Further Questions Response Document

Site name:	**Hemerdon Mine Mineral Processing Facility**
Site address:	**Hemerdon Mine, Plympton, Devon PL7 5BS**
Operator name:	**Drakelands Restoration Limited**
Application reference:	**EPR/AP3203ML/A001**

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Introduction

Overview

This document has been written by Shann Pitts Consulting Limited on behalf of and in conjunction with Drakelands Restoration Limited, drawing on additional technical knowledge from several sources, namely:

- Louise Beamish (WSP Acoustics Team)
- Brian Jarvis (Eatec Dynamics)

This document serves as a formal response document to an email sent by the Environment Agency (EA) to Drakelands Restoration Limited on the 9 November 2023 containing seven questions relating to the Schedule 5 Response submitted by Drakelands Restoration Limited on the 25 October 2023. This information has been requested by the EA in relation to the determination of a new permit application for the operation of the minerals processing facility at Hemerdon mine (permit application reference: EPR/AP3203ML/A001).

Structure of Document

The seven questions in the email are replicated with the responses underneath.

The following separate supporting document accompanies this response:

- A revised 'Appendix G' excel spreadsheet from the October 2023 Schedule 5 Response submission, referenced in question 1.

Question 1

Explain all discrepancies between screen descriptors and sound levels presented in the spreadsheet at Appendix G of document 'Document Ref: SPC0124/Schedule5 Response/TWL October 2023' and within the body text answer to Q1m at 'Table Error! No text of specified style in document.-1 (Revised) – LFN Sources Included in the Noise Model (Excluding Inherent Mitigation)' in that document, and Table 6-1 in the Noise Impact Assessment document V3 dated August 2023. Confirm which is correct and provide a definitive version of a table of screen reference and descriptor, and characteristic level.

Screen references, descriptors, and associated sound levels presented in Appendix G do not fully match the screen references, descriptors, and associated sound levels presented in the table in the answer to Q1m (which appear to be the same as presented at Table 6-1 of the Noise Impact Assessment document). We also note that some levels presented in Appendix G appear lower than levels presented in the other tables. Thus there is some ambiguity associated with 'source term' for any predictive modelling, for both identification of particular screens, and for 'characteristic levels' associated with each screen. We note confirmation that the levels presented in Appendix G do not include the effect of control measures e.g., enclosure and deck vents).

Appendix G:

The references to the following four screens are incorrect:

- 110-SN-01 Secondary Crusher Scalping Screen;
- 120-SN-11 Ore Sorter Sizing Screen;
- 125-SN-03 Pebble Ore Sorter 3 Dewatering Screen; and
- 125-SN-04 Pebble Ore Sorter 4 Dewatering Screen.

The updated references are below, following the same order as above.

- 115-SN-02 Secondary Crusher Scalping Screen;
- 125-SN-11 Ore Sorter Sizing Screen;
- 125-SN-03 Cobble Ore Sorter 1 Dewatering Screen; and
- 125-SN-04 Cobble Ore Sorter 2 Dewatering Screen.

Revised Table 6-1 labelled as 'Table Error! No text of specified style in document.-1 (Revised) – LFN Sources Included in the Noise Model (Excluding Inherent Mitigation)' in the Schedule 5 response:

The references to the following screen sound pressure levels are incorrect:

- 115-SN-02 Secondary Crusher Scalping Screen;
- 125-SN-11 Ore Sorter Sizing Screen;
- 125-SN-01 Pebble Ore Sorter 1 Dewatering Screen;
- 125-SN-02 Pebble Ore Sorter 2 Dewatering Screen;
- 125-SN-03 Cobble Ore Sorter 1 Dewatering Screen;
- 125-SN-04 Cobble Ore Sorter 2 Dewatering Screen; and
- 130-SN-12 Tertiary Crusher Sizing Screen.

Some of the sound pressure levels were incorrect in the revised Table 6-1. These were typographical errors.

The updated Appendix G (submitted as a supporting document) is the final and definitive list of screen descriptors and sound pressure levels.

It is important to note that whilst some descriptors and characteristic sound levels were incorrect in the October 2023 Schedule 5 response, the noise model contains correct noise levels for all screens and, therefore, the predicted noise levels at assessment locations in the Noise Impact Assessment (NIA) are correct.

Question 1 also makes reference to Table 6-1 of the NIA. However, this was replaced by the revised Table 6-1 included in the Schedule 5 response document, dated October 2023.

Question 2

A) Confirm that the content of Table 6-3 (and contour plot at Figure 6-5) in the Noise Impact Assessment document (V3 dated August 2023) is based on the correct screen reference, descriptor, and characteristic level (See question 1). OR

B) If the input data has changed in accordance with Question 1, re-run the predictive model, and present revised content of Table 6-3 (and contour plot at Figure 6-5) in the Noise Impact Assessment to demonstrate predicted sound levels at receptor locations.

The predicted levels at receptors within Table 6-3 in the Noise Impact Assessment document V3 dated August 2023 appear to be based on source term data which does not match the 'characteristic levels' (or the screen descriptors) presented in Appendix G.

We confirm that A) above is correct. The sound pressure levels in Table 6-3 are predicted using the correct sound pressure levels for the screens. The contour plot at Figure 6-5 has been generated using these sound pressure levels and is, therefore, also correct.

Question 3

Explain what the predicted levels shown in Table 6-3 for each receptor actually represent.

We assume the predicted levels at receptors within Table 6-3 (and contour plot at Figure 6-5) are time averages, but this together with the time period appear unconfirmed.

The LZeq values quoted in Table 6-3 and in Figure 6-5 are the equivalent un-weighted sound pressure levels calculated for a 60 second time period at a resolution of 1 ms (60,000 values).

The LZeq value is not strictly a time average of the waveform which would always give a zero value. Instead, it should be considered as the equivalent continuous sound level that contains the same energy as that in a representative period of the measured or calculated sound.

For all model predictions, the representative period is 60 seconds unless otherwise stated.

The calculation for the LZeq time averaging is shown below.

$$LZeq = 10 * log\left(\frac{\sum_{i=1}^{60000} v_i^2}{60000 \times (20 \times 10^{-6})^2}\right)$$

Where v_i is the air pressure calculated at time step i in Pa

Question 4

Provide an explanation of the likely difference between the predicted levels at receptors in the revised Table 6-3, and the highest levels which are likely to occur at these locations when the maximum effect from constructive interference occurs. How often are those highest levels likely to occur?

We assume the predicted levels at receptors within Table 6-3 are time averages, and do not reflect the highest levels which are likely to occur at those locations due to maximum constructive interference which will occur from time to time at those locations. We expect a complex beating pattern to occur at receptor locations when all twelve screens are run together, and we expect the levels which will occur at a receptor location when near maximum constructive interference occurs will be significantly higher than the time average level. We do not understand how frequently this is likely to occur but anticipate that significantly increased sound pressure levels may occur every few seconds. We understand the predictive model used has sufficient functionality to demonstrate this likely effect.

The plots in Appendix A- Far Field Waveforms show the variation of instantaneous sound pressure level over a 60 second period at a selection of receptors from the models of the Wolf screens and the Tungsten West screens.

We recognise that there is a complex beating pattern at each receptor location when all screens are running together. To quantify this effect further, a comparison is given below. However, to be able to compare maximum levels with root mean square (rms) levels the units need to be comparable therefore we have moved away from using sound pressure levels in dB (as per Table 6-3) and made the comparison in linear pressure level. All data have been taken directly from the noise model.

The difference between maximum and rms values for the Wolf screens is an order of magnitude greater than those from the Tungsten West screens. This is demonstrated by the values from the model at various far field receptors shown in the table below:

Receptor	Easting_X	Northing_Y	Distance from MPF (m)	Tungsten West		Wolf Minerals	
				rms (mPa)	max (mPa)	rms (mPa)	max (mPa)
Portworthy Fhouse	55442	60180	1953	2.37	7.78	43.69	125.55
Newnham Park	55646	57967	1653	2.59	7.98	58.48	171.34
Galva House	56535	58008	1045	13.88	40.22	151.80	451.80
Birchland Farm	57916	58311	1149	11.86	32.43	110.60	347.12
Mumford Cottage	57797	60766	1988	4.41	11.56	39.09	116.92
Broad Oak Cottages	56768	61343	2391	2.78	7.61	26.54	77.49
Boringdon Hill	54767	59349	2234	2.11	6.56	33.50	83.85
Colebrook Road	54442	58766	2532	2.27	6.12	25.92	77.12
Unnamed Road	58434	58518	1532	2.74	8.37	62.86	165.47
Gorah Cottages	58855	59101	1893	3.67	9.05	41.67	120.09
Cornfield Gardens	55671	57226	2165	2.67	7.88	34.04	93.68
Hemerdon Lane	56494	57711	1336	8.84	24.64	91.54	290.02
Elford Crescent	54767	57497	2642	1.18	3.72	22.54	62.65
Bond Street	60514	59768	3638	1.09	3.06	11.56	34.61
Windwhistle Farm	55941	57846	1515	4.41	12.73	69.91	196.61

The table above shows the differences between the rms and maximum levels but does not indicate how frequently the maximum levels occur. The variation in levels can increase the perception of LFN, but the effect is difficult to quantify. The overall maxima might be well separated in time, but in

between other local maxima might affect human perception. In addition, there is no unique answer to this question because it is dependent on the spatial relationship between the receptor and the screens. The far field locations considered in Appendix A - Far Field Waveforms represent a comprehensive set of far field receptors (as per the NIA) around the mine. The variation in times between maximum values for Tungsten West in this set ranges from 5 to 30 seconds. Between these maximum values, the variation is minor and unlikely to be perceived.

For the Wolf Minerals waveforms, the time interval between the absolute maxima is up to 30 seconds but the local maxima in between occur at about 2 second intervals. The variation in level every 2 seconds might be sufficient to be perceived.

Differences between the two scenarios are to be expected with screens running at different speeds and with a range of Acoustic Efficiency values.

There is not enough understood within the scientific community about the effect of time varying low frequency sound (beating) to enable numerical limits to be derived. However, it can be said with certainty that the maximum levels from the Tungsten West scenario are an order of magnitude lower than those from the Wolf Minerals comparison.

Figure 7-1 *Time waveform showing Beating Effect* of the Noise Impact Assessment_V3, dated August 2023, was generated specifically to answer Item 1h of the March 2023 Schedule 5 Notice. Item 1h required clarification of whether the noise model accounts for beating and how this is likely to affect sound pressure levels at assessment locations. Figure 7-1 is a waveform from the noise model demonstrating the beating effects resulting from four screens operating simultaneously (with the influence from the background removed). The noise level of 66.1dBZ shown on Figure 7-1 does not include any mitigation, as will be applied during the construction phase, and is predicted at a location close to Windwhistle Farm. For these reasons, Figure 7-1 is not directly comparable to the waveforms presented in Appendix A but was generated to answer Item 1h of the March 2023 Schedule 5 Notice.

Question 5

Provide a full explanation of how the levels presented in Table 6-3 in the Noise Impact Assessment document V3 dated August 2023 in the column 'Wolf Minerals Sound Pressure Level (B)' have been obtained, and what they represent. Are these measured levels or predicted levels? Are these time average levels, and if so what is the time period? If they are predicted levels provide and justify source term/model input data.

Comparison of predicted levels at receptors with those which occurred in previous operation is potentially a useful exercise. The comparison must be fully explained. We assume the predictive model has been used to obtain the 'Wolf Minerals Sound Pressure Level' information, but this has not been confirmed. We know a large amount of legacy far field level measurement data exists. We are aware that time average levels do not fully reflect the greatest sound levels likely to occur at receptor locations due to constructive interference and beating effects.

The values given in Table 6-3 have been calculated using the predictive model for both Wolf and Tungsten West configurations, all screens were running, and the calculations were for a period of 60 seconds at an interval of 1 ms. The values are equivalent un-weighted sound pressure levels (LZeq) as calculated by the expression given in the answer to Q3.

The plots in Appendix A - Far Field Waveforms show the comparison between the Wolf Minerals screens and those to be used by Tungsten West.

The following tables represent the input configuration to the predictive model for the Tungsten West and Wolf Minerals scenarios.

The parameter with the greatest uncertainty is the Acoustic Efficiency (AE). For the Tungsten West configuration, the AE values have all been set to 0.3 (realistic worst case).

For the Wolf Minerals configuration, the AE values were taken from tests using measured data at Windwhistle Farm. The exceptions to this were from screens 140-SN-01 and 140-SN-07 where a best estimate value of 0.2 was used.

