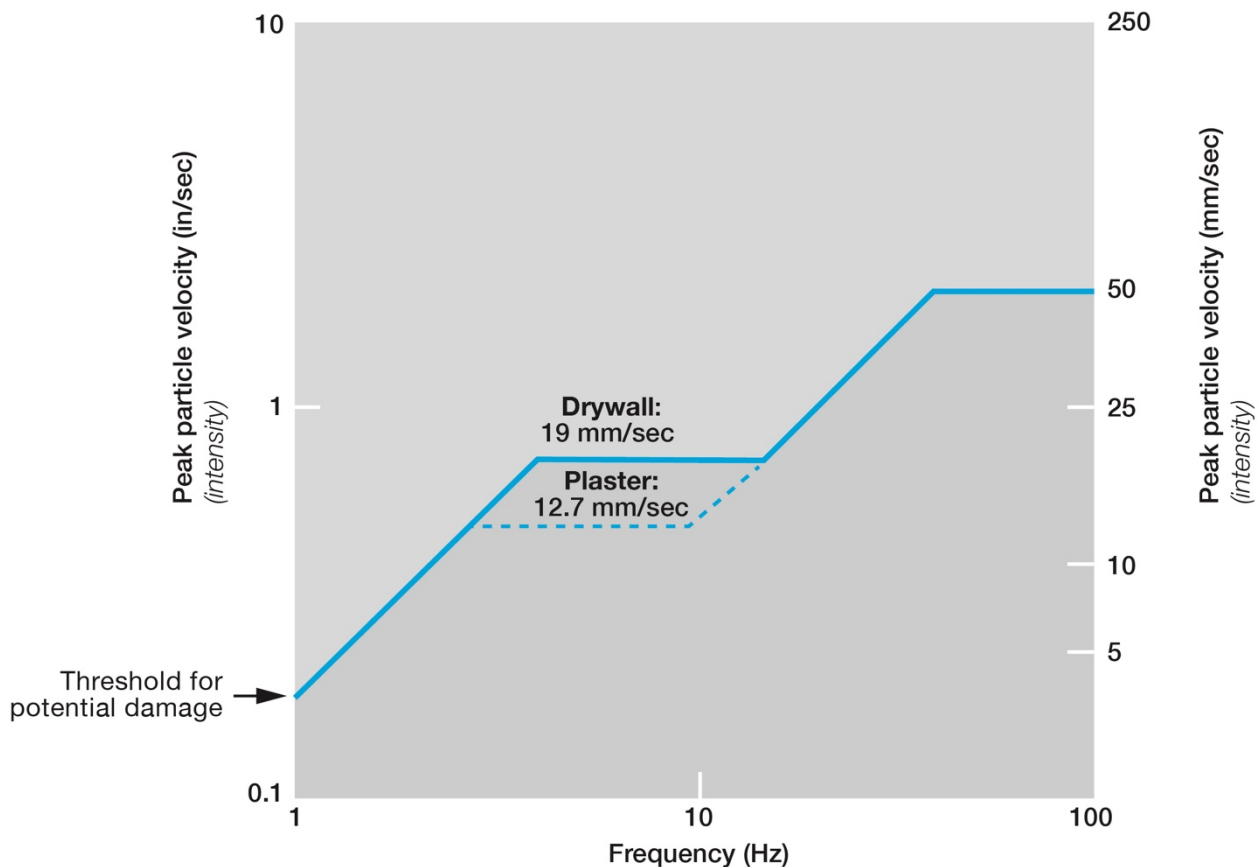


Understanding the Z-Curve

The Z-Curve line establishes a limit above which damage becomes possible, but it is crucial to note that damage does not automatically occur once this limit is breached. Damage would not actually occur in the average residence until ground vibrations reached significantly higher intensities than those outlined by the USBM Z-Curve. If the Z-Curve criteria is exceeded, the probability of damage is merely introduced and will incrementally increase with higher and higher vibration amplitudes.

USBM Z-CURVE (USBM RI 8507)
Threshold damage vibration criteria



Vibrations are occurring around us every day and are highly subjective. Each individual's perception and tolerance will influence the degree to which vibrations are a nuisance or objectionable. Humans and animals are far more sensitive to vibrations than a two-storey timber framed house, bridge or other structures.

