



ACOUSTIC
CONSULTANTS LTD

Noise Impact Assessment

**Proposed Asphalt Plant
Former Edwards Yard, Skewen, Neath**

Reference: 8968/BL/PR

Proposed Asphalt Plant Former Edwards Yard, Skewen, Neath

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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 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

Gerald D Harries & Sons Limited appointed Acoustic Consultants Limited to carry out a noise survey and provide a noise impact assessment for the proposed construction and operation of an asphalt plant on land within an existing industrial site at Llandarcy, Neath Port Talbot.

The assessment takes into consideration the noise impact of the development on the dwellings in the area.

The report assesses the suitability of the site with respect to TAN 11 and British Standard 4142:2014+A1:2019.

The author of this report is a Member of the Institute of Acoustics (MIOA) with a recognised acoustic qualification and over 14 years' experience within the field.

2. The Site & Proposals

The site comprises 0.759 hectares of brownfield land located on land in Llandarcy, Neath Port Talbot. The site is located within the existing industrial estate and comprises an existing building and hard standing. The site is bound by open countryside to the south and north. To the west is the Tennant Canal with open countryside beyond and to the east is the M4. The open countryside to the south, west and north is designated as Green Wedge (Crymlyn Bog/ Crymlyn Burrows/ Llandarcy). The site is accessed via a road that connects to the B4290 and benefits from convenient access to Junction 43 of the M4.

The nearest residential receptors to the site are located approximately 1.2km to the north at Coed Darcy and 1.9km to the west in Jersey Marine, Skewen which comprises a variety of apartment, detached and semi-detached housing.

The Google site location is provided below in Figure 1.

Figure 1: Google Maps of Site Location



The development is for the installation of an Asphalt plant as shown on the accompanying drawing. The details of the development are as follows:

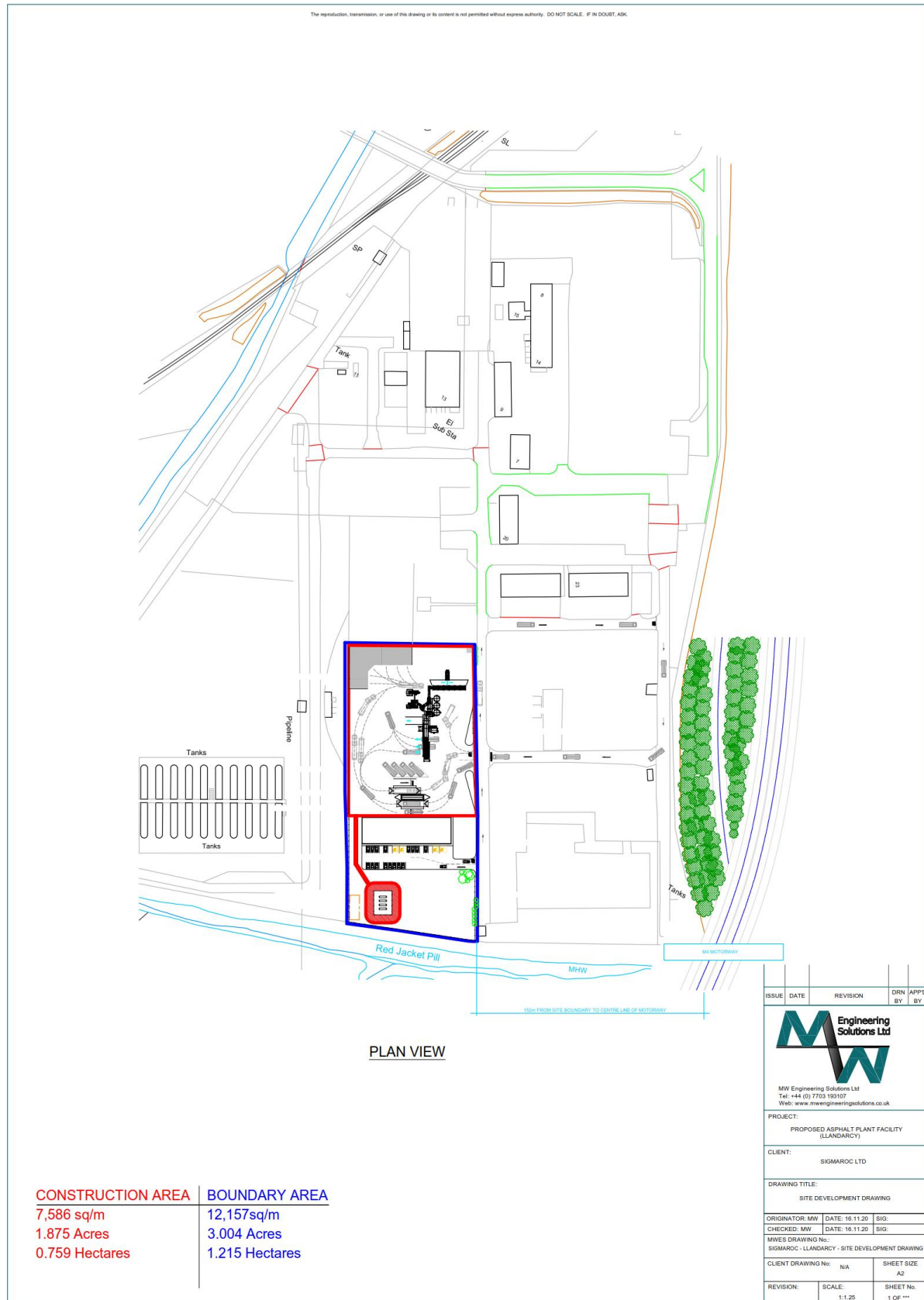
- An asphalt plant (Parker Star Batch 1500) or equivalent.
- The proposal would generate employment locally with 5 asphalt plant staff and 5 HGV drivers, plus an estimated further 10 staff within the asphalt contracting and maintenance team as this expands into the area, noting this further 10 persons will not be based on this site, but will be working within Neath Port Talbot and Swansea areas.
- Bitumen and where required Filler would be delivered in tankers and blown or pumped into suitable tanks/ silos.
- The process involved at the plant will be to manufacture asphalt, aggregate and sand are moved into hoppers where they will then be heated and screened. Batches of hot aggregate are weighed into a mixing hopper, then mixed with filler and bitumen in batches to produce Asphalt. Batches then stored in vertical silos ready for collection in heavy good vehicles with up to a maximum load weight of 20 tonnes despatched.