Mode input configuration data for Tungsten West scenario

All screens running	Easting	Northing	Screen rpm	Stroke normal to deck(mm)	Vibrating Area (m^2)	Phase (degrees)	Acoustic Efficiency	Active Noise Control (Pa)	Enclosure mitigation + deck venting (dB)
140-SN-01 DMS Feed Preparation Screen	56899.87	58963.89	936.12	6.98	11.52	0	0.30	0	17
140-SN-06 Secondary DMS Screen	56912.2	58956.66	1000.8	3.96	8.64	0	0.30	0	17
140-SN-07 Scavenger DMS Screen	56914.9	58958.64	990.96	3.76	8.64	0	0.30	0	17
150-SN-01 Primary Mill Sizing Screen	56920.26	58955.83	948.54	6.57	9	0	0.30	0	17
115-SN-02 Secondary Crusher Scalping Screen	57124.2	59103.8	738	8.5	18	0	0.30	0	17
125-SN-11 Ore Sorter Sizing Screen	57058.3	58979.4	738	8.5	14	0	0.30	0	17
125-SN-01 Pebble Ore Sorter 1 Dewatering Screen	57040.6	59019.9	960	5.7	3.6	0	0.30	0	17
125-SN-02 Pebble Ore Sorter 2 Dewatering Screen	57036.6	59017.9	960	5.7	3.6	0	0.30	0	17
125-SN-03 Cobble Ore Sorter 3 Dewatering Screen	57033.5	59016.6	960	5.7	3.6	0	0.30	0	17
125-SN-04 Cobble Ore Sorter 4 Dewatering Screen	57029.1	59014.7	960	5.7	3.6	0	0.30	0	17
130-SN-12 Tertiary Crusher Sizing Screen	56958	58926.4	740	8.5	18	0	0.30	0	17
130-SN-13 Tertiary Crusher Deatering Screen	57013.5	58965.7	740	8.5	18	0	0.30	0	17

Mode input configuration data for Wolf Minerals scenario

All screens running	Easting	Northing	Screen rpm	Stroke normal to deck(mm)	Vibrating Area (m^2)	Phase (degrees)	Acoustic Efficiency	Active Noise Control (Pa)	Enclosure mitigation + deck venting (dB)
120-SN-01	56943.85	58920.65	904	10	32.4	0	0.029	0	0
120-SN-02	56934.67	58912.85	945	10	26.28	0	0.219	0	0
140-SN-01	56900.06	58963.74	931	10	11.52	0	0.2	0	0
140-SN-02	56896.23	58969.39	916	10	11.52	0	0.465	0	0
140-SN-03	56903.25	58973.33	913	10	11.52	0	0.819	0	0
140-SN-04	56892.03	58975.53	923	9	26.28	0	0.005	0	0
140-SN-05	56898.79	58979.91	922	9	26.28	0	0.192	0	0
140-SN-06	56911.58	58956.16	941	9	8.64	0	0.246	0	0
140-SN-07	56915.15	58958.65	960	10	8.64	0	0.2	0	0
150-SN-01	56922.49	58954.96	931	10	9	0	0.23	0	0

Question 6

Provide an explanation of how the predicted levels presented in the revised Table 6-3 are likely to under-estimate levels at receptor locations when the receptor is downwind of the source.

We are aware the model does not account for weather conditions, and that it under-estimated far field levels at a receptor by up to 8.8 dB (6.5.2 Noise Impact Assessment V3 August 2023) in recent tests involving four screens operated within the Mineral Processing Facility building when the receptor was downwind of the source.

Section 9.3 of the Noise Impact Assessment (NIA) addresses uncertainties in the noise model. It has been made clear through the NIA (paragraphs 9.3.3 to 9.3.8 and 9.5.3) and discussions with the EA that further work is required to better understand the extent to which wind effects influence the noise levels at the assessment locations. It is, therefore, not possible to directly respond to this question.

However, wind effects should be seen alongside other uncertainties in the noise model and assessment, rather than in isolation. We draw your attention to the following paragraphs of the NIA (as replicated below) which demonstrate the reduction in comparison to Wolf Minerals LFN levels, as requested in the Schedule 5 (paragraph 9.3.7 of the NIA), the commitment from DRL to conduct

further research with respect to wind effects (paragraph 9.3.8 of the NIA) and the overall conclusions of the uncertainty assessment (paragraph 9.5.3 of the NIA).

The further research into wind effects at the assessment locations will start during the verification process and, if needed, will extend beyond.

9.3.7. To conclude, it is recognised that wind effects are known to result in increased noise levels of up to 6.4 dB and that further research is required to better quantify the LFN variation in the area due to wind speed and direction. However, the Schedule 5 states the following:

"A reduction from the current proposed levels would need to be demonstrated within the NVIA for us to consider issuing an environmental permit authorising operation of the proposed Mineral Processing Facility."

9.3.8. Regardless of wind effects, which DRL acknowledges are important and do need to be further researched, the reduction in noise levels from the acoustic enclosures in comparison to Wolf Minerals' operation is 11 dB, with a further reduction of 6 dB obtained from deck venting. The overall reduction, including the removal and replacement of operational screens, is in the region of 23 dB. The same wind effects would have been present when the mine was operated by Wolf Minerals.

9.5.3. Uncertainty measures 2 and 3 result in a combined uncertainty of 10.3 dB overprediction of modelled noise levels. The uncertainty value for the noise model underpredicting is 6.4 dB, or more. Taking these values and including a penalty to the noise levels of +5 dB for beating results in a 1.1 dB increase in the DRL predicted sound pressure levels shown in Table 6-3 in Section 6.6 and at least a 17.9 dB reduction when compared to the Wolf Minerals operation. However, this could be considered an unfair comparison as the modelled sound pressure levels from Wolf Minerals do not include wind effects or beating. With these effects removed from the DRL predicted levels in Table 6-3 (but including uncertainty of -10.3 dB for uncertainty measures 2 and 3) results in a reduction of at least 30 dB when compared to the Wolf Minerals operation. This is a considerable and impressive reduction in noise levels and only confirms the conclusion of the noise impact assessment.

Question 7

Provide representative time series plots of predicted sound level at selected receptors with closest proximity to the proposed Mineral Processing Facility, to illustrate likely effects of beating, including repeat period, and the range of sound levels including the highest sound levels which are predicted to occur at those locations. Confirm the time periods represented in the plots.

We are aware the predictive model has sufficient functionality to provide time series sound level plots; one was included at Figure 7-1 in the 'Noise Impact Assessment document V3 dated August 2023' although the time period was not confirmed. Figure 7-1 was illustrative of the wide variation in sound levels predicted to arise over time at a receptor location from operation of multiple screens, and also the highest periodic sound levels predicted to occur at a receptor location, and how this may be different to a time average level. We consider the closest receptor locations including Portworthy Farm, Birchland Farm, Birchland Road, Galva House, Mumford Cottage, should be included as a minimum.

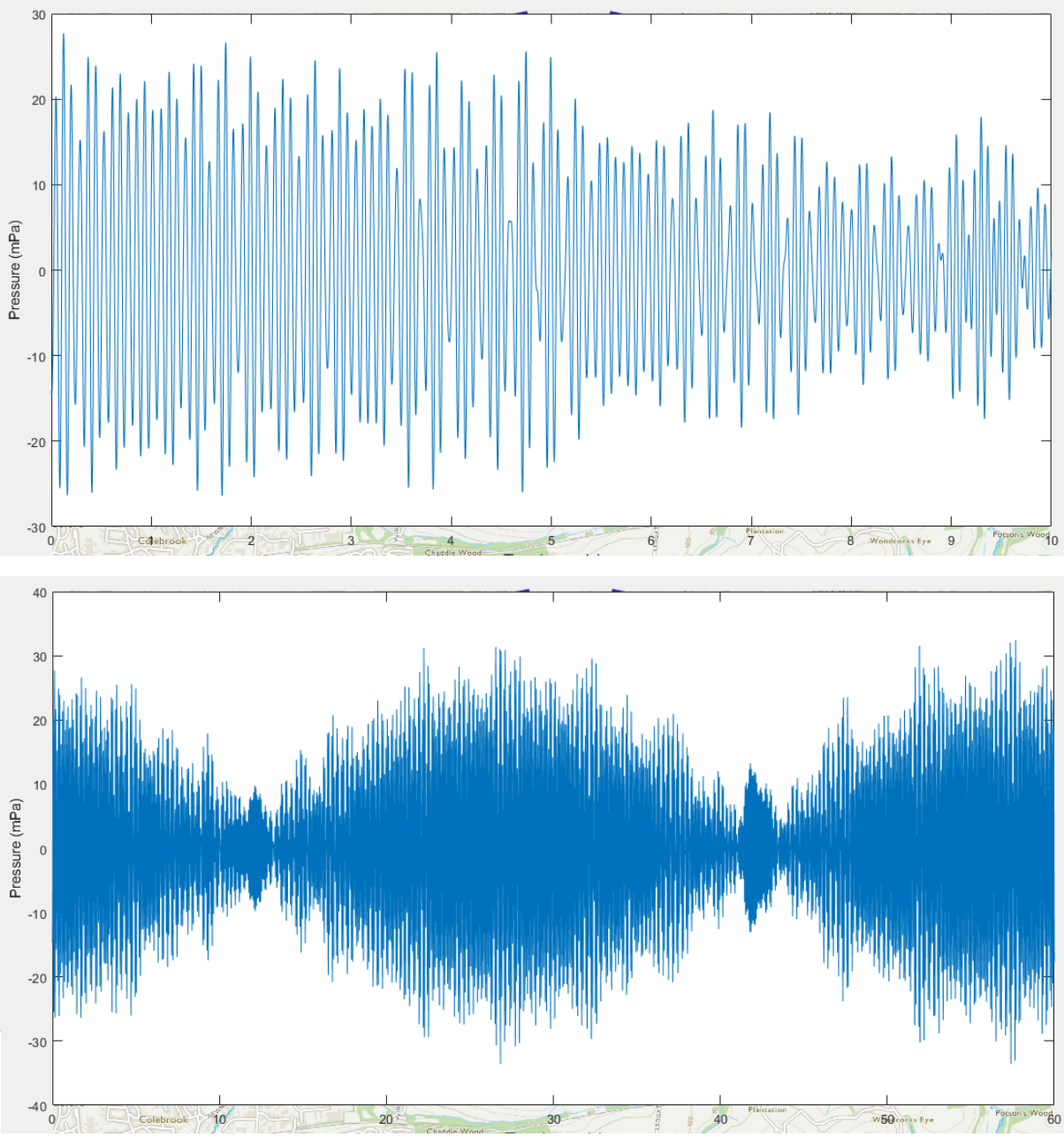
Plots are provided in Appendix A- Far field Waveforms. All levels quoted are for a calculation interval of 60 seconds.

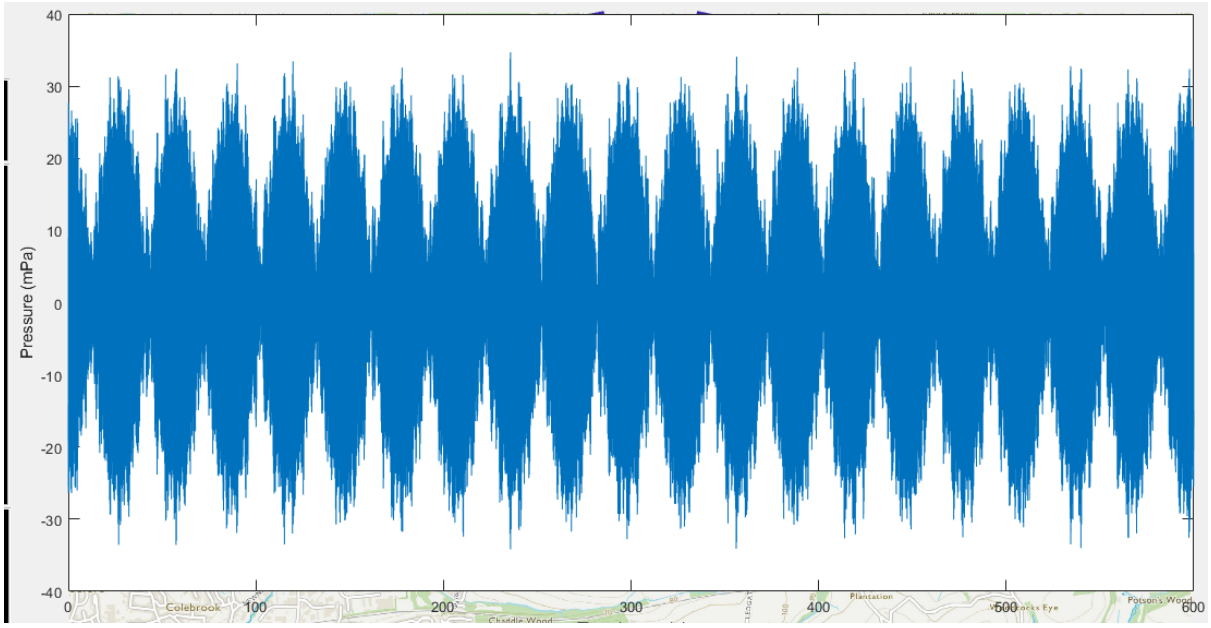
In order to demonstrate the effect of varying calculation intervals, below are calculations for Birchland Farm carried out for 10 seconds, 60 seconds and 600 seconds.

