



ACOUSTIC CONSULTANTS LTD
noise and acoustic specialists since 1987

Noise Impact Assessment

B1, B2b B8 Development
Jersey Marine, Swansea

Reference: 8180/RD
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**Client:****Acoustic Consultant:**
ACOUSTIC CONSULTANTS LTD
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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the external noise aspects as included in this report. We provide advice only in relation to noise and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.



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1. Introduction

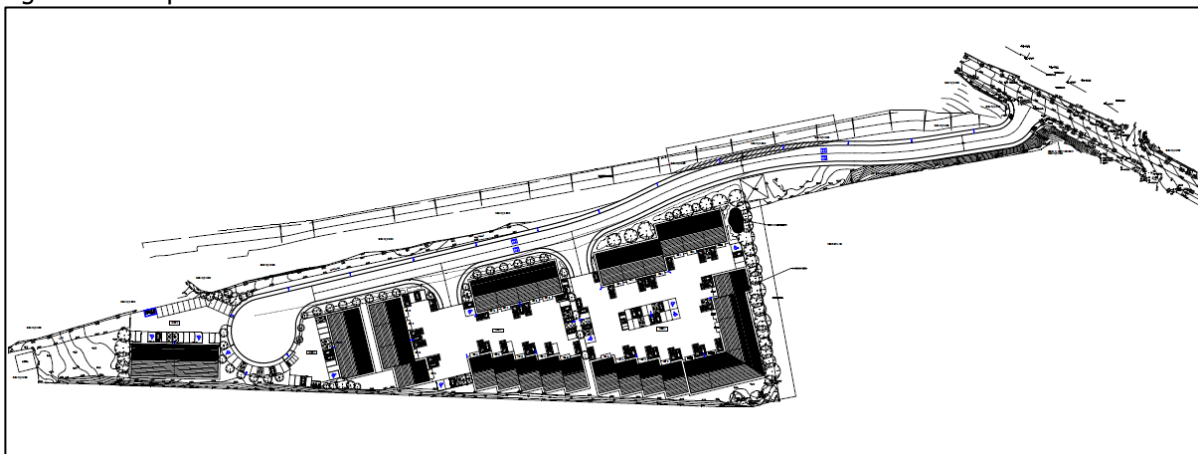
SGW Planning appointed Acoustic Consultants Limited to undertake a noise impact assessment for the development of the commercial development site at the land off Ashleigh Terrace located in Jersey Marine, Swansea. This is to consist of 31 units of B1, B2 or B8 use.

The report identifies relevant planning and noise guidance whilst establishing the impact of proposed noise sources in support of a planning application.

The noise impact assessment has been undertaken in accordance with the guidance in Planning Policy Wales (PPW), Technical Advice Note 11, British Standard 4142:2014 (BS4142) and British Standard 8233 (BS8233).

The proposed site plan is provided below:

Figure 1 – Proposed Site Plan



2. The Site and Proposals

The site is located on the land off Ashleigh Terrace near an Amazon distribution centre. The site is in a mixed industrial and residential area. The nearest noise sensitive Receivers (NSR1) are located east of the proposed site within Towers Hotel & Spa at a distance of 40 metres.

NSR's 1,2 and 3 are approximately 50m, 80m and 100m from the industrial site respectively.

The proposal entails the development of 31 commercial units in the vicinity. The site location is provided below along with the nearest noise sensitive receiver's (NSR's):

Figure 2 – Site Location and NSR's





3. Planning Guidance

3.1. Planning Policy Wales

Planning Policy Wales (PPW) Edition 10 dated December 2018 sets out the land use planning policies of the Welsh Government. Section 1 states:

"1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs¹, MTANs² and policy clarification letters comprise national planning policy."

