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STRAIGHTFORWARD ACOUSTIC DESIGN

**SWANSEA BAY
TECHNOLOGY CENTRE**
BASELINE NOISE SURVEY REPORT

Project no. P1033

Report ref. P1033-REP-0001

Date 02-04-2020

Revision P02



EXEC SUMMARY

Neath Port Talbot Council is applying for full planning permission to develop a site adjacent to the existing Canolfan Arloesi Bae Baglan Bay Innovation Centre, to provide a new Technology Centre. This report summarises an assessment of the potential noise impacts arising from the proposed development.

POTENTIAL NOISE IMPACTS

The proposed development will not generate significant operational noise levels or changes in road traffic on the local road network. Construction noise is not expected to be significant in the context of the site and the local area.

Therefore, the potential impacts which have been assessed are:

- 1) Environmental noise at the site affecting noise sensitive spaces within the proposed building.
- 2) Noise from mechanical services plant affecting nearby noise sensitive receptors.

EXISTING NOISE CLIMATE

The site is located in close proximity to the M4 motorway, which dominates the noise climate. Based on the results of a baseline noise survey undertaken by Formant, the representative levels used in the assessment are:

- 1) 54 dBL_{Aeq,T} at the location of proposed façades with line of sight to the motorway
- 2) 52 dBL_{Aeq,T} at the location of proposed facades which are screened from the motorway and
- 3) 50 dBL_{A90,T} at the location of the nearest noise sensitive receptors.

ASSESSMENT OUTCOME

Noise break-in to the proposed development has been assessed based on the architects' proposed drawings. A mechanical ventilation strategy is proposed for non-acoustic reasons. The predicted internal noise levels are below the BS 8233 internal ambient noise level targets, therefore **no significant impacts are predicted.**

Initial plant selections have been reviewed against the relevant noise emissions limits at existing NSRs within the site boundary and outside the site. The assessment shows that plant noise emissions are predicted to be within the limits, therefore **no significant impacts are predicted.**



1 INTRODUCTION

Neath Port Talbot Council is applying for full planning permission to develop a new Technology Centre building adjacent to the existing Baglan Bay Innovation Centre, Baglan Energy Park, Central Ave, Port Talbot SA12 7AX.

Formant has been appointed to undertake a baseline noise survey in order to assess the potential noise impact of the proposed development.

This report provides:

- 1) A summary of applicable legislation, policy and guidance
- 2) A description of the proposed development and its potential impacts
- 3) The results of a baseline noise survey undertaken at the site
- 4) A summary of the assessment of potential noise impacts

2 PROPOSED DEVELOPMENT

A summary of the key points relating to the proposed site, noise climate, nearby noise sensitive receptors (NSRs) and potential noise impacts is provided in Figure 1. More details on each item are provided below.

2.1 PROPOSED SITE

The existing site comprises of a 4-storey office building, car parking and soft landscaping. The M4 runs along the north-eastern boundary of the site with residential properties beyond. Railway sidings are located to the north of the site and a range of industrial and commercial buildings are located to the south-west and the south-east.

2.2 SITE NOISE CLIMATE

The site noise climate is dominated by noise from the M4. No other significant noise sources were observed during the noise survey. At the location of the proposed building, the existing Baglan Bay Innovation Centre provides a degree of partial screening from the noise of the M4.

2.3 NEARBY RECEPTORS

The nearest noise sensitive receptor (NSR) is the existing Baglan Bay Innovation Centre, immediately adjacent to the proposed development. The nearest residential properties are located on the opposite side of the M4 and are not expected to be materially affected by noise from the proposed development.

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REF: 1033/SK01
DATE: 12 Sep 2019
MADE BY: PAUL DRISCOLL

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NOISE FROM THE DEVELOPMENT

RECEPTORS

Nearest Noise Sensitive Receptor (NSR) is adjacent Baglan Bay Innovation Centre. No nearby residential NSRs on same side of M4.

