/s @ 64 Hz	113	-
3. Civic No. 4150 Route 111 (PW-13)		900 m SE	0.62 mm/s @ 47 Hz	112	-
4. Civic No. 2447 Route 820 (PW-07)		1,010 m NE	< 0.5 mm/s	<120	Units were not triggered
5. PW-03 - Cottage Route 820		625 m N	< 0.5 mm/s	<120	
6. Civic No. 2341 Route 820 (PW-05)		590 m N	1.40 mm/s @ 64 Hz	112	-
7. Civic No. 50 Myron Road (PW-15)		765 m NW	1.27 mm/s @ 85 Hz	111	-
8. Civic No. 86 Myron Road (PW-16)		650 m W	0.88 mm/s @ 12 Hz	112	-
9. Civic No. 220 Myron Road (PW-01)		1,350 m SW	< 0.5 mm/s	<120	Unit was not triggered
<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*

*May 3, 2023*

*Project No.: 234601.00 - Blast No.: 2023-12*

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>May 3, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-12</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°28.903' W 65°38.152' (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>10,640 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Light drizzle</u>	<b>Air Temp.:</b>	<u>6°C</u>
<b>Est. Wind Speed :</b>	<u>≈15 km/h</u>	<b>Wind Direction:</b>	<u>NE</u>
<b>Cloud Cover:</b>	<u>Overcast</u>	<b>Precipitation:</b>	<u>Light drizzle</u>

### BLAST DESIGN:

<b>Total No. Holes:</b>	<u>87</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>4.7 m – 6.8 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.: 140 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>3,644 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>May 3, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-12</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>590 m</u>
<b>Direction to the Nearest Structure:</b>	<u>North</u>
<b>Structure Type:</b>	<u>House</u>
<b>Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):</b>	<u>49.9</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>May 3, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-12</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #1

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 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,390 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 #20203</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>1,020 m South</u>
Transverse Particle Velocity:	<u>0.43 mm/s @ 47 Hz</u>
Vertical Particle Velocity:	<u>0.71 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.49 mm/s @ 64 Hz</u>
Peak Particle Velocity:	<u>0.71 mm/s @ 564 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>May 3, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-12</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #3

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 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>900 m Southeast</u>
Transverse Particle Velocity:	<u>0.62 mm/s @ 47 Hz</u>
Vertical Particle Velocity:	<u>0.34 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.46 mm/s @ 51 Hz</u>
Peak Particle Velocity:	<u>0.62 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>112 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>1,010 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>May 3, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-12</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5676</u>
Calibration Date:	<u>March 8, 2023</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>625 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 Minimate, Serial #5487</u>
Calibration Date:	<u>January 16, 2023</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>590 m North</u>
Transverse Particle Velocity:	<u>1.08 mm/s @ 43 Hz</u>
Vertical Particle Velocity:	<u>1.40 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>1.14 mm/s @ 32 Hz</u>
Peak Particle Velocity:	<u>1.40 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>May 3, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-12</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #7

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 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>765 m Northwest</u>
Transverse Particle Velocity:	<u>0.89 mm/s @ 57 Hz</u>
Vertical Particle Velocity:	<u>1.27 mm/s @ 85 Hz</u>
Longitudinal Particle Velocity:	<u>0.76 mm/s @ 43 Hz</u>
Peak Particle Velocity:	<u>1.27 mm/s @ 85 Hz</u>
Maximum Airblast:	<u>111 dB(L)</u>

### Data Collection – Seismometer #8

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 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>650 m West</u>
Transverse Particle Velocity:	<u>0.58 mm/s @ 18 Hz</u>
Vertical Particle Velocity:	<u>0.53 mm/s @ 28 Hz</u>
Longitudinal Particle Velocity:	<u>0.88 mm/s @ 12 Hz</u>
Peak Particle Velocity:	<u>0.88 mm/s @ 12 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>May 3, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:00</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-12</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>1,350 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>

## Attachment B

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### *Blast and Seismograph Location Plan*

# Blast and Seismograph Location Plan

**Blast No:** 2023-12

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay

**Legend**

- ★ Blast 2023-12
- Seismograph Location



Google Earth

Image © 2023 CNES / Airbus

**Date:** May 3, 2023  
**Project No.:** 234601.00



## Attachment C

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### *Blast Event Reports*

**Date/Time** Vert at 14:00:45 May 3, 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\_20230503140045.IDFW

**Post Event Notes**

Location: Civic Number 4126 Route 111 (PW-10)  
 Blast No.: 2023-12  
 Project No: 234601.00

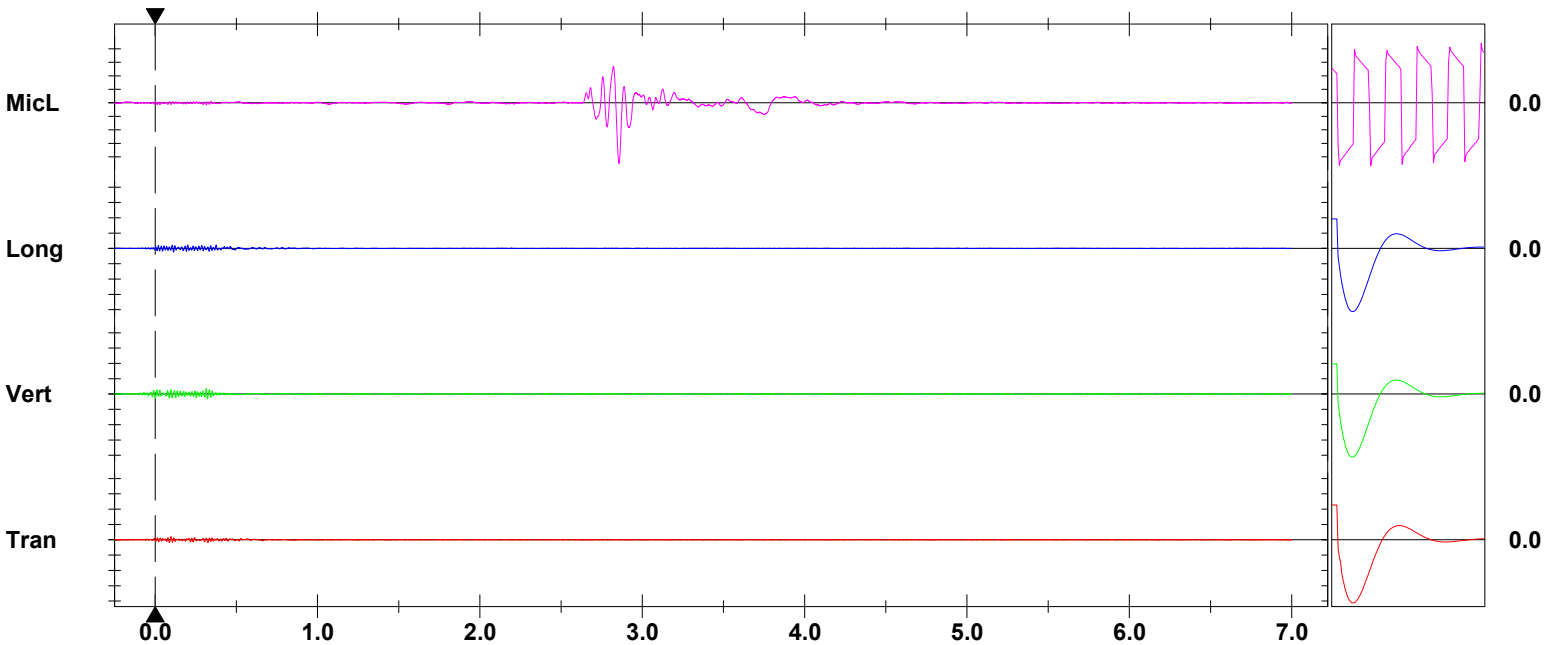
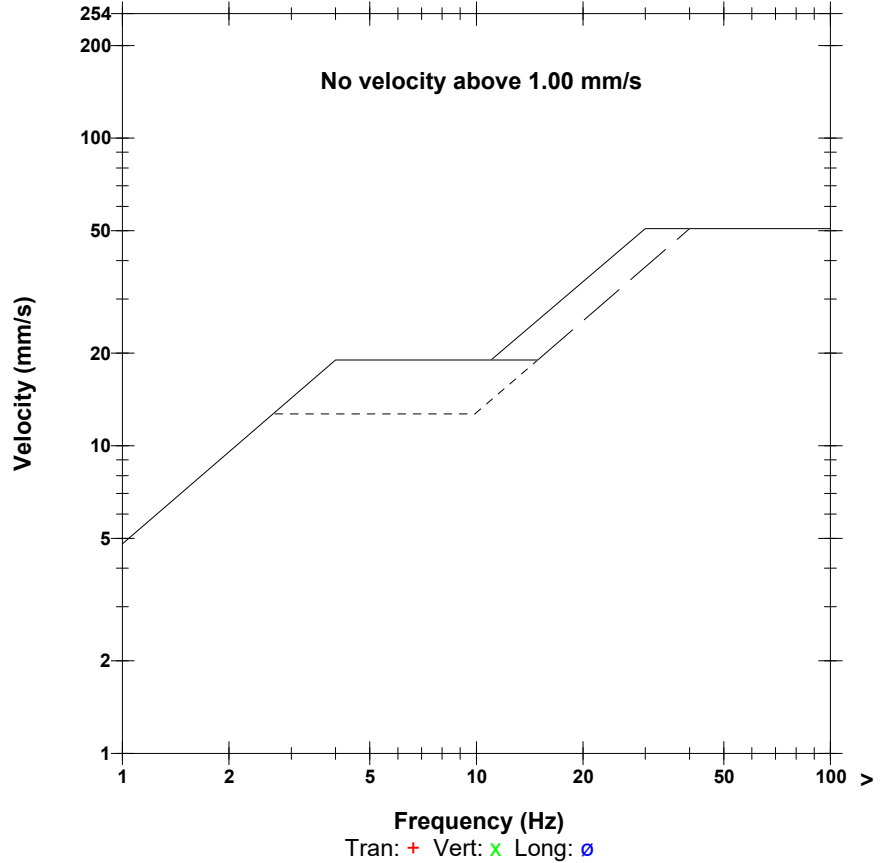
**Notes**

**Microphone** Linear Weighting  
**PSPL** 113.1 dB(L) 8.999 pa.(L) at 2.857 sec  
**ZC Freq** 13 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1522 mv )

	Tran	Vert	Long	
PPV	0.434	0.709	0.489	mm/s
PPV	43.74	48.02	44.78	dB
ZC Freq	47	64	64	Hz
Time (Rel. to Trig)	0.098	0.313	0.113	sec
Peak Acceleration	0.026	0.035	0.021	g
Peak Displacement	0.001	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.5	7.5	Hz
Overswing Ratio	4.5	4.5	4.3	

**Peak Vector Sum** 0.751 mm/s at 0.097 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** Tran at 14:00:45 May 3, 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** 3.5 Volts  
**Unit Calibration** April 11, 2022 by InstanTel  
**File Name** UM18193\_20230503140045.IDFW

**Post Event Notes**

Location: Civic Number 4150 Route 111 (PW-13)  
 Blast No.: 2023-12  
 Project No: 234601.00

**Notes**

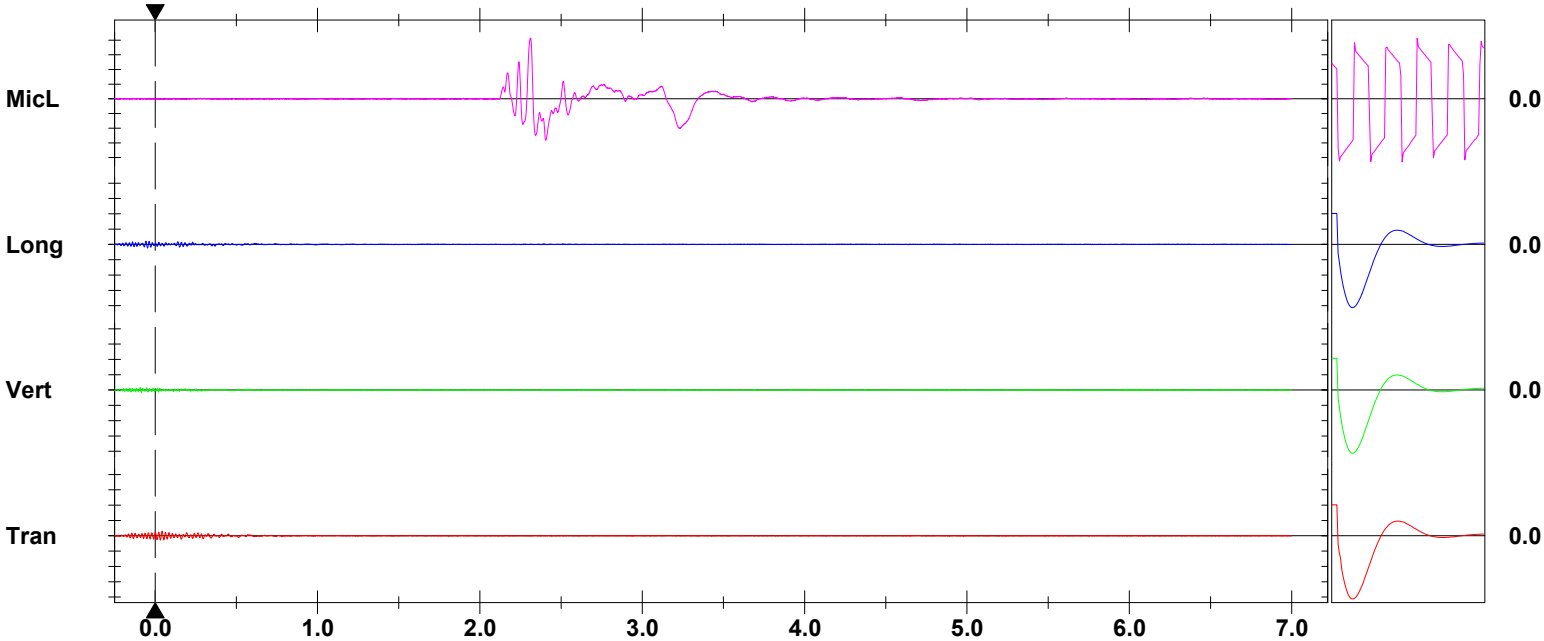
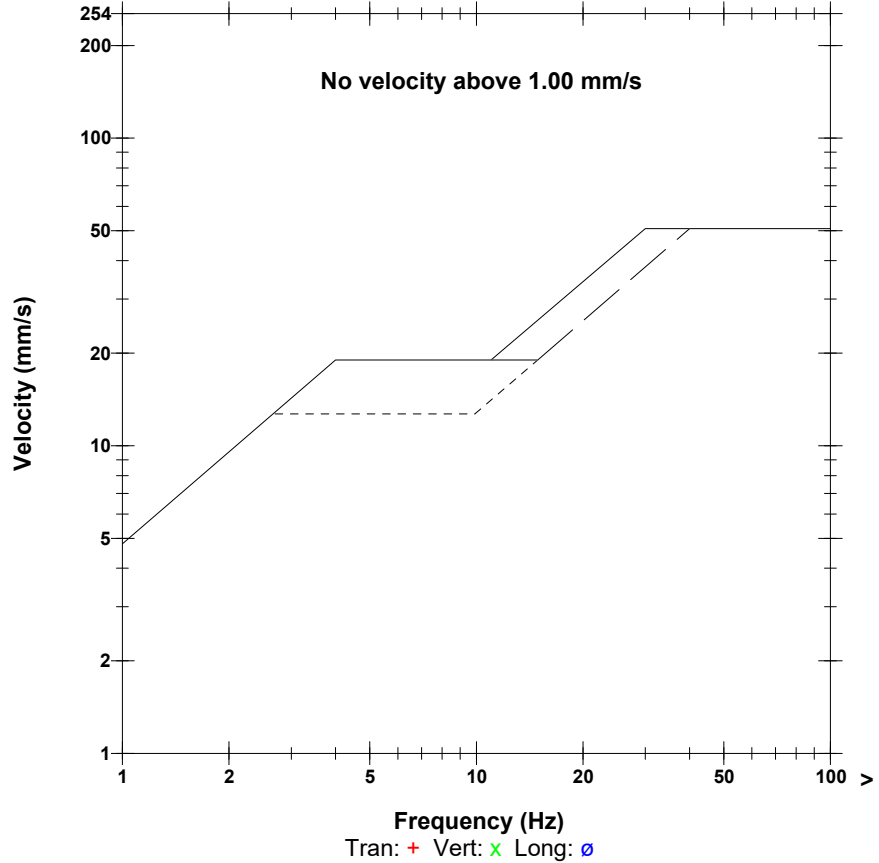
Location:  
 Client:  
 User Name:  
 General:

**Microphone** Linear Weighting  
**PSPL** 112.3 dB(L) 8.285 pa.(L) at 2.313 sec  
**ZC Freq** 13 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1580 mv )

	Tran	Vert	Long	
PPV	0.623	0.339	0.457	mm/s
PPV	46.89	41.60	44.20	dB
ZC Freq	47	57	51	Hz
Time (Rel. to Trig)	0.043	-0.084	-0.048	sec
Peak Acceleration	0.033	0.013	0.018	g
Peak Displacement	0.002	0.001	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.3	4.2	4.4	

**Peak Vector Sum** 0.644 mm/s at 0.043 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** Vert at 14:00:51 May 3, 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** 5.9 Volts  
**Unit Calibration** January 16, 2023 by InstanTel  
**File Name** G487K0AP.LF0

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: May 3, 2023 16:19:44 (V10.72.1)