The most relevant statements for noise are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.6 In proposing new development, planning authorities and developers must, therefore:

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- not create areas of poor air quality or inappropriate soundscape; and*
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

6.7.7 To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission. Location of Commercial, Industrial and other Potentially Polluting Development



6.7.17 The location of potentially polluting development adjacent to sensitive receptors will be unacceptable where health and amenity impacts cannot be minimised through appropriate design and mitigation measures. It is the overall expectation that levels of pollution should be reduced as far as possible and for this reason the location of potentially polluting development should be taken into account as part of overall strategies in development plans to ensure it can be appropriately located and maximum environmental benefits can be gained through measures such as green infrastructure.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications. Soundscapes and Compatibility of Uses."

PPW does not provide any quantifiable criteria and directs you to the Technical Advice Notes (TAN 11).

3.2. Technical Advice Note (Wales) 11 – Noise

The relevant planning criteria for proposed noise sensitive/noise generating development is provided in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction of TAN11 states:

"This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources."

For noise from industrial and commercial developments, such as plant noise, TAN 11 states:

"B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'.



Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987."

We would consider that British Standard 4142 is the appropriate standard for assessing the noise impact from an industrial operation on a dwelling, however it should be noted that British Standard 4142:1990 has now been superseded by both British Standard 4142:1997 and British Standard 4142:2014.

We would consider that British Standard 8233 is the appropriate standard for assessing the noise impact from an industrial operation on a commercial premises.



4. Assessment Criteria

We would consider the following criteria to be relevant for the assessment of noise from the development.

4.1. **BS4142:2014**

For industrial noise, affecting a dwelling, the most relevant guidance is provided within British Standard 4142:2014 entitled 'Method for rating and assessing industrial and commercial sound'. The British Standard uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes.

The principle is that of establishing the "difference" between the "rating level" and the "background sound level".

An acoustic character correction should be added to the "specific sound level" if the noise source exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies dependant on the prominence of the character of the noise source at the assessment location.

In Section 11 of the Standard, under "Assessment of the Impacts", it states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.

- 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.*
- d) 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."*

Where the assessment difference is 0 dB or less, the impact is likely to be low and therefore acceptable.

4.2. Vehicle Movements

There is no specific planning guidance in relation to the arrival and departure of the site vehicles. We would consider the arrival and departure of site vehicles to be outside the scope of British Standard 4142:2014.

4.2.1. IEMA Guidelines

For vehicle movements on a highway and site we would consider a comparison of the proposed traffic on the highways with the existing noise climate to be appropriate.

In addition to the above, the Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment assessing the impact of the noise source against the existing baseline noise climate (L_{AeqT}). The assessment process existing equivalent noise levels (L_{Aeq} (1 hour)) to the predicted equivalent noise levels of the vehicles arriving/departing (L_{Aeq} (1 hour)). The overall impact is then determined by the change in noise levels as a result of these vehicles.

The Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment, Version 1.2 published in November 2014 categorises the significant of a change in noise level this is summarised as follows and taken from Table 7-14 of the guidance:

Table 1: IEMA Impact from the Change in Sound Levels (Table 7-14)

Long-term impact classification	Short-term impact classification	Sound Level Change L_{pAeqT} positive or negative) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3 dB and < 5 dB
Moderate	Major	≥ 5 dB and < 10 dB
Major		≥ 10 dB

However it should be noted that even if the change in noise levels is considered to result in an increase in noise levels if good internal or external conditions can be met then the overall impact will be considered to be acceptable.

4.2.2. BS8233/WHO1999

In addition a comparison of the overall noise level against the criteria of BS8233/WHO1999 should be considered, BS8233/WHO1999 is summarised below:

Table 2: IANL criteria of British Standard 8233:2014

Activity	Location	07:00 to 23:00
Resting	Living room	35 dB L_{Aeq} , 16 hr
Dining	Dining room / area	40 dB L_{Aeq} , 16 hr
Sleeping (daytime resting)	Bedroom	35 dB L_{Aeq} , 16 hr

5. Baseline Noise Monitoring

A site noise survey was undertaken between 5th-8th February 2020 to determine the existing noise climate across the site and area.