Permanent Monitoring Units

West Calgary Ring Road			92 Cougarstone Manor SW, Calgary, AB		9555 2 Avenue SW, Calgary, AB		97 Cougar Ridge Close SW, Calgary, AB		130 Cougarstone Close SW, Calgary, AB		77 Cougar Ridge Close SW, Calgary, AB		ATCO Gasline	128 Cougarstone Manor SW, Calgary, AB		152 Cougarstone Common SW, Calgary, AB		135 Cougarstone Common SW, Calgary, AB	
Blast Date:	Blast no.	Blast time:	PPV	AOP	PPV	AOP	PPV	AOP	PPV	AOP	PPV	AOP	PVS	PPV	AOP	PPV	AOP	PPV	AOP
4-Aug-20	WCRR-140	16:05	1.14mm/s	113.5dB(L)	1.02mm/s	114.0dB(L)	8.13mm/s	117.6dB(L)	0.25mm/s	105.5dB(L)	3.18mm/s	117.1dB(L)	1.85mm/s	1.40mm/s	106.5dB(L)	0.64mm/s	106.0dB(L)	0.64mm/s	101.0dB(L)
5-Aug-20	WCRR-141	16:09	0.64mm/s	106.5dB(L)	2.41mm/s	117.9dB(L)	1.91mm/s	110.2dB(L)	0.38mm/s	102.8dB(L)	1.14mm/s	109.2dB(L)	2.24mm/s	1.14mm/s	115.2dB(L)	0.64mm/s	102.8dB(L)	0.38mm/s	97.5dB(L)
6-Aug-20	WCRR-142	16:05	1.65mm/s	115.0dB(L)	1.91mm/s	122.5dB(L)	3.05mm/s	116.1dB(L)	0.51mm/s	118.6dB(L)	2.67mm/s	118.7dB(L)	4.56mm/s	3.56mm/s	122.4dB(L)	1.27mm/s	114.6dB(L)	0.89mm/s	117.9dB(L)
8-Aug-20	WCRR-143	16:02	1.40mm/s	127.1dB(L)	1.27mm/s	123.8dB(L)	6.10mm/s	115.7dB(L)	0.51mm/s	131.1dB(L)	3.18mm/s	128.7dB(L)	1.61mm/s	5.59mm/s	131.3dB(L)	4.19mm/s	117.2dB(L)	0.89mm/s	117.4dB(L)

**Click on a highlighted cell to view the seismograph report for the corresponding date and location.*

Date/Time Tran At 15:49:39 August 4, 2020
 Trigger Source Geo: 5.00 mm/s
 Range Geo: 254 mm/s
 Sample Rate 5.0 sec. At 1024 Sps
 Job Number 8177

Serial Number BE11251 V 10.72-8.17 MiniMate Plus
 Battery Level 6.6 Volts
 Unit Calibration October 23, 2019 by Instantel
 File Name M2511KPF.YROW

Notes

Location: 97 Cougar Ridge Close SW, Calgary, AB
 Client: McCaw's Drilling and Blasting
 User Name: Explotech Engineering Ltd.
 General: Sandbagged on ground

