Memo

HAMMOND RIVER HOLDINGS

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

From: Dan Guest, Hammond River Holdings Ltd.

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

Date: May 28, 2021

Subject: Monthly Report – Upham East Gypsum Quarry, Surface Water Sampling – April 2021

Our File: File # 18-8346

Introduction

This monthly report details activities associated with the operation of the Upham East Gypsum Quarry for the month of April 2021, in accordance with conditions of the Approval to Operate I-10936. As required by the approval to operate, surface water sampling of the watercourse that crosses the site and in the Hammond River began immediately. Refer to the December 2019, January through December 2020, and January through March 2021 reports for previous water quality results.

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

- Week 1: April 8, 2021
- Week 2: April 16, 2021
- Week 3: April 19, 2021
- Week 4: April 26, 2021

There was one additional sampling event, on April 2, 2021, after a heavy rain event, defined as more than 25 mm of rain over a 24-hour period.

Surface Water Sampling – Field Methods

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

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

- PDP-1 was collected at the discharge point from the site, which is located before the confluence with the unnamed tributary to the Hammond River. This is the point of compliance;

- SW3 was the background sample. It was collected within the unnamed tributary approximately 100 m upstream from the PDP-1;
- SW5 was collected within the unnamed tributary approximately 100m downstream from PDP-1

Surface water samples were collected using laboratory supplied bottles. The bottles were rinsed three times in the watercourse and then submerged below the water surface. The samples were submitted to the Research Productivity Council (RPC) in Fredericton, NB. RPC is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for each of the laboratory analytical methods utilized and have in-house QA/QC programs to govern sample analysis and analytical data quality assurance.

Compliance Monitoring Results

Results of the surface water compliance monitoring 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**.

Environmental Accidents and Malfunctions

One spill occurred on April 26, 2021. Approximately 3 litres of hydraulic fluid were released from a front end loader. The spill did not occur within 100m of a watercourse or potable well. The spill was promptly contained and cleaned-up.

Ambient Air Quality Monitoring – Total Suspended Particulate

24-hour air samples are collected every 6 days in accordance with the National Air Pollution Surveillance (NAPS) schedule. The air quality monitor used to conduct the monitoring is a BGI PQ100 air sampler, a high-volume sampler for total suspended particulate matter. In April there were 5 air quality monitoring events, April 6, 12, 18, 24, and 30; the results are provided in **Table 3**. There were no exceedances of the 120 $\mu g/m^3$ maximum permissible ground level concentration of total suspended particulate that is specified in Schedule B of the New Brunswick *Air Quality Regulation – Clean Air Act*.

Blasting

In April there were three blasts, April 6, April 12, and April 23, 2021. There were no exceedances of Approval to Operate limits for maximum velocity and sound pressure. Blast reports are attached.

Public Complaints

Hammond River Holdings received 1 public complaint during the April 2021 monitoring period. The complaint was discussed over the phone with the resident by an HRH representative. The complaint was in relation to damage to the local roads and how the damage was being repaired.

Summary

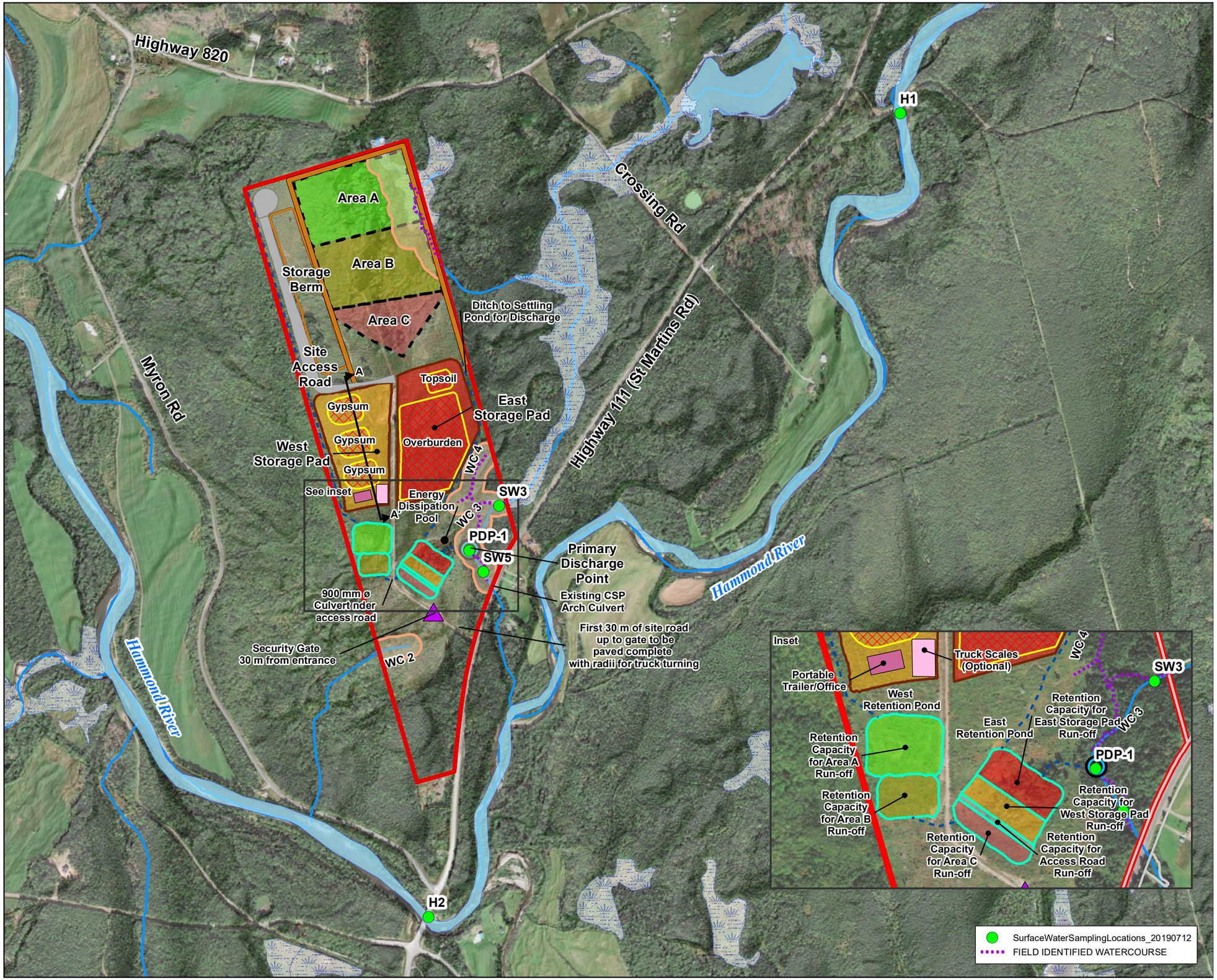
The water chemistry at the discharge point into WC3 is comparable to background. Based on the results provided in **Table 1**, the gypsum extraction activities being conducted on site have not had a negative impact on WC3 and subsequently the Hammond River. All air quality monitoring and blast monitoring returned results below the guidelines for each.

References

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

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

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



HAMMOND RIVER HOLDINGS LIMITED
PROPOSED UPHAM EAST GYPSUM QUARRY

SURFACE WATER SAMPLING LOCATIONS
FIGURE 1

- PROPERTY BOUNDARY
- PROJECT DEVELOPMENT AREA
- WATERBODY
- WATERCOURSE
- REGULATED WETLAND
- 30 METRE WETLAND/WATERCOURSE BUFFER

PROPOSED SITE FEATURES

- DITCH
- TRUCK SCALE (OPTIONAL)
- SITE AREAS
- DISCHARGE POINT
- SECURITY GATE
- PORTABLE TRAILER/OFFICE
- ACCESS ROAD
- STORAGE PAD
- STOCKPILE
- RETENTION POND
- CROSS SECTION
- QUARRY BERM CONSTRUCTED FROM TOPSOIL AND OVERBURDEN (OFFSET MINIMUM 7m FROM PROPERTY BOUNDARY)
- HATCHING INDICATES MATERIAL STOCKPILE AREA ON TOP OF STORAGE PAD

0 50 100 200 m

SCALE 1:8,500

N W E S

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

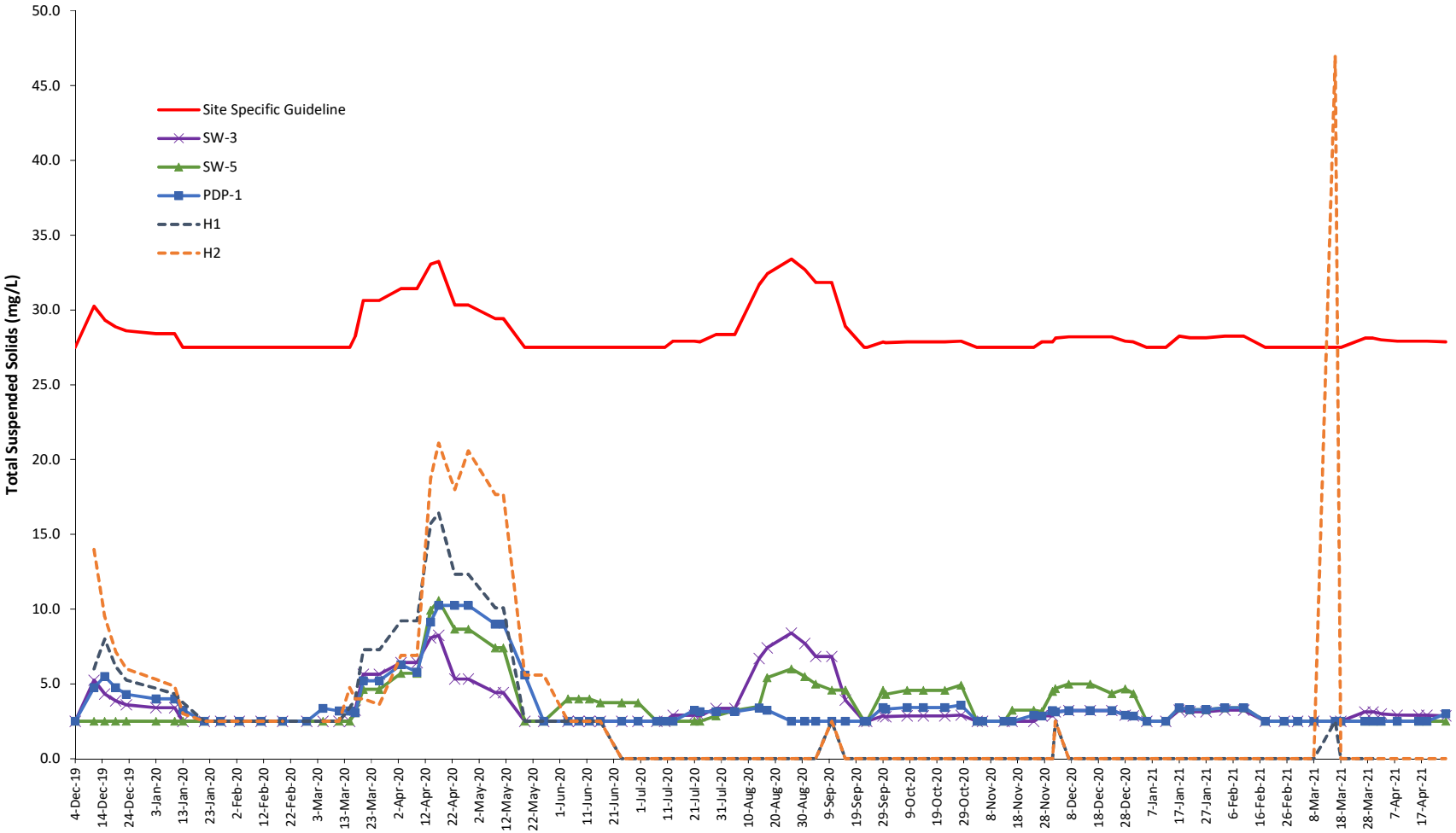
MAP CREATED BY: JH
MAP REVISED BY: JO
MAP CHECKED BY: GA
MAP PROJECTION: NAD_1983_CSRS_NEW_BRUNSWICK_STEREOGRAPHIC

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

DILLON CONSULTING

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

Figure 2: TSS Monthly Average



Notes:

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

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

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

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

Parameter		Ambient Air Temperature[a]	Precipitation 48 hours prior to sample collection[b]	Water Temperature	Specific Conductivity	Turbidity	Total Suspended Solids[c]
Units		°C	mm	°C	mS/cm	NTU	mg/L
Sample ID	Date						
SW3	02-Apr-21	1.50	0.00	2.60	112	4.24	<5
PDP-1	02-Apr-21			2.60	175	5.18	<5
SW5	02-Apr-21			2.70	263	7.25	<5
SW3	08-Apr-21	9.40	0.00	5.30	263	1.39	<5
PDP-1	08-Apr-21			5.20	390	0.86	<5
SW5	08-Apr-21			5.20	395	1.86	<5
SW3	16-Apr-21	5.5	2.1	5.5	499	0.68	<5
PDP-1	16-Apr-21			5.2	658	0.12	<5
SW-5	16-Apr-21			5.1	672	-0.12	<5
SW3	19-Apr-21	13.4	0	5.2	427	-0.63	<5
PDP-1	19-Apr-21			4.7	531	-0.2	<5
SW5	19-Apr-21			4.7	540	0.13	<5
SW3	26-Apr-21	7.30	3.60	8.20	394	1.63	<5
PDP-1	26-Apr-21			8.30	369	0.66	<5
SW5	26-Apr-21			8.10	430	0.93	6

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

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

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

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

SW3 is the background sample for Watercourse 3.

There were no duplicate samples collected in April 2021.

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

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

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 18-8346

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	SW5	PDP-1
04-Dec-19	27.5	-	-	2.5	2.5	2.5
11-Dec-19	30.3	6.0	14.0	5.3	2.5	4.8
15-Dec-19	29.3	8.0	9.5	4.3	2.5	5.5
19-Dec-19	28.9	6.2	7.2	3.9	2.5	4.8
23-Dec-20	28.6	5.3	6.0	3.6	2.5	4.3
3-Jan-20	28.4	4.7	5.3	3.4	2.5	4.0
10-Jan-20	28.4	4.3	4.8	3.4	2.5	4.0
13-Jan-20	27.5	3.8	3.0	2.5	2.5	3.3
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
3-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
5-Mar-20	27.5	2.5	2.5	2.5	2.5	3.4
11-Mar-20	27.5	2.5	2.5	2.5	2.5	3.2
15-Mar-20	27.5	3.4	4.8	2.5	2.5	3.2
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	4.6	5.2
26-Mar-20	30.6	7.3	3.6	5.6	4.6	5.2
3-Apr-20	31.4	9.2	6.9	6.4	5.7	6.3
9-Apr-20	31.4	9.2	6.9	6.4	5.7	5.8
14-Apr-20	33.1	15.7	18.8	8.1	9.9	9.1
17-Apr-20	33.3	16.4	21.1	8.3	10.6	10.3
23-Apr-20	30.3	12.3	18.0	5.3	8.7	10.3
28-Apr-20	30.3	12.3	20.6	5.3	8.7	10.3
8-May-20	29.1	9.0	15.5	4.1	6.7	8.1
11-May-20	29.1	9.0	15.5	4.1	6.7	8.1
19-May-20	27.5	2.5	5.1	2.5	2.5	5.1
26-May-20	27.5	2.5	5.1	2.5	2.5	2.5
4-Jun-20	27.5	2.5	2.5	2.5	10.0	2.5
8-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
7-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	2.5	7.0
23-Jul-20	27.8	-	-	2.5	2.5	2.5
29-Jul-20	28.3	-	-	6	5	2.5
5-Aug-20	28.4	-	-	3.4	3.2	3.1
14-Aug-20	31.7	-	-	6.7	3.5	3.4
17-Aug-20	32.4	-	-	7.4	5.4	3.3
26-Aug-20	33.4	-	-	8.4	6.0	2.5
31-Aug-20	32.7	-	-	7.7	5.5	2.5
4-Sep-20	31.8	-	-	6.8	5.0	2.5
10-Sep-20	31.8	2.5	2.5	6.8	4.6	2.5
15-Sep-20	28.9	-	-	3.9	4.6	2.5
22-Sep-20	27.5	-	-	2.5	2.5	2.5

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 18-8346

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	SW5	PDP-1
23-Sep-20	27.5	-	-	2.5	2.5	2.5
29-Sep-20	27.9	-	-	2.9	4.6	3.4
30-Sep-20	27.8	-	-	2.8	4.3	3.3
8-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
3-Nov-20	27.5	-	-	2.5	2.5	2.5
5-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	7.0	2.5
24-Nov-20	27.5	-	-	2.5	2.5	5.0
27-Nov-20	27.9	-	-	5	2.5	2.5
1-Dec-20	27.9	-	-	2.9	4.5	3.2
2-Dec-20	28.1	2.5	2.5	3.1	4.7	3.1
7-Dec-20	28.2	-	-	3.2	5.0	3.2
15-Dec-20	28.2	-	-	3.2	5.0	3.2
23-Dec-20	28.2	-	-	3.2	4.4	3.2
28-Dec-20	27.9	-	-	2.9	4.7	2.9
31-Dec-20	27.9	-	-	2.9	4.4	2.9
5-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
3-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
2-Mar-21	27.5	-	-	2.5	2.5	2.5
8-Mar-21	27.5	-	-	2.5	2.5	2.5
16-Mar-21	27.5	2.5	-	2.5	2.5	2.5
18-Mar-21	27.5	-	-	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
2-Apr-21	28.0	-	-	3.0	2.5	2.5
8-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	6.0

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. This applies to SW3, SW5, and PDP-1.
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