POTENTIAL IMPACTS

New M&E plant has potential for adverse impacts at NSR during daytime hours. No significant construction or traffic noise impacts are expected.

SURVEY METHOD

Measure daytime noise levels at proposed site, to capture background noise levels at NSR. No need to measure at residential receptors.

ASSESSMENT METHOD

Assess plant noise in line with BS4142 with limits set 5 dB below existing L_{A90} at NSRs.



RECEPTORS

The building will contain spaces with varying noise sensitivity e.g. offices, meeting rooms, etc. No proposed external amenity

POTENTIAL IMPACTS

Environmental noise break-in to the building could affect speech clarity and adversely affect concentration.

SURVEY METHOD

Attended daytime noise measurements in proxy location for proposed building facades.

ASSESSMENT METHOD

Assess noise break-in using BS 8233 criteria.

NOISE AFFECTING THE DEVELOPMENT

Figure 1: Existing site and summary of survey/assessment method and results.

3 LEGISLATION, POLICY AND GUIDANCE

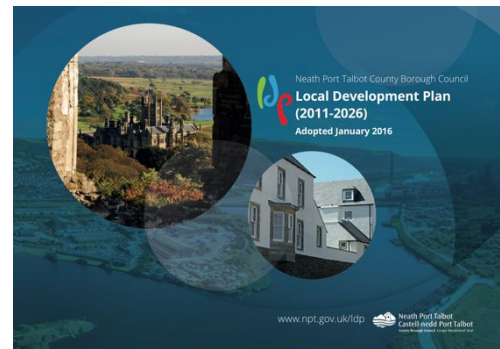
3.1 LEGISLATION

No specific legislation is relevant to the noise impact assessment for the proposed development.

3.2 LOCAL POLICY

Paragraph 5.3.46 of the NPT Local Development Plan states that

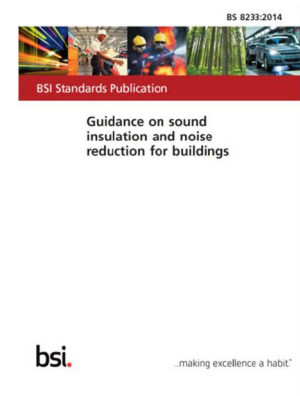
“In relation to noise, potentially noisy proposals should not be located close to sensitive uses (such as hospitals, schools and housing) and new noise-sensitive developments should not be located near to existing noisy uses (including industry and existing or proposed transport infrastructure) unless it can be shown that adverse effects can be dealt with through mitigation measures incorporated into the design.”



3.3 GUIDANCE

BS 8233:2014

BS 8233:2014 provides a method for assessing noise break-in to buildings. It recommends internal ambient noise limits for different types of buildings and a calculation method to determine noise break-in. It has been used as the basis for assessing noise break-in to the proposed development.



BS 4142:2014

BS4142 provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The method is applicable to fixed plant installations and has been used as the basis for the assessment of plant noise emissions.

BREEAM 2018: NON-DOMESTIC BUILDINGS

BREEAM provides criteria and assessment methods applicable to schools, under the Hea5 and Pol5 credits. These criteria have been adopted for this assessment.



4 BASELINE NOISE SURVEY

A baseline noise survey was undertaken by Formant on 22 October 2019. The full details of the survey are provided in the Appendix to this report. A summary of the measurement positions and key results is provided in Figure 1 below.

4.1 AMBIENT NOISE LEVELS

In order to assess noise break-in to the proposed development, it is necessary to determine a representative value for the daytime ambient noise level ($L_{Aeq,T}$) at the locations of the proposed building facades.

Attended noise measurements were undertaken at each location until a consistent and steady noise level was captured. The logarithmic average of the individual ambient noise level results is considered to be representative of the $L_{Aeq,T}$ ambient noise levels.

The measured ambient noise levels were from **54 dBL_{Aeq} (unscreened from the M4)** and **52 dBL_{Aeq} (screened from the M4)** at the locations shown in Figure 2 below.