Post Event Notes

Extended Notes

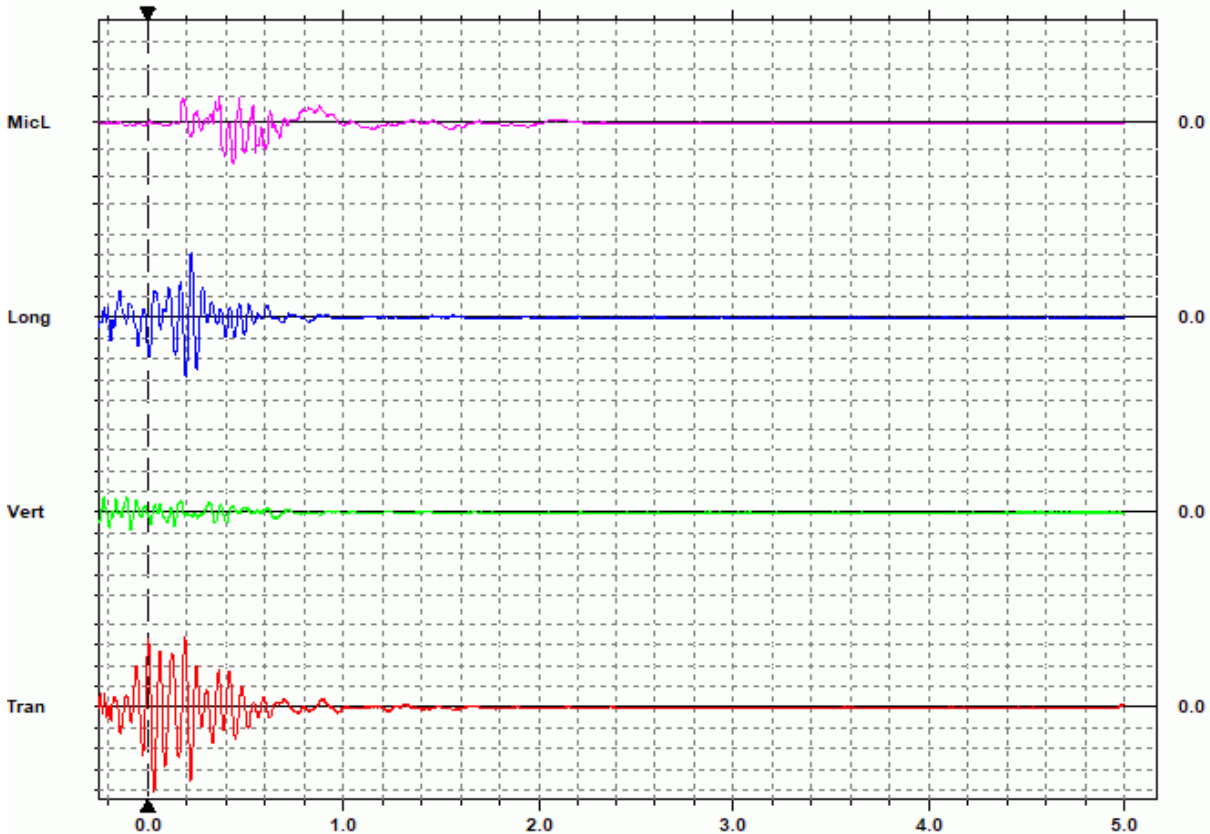
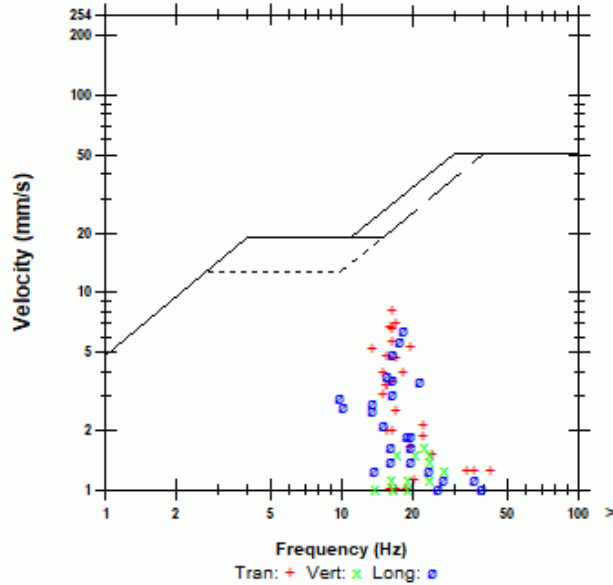
Combo Mode August 4, 2020 05:16:47
 Geophone is sandbagged under the stairs of the backyard deck at 97 Cougar Ridge Close SW adjacent ongoing blasting operations.

Microphone Linear Weighting
 PSPL 117.6 dB(L) at 0.440 sec.
 ZC Freq 16 Hz.
 Channel Test Disabled

	Tran	Vert	Long	
PPV	8.13	1.65	6.48	mm/s
ZC Freq	17	22	18	Hz
Time (Rel. to Trig)	0.034	-0.085	0.225	sec
Peak Acceleration	0.0928	0.0265	0.0795	g
Peak Displacement	0.0775	0.0138	0.0547	mm
Sensor Check	Disabled	Disabled	Disabled	

Peak Vector Sum 9.44 mm/s At 0.224 sec.

USBM R18507 And OSMRE



Time(Seconds) 0.20 sec/div Amplitude Geo: 2.00 mm/s/div Mic: 10.00 pa.(L)/div
 Trigger =

Date/Time Tran At 15:49:39 August 4, 2020
Trigger Source Geo: 5.00 mm/s
Range Geo: 254 mm/s
Sample Rate 5.0 sec. At 1024 Sps
Job Number 8177

Serial Number BE11251 V 10.72-8.17 MiniMate Plus
Battery Level 6.6 Volts
Unit Calibration October 23, 2019 by Instantel
File Name M251IKPF.YR0W