For a 10 second period, the SPL was 55.2 dBZ and for 60 and 600 seconds, the value was 55.5 dBZ.

The peak pressure was 35 mPa. If this had come from a sustained single frequency waveform, the rms level would have been 24.7 mPa which equates to 61.9 dBZ.

By comparison, the calculation from the Wolf screens, taking the peak pressure of 347 mPa and assuming a sustained single frequency gives 81.8 dBZ which demonstrates an order of magnitude improvement over the previous operator.




Pressure (mPa)
40
30
20
10
0
-10
-20
-30
-40
0
100
200
300
400
500
600
Colebrook
Plantation
Poson's Wood

Appendix A – Far Field Waveforms

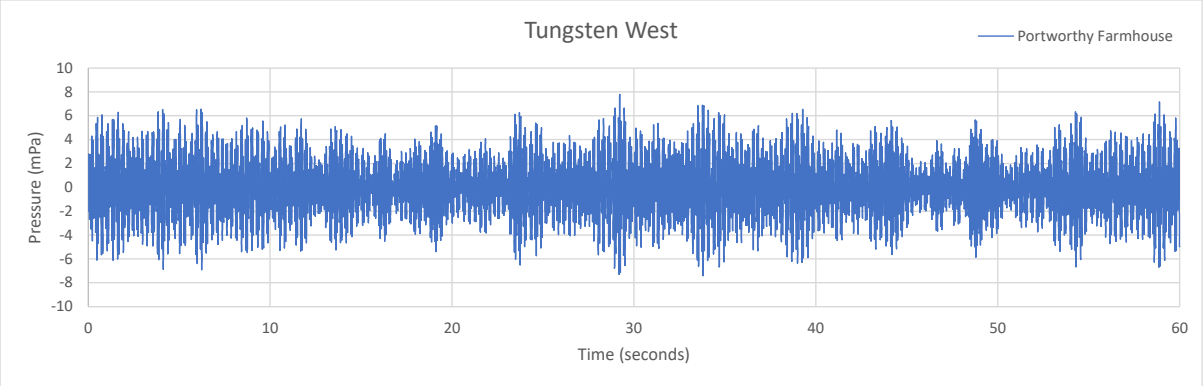
The following plots are from the LFN predictive model for the set of screens as will be used by Tungsten West and those that were used by Wolf Minerals.

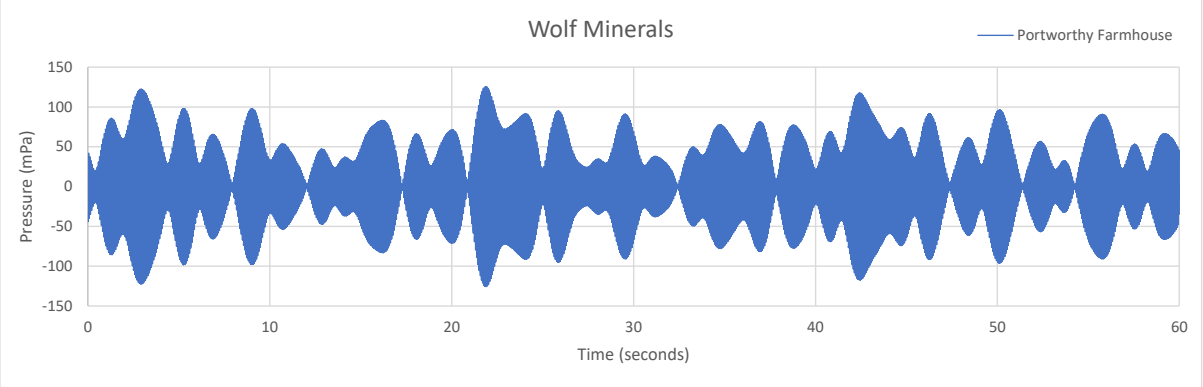
There is a set of three plots for each of fifteen far field receptor locations. In each set:

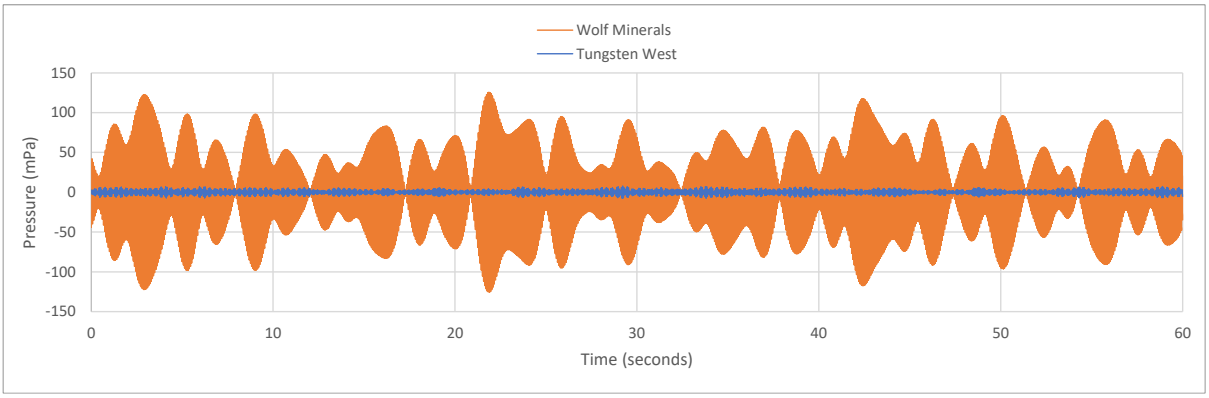
- the first plot shows the predicted far field measurements based on data for Tungsten West screens (all screens operating with inherent mitigation);
- the second plot shows the predicted far field measurements based on data from Wolf Minerals operations (all screens operating); and
- the final plot is a comparison of the first two plots using the same y- axis scale.

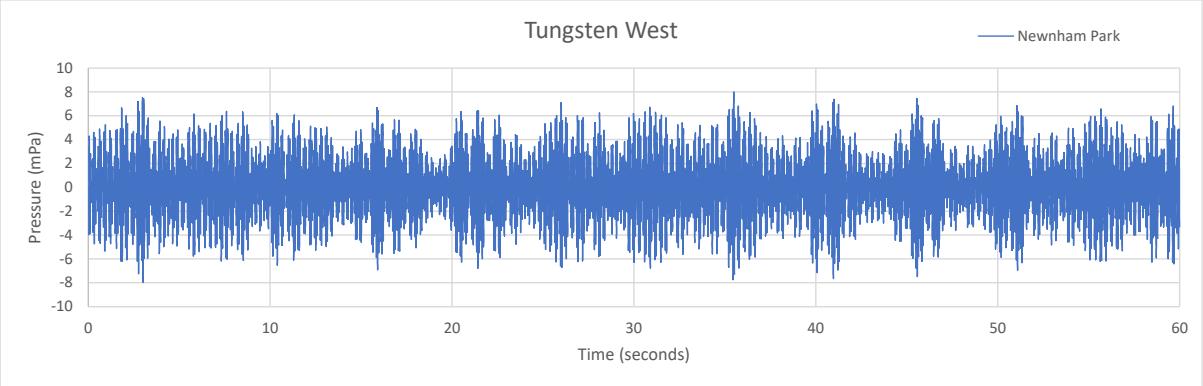
The following assumptions have been made:

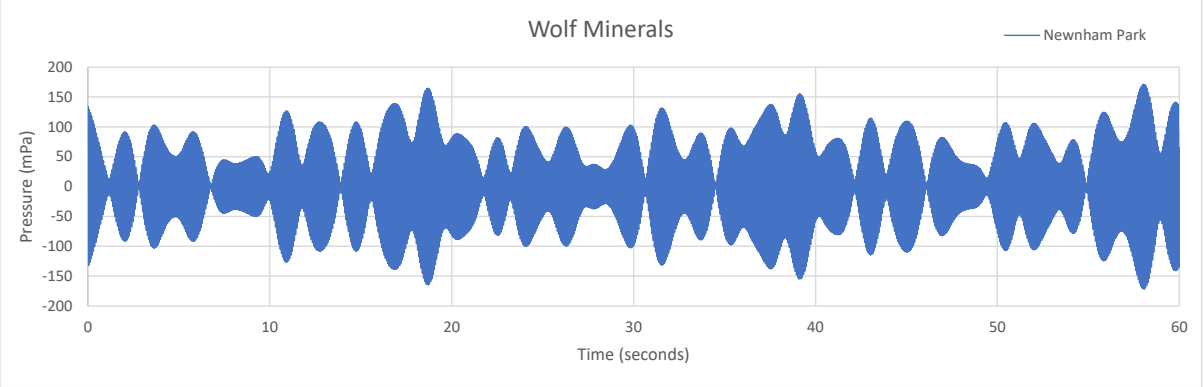
- Strokes assumed normal to screen deck.
- Acoustic efficiency values for Wolf Minerals screens from measured values.
- Acoustic efficiency values for Tungsten West screens set to 0.3.
- No building attenuation
- No environmental acoustic damping
- No wind effects

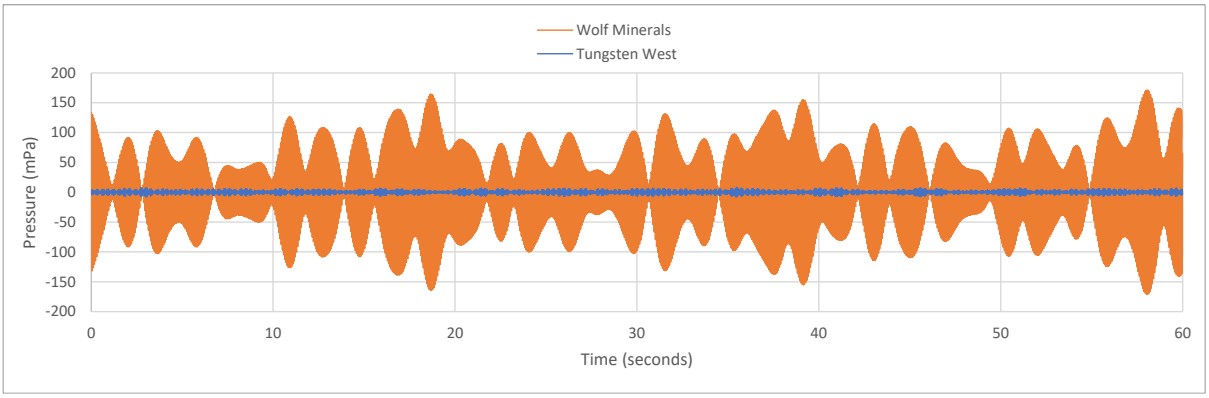

Tungsten West
Portworthy Farmhouse
Pressure (mPa)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
10
20
30
40
50
60
Time (seconds)

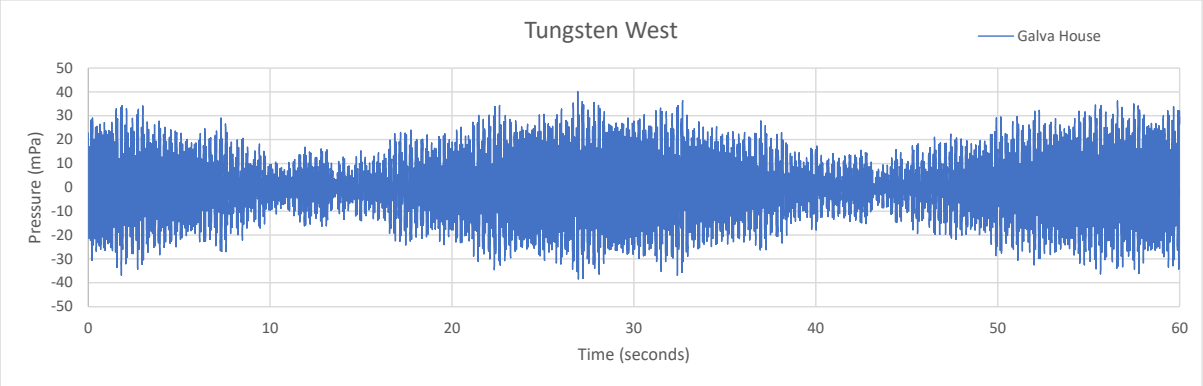

Wolf Minerals
Portworthy Farmhouse
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

