

## BLAST MONITORING REPORT

HM22 Hard Stone Quarry at Wied Filep, l/o Naxxar

30th November 2015

### Details

Date	30-11-2015
Quarry number	HM22 – Victoria Lines l/o Naxxar
Quarry operator	Ballut Blocks Ltd.
ANFO Supplier	Framegrip Ltd.
Police escort	PC 1015 – J Borg

### Location and Time of Blasting

Six blasts were carried out between 10:29 and 10:54 at the points as approximately indicated on the attached site diagram.

### Summary of Blasting Conditions

Maximum charge per delay: upper area: 12.5 Kg, lower area: 25 Kg

Vibration limit: 4 mm/s (20 to 40Hz) at the nearest residential areas within 200 metres.

Air overpressure limit: 120 dB(L).

### Site Specific Permit

All holes were within quarry boundaries and within the maximum depth allowed. Maximum charge per delay was not exceeded. Blasting is carried out according to site specifications.

### Weather Conditions

Humidity <sup>[1]</sup>	Wind <sup>[1]</sup>	Temp. <sup>[1]</sup>	Atm. Pressure <sup>[1]</sup>	Cloud Cover <sup>[2]</sup>
58%	17 Knots N by W	17C	1029 hPa	clear

[1] As reported by weather.maltairport.com on 30 Nov 2015 at 11:45 at Luqa Airport [2] Our observation

### Comments

All holes are at middle shelves of the quarry in their respective areas.

Blasts number 1 and 2, and 3 and 4 were organised as two pairs and each pair was detonated by means of two short-circuit exploders in very quick sequence and captured as one event by the seismograph.

## Notes about Monitoring

The seismograph was placed at monitoring point M2 (Triq Brydone). The seismograph used is MiniMate Plus, serial number BE9488. Neither the ground vibration nor the air overpressure generated by blast number 6 was strong enough to trigger the instrument.

## Readings

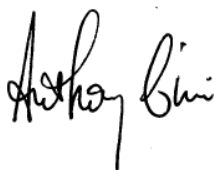
Blast Number	1	2	3	4	5	6
Time	10:29		10:38		10:45	10:54
No. of Holes	11	11	8	8	8	8
No. of Delays	11	11	8	8	8	8
Depth of Holes (m)	7.5	7.5	9	7.5	9	9
Max. Charge/Delay (kg)	18.5	18.5	22	20	22	22
Total Charge (kg)	200	200	175	157	175	175
Dist. from Seismo. (m)	230	230	230	230	190	190
PPV (mm/s)	0.78		1.38		1.60	<0.51
Frequency (Hz)	22.8		13.8		13.5	N/a
Air Overpressure (dB L)	104.9		111.2		101.9	<115
Scaled Dist. (m kg <sup>-1/2</sup> )	53.5	53.5	49.0	51.4	40.5	40.5

Burden is an average of 2 metres, and distance between holes is an average of 2.5 metres.

*Weights in kilograms are rounded-up to the nearest ½ unit, and depth in metres is rounded to the nearest ½ unit. The plotting of the position of the holes on the attached site-diagram in relation to quarry shape and other landmarks is not accurate and no site survey was carried out to plot these. Displacement between the holes (as plotted on the diagram) and the seismograph is measured using the online version of MEPA's Map Server and is accurate to the nearest 10 metres. Number of holes, their depth, burden, and the amount of ANFO used are as given by the quarry operator (signed document attached). Scaled distance and maximum charge per delay are calculated from the primary data. Weights are rounded-up to the nearest kilogram and the depth is rounded to the nearest ½ meter.*

## Observations

There was no flyrock outside the quarry boundaries. No damage to the surroundings was observed after the blast. The ground vibration and air overpressure measured for all blasts are within the limits.