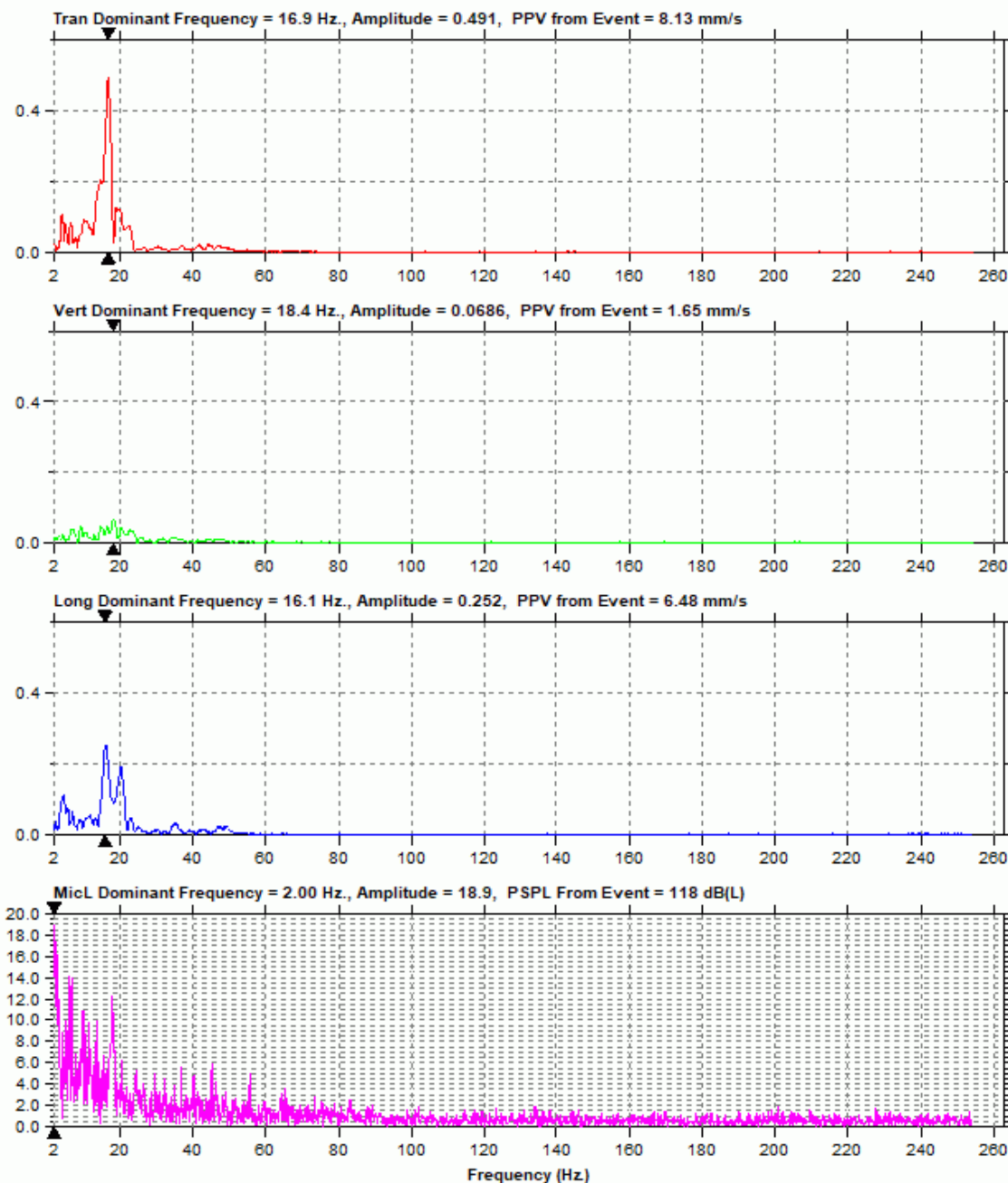
Notes

Location: 97 Cougar Ridge Close SW, Calgary, AB
Client: McCaw's Drilling and Blasting
User Name: Explotech Engineering Ltd.
General: Sandbagged on ground

Extended Notes

Combo Mode August 4, 2020 05:16:47
Geophone is sandbagged under the stairs of the backyard deck at 97 Cougar Ridge Close SW adjacent ongoing blasting operations.

Post Event Notes



Date/Time Tran At 15:46:55 August 8, 2020
 Trigger Source Geo: 5.00 mm/s
 Range Geo: 254 mm/s
 Sample Rate 5.0 sec. At 1024 Sps
 Job Number 8177

Serial Number BE11251 V 10.72-8.17 MiniMate Plus
 Battery Level 6.8 Volts
 Unit Calibration October 23, 2019 by InstanTel
 File Name M251IKWU.170W

Notes

Location: 97 Cougar Ridge Close SW, Calgary, AB
 Client: McCaw's Drilling and Blasting
 User Name: Explotech Engineering Ltd.
 General: Sandbagged on ground