**Post Event Notes**  
 Location: Civic Number 2341 Route 820 (PW-05)  
 Blast No.: 2023-12  
 Project No: 234601.00

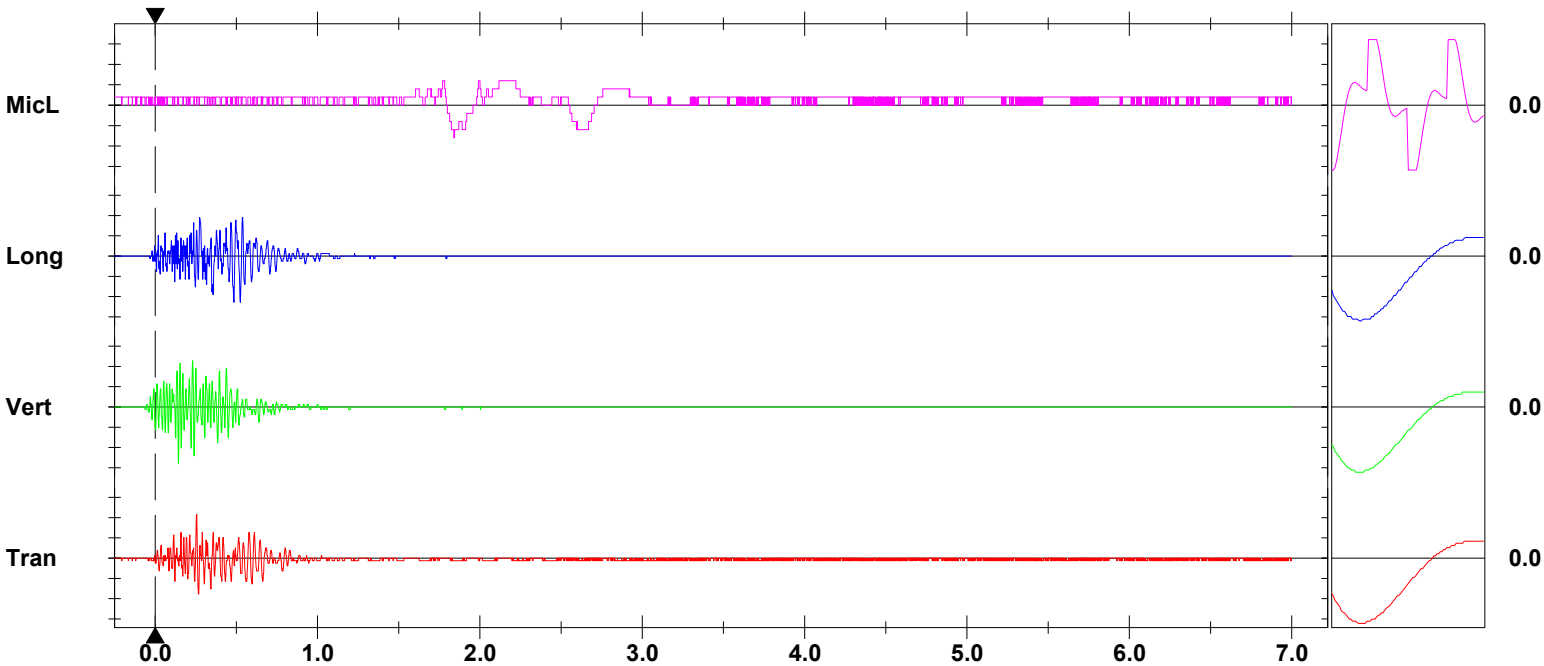
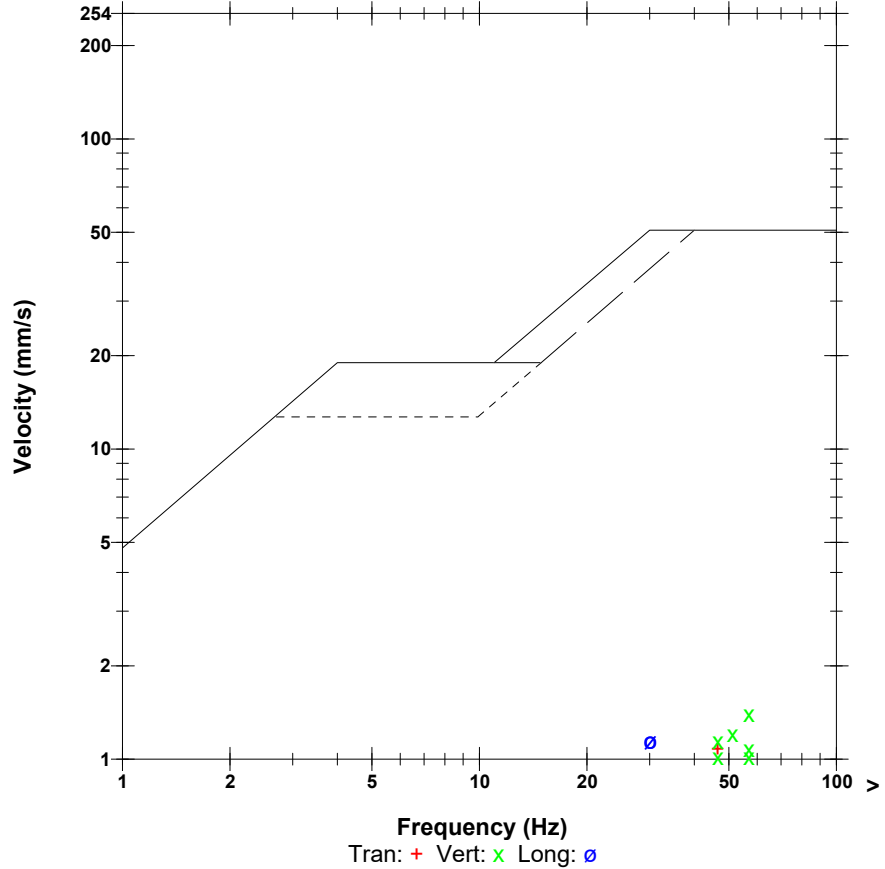
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 112.0 dB(L) 8.000 pa.(L) at 1.840 sec  
**ZC Freq** 3.0 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 289 mv )

	Tran	Vert	Long	
PPV	1.080	1.397	1.143	mm/s
PPV	51.66	53.90	52.16	dB
ZC Freq	43	64	32	Hz
Time (Rel. to Trig)	0.256	0.145	0.485	sec
Peak Acceleration	0.033	0.053	0.040	g
Peak Displacement	0.004	0.004	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.7	7.7	Hz
Overswing Ratio	3.5	4.2	3.9	

**Peak Vector Sum** 1.413 mm/s at 0.145 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** Vert at 14:00:47 May 3, 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** BE21349 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.1 Volts  
**Unit Calibration** July 20, 2022 by InstanTel  
**File Name** W349K08U.XB0

**Notes**

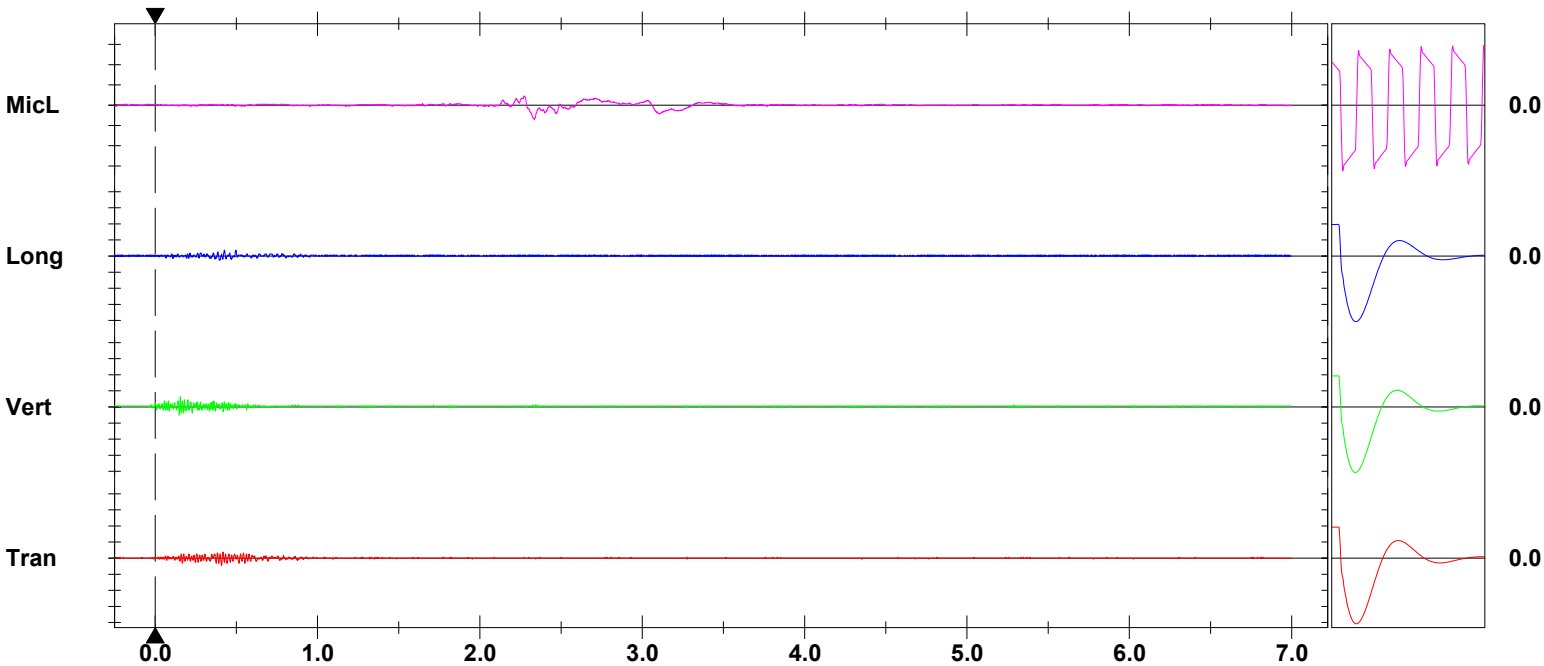
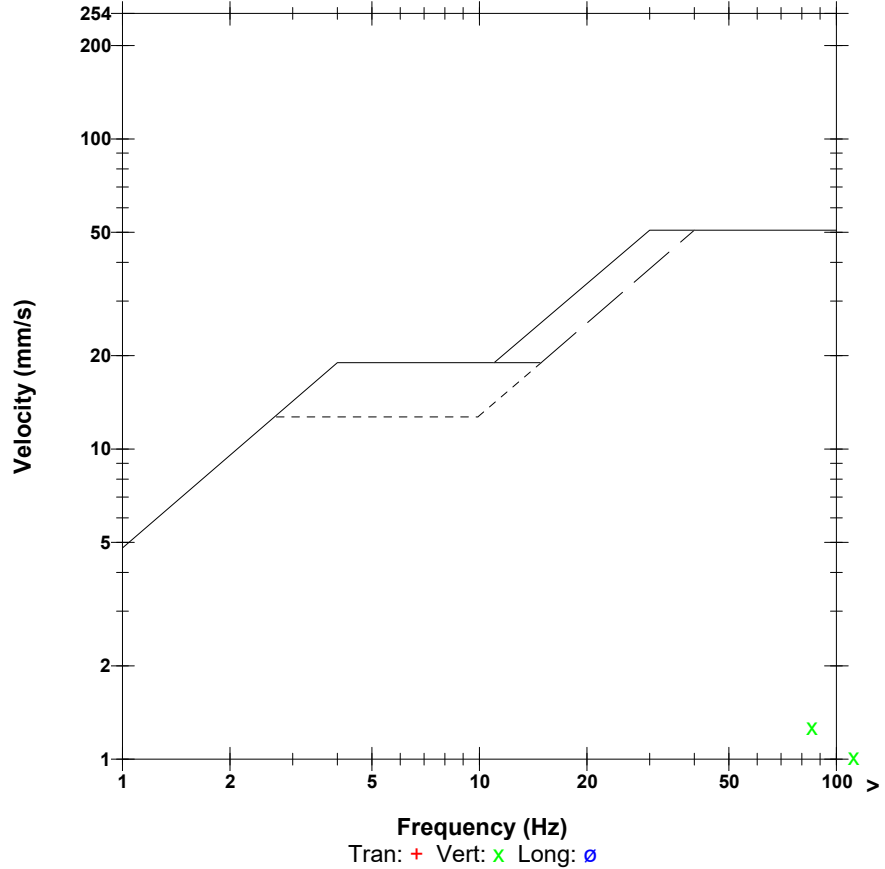
**Post Event Notes**  
 Location: Civic Number 50 Myron Road (PW-15)  
 Blast No.: 2023-12  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 110.9 dB(L) 7.000 pa.(L) at 2.335 sec  
**ZC Freq** 3.6 Hz  
**Channel Test** Passed (Freq = 19.7 Hz Amp = 697 mv )

	Tran	Vert	Long	
PPV	0.889	1.270	0.762	mm/s
PPV	49.98	53.08	48.64	dB
ZC Freq	57	85	43	Hz
Time (Rel. to Trig)	0.408	0.155	0.426	sec
Peak Acceleration	0.040	0.066	0.027	g
Peak Displacement	0.002	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.5	7.2	Hz
Overswing Ratio	3.7	4.0	4.3	

**Peak Vector Sum** 1.295 mm/s at 0.155 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** Long at 14:00:44 May 3, 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** 3.5 Volts  
**Unit Calibration** May 31, 2022 by Instatel  
**File Name** UM20205\_20230503140044.IDFW

**Notes**

**Post Event Notes**

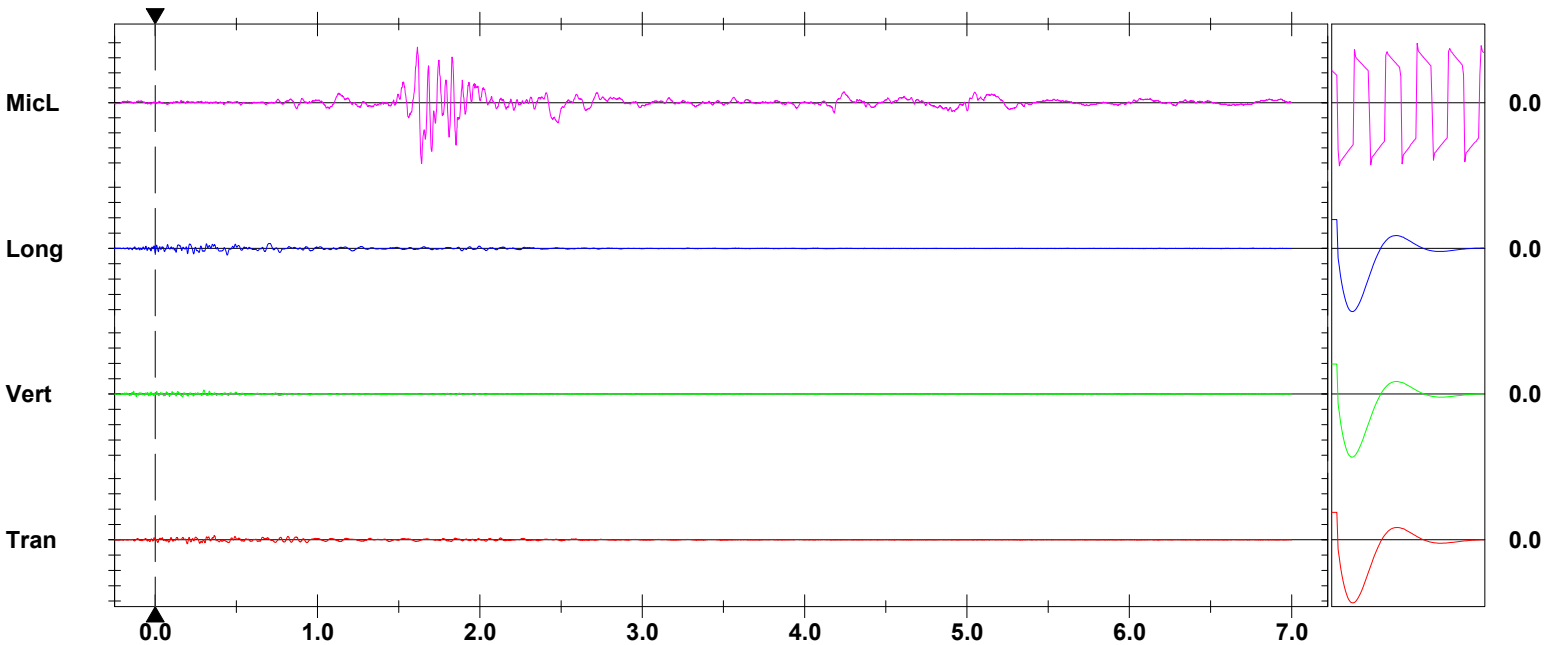
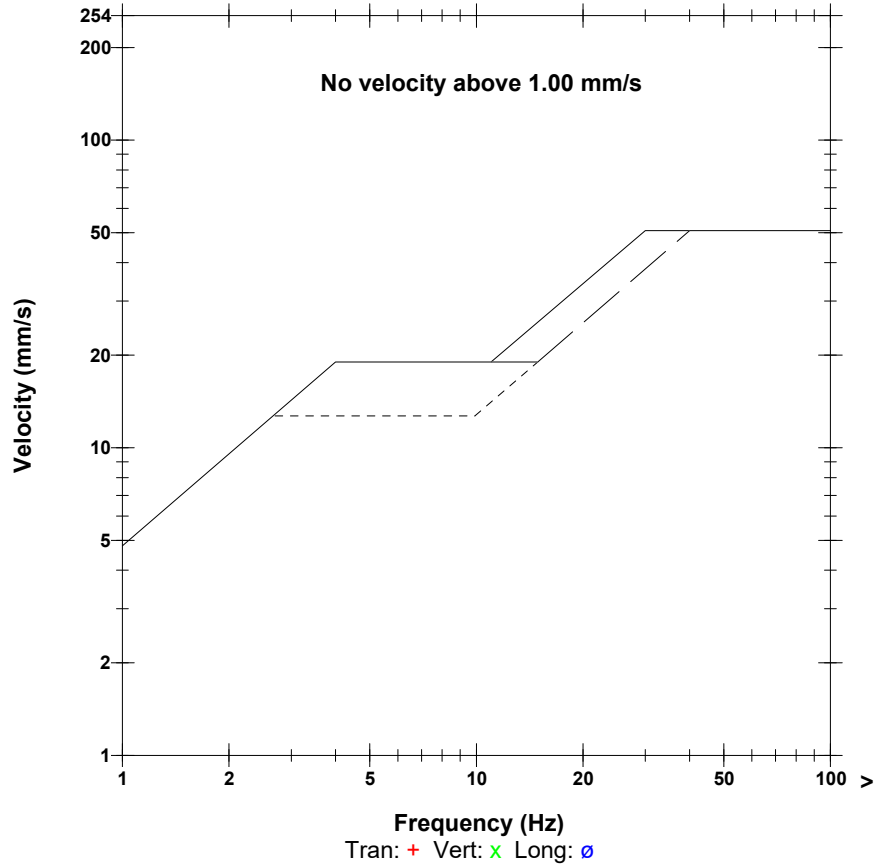
Location: Civic Number 86 Myron Road (PW-16)  
 Blast No.: 2023-12  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 112.1 dB(L) 8.099 pa.(L) at 1.641 sec  
**ZC Freq** 10 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1625 mv )

	Tran	Vert	Long	
PPV	0.583	0.528	0.875	mm/s
PPV	46.32	45.45	49.84	dB
ZC Freq	18	28	12	Hz
Time (Rel. to Trig)	0.366	0.300	0.443	sec
Peak Acceleration	0.021	0.017	0.023	g
Peak Displacement	0.008	0.003	0.008	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.5	Hz
Overswing Ratio	5.2	5.1	4.9	

**Peak Vector Sum** 0.918 mm/s at 0.443 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



May 10, 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. 2023-13 – 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 12:28 on May 10, 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. 2023-13 – May 10, 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)	12:28	1,280 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		855 m S	0.63 mm/s @ 64 Hz	109	-
3. Civic No. 4150 Route 111 (PW-13)		670 m SE	1.11 mm/s @ 57 Hz	108	-
4. Civic No. 2447 Route 820 (PW-07)		900 m NE	0.51 mm/s @ 17 Hz	110	-
5. PW-03 - Cottage Route 820		710 m N	< 0.5 mm/s	<120	Units were not triggered
6. Civic No. 2341 Route 820 (PW-05)		750 m N	< 0.5 mm/s	<120	
7. Civic No. 50 Myron Road (PW-15)		1,025 m NW	< 0.5 mm/s	<120	
8. Civic No. 86 Myron Road (PW-16)		890 m W	1.31 mm/s @ 9 Hz	100	-
9. Civic No. 220 Myron Road (PW-01)		1,340 m SW	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 2337 Route 820 (PW-04)		835 m NW	< 0.5 mm/s	<120	
11. Civic No. 4140 Route 111 (PW-12)		760 m SE	0.75 mm/s @ 39 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*