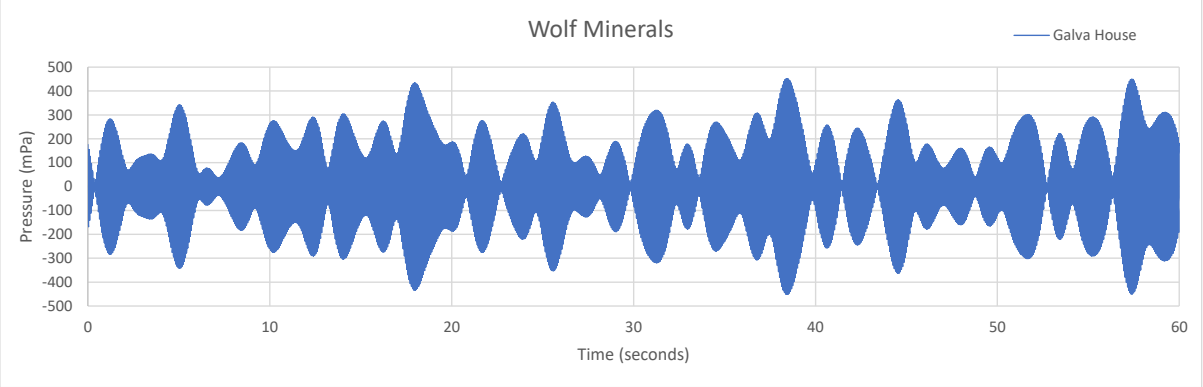

Wolf Minerals
Tungsten West
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

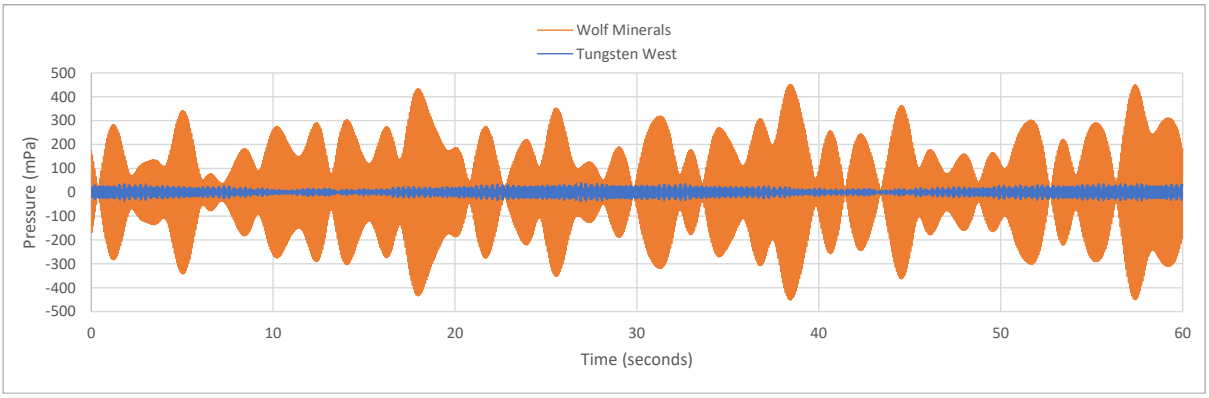

Tungsten West
Newnham Park
Pressure (mPa)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
10
20
30
40
50
60
Time (seconds)

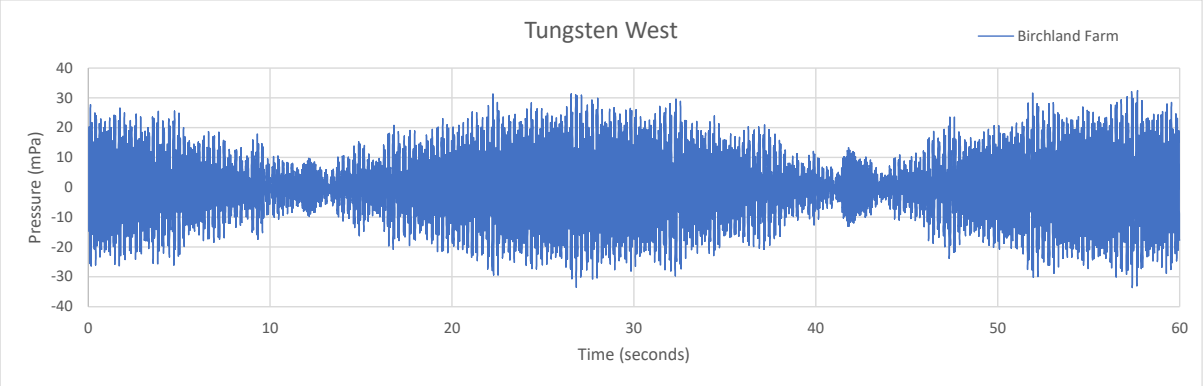

Wolf Minerals
Newnham Park
Pressure (mPa)
200
150
100
50
0
-50
-100
-150
-200
0
10
20
30
40
50
60
Time (seconds)

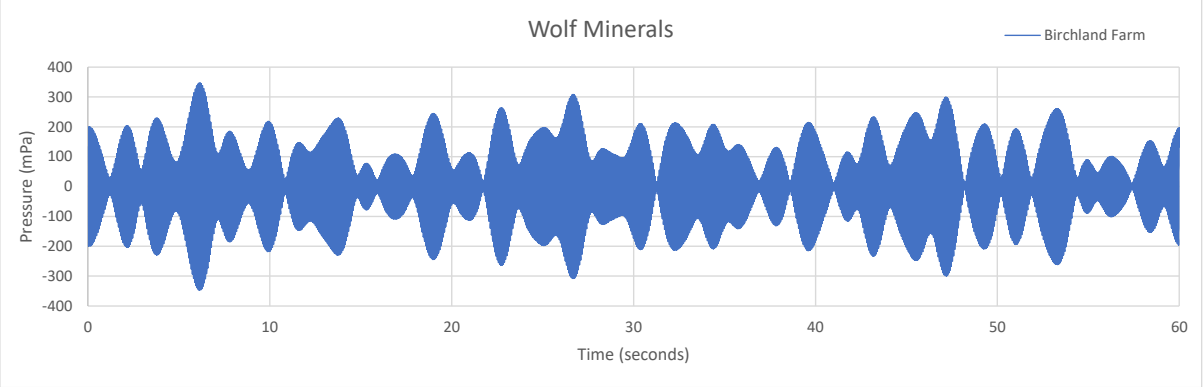

Wolf Minerals
Tungsten West
Pressure (mPa)
200
150
100
50
0
-50
-100
-150
-200
0
10
20
30
40
50
60
Time (seconds)

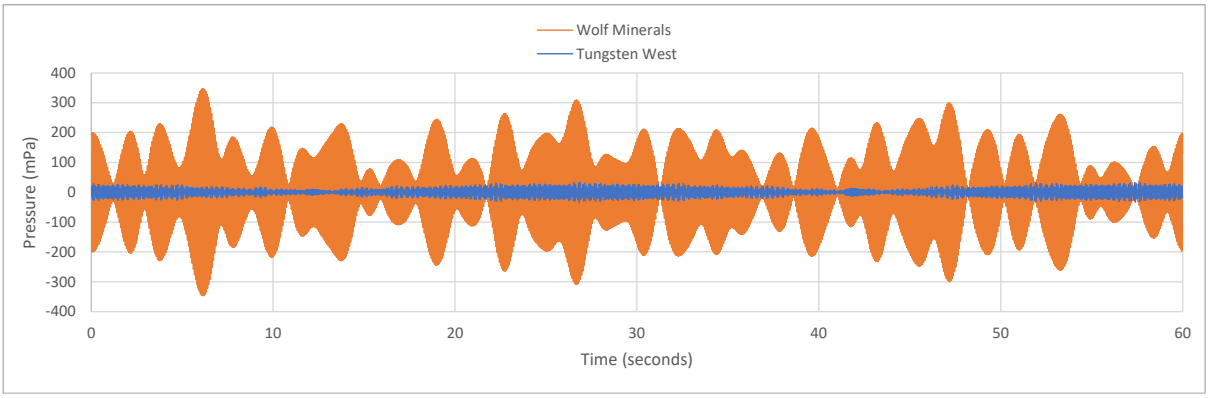

Tungsten West
Galva House
Pressure (mPa)
50
40
30
20
10
0
-10
-20
-30
-40
-50
0
10
20
30
40
50
60
Time (seconds)

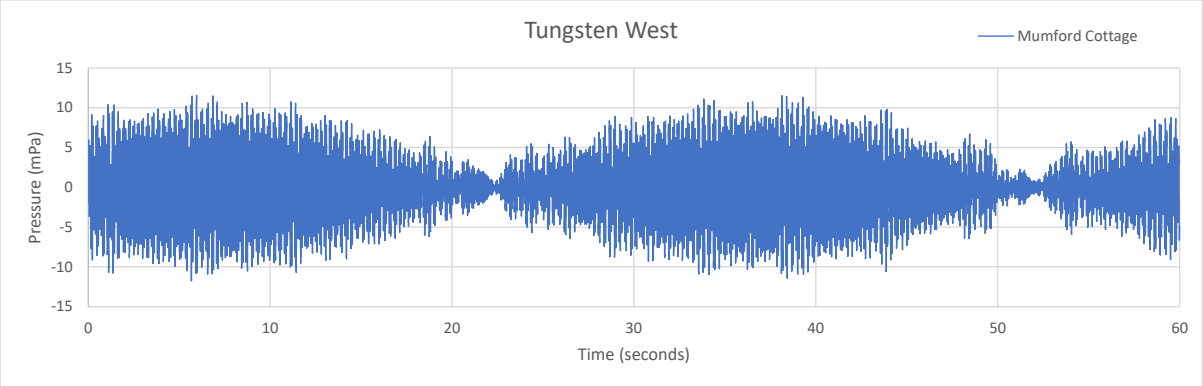

Wolf Minerals
Galva House
Pressure (mPa)
500
400
300
200
100
0
-100
-200
-300
-400
-500
0
10
20
30
40
50
60
Time (seconds)

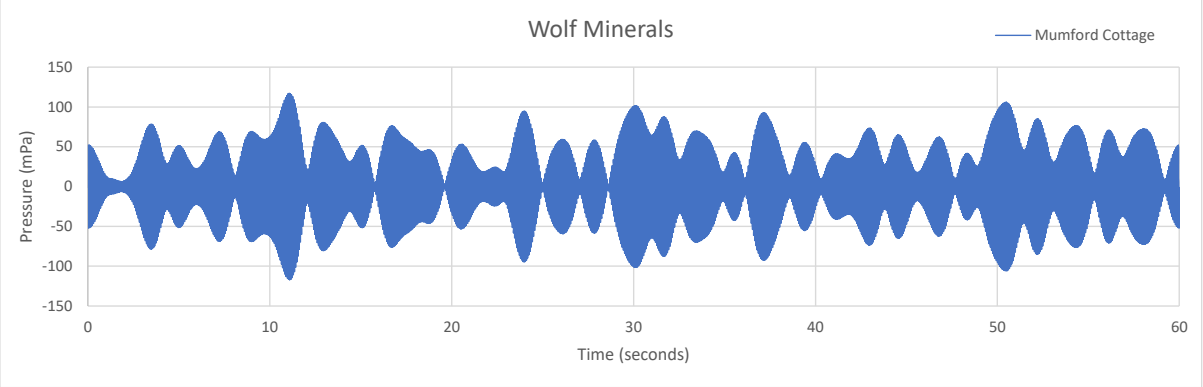

Wolf Minerals
Tungsten West
Pressure (mPa)
500
400
300
200
100
0
-100
-200
-300
-400
-500
0
10
20
30
40
50
60
Time (seconds)

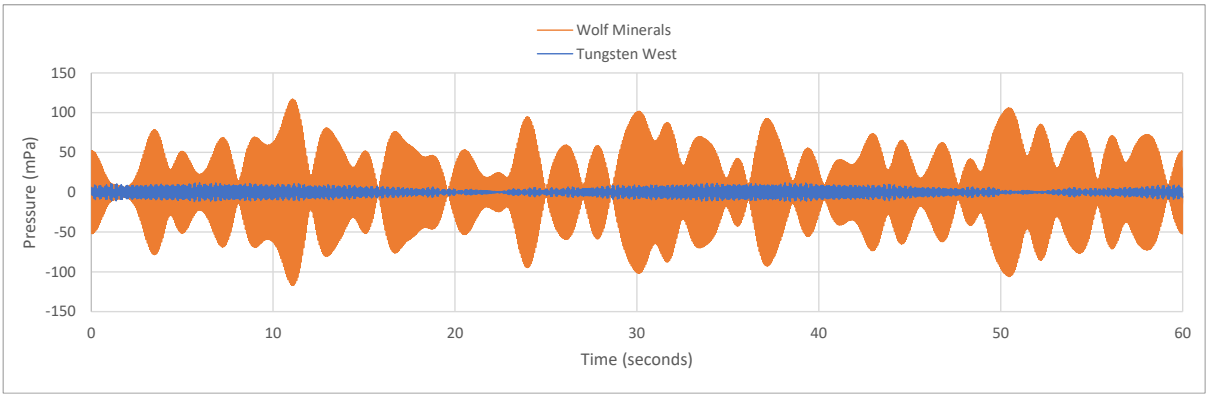

Tungsten West
Birchland Farm
Pressure (mPa)
40
30
20
10
0
-10
-20
-30
-40
0
10
20
30
40
50
60
Time (seconds)