5.1. Equipment

Sound Pressure Levels were measured using Class 1 Sound Level Meters with half-inch condenser microphones, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 3: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial number	Date of calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-11041-E0	05/04/19	31440
Pre-Amp, NTI, MA220	6428	05/04/19	31440
Microphone, NTI, MC230A	9583	05/04/19	31439
Calibrator, CEL-110	045169	05/04/19	31438

The measurement system was checked before and after use with the calibrator and no significant drift was recorded.

5.2. Monitoring Procedure

The monitoring location was located to the north of the site and representative of the nearest NSR's in the vicinity. The main source of noise was road traffic. The survey was completed over 24 hours, with the microphone on a tripod 1.5m off of the ground in a free-field position.

It should be noted that electrical noise from the two pylons at the site was not distinguishable at the monitoring position. To ensure this, measurements were taken 50m from the pylon north east of the site to avoid pylon noise whilst maintaining a monitoring position representative of the nearest NSR's at the proposed site location.

The access road and Hotel were also highly affected by Hotel plant, as such the survey locations was also moved to a position unaffected by the hotel plant.

The monitoring location is provided in the figure below.

Figure 3: Monitoring location



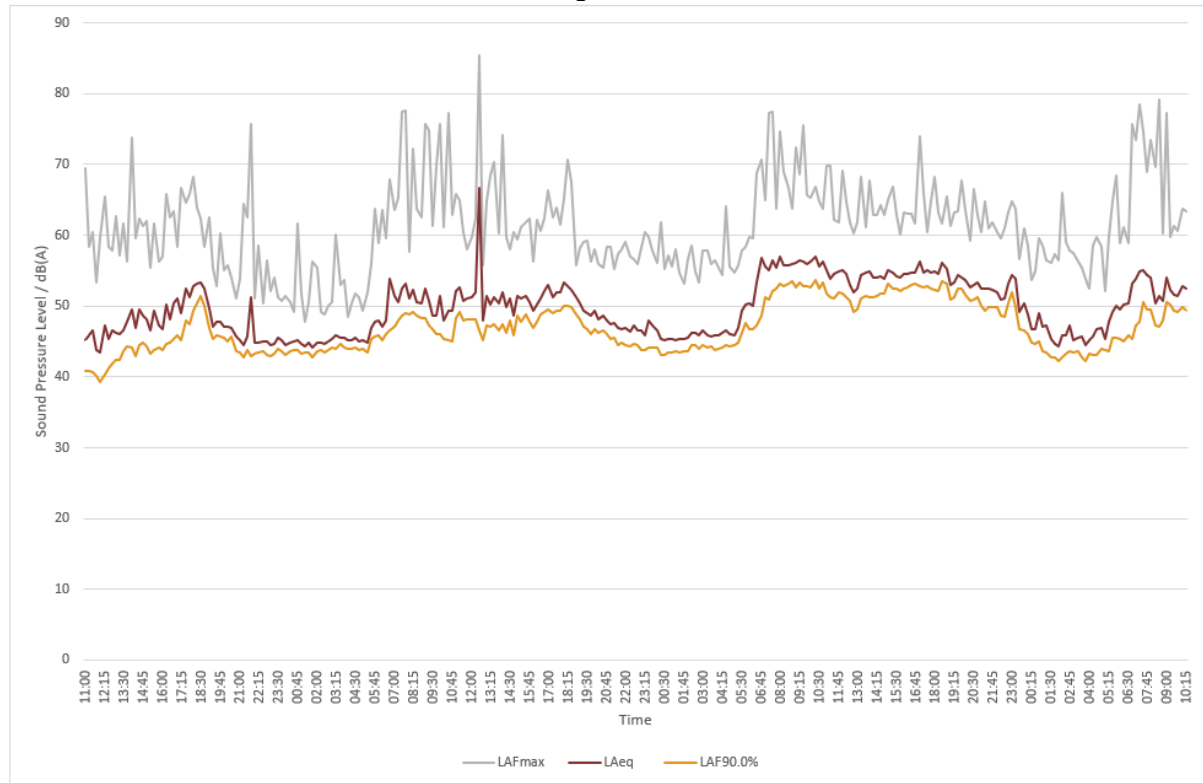
5.3. Weather Conditions

During the survey the weather conditions on the 5th February 2020 were dry, with the temperature varying between 4-8 degrees with windspeeds of less than 9 m/s. The weather conditions are not expected to have adversely affected the measurement data.