*May 10, 2023*

*Project No.: 234601.00 – Blast No.: 2023-13*

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>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</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°28.856' W 65°37.929' (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>11,596 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Overcast</u>	<b>Air Temp.:</b>	<u>14°C</u>
<b>Est. Wind Speed :</b>	<u>≈20 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>110</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>5.4 m – 7.9 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.: 105 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>3,856 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>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>670 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>65.4</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>
<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>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</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>1,280 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>855 m South</u>
Transverse Particle Velocity:	<u>0.25 mm/s @ &gt;100 Hz</u>
Vertical Particle Velocity:	<u>0.63 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.25 mm/s @ &gt;100 Hz</u>
Peak Particle Velocity:	<u>0.63 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>109 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #3

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 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>670 m Southeast</u>
Transverse Particle Velocity:	<u>1.11 mm/s @ 57 Hz</u>
Vertical Particle Velocity:	<u>1.09 mm/s @ 73 Hz</u>
Longitudinal Particle Velocity:	<u>0.75 mm/s @ 73 Hz</u>
Peak Particle Velocity:	<u>1.11 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>108 dB(L)</u>

### Data Collection – Seismometer #4

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 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>900 m Northeast</u>
Transverse Particle Velocity:	<u>0.45 mm/s @ 13 Hz</u>
Vertical Particle Velocity:	<u>0.38 mm/s @ 34 Hz</u>
Longitudinal Particle Velocity:	<u>0.51 mm/s @ 17 Hz</u>
Peak Particle Velocity:	<u>0.51 mm/s @ 17 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>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5673</u>
Calibration Date:	<u>April 25, 2023</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>710 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 Minimate, Serial #5489</u>
Calibration Date:	<u>May 5, 2023</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>750 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>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #7

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 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>1,025 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 #20206</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>890 m West</u>
Transverse Particle Velocity:	<u>1.31 mm/s @ 9 Hz</u>
Vertical Particle Velocity:	<u>0.48 mm/s @ 24 Hz</u>
Longitudinal Particle Velocity:	<u>1.03 mm/s @ 10 Hz</u>
Peak Particle Velocity:	<u>1.31 mm/s @ 9 Hz</u>
Maximum Airblast:	<u>100 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #9

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 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,340 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 #5372</u>
Calibration Date:	<u>February 28, 2023</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>835 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>May 10, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>12:28</u>
<b>Inspector:</b>	<u>M. Merriam-MacLeod</u>	<b>Blast No.:</b>	<u>2023-13</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #11

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 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>760 m Southeast</u>
Transverse Particle Velocity:	<u>0.37 mm/s @ 57 Hz</u>
Vertical Particle Velocity:	<u>0.65 mm/s @ 43 Hz</u>
Longitudinal Particle Velocity:	<u>0.75 mm/s @ 39 Hz</u>
Peak Particle Velocity:	<u>0.75 mm/s @ 39 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:** 2023-13

Upham East Gypsum Quarry

Upham, NB



**Date:** May 10, 2023  
**Project No.:** 234601.00



## Attachment C

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### *Blast Event Reports*

**Date/Time** Vert at 12:27:38 May 10, 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** 6.2 Volts  
**Unit Calibration** July 21, 2022 by InstanTel  
**File Name** W348K0LP.A20

**Notes**

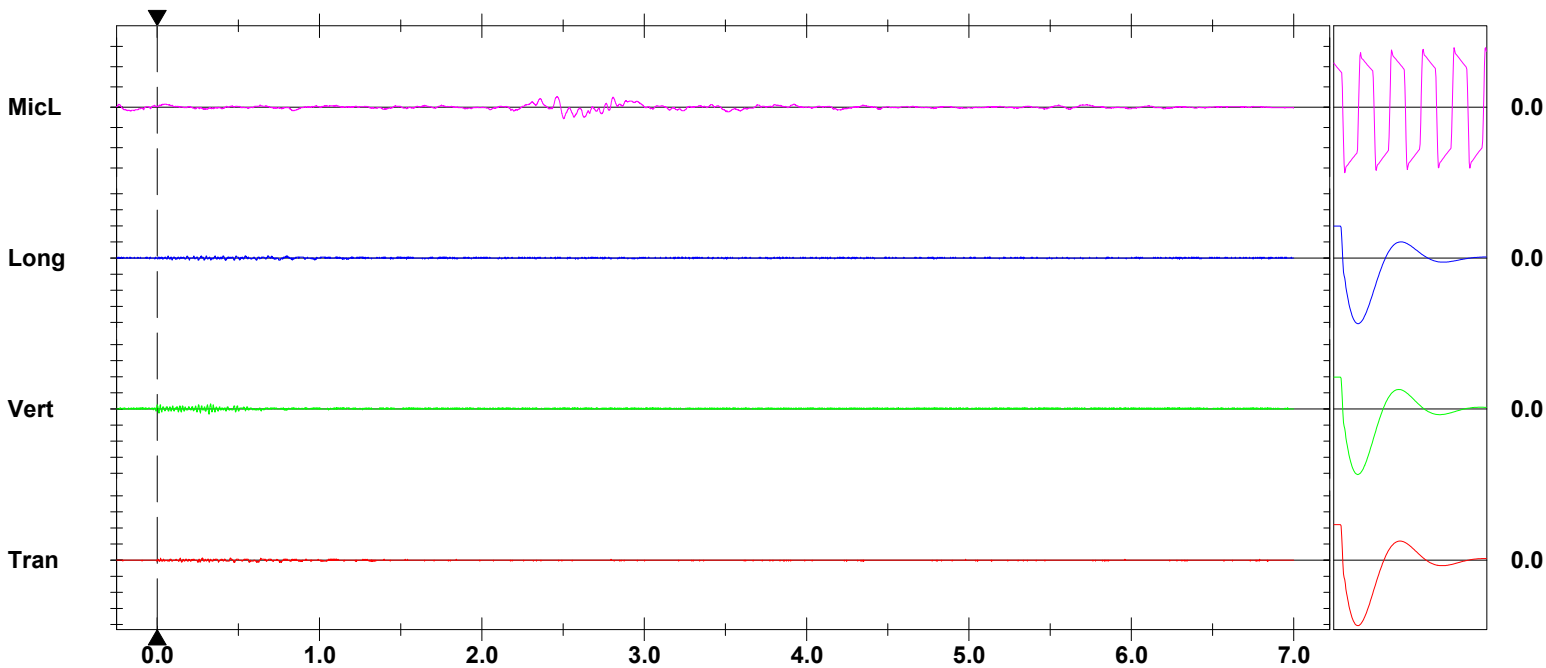
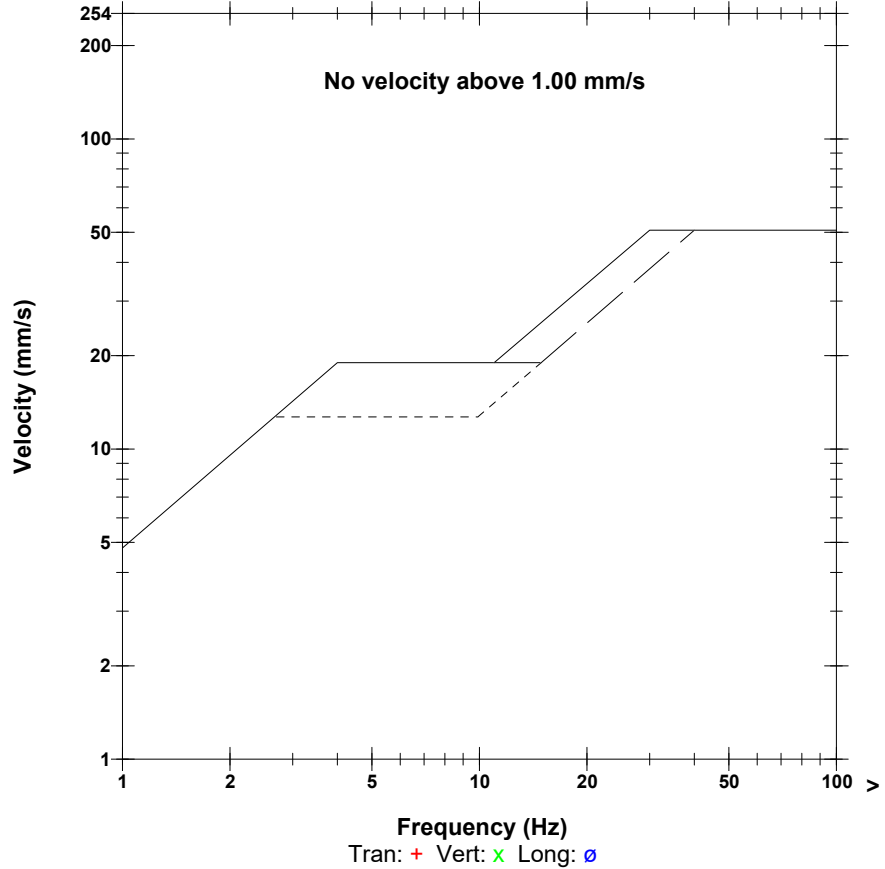
**Post Event Notes**  
 Location: Civic Number 4126 Route 111 (PW-10)  
 Blast No.: 2023-13  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 109.2 dB(L) 5.750 pa.(L) at 2.503 sec  
**ZC Freq** 10 Hz  
**Channel Test** Passed (Freq = 19.7 Hz Amp = 599 mv)

	Tran	Vert	Long	
PPV	0.254	0.635	0.254	mm/s
PPV	39.10	47.06	39.10	dB
ZC Freq	>100	64	>100	Hz
Time (Rel. to Trig)	0.021	0.317	0.066	sec
Peak Acceleration	0.013	0.027	0.027	g
Peak Displacement	0.001	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.3	Hz
Overswing Ratio	3.4	3.4	4.1	

**Peak Vector Sum** 0.696 mm/s at 0.320 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 12:28:25 May 10, 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** 3.7 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20204\_20230510122825.IDFW

### Post Event Notes

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

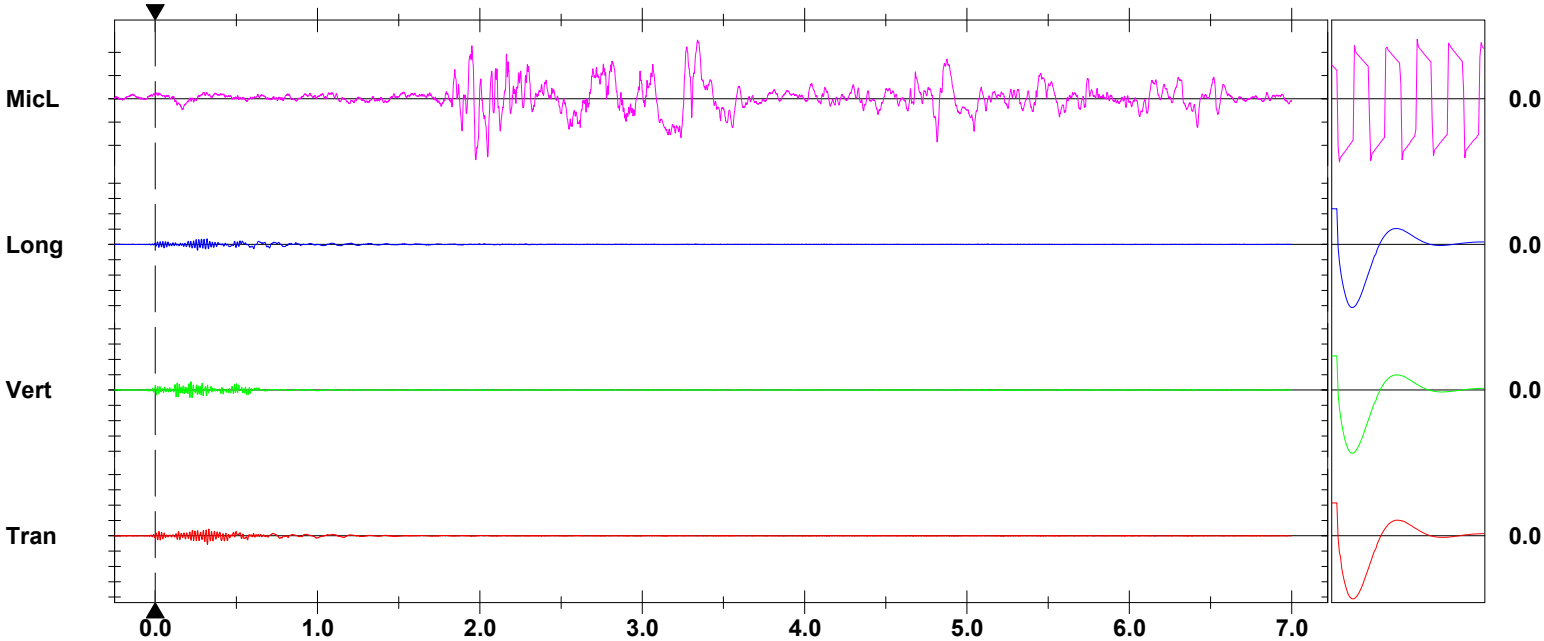
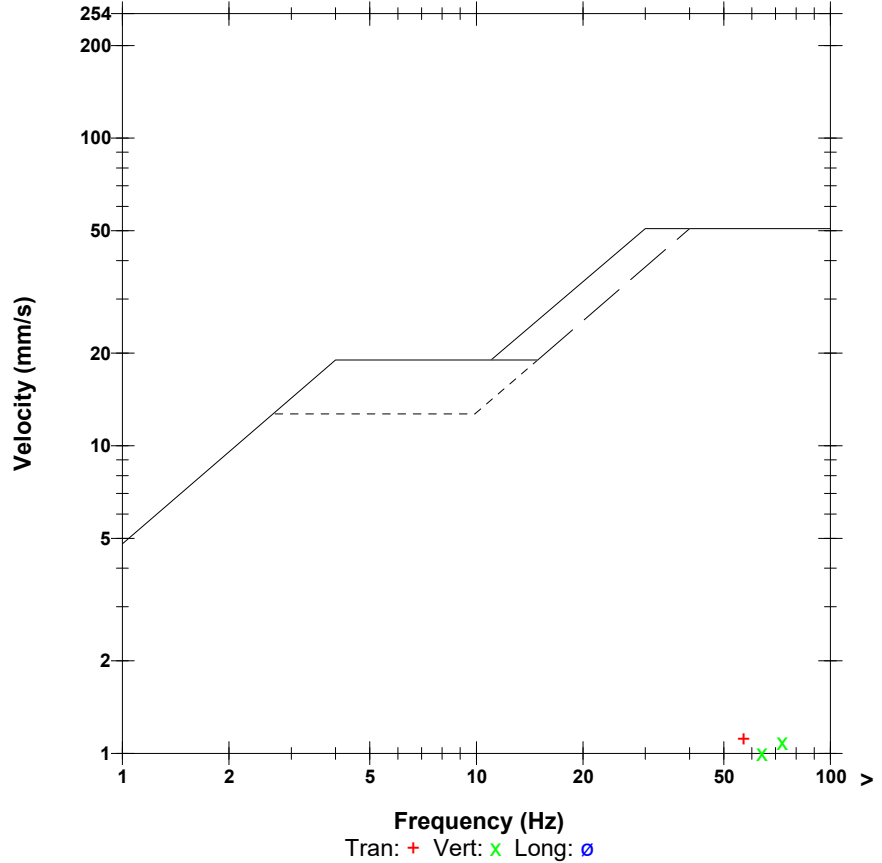
### Notes

**Microphone** Linear Weighting  
**PSPL** 108.3 dB(L) 5.229 pa.(L) at 1.976 sec  
**ZC Freq** 15 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1448 mv )

	Tran	Vert	Long	
PPV	1.111	1.088	0.749	mm/s
PPV	51.92	51.73	48.49	dB
ZC Freq	57	73	73	Hz
Time (Rel. to Trig)	0.322	0.220	0.260	sec
Peak Acceleration	0.067	0.066	0.049	g
Peak Displacement	0.005	0.002	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.0	4.2	4.0	

**Peak Vector Sum** 1.376 mm/s at 0.321 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 12:28:28 May 10, 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** 6.2 Volts  
**Unit Calibration** January 16, 2023 by InstanTel  
**File Name** G487K0NJ.ZG0  
**Post Event Notes**  
 Location: Civic Number 2447 Route 850 (PW-07)  
 Blast No.: 2023-13  
 Project No: 234601.00

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: May 10, 2023 14:57:00 (V10.72.1)

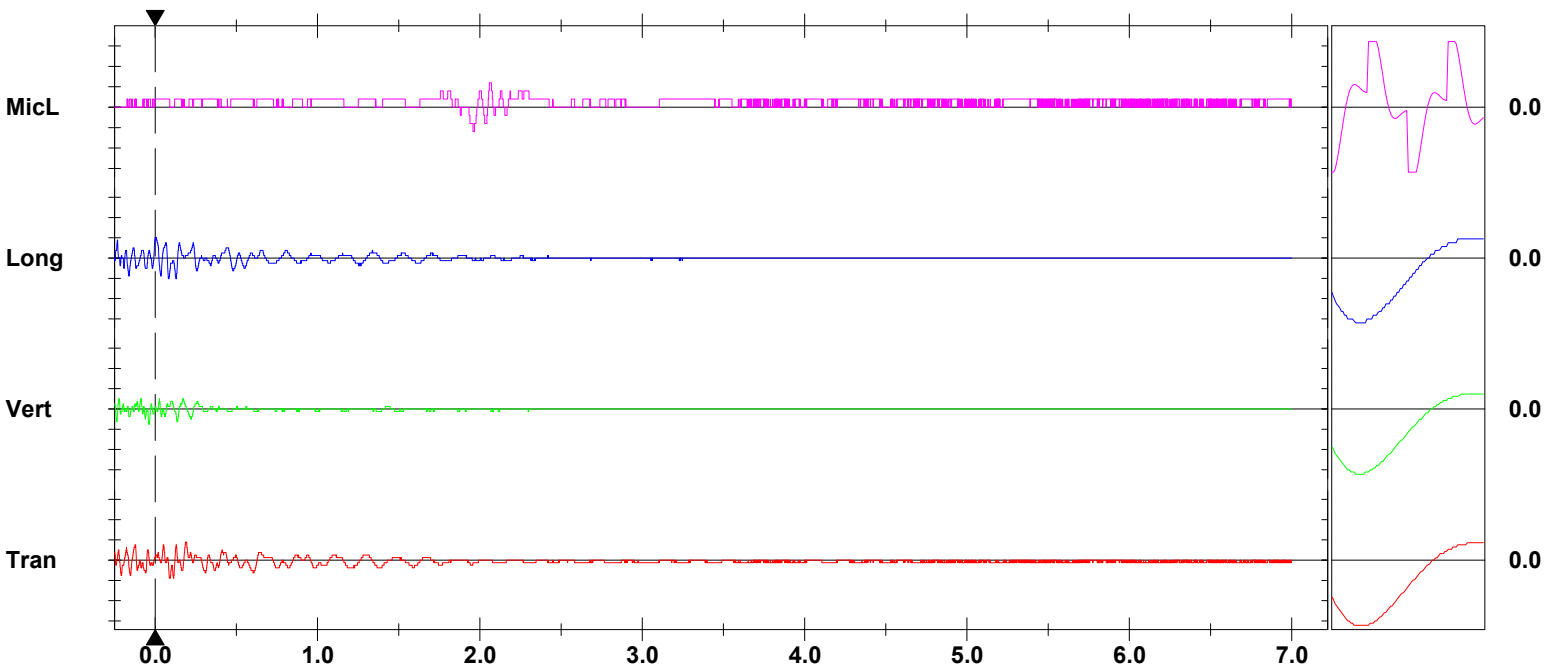
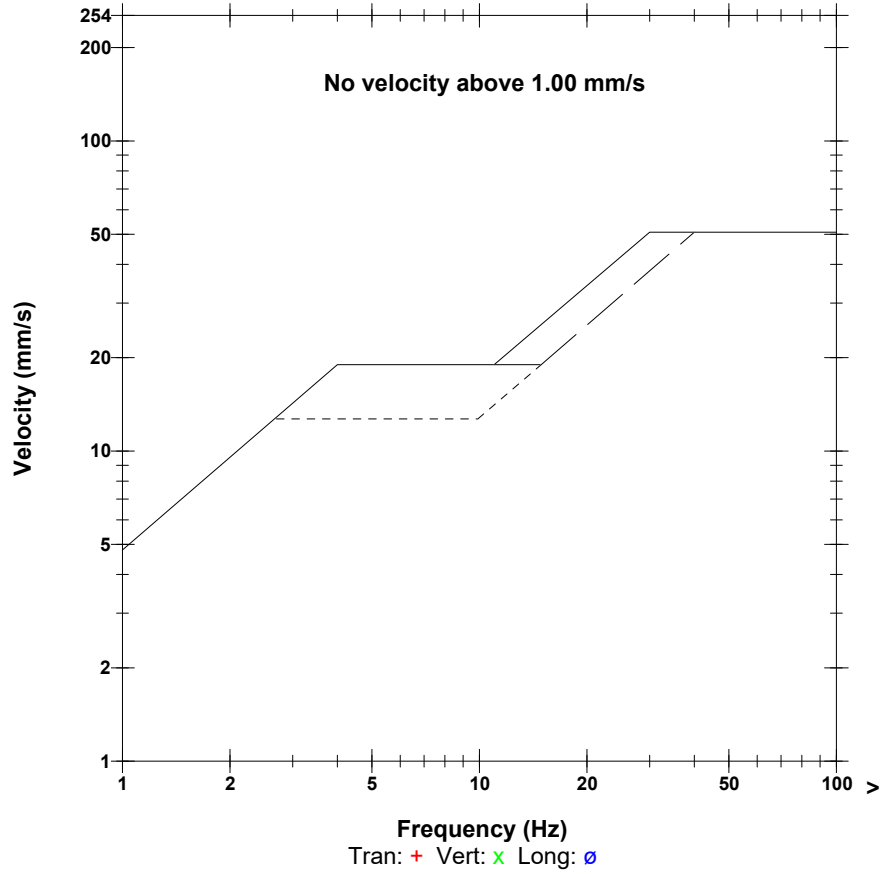
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 109.5 dB(L) 6.000 pa.(L) at 1.958 sec  
**ZC Freq** 10 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 288 mv )