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## DATA COLLECTION SHEET

### BLASTING SESSION DETAILS

Quarry Name & Number:	HM22 - Wied Fieq, V'o Naxxar	Quarry Operator:	Ballut Blocks Services Ltd.
Date:	30-11-15	MIC for HM22 is <b>25Kg</b>	
Quarry personnel charging:	DAVID MUSCAT.		
Police Escort:	No: PC1015 Name: JASON DORG.		
ANFO suppliers:	Company: FRANK GEL LTD	Chief on site: MARIO CALLEJA	
Seismograph readings by:	RICHARD MUCALPE		

### BLAST DETAILS

Blast No.	Time	Holes	Delays	Dist. (m)	Depth		Total charge		Max. Chrg.	PPV mm/s	Freq. (Hz)	Air (dB)
					(ft)	(m)	Bags	(kg)				
1	10-29-45	11	11	230	25	7.5	8	200	18.5	0.78	22.8	104.9
2	—	11	11	230	25	7.5	8	200	18.5	—	—	—
3	10-38-28	8	8	230	30	9	7	175	22	1.38	13.8	111.2
4	—	8	8	230	25	7.5	6 1/4	156 1/4	20	—	—	—
5	10-45-38	8	8	190	30	9	7	175	22	1.6	13.5	101.9
6	10-54-50	8	8	190	30	9	7	175	22	10.5	N/A	N/A
7	—	54	—	—	—	—	43 1/4	1081 1/4	—	—	—	—
8	—	—	—	—	—	—	—	—	—	—	—	—
9	—	—	—	—	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—	—	—	—	—
11	—	—	—	—	—	—	—	—	—	—	—	—
12	—	—	—	—	—	—	—	—	—	—	—	—
13	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—	—	—	—	—

### BLAST CHARACTERISTICS

Burden	Distance between boreholes: 2.5 m	Distance from rock face (burden): 2 m	
Levels of holes: (top/mid/low shelves)	(1-6) Middle Shelf		
Any horizontal holes?	No		[if yes, which? why?]
Any blast has holes of varying depths?	No		[if yes, which? why?]
Any grouping of blasts?	Yes, as indicated, to reduce blasts due to wash process		[if yes, which? why?]
Notes	[expand on any of the above]		

### WEATHER CONDITIONS

Weather conditions observation:	[ <input checked="" type="checkbox"/> ] % cloud cover	[ High / Low ] Cloud	Rain: [ <input checked="" type="checkbox"/> / light / medium / heavy ] showers
	Wind [ calm / light breeze / strong wind ]	Approx. direction: [ N / S / E / W ]	

