MOTT MACDONALD

Technical Note

Project title	Afan Wastewater Treatment Works and Sewage Treatment Centre Environmental permit variation application
Subject	Noise Impact Assessment
Project number	100381175-006
Document ref.	100123523_Noise Impact Assessment Technical Note_AFA September 2024
Date	28 July 2022
Author	I Sartori
Checker and approver	A Monk-Steel

1. Background

As part of Welsh Water's application to vary a bespoke Environmental Permit (EPR/ZP3032KQ) for the Afan Welsh Water wastewater Treatment Works (WwTW) and Sludge Treatment Centre (STC) in Port Talbot, SA13 1RB, Mott MacDonald has been commissioned to undertake an assessment of the associated operational noise impacts.

2. Purpose

The purpose of the assessment is to assess the operational noise impact of the anaerobic digestors and sludge treatment activities of the STC. The assessment is made by way of a desk study and is based on a comparison of:

- Calculated operational noise impacts based on reference measurements of the same types of equipment installed at similar facilities and a simple propagation model
- Representative baseline noise levels obtained from published strategic noise maps

The approach to the assessment follows the guidance described by:

- Environment Agency (EA) Guidance 'Noise and vibration management: environmental permits'[1]
- British Standard (BS) 4142 'Methods for rating and assessing industrial and commercial sound' 2014+A1:2019[2]

3. Site Location and Receptors

The existing site is located along the coast in Port Talbot, Wales as shown in Figure 1. The Bristol Channel is to the west and south otherwise the site is surrounded by an industrial area comprising the steelworks and tarmac processing area to the north and east respectively. The industrial railway at is closest point is approximately 1km to the east while the South Wales Main Line railway and the M4 motorway are further to the east approximately 1.8km and 2.3km respectively.

The closest Noise Sensitive Receptors (NSRs) to the Afan WwTW and STC site, as shown in Figure 1, are:

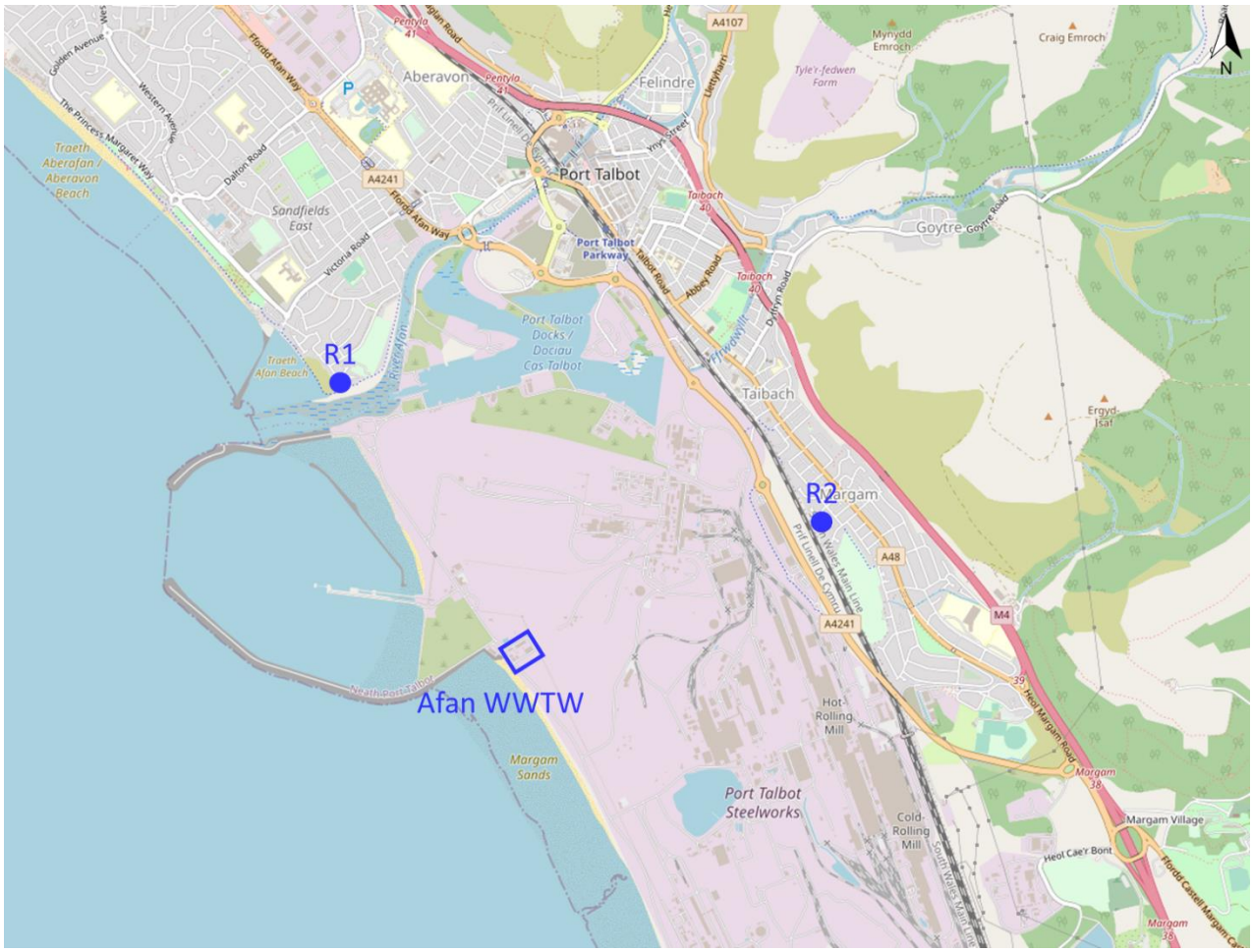
[1] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits [Last accessed 28 July 2022]

[2] British Standards Institution (2014+A1:2019). BS 4142 Methods for rating and assessing industrial and commercial sound.