Test Start	Time	Duration	Flow Rate (L/min)	Air Volume (m^3)	Pressure (mm Hg)	Temperature (°C)	Initial Filter Weight (g)	Final Filter Weight (g)	TSP Mass (µg)	TSP (µg/m3)	Site Guideline (µg/m^3)
2020-07-22	14:51	24 hours	16.7	24.05	752	20.3	14.842	14.865	23000	39.8	120
2020-07-28	23:59	24 hours	16.46	23.7	747	24.4	14.826	14.828	1700	3.0	120
2020-08-04	13:55	24 hours	16.66	23.99	753	22.8	14.826	14.830	3100	5.4	120
2020-08-09	23:59	24 hours	16.74	24.1	752	21.2	14.842	14.844	2200	3.8	120
2020-08-15	23:59	24 hours	16.88	24.3	754	19.8	14.824	14.836	11600	19.9	120
2020-08-21	23:59	24 hours	16.87	24.3	749	17.9	14.839	14.842	2100	3.6	120
2020-08-27	23:59	24 hours	17.06	24.57	743	12.4	14.823	14.845	21700	36.8	120
2020-09-02	23:59	24 hours	16.75	24.12	747	18.8	14.842	14.861	19700	34.0	120
2020-09-08	23:59	24 hours	17.02	24.51	759	19.1	14.859	14.871	12100	20.6	120
2020-09-14	23:59	24 hours	17.62	25.37	756	8	14.828	14.837	9300	15.3	120
2020-09-20	23:59	24 hours	18.03	25.97	764	4.8	14.835	14.852	17100	27.4	120
2020-09-26	23:59	24 hours	17.1	24.62	753	15.3	14.856	14.859	3300	5.6	120
2020-10-02	23:59	24 hours	14.43	25.1	753	9.6	14.972	14.959	-12800	-21.2	120
2020-10-08	23:59	24 hours	17.69	25.48	748	3.8	14.861	14.889	28800	47.1	120
2020-10-14	23:59	24 hours	17.56	25.29	753	7.8	14.883	14.891	8300	13.7	120
2020-10-20	23:59	19:31	17.63	20.66	760	9.1	14.875	14.858	-17100	-34.5	120
2020-10-23	23:59	21:55	17.34	22.82	750	10.1	14.859	14.865	5600	11.2	120
2020-10-26	23:59	21:02	17.71	22.35	752	4.8	14.854	14.864	10100	21.5	120
2020-11-01	23:59	24 hours	17.19	24.75	732	5.9	14.873	14.880	7300	12.3	120
2020-11-07	23:59	24 hours	17.84	25.68	759	5.9	14.869	14.872	3100	5.0	120
2020-11-13	23:59	24 hours	17.79	25.62	748	1.9	14.860	14.861	600	1.0	120
2020-11-19	23:59	24 hours	17.63	25.22	756	7.3	14.848	14.850	2200	3.6	120
2020-11-25	23:59	24 hours	17.83	25.68	756	4.4	14.850	14.856	6700	10.9	120
2020-12-01	23:59	24 hours	17.48	25.18	748	7	14.843	14.861	18300	30.3	120
2020-12-07	23:59	24 hours	17.88	25.75	740	-2.1	14.834	14.836	1900	3.1	120
2020-12-13	23:59	24 hours	17.98	25.9	746	-1.3	14.831	14.839	8300	13.4	120
2020-12-19	23:59	24 hours	18.37	26.45	756	-3.6	14.837	14.843	5700	9.0	120
2020-12-25	23:59	24 hours	17.34[a]	22.82[a]	753[a]	12.3[a]	14.840	14.850	10000	18.3	120
2020-12-31	23:59	24 hours	18.58	26.76	759	-5.8	14.845	14.850	4800	7.5	120
2021-01-06	23:59	24 hours	18	24.73	744	-2.7	14.836	14.852	16300	27.5	120
2021-01-12	23:59	24 hours	16.7	24.74	749	-6.7	14.854	14.872	18200	30.7	120
2021-01-18	23:59	24 hours	17.52	25.52	737	-0.8	14.868	14.877	8600	14.0	120
2021-01-24	23:59	24 hours	16.7	24.03	737	-8	14.823	14.827	4200	7.3	120
2021-01-30	23:59	24 hours	16.7	24.03	750	-11.2	14.829	14.833	3600	6.2	120
2021-02-05	23:59	24 hours	17.9	25.8	744	-0.9	14.850	14.866	15800	25.5	120
2021-02-11	23:59	24 hours	16.7	24.05	750	-12.6	14.829	14.834	5300	9.2	120
2021-02-17	9:59	24 hours	16.7	24.05	755	-9.9	14.818	14.821	2800	4.9	120
2021-02-23	23:59	24 hours	17.7	25.49	737	-0.6	14.891	14.897	6000	9.8	120
2021-03-01	23:59	24 hours	17.87	25.74	741	-1.6	14.858	14.866	7700	12.5	120
2021-03-07	23:59	24 hours	16.7	24.05	753	-8.9	14.840	14.851	11800	20.4	120
2021-03-13	23:59	24 hours	17.92	25.81	743	-1.3	14.828	14.835	6900	11.1	120
2021-03-19	23:59	24 hours	16.7	24.05	750	-5.3	14.819	14.823	4600	8.0	120
2021-03-25	23:59	24 hours	17.52	24.23	754	8.9	14.820	14.826	6100	10.5	120
2021-03-31	23:59	24 hours	16.7	24.05	756	6.8	14.823	14.831	8600	14.9	120
2021-04-06	23:59	24 hours	16.7	24.05	746	4.1	14.822	14.835	13400	23.2	120
2021-04-12	23:59	24 hours	17.64	25.55	749	5.2	14.812	14.817	5100	8.3	120
2021-04-18	23:59	24 hours	16.7	24.05	742	2.6	14.815	14.825	10000	17.3	120
2021-04-24	23:59	24 hours	17.27	24.05	743	8.8	14.815	14.826	10400	18.0	120
2021-04-30	23:59	24 hours	17.24	24.82	735	6.4	14.814	14.921	107000	11.8	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.

Report ID: 390461-IAS
Report Date: 12-Apr-21
Date Received: 06-Apr-21

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:			390461-1	390461-2	390461-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			2-Apr-21	2-Apr-21	2-Apr-21
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5

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

RL = Reporting Limit

Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 390461-IAS
Report Date: 12-Apr-21
Date Received: 06-Apr-21

CERTIFICATE OF ANALYSIS

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

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

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 391240-IAS
Report Date: 15-Apr-21
Date Received: 12-Apr-21

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:			391240-1	391240-2	391240-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			8-Apr-21	8-Apr-21	8-Apr-21
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5

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

RL = Reporting Limit

Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 391240-IAS
Report Date: 15-Apr-21
Date Received: 12-Apr-21

CERTIFICATE OF ANALYSIS

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

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

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 392616-IAS
Report Date: 29-Apr-21
Date Received: 21-Apr-21

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:			392616-1	392616-2	392616-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			19-Apr-21	19-Apr-21	19-Apr-21
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5

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

RL = Reporting Limit

Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry

Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 392616-IAS
Report Date: 29-Apr-21
Date Received: 21-Apr-21

CERTIFICATE OF ANALYSIS

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

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

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 392617-IAS
Report Date: 29-Apr-21
Date Received: 21-Apr-21

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:			392617-1	392617-2	392617-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			16-Apr-21	16-Apr-21	16-Apr-21
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	< 5	< 5

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

RL = Reporting Limit

Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry

Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 392617-IAS
Report Date: 29-Apr-21
Date Received: 21-Apr-21

CERTIFICATE OF ANALYSIS

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

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

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 393475-IAS
Report Date: 10-May-21
Date Received: 28-Apr-21

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:			393475-1	393475-2	393475-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			26-Apr-21	26-Apr-21	26-Apr-21
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	6	< 5

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

RL = Reporting Limit

Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry

Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 393475-IAS
Report Date: 10-May-21
Date Received: 28-Apr-21

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
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

SPILL REPORT FORM

IDENTIFICATION

Spill Date: 04-26-2021		**Time:** 1:43 PM	
Location: UPHAM EAST		:	
Civic Address of Incident: 4119 ROUTE 111 UPPERTON NB			
Field Contact: RICK HATTY		**Phone Number:** (506) 647-3730	

SPILL NOTIFICATION

- ☑ **Supervisor** (During working hours) - **Name (specify):**
- ☑ **Department of Environment** (During working hours)
  Saint John Region – 506.658.2558 EMAILED
- ☐ **Coast Guard – 800.565.1633**

SPILL INFORMATION

Product Spilled:	☐ Transformer Oil	Quantity (L):	
	☑ Hydraulic Fluid	Quantity (L): 3L	
	☐ Other (specify):	Quantity (L):	
Equipment:	☐ Pole-top transformer	**Serial / ID1 Number:** LO 253	
	☑ Heavy Equipment	FRONT END LOADER	
	☐ Vehicle	***Year of Manufacture:**	
	☐ Other (specify):		
Environmental Impact:		**YES**	**NO**
	Watercourse within 100 m	☐	☑
	Domestic well within 100 m	☐	☑
Cause and additional detail:	BLOWN HYDRAULIC HOSE.		

Samples sent to RPC laboratory for analysis (Address: 921 College Hill Rd, Fredericton, 506.452.1212)

- ☐ Oil (from equipment): _____ ppm
- ☐ Soil (unable to sample equipment): _____ ppm
- ☐ Other (watercourse): _____ ppm

ADDITIONAL INFORMATION

	YES	NO
Is source of spill stopped?	☑	☐
Is spill contained?	☑	☐
Is spill cleaned-up?	☑	☐

EXTERNAL RESOURCES / INSPECTORS (if applicable)

	YES	NO	If "yes", indicate Name, Date and Time
Environment Inspector on-site	☐	☑	
Contractor used for clean-up	☑	☐	GULF OPERATORS
Site Professional used for remediation support	☐	☑	

APPROVAL AND REVIEW

Initiator DAN GUEST	Signature:	Date Prepared: 04/27/2021
Supervisor/Manager DAN GUEST	Signature: Comments: Spill kit and spill response supplies replenished?	Date Reviewed: 04/27/2021 ☑ YES ☐ NO
EMS Coordinator	Signature:	Date Completed:

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Saint John, New Brunswick
E2L 5E9
Phone: (506) 635-7565
Fax: (506) 635-8866
www.conquest-eng.com

Saint John
Moncton
Fredericton
Bedford

April 7, 2021

Project No.: 21S003.00

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

Re: Blast Vibration Monitoring – Blast No. 2021-09 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated at 14:39 on April 6, 2021. 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. 2021-09 – April 6, 2021

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)	14:39	1,265 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4150 Route 111 (PW-13)		673 m S	1.52 mm/s @ 64 Hz	114	-
3. Civic No. 2447 Route 820 (PW-07)		926 m NE	0.51 mm/s @ 34 Hz	110	-
4. PW-03 - Route 820		712 m N	0.76 mm/s @ 26 Hz	112	-
5. Civic No. 2341 Route 820 (PW-05)		731 m NW	0.70 mm/s @ 34 Hz	112	-
6. Civic No. 50 Myron Road (PW-15)		988 m NW	0.70 mm/s @ 32 Hz	106	-
7. Civic No. 86 Myron Road (PW-16)		854 m W	1.27 mm/s @ 43 Hz	110	-
8. Civic No. 4140 Route 111 (PW-12)		747 m S	2.29 mm/s @ 73 Hz	114	-
9. Civic No. 2337 Route 820 (PW-04)		799 m NW	0.51 mm/s @ 21 Hz	110	-
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

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

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

Best regards,
CONQUEST ENGINEERING
A Division of CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Geotechnical Engineer

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Reports

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575 Crown Street
Saint John, New Brunswick
E2L 5E9
Phone: (506) 635-7565
Fax: (506) 635-8866
www.conquest-eng.com

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 6, 2021
Project No.:	21S003.00	**Time of Blast:**	14:39
Inspector:	B. Fillmore	**Blast No.:**	2021-09
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28'51.4" E 65º37'57.4"		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	15,922 tonnes
Weather at time of Blast:	Mostly cloudy	**Air Temp.:**	8ºC
Est. Wind Speed :	≈15 km/h	**Wind Direction:**	North
Cloud Cover:	Yes	**Precipitation:**	Mist

BLAST DESIGN:

Total No. Holes:	96	**Hole Diameter:**	4.5"
Average Depth:	7.4 – 8.7 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	5	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	17 & 42 ms
Initiation Method:	Non -Electric		
Weight of Explosives per Delay:	Max.: 300 kg		
Type and weight of Explosives for Blast:	5,929 kg – Titan XL 1000		

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 6, 2021
Project No.:	21S003.00	**Time of Blast:**	14:39
Inspector:	B. Fillmore	**Blast No.:**	2021-09
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	673 m
Direction to the Nearest Structure:	South
Structure Type:	House
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	38.9

SAFETY:

Type of Warning Signal Used:	Air horn
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No
If Yes, Describe:	
Misfire (yes or no):	No

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

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E2L 5E9
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Fax: (506) 635-8866
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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 6, 2021
Project No.:	21S003.00	**Time of Blast:**	14:39
Inspector:	B. Fillmore	**Blast No.:**	2021-09
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5673
Calibration Date:	March 12, 2021
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,265 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	June 12, 2020
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	673 m South
Transverse Particle Velocity:	1.40 mm/s @ 57 Hz
Vertical Particle Velocity:	1.52 mm/s @ 64 Hz
Longitudinal Particle Velocity:	1.14 mm/s @ 51 Hz
Peak Particle Velocity:	1.52 mm/s @ 64 Hz
Maximum Airblast:	114 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 6, 2021
Project No.:	21S003.00	**Time of Blast:**	14:39
Inspector:	B. Fillmore	**Blast No.:**	2021-09
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	May 15, 2020
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	926 m Northeast
Transverse Particle Velocity:	0.45 mm/s @ 17 Hz
Vertical Particle Velocity:	0.51 mm/s @ 51 Hz
Longitudinal Particle Velocity:	0.51 mm/s @ 34 Hz
Peak Particle Velocity:	0.51 mm/s @ 34 Hz
Maximum Airblast:	110 dB(L)

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 17, 2021
Location of seismograph:	PW-03 - Route 820
Distance and Direction from Blast:	712 m North
Transverse Particle Velocity:	0.64 mm/s @ 39 Hz
Vertical Particle Velocity:	0.45 mm/s @ 57 Hz
Longitudinal Particle Velocity:	0.76 mm/s @ 26 Hz
Peak Particle Velocity:	0.76 mm/s @ 26 Hz
Maximum Airblast:	112 dB(L)

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E2L 5E9
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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 6, 2021
Project No.:	21S003.00	**Time of Blast:**	14:39
Inspector:	B. Fillmore	**Blast No.:**	2021-09
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5960
Calibration Date:	May 15, 2020
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	731 m Northwest
Transverse Particle Velocity:	0.57 mm/s @ 34 Hz
Vertical Particle Velocity:	0.45 mm/s @ 43 Hz
Longitudinal Particle Velocity:	0.70 mm/s @ 34 Hz
Peak Particle Velocity:	0.70 mm/s @ 34 Hz
Maximum Airblast:	112 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5372
Calibration Date:	February 8, 2021
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	988 m Northwest
Transverse Particle Velocity:	0.70 mm/s @ 32 Hz
Vertical Particle Velocity:	0.38 mm/s @ 43 Hz
Longitudinal Particle Velocity:	0.57 mm/s @ 39 Hz
Peak Particle Velocity:	0.70 mm/s @ 32 Hz
Maximum Airblast:	106 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 6, 2021
Project No.:	21S003.00	**Time of Blast:**	14:39
Inspector:	B. Fillmore	**Blast No.:**	2021-09
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5635
Calibration Date:	March 23, 2021
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	854 m West
Transverse Particle Velocity:	1.14 mm/s @ 30 Hz
Vertical Particle Velocity:	1.27 mm/s @ 43 Hz
Longitudinal Particle Velocity:	0.95 mm/s @ 51 Hz
Peak Particle Velocity:	1.27 mm/s @ 43 Hz
Maximum Airblast:	110 dB(L)

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	June 12, 2020
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	747 m South
Transverse Particle Velocity:	1.65 mm/s @ 73 Hz
Vertical Particle Velocity:	2.29 mm/s @ 64 Hz
Longitudinal Particle Velocity:	0.89 mm/s @ 51 Hz
Peak Particle Velocity:	2.29 mm/s @ 73 Hz
Maximum Airblast:	114 dB(L)

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Saint John, New Brunswick
E2L 5E9
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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 6, 2021
Project No.:	21S003.00	**Time of Blast:**	14:39
Inspector:	B. Fillmore	**Blast No.:**	2021-09
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5676
Calibration Date:	February 19, 2021
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	799 m Northwest
Transverse Particle Velocity:	0.45 mm/s @ 18 Hz
Vertical Particle Velocity:	0.32 mm/s @ 32 Hz
Longitudinal Particle Velocity:	0.51 mm/s @ 21 Hz
Peak Particle Velocity:	0.51 mm/s @ 21 Hz
Maximum Airblast:	110 dB(L)

Blast and Seismograph Location Plan
Blast No: 2021-09
Upham East Gypsum Quarry, Upham, NB

Date: April 6, 2021
CE Project No.: 21S003.00

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Event Report

Date/Time Vert at 14:39:42 April 6, 2021
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps

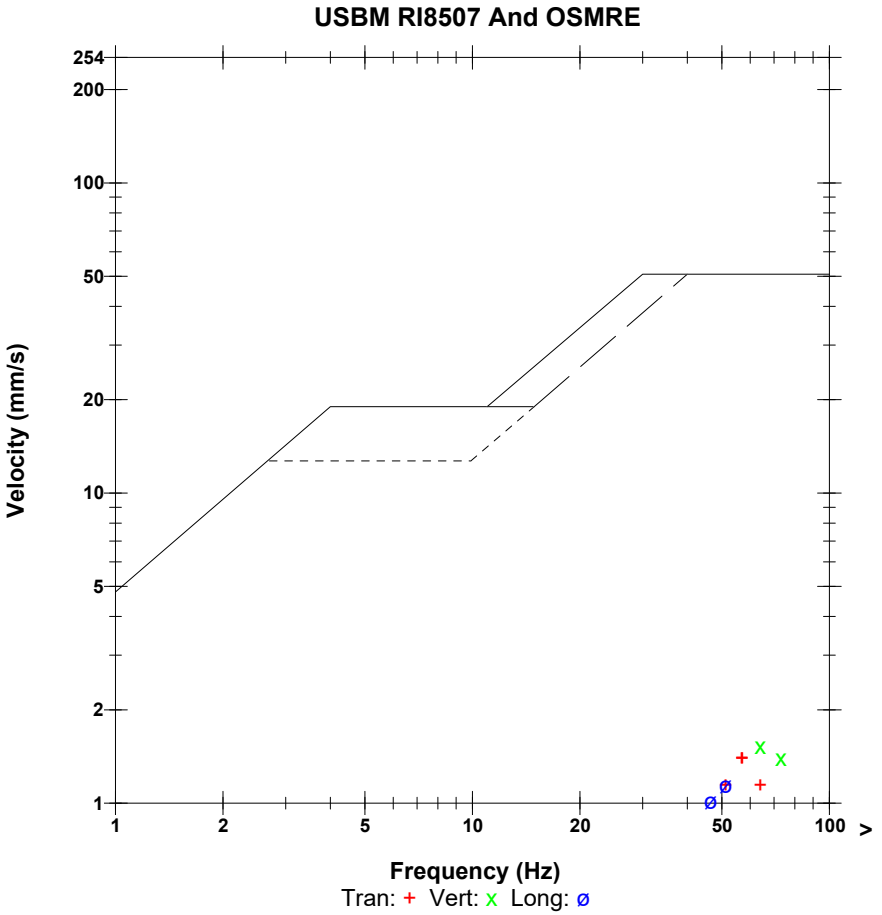
Notes

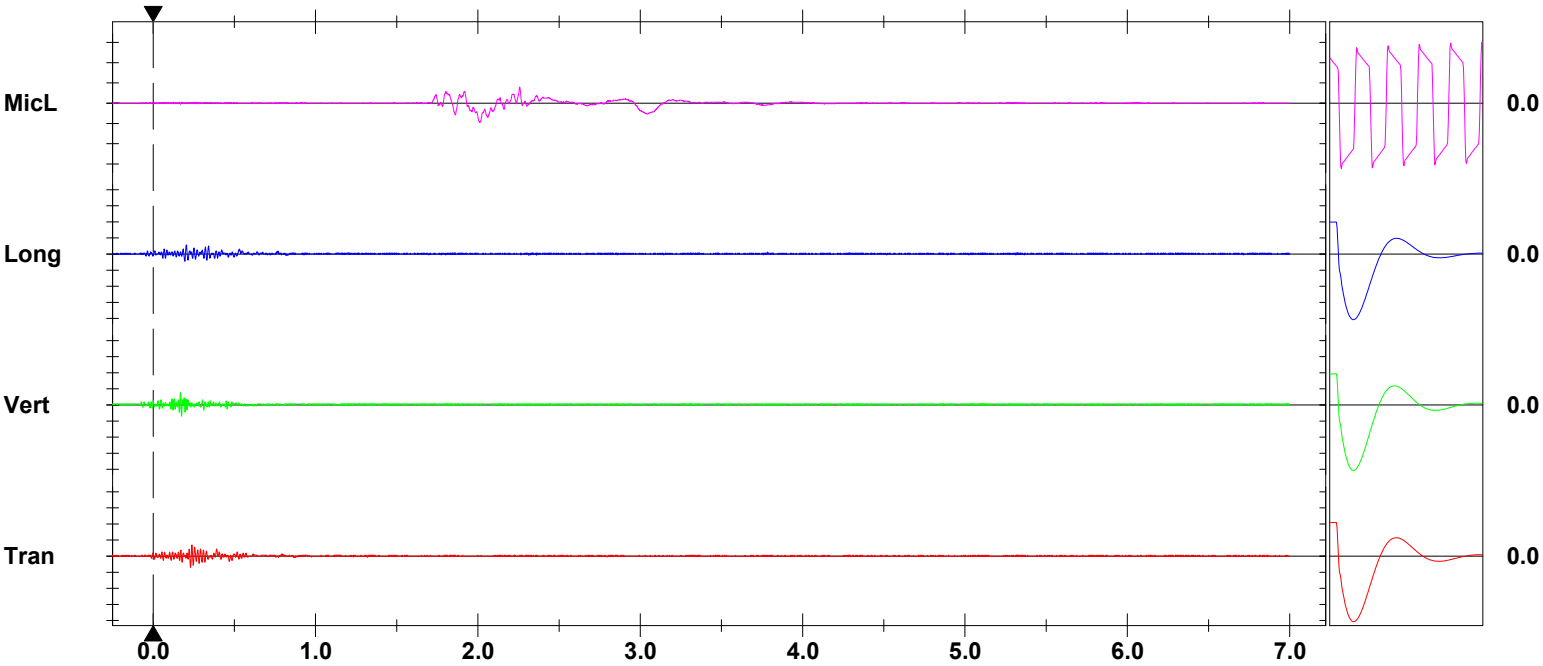
Serial Number BE21348 V 10.72-1.1 Minimate Blaster
Battery Level 6.1 Volts
Unit Calibration June 12, 2020 by Instantel
File Name W348IXB2.260
Post Event Notes
Location of Seismograph: Civic No.4150 Route 111 (PW-13)
Blast No.: 2021-09
CE Project No.: 21S003.00

Microphone Linear Weighting
PSPL 113.5 dB(L) 9.500 pa.(L) at 2.010 sec
ZC Freq 2.8 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 645 mv)

	Tran	Vert	Long	
PPV	1.397	1.524	1.143	mm/s
ZC Freq	57	64	51	Hz
Time (Rel. to Trig)	0.229	0.167	0.203	sec
Peak Acceleration	0.053	0.066	0.040	g
Peak Displacement	0.004	0.004	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.3	Hz
Overswing Ratio	3.6	3.5	4.2	

Peak Vector Sum 1.591 mm/s at 0.168 sec





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Vert at 14:39:49 April 6, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 6, 2021 16:39:51 (V10.72.1)

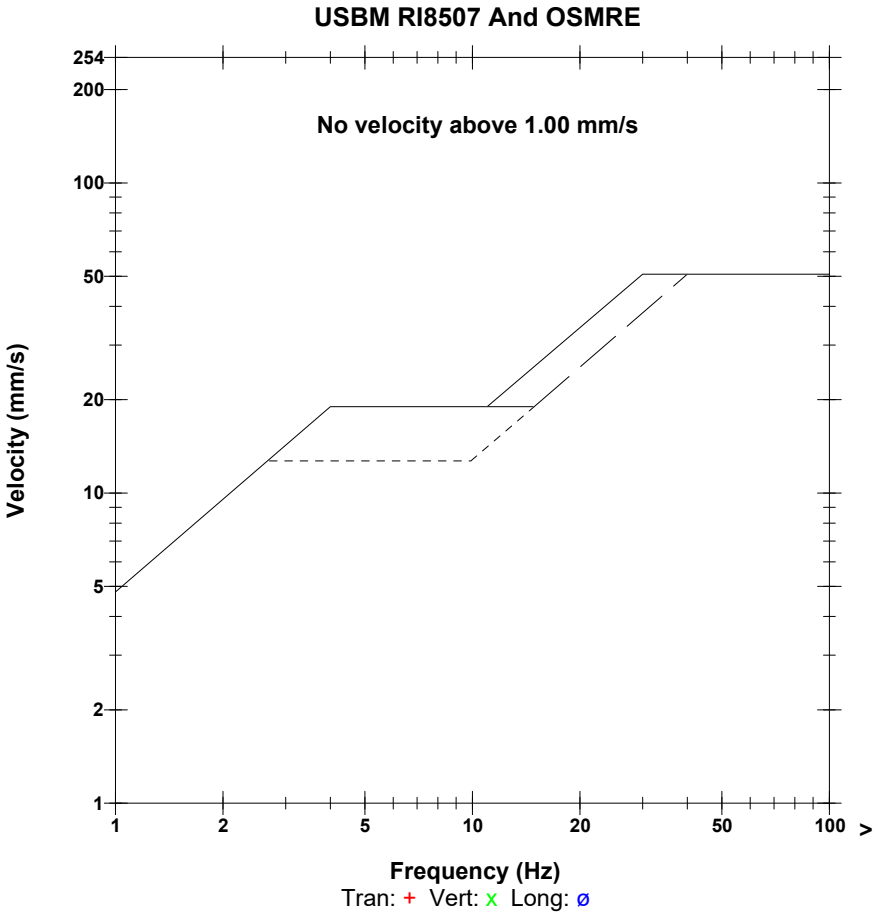
Extended Notes

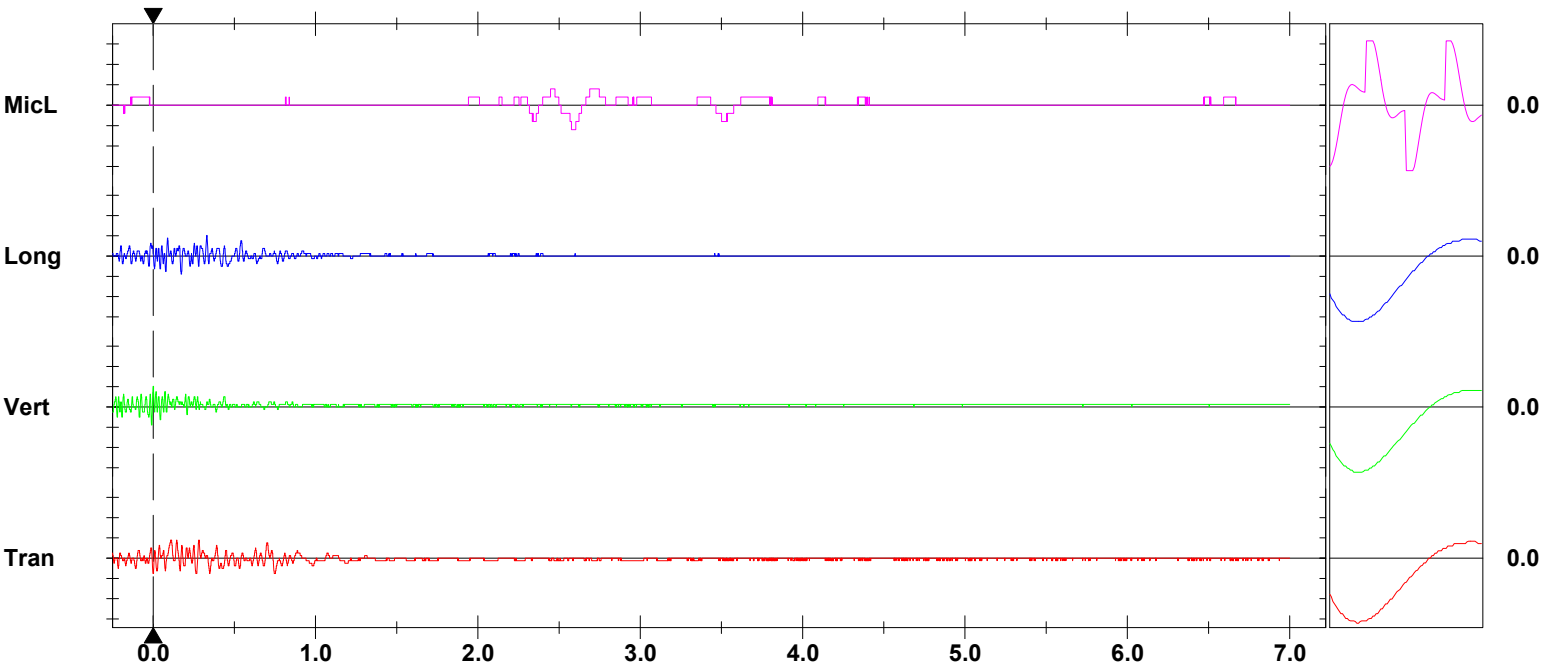
Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 2.577 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 273 mv)

	Tran	Vert	Long	
PPV	0.445	0.508	0.508	mm/s
ZC Freq	17	51	34	Hz
Time (Rel. to Trig)	0.107	0.002	0.330	sec
Peak Acceleration	0.013	0.020	0.020	g
Peak Displacement	0.004	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.7	7.8	Hz
Overswing Ratio	3.7	4.0	3.9	

Peak Vector Sum 0.651 mm/s at 0.000 sec

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration May 15, 2020 by Instantel
File Name G489IXCW.QD0
Post Event Notes
Location of Seismograph: Civic No. 2447 Route 820 (PW-07)
Blast No.: 2021-09
CE Project No.: 21S003.00





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Long at 14:39:53 April 6, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 6, 2021 17:11:11 (V10.72.1)

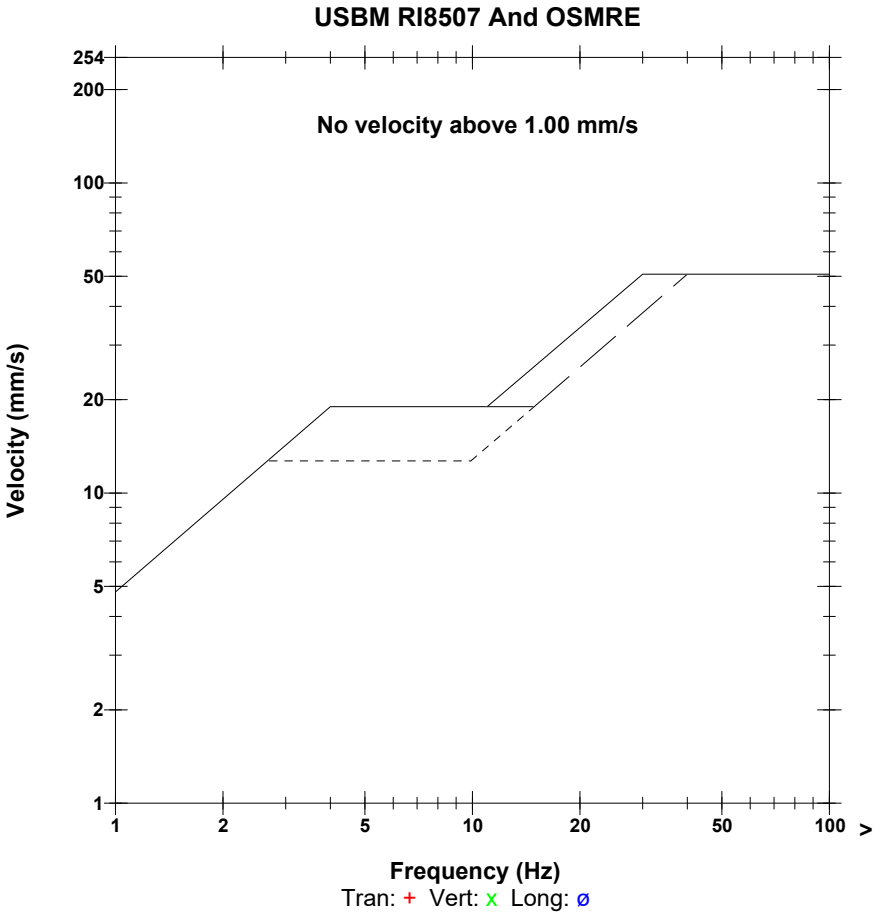
Extended Notes

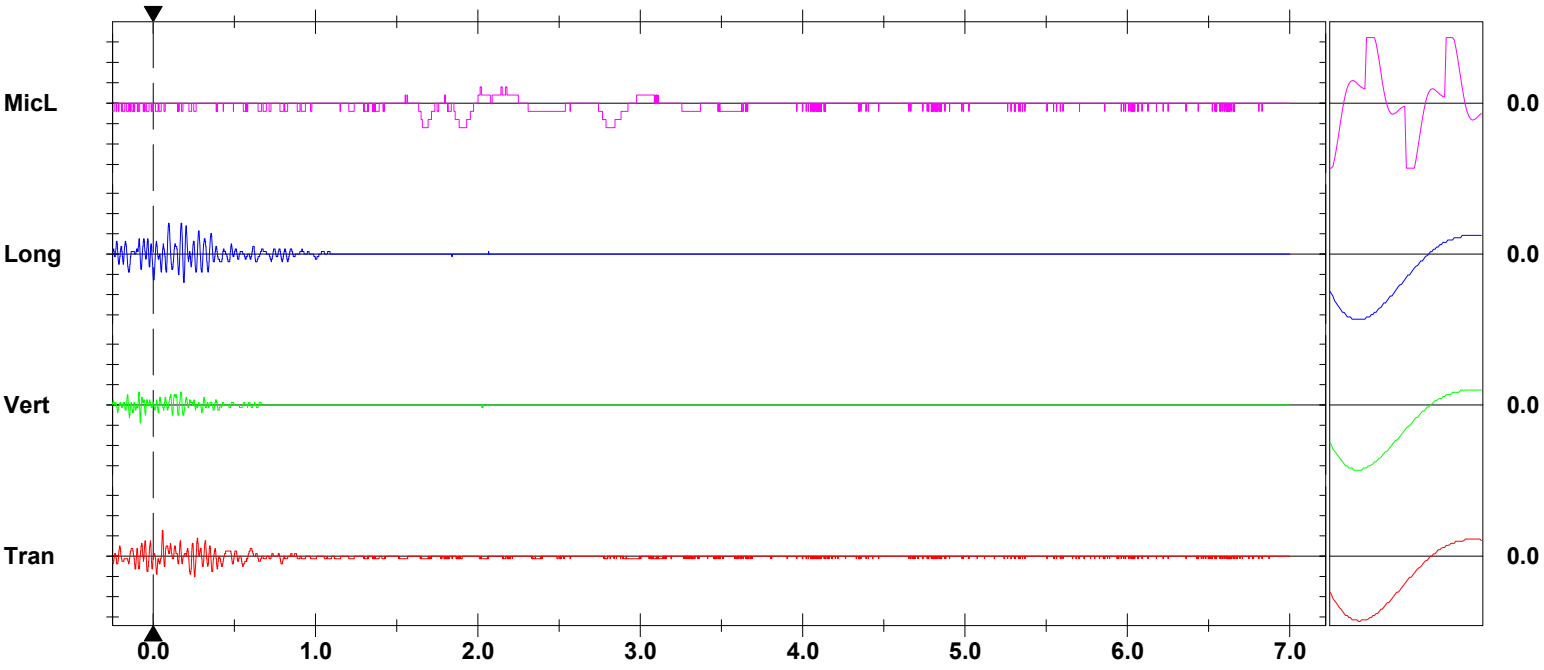
Serial Number 5487 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration February 17, 2021 by Instantel
File Name G487IXCW.QH0
Post Event Notes
Location of Seismograph: Cottage - Route 820 (PW-03)
Blast No.: 2021-09
CE Project No.: 21S003.00

Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 1.659 sec
ZC Freq 5.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 289 mv)

	Tran	Vert	Long	
PPV	0.635	0.445	0.762	mm/s
ZC Freq	39	57	26	Hz
Time (Rel. to Trig)	0.058	-0.077	0.096	sec
Peak Acceleration	0.013	0.013	0.020	g
Peak Displacement	0.003	0.002	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.8	Hz
Overswing Ratio	3.5	4.2	4.0	

Peak Vector Sum 0.841 mm/s at 0.173 sec





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Long at 14:39:30 April 6, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 6, 2021 17:13:28 (V10.72.1)

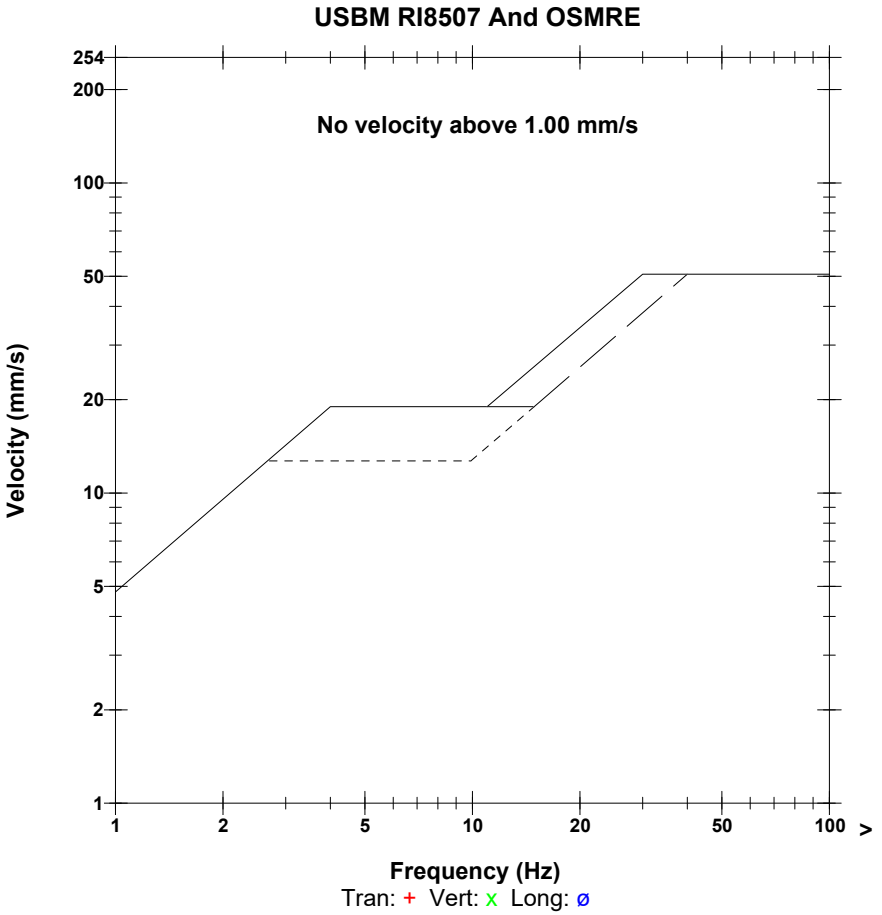
Extended Notes

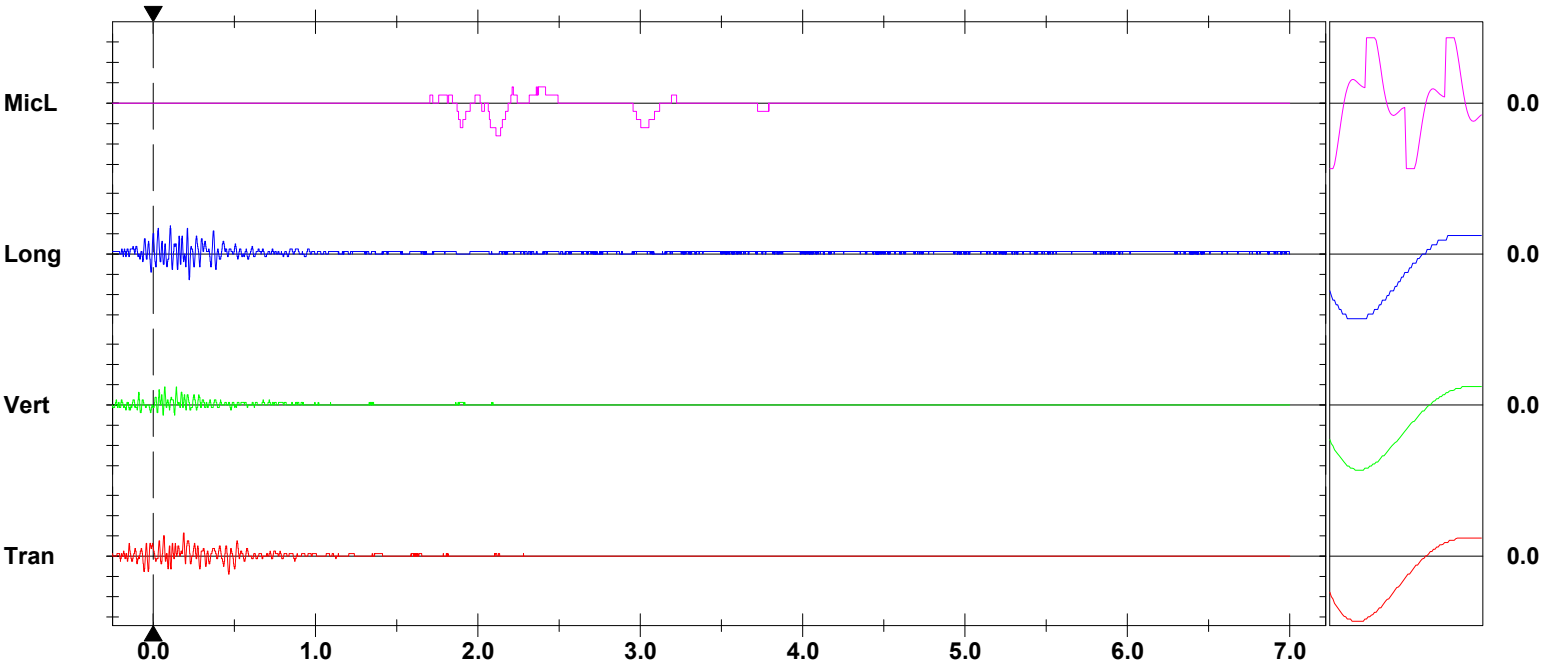
Serial Number 5960 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration May 15, 2020 by Instantel
File Name G960IXCW.PU0
Post Event Notes
Location of Seismograph: Civic No. 2341 Route 820 (PW-05)
Blast No.: 2021-09
CE Project No.: 21S003.00

Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 2.112 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 299 mv)

	Tran	Vert	Long	
PPV	0.572	0.445	0.699	mm/s
ZC Freq	34	43	34	Hz
Time (Rel. to Trig)	0.188	0.071	0.106	sec
Peak Acceleration	0.013	0.013	0.020	g
Peak Displacement	0.003	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.7	8.1	Hz
Overswing Ratio	3.7	3.7	3.6	

Peak Vector Sum 0.778 mm/s at 0.211 sec





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Long at 14:39:47 April 6, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 6, 2021 16:47:17 (V10.72.1)

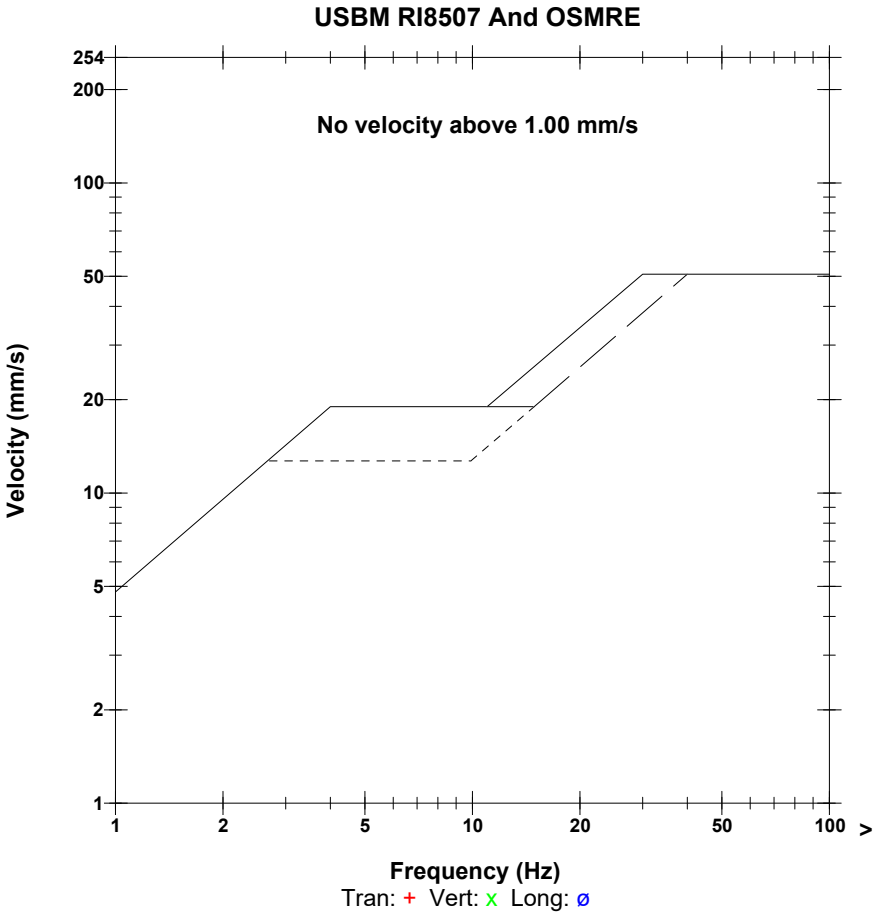
Extended Notes

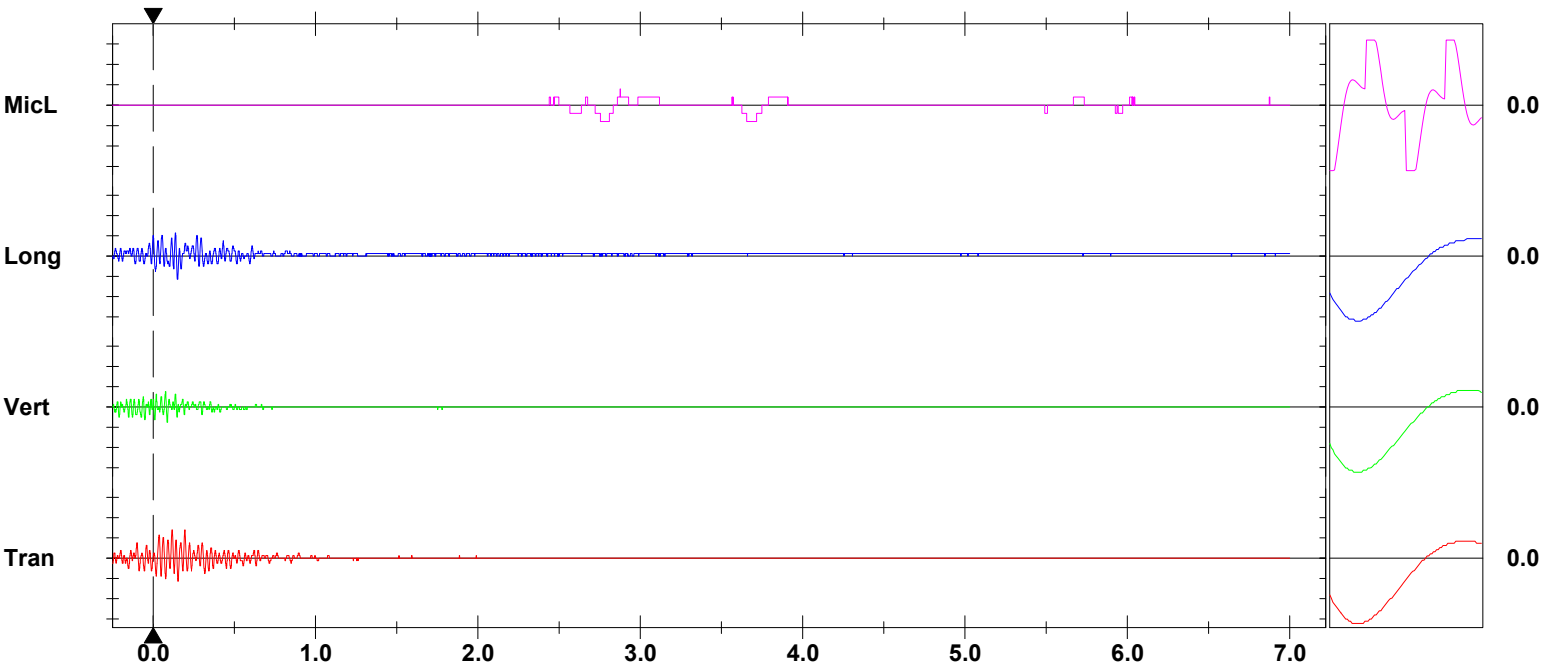
Microphone Linear Weighting
PSPL 106.0 dB(L) 4.000 pa.(L) at 2.756 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 295 mv)

	Tran	Vert	Long	
PPV	0.699	0.381	0.572	mm/s
ZC Freq	32	43	39	Hz
Time (Rel. to Trig)	0.116	0.076	0.138	sec
Peak Acceleration	0.020	0.013	0.013	g
Peak Displacement	0.003	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	7.8	Hz
Overswing Ratio	3.5	3.6	4.2	

Peak Vector Sum 0.794 mm/s at 0.116 sec

Serial Number 5372 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration February 8, 2021 by Instantel
File Name G372IXCW.QB0
Post Event Notes
Location of Seismograph: Civic No. 50 Myron Road (PW-15)
Blast No.: 2021-09
CE Project No.: 21S003.00





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Vert at 14:39:51 April 6, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 6, 2021 16:53:47 (V10.72.1)