Post Event Notes

Extended Notes

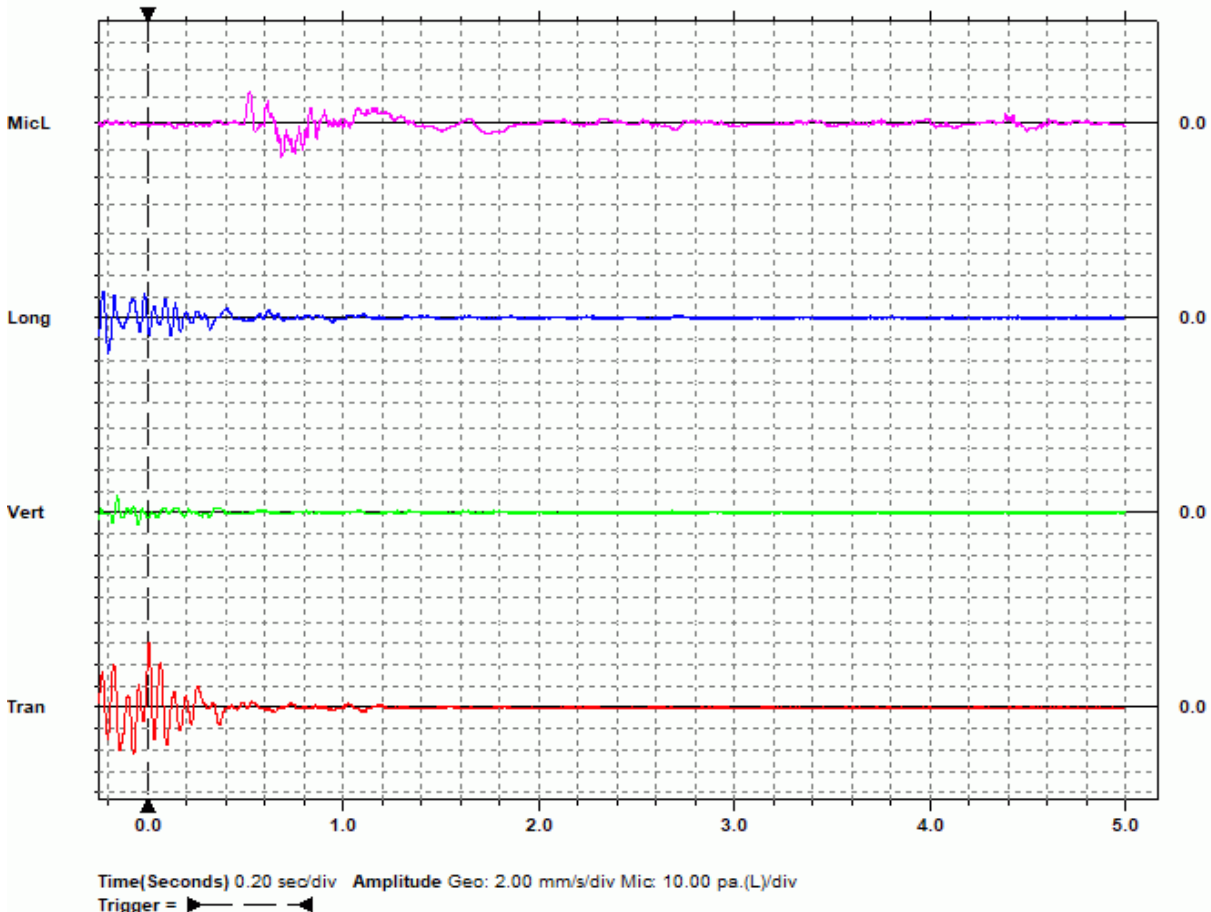
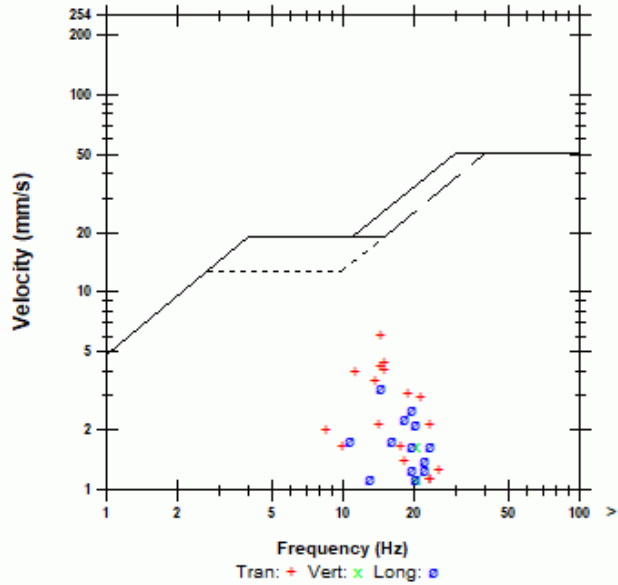
Combo Mode August 8, 2020 05:16:49
 Geophone is sandbagged under the stairs of the backyard deck at 97 Cougar Ridge Close SW adjacent ongoing blasting operations.