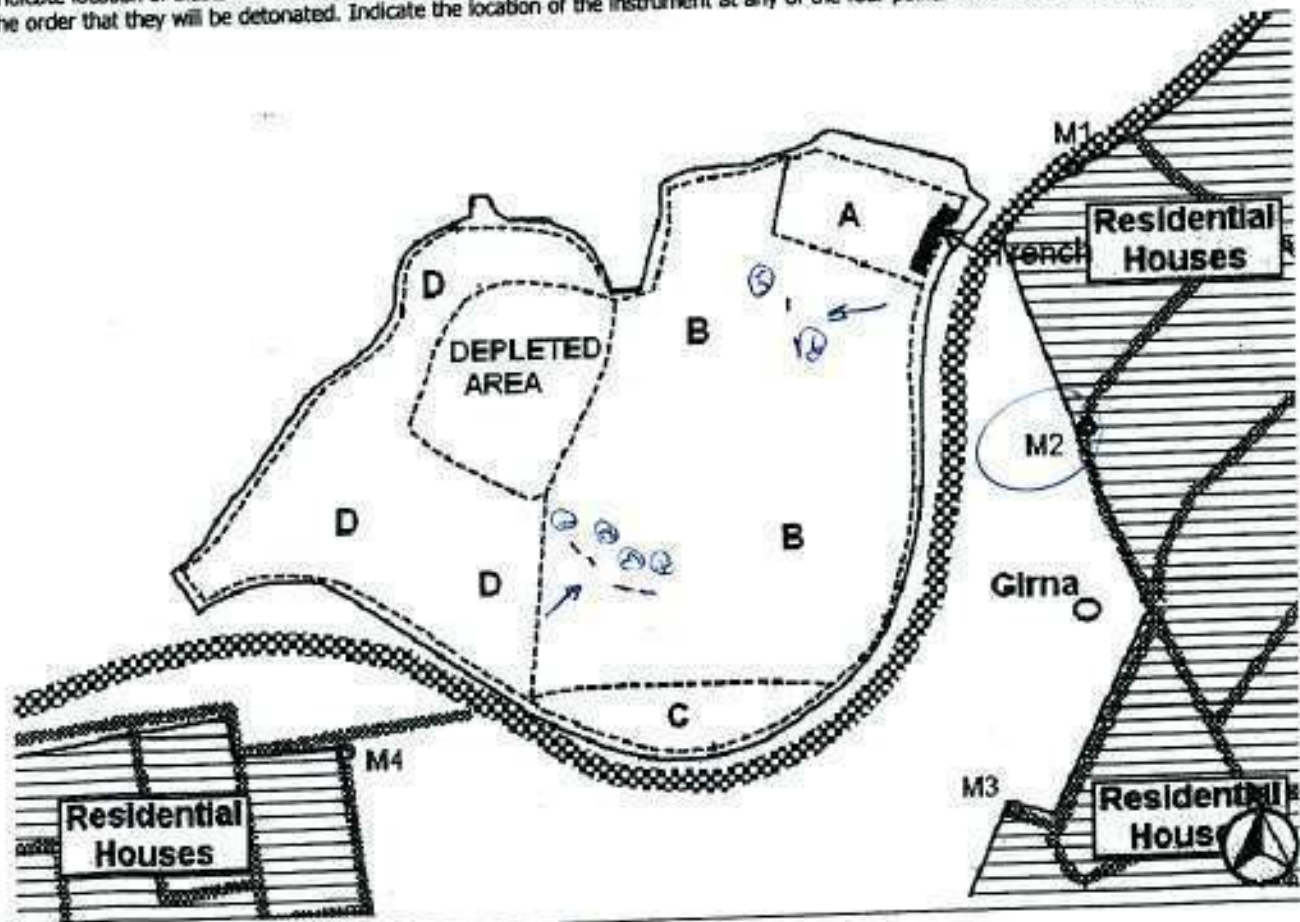
### OTHER

Any visitors before/during/after blasts?	Nobody	[if yes, who? Why?]
Any complaints from neighbours?	None reported to us	[names/organizations]

### MONITORING DETAILS

Location of Seismograph	<input type="checkbox"/> M1: Front of Villa Nordani, Triq Id-Difza Chvili	<input checked="" type="checkbox"/> M2: Corner of Triq Brydone
	<input type="checkbox"/> M3: Front of No. 2, Melitta hse, Triq Sir Arturo Merlecca	<input type="checkbox"/> M4: Triq L-irfisaqqfin <input type="checkbox"/> Other: _____

Indicate location of blasts on the diagram below after having observed their location in relation to the quarry boundaries. Number them in the order that they will be detonated. Indicate the location of the instrument at any of the four points indicated as M1, M2, M3, or M4.



Observations after blast:	No damage observed	[Flyrock/damage to surroundings]
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Signatures - By signing here you are agreeing with the information given by you above. Please check the information again before signing.





Blast monitoring agent

**Date/Time** Tran at 10:29:45 November 30, 2015  
**Trigger Source** Geo: 0.510 mm/s  
**Range** Geo: 31.75 mm/s  
**Record Time** 2.0 sec at 4096 sps

**Serial Number** BE9488 V 10.72-8.17 MiniMate Plus  
**Battery Level** 6.1 Volts  
**Unit Calibration** August 20, 2015 by Datum Monitoring  
**File Name** K488G4S7.TL0