	Tran	Vert	Long	
PPV	0.445	0.381	0.508	mm/s
PPV	43.96	42.62	45.12	dB
ZC Freq	13	34	17	Hz
Time (Rel. to Trig)	0.088	-0.034	0.007	sec
Peak Acceleration	0.013	0.007	0.013	g
Peak Displacement	0.005	0.002	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	8.0	Hz
Overswing Ratio	3.4	4.2	3.6	

**Peak Vector Sum** 0.667 mm/s at 0.131 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 12:28:25 May 10, 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** 3.8 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20206\_20230510122825.IDFW

**Post Event Notes**

Location: Civic Number 86 Myron Road (PW-16)  
 Blast No.: 2023-13  
 Project No: 234601.00

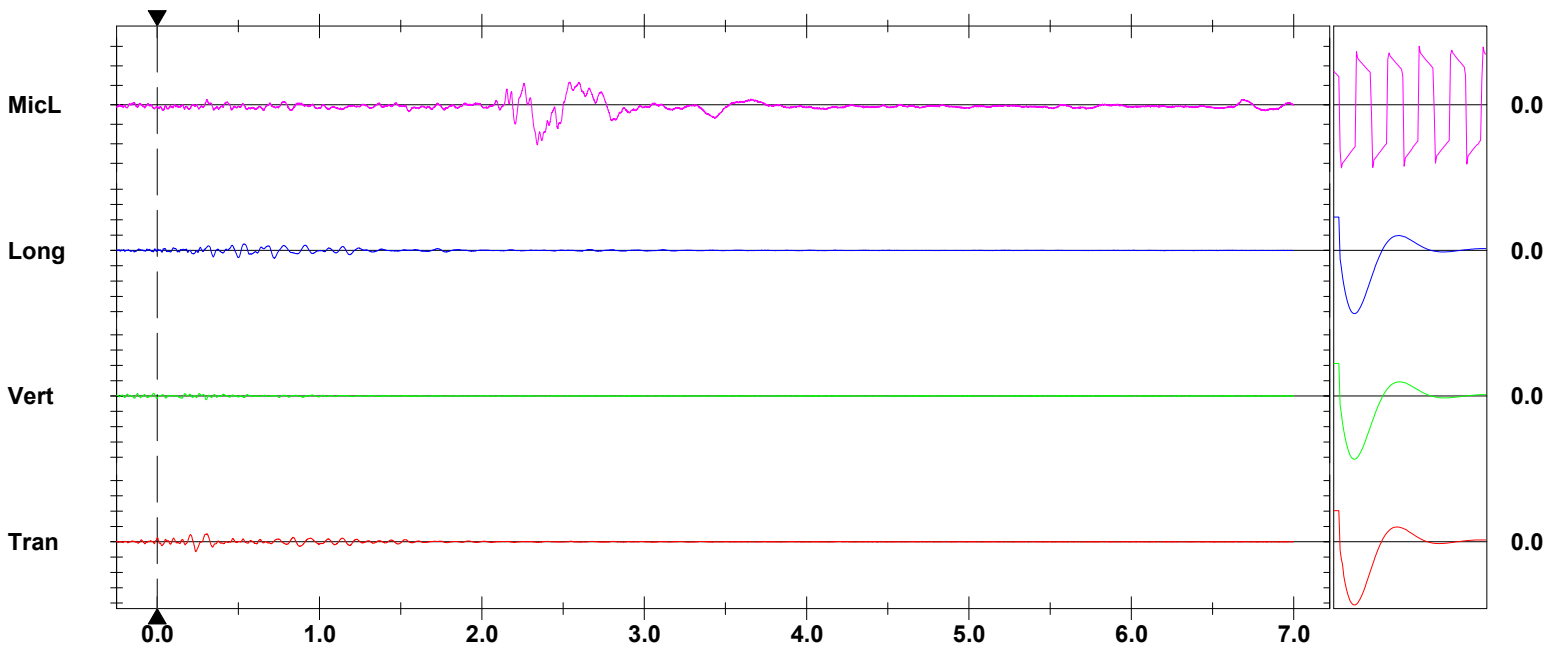
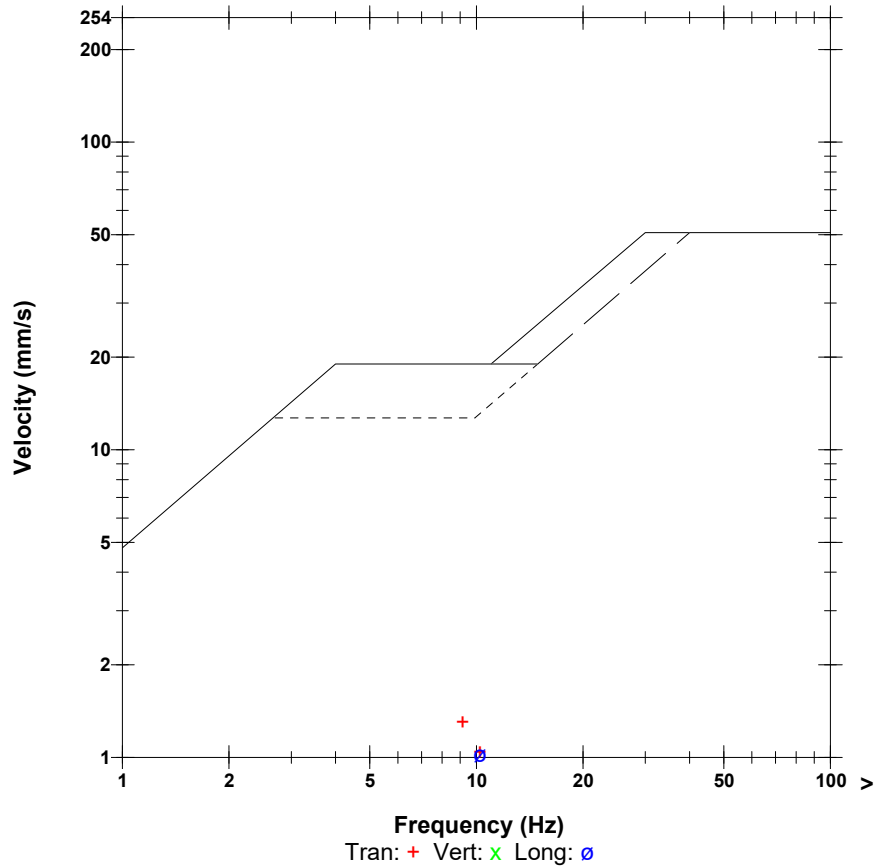
**Notes**

**Microphone** Linear Weighting  
**PSPL** 100.2 dB(L) 2.048 pa.(L) at 2.340 sec  
**ZC Freq** 2.6 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1440 mv )

	Tran	Vert	Long	
PPV	1.308	0.481	1.025	mm/s
PPV	53.33	44.64	51.21	dB
ZC Freq	9.1	24	10	Hz
Time (Rel. to Trig)	0.238	0.302	0.723	sec
Peak Acceleration	0.023	0.013	0.012	g
Peak Displacement	0.016	0.004	0.014	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.3	7.5	Hz
Overswing Ratio	4.3	4.5	4.2	

**Peak Vector Sum** 1.323 mm/s at 0.238 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 12:28:25 May 10, 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 Instatel  
**File Name** UM20203\_20230510122825.IDFW

**Post Event Notes**

Location: Civic Number 4140 Route 111 (PW-12)  
 Blast No.: 2023-13  
 Project No: 234601.00

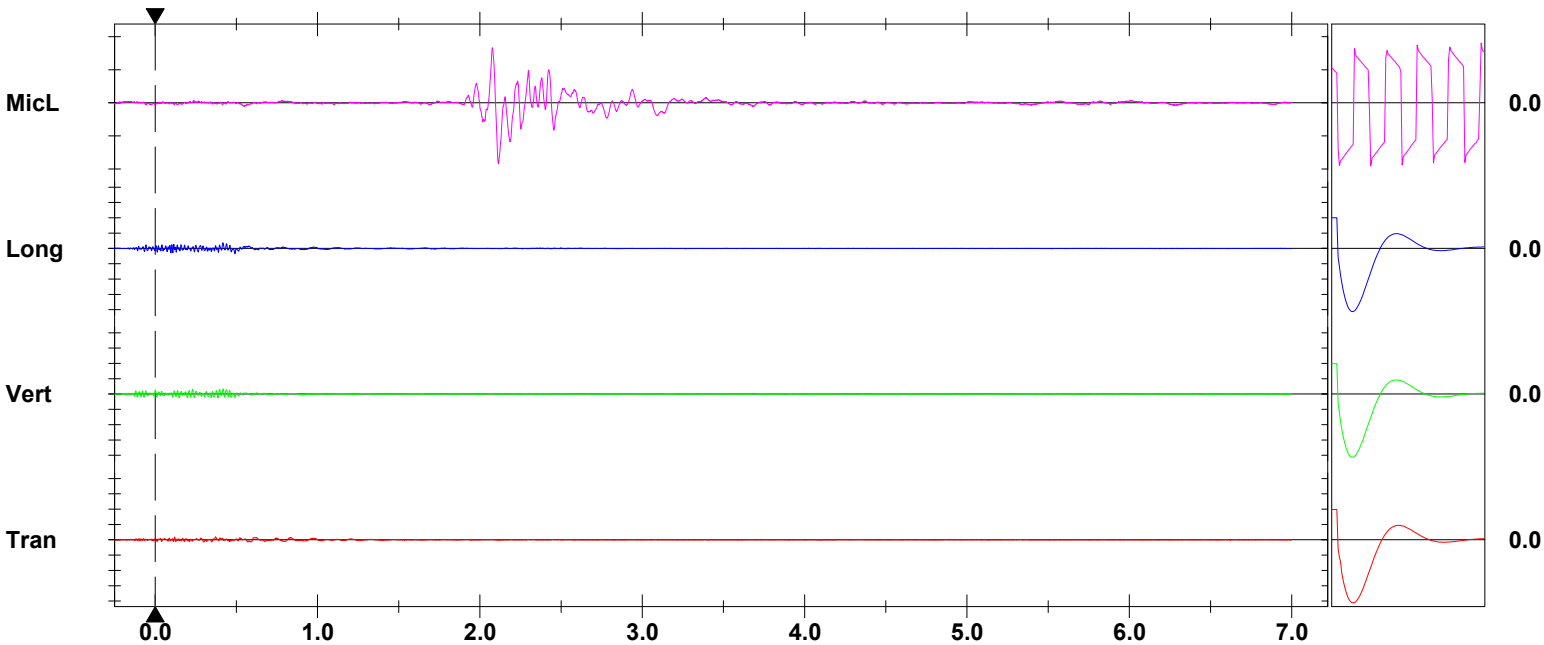
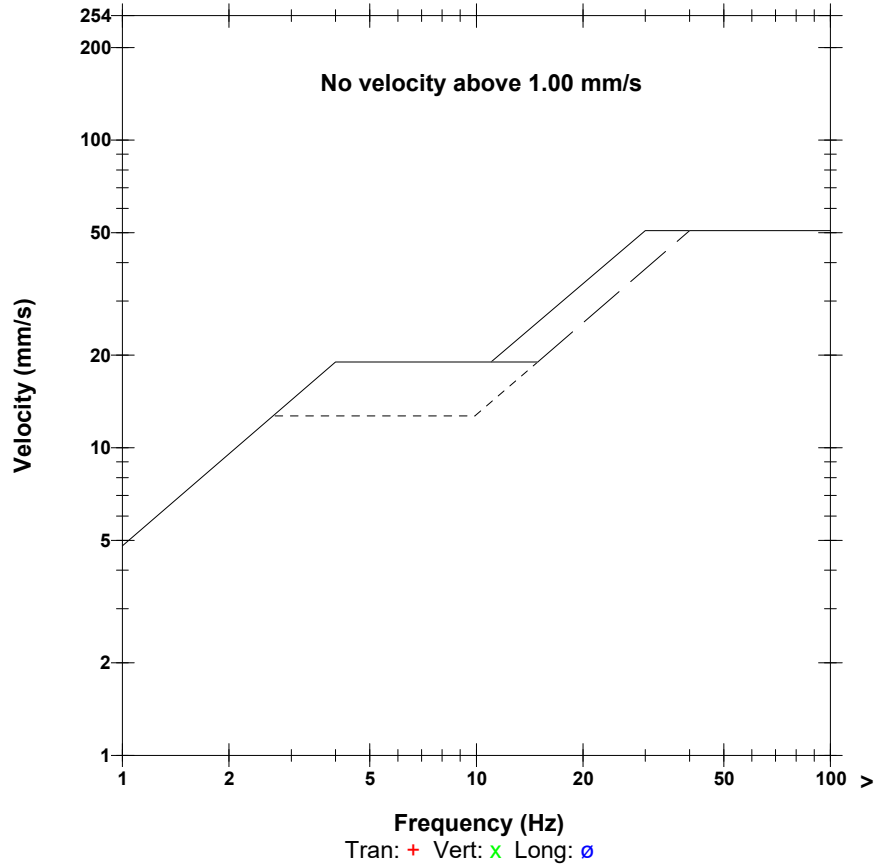
**Notes**

**Microphone** Linear Weighting  
**PSPL** 113.2 dB(L) 9.169 pa.(L) at 2.114 sec  
**ZC Freq** 9.7 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1442 mv )

	Tran	Vert	Long	
PPV	0.370	0.654	0.749	mm/s
PPV	42.37	47.31	48.49	dB
ZC Freq	57	43	39	Hz
Time (Rel. to Trig)	0.119	0.419	0.417	sec
Peak Acceleration	0.023	0.026	0.031	g
Peak Displacement	0.004	0.003	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.5	7.5	Hz
Overswing Ratio	4.4	4.5	4.3	

**Peak Vector Sum** 1.001 mm/s at 0.417 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

May 23, 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. 2023-14 – 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 14:03 on May 23, 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. 2023-14 – May 23, 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)	14:03	1,390 m S	< 0.5 mm/s	<120	Units were not triggered	
2. Civic No. 4126 Route 111 (PW-10)		1,010 m SE	< 0.5 mm/s	<120		
3. Civic No. 4150 Route 111 (PW-13)		895 m SE	< 0.5 mm/s	<120		
4. Civic No. 2447 Route 820 (PW-07)			987 m NE	1.33 mm/s @ 28 Hz	106	-
5. PW-03 - Cottage Route 820			623 m N	< 0.5 mm/s	<120	Unit was not triggered
6. Civic No. 2341 Route 820 (PW-05)			548 m N	1.97 mm/s @ 51 Hz	117	-
7. Civic No. 50 Myron Road (PW-15)			736 m NW	1.08 mm/s @ >100 Hz	116	-
8. Civic No. 86 Myron Road (PW-16)			564 m W	NA	NA	Memory full due to false triggers
9. Civic No. 220 Myron Road (PW-01)			1,340 m S	< 0.5 mm/s	<120	Unit was not triggered
10. Civic No. 2337 Route 820 (PW-04)			581 m N	1.87 mm/s @ 51 Hz	113	-
11. Civic No. 4140 Route 111 (PW-12)			950 m SE	< 0.5 mm/s	<120	Unit was not triggered
<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*

*May 23, 2023*

*Project No.: 234601.00 - Blast No.: 2023-14*

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>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</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°28'54" W 65°38'10" (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>10,163 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Clear</u>	<b>Air Temp.:</b>	<u>12°C</u>
<b>Est. Wind Speed :</b>	<u>≈10 km/h</u>	<b>Wind Direction:</b>	<u>N</u>
<b>Cloud Cover:</b>	<u>No</u>	<b>Precipitation:</b>	<u>No</u>

### BLAST DESIGN:

<b>Total No. Holes:</b>	<u>105</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>5.4 m – 6.3 m</u>	<b>Spacing:</b>	<u>10 ft x 10 ft</u>
<b>No. Holes per Delay:</b>	<u>2</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.: 69 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>4,503 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>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>548 m</u>
<b>Direction to the Nearest Structure:</b>	<u>North</u>
<b>Structure Type:</b>	<u>House</u>
<b>Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):</b>	<u>66.0</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>
<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>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #1

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 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,390 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 #21349</u>
Calibration Date:	<u>July 2, 2022</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>1,010 m Southeast</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>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</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>895 m Southeast</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 #4

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 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>987 m Northeast</u>
Transverse Particle Velocity:	<u>0.83 mm/s @ 32 Hz</u>
Vertical Particle Velocity:	<u>0.38 mm/s @ 37 Hz</u>
Longitudinal Particle Velocity:	<u>1.33 mm/s @ 28 Hz</u>
Peak Particle Velocity:	<u>1.33 mm/s @ 28 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>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</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>623 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 Minimate, Serial #5673</u>
Calibration Date:	<u>April 1, 2023</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>548 m North</u>
Transverse Particle Velocity:	<u>1.97 mm/s @ 51 Hz</u>
Vertical Particle Velocity:	<u>1.78 mm/s @ 47 Hz</u>
Longitudinal Particle Velocity:	<u>1.97 mm/s @ 51 Hz</u>
Peak Particle Velocity:	<u>1.97 mm/s @ 51 Hz</u>
Maximum Airblast:	<u>117 dB(L)</u>

## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5489</u>
Calibration Date:	<u>May 5, 2023</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>736 m Northwest</u>
Transverse Particle Velocity:	<u>1.02 mm/s @ 64 Hz</u>
Vertical Particle Velocity:	<u>1.08 mm/s @ &gt;100 Hz</u>
Longitudinal Particle Velocity:	<u>0.76 mm/s @ 57 Hz</u>
Peak Particle Velocity:	<u>1.08 mm/s @ &gt;100 Hz</u>
Maximum Airblast:	<u>116 dB(L)</u>

### Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #18193</u>
Calibration Date:	<u>May 12, 2023</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>564 m West</u>
Transverse Particle Velocity:	<u>N/A – Memory full due to false triggers</u>
Vertical Particle Velocity:	<u>N/A – Memory full due to false triggers</u>
Longitudinal Particle Velocity:	<u>N/A – Memory full due to false triggers</u>
Peak Particle Velocity:	<u>N/A – Memory full due to false triggers</u>
Maximum Airblast:	<u>N/A – Memory full due to false triggers</u>



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #9

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 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,340 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 #10

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #18187</u>
Calibration Date:	<u>May 12, 2023</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>581 m North</u>
Transverse Particle Velocity:	<u>1.50 mm/s @ 64 Hz</u>
Vertical Particle Velocity:	<u>1.62 mm/s @ 51 Hz</u>
Longitudinal Particle Velocity:	<u>1.87 mm/s @ 51 Hz</u>
Peak Particle Velocity:	<u>1.87 mm/s @ 51 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>May 23, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>14:03</u>
<b>Inspector:</b>	<u>Sarah Carroll</u>	<b>Blast No.:</b>	<u>2023-14</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #11

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 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>950 m Southeast</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:** 2023-14

Upham East Gypsum Quarry  
Upham, NB



**Date:** May 23, 2023  
**Project No.:** 234601.00



## Attachment C

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### *Blast Event Reports*

**Date/Time** Long at 14:02:10 May 23, 2023  
**Trigger Source** Geo: 1.000 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 4.0 sec at 1024 sps

**Serial Number** 5632 V 2.61 MiniMate  
**Battery Level** 5.8 Volts  
**Unit Calibration** November 16, 2022 by InstanTel  
**File Name** G632K1BQ.ZM0  
**Post Event Notes**  
 Location: Civic Number 2447 Route 820 (PW-07)  
 Blast No.: 2023-14  
 Project No: 234601.00

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: May 23, 2023 16:01:40 (V10.72.1)

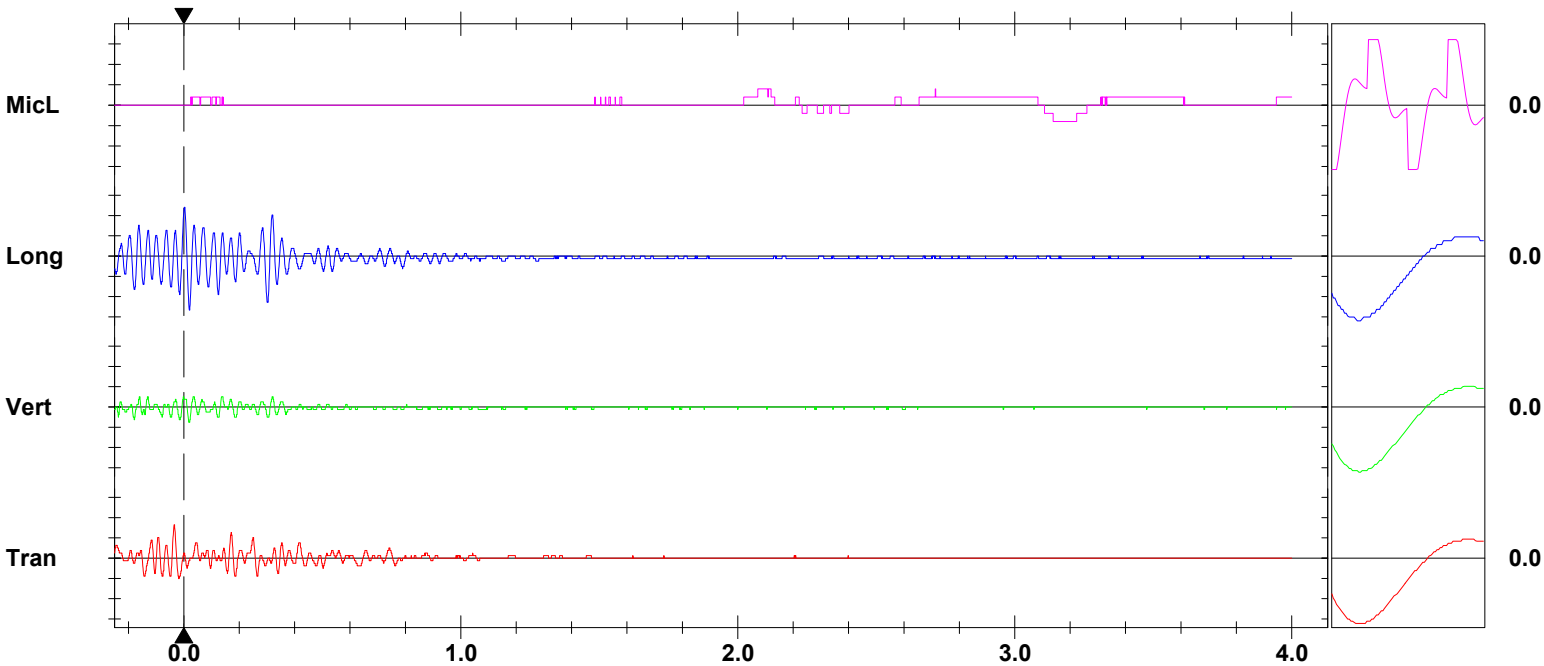
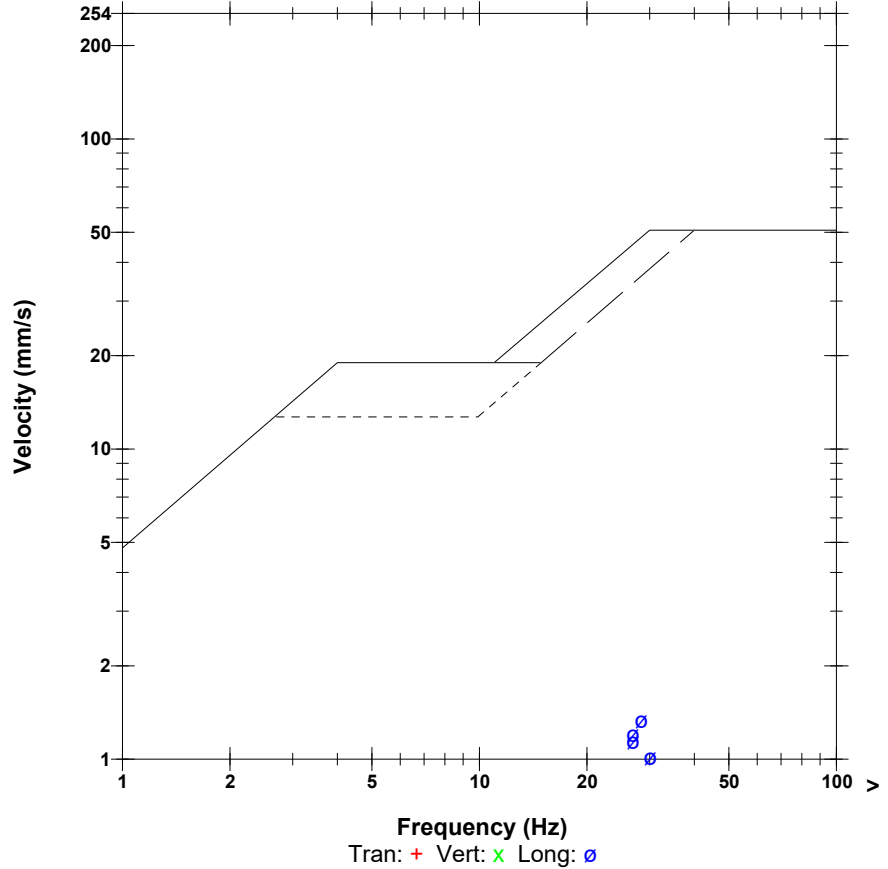
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 106.0 dB(L) 4.000 pa.(L) at 2.073 sec  
**ZC Freq** 4.0 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 299 mv )

	Tran	Vert	Long	
PPV	0.826	0.381	1.334	mm/s
PPV	49.33	42.62	53.50	dB
ZC Freq	32	37	28	Hz
Time (Rel. to Trig)	-0.033	0.019	0.021	sec
Peak Acceleration	0.020	0.013	0.027	g
Peak Displacement	0.004	0.001	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	8.2	8.3	Hz
Overswing Ratio	3.6	3.2	3.6	

**Peak Vector Sum** 1.381 mm/s at 0.021 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =** ▶ ◀

Sensor Check

**Date/Time** Vert at 14:03:06 May 23, 2023  
**Trigger Source** Geo: 1.000 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5673 V 2.61 MiniMate  
**Battery Level** 5.9 Volts  
**Unit Calibration** April 25, 2023 by Instatel  
**File Name** G673K1BR.160

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: May 23, 2023 16:06:15 (V10.72.1)

**Post Event Notes**  
 Location: Civic Number 2341 Route 820 (PW-05)  
 Blast No.: 2023-14  
 Project No: 234601.00

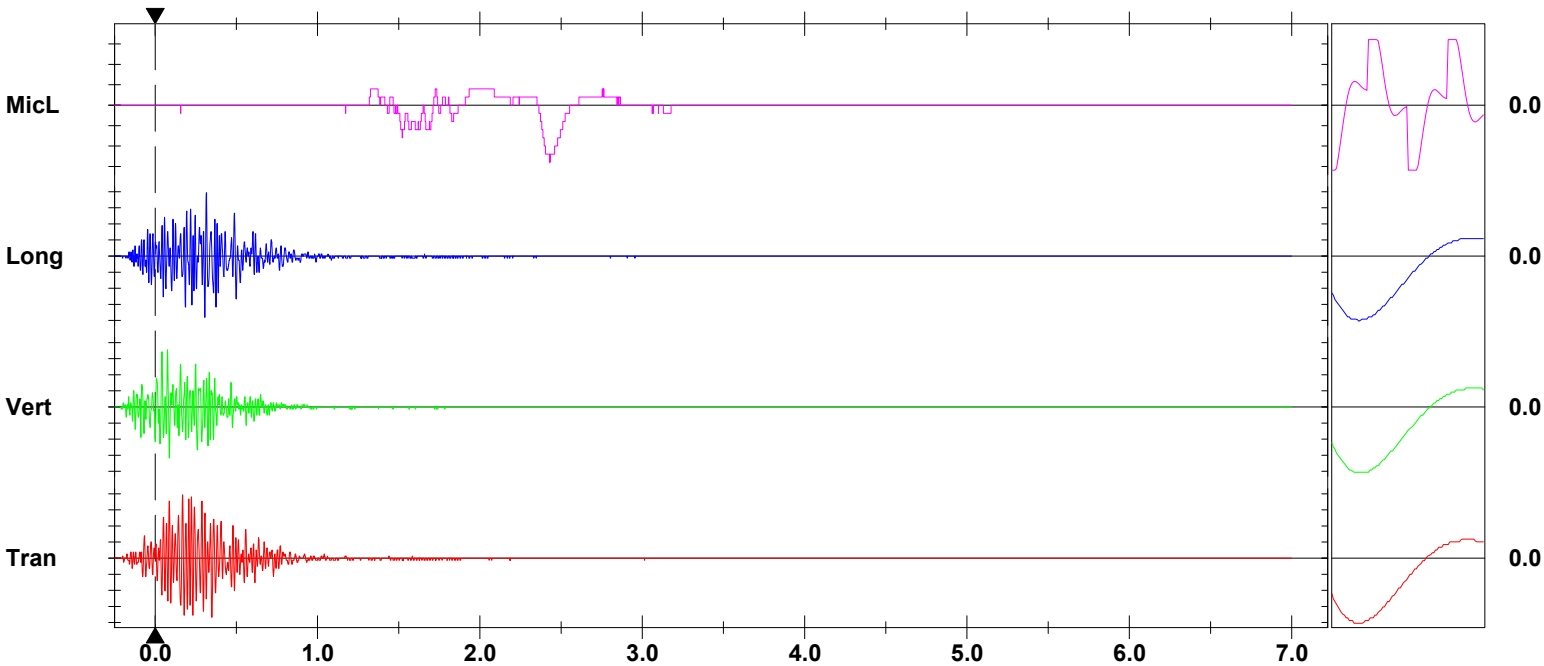
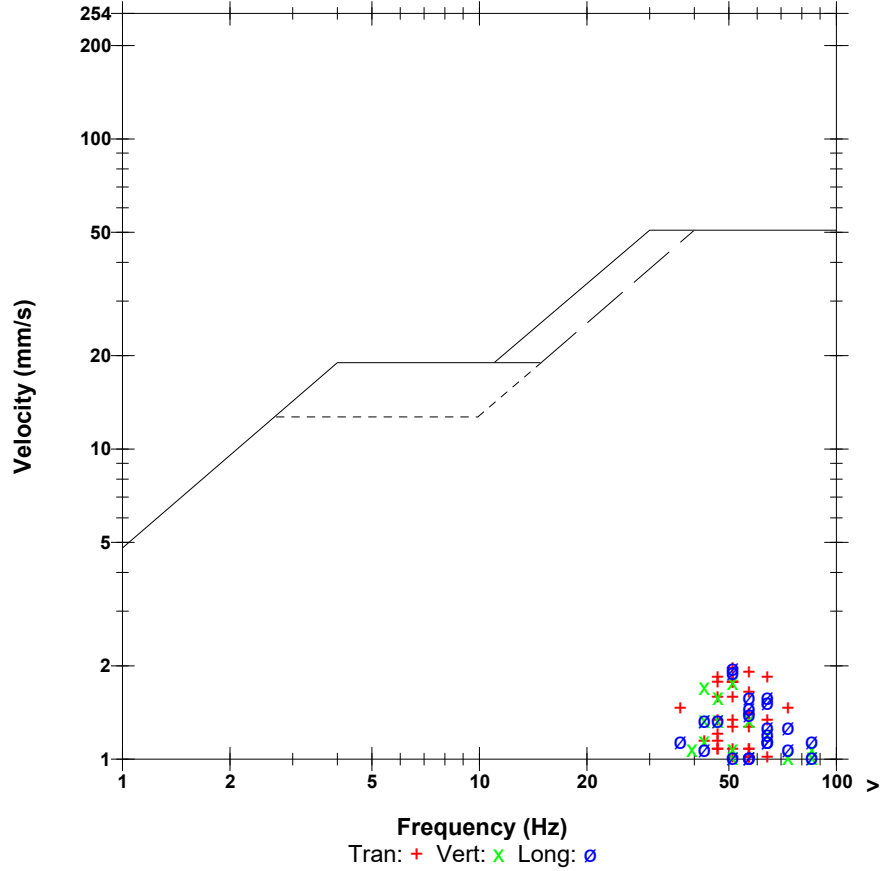
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 116.9 dB(L) 14.00 pa.(L) at 2.431 sec  
**ZC Freq** 3.0 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 307 mv )

	Tran	Vert	Long	
PPV	1.969	1.778	1.969	mm/s
PPV	56.88	56.00	56.88	dB
ZC Freq	51	47	51	Hz
Time (Rel. to Trig)	0.170	0.077	0.315	sec
Peak Acceleration	0.073	0.060	0.066	g
Peak Displacement	0.007	0.006	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.2	7.8	8.0	Hz
Overswing Ratio	3.8	3.6	3.8	

**Peak Vector Sum** 2.445 mm/s at 0.307 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** Vert at 14:03:56 May 23, 2023  
**Trigger Source** Geo: 1.000 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 5.0 sec at 1024 sps

**Serial Number** 5489 V 2.61 MiniMate  
**Battery Level** 5.9 Volts  
**Unit Calibration** May 5, 2023 by InstanTel  
**File Name** G489K1BR.2K0

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: May 23, 2023 16:10:19 (V10.72.1)

**Post Event Notes**  
 Location: Civic Number 50 Myron Road (PW-15)  
 Blast No.: 2023-14  
 Project No: 234601.00

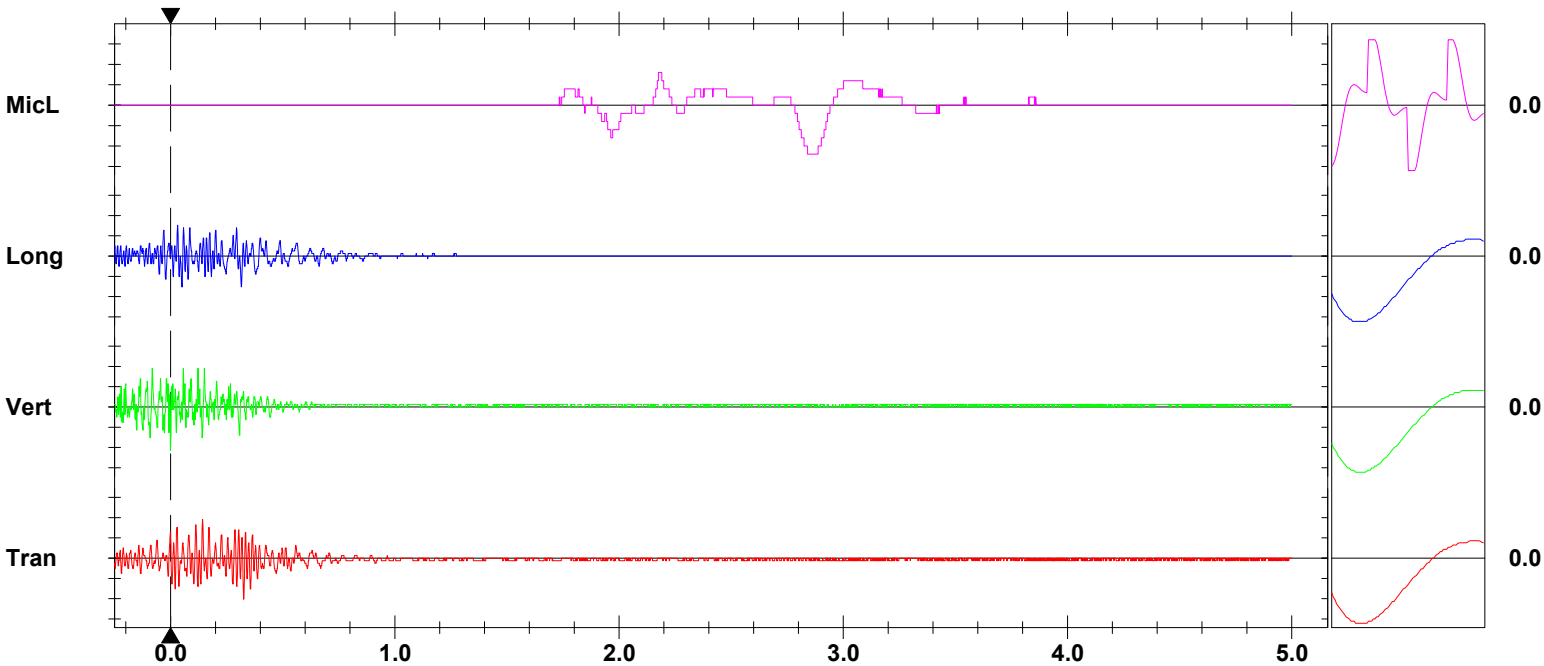
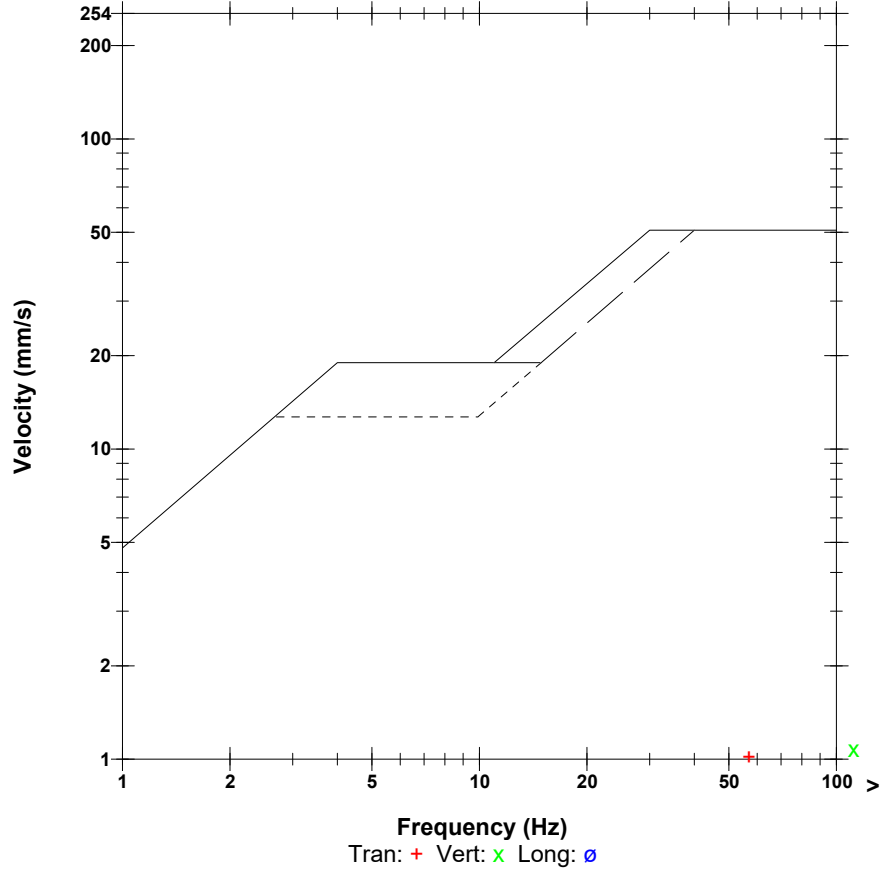
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 115.6 dB(L) 12.00 pa.(L) at 2.842 sec  
**ZC Freq** 3.0 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 284 mv )