Microphone Linear Weighting
 PSPL 115.7 dB(L) at 0.684 sec.
 ZC Freq 2.9 Hz.
 Channel Test Disabled

	Tran	Vert	Long	
PPV	6.10	1.65	3.30	mm/s
ZC Freq	15	20	15	Hz
Time (Rel. to Trig)	0.006	-0.157	-0.203	sec
Peak Acceleration	0.0663	0.0265	0.0398	g
Peak Displacement	0.0620	0.0120	0.0358	mm
Sensor Check	Disabled	Disabled	Disabled	

Peak Vector Sum 6.33 mm/s At 0.007 sec.

USBM RI8507 And OSMRE



Date/Time Tran At 15:46:55 August 8, 2020
Trigger Source Geo: 5.00 mm/s
Range Geo: 254 mm/s
Sample Rate 5.0 sec. At 1024 Sps
Job Number 8177

Serial Number BE11251 V 10.72-8.17 MiniMate Plus
Battery Level 6.8 Volts
Unit Calibration October 23, 2019 by InstanTel
File Name M251IKWU.170W

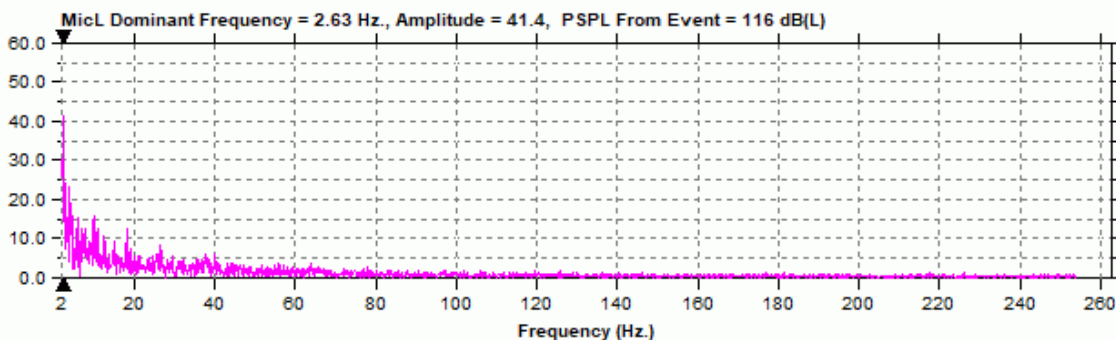
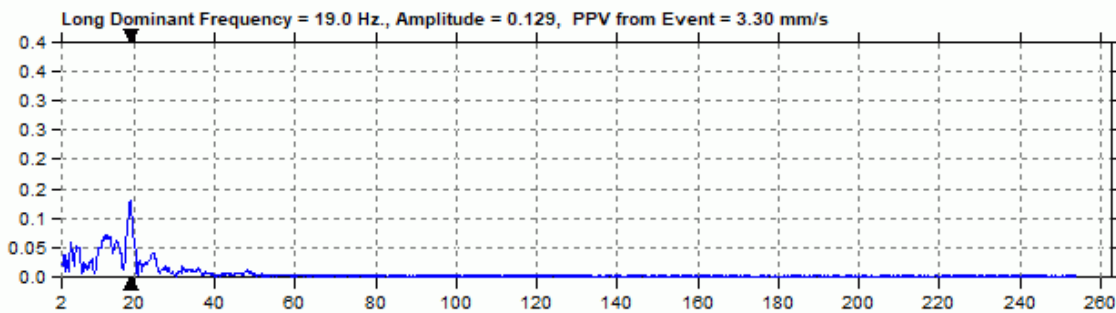
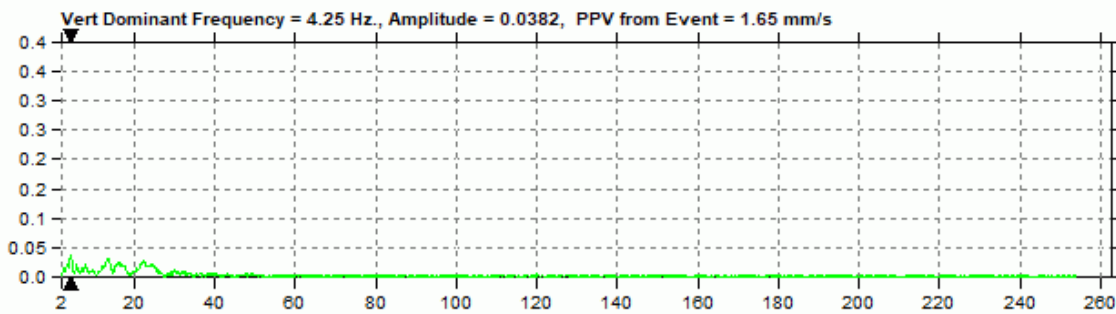
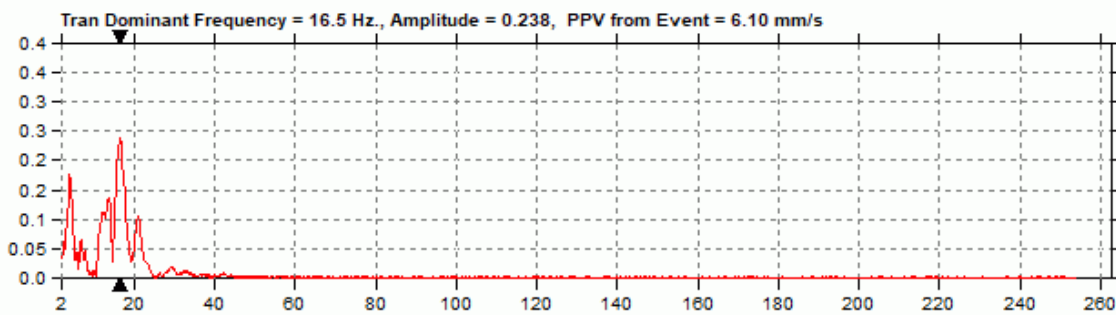
Notes

