



Ref: P3073/L02/DMT

29 November 2023

To:	John Morten	of:	J E Morten Ltd
Cc:	As per email distribution list	of:	

Dear John,

Storage Tanks, Ancillary Pump – Updated Noise Assessment to Discharge Planning

As requested, following the improved noise mitigation measures you have implemented, AEC has undertaken noise measurements to verify that the Local Authority noise limit has been achieved. Please find below the results of the updated assessment.

1.0 INTRODUCTION

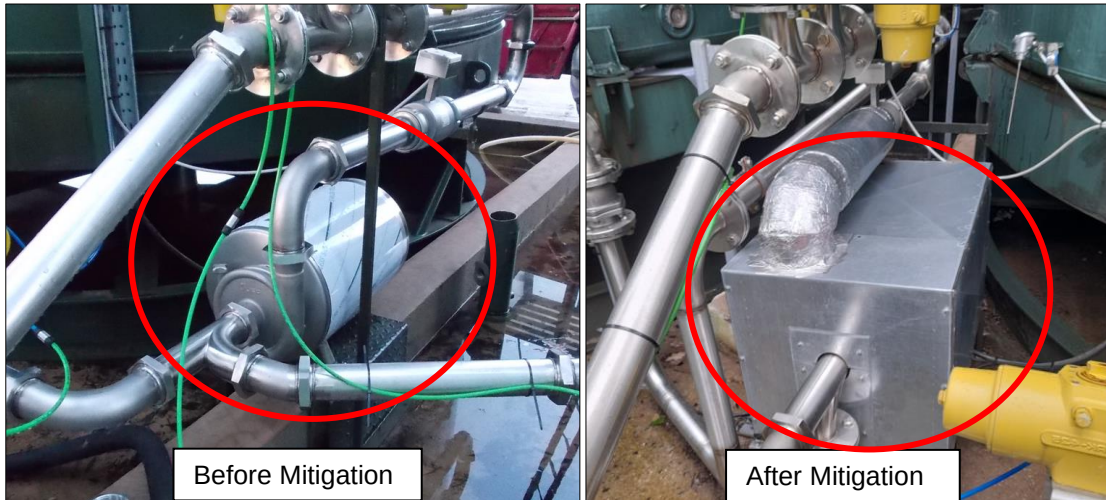
- 1.1 In 2014 AEC assessed a newly installed pump and motor assembly and identified that the mitigation works would be required in order to meet the noise limit required by High Peak Borough Council (HPBC). *AEC report Reference: P3073/L01/DMT, dated 27 November 2014.*
- 1.2 The planning condition from HPBC stated:

“The scheme shall demonstrate that the rating level of noise from ancillary operations associated with the use of the storage tanks shall not exceed the pre-existing background noise levels as measured at the nearest noise sensitive properties.”
- 1.3 The pre-existing background noise level was previously established as **45dBL_{A90}**.
- 1.4 Extensive mitigation works were undertaken by J E Morten Ltd, and AEC has undertaken a site inspection and noise verification measurements demonstrate compliance with the limit.
- 1.5 The various acoustic indices referred to in this report are described in Appendix A.

2.0 NOISE LEVEL MEASUREMENTS

- 2.1 Several attended noise level measurements were undertaken by AEC, on Wednesday 22 November 2023, using a Class 1 integrating sound level meter.
- 2.2 Measurements were taken in proximity to the pump and motor assembly and at the nearest residential receptor, directly opposite the pump, 7 metres away to the south. Noise survey details are provided in the measurement procedure in Appendix B. Full measured data is presented in Table B.1.
- 2.3 The noise level from the pump at 1 metre was approximately 83dBL_{Aeq,T} when in operation in 2014 before mitigation. However, following the enclosing of the pump in a metal housing with 50mm insulation inside, a 19dBA reduction has been achieved and the pump noise level is now **64dBL_{Aeq,T} at 1 metre**. This was based on several measurements around the pump.
- 2.4 The images below (Image 2.1) show the noise mitigation measures that have been implemented to the pump set.

Image 2.1 – Before and After – Pump Noise Enclosure



- 2.5 The noise level at the nearest residential receptor, approximately 7 metres away from the pump, was approximately 68dBL_{Aeq,T} when measured in 2014.
- 2.6 Following the enclosing of the pump in a metal housing and the construction of a blockwork wall noise barrier, approximately 2.3m high, a ≥ 24 dBA reduction has been achieved and the pump noise level is now **44dBL_{Aeq,T}** at the nearest receptor. This was based on a 5-minute sample measurement. This was considered to be sufficient to establish a reliable noise level, as the noise source was constant and steady.
- 2.7 The above noise level was slightly affected by other prevailing noise sources. Therefore, actual noise from the pump is likely to be slightly lower than 44dBL_{Aeq,T}. The improved noise barrier mitigation is indicated in Image 2.2 below.