	Tran	Vert	Long	
PPV	1.016	1.080	0.762	mm/s
PPV	51.14	51.66	48.64	dB
ZC Freq	64	>100	57	Hz
Time (Rel. to Trig)	0.327	0.000	0.032	sec
Peak Acceleration	0.040	0.060	0.033	g
Peak Displacement	0.003	0.003	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.7	Hz
Overswing Ratio	3.8	4.0	3.9	

**Peak Vector Sum** 1.254 mm/s at 0.000 sec

**USBM RI8507 And OSMRE**



**Time Scale:** 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div  
**Trigger =**

Sensor Check



**Date/Time** Tran at 13:03:57 May 23, 2023  
**Trigger Source** Geo: 1.000 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** 3.8 Volts  
**Unit Calibration** May 12, 2023 by InstanTel  
**File Name** \_\_TEMP.EVT

**Notes**

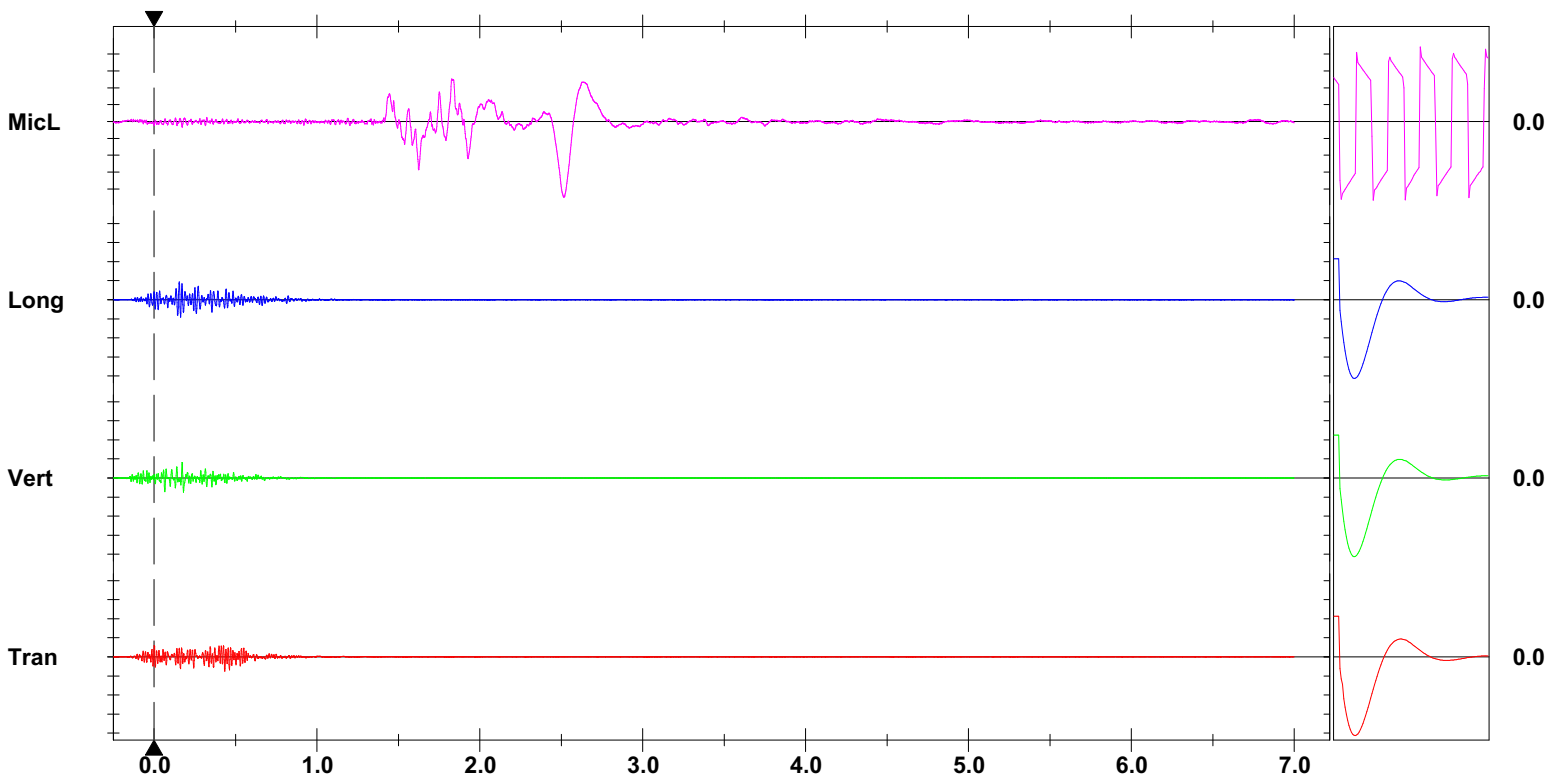
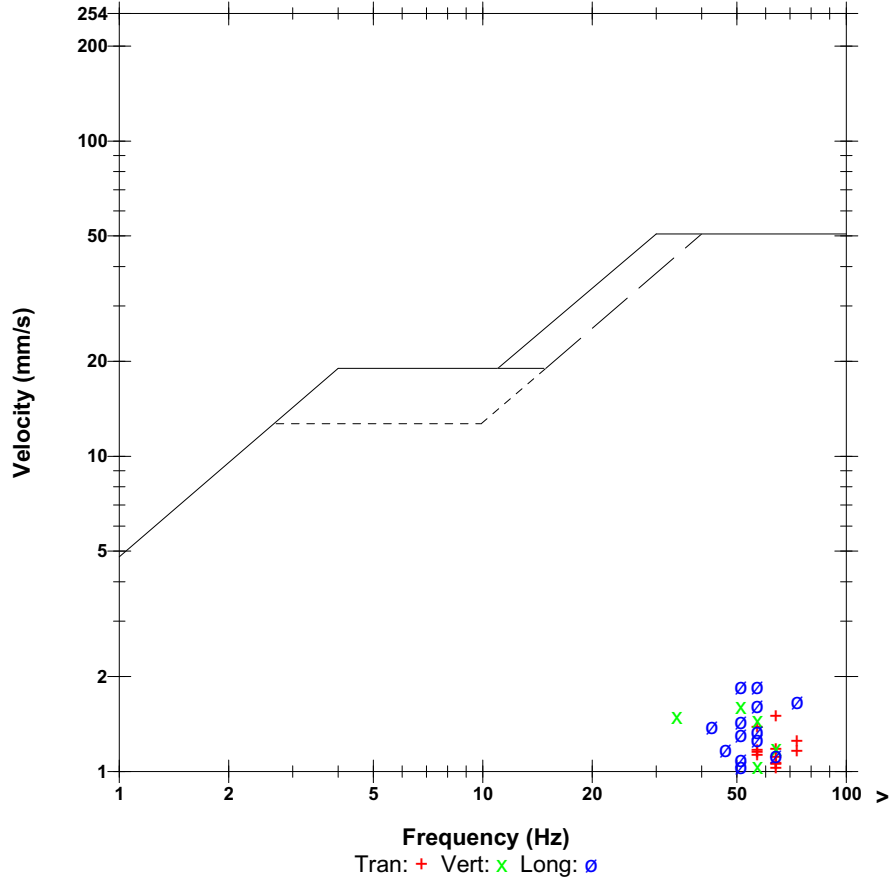
Location:  
 Client:  
 User Name:  
 General:

**Microphone** Linear Weighting  
**PSPL** 113.0 dB(L) at 2.516 sec  
**ZC Freq** 3.8 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1374 mv )

	Tran	Vert	Long	
PPV	1.498	1.616	1.868	mm/s
ZC Freq	64	51	51	Hz
Time (Rel. to Trig)	0.435	0.172	0.154	sec
Peak Acceleration	0.096	0.090	0.137	g
Peak Displacement	0.004	0.005	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.4	4.2	4.2	

Peak Vector Sum 2.368 mm/s at 0.171 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

May 26, 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. 2023-15 – 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 13:36 on May 25, 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. 2023-15 – May 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)	13:36	1,280 m S	0.51 mm/s @ 47 Hz	112	-
2. Civic No. 4126 Route 111 (PW-10)		858 m S	< 0.5 mm/s	<120	Unit was not triggered
3. Civic No. 4150 Route 111 (PW-13)		697 m SE	1.88 mm/s @ 39 Hz	110	-
4. Civic No. 2447 Route 820 (PW-07)		866 m NE	1.78 mm/s @ 19 Hz	111	-
5. PW-03 - Cottage Route 820		670 m N	< 0.5 mm/s	<120	Units were not triggered
6. Civic No. 2341 Route 820 (PW-05)		687 m NW	< 0.5 mm/s	<120	
7. Civic No. 50 Myron Road (PW-15)		965 m NW	1.78 mm/s @ 73 Hz	100	-
8. Civic No. 86 Myron Road (PW-16)		802 m W	0.97 mm/s @ 9 Hz	110	-
9. Civic No. 220 Myron Road (PW-01)		1,330 m SW	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 2337 Route 820 (PW-04)		745 m NW	< 0.5 mm/s	<120	
11. Civic No. 4140 Route 111 (PW-12)		774 m S	1.27 mm/s @ 51 Hz	116	-
<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*

*May 26, 2023*

*Project No.: 234601.00 – Blast No.: 2023-15*

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".

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>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</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°28'52.4" W 65°37'57.9" (see attached sketch)</u>		
<b>Type of Rock:</b>	<u>Anhydrate/Gypsum</u>	<b>Est. Vol. or Tonnage:</b>	<u>10,310 tonnes</u>
<b>Weather at time of Blast:</b>	<u>Cloudy</u>	<b>Air Temp.:</b>	<u>12°C</u>
<b>Est. Wind Speed :</b>	<u>≈ 15 km/h</u>	<b>Wind Direction:</b>	<u>S</u>
<b>Cloud Cover:</b>	<u>≈ 80%</u>	<b>Precipitation:</b>	<u>No</u>

### BLAST DESIGN:

<b>Total No. Holes:</b>	<u>100</u>	<b>Hole Diameter:</b>	<u>4.5"</u>
<b>Average Depth:</b>	<u>6.2 m – 10.0 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 ms</u>
<b>Initiation Method:</b>	<u>Non-Electric</u>		
<b>Weight of Explosives per Delay:</b>	<u>Max.: 230 kg</u>		
<b>Type and weight of Explosives for Blast:</b>	<u>6,161 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>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### BLAST MONITORING

<b>Distance to the Nearest Structure:</b>	<u>670 m</u>
<b>Direction to the Nearest Structure:</b>	<u>N</u>
<b>Structure Type:</b>	<u>Cottage</u>
<b>Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):</b>	<u>44.2</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>
<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>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #1

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 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,280 m South</u>
Transverse Particle Velocity:	<u>0.25 mm/s @ 43 Hz</u>
Vertical Particle Velocity:	<u>0.38 mm/s @ 47 Hz</u>
Longitudinal Particle Velocity:	<u>0.51 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>0.51 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>

### Data Collection – Seismometer #2

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 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>858 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>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #20204</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>697 m Southeast</u>
Transverse Particle Velocity:	<u>1.88 mm/s @ 39 Hz</u>
Vertical Particle Velocity:	<u>1.29 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.85 mm/s @ 21 Hz</u>
Peak Particle Velocity:	<u>1.88 mm/s @ 39 Hz</u>
Maximum Airblast:	<u>110 dB(L)</u>

### Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #18193</u>
Calibration Date:	<u>May 12, 2023</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>866 m Northeast</u>
Transverse Particle Velocity:	<u>1.78 mm/s @ 19 Hz</u>
Vertical Particle Velocity:	<u>0.45 mm/s @ 15 Hz</u>
Longitudinal Particle Velocity:	<u>1.14 mm/s @ 20 Hz</u>
Peak Particle Velocity:	<u>1.78 mm/s @ 19 Hz</u>
Maximum Airblast:	<u>111 dB(L)</u>



## BLAST RECORD

<b>Project Name:</b>	<u>Upham Gypsum Quarry</u>	<b>Date of Blast:</b>	<u>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Minimate, Serial #5673</u>
Calibration Date:	<u>April 25, 2023</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>670 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 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>687 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>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</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>965 m Northwest</u>
Transverse Particle Velocity:	<u>1.52 mm/s @ 73 Hz</u>
Vertical Particle Velocity:	<u>0.64 mm/s @ 85 Hz</u>
Longitudinal Particle Velocity:	<u>1.78 mm/s @ 73 Hz</u>
Peak Particle Velocity:	<u>1.78 mm/s @ 73 Hz</u>
Maximum Airblast:	<u>100 dB(L)</u>

### Data Collection – Seismometer #8

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 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>802 m West</u>
Transverse Particle Velocity:	<u>0.79 mm/s @ 7 Hz</u>
Vertical Particle Velocity:	<u>0.62 mm/s @ 16 Hz</u>
Longitudinal Particle Velocity:	<u>0.97 mm/s @ 9 Hz</u>
Peak Particle Velocity:	<u>0.97 mm/s @ 9 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>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Micromate, Serial #5372</u>
Calibration Date:	<u>February 28, 2023</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,330 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 #18187</u>
Calibration Date:	<u>May 12, 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>May 25, 2023</u>
<b>Project No.:</b>	<u>234601.00</u>	<b>Time of Blast:</b>	<u>13:36</u>
<b>Inspector:</b>	<u>S. Carroll</u>	<b>Blast No.:</b>	<u>2023-15</u>
<b>Client:</b>	<u>Hammond River Holdings</u>		

### Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>InstanTel Minimate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>774 m South</u>
Transverse Particle Velocity:	<u>0.51 mm/s @ 57 Hz</u>
Vertical Particle Velocity:	<u>0.76 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>1.27 mm/s @ 51 Hz</u>
Peak Particle Velocity:	<u>1.27 mm/s @ 51 Hz</u>
Maximum Airblast:	<u>116 dB(L)</u>

## Attachment B

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### *Blast and Seismograph Location Plan*

# Blast and Seismograph Location Plan

**Blast No:** 2023-15

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay



**Date:** May 25, 2023  
**Project No.:** 234601.00



## Attachment C

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### *Blast Event Reports*

**Date/Time** Long at 13:36:14 May 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** 6.1 Volts  
**Unit Calibration** January 16, 2023 by InstanTel  
**File Name** G487K1FF.4E0  
**Post Event Notes**  
 Location: Civic Number 4079 Route 111 (PW-09)  
 Blast No.: 2023-15  
 Project No: 234601.00