Location: 97 Cougar Ridge Close SW, Calgary, AB
Client: McCaw's Drilling and Blasting
User Name: Explotech Engineering Ltd.
General: Sandbagged on ground

Extended Notes

Combo Mode August 8, 2020 05:16:49
Geophone is sandbagged under the stairs of the backyard deck at 97 Cougar Ridge Close SW adjacent ongoing blasting operations.

Post Event Notes



Date/Time Vert At 15:48:46 August 8, 2020
Trigger Source Geo: 5.00 mm/s
Range Geo: 254 mm/s
Sample Rate 5.0 sec. At 1024 Sps
Job Number 8177

Serial Number BE9028 V 10.72-8.17 MiniMate Plus
Battery Level 6.6 Volts
Unit Calibration December 10, 2019 by InstanTel
File Name K028IKWU.LA0W

Notes

Location: 128 Cougarstone Manor SW, Calgary, AB
Client: McCaw's Drilling and Blasting
User Name: Explotech Engineering Ltd.
General: Sandbagged on ground

Post Event Notes

Extended Notes

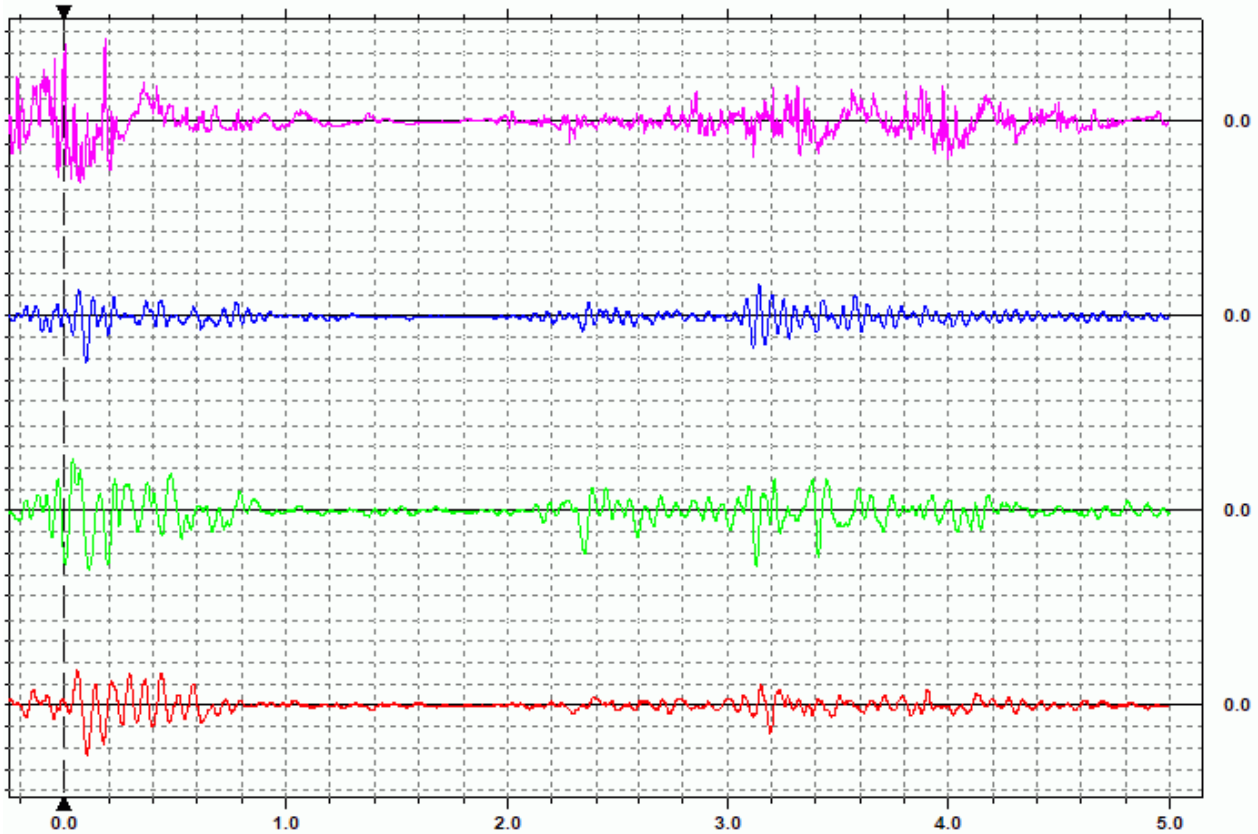
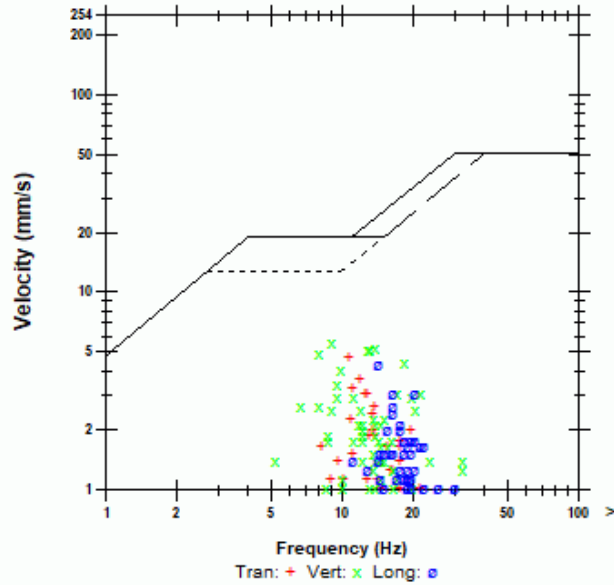
Combo Mode August 8, 2020 15:40:14
 Geophone is sandbagged in the backyard of 128 Cougarstone Manor SW adjacent ongoing blasting operations.

Microphone Linear Weighting