It is anticipated that the plant would create outputs of 40,000 tonnes per annum with daily importation of trucks carrying up to 28t loads, this a mix of aggregates, filler and bitumen with a mix of 30 light commercial and HGV's removing finished asphalt. In terms of its operation on a day-to-day basis it is proposed to operate the plant between the hours of 0530-1700 on Monday-Friday and 0530-1300 at weekends. However, a degree of flexibility may be necessary based on operational/client need such as night time work required by government contracts/ emergency repairs.

All materials required for construction of the plant and any import of aggregate to the site will be transported via road only. All finished products are to be exported via road only.

The site layout plan is provided below.

Figure 2: Proposed Site Plan



3. Planning Policy

3.1. Planning Policy Wales

Planning Policy Wales (PPW) Edition 11 dated February 2021 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 affecting a residential use 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."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change.

In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

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.

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- traffic management and road safety;*
- ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- supporting low or zero emissions public transport;*
- providing active travel infrastructure; and*
- incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

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.

6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of

people to pollution will be unacceptable. Whilst some uses may be appropriate with the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

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

6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken."

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

3.2. Technical Advice Note (Wales) - Noise

Planning Policy Wales (PPW) Edition 11 dated February 2021 sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes. The relevant planning criteria for proposed residential development is in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction 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, such as plant noise, 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.

3.3. British Standard 4142:2014+A1:2019

For industrial and commercial noise, the most relevant guidance is provided within British Standard 4142:2014+A1:2019. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premise used for residential purposes.

The initial estimate principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'. The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Clause 9 entitled 'Rating Level' states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location. In Clause 11 of the Standard, entitled '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.

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

It should be noted that the numerical outcome only represents the initial estimate of impact, as stated in the first paragraph of Clause 11, and that contextual matters should be considered before determining what the potential impact is. This paragraph states:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context."