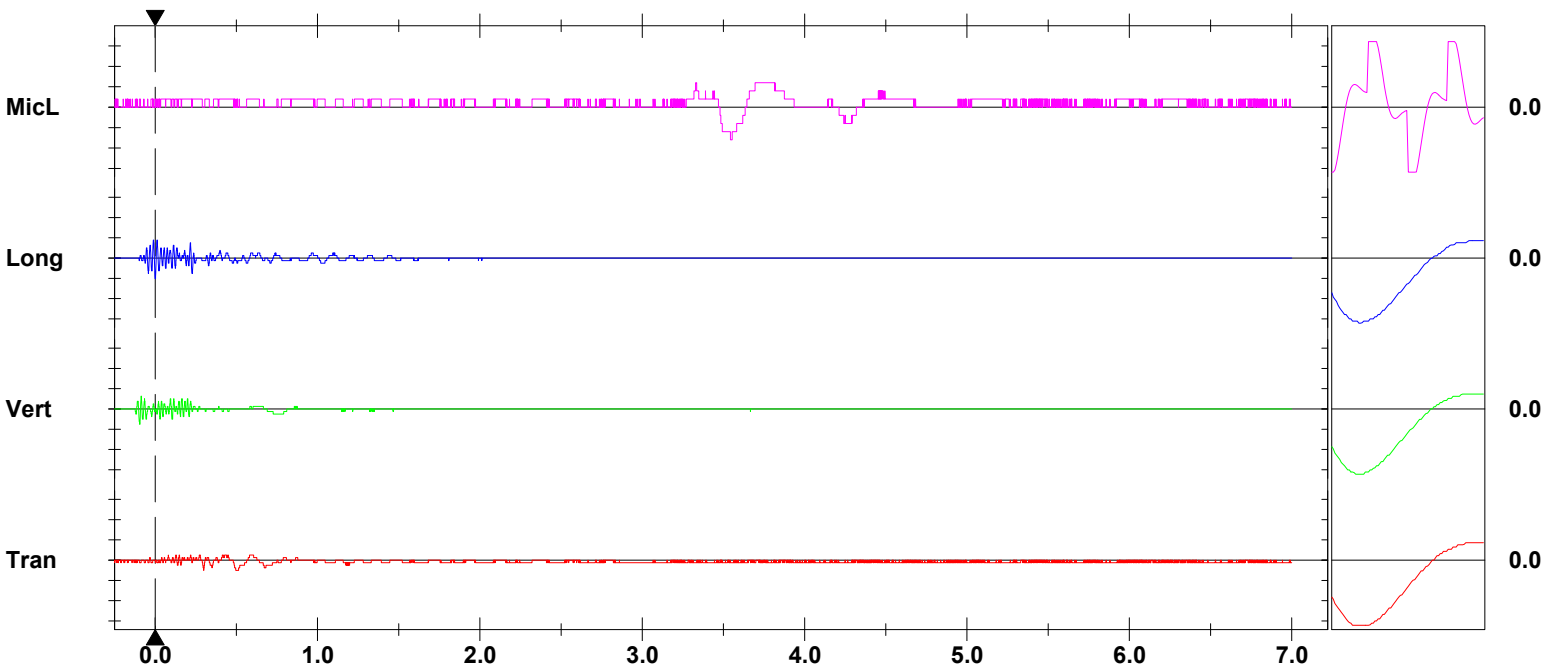
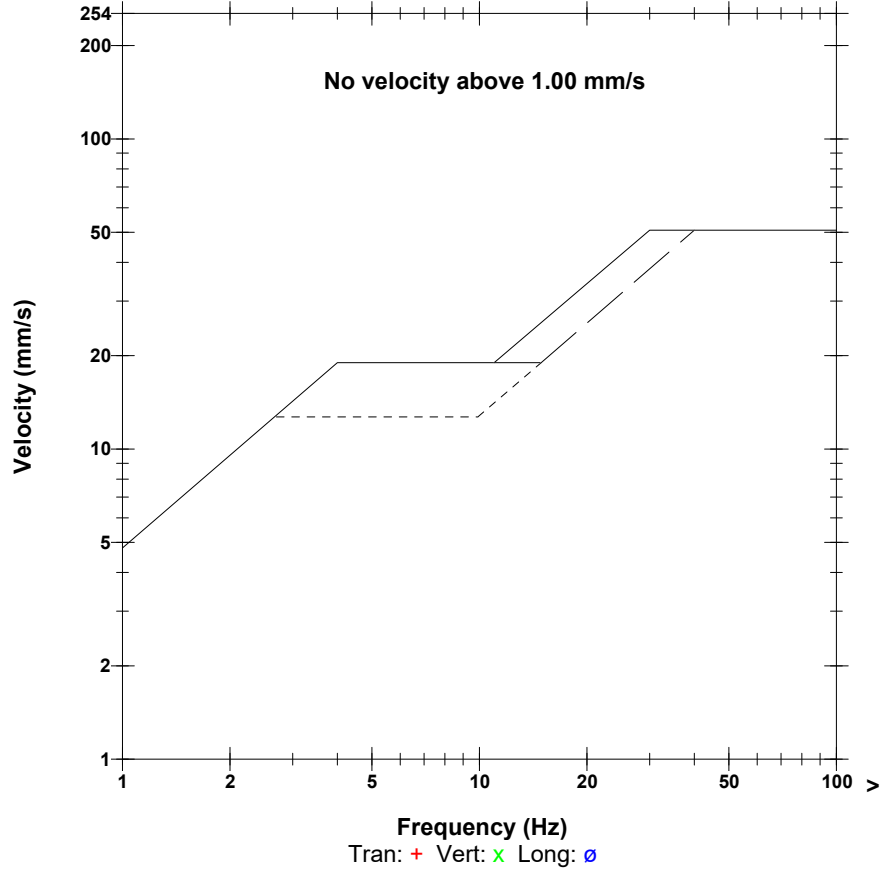
**Notes**  
 Location: \*  
 Client: TUG  
 User Name: U  
 Converted: May 25, 2023 15:37:53 (V10.72.1)

**Microphone** Linear Weighting  
**PSPL** 112.0 dB(L) 8.000 pa.(L) at 3.544 sec  
**ZC Freq** 3.0 Hz  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 288 mv)

	Tran	Vert	Long	
PPV	0.254	0.381	0.508	mm/s
PPV	39.10	42.62	45.12	dB
ZC Freq	43	47	47	Hz
Time (Rel. to Trig)	0.299	-0.094	0.002	sec
Peak Acceleration	0.007	0.013	0.013	g
Peak Displacement	0.002	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.7	Hz
Overswing Ratio	3.4	4.2	3.8	

**Peak Vector Sum** 0.508 mm/s at 0.001 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** Vert at 13:36:09 May 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/GAYTON.mmb

**Serial Number** UM20204 V 10-90GC Micromate ISEE  
**Battery Level** 3.6 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20204\_20230525133609.IDFW

**Post Event Notes**

Location: Civic Number 4150 Route 111 (PW-13)  
 Blast No.: 2023-15  
 Project No: 234601.00

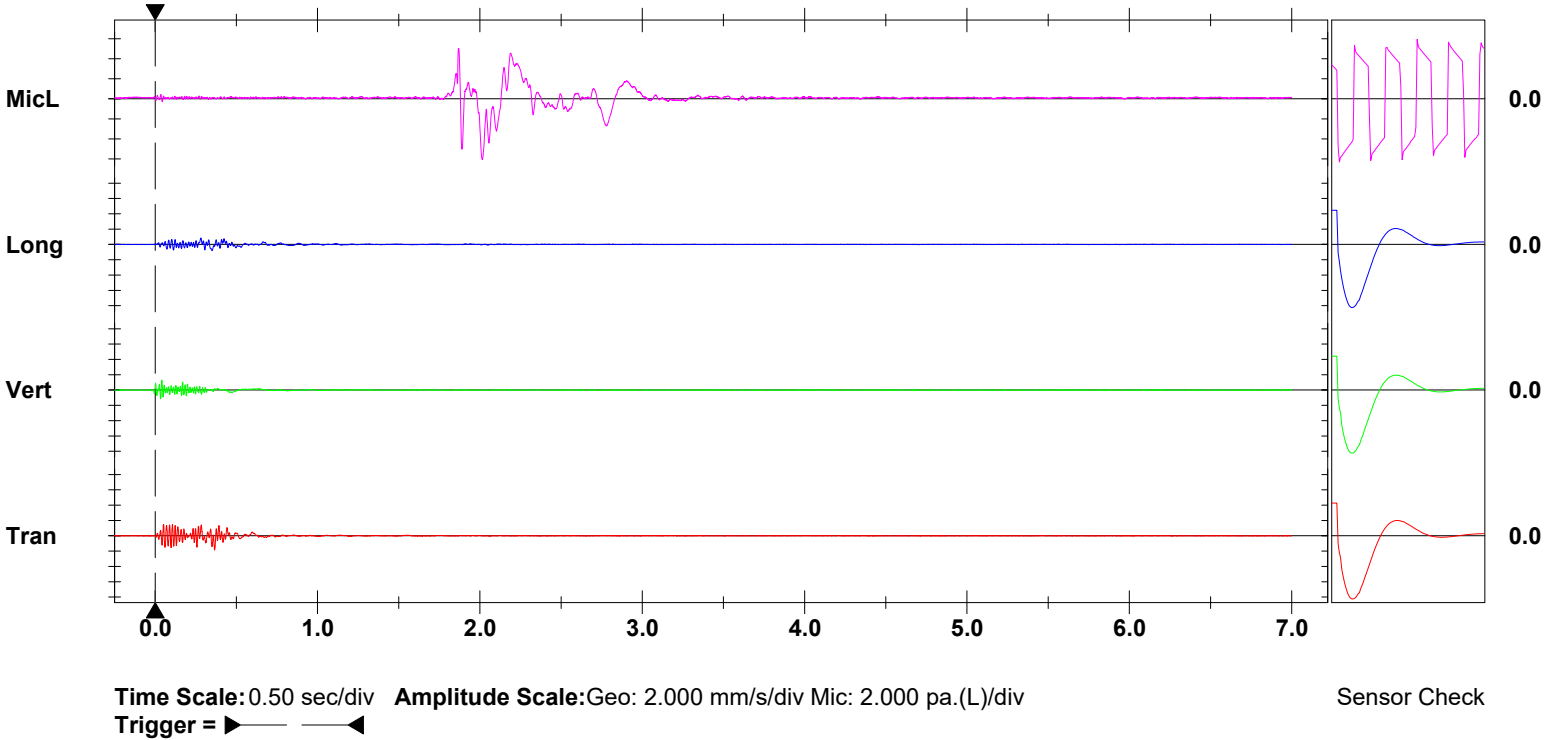
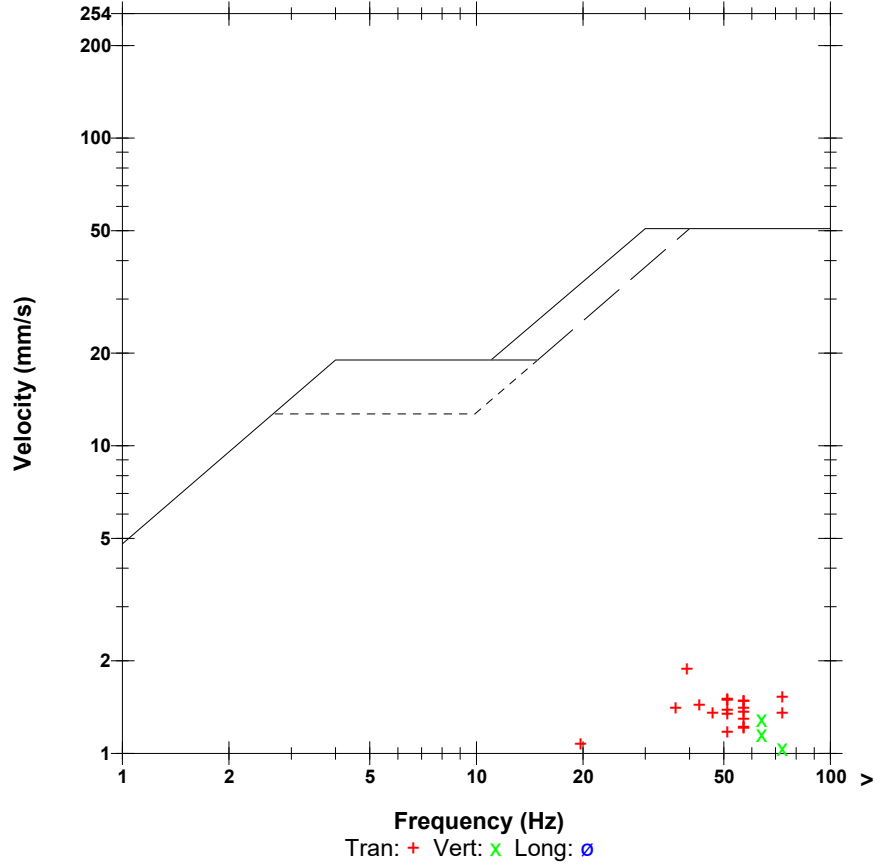
**Notes**

**Microphone** Linear Weighting  
**PSPL** 109.6 dB(L) 6.066 pa.(L) at 2.015 sec  
**ZC Freq** 3.4 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1434 mv )

	Tran	Vert	Long	
PPV	1.876	1.293	0.851	mm/s
PPV	56.46	53.23	49.60	dB
ZC Freq	39	64	21	Hz
Time (Rel. to Trig)	0.366	0.041	0.281	sec
Peak Acceleration	0.104	0.080	0.037	g
Peak Displacement	0.007	0.008	0.008	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.7	Hz
Overswing Ratio	4.1	4.2	4.0	

**Peak Vector Sum** 1.899 mm/s at 0.366 sec

**USBM RI8507 And OSMRE**



Sensor Check

**Date/Time** Long at 13:36:08 May 25, 2023  
**Trigger Source** Geo: 1.000 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** UM18193 V 10-90GC Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** May 12, 2023 by InstanTel  
**File Name** UM18193\_20230525133608.IDFW

### Post Event Notes

Location: Civic Number 2447 Route 820 (PW-07)  
 Blast No.: 2023-15  
 Project No: 234601.00

### Notes

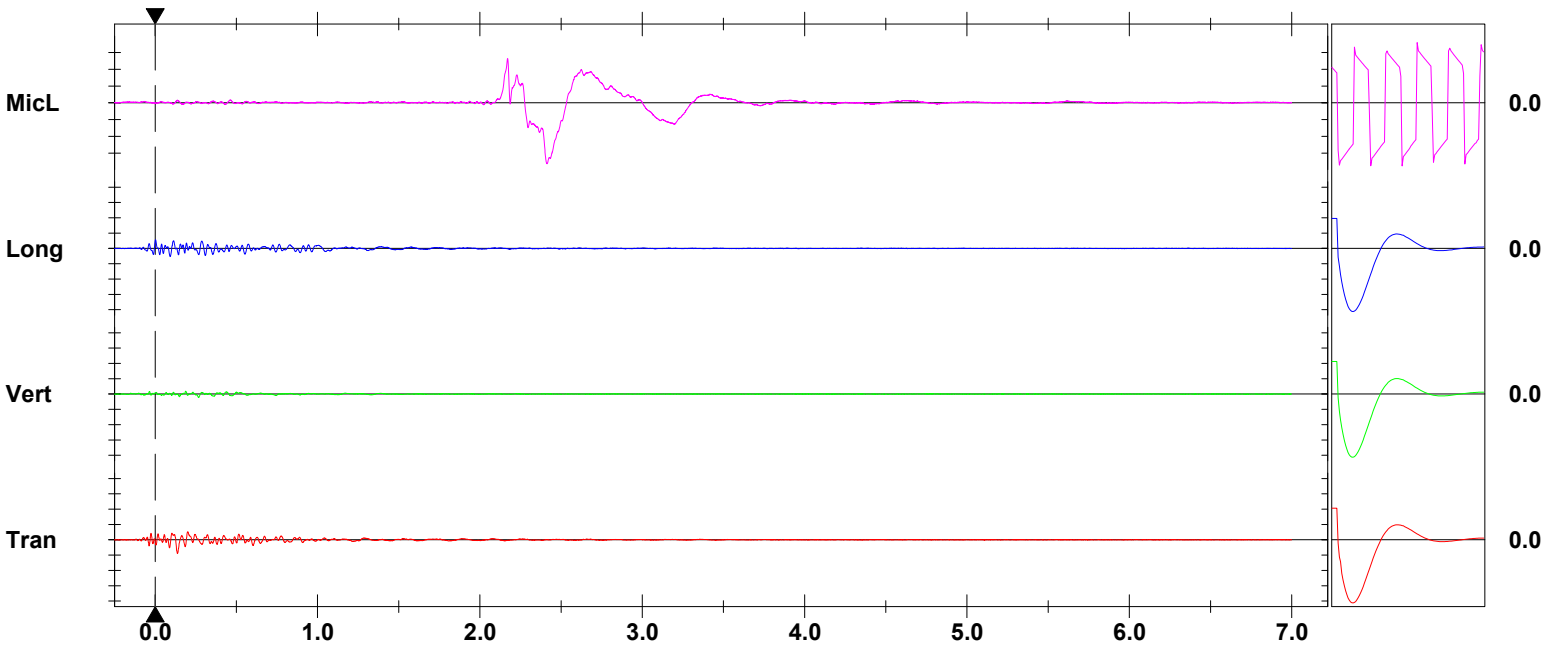
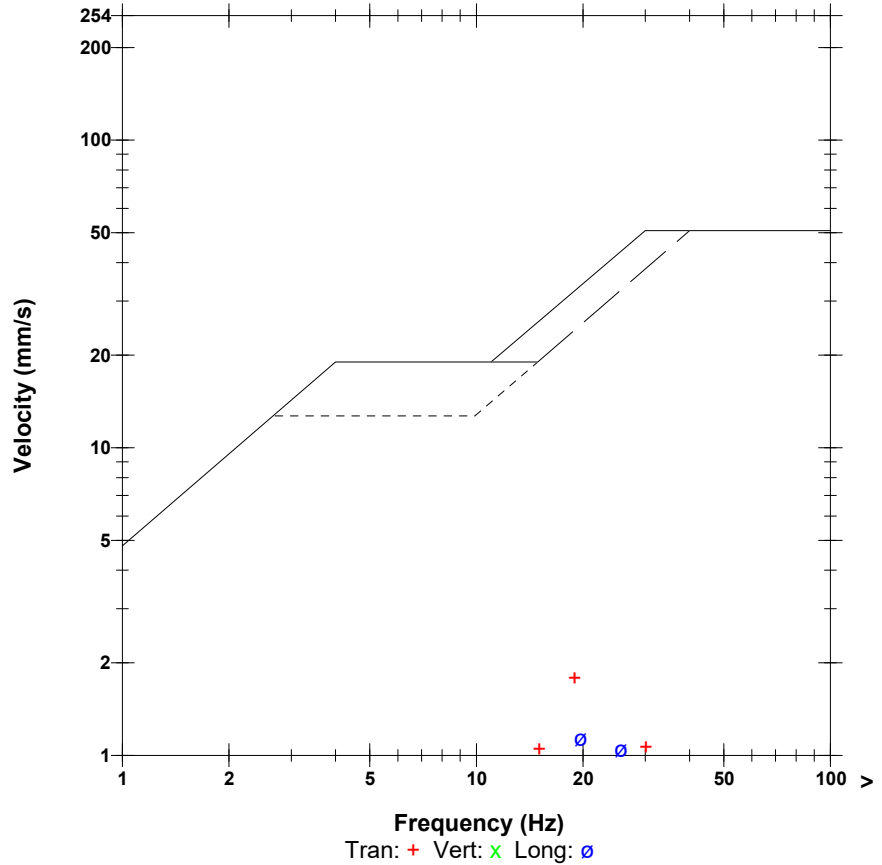
Location:  
 Client:  
 User Name:  
 General:

**Microphone** Linear Weighting  
**PSPL** 111.2 dB(L) 7.246 pa.(L) at 2.413 sec  
**ZC Freq** 1.9 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1403 mv )

	Tran	Vert	Long	
PPV	1.781	0.449	1.135	mm/s
PPV	56.01	44.05	52.10	dB
ZC Freq	19	15	20	Hz
Time (Rel. to Trig)	0.137	0.269	0.002	sec
Peak Acceleration	0.044	0.014	0.030	g
Peak Displacement	0.014	0.004	0.008	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.2	4.1	4.4	

**Peak Vector Sum** 1.812 mm/s at 0.139 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** Tran at 13:37:01 May 25, 2023  
**Trigger Source** Geo: 1.000 mm/s, Mic: 119.6 dB(L)  
**Range** Geo: 127.0 mm/s  
**Record Time** 7.0 sec at 1024 sps

**Serial Number** 5676 V 2.61 MiniMate  
**Battery Level** 6.4 Volts  
**Unit Calibration** March 8, 2023 by InstanTel  
**File Name** G676K1FF.5P0