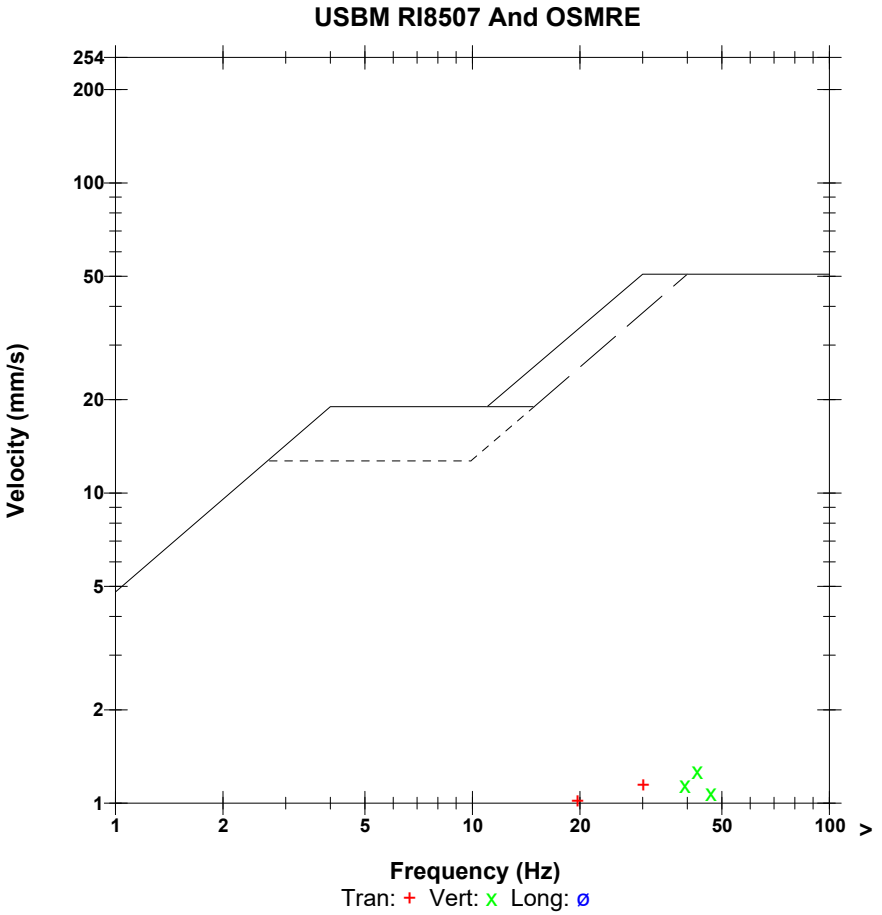
Extended Notes

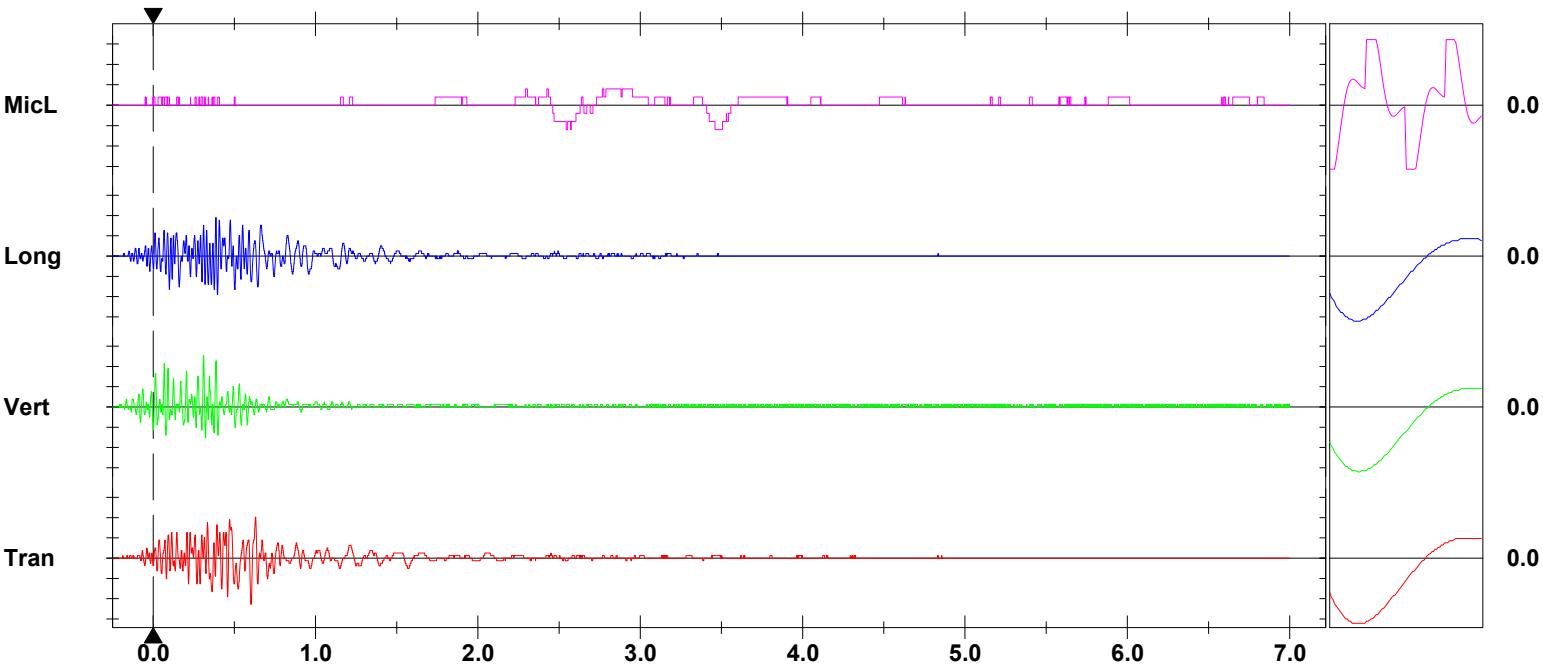
Serial Number 5635 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration March 23, 2021 by Instantel
File Name G635IXCW.QF0
Post Event Notes
Location of Seismograph: Civic No. 86 Myron Road (PW-16)
Blast No.: 2021-09
CE Project No.: 21S003.00

Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 2.545 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 299 mv)

	Tran	Vert	Long	
PPV	1.143	1.270	0.953	mm/s
ZC Freq	30	43	51	Hz
Time (Rel. to Trig)	0.603	0.311	0.387	sec
Peak Acceleration	0.027	0.033	0.033	g
Peak Displacement	0.009	0.005	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.0	Hz
Overswing Ratio	3.2	3.7	3.8	

Peak Vector Sum 1.492 mm/s at 0.312 sec





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Vert at 14:39:33 April 6, 2021
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps

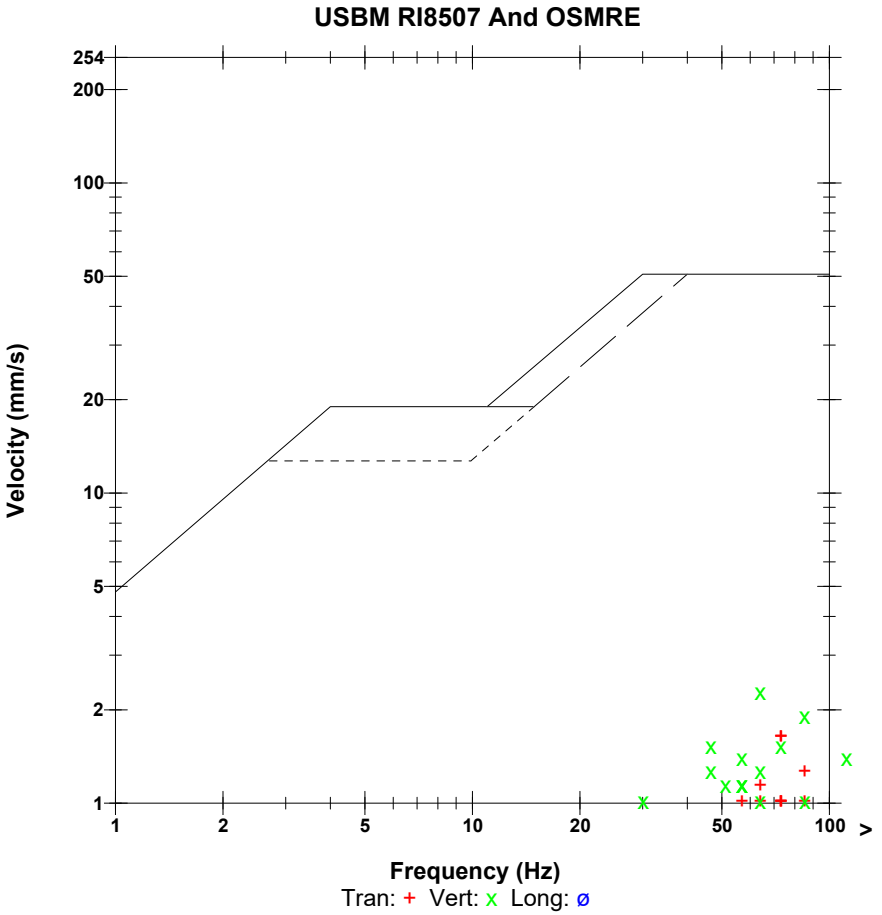
Notes

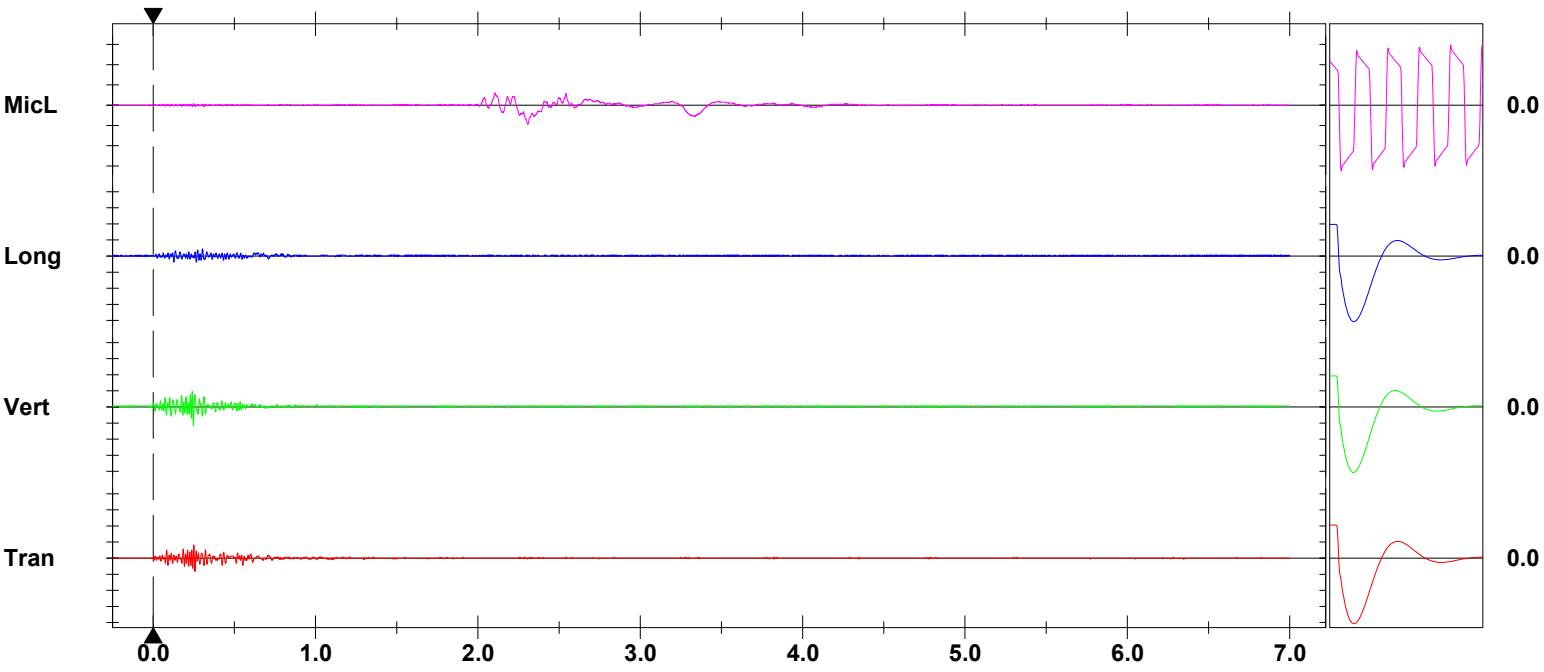
Serial Number BE21349 V 10.72-1.1 Minimate Blaster
Battery Level 5.9 Volts (Battery Low)
Unit Calibration June 12, 2020 by Instantel
File Name W349IXB2.1X0
Post Event Notes
Location of Seismograph: Civic No. 4140 Route 111 (PW-12)
Blast No.: 2021-09
CE Project No.: 21S003.00

Microphone Linear Weighting
PSPL 113.5 dB(L) 9.500 pa.(L) at 2.308 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 662 mv)

	Tran	Vert	Long	
PPV	1.651	2.286	0.889	mm/s
ZC Freq	73	64	51	Hz
Time (Rel. to Trig)	0.251	0.248	0.303	sec
Peak Acceleration	0.080	0.106	0.040	g
Peak Displacement	0.004	0.005	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.5	7.2	Hz
Overswing Ratio	3.9	4.0	4.2	

Peak Vector Sum 2.389 mm/s at 0.249 sec





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Long at 14:39:45 April 6, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 6, 2021 17:08:15 (V10.72.1)

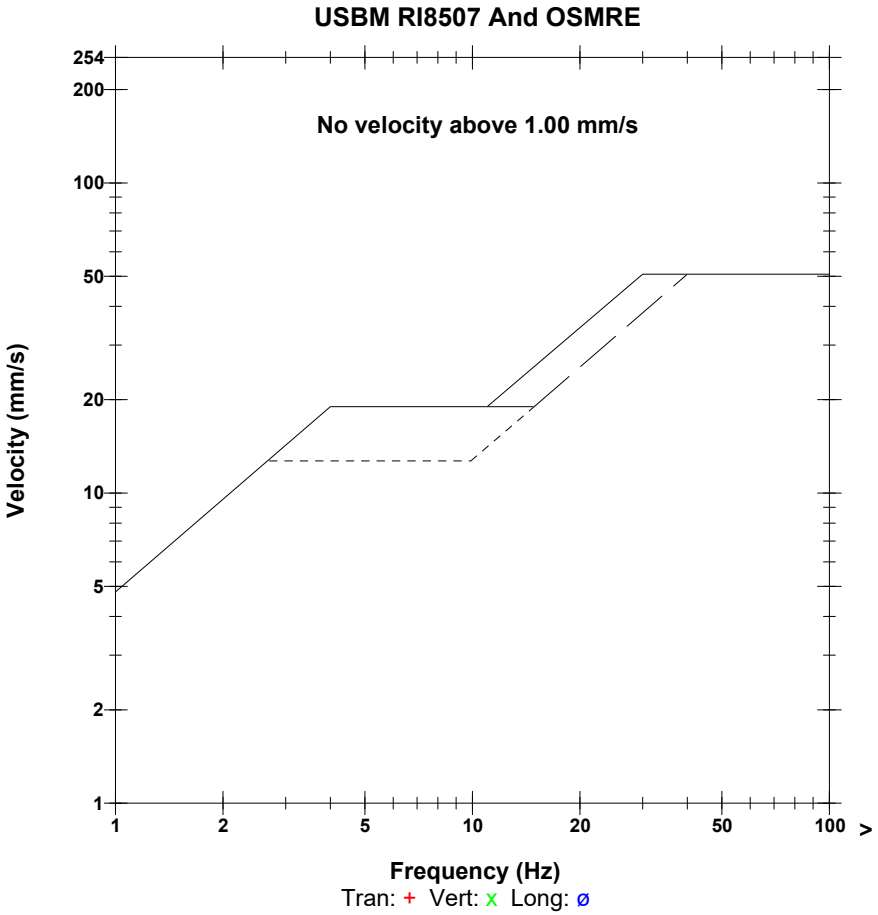
Extended Notes

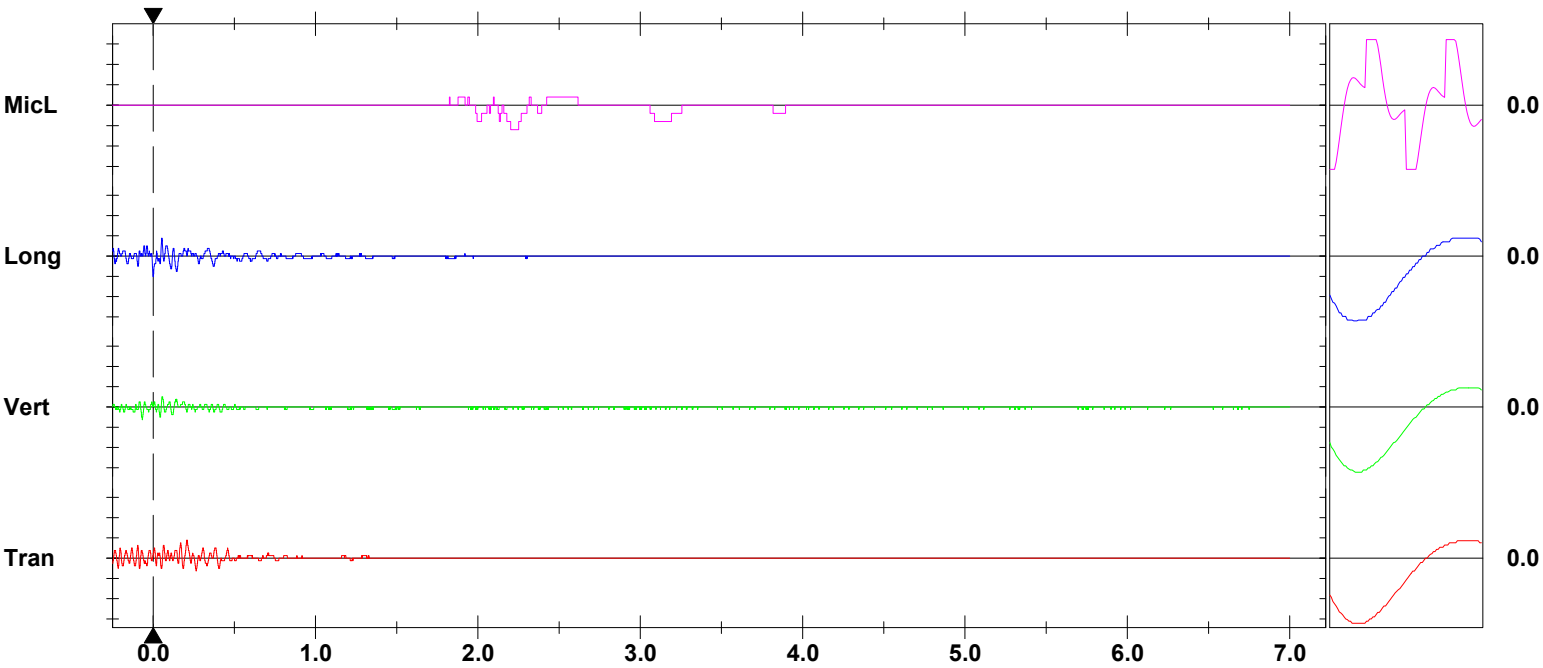
Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 2.203 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 301 mv)

	Tran	Vert	Long	
PPV	0.445	0.318	0.508	mm/s
ZC Freq	18	32	21	Hz
Time (Rel. to Trig)	0.207	-0.065	0.001	sec
Peak Acceleration	0.013	0.007	0.013	g
Peak Displacement	0.003	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	8.1	8.1	Hz
Overswing Ratio	3.8	3.6	3.8	

Peak Vector Sum 0.540 mm/s at 0.055 sec

Serial Number 5676 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 19, 2021 by Instantel
File Name G676IXCW.Q90
Post Event Notes
Location of Seismograph: Civic No. 2337 Route 820 (PW-04)
Blast No.: 2021-09
CE Project No.: 21S003.00





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

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575 Crown Street
Saint John, New Brunswick
E2L 5E9
Phone: (506) 635-7565
Fax: (506) 635-8866
www.conquest-eng.com

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Moncton
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April 12, 2021

Project No.: 21S003.00

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

Re: Blast Vibration Monitoring – Blast No. 2021-10 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated at 14:11 on April 12, 2021. For the monitoring we positioned ten (10) digital seismographs in the area. The location of each monitoring point is noted in the following table.