Figure 2 Measurement positions unscreened (L) and screened (R) from traffic noise on the M4

4.2 BACKGROUND NOISE LEVELS

In order to set appropriate noise emissions limits for noise from the proposed development, it is necessary to determine an appropriate value for the daytime background noise ($L_{A90,15min}$). The average of the background noise level results at the screened position is considered to be representative of the background noise levels at the nearest NSR.

The measured background noise level at the NSR was **50 dBL_{A90,15min}**.



5 NOISE BREAK-IN ASSESSMENT

Noise break-in to the proposed development was calculated in line with the calculation method and criteria set out in BS 8233.

5.1 ASSESSMENT CRITERIA

BS 8233 provides internal ambient noise level (IANL) criteria for different types of space within a building. The proposed development could feature a range of different types of internal space, depending on the nature of the final client fit-out. The most noise sensitive space which is expected within the proposed development would be an Executive Office, which in accordance with BS 8233 has an IANL criterion of 35-40 dB.

5.2 VENTILATION STRATEGY AND FAÇADE SPECIFICATION

The predicted internal noise levels with windows open would be around 38-40 dB, which meets the noise criteria for all proposed uses. The proposed development will be mechanically ventilated for non-acoustic reasons and whilst windows may be openable, the design will ensure that occupants do not *have* to open windows for fresh air or for cooling. Therefore noise break-in has been assessed with closed windows. The proposed façade comprises a mix of curtain walling, glazing and cladding panels. At that stage it is assumed that standard thermal double glazing will be used (e.g. 6/12/6 mm).

5.3 CALCULATED INTERNAL NOISE LEVELS

Based on the proposed ventilation strategy and building envelope design, the internal noise levels have been calculated within a potential future fitted-out Executive Office. The results show that the predicted internal noise levels are around:

- 24 dBL_{Aeq} on facades which are screened from the M4 and
- 22 dBL_{Aeq} on facades which have line of sight to the M4.

These levels of environmental noise break-in are more than 10 dB below the internal noise limits. The internal noise levels are therefore expected to be dominated by the noise of the mechanical ventilation system, which will be designed to meet the internal noise criteria. On this basis, **no significant impacts are predicted as a result of environmental noise break-in.**



6 PLANT NOISE EMISSIONS

6.1 NOISE EMISSIONS LIMITS

In line with BREEAM Pol5 and local policy, Rating sound limits are proposed at a level 5 dB below the representative background noise level at nearby noise sensitive receptors (NSRs) outside the site. Therefore the proposed limits are **$L_{A,r}$ 45 dB at NSRs outside the site**. This is likely to be a conservative limit, seeing as the background measurements were screened from M4 traffic noise, but the receptors are not.

For NSRs within the site boundary (i.e. the existing Innovation Centre building) it is possible to set a noise emissions limit which is slightly higher because both buildings are under the same ownership and management. Therefore a slightly more relaxed noise limit of **52 dBL_{A,r} is proposed at the nearest window of the existing Innovation Centre building**, on the basis that this would be (a) at the same level as the ambient noise climate and (b) when considered cumulatively, would be equivalent to a noise level of around 43 dB inside the building with windows open, which is compliant with the 45 dB noise criterion for offices and labs.

6.2 PLANT SPECIFICATIONS AND ATTENUATION

The proposed plant comprises an AHU, MVHR units, kitchenette extract fans and condensers. The sound power levels of each item of plant are listed in the table below. The noise impact assessment is based on sound power data and layout drawings provided by Hydrock. The sound power levels and numbers of items of each plant are shown in Table 1.

The condensers are housed in a compound to the north-east of the proposed Technology Centre building. We have assumed that the condensers will be partially screened by a solid timber or metal screen of sufficient height that the windows on the ground floor of the Technology Centre have no line of sight to the condensers.

No data is available for the kitchenette extract fans therefore we have conservatively assumed that the noise emissions will be no greater 70 dBA (sound power) at the exhaust terminal.