**Notes**  
 Location:  
 Client:  
 User Name:  
 Converted: May 25, 2023 15:55:58 (V10.72.1)

**Post Event Notes**  
 Location: Civic Number 50 Myron Road (PW-15)  
 Blast No.: 2023-15  
 Project No: 234601.00

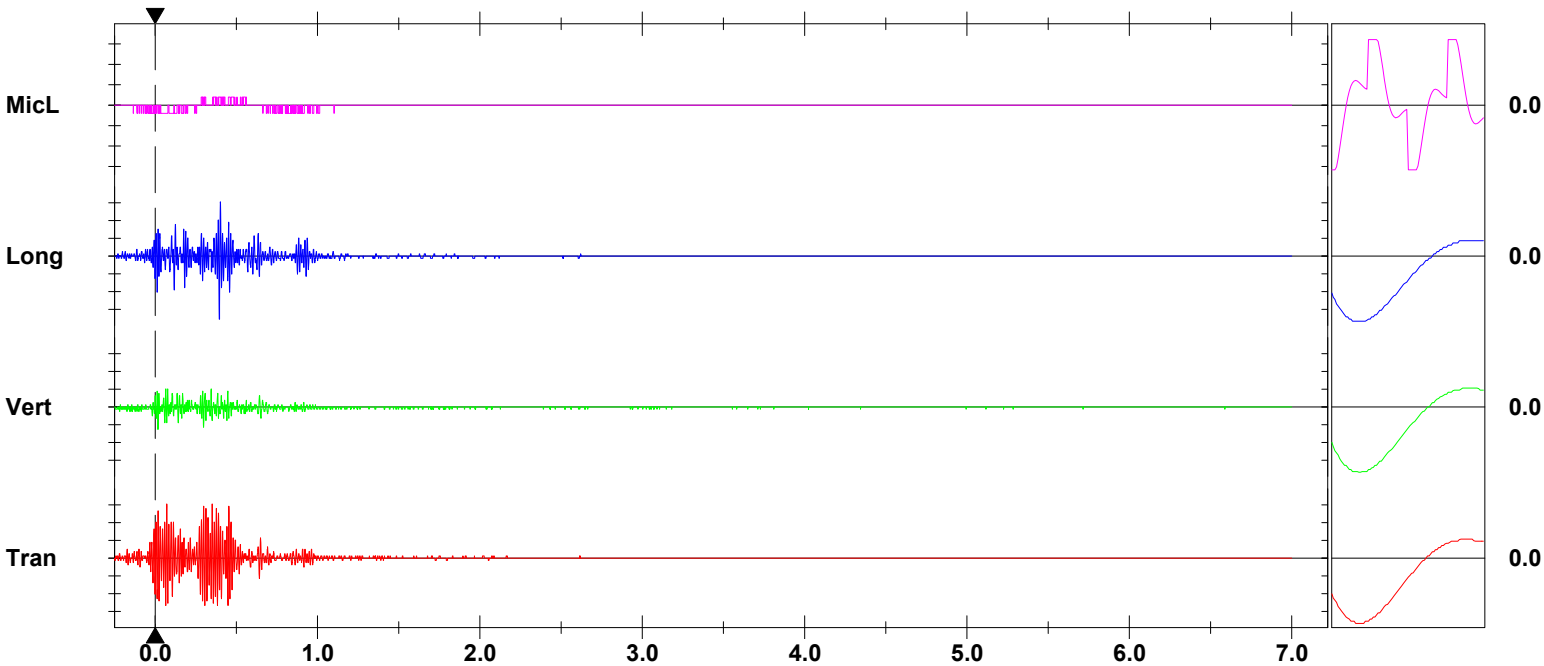
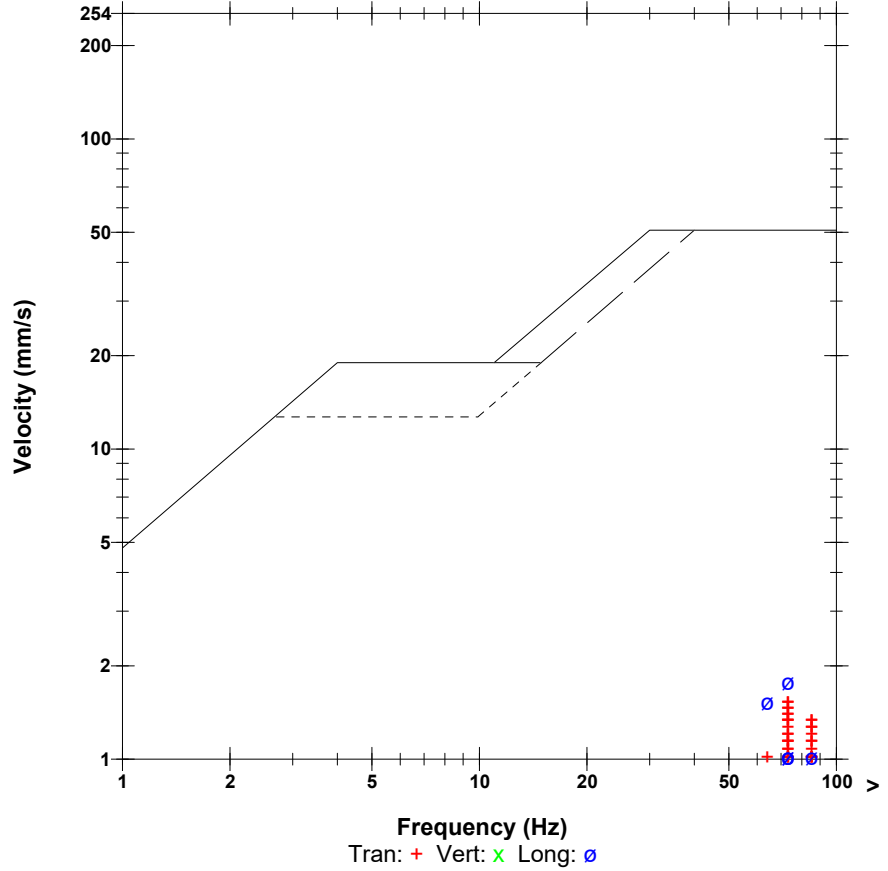
**Extended Notes**

**Microphone** Linear Weighting  
**PSPL** 100.0 dB(L) 2.000 pa.(L) at 0.002 sec  
**ZC Freq** N/A  
**Channel Test** Passed (Freq = 20.0 Hz Amp = 301 mv )

	Tran	Vert	Long	
PPV	1.524	0.635	1.778	mm/s
PPV	54.66	47.06	56.00	dB
ZC Freq	73	85	73	Hz
Time (Rel. to Trig)	0.072	0.018	0.396	sec
Peak Acceleration	0.073	0.033	0.080	g
Peak Displacement	0.003	0.001	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.2	8.0	7.7	Hz
Overswing Ratio	3.6	3.6	4.2	

**Peak Vector Sum** 1.984 mm/s at 0.396 sec  
 N/A: Not Applicable

**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** Vert at 13:36:07 May 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/GAYTON.mmb

**Serial Number** UM20206 V 10-90GC Micromate ISEE  
**Battery Level** 3.8 Volts  
**Unit Calibration** May 31, 2022 by InstanTel  
**File Name** UM20206\_20230525133607.IDFW

### Post Event Notes

Location: Civic Number 86 Myron Road (PW-16)  
 Blast No.: 2023-15  
 Project No: 234601.00

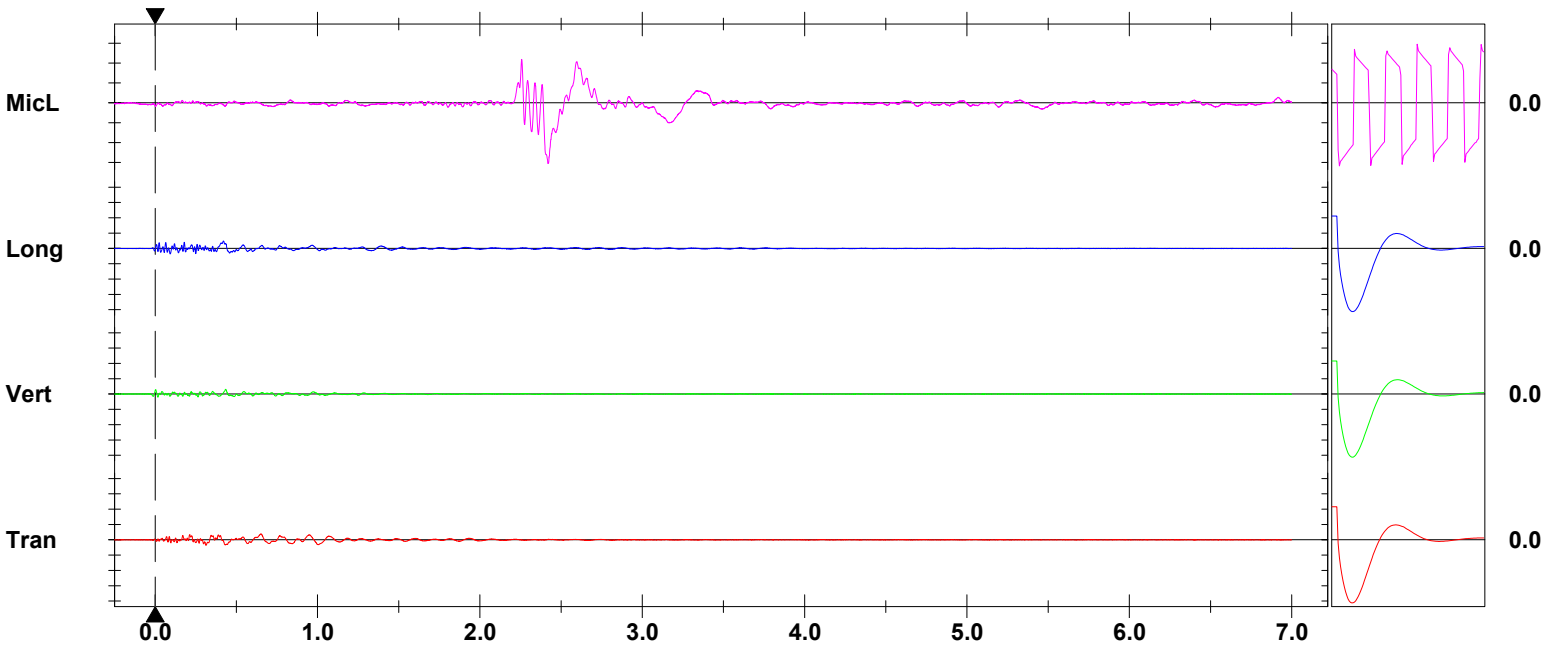
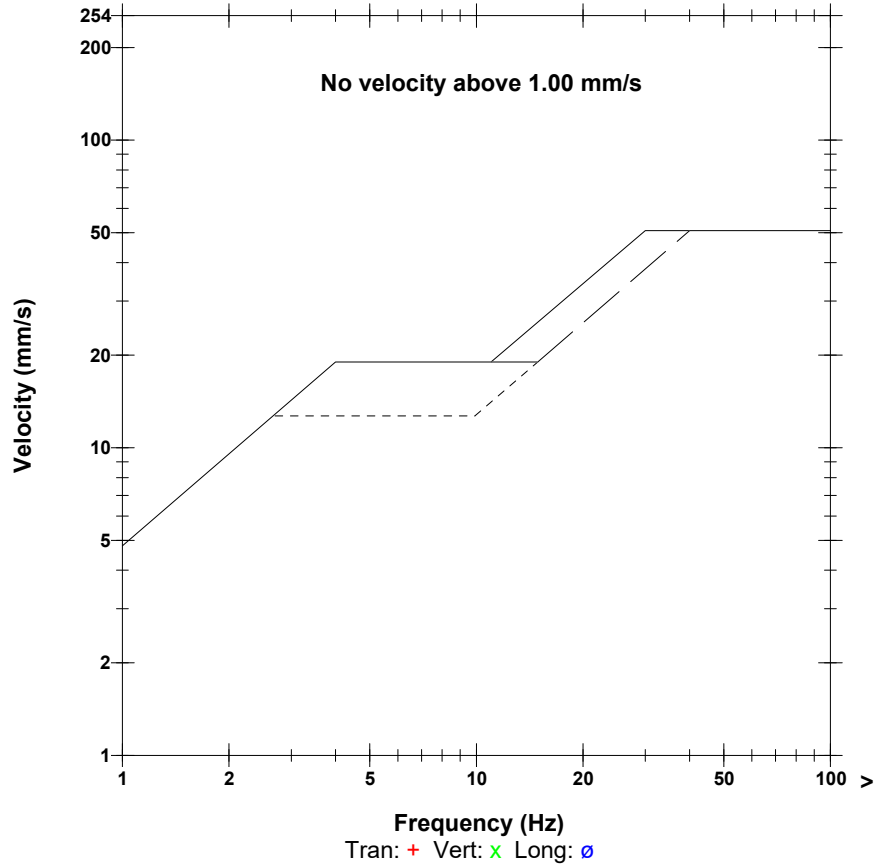
### Notes

**Microphone** Linear Weighting  
**PSPL** 109.7 dB(L) 6.113 pa.(L) at 2.420 sec  
**ZC Freq** 3.9 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 1457 mv )

	Tran	Vert	Long	
PPV	0.788	0.615	0.969	mm/s
PPV	48.93	46.77	50.73	dB
ZC Freq	7.1	16	9.0	Hz
Time (Rel. to Trig)	0.652	0.434	0.419	sec
Peak Acceleration	0.030	0.016	0.042	g
Peak Displacement	0.014	0.005	0.015	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** 1.102 mm/s at 0.434 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** Vert at 13:36:06 May 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** BE21349 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.4 Volts  
**Unit Calibration** July 20, 2022 by InstanTel  
**File Name** W349K1DK.G60

**Notes**

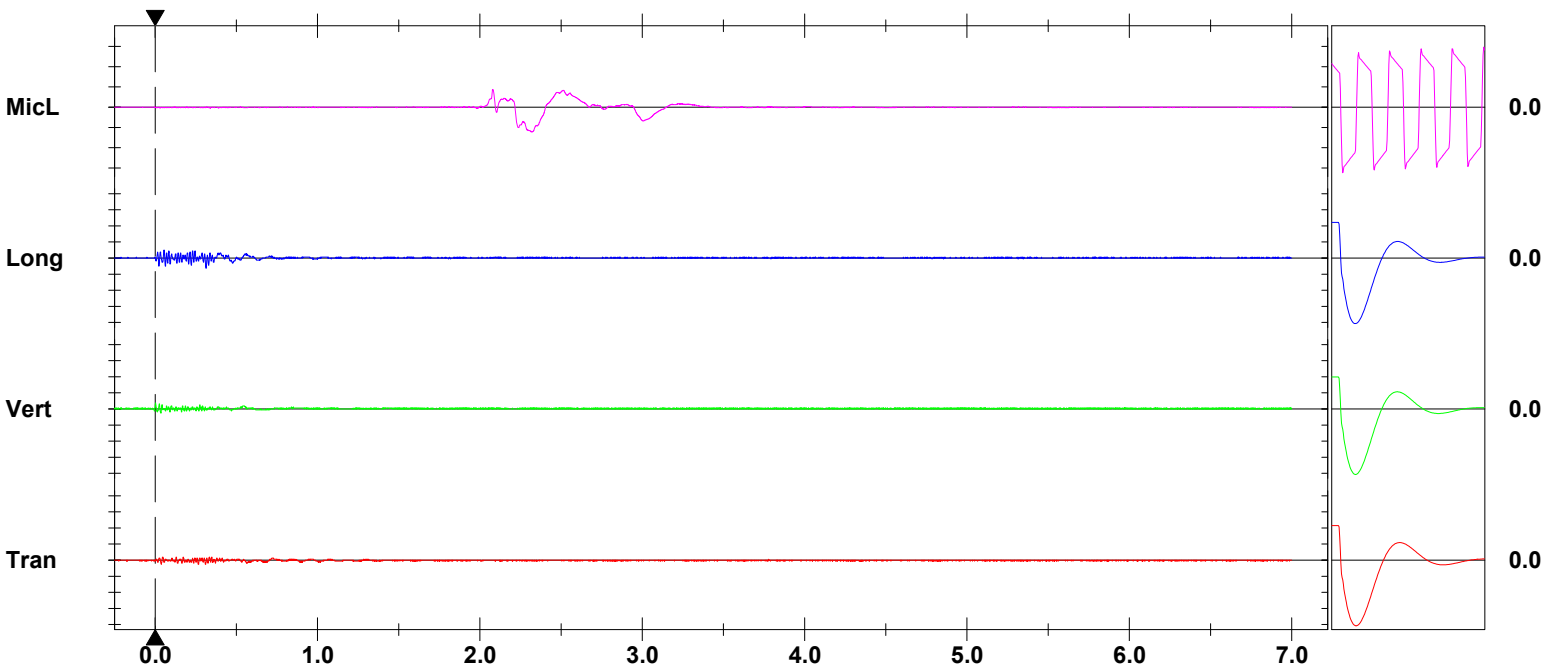
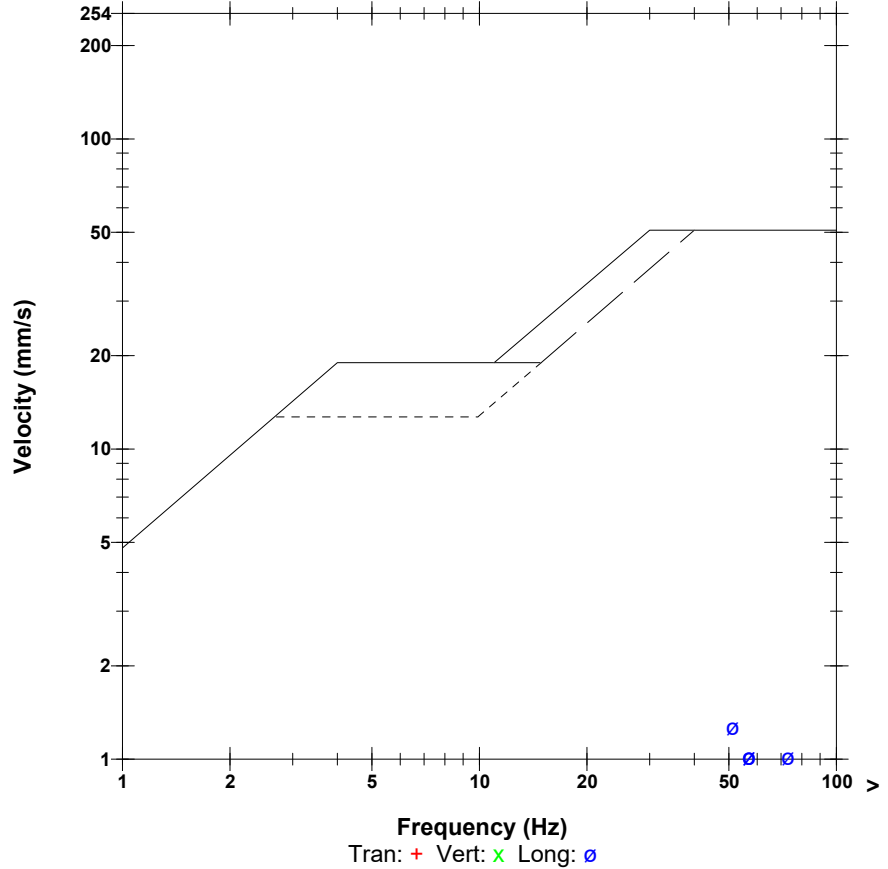
**Post Event Notes**  
 Location: Civic Number 4140 Route 111 (PW-12)  
 Blast No.: 2023-15  
 Project No: 234601.00

**Microphone** Linear Weighting  
**PSPL** 115.7 dB(L) 12.25 pa.(L) at 2.315 sec  
**ZC Freq** 2.7 Hz  
**Channel Test** Passed (Freq = 19.7 Hz Amp = 614 mv )

	Tran	Vert	Long	
PPV	0.508	0.762	1.270	mm/s
PPV	45.12	48.64	53.08	dB
ZC Freq	57	64	51	Hz
Time (Rel. to Trig)	0.037	0.002	0.313	sec
Peak Acceleration	0.027	0.027	0.040	g
Peak Displacement	0.002	0.004	0.009	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	3.7	3.8	4.0	

**Peak Vector Sum** 1.301 mm/s at 0.313 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