Blast No. 2021-10 – April 12, 2021

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)	14:11	1,032 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		892 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		739 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		949 m NE	< 0.5 mm/s	<120	
5. PW-03 - Route 820		678 m N	0.64 mm/s @ 34 Hz	106	-
6. Civic No. 2341 Route 820 (PW-05)		675 m N	0.70 mm/s @ 39 Hz	106	-
7. Civic No. 50 Myron Road (PW-15)		909 m NW	< 0.5 mm/s	<120	Unit was not triggered
8. Civic No. 86 Myron Road (PW-16)		776 m W	0.95 mm/s	112	Data was deleted prior to download
9. Civic No. 220 Myron Road (PW-01)		1,033 m S	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 4140 Route 111 (PW-12)		807 m SE	< 0.5 mm/s	<120	
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

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

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

Best regards,
CONQUEST ENGINEERING
A Division of CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Geotechnical Engineer

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Reports

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Saint John, New Brunswick
E2L 5E9
Phone: (506) 635-7565
Fax: (506) 635-8866
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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 12, 2021
Project No.:	21S003.00	**Time of Blast:**	14:11
Inspector:	B. Fillmore	**Blast No.:**	2021-10
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28'52.3" E 65º38'06.4"		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	19,561 tonnes
Weather at time of Blast:	Sunny with few clouds	**Air Temp.:**	12ºC
Est. Wind Speed :	≈20 km/h	**Wind Direction:**	NE
Cloud Cover:	Few	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	228	**Hole Diameter:**	4.5"
Average Depth:	3.7 – 4.9 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	6	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	17, 42 ms
Initiation Method:	Non -Electric		
Weight of Explosives per Delay:	Max.: 250 kg		
Type and weight of Explosives for Blast:	5,529 kg – Titan XL 1000		

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

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E2L 5E9
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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 12, 2021
Project No.:	21S003.00	**Time of Blast:**	14:11
Inspector:	B. Fillmore	**Blast No.:**	2021-10
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	675 m
Direction to the Nearest Structure:	North
Structure Type:	House
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	42.7

SAFETY:

Type of Warning Signal Used:	Air horn
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No
If Yes, Describe:	
Misfire (yes or no):	No

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

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Fax: (506) 635-8866
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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 12, 2021
Project No.:	21S003.00	**Time of Blast:**	14:11
Inspector:	B. Fillmore	**Blast No.:**	2021-10
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	June 12, 2021
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,032 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	June 12, 2020
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	892 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 12, 2021
Project No.:	21S003.00	**Time of Blast:**	14:11
Inspector:	B. Fillmore	**Blast No.:**	2021-10
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5635
Calibration Date:	March 23, 2021
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	739 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5676
Calibration Date:	February 19, 2021
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	949 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 12, 2021
Project No.:	21S003.00	**Time of Blast:**	14:11
Inspector:	B. Fillmore	**Blast No.:**	2021-10
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5372
Calibration Date:	February 8, 2021
Location of seismograph:	PW-03 - Route 820
Distance and Direction from Blast:	678 m North
Transverse Particle Velocity:	0.64 mm/s @ 34 Hz
Vertical Particle Velocity:	0.45 mm/s @ 51 Hz
Longitudinal Particle Velocity:	0.51 mm/s @ 39 Hz
Peak Particle Velocity:	0.64 mm/s @ 34 Hz
Maximum Airblast:	106 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	May 15, 2020
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	675 m North
Transverse Particle Velocity:	0.64 mm/s @ 47 Hz
Vertical Particle Velocity:	0.70 mm/s @ 39 Hz
Longitudinal Particle Velocity:	0.57 mm/s @ 73 Hz
Peak Particle Velocity:	0.70 mm/s @ 39 Hz
Maximum Airblast:	106 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 12, 2021
Project No.:	21S003.00	**Time of Blast:**	14:11
Inspector:	B. Fillmore	**Blast No.:**	2021-10
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 17, 2021
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	909 m Northwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5960
Calibration Date:	May 15, 2020
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	776 m West
Transverse Particle Velocity:	Not Available (NA) Data was deleted prior to download
Vertical Particle Velocity:	NA
Longitudinal Particle Velocity:	NA
Peak Particle Velocity:	0.95 mm/s
Maximum Airblast:	112 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 12, 2021
Project No.:	21S003.00	**Time of Blast:**	14:11
Inspector:	B. Fillmore	**Blast No.:**	2021-10
Client:	Hammond River Holdings		

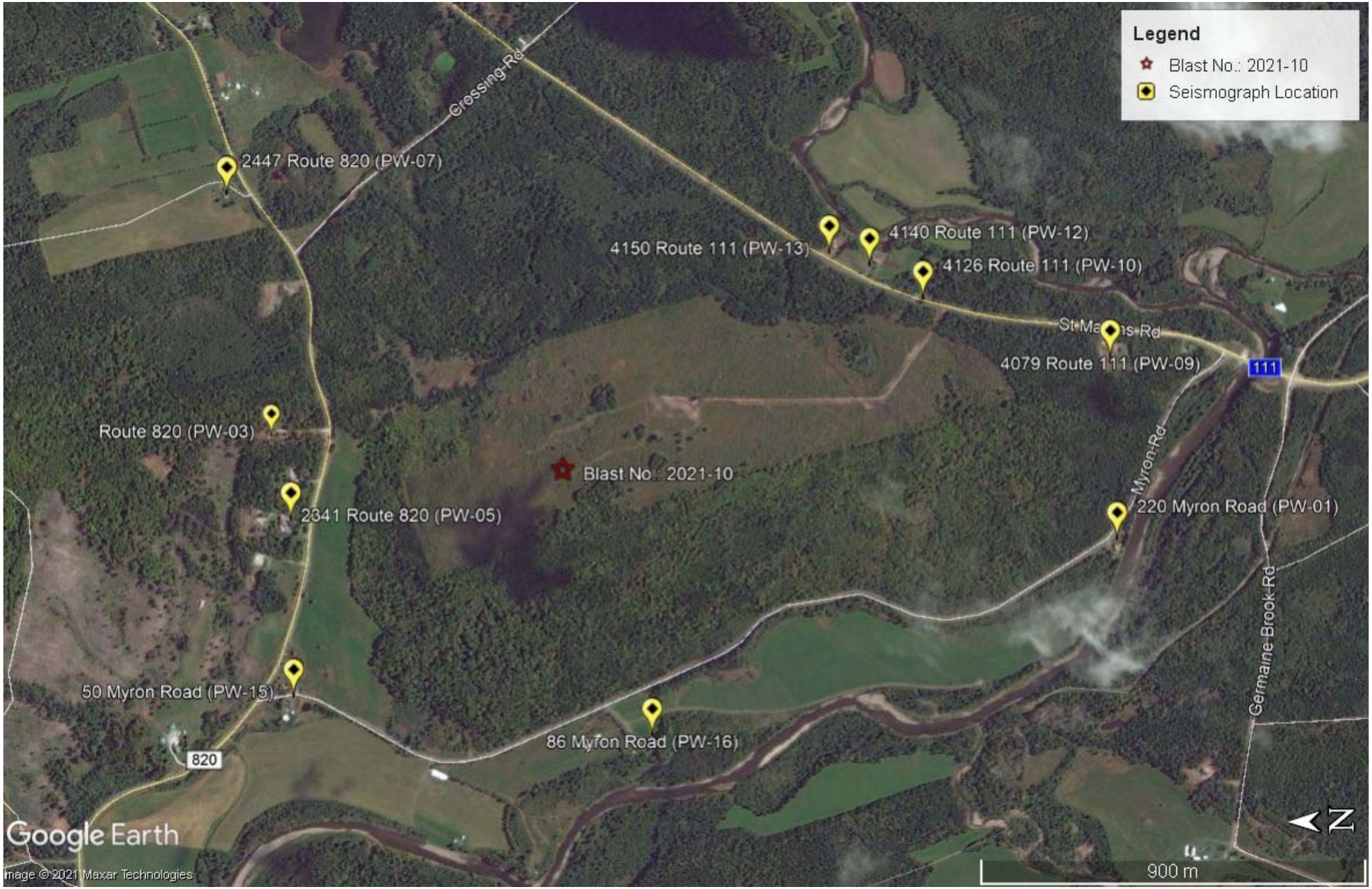
Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	October 20, 2020
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,033 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5673
Calibration Date:	March 12, 2021
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	807 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Blast and Seismograph Location Plan
Blast No: 2021-10
Upham East Gypsum Quarry, Upham, NB



Date: April 12, 2021
CE Project No.: 21S003.00

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Event Report

Date/Time Long at 14:11:22 April 12, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 12, 2021 16:16:18 (V10.72.1)

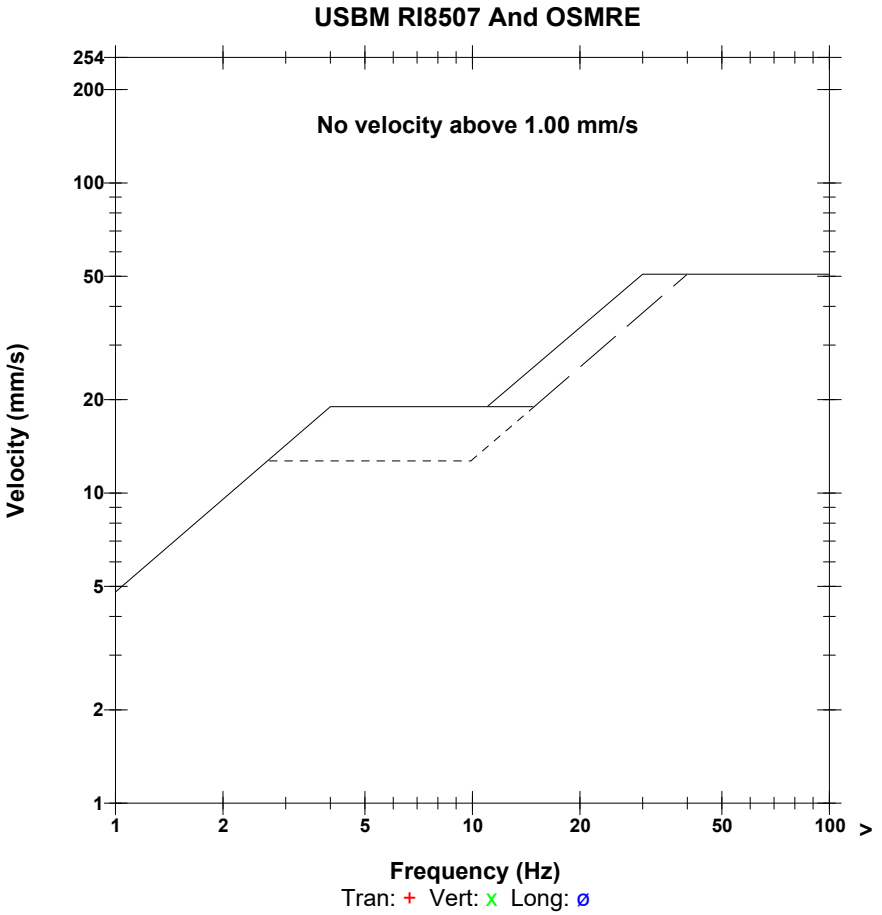
Extended Notes

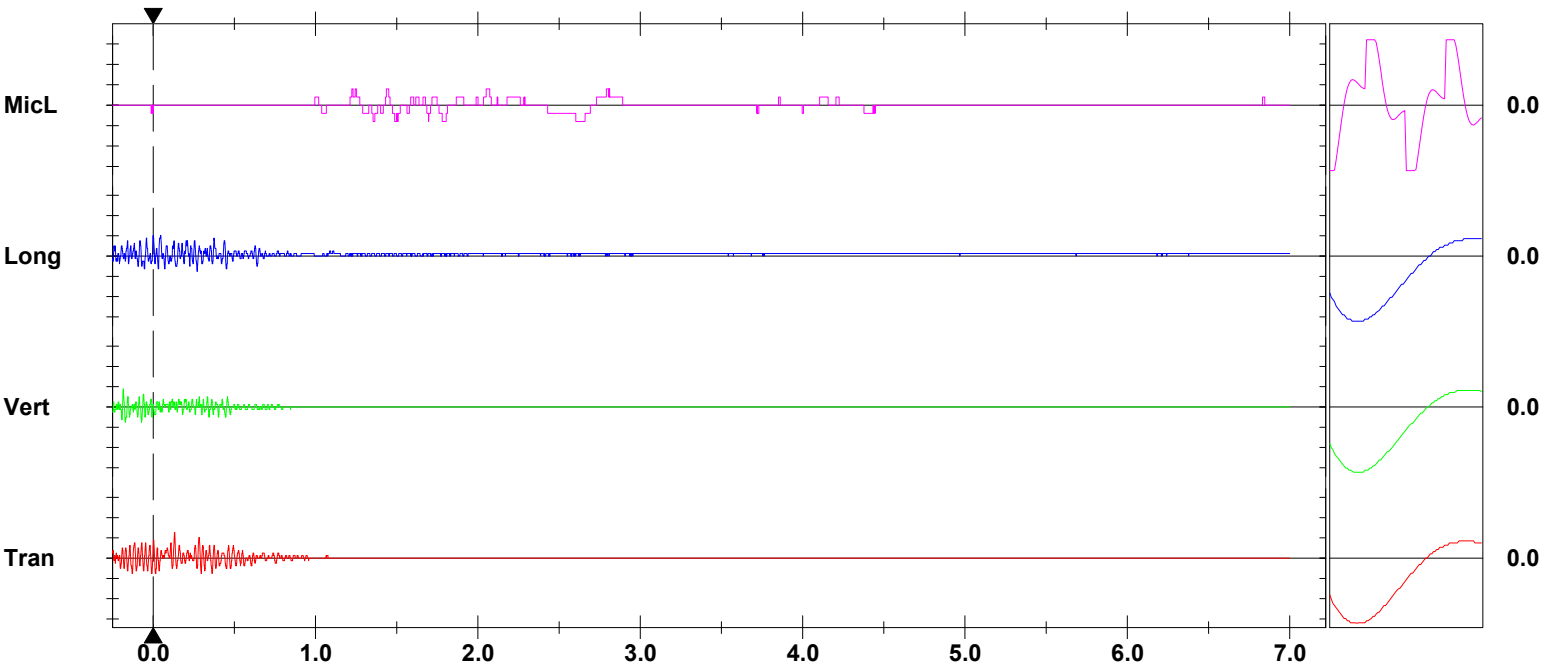
Microphone Linear Weighting
PSPL 106.0 dB(L) 4.000 pa.(L) at 1.225 sec
ZC Freq 8.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 295 mv)

	Tran	Vert	Long	
PPV	0.635	0.445	0.508	mm/s
ZC Freq	34	51	39	Hz
Time (Rel. to Trig)	0.133	-0.183	0.001	sec
Peak Acceleration	0.013	0.020	0.020	g
Peak Displacement	0.003	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	7.7	Hz
Overswing Ratio	3.4	3.6	4.2	

Peak Vector Sum 0.635 mm/s at 0.133 sec

Serial Number 5372 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 8, 2021 by Instantel
File Name G372IXNZ.EY0
Post Event Notes
Location of Seismograph: Cottage - Route 820 (PW-03)
Blast No.: 2021-10
CE Project No.: 21S003.00





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Vert at 14:11:21 April 12, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 12, 2021 16:20:07 (V10.72.1)