The second part of Clause 11 sets out three contextual matters that should be taken into account once the initial numerical estimate has been determined. It is important to note that the three listed are not exhaustive and all pertinent factors should be considered.

4. Noise Monitoring

A noise monitoring exercise was undertaken at four locations in May and June 2021.

4.1. Monitoring Equipment

Sound Pressure Levels were measured using Class 1 sound level meters with a half-inch condenser microphone. The equipment is checked annually using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2005 and in accordance with British Standard EN 10012:2003 and traceable to the National Standards. This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 1: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, Cirrus Research, CR:171C	G080650	23/06/2020	142691
Microphone, Cirrus Research, MK224	210551D	23/06/2020	142691
Calibrator, Cirrus Research, CR:515	84377	23/06/2020	142693
SLM, NTI, XL2	A2A-11041-E0	04/05/2021	37820
Pre-Amp, NTI, MA220	6428	05/05/2021	37818
Microphone, NTI, MC230A	9583	06/05/2021	37819
Calibrator, CEL-110	045169	04/05/2021	37818
SLM, NTI, XL2	A2A-09705-E0	30/09/2019	U32978
Pre-Amp, NTI, MA220	5332	30/09/2019	U32978
Microphone, NTI, MC230A	A14374	30/09/2019	U32978
Calibrator, CEL, Type 284/2	3/02716829	02/10/2020	35889

The measurement systems were checked before and after use with the calibrators and no significant drift was detected.

4.2. Weather Conditions

During the monitoring conditions were clear, dry, and calm. The weather conditions are not expected to have adversely affected the measured data.

Table 2: Weather Conditions During Survey

Wind Speed (m/s)	Average Air Temperature (°C)	Precipitation (time/hrs)	Cloud Cover (%)
< 5	~ 15 to 25	0	~ 0 to 75