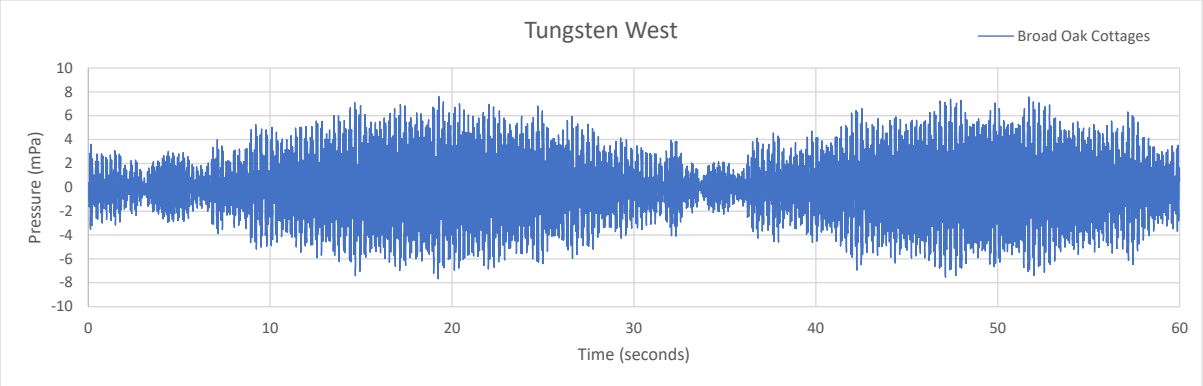

Wolf Minerals
Birchland Farm
Pressure (mPa)
400
300
200
100
0
-100
-200
-300
-400
0
10
20
30
40
50
60
Time (seconds)

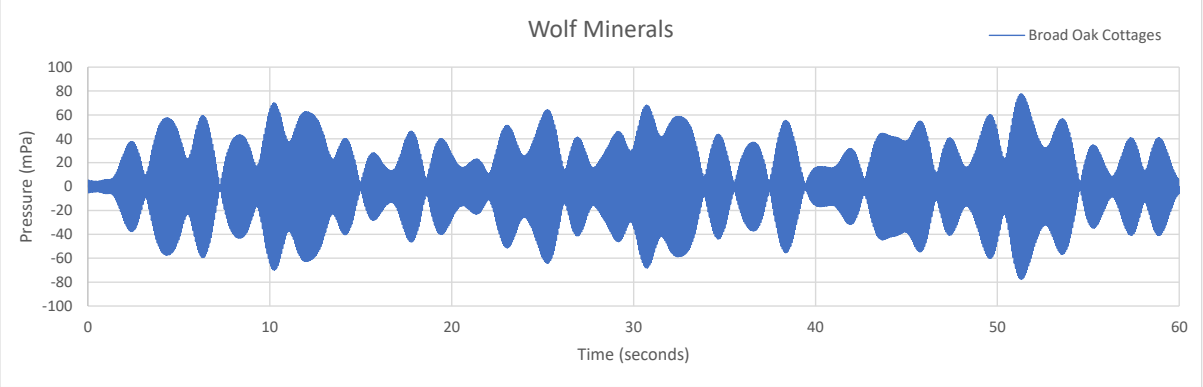

Wolf Minerals
Tungsten West
Pressure (mPa)
400
300
200
100
0
-100
-200
-300
-400
0
10
20
30
40
50
60
Time (seconds)

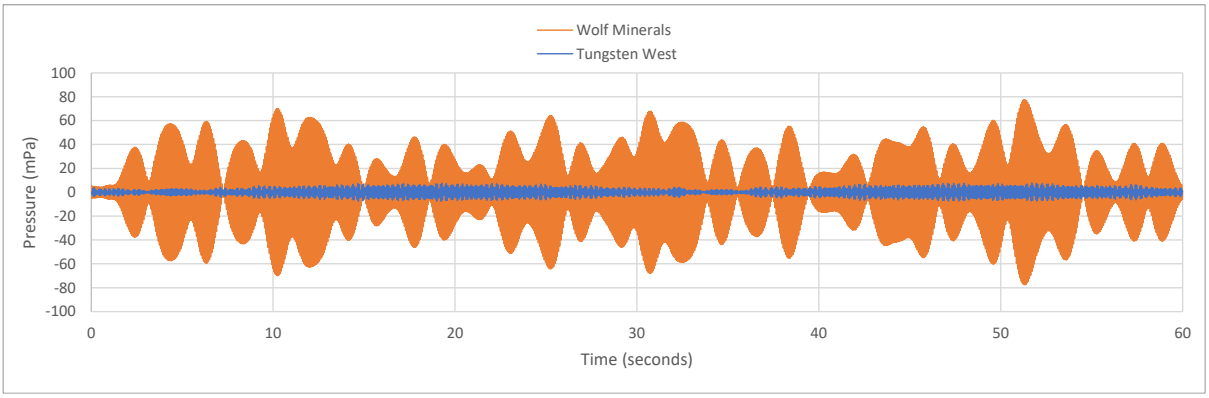

Tungsten West
Mumford Cottage
Pressure (mPa)
15
10
5
0
-5
-10
-15
0
10
20
30
40
50
60
Time (seconds)

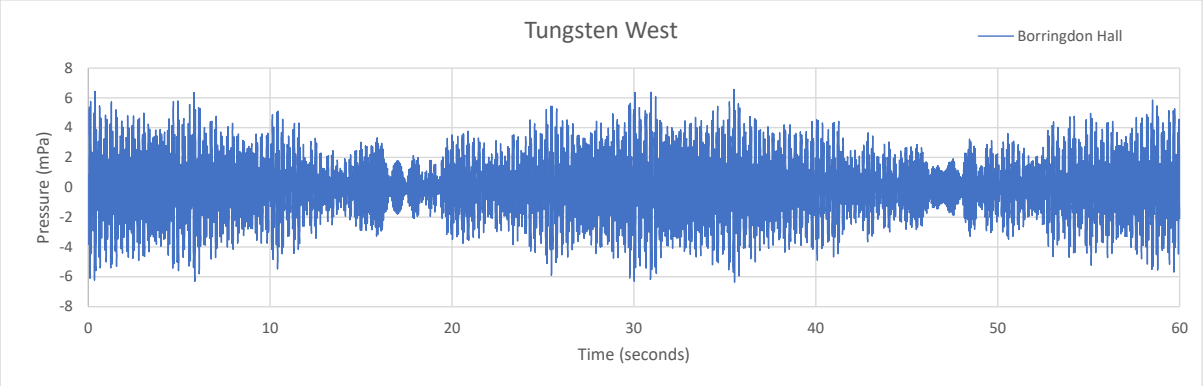

Wolf Minerals
Mumford Cottage
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

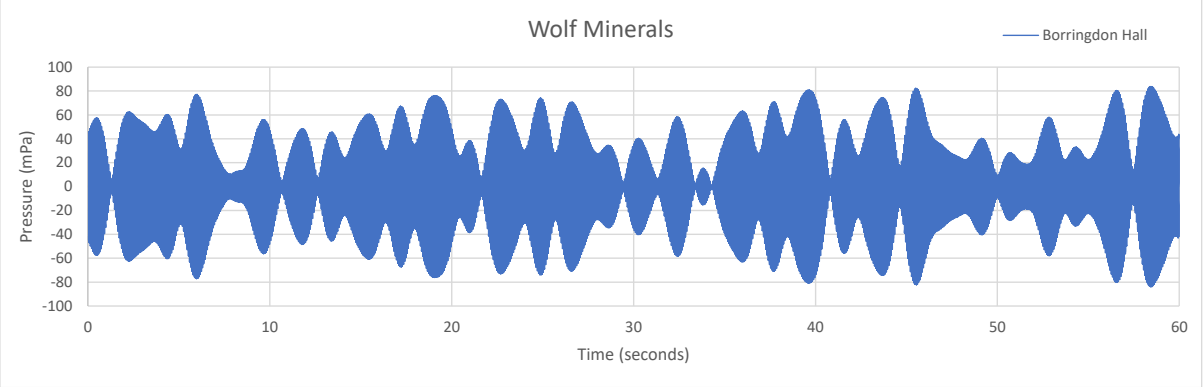

Wolf Minerals
Tungsten West
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

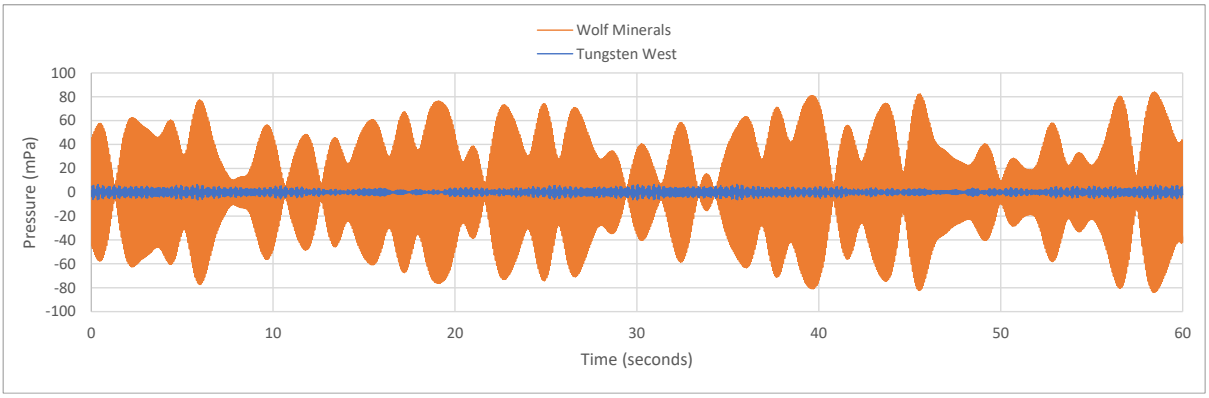

Tungsten West
Broad Oak Cottages
Pressure (mPa)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
10
20
30
40
50
60
Time (seconds)

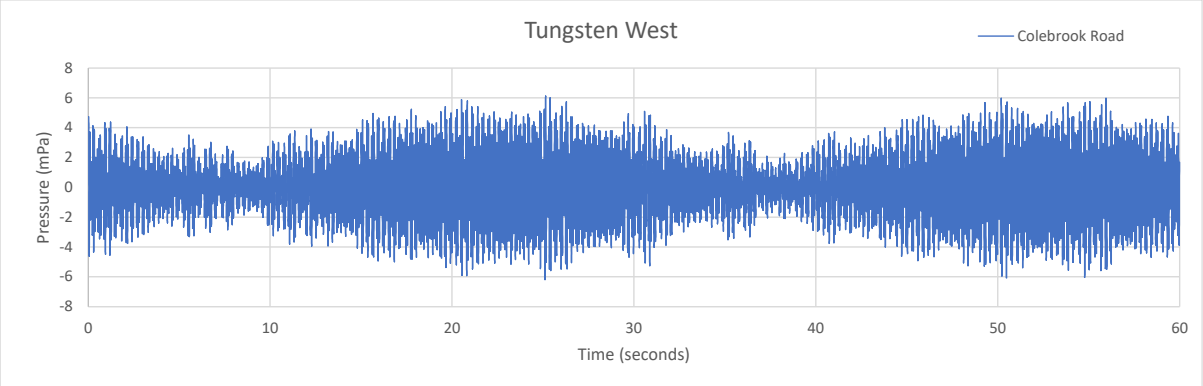

Wolf Minerals
Broad Oak Cottages
Pressure (mPa)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
10
20
30
40
50
60
Time (seconds)

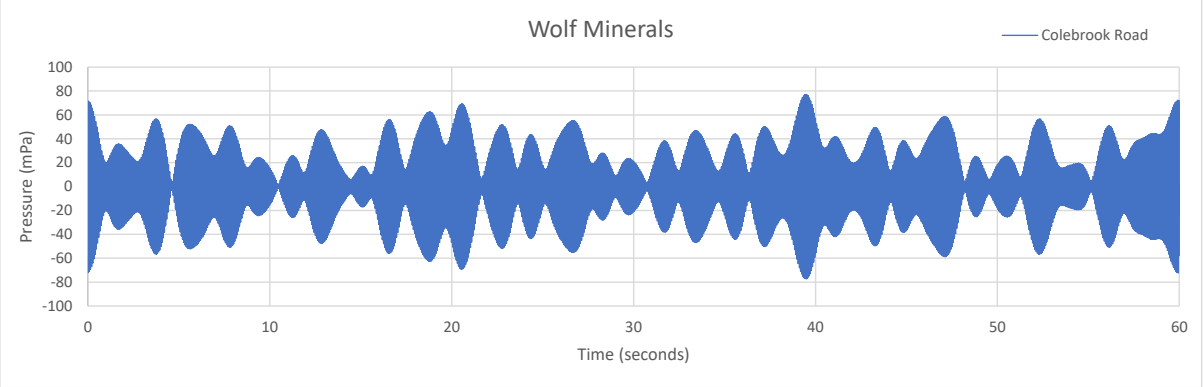

Wolf Minerals
Tungsten West
Pressure (mPa)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
10
20
30
40
50
60
Time (seconds)