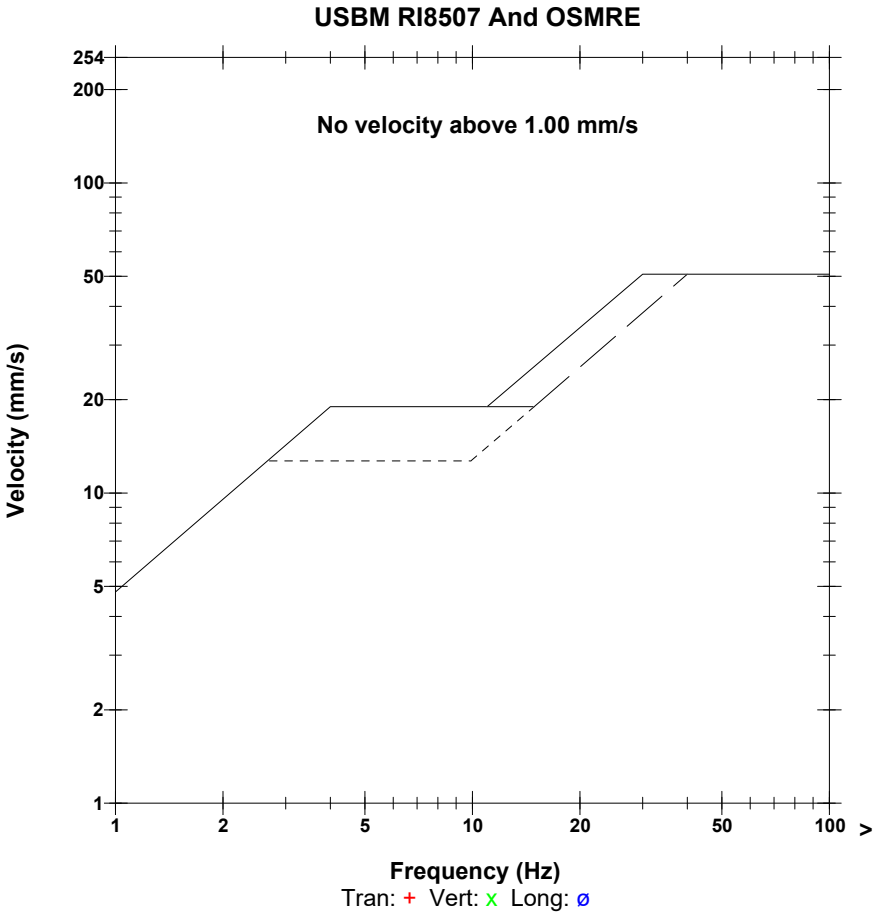
Extended Notes

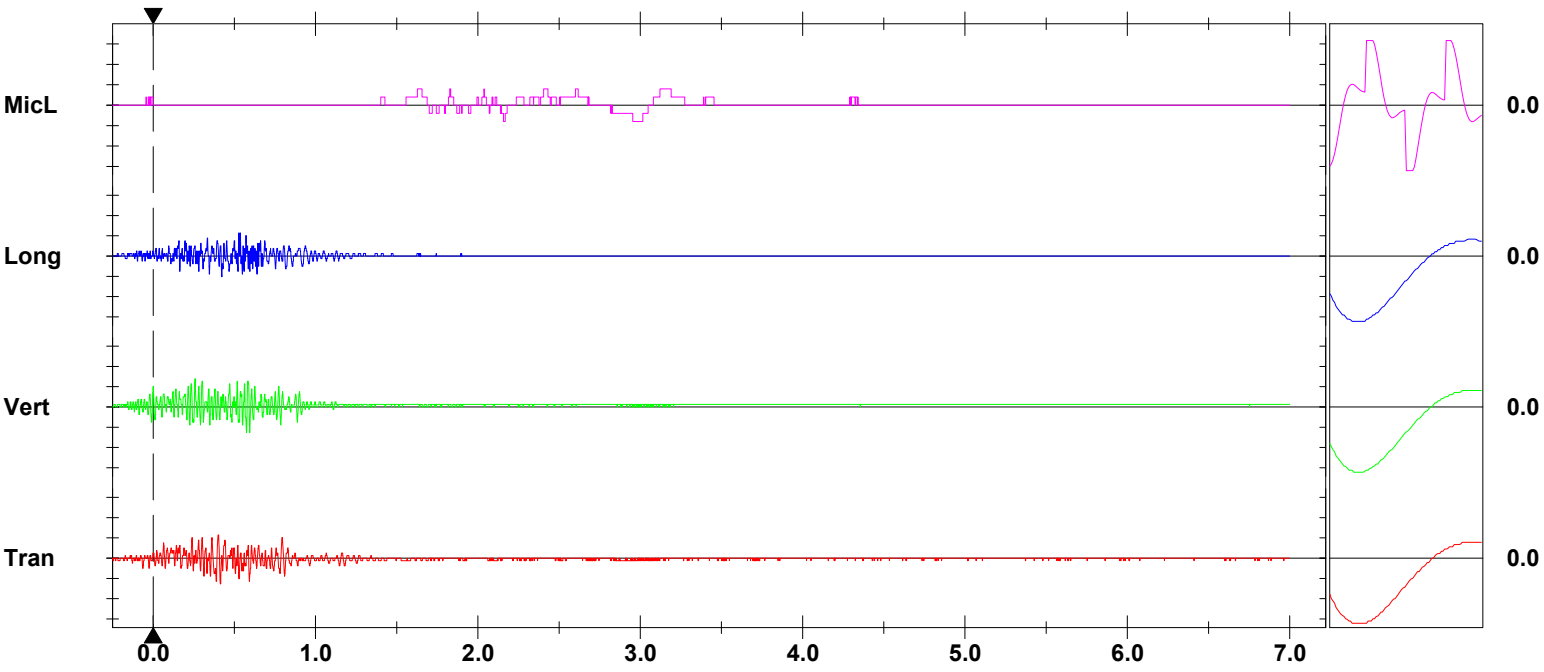
Microphone Linear Weighting
PSPL 106.0 dB(L) 4.000 pa.(L) at 1.628 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 273 mv)

	Tran	Vert	Long	
PPV	0.635	0.699	0.572	mm/s
ZC Freq	47	39	73	Hz
Time (Rel. to Trig)	0.414	0.259	0.528	sec
Peak Acceleration	0.020	0.033	0.027	g
Peak Displacement	0.004	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.7	Hz
Overswing Ratio	4.0	4.0	3.9	

Peak Vector Sum 0.857 mm/s at 0.596 sec

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration May 15, 2020 by Instantel
File Name G489IXNZ.EX0
Post Event Notes
Location of Seismograph: Civic No. 2341 Route 820 (PW-05)
Blast No.: 2021-10
CE Project No.: 21S003.00





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

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April 25, 2021

Project No.: 21S003.00

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

Re: Blast Vibration Monitoring – Blast No. 2021-11 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated at 14:01 on April 23, 2021. 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. 2021-11 – April 23, 2021

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)	14:01	1,310 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		876 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		712 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		920 m NE	< 0.5 mm/s	<120	
5. PW-03 - Route 820		682 m N	0.57 mm/s @ 39 Hz	114	-
6. Civic No. 2341 Route 820 (PW-05)		695 m N	0.70 mm/s @ 39 Hz	112	-
7. Civic No. 50 Myron Road (PW-15)		948 m NW	0.51 mm/s @ 64 Hz	110	-
8. Civic No. 86 Myron Road (PW-16)		828 m W	2.86 mm/s @ 51 Hz	112	-
9. Civic No. 220 Myron Road (PW-01)		1,350 m S	< 0.5 mm/s	<120	Unit was not triggered
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

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

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

Best regards,
CONQUEST ENGINEERING
A Division of CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Geotechnical Engineer

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Reports

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 23, 2021
Project No.:	21S003.00	**Time of Blast:**	14:01
Inspector:	B. Fillmore	**Blast No.:**	2021-11
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28'52.36" E 65º37'58.89"		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	13,127 tonnes
Weather at time of Blast:	Partially sunny	**Air Temp.:**	6ºC
Est. Wind Speed :	≈10 km/h	**Wind Direction:**	W
Cloud Cover:	Yes	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	91	**Hole Diameter:**	4.5"
Average Depth:	6.2 – 9.1 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	4	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	17, 42 ms
Initiation Method:	Non -Electric		
Weight of Explosives per Delay:	Max.: 216 kg		
Type and weight of Explosives for Blast:	4,466 kg – Titan XL 1000		

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 23, 2021
Project No.:	21S003.00	**Time of Blast:**	14:01
Inspector:	B. Fillmore	**Blast No.:**	2021-11
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	682 m
Direction to the Nearest Structure:	North
Structure Type:	Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	46.4

SAFETY:

Type of Warning Signal Used:	Air horn
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No
If Yes, Describe:	
Misfire (yes or no):	No

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 23, 2021
Project No.:	21S003.00	**Time of Blast:**	14:01
Inspector:	B. Fillmore	**Blast No.:**	2021-11
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	June 24, 2020
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,310 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	October 22, 2020
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	876 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 23, 2021
Project No.:	21S003.00	**Time of Blast:**	14:01
Inspector:	B. Fillmore	**Blast No.:**	2021-11
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	June 12, 2020
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	712 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5676
Calibration Date:	February 19, 2021
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	920 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 23, 2021
Project No.:	21S003.00	**Time of Blast:**	14:01
Inspector:	B. Fillmore	**Blast No.:**	2021-11
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5635
Calibration Date:	March 22, 2021
Location of seismograph:	PW-03 - Route 820
Distance and Direction from Blast:	682 m North
Transverse Particle Velocity:	0.57 mm/s @ 39 Hz
Vertical Particle Velocity:	0.38 mm/s @ 34 Hz
Longitudinal Particle Velocity:	0.45 mm/s @ 47 Hz
Peak Particle Velocity:	0.57 mm/s @ 39 Hz
Maximum Airblast:	114 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 17, 2021
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	695 m North
Transverse Particle Velocity:	0.70 mm/s @ 28 Hz
Vertical Particle Velocity:	0.57 mm/s @ 47 Hz
Longitudinal Particle Velocity:	0.70 mm/s @ 39 Hz
Peak Particle Velocity:	0.70 mm/s @ 28 Hz
Maximum Airblast:	112 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 23, 2021
Project No.:	21S003.00	**Time of Blast:**	14:01
Inspector:	B. Fillmore	**Blast No.:**	2021-11
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5673
Calibration Date:	March 12, 2021
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	948 m Northwest
Transverse Particle Velocity:	0.51 mm/s @ 64 Hz
Vertical Particle Velocity:	0.51 mm/s @ 73 Hz
Longitudinal Particle Velocity:	0.38 mm/s @ 47 Hz
Peak Particle Velocity:	0.51 mm/s @ 64 Hz
Maximum Airblast:	110 dB(L)

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5960
Calibration Date:	May 15, 2020
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	828 m West
Transverse Particle Velocity:	1.02 mm/s @ 39 Hz
Vertical Particle Velocity:	0.57 mm/s @ 34 Hz
Longitudinal Particle Velocity:	2.86 mm/s @ 51 Hz
Peak Particle Velocity:	2.86 mm/s @ 51 Hz
Maximum Airblast:	112 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	April 23, 2021
Project No.:	21S003.00	**Time of Blast:**	14:01
Inspector:	B. Fillmore	**Blast No.:**	2021-11
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	June 12. 2020
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,350 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Blast and Seismograph Location Plan
Blast No: 2021-11
Upham East Gypsum Quarry, Upham, NB

Date: April 23, 2021
CE Project No.: 21S003.00

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Event Report

Date/Time Tran at 14:01:42 April 23, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 23, 2021 16:31:58 (V10.72.1)

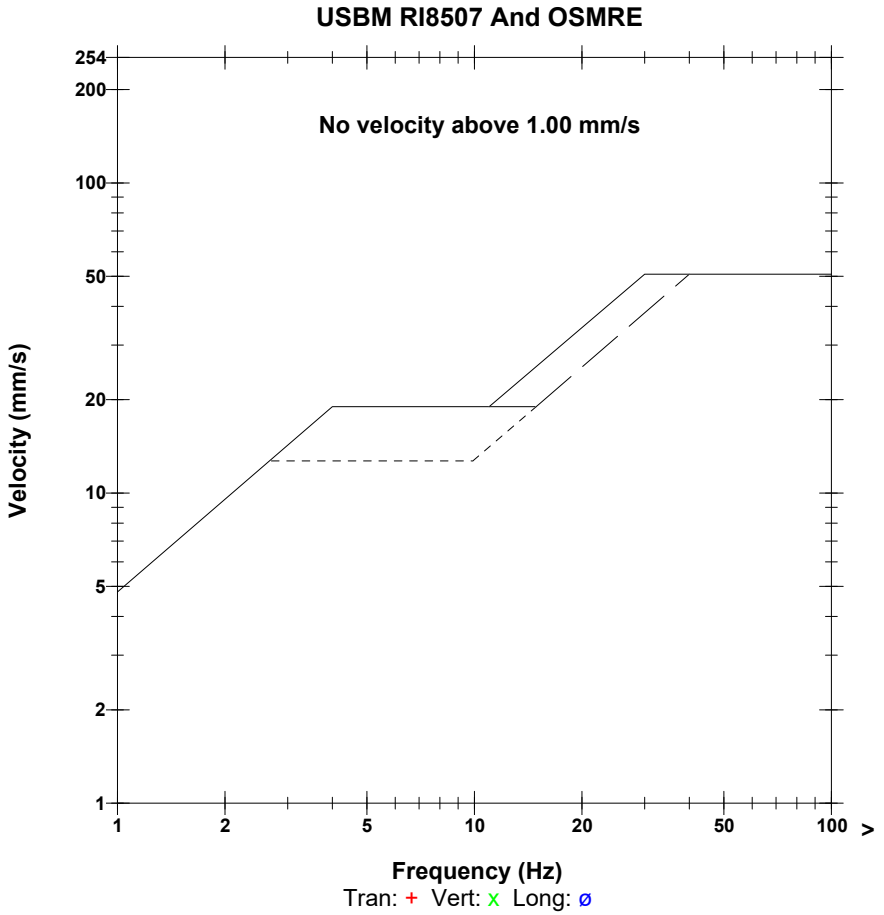
Extended Notes

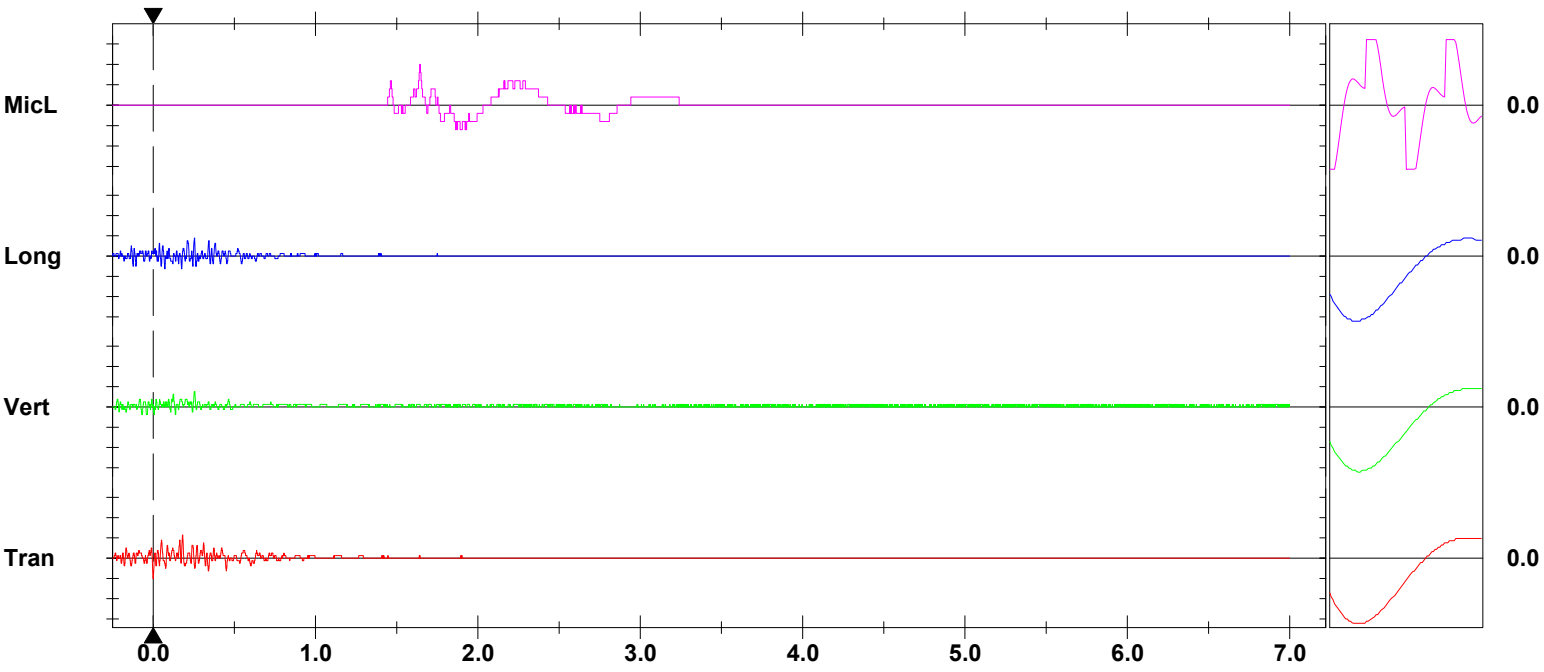
Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 1.642 sec
ZC Freq 5.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 299 mv)

	Tran	Vert	Long	
PPV	0.572	0.381	0.445	mm/s
ZC Freq	39	34	47	Hz
Time (Rel. to Trig)	0.182	0.254	0.255	sec
Peak Acceleration	0.013	0.013	0.013	g
Peak Displacement	0.002	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.0	Hz
Overswing Ratio	3.2	3.7	3.7	

Peak Vector Sum 0.619 mm/s at 0.255 sec

Serial Number 5635 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration March 23, 2021 by Instantel
File Name G635IY8C.AU0
Post Event Notes
Location of Seismograph: Cottage on Route 820 (PW-03)
Blast No.: 2021-11
CE Project No.: 21S003.00





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

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Event Report

Date/Time Long at 14:01:43 April 23, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 23, 2021 16:23:31 (V10.72.1)