5.4. Measured Noise Levels

Noise levels were measured over 15-minute intervals. The following chart shows the measured noise level over the measurement period.

Chart 1: Measured Noise Levels at the Monitoring Location



A summary of the noise levels measured at the monitoring location are provided below.

Table 4: Summary of Measured Noise Levels (free-field levels)

Period	L _{Aeq} (T)		L _{A90} (T)	
	Range	Typical	Range	Mode
Day (07:00-19:00)	43 - 67	52	39 - 54	49
Evening (19:00-23:00)	44 - 54	47	43 - 53	46
Night (23:00-07:00)	44 - 57	45	42 - 52	44



6. Operational Noise Limits

Any plant or unit associated with the proposed development has the potential to operate 24/7 depending on the final operator. As this is an outline application, no detailed information has been provided.

The noise impact of this outline scheme can be controlled by setting appropriate noise limits on the consent.

As such, we have provided noise limits at the nearest noise sensitive dwellings based on the monitoring data obtained above, British Standards 4142:2014 and the IEMA guidelines.

Based on the above criteria and operational hours the following table provides the maximum cumulative rating of noise from plant, deliveries and internal operations when assessed to BS4142. The table also provides noise limits for vehicle movements in terms of the IEMA guidelines.

Table 5: Operational Noise Limits

Time Period	Maximum Rating Level at nearest dwellings/hotel	Vehicle Movements noise limit at nearest dwellings/hotel
Daytime (07:00 to 19:00 hrs)	49 dB L _{Ar} (1 hour)	52 dB L _{Aeq} (1hr)
Evening (19:00-23:00)	46 dB L _{Ar} (1 hour)	47 dB L _{Aeq} (1hr)
Night-time (23:00 to 07:00 hrs)	44 dB L _{Ar} (15min)	45 dB L _{Aeq} (1hr)

The plant should be selected to ensure any character (tonality, intermittency or other sound characteristics) are not readily distinguishable at the dwellings. If character is present, a character correction should be applied as per BS4142.

The above plant noise limits are the cumulative plant noise limits where measured or predicted at the most sensitive receivers around the site.

If considered necessary, a planning condition could be imposed requiring submission and approval of the finalised details of each unit prior to operation. The condition should refer to the above noise limits.

7. Noise Modelling

The operational noise emission has been modelled in the noise modelling software Cadna:A by DataKustik. This model is outline, and has been produced to demonstrate the impact of an outline scheme. As the application is outline, details of plant or internal operations have not been specified. The following assumptions have been made:

7.1. Internal Operations

As the specific operators of the units have not been specified, worst case levels in regard to the noise at work (HSE) guidelines have been assumed, i.e. *a daily or weekly personal noise exposure of 85 dB (A-weighted)*.

It should be noted that this noise level is expected to be higher than normal for units of this type and some units may operate at a considerably lower noise level.

7.2. Vehicle Movements and Unloading

The main vehicle movements will consist of cars and HGV accessing/departing the site. In noise terms the impact of the HGV's will be considered the highest and therefore are assessed here.

The supplied transport assessment estimates the Annual Average Daily Traffic (AADT) at approximately 293 to the north of site access. This is the most sensitive area of the site due to the dwellings in the vicinity. This gives an average of 6 HGV's over a typical 1 hour peak day/night period.