PSPL 131.3 dB(L) at 0.183 sec.
ZC Freq 27 Hz.
Channel Test Disabled

	Tran	Vert	Long	
PPV	4.70	5.59	4.32	mm/s
ZC Freq	11	9.0	14	Hz
Time (Rel. to Trig)	0.101	0.107	0.096	sec
Peak Acceleration	0.0398	0.0663	0.0398	g
Peak Displacement	0.0654	0.0987	0.0478	mm
Sensor Check	Disabled	Disabled	Disabled	

Peak Vector Sum 7.78 mm/s At 0.101 sec.

USBM RI8507 And OSMRE



Time(Seconds) 0.20 sec/div **Amplitude** Geo: 2.00 mm/s/div Mic: 20.0 pa.(L)/div
Trigger =

Date/Time Vert At 15:48:46 August 8, 2020
Trigger Source Geo: 5.00 mm/s
Range Geo: 254 mm/s
Sample Rate 5.0 sec. At 1024 Sps
Job Number 8177

Serial Number BE9028 V 10.72-8.17 MiniMate Plus
Battery Level 6.6 Volts
Unit Calibration December 10, 2019 by Instantel
File Name K028IKWU.LA0W

Notes

Location: 128 Cougarstone Manor SW, Calgary, AB
Client: McCaw's Drilling and Blasting
User Name: Explotech Engineering Ltd.
General: Sandbagged on ground

Extended Notes

Combo Mode August 8, 2020 15:40:14
Geophone is sandbagged in the backyard of 128 Cougarstone Manor SW adjacent ongoing blasting operations.

Post Event Notes