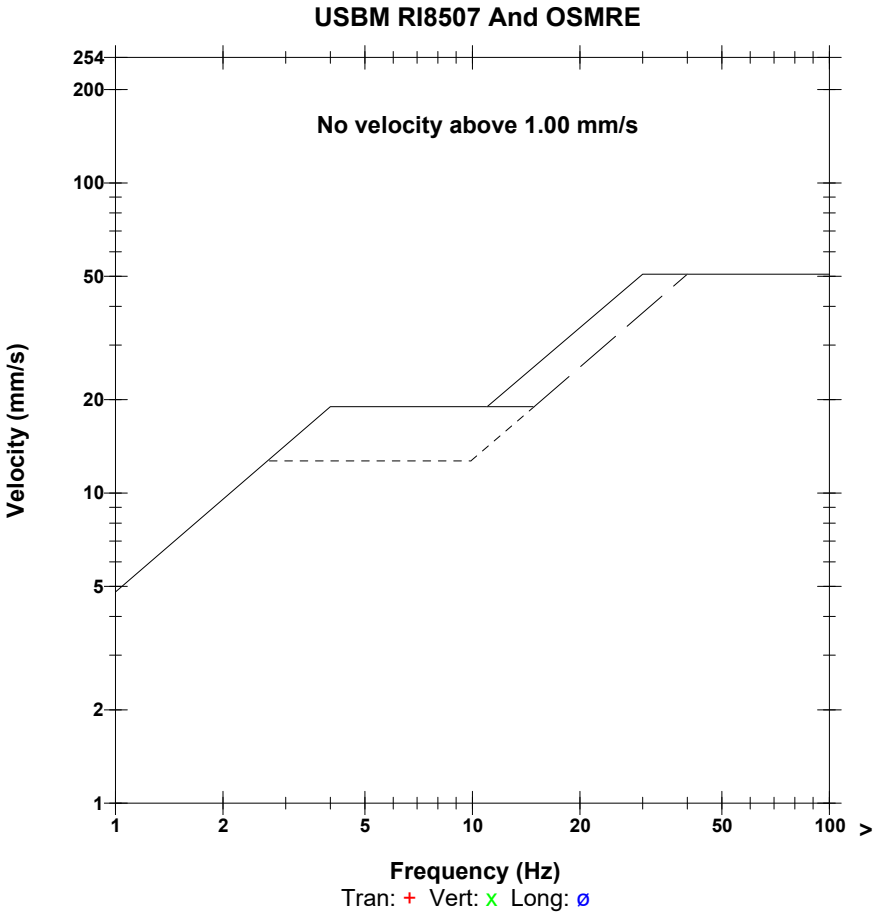
Extended Notes

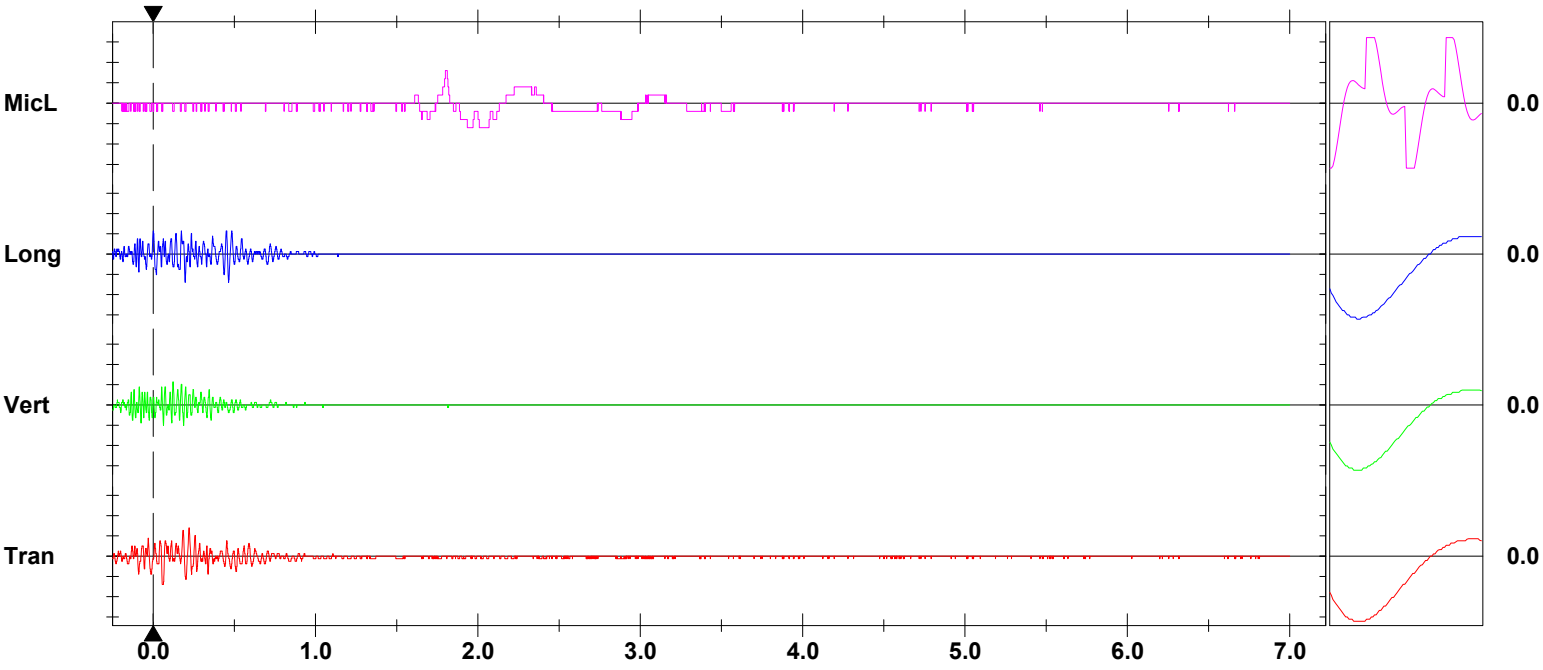
Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 1.801 sec
ZC Freq 7.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 288 mv)

	Tran	Vert	Long	
PPV	0.699	0.572	0.699	mm/s
ZC Freq	28	47	39	Hz
Time (Rel. to Trig)	0.057	0.122	0.197	sec
Peak Acceleration	0.020	0.027	0.020	g
Peak Displacement	0.005	0.002	0.003	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 0.921 mm/s at 0.198 sec

Serial Number 5487 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 17, 2021 by Instantel
File Name G487IY8C.AV0
Post Event Notes
Location of Seismograph: Civic No. 2341 Route 820 (PW-05)
Blast No.: 2021-11
CE Project No.: 21S003.00





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Vert at 14:01:39 April 23, 2021
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

Notes
Location:
Client:
User Name:
Converted: April 23, 2021 16:25:54 (V10.72.1)

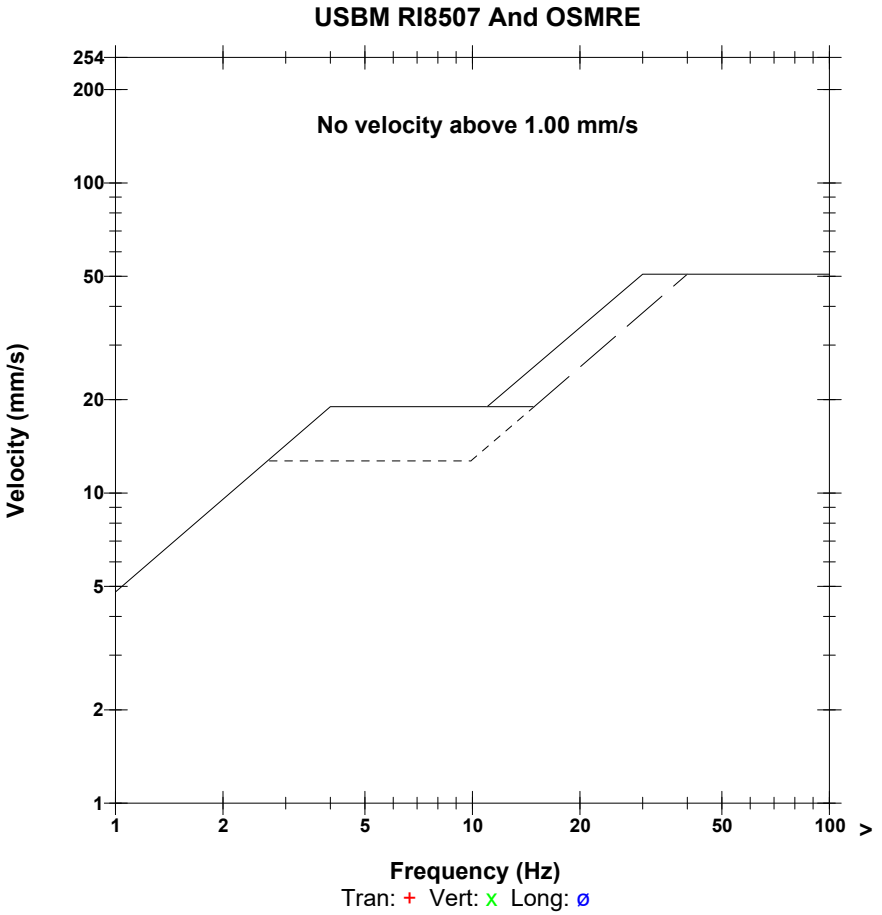
Extended Notes

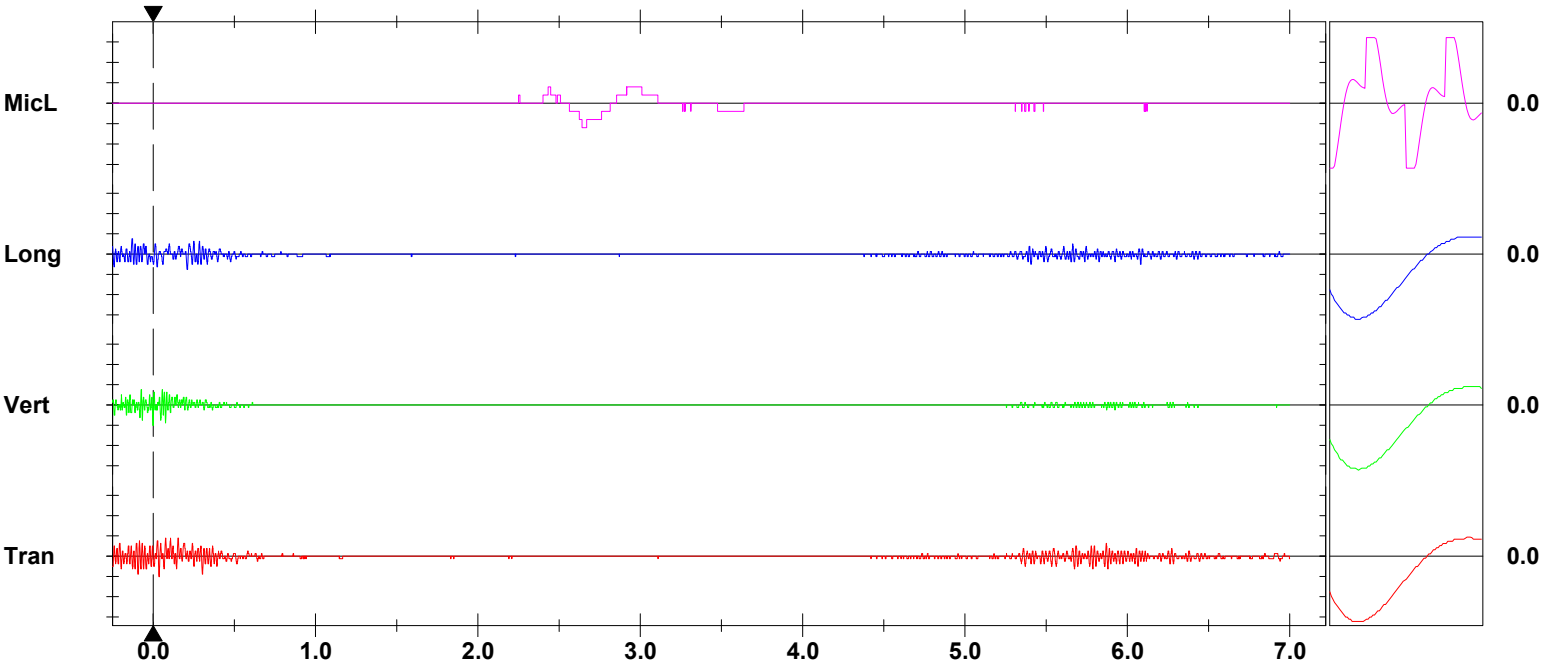
Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 2.643 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 307 mv)

	Tran	Vert	Long	
PPV	0.508	0.508	0.381	mm/s
ZC Freq	64	73	47	Hz
Time (Rel. to Trig)	0.037	0.000	-0.127	sec
Peak Acceleration	0.020	0.027	0.013	g
Peak Displacement	0.001	0.001	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	7.8	Hz
Overswing Ratio	3.6	3.7	3.9	

Peak Vector Sum 0.635 mm/s at 0.077 sec

Serial Number 5673 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration March 12, 2021 by Instantel
File Name G673IY8C.AR0
Post Event Notes
Location of Seismograph: Civic No. 50 Myron Road (PW-15)
Blast No.: 2021-11
CE Project No.: 21S003.00





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

Format © 1995-2015 Xmark Corporation

Event Report

Date/Time Long at 14:01:37 April 23, 2021
Trigger Source Geo: 0.492 mm/s, Mic: 120.0 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Notes
Location:
Client:
User Name:
Converted: April 23, 2021 16:18:31 (V10.72.1)

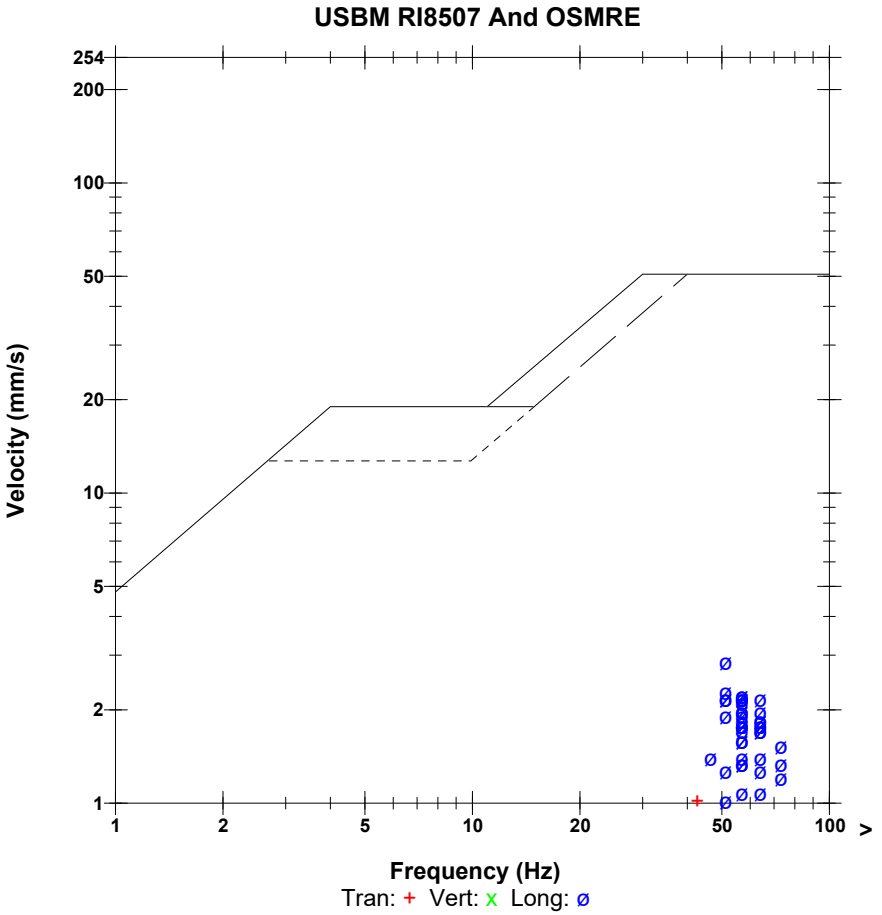
Extended Notes

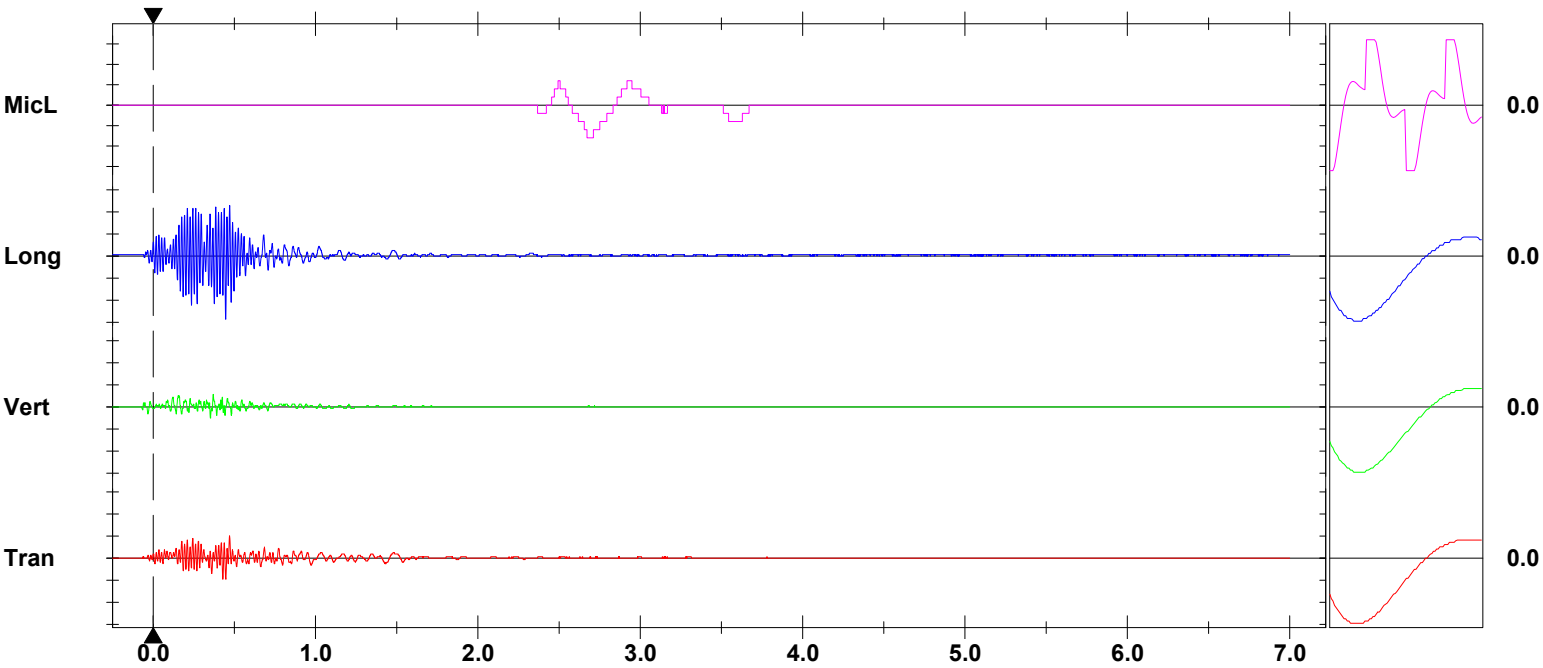
Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 2.673 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 299 mv)

	Tran	Vert	Long	
PPV	1.016	0.572	2.858	mm/s
ZC Freq	39	34	51	Hz
Time (Rel. to Trig)	0.472	0.371	0.447	sec
Peak Acceleration	0.033	0.020	0.093	g
Peak Displacement	0.004	0.003	0.009	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.7	8.0	Hz
Overswing Ratio	3.7	3.7	3.8	

Peak Vector Sum 3.016 mm/s at 0.447 sec

Serial Number 5960 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration May 15, 2020 by Instantel
File Name G960IY8C.AP0
Post Event Notes
Location of Seismograph: Civic No. 86 Myron Road (PW-16)
Blast No.: 2021-11
CE Project No.: 21S003.00





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 1.000 mm/s/div Mic: 5.000 pa.(L)/div Sensor Check
Trigger =

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