In terms of the noise emission Acoustic Consultants Limited have measured the delivery operation from B1, B2 and B8 uses over a number of years at a number of different sites. The typical measured noise levels are as follows; the measured levels are free-field levels and have been corrected to a distance of 10 metres where appropriate.

Table 6: Delivery Operation Noise Levels

Duration	L _{Aeq(T)} (dB)	Activity at 10 metres
347 seconds	61	HGV Arrive
30-60 minutes	58	HGV Unloading via tail lift
120 seconds	63	HGV Depart

The modelling software calculates sound levels based on the inputted sound emission values, source and receiver locations, and primarily distance, barrier and ground attenuation.

7.3. General Modelling Parameters

Calculations are undertaken using the General Method of Calculation from ISO 9613. The parameters within the Cadna:A model are as follows and are considered reasonable assumptions:

- The building heights around the site are based on google earth images and site observations.
- The proposed building is based on supplied drawings.
- The order of reflections is 2, and all buildings are reflective.
- The topography is based on google maps and from site observations
- The levels within the proposed commercial units are based on Noise at Work (HSE) guideline levels internally.
- The ground across the site is considered a mixture of hard and soft
- The predicted noise map level at each receiver is the level at 4.5 metres above ground.
- The predictions are based on the operation running continuously throughout the daytime. This is a worst case.
- The unit construction is assumed as a steel frame scheme of profile sheet metal
- The source noise levels are as noted below we have assumed 24/7 operation for all items of plant, in reality this is unlikely to occur.

7.4. Building Façade Construction

The building structure is expected to be a steel frame scheme of profile sheet metal. The building structure is expected to achieve the following minimum sound reduction index. These are considered worst-case assumptions based on manufacturers data and other sites.

Table 7: Building Façade

Octave Band (Hz)	125	250	500	1000	2000	4000	R _w
Roof, and Walls, R (dB)	14	16	20	25	29	23	25
Roller Doors, R (dB)	13	20	24	29	33	39	29

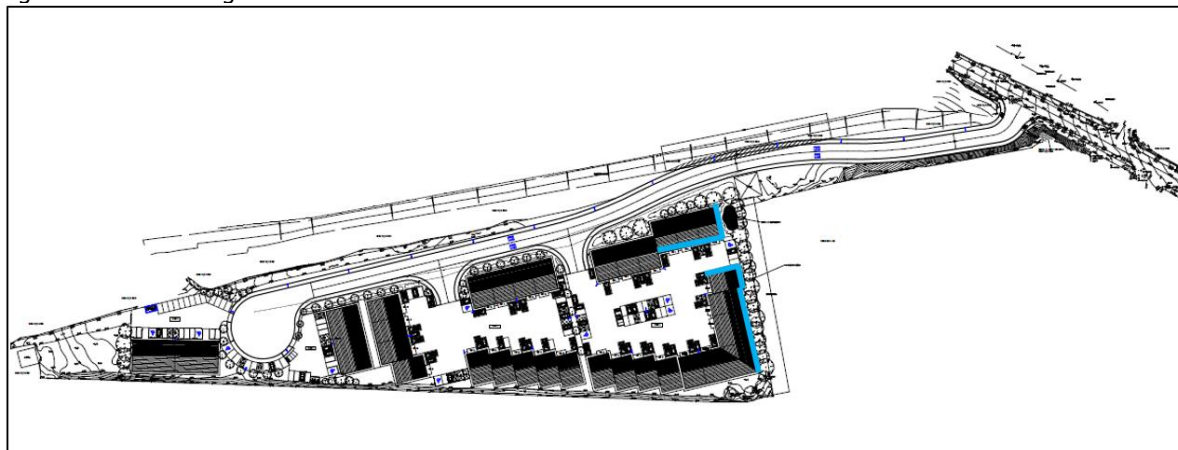
It is recommended that façades to the east of the proposed site are insulated with 120mm of mineral fibre in order to reduce the noise impact of activities within units 4-10 to people staying in the Towers Hotel to the east of the site. The façade should achieve the following SRI indices:

Table 8: Building Façade (East)

Octave Band (Hz)	125	250	500	1000	2000	4000	R _w
Walls, R (dB)	15	20	28	37	43	40	32

The location of the upgrade walls is indicated below:

Figure 4: Facade Mitigation



7.5. Noise Modelling Results

A colour graded noise map of the noise levels across the site and area is provided in the following figures, three maps have been produced, the first of internal operations, the second of unloading noise, the third of vehicle movements:

Figure 5: Predicted Internal Operation Egress Noise Level $L_{Aeq}(1 \text{ hr})$



Figure 6: Predicted Daytime HGV Unloading Noise Level $L_{Aeq}(1 \text{ hr})$

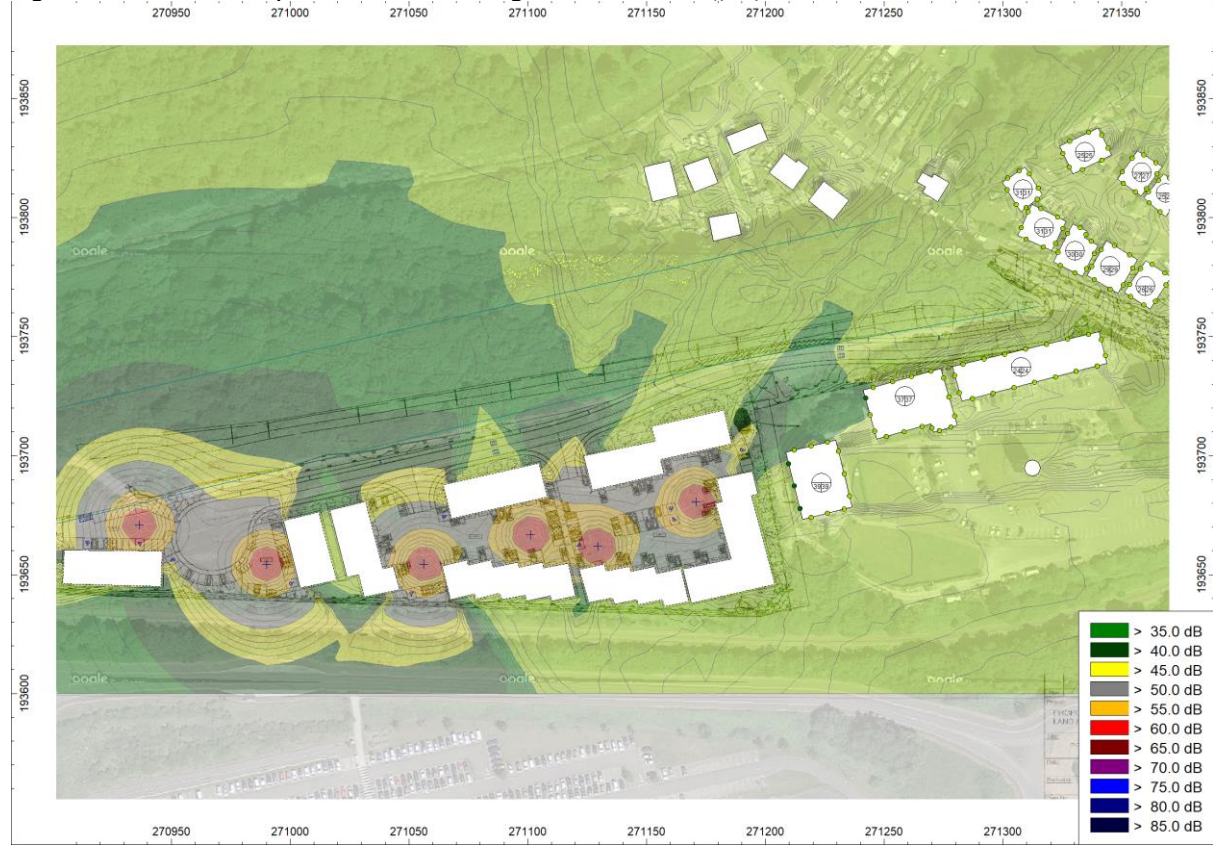


Figure 7: Predicted Daytime Vehicle Movement Noise Level $L_{Aeq}(1 \text{ hr})$



8. Noise Impact Assessment

8.1. Internal Operation's Noise Assessment at Residential Receivers

We have assessed the impact of the site operations in accordance with the methodology of British Standard 4142:2014. Due to the size of the units, it is assumed the internal operations will occur during the daytime hours only.

We have determined a typical design background sound level at to be 49 dB L_{A90} (1 hour) during the day time.

The predicted specific sound levels at the worst-case residential receivers are 43 dB L_{Aeq} (15 minutes), 34 dB L_{Aeq} (15 minutes) and 27 dB L_{Aeq} (15 minutes).

Character corrections should be applied to the specific sound level if the noise source exhibits tonality, intermittency, impulsivity or any other sound characteristic at the noise-sensitive receiver.

We would not consider any character of the operation to be clearly distinguishable.

The British Standard 4142:2014 initial estimate at the most sensitive location is as follows:

Table 9: British Standard 4142:2014 initial estimate for NSR1

Parameter	NSR 1	NSR 2	NSR 3
Background Level, L_{A90} , (T)	49 dB	49 dB	49 dB
Specific Sound Level, L_{Aeq} , (T)	43 dB	34 dB	27 dB
Character Correction	0 dB	0 dB	0 dB
Rating Level, L_{Ar} , 15min	43 dB	34 dB	27 dB
Excess of rating over background level	-6 dB	-15 dB	-22 dB