- R1: End of Mariners Point, Port Talbot, SA12 6DL, approximately 1.79km to the north-west from the centre of the site
- R2: Clos Y Wern, Port Talbot, SA13 2LX, approximately 1.83km to the east from the centre of the site

The site location and layout plan is detailed in the drawing B16399-123532-ZZ-XX-DR-YA-AM0006.

Figure 1: Afan WwTW and STC site location and the closest NSRs



Source: www.openstreetmap.org OpenStreetMap® is *open data*, licensed under the Open Data Commons Open Database License (ODbL), with IS notes

4. Methodology

4.1 BS 4142:2014+A1:2019

The British Standard BS 4142 'Methods for rating and assessing industrial and commercial sound' 2014+A1:2019 (hereafter referred to as BS 4142), provides guidance for assessing a new industrial sound source in mixed residential and industrial areas. The methods described in this standard assess the likely effects of the new sound source on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

The level of sound due to the operation of the STC, the 'rating level', is calculated in terms of the A-weighted equivalent continuous sound level dB L_{Aeq} and compared with the existing 'background sound level', in terms of L_{A90} descriptor that is representative of the period being assessed (e.g. daytime or night-time). If the new

sound source is impulsive, intermittent, or tonal in nature, then a penalty is added to the 'rating level' to account for the character of the noise. On a precautionary basis, a penalty of 3 dB has been added to all calculated values of the operational noise of the STC incident on the NSRs.

BS 4142 presents a method to determine the potential significance, depending on context, based on the difference between the background sound level and the 'rating level' as follows:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

4.2 Environment Agency Guidance

The Environment Agency guidance supplements BS 4142 with regard to permitting and the responsibilities of the operator as set out in Table 1.

Table 1: Assessment criteria based on EA guidance

Difference between rating level over background sound level	BS 4142 assessment	EA guidance	Operator responsibility
+10 dB or more	Significant adverse impact	Unacceptable level of audible or detectable noise	You must take further action or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.
Around +5 dB	Adverse impact	Audible or detectable noise	Your duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if you are using appropriate measures. But you will need to rigorously demonstrate that you are using appropriate measures.
Equal to or lower	Low or no impact	No noise or barely audible or detectable noise	Low impact does not mean there is no pollution. However, if you have correctly assessed it as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority. Note that BS 4142 is unlikely to be the appropriate methodology on its own to assess low frequency noise.

5. Assessment

5.1 Noise emissions

Reference noise measurements undertaken by Mott MacDonald for types of equipment installed at similar facilities have been used. The noise emission values used in the calculations are presented in Table 2. The combined sound power level for this collection of items is used to represent the overall noise impact of the STC.

Table 2: Noise emission values assumed for the calculation of operational noise impact

Emission point	Assets	Reference SPL dB(A)	Distance from source (m)	Reference SWL dB(A)
CHP - unit 1	Imported sludge tank	65.0	10	93.0
CHP - unit 2	THP feed silo	65.0	10	93.0
Boiler unit 1	Thermal hydrolysis plant (THP)	70.5	5	92.5
Boiler unit 2	Digesters - 1	70.4	5	92.4
Biogas flare stack	Digesters - 2	81.5	2.5	97.5
Digester unit 1	Digested sludge holding tank	80.9	5	102.9
Digester unit 2	Belt presses and cake bays	68.0	10	96.0
OCU carbon filter	Indigenous sludge silo	71.2	2	85.2
OCU sulphuric acid scrubber	Gas holding tank	71.4	5	93.4
				Total **105.9 dB(A)**

5.2 Noise Sensitive Receptors

The closest NSRs are located more than 1.5km from the north and east of the centre of the site as described above and shown in Figure 1.

A hemispherical propagation model has been used to calculate the attenuation of noise levels to each NSR. No allowance is made for ground and atmospheric absorption, or screening attenuation, on a precautionary basis. The results give a calculated level of 33 dB(A) at both NSRs. By adding a penalty of 3 dB, the rating level for assessment is therefore 36 dB(A) for both NSRs.

Representative baseline ambient noise levels (L_{Aeq}) have been obtained from published strategic noise maps[3] and used to give approximate background sound levels (L_{A90}) by subtracting 2 dB from the baseline L_{Aeq} values. Finally, the excess of the rating levels over background sound levels for the daytime and night-time have been calculated by subtracting the L_{A90} values from the rating levels. These values are reported in Table 3.

Table 3: Assessment of operational noise impact at NSRs

Period	Parameter		NSRs	
			R1 - 1.79 km	R2 - 1.83 km
	Calculated specific level dB(A)		33	33
	Rating level dB(A)		36	36
Daytime	L_{Aeq} dB		55	65
	L_{A90} dB		53	63
		Excess dB	**-17**	**-27**
Night-time	L_{Aeq} dB		50	60
	L_{A90} dB		48	58
		Excess dB	**-12**	**-22**

[3] http://extrium.co.uk/walesnoiseviewer.html Last accessed 26 July 2022

The results show that the calculated rating levels are significantly below the estimated background sound levels. This is an indication that operational noise is expected to be barely audible or detectable having low or no impact.

6. Conclusion

This high-level noise impact assessment indicates that the calculated rating levels for the operation of Afan STC are expected to be significantly below background sound levels during the day and night-time, therefore having low or no impact.