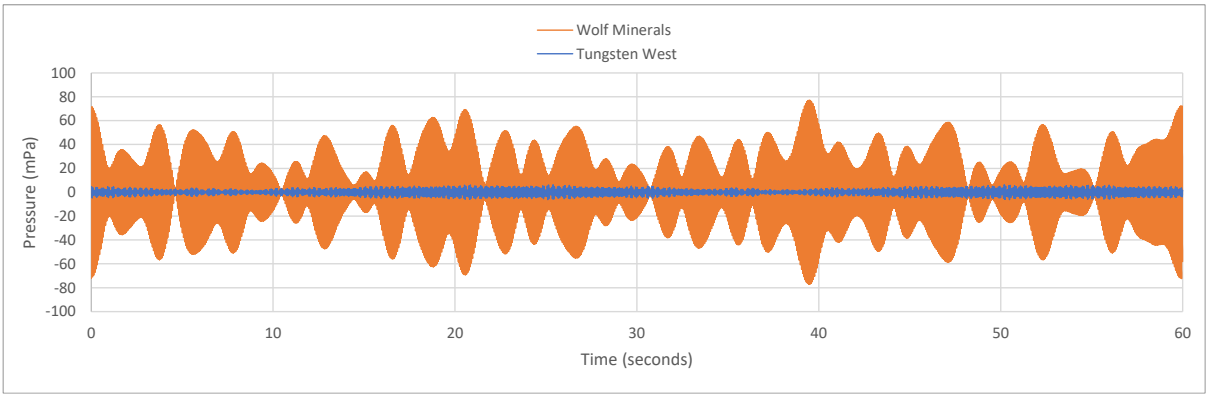

Tungsten West
Borringdon Hall
Pressure (mPa)
8
6
4
2
0
-2
-4
-6
-8
0
10
20
30
40
50
60
Time (seconds)

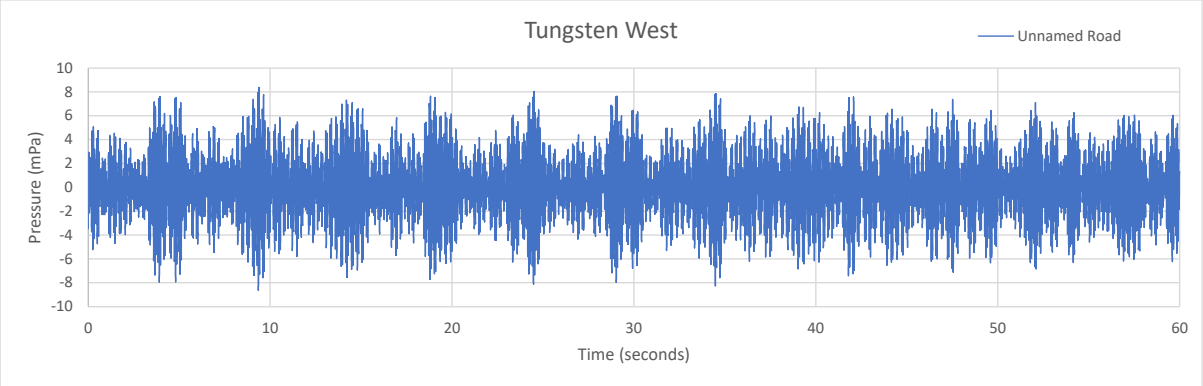

Wolf Minerals
Borringdon Hall
Pressure (mPa)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
10
20
30
40
50
60
Time (seconds)

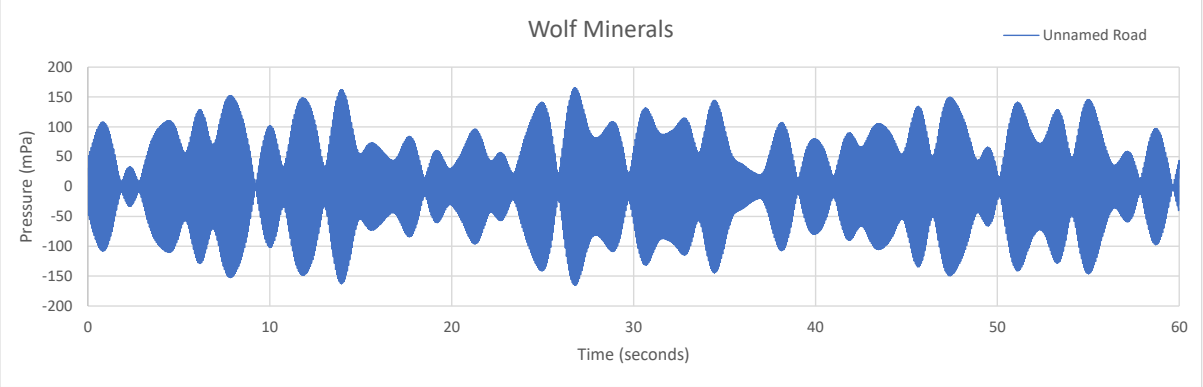

Wolf Minerals
Tungsten West
Pressure (mPa)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
10
20
30
40
50
60
Time (seconds)

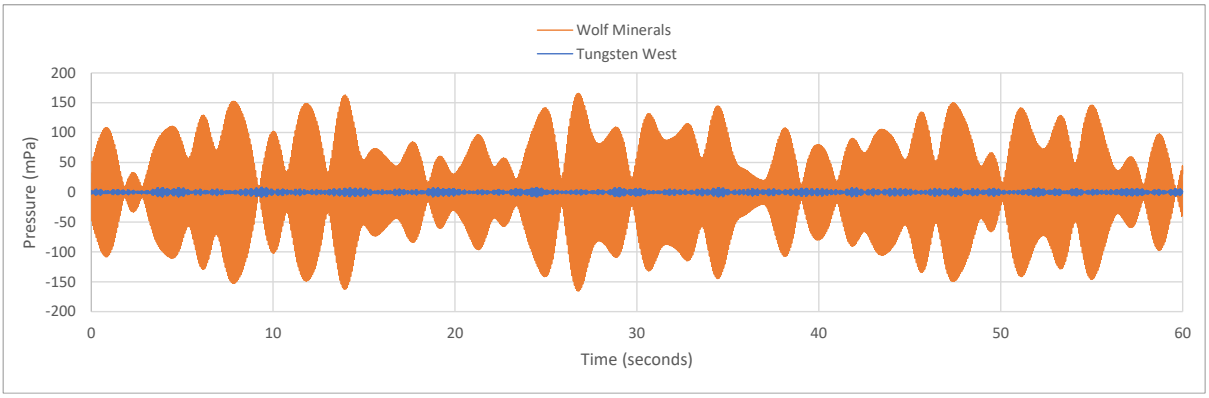

Tungsten West
Colebrook Road
Pressure (mPa)
8
6
4
2
0
-2
-4
-6
-8
0
10
20
30
40
50
60
Time (seconds)

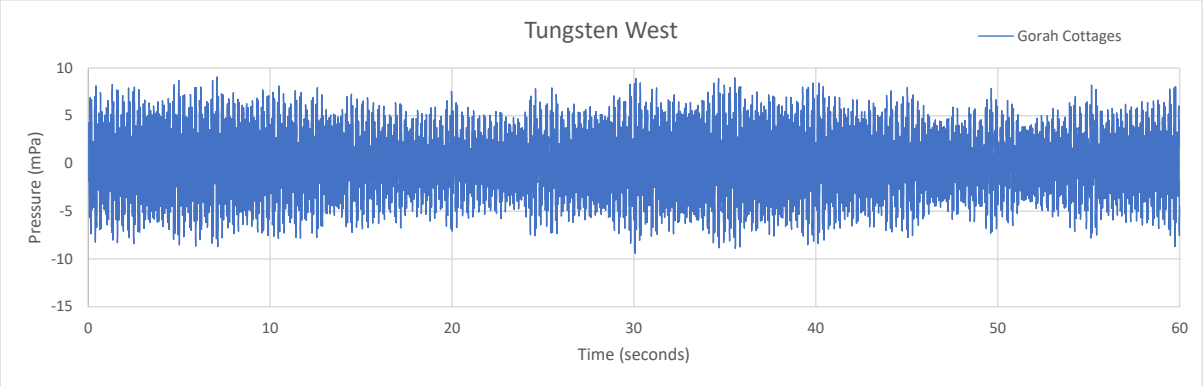

Wolf Minerals
Colebrook Road
Pressure (mPa)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
10
20
30
40
50
60
Time (seconds)

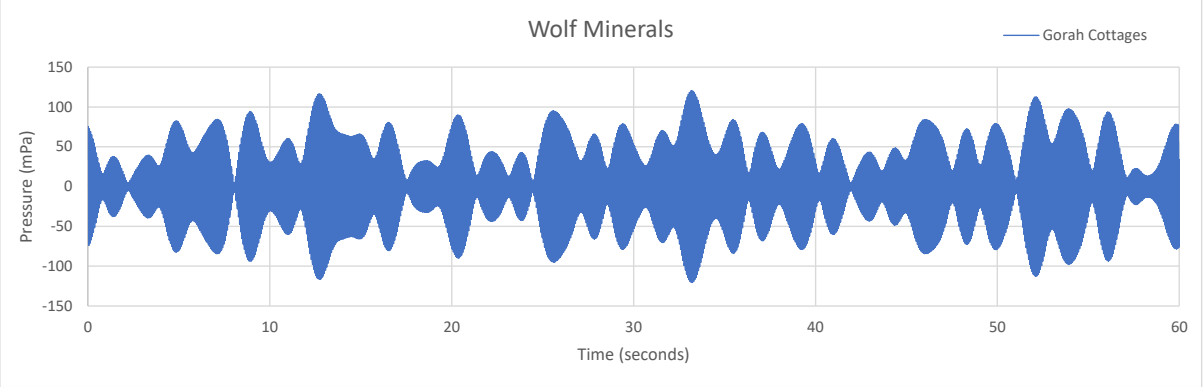

Wolf Minerals
Tungsten West
Pressure (mPa)
100
80
60
40
20
0
-20
-40
-60
-80
-100
0
10
20
30
40
50
60
Time (seconds)

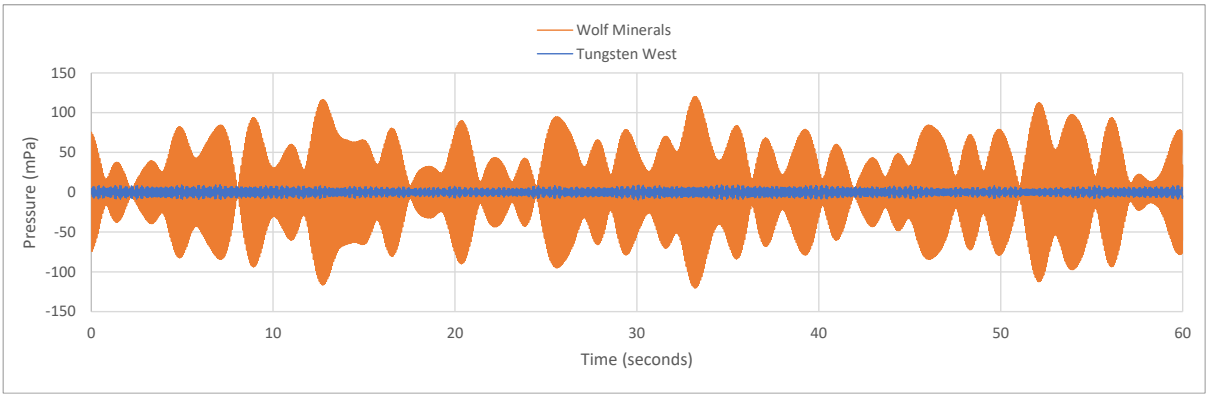

Tungsten West
Unnamed Road
Pressure (mPa)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
10
20
30
40
50
60
Time (seconds)