Image 2.2 – Before and After – Improved Site Boundary Noise Barrier



3.0 Discussion & Conclusion

- 3.1 The mitigation measures evidenced in the images above, including enclosing the pump in an acoustically insulated metal housing and building up the masonry boundary wall to at least 2.3 metres, have ensured that a ≥ 24 dBA reduction in noise has been achieved.
- 3.2 The resulting noise level at the nearest (worst case) noise sensitive receptor, seven metres to the south of the pump, is **44dBL_{Aeq,T}**.
- 3.3 This meets the HPBC planning condition requirement, and therefore, on the basis of this assessment, it can be recommended that this condition is discharged.

Yours sincerely



David Terry

Checked by: WSK

APPENDIX A – Acoustic Terminology in Brief

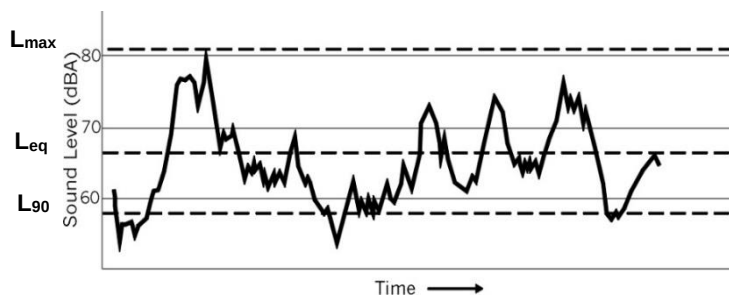
General

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most noise is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The dBA weighting emphasizes or reduces the importance of certain frequencies within the audible range

Sound / Noise Units

The figure below shows an example of sound level varying with time. Because of this variation over time the same period of noise can be described by several different levels. The most common of these are described below.



Commonly Used Descriptors for Sound / Noise

L_{AE}	The sound exposure level is a notional noise level and describes the average L_{Aeq} noise level of an event over a given time period as if it occurred during a one second period. This allows the L_{Aeq} to be determined over a time period with a number of distinct events.
$L_{Amax,F/S}$	The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.
$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises. It can be considered as the "ambient" noise level.
$L_{A90,T}$	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe the "background" noise.
$L_{A10,T}$	The (A-weighted) sound level exceeded for 10% of a measurement period. It is the value often used to describe traffic noise.
Free-field Level	This refers to the sound level measured outside, away from reflecting surfaces.
Façade Level	This refers to the sound level measured outside, at 1m from a hard reflecting surface, typically 3dB greater than the free-field level.

APPENDIX B – Noise Survey Details

Date & Time of Survey:	Daytime: 1030h to 1130h on Wednesday 22 November 2023.					
Personnel:	David Terry					
Equipment Used:	B&K 2260 Real Time Analyser (AEC Kit 2)					
Calibration:	The sound level analyser, which conform to BS EN 61672-1: 2013 <i>'Electroacoustics – Sound level meters - Part 1 Specifications'</i> for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
	22.11.23	Day	Dry	12°C	Westerly 0-3m/s	60%
Measurement Locations:	Measurements were undertaken at the source, in proximity to the pump, and at the nearest receptor opposite the pump, directly to the south. Pump – 1m from pump housing (above, 45 degrees and in line) Pump – 2m from pump at approximately 45 degrees. Receptor – Representative of the rear elevation, approximately 7m from pump. Ground floor of property.					
Measurement Details:	Measurements were undertaken in terms of L_{eq}, L_{10}, L_{90}, and L_{max} and were measured over short sample durations. Full results for the attended measurements are given in Table B.1.					
Measured Data:	Full 1/3 octave band centre frequency data was obtained for all measurements. There is no prominent tonal content.					

Table B.1 – Measured Noise Levels

Location	Period, h	Noise Level, dB			Comments
		L _{Aeq}	L _{A90}	L _{Amax} , F	
At Source (Pump)					
1 metre around pump (Average of 3 measurements)	1043-1045	64.4	63.0	67.3	Pump Noise Dominant.
2 metres from pump	1046-1047	59.6	58.2	62.1	Pump Noise Dominant.
At Receptor					
Free-field At Nearest Receptor (Pump On)	1115-1120	44.2	43.4	47.3	Pump noise barely audible, other noise sources affecting measurement.