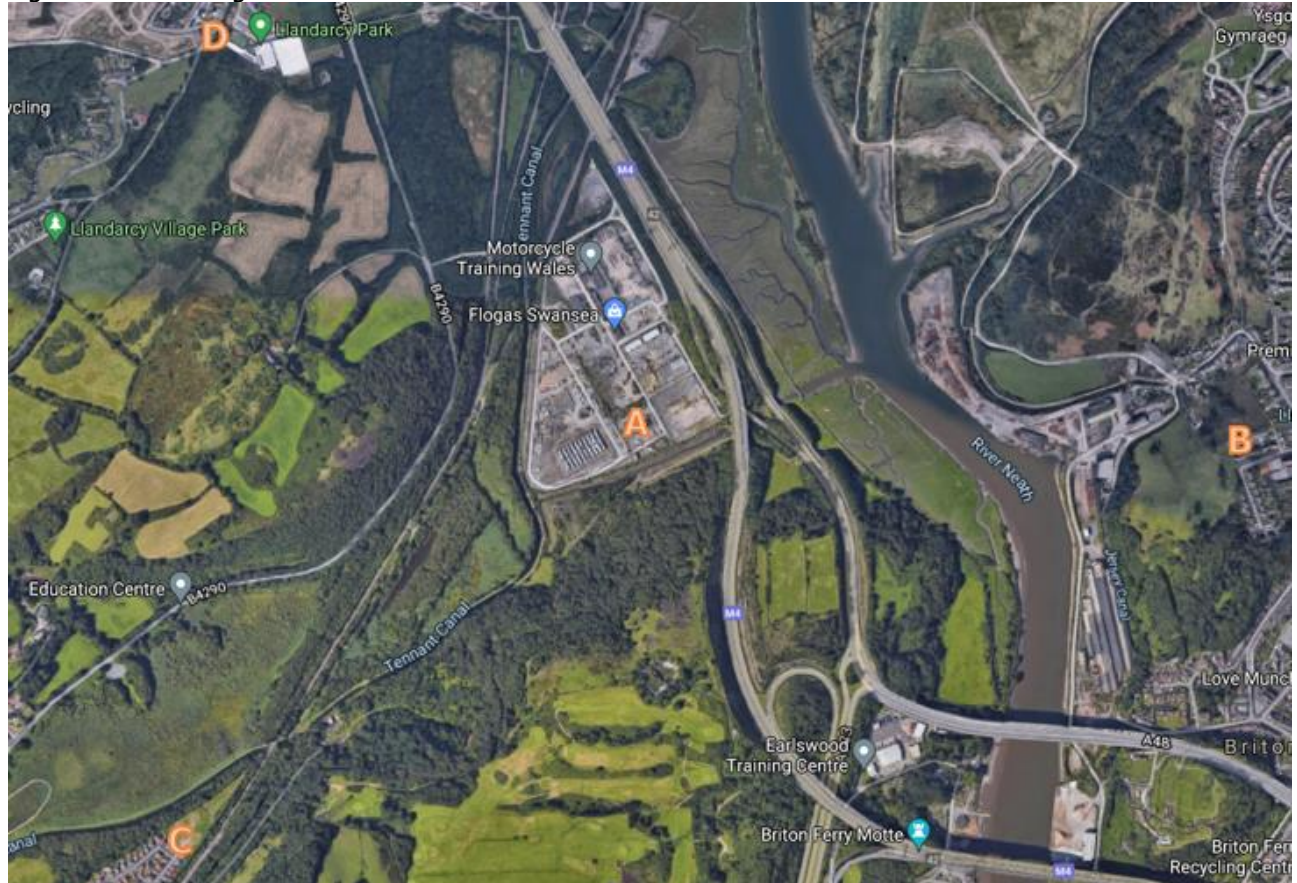
4.3. Noise Monitoring Procedure

An unattended monitoring exercise was completed on the site, which was supported by two attended measurements at each of the three sensitive locations. The survey was completed in accordance with BS4142:2014.

The long-term location was undertaken at Location A on the site, the purpose of this location was to determine the night-time background sound level. The sound level meter was in a free-field position. The main noise source was the M4 motorway.

The attended location was undertaken at Locations B-D at the residential areas around the site, the purpose of these locations was to determine the daytime background sound level. The sound level meter was in a free-field position. The main noise source was distant road traffic from the M4 motorway.

Figure 3: Monitoring Locations



All microphones were mounted on a tripod approximately 1.5 metres above the ground and in free-field positions. All meters used during the monitoring exercise had their internal clock synchronised.

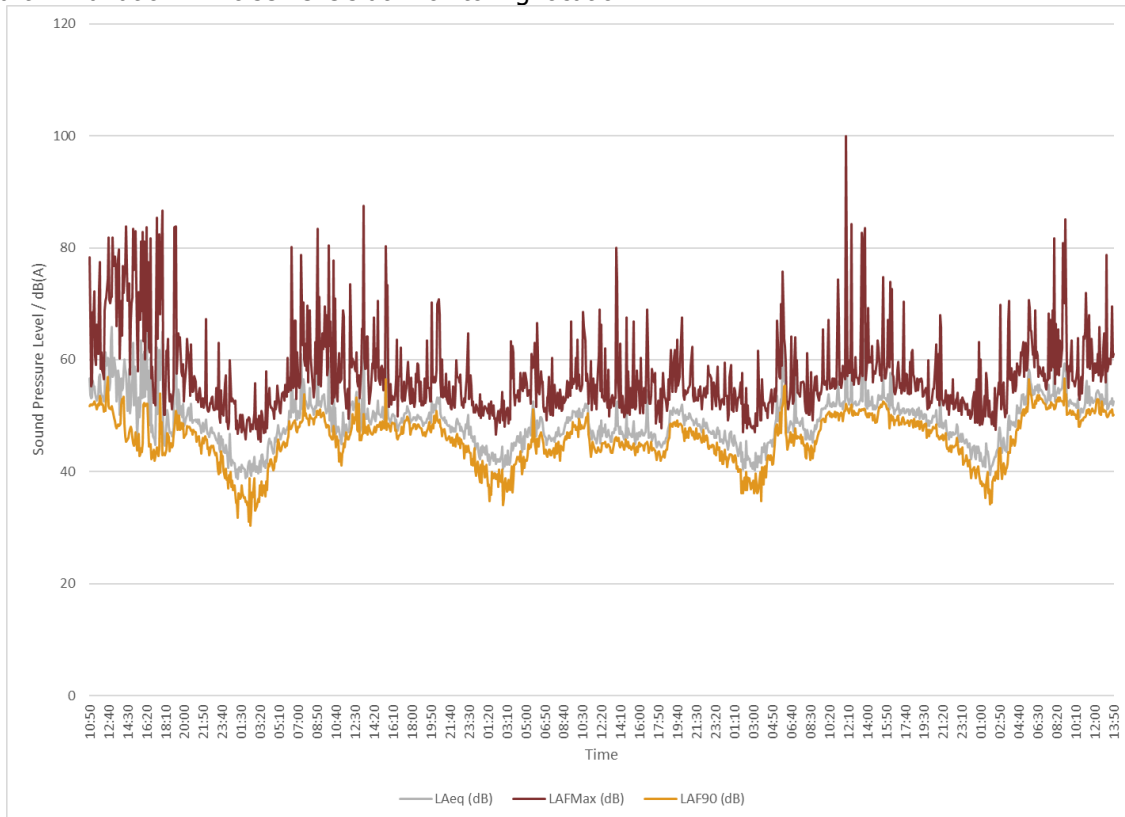
4.4. Measured Noise Levels & Observations

The main noise affecting the whole site was determined to be road traffic noise from the M4.

4.4.1. Long Term 'Monitoring Location A'

A chart of the variation in equivalent and maximum noise levels with time is provided below:

Chart 1: Variation in Noise Levels at 'monitoring location A'



We have determined the following background noise levels $L_{A90, 15 \text{ min}}$ at this monitoring location. This data will be used to aid in a BS4142 assessment.

Table 3: Measured background noise levels $L_{A90, 15 \text{ min}}$ at 'Monitoring Location A'

Period	$L_{A90, 15 \text{ min}}$	
	Range	Mode
Day (07:00 - 23:00 hrs)	41 - 57	48
Night (23:00 - 07:00 hrs)	30 - 57	41

4.4.2. Short Term Noise Levels

We have determined the following background noise levels $L_{A90, 15 \text{ min}}$ at the monitoring locations on each date.

Table 4: Measured background noise levels $L_{A90, 15 \text{ min}}$ at 'Monitoring Location B-D'

Location	Start Date & Time	Duration (hh:mm)	$L_{A90, 15 \text{ min}}$	
			Range	Mode
B	28/05/21 13:19	00:45	40-41	41
C	28/05/21 12:10	00:45	35-38	37
D	28/05/21 11:00	00:45	53-54	54
B	01/06/2021 11:00	00:30	41-41	41
C	01/06/2021 12:00	00:30	38-42	40
D	01/06/2021 13:00	00:30	50 – 52	51

5. Operational Procedure

5.1. Operation Method

In terms of its operation on a day-to-day basis it is proposed to operate the plant between the hours of 0530-1700 on Monday-Friday and 0530-1300 at weekends.

The development site will use a number of items of plant these include:

- Parker Plant, Roadstar 1500, 120 TPH Mobile Asphalt Plant.
- 18 T Wheel Loader (2 of).
- 18T Rigid Axle Tipper Lorry (as required for export/import of materials).

5.2. Asphalt Plant

We have been advised the noise level of the asphalt plant is as follows:

Noise Pollution: Can change as per locaiton of asphalt plant, wind, altitude. But our last measurment in Turkey as below. At 900m altitude, 9 degrees

Noise Source	Distance (m)	Noice Pressure Level (dB)		
		500 Hz	1000 Hz	2000 Hz
Asfalt Plant	50	60.55	63.75	64.95
	100	54.50	57.60	58.42
	150	50.96	54.02	54.65
	200	48.45	51.46	51.89
	250	46.49	49.45	49.70
	300	44.89	47.81	47.86
	380	42.81	45.65	45.40
	400	42.36	45.18	44.85
	500	40.39	43.11	42.41
	700	37.41	39.94	38.47
	900	35.16	37.50	35.27
	1000	34.21	36.46	33.84

information is provided for advice. may vary from region to region. Fuel consumption data are measured at 900m altitude and an annual average of 9 degrees Celsius. The values measured by the annual average temperature, altitude, etc. of your construction site may not match each other. **Gas Emissons should be calculate as per: Total LPG Consmpion/Hour:114,3nm3/h-4397nm3/h for 120-160TPH Asphalt**

5.3. Other Plant

For the