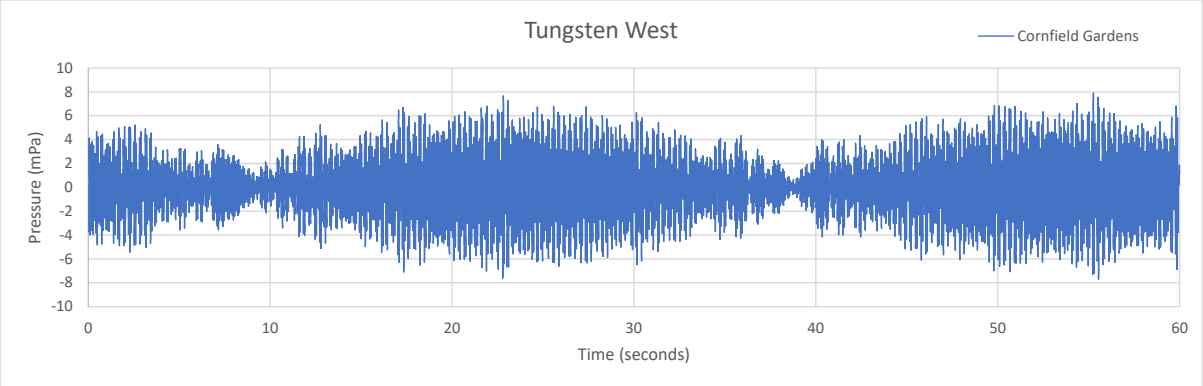

Wolf Minerals
Unnamed Road
Pressure (mPa)
200
150
100
50
0
-50
-100
-150
-200
0
10
20
30
40
50
60
Time (seconds)

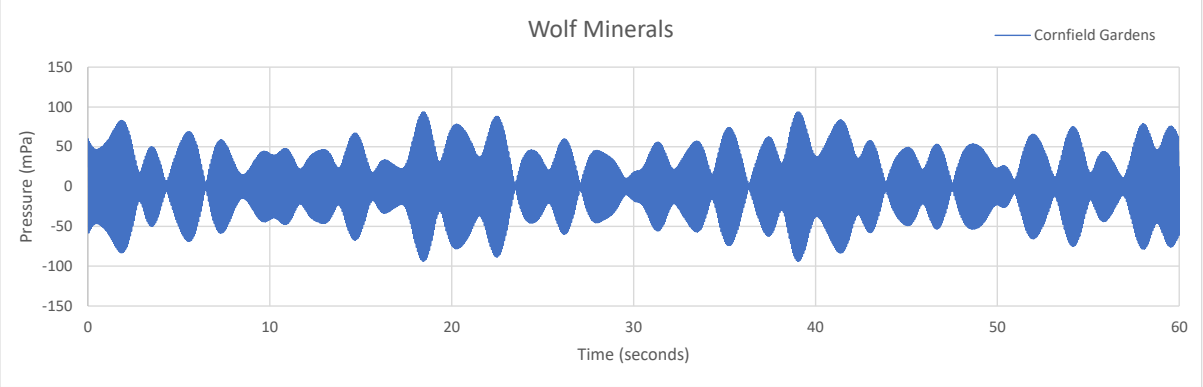

Wolf Minerals
Tungsten West
Pressure (mPa)
200
150
100
50
0
-50
-100
-150
-200
0
10
20
30
40
50
60
Time (seconds)

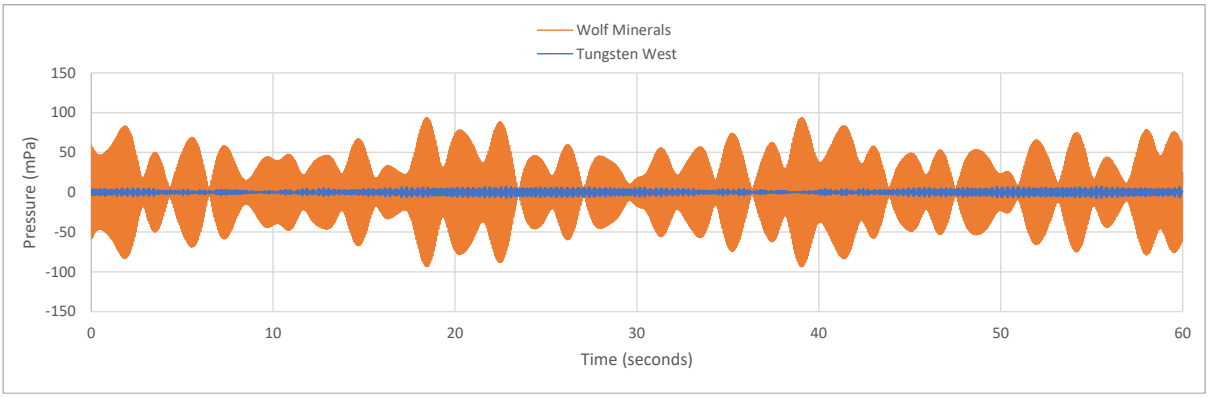

Tungsten West
Gorah Cottages
Pressure (mPa)
10
5
0
-5
-10
-15
0
10
20
30
40
50
60
Time (seconds)

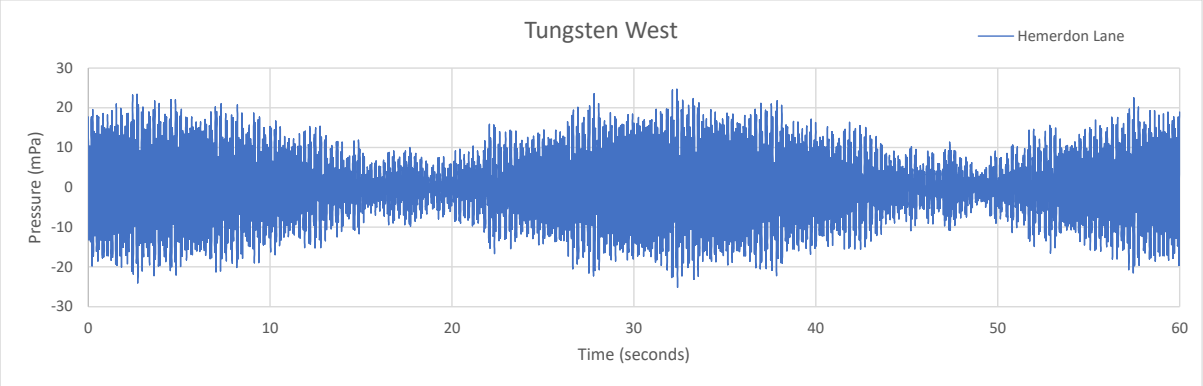

Wolf Minerals
Gorah Cottages
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

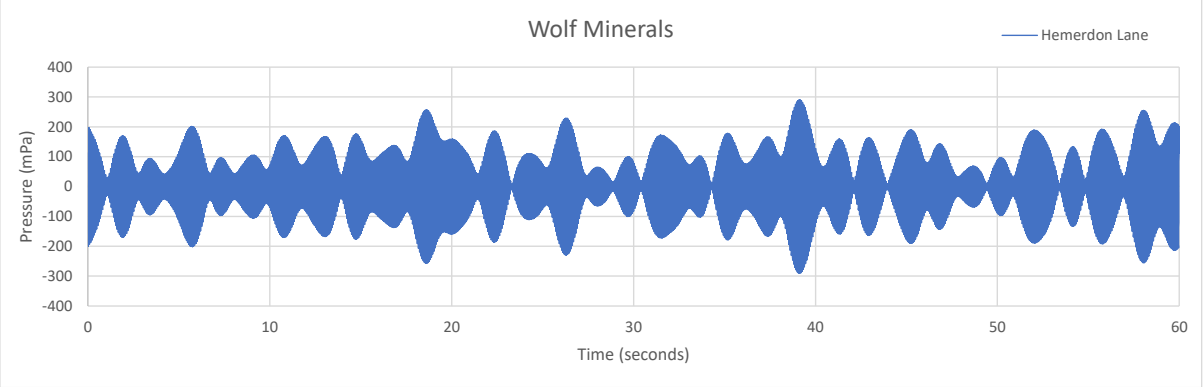

Wolf Minerals
Tungsten West
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

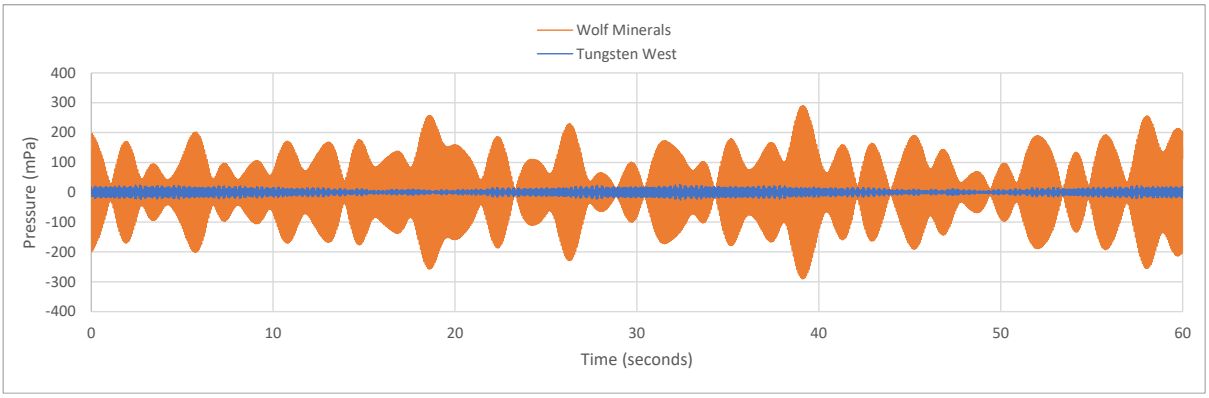

Tungsten West
Cornfield Gardens
Pressure (mPa)
10
8
6
4
2
0
-2
-4
-6
-8
-10
0
10
20
30
40
50
60
Time (seconds)

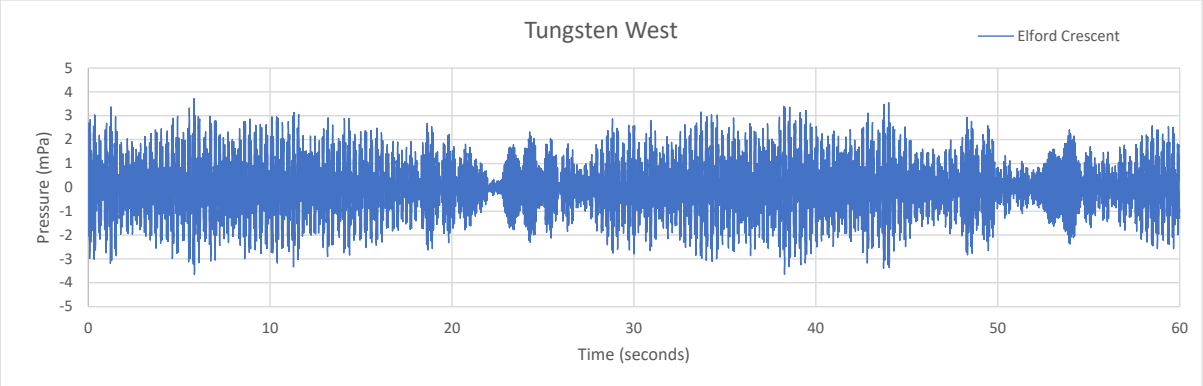

Wolf Minerals
Cornfield Gardens
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

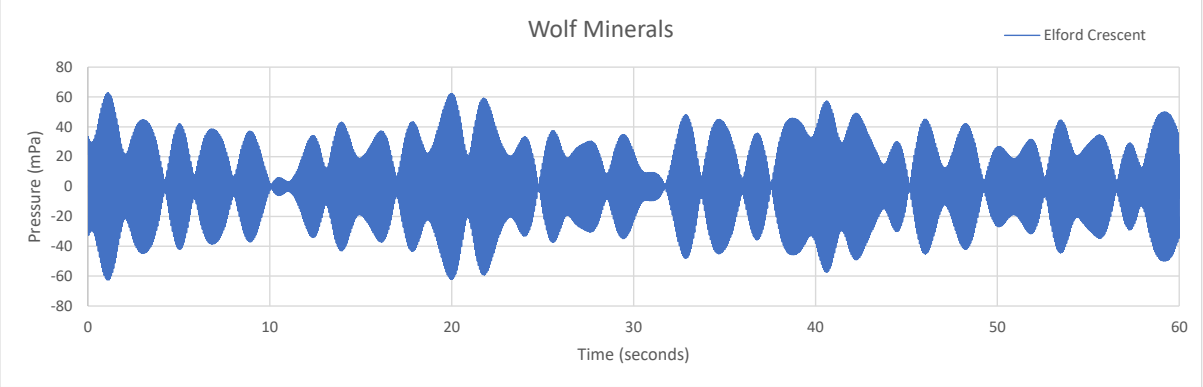

Wolf Minerals
Tungsten West
Pressure (mPa)
150
100
50
0
-50
-100
-150
0
10
20
30
40
50
60
Time (seconds)