This means that the rating noise level at the nearest noise sensitive receiver will result in a 'difference' of -6 dB at NSR1, -15 dB at NSR2 and -22 dB at NSR3. This indicates that the internal operations will be of a low impact at the sensitive façades when assessed to British Standard 4142:2014.

8.2. Delivery Unloading Noise Assessment at Residential Receivers

We have assessed the impact of the delivery unloading in accordance with the methodology of British Standard 4142:2014. We have been advised the HGV will only access the site during the day, as such a daytime assessment has been completed.

We have determined a typical design background sound level at to be 49 dB L_{A90} (1 hour) during the day time.



The predicted specific sound levels at the worst-case residential receivers are 39 dB L_{Aeq} (15 minutes), 37 dB L_{Aeq} (15 minutes) and 24 dB L_{Aeq} (15 minutes)

Character corrections should be applied to the specific sound level if the noise source exhibits tonality, intermittency, impulsivity or any other sound characteristic at the noise-sensitive receiver.

We would not consider any character of the operation to be clearly distinguishable.

The British Standard 4142:2014 initial estimate at the most sensitive location is as follows:

Table 10: British Standard 4142:2014 Estimate of Impact

Parameter	NSR 1	NSR 2	NSR 3
Background Level, L_{A90} , (T)	49 dB	49 dB	49 dB
Specific Sound Level, L_{Aeq} , (T)	39 dB	37 dB	24 dB
Character Correction	0 dB	0 dB	0 dB
Rating Level, L_{Ar} , 15min	39 dB	37 dB	24 dB
Excess of rating over background level	-10 dB	-12 dB	-25 dB

This means that the rating noise level at the nearest noise sensitive receiver will result in a 'difference' of -10 dB at NSR1, -12 dB at NSR2 and -25 dB at NSR3.

This indicates that the unloading noise will be of a low impact at the sensitive façades when assessed to British Standard 4142:2014.

8.3. Vehicle Movement Noise Assessment at Residential Receivers

There is no specific planning guidance in relation to the arrival and departure of the vehicles. We consider it appropriate to determine the impact on the noise sensitive receivers around the site by comparing existing equivalent noise levels (Daytime L_{Aeq} (1 hour)), to the cumulative equivalent noise levels due to both the existing noise climate and the vehicles arriving/departing (L_{Aeq} (1 hour)).