**Notes**

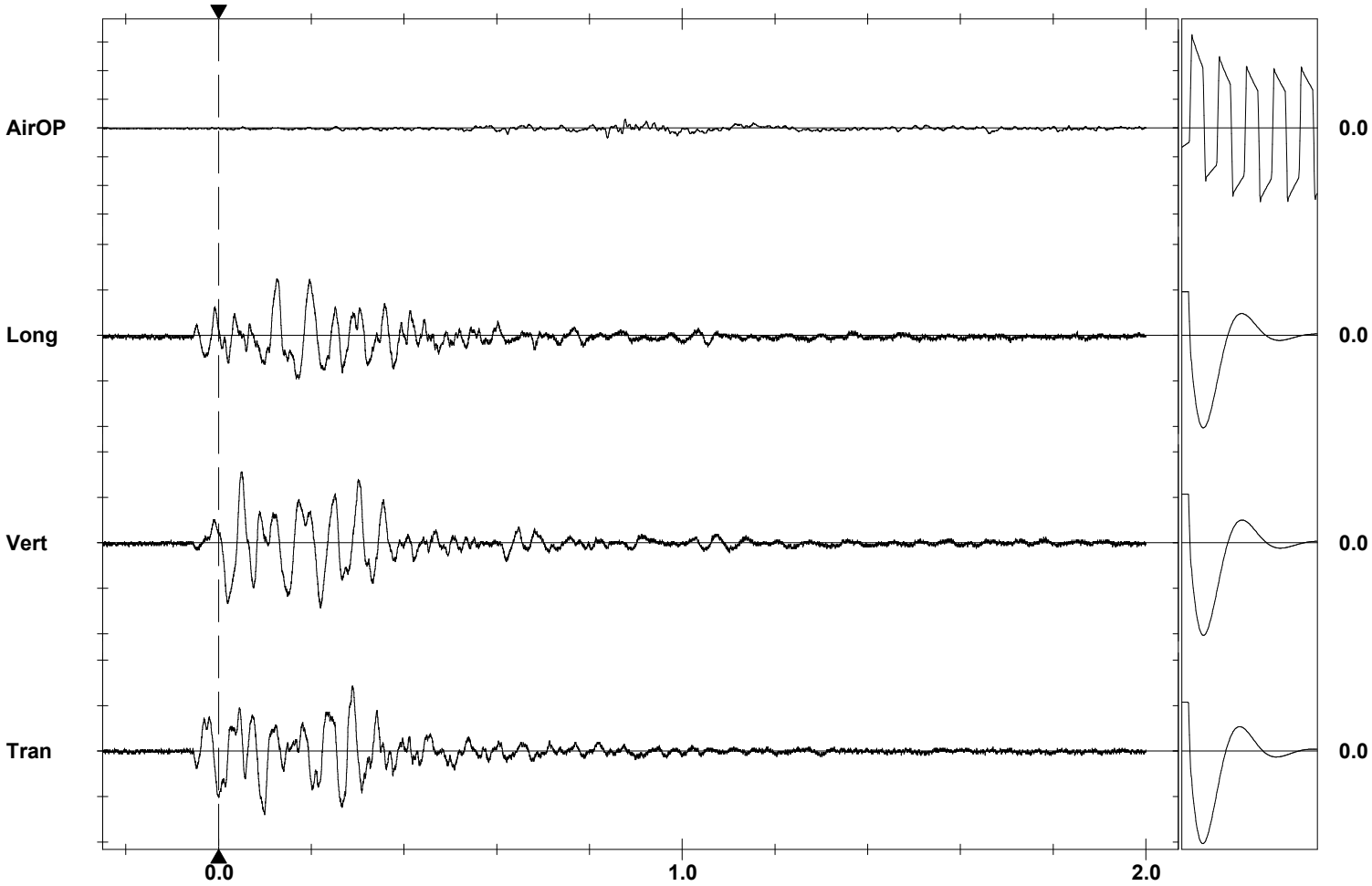
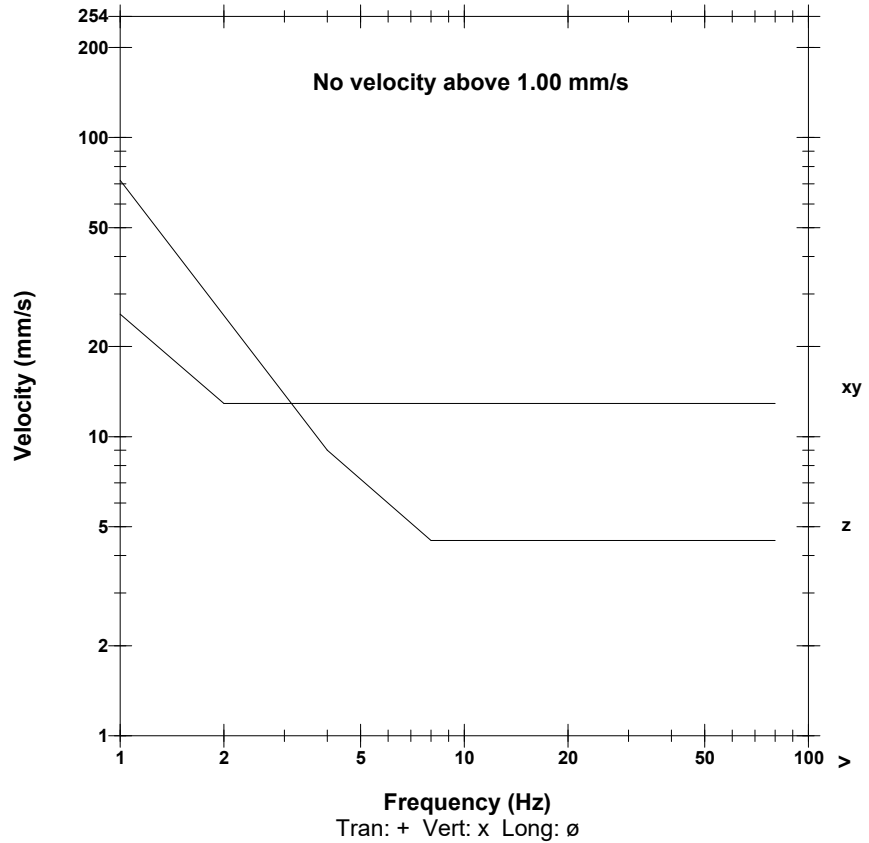
Location: Quarry Blasting  
 Client:  
 User Name: ems  
 General:

**Microphone** Linear Weighting  
**PSPL** 104.9 dB(L) 3.500 pa.(L) at 0.839 sec  
**ZC Freq** 49 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 608 mv )

	Tran	Vert	Long	
PPV	0.714	0.778	0.619	mm/s
PPV	48.08	48.82	46.84	dB
ZC Freq	23.5	22.8	21.8	Hz
Time (Rel. to Trig)	0.288	0.049	0.125	sec
Peak Acceleration	0.033	0.020	0.027	g
Peak Displacement	0.005	0.006	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.2	7.2	Hz
Overswing Ratio	3.8	4.1	4.3	

Peak Vector Sum 0.853 mm/s at 0.049 sec

**BS 6472:1992 CURVE 32**



**Time Scale:** 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Tran at 10:38:25 November 30, 2015  
**Trigger Source** Geo: 0.510 mm/s  
**Range** Geo: 31.75 mm/s  
**Record Time** 2.0 sec at 4096 sps

**Serial Number** BE9488 V 10.72-8.17 MiniMate Plus  
**Battery Level** 6.1 Volts  
**Unit Calibration** August 20, 2015 by Datum Monitoring  
**File Name** K488G4S8.810

**Notes**

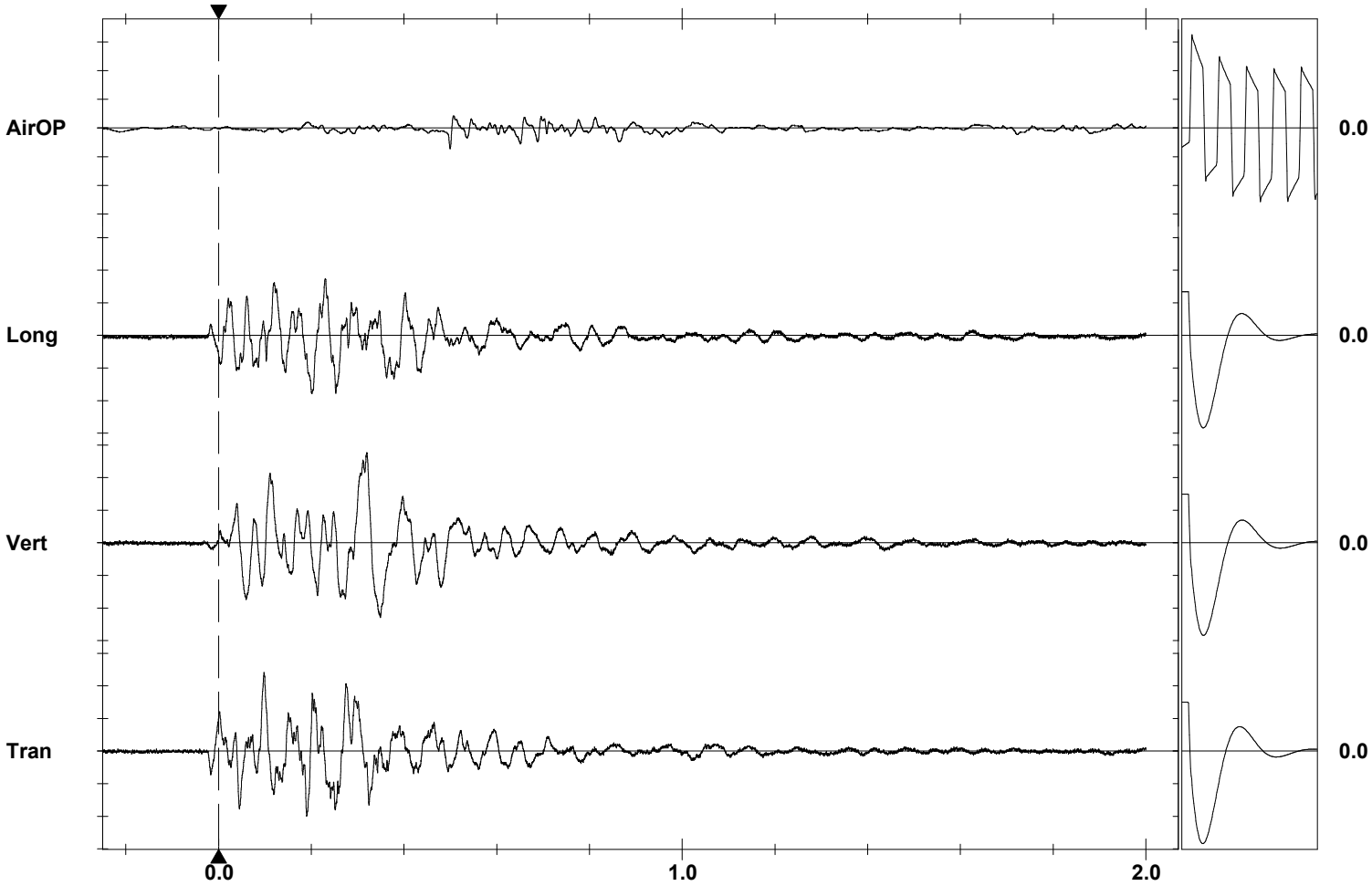
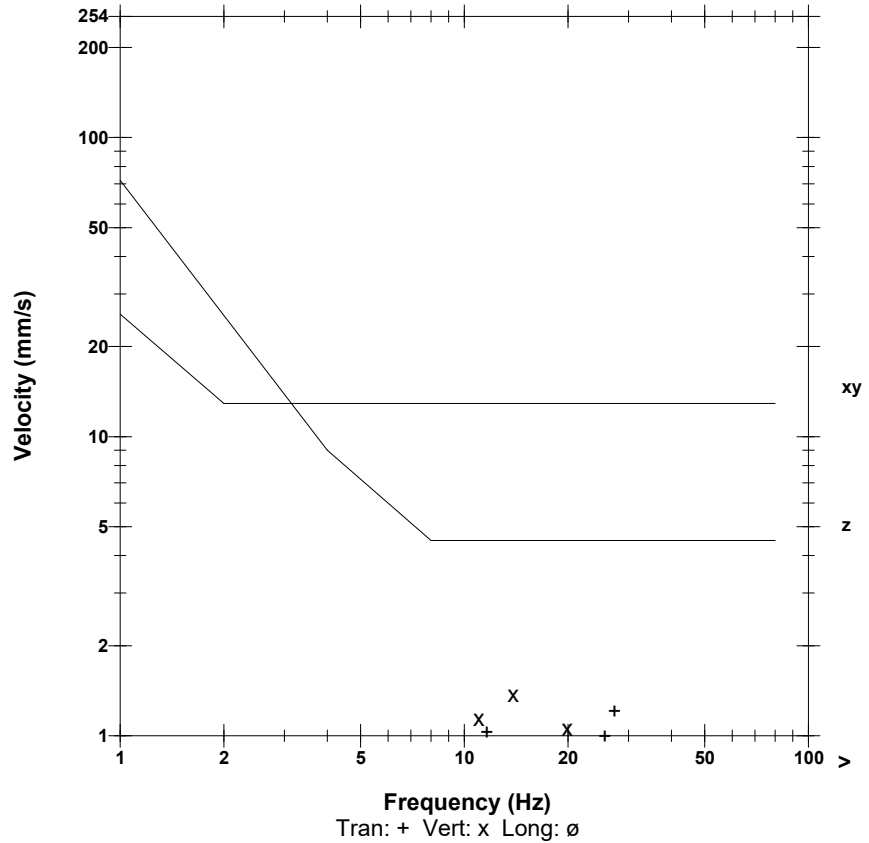
Location: Quarry Blasting  
 Client:  
 User Name: ems  
 General:

**Microphone** Linear Weighting  
**PSPL** 111.2 dB(L) 7.250 pa.(L) at 0.500 sec  
**ZC Freq** 7.9 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 608 mv )

	Tran	Vert	Long	
PPV	1.206	1.381	0.889	mm/s
PPV	52.63	53.80	49.98	dB
ZC Freq	27.3	13.8	17.1	Hz
Time (Rel. to Trig)	0.098	0.319	0.201	sec
Peak Acceleration	0.040	0.033	0.027	g
Peak Displacement	0.012	0.016	0.009	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.2	7.2	Hz
Overswing Ratio	3.8	4.1	4.3	

Peak Vector Sum 1.412 mm/s at 0.319 sec

**BS 6472:1992 CURVE 32**



**Time Scale:** 0.20 sec/div    **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Long at 10:45:38 November 30, 2015  
**Trigger Source** Geo: 0.510 mm/s  
**Range** Geo: 31.75 mm/s  
**Record Time** 2.0 sec at 4096 sps

**Serial Number** BE9488 V 10.72-8.17 MiniMate Plus  
**Battery Level** 6.1 Volts  
**Unit Calibration** August 20, 2015 by Datum Monitoring  
**File Name** K488G4S8.K20

**Notes**

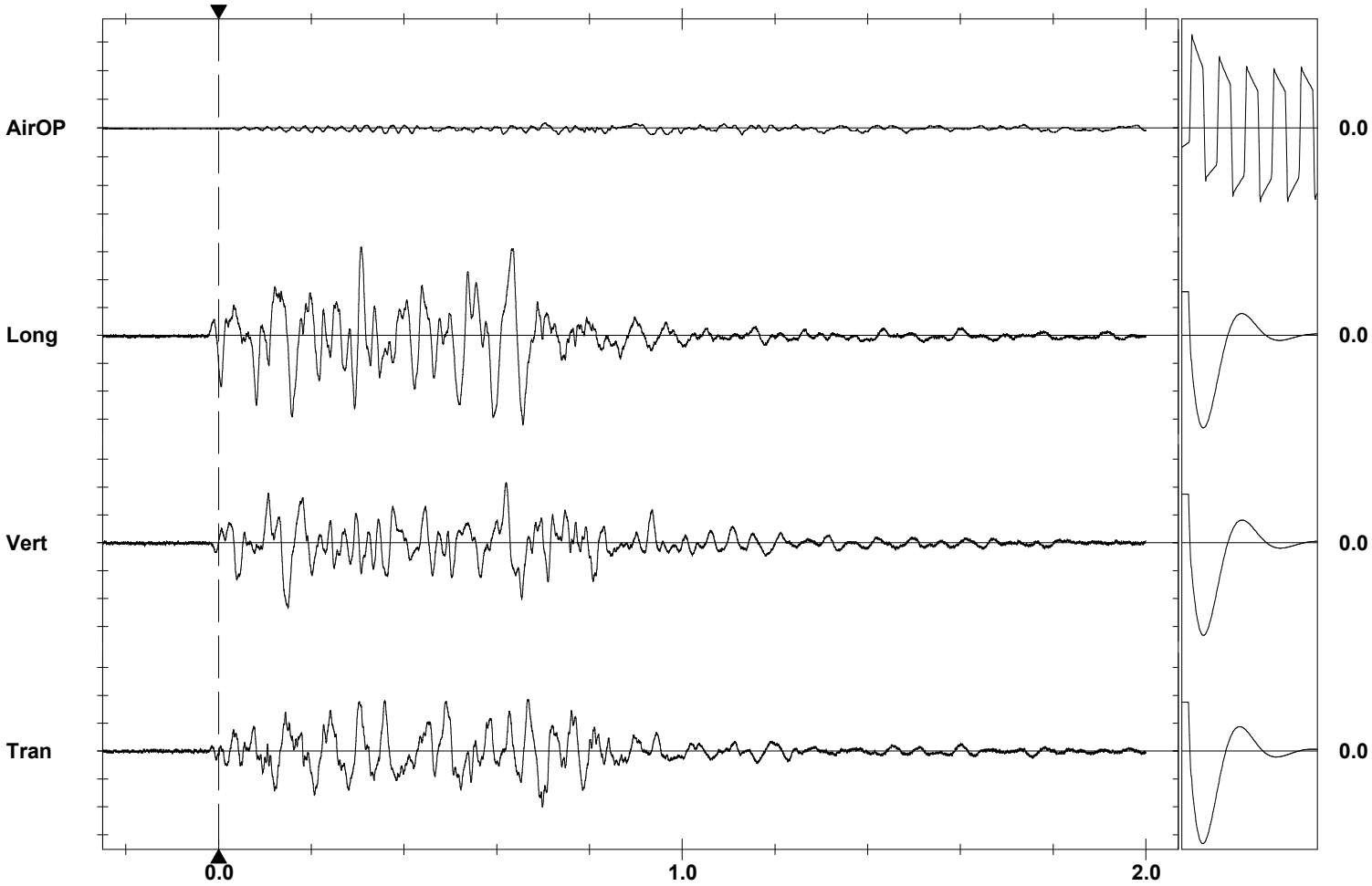