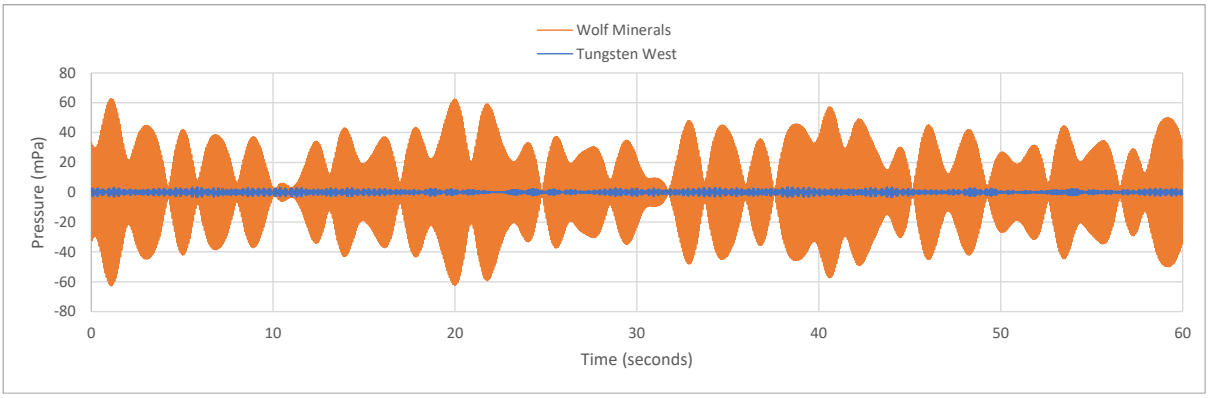

Tungsten West
Hemerdon Lane
Pressure (mPa)
30
20
10
0
-10
-20
-30
0
10
20
30
40
50
60
Time (seconds)

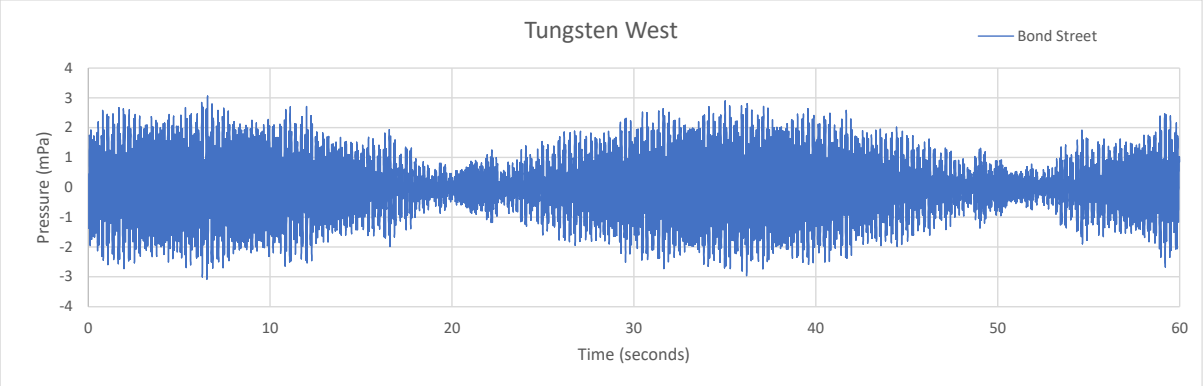

Wolf Minerals
Hemerdon Lane
Pressure (mPa)
400
300
200
100
0
-100
-200
-300
-400
0
10
20
30
40
50
60
Time (seconds)

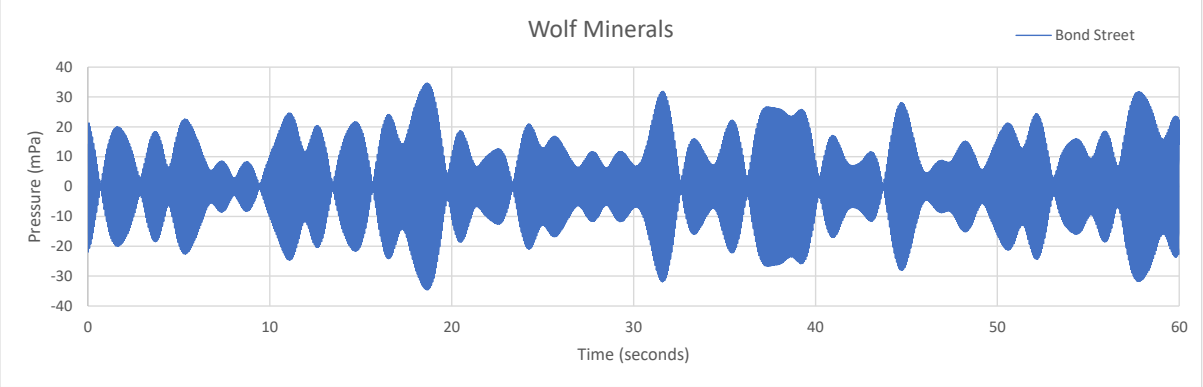

Wolf Minerals
Tungsten West
Pressure (mPa)
400
300
200
100
0
-100
-200
-300
-400
0
10
20
30
40
50
60
Time (seconds)

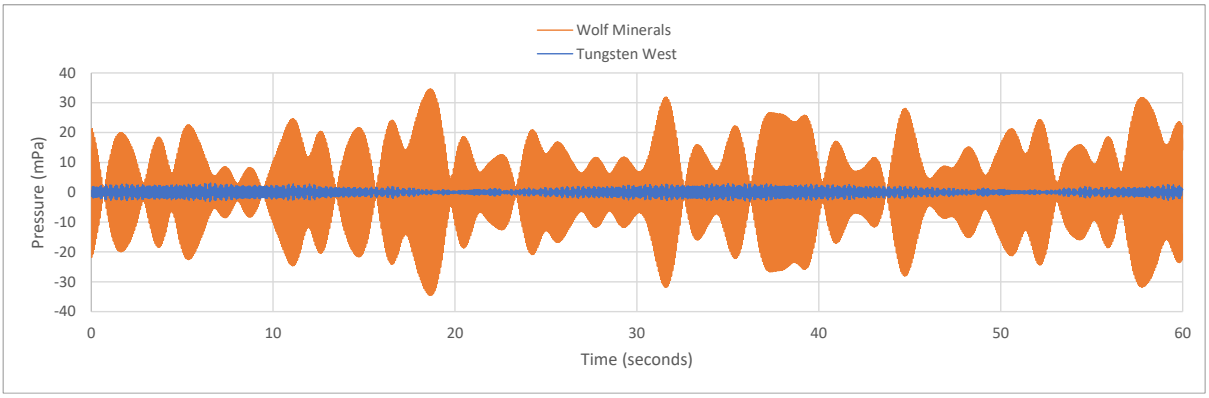

Tungsten West
Elford Crescent
Pressure (mPa)
5
4
3
2
1
0
-1
-2
-3
-4
-5
0
10
20
30
40
50
60
Time (seconds)

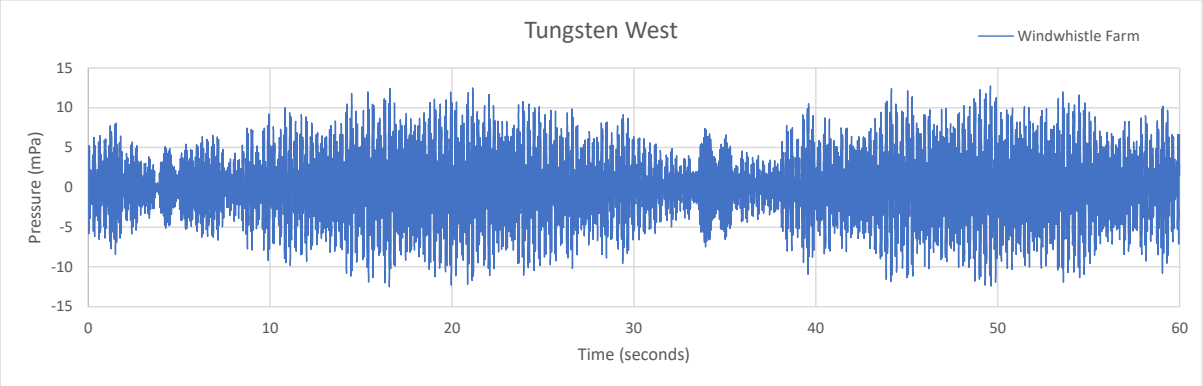

Wolf Minerals
Elford Crescent
Pressure (mPa)
80
60
40
20
0
-20
-40
-60
-80
0
10
20
30
40
50
60
Time (seconds)

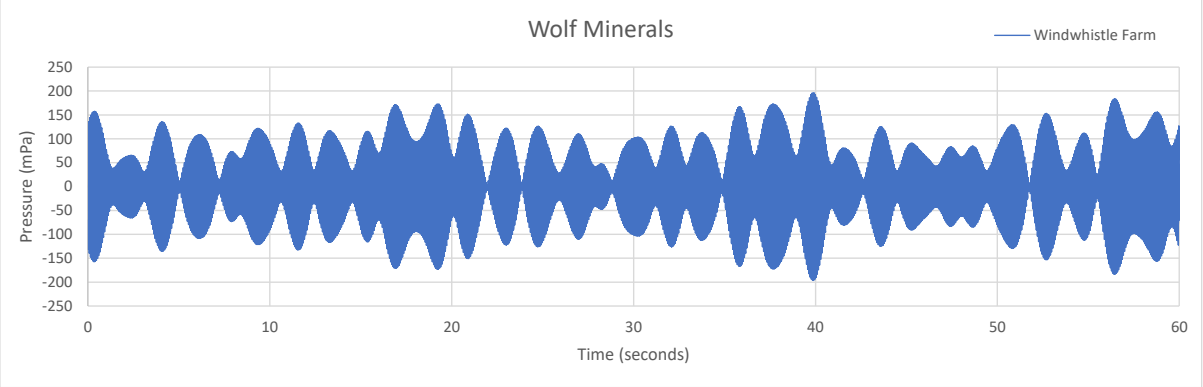

Wolf Minerals
Tungsten West
Pressure (mPa)
80
60
40
20
0
-20
-40
-60
-80
0
10
20
30
40
50
60
Time (seconds)

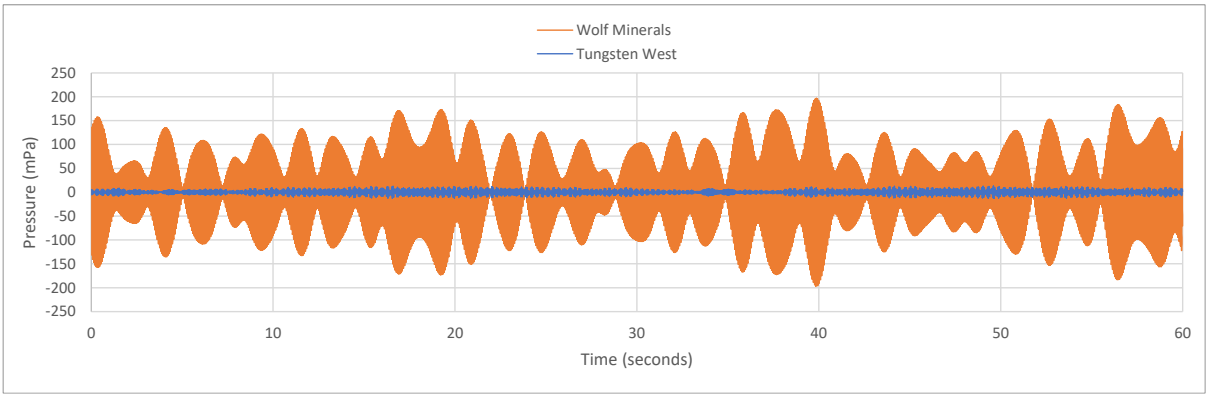

Tungsten West
Bond Street
Pressure (mPa)
4
3
2
1
0
-1
-2
-3
-4
0
10
20
30
40
50
60
Time (seconds)


Wolf Minerals
Bond Street
Pressure (mPa)
40
30
20
10
0
-10
-20
-30
-40
0
10
20
30
40
50
60
Time (seconds)


Wolf Minerals
Tungsten West
Pressure (mPa)
40
30
20
10
0
-10
-20
-30
-40
0
10
20
30
40
50
60
Time (seconds)


Tungsten West
Windwhistle Farm
Pressure (mPa)
15
10
5
0
-5
-10
-15
0
10
20
30
40
50
60
Time (seconds)


Wolf Minerals
Windwhistle Farm
Pressure (mPa)
250
200
150
100
50
0
-50
-100
-150
-200
-250
0
10
20
30
40
50
60
Time (seconds)


Wolf Minerals
Tungsten West
Pressure (mPa)
250
200
150
100
50
0
-50
-100
-150
-200
-250
0
10
20
30
40
50
60
Time (seconds)