The table below shows a summary of the baseline sound levels, the predicted vehicle sound levels, the cumulative of the two and the difference between the baseline and cumulative.

Table 11: Difference in Baseline and Predicted Vehicle Noise Levels

Noise Sensitive Receiver	Predicted External Level $L_{Aeq}(1hr)$ dB	Typical Baseline $L_{Aeq}(1hr)$ dB	Cumulative Level $L_{Aeq}(1hr)$ dB	Change in Level
NSR1	43	52	53	+1 dB
NSR2	50		54	+2 dB
NSR3	50		54	+2 dB

The increase in noise levels from HGV's due to the proposed development is +2 dB.

Following the methodology of the IEMA guidelines this would result in a "Minor" short term impact classification and "Negligible" long term impact and as such would be considered acceptable. Therefore the assessment above clearly demonstrate that the noise impact of the vehicles serving the development will be acceptable when considered in terms of the IEMA guidelines.

8.3.1. BS 8233:2014 Assessment

When comparing to BS 8233:2014 internally during the day noise levels should not exceed 35 dB $L_{Aeq(16hr)}$. As a worse case with a façade can typically achieve a sound reduction of around 15 dB(A) when naturally ventilated with open windows. Therefore based on the above, the internal vehicle movement noise levels are as follows.

Table 12: Comparison with BS8233:2014 at worse case receiver

Noise Sensitive Receiver	Predicted External Level $L_{Aeq(1hr)}$ dB	Open Window Attenuation dB(A)	Predicted Internal Level dB(A)	Within Criteria
NSR1	43	-15	28	YES
NSR2	50		35	YES
NSR3	50		35	YES

As can be seen in the table above, all NSR's are within the BS8233/WHO1999 criteria for daytime rooms and therefore acceptable in terms of BS 8233.

8.4. Summary of Assessment

As can be seen above, the noise impact of the vehicle movements will be low. We would consider the noise impact due to the increase in road traffic associated with the development will not adversely affect the residential amenity of the existing nearby residential properties.



9. Summary & Conclusions

SGW Planning appointed Acoustic Consultants Limited to undertake a noise impact assessment for the erection of 31 industrial units at Jersey Marine, Swansea.

This assessment takes into account internal noise levels, external plant and HGV's (unloading and manoeuvring) in the surrounding area. The noise impact assessment has been undertaken in accordance with the guidance in Planning Policy Wales (PPW), Technical Advice Note 11, British Standard 4142:2014 (BS4142) and British Standard 8233 (BS8233).

A noise survey, modelling exercise and assessment has been completed.

The assessment concludes that the site operations will be acceptable when assessed to British Standard 4142:2014, IEMA guidelines, British Standard 8233:2014 and Planning Policy Wales.

The report also provides noise limits. These noise limits can be written into the consent for the scheme. With these noise limits being met the impact will be low at the sensitive receivers around the site.



10. Appendix 1 – Glossary of Acoustic Terminology

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-pascals to 100 pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

ambient sound level, $L_a = L_{Aeq,T}$ - equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.

NOTE. The ambient sound level is a measure of the residual sound and the specific sound when present.

background sound level, $L_{A90,T}$ - A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in pascals (pa), typically from 20 micro-pascals to 100 pascals, but commonly simplified onto the decibel scale.

equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ - value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:



$$L_{Aeq,T} = 10 \lg_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2 / p_0^2] dt \right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

rating level, L_{Ar,T_r} - specific sound level plus any adjustment for the characteristic features of the sound.

reference time interval, T_r - specified interval over which the specific sound level is determined.

NOTE This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.

Residual sound – ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

residual sound level, $L_r = L_{Aeq,T}$ - equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T .

specific sound level, $L_s = L_{Aeq,T_r}$ - equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .



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