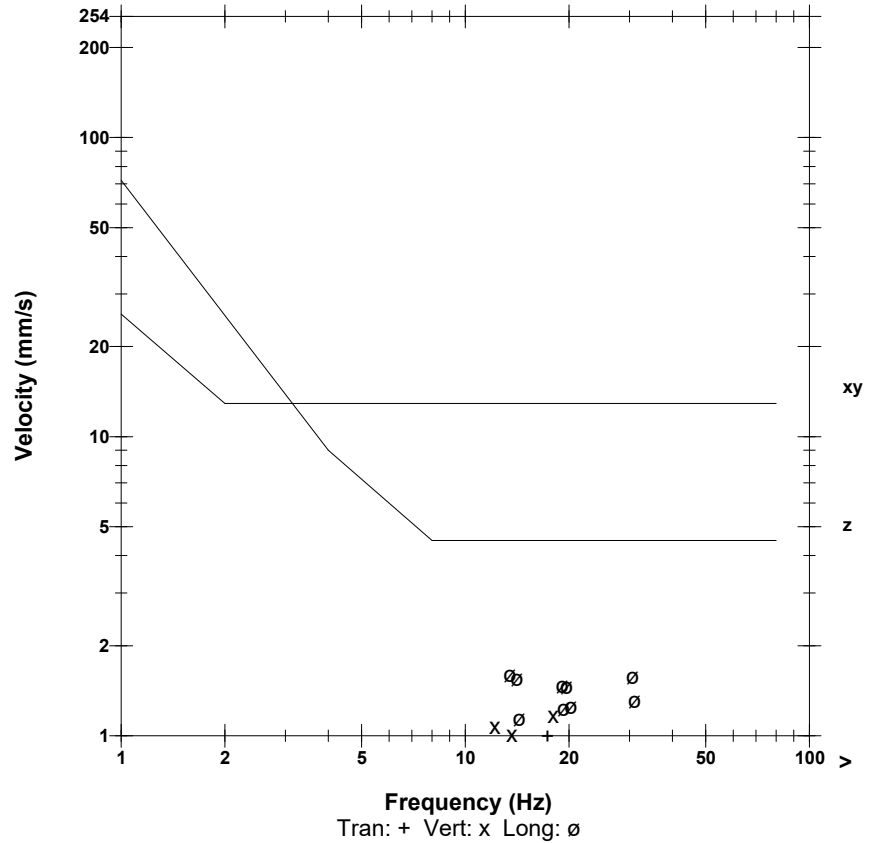
Location: Quarry Blasting  
 Client:  
 User Name: ems  
 General:

**Microphone** Linear Weighting  
**PSPL** 101.9 dB(L) 2.500 pa.(L) at 1.129 sec  
**ZC Freq** 23.3 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 608 mv )

	Tran	Vert	Long	
PPV	1.000	1.175	1.603	mm/s
PPV	51.00	52.40	55.10	dB
ZC Freq	17.4	18.0	13.5	Hz
Time (Rel. to Trig)	0.698	0.150	0.656	sec
Peak Acceleration	0.033	0.033	0.046	g
Peak Displacement	0.009	0.009	0.015	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.2	7.2	Hz
Overswing Ratio	3.8	4.1	4.3	

Peak Vector Sum 1.874 mm/s at 0.307 sec

**BS 6472:1992 CURVE 32**



**Time Scale:** 0.20 sec/div    **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div  
**Trigger =**

Sensor Check