It is considered unlikely that the plant will exhibit any acoustic features (tonality, intermittency, etc.), therefore no feature corrections have been applied.

6.3 NOISE EMISSIONS CALCULATIONS

The full details of the plant noise emissions calculations are shown in Table 1. Distance attenuation has been calculated assuming hemispherical propagation over a reflecting plane. Conservative screening attenuation allowances are based on -15 dB for full screening and -5 to -10 dB for partial screening.



NSR	Plant item	Sound power level (dB)	No of units	Distance to NSR (m)	Distance attenuation (dB)	Screening allowance (dB)	SPL at NSR (dB)	Feature correction (dB)	Rating level (L _{A,r}) at NSR	Cumulative L _{A,r} (dB)	Rating noise limit (dB)	Compliant?
Residential Receptors outside the site	AHU	73	1	307	-58	-15	1	0	1	15	45	YES
	MVHRs	77	3	284	-57	-15	10	0	10			
	Kitchenette extract	70	3	284	-57	-15	3	0	3			
	DX Condensers	69	2	262	-56	-15	1	0	1			
	VRF Condensers	76	6	262	-56	-15	12	0	12			
Innovation Centre nearest window	AHU	73	1	67	-45	0	29	0	29	44	52	YES
	MVHRs	77	3	44	-41	0	41	0	41			
	Kitchenette extract	70	3	44	-41	0	34	0	34			
	DX Condensers	69	2	22	-35	-10	27	0	27			
	VRF Condensers	76	6	22	-35	-10	39	0	39			

Table 1 Plant noise emissions assessment

The results of the assessment show that the proposed plant will be below the noise limits at each receptor. Therefore **no significant impacts are predicted as a result of plant noise emissions.**



APPENDIX: BASELINE NOISE SURVEY DETAILS



MEASUREMENT METHODOLOGY

Environmental noise measurements were undertaken by Lewis Wheatley on behalf of Formant between 15:45 and 16:15 hrs on 22 October 2019. Noise measurements were taken at approximately 1.2 metres above local ground level, at a distance of at least 2.5 metres from the façade of buildings and are considered representative of free field measurements. Measurements were made in line with BS 7445:2003 *Description of Environmental Noise*.

EQUIPMENT

The following measurement equipment was used to conduct the survey:

- NTi Audio XL2 Sound level meter, SNo. A2A-14510-E0,
- NTi Audio M2230 microphone, SNo. 7614, with windshield
- Cirrus CR:515 Calibrator, SNo. 82501

All measurement equipment owned or hired and operated by Formant has annual or bi-annual calibration checks carried out by external companies traceable to UKAS or national standards. Copies of all calibration records are kept and can be provided upon request.

DESCRIPTION OF NOISE CLIMATE

The noise climate around the site during the survey was dominated by traffic noise on the M4. The only other contributing source was traffic in the car park, although this was not significant in the context of the noise from the M4.

NOISE PARAMETERS

A full range of noise data was captured during the survey including the following statistical measurements:

L_{Amax}	The sound pressure level of the single noisiest event during the measurement period.
L_{Aeq}	Time averaged sound pressure level. This is generally considered to be an acceptable representative descriptor of environmental noise;
L_{A90}	Sound pressure level exceeded for 90% of the measurement period, this is generally accepted to be indicative of the continuous background noise level.

MEASUREMENT RESULTS

A summary of the noise survey results is provided in the table below:

Position	Time	L_{Aeq}	L_{AFmax}	L_{A90}	L_{eq} at octave band frequency							
					63	125	250	500	1000	2000	4000	8000
MP1	15:45	53.8	63.6	52.5	64.7	53.9	49.4	49.5	52.2	40.8	28.7	23.0
MP2	16:00	51.8	61.4	50.1	60.8	54.0	48.6	47.8	49.7	39.7	29.7	25.5

Table A2: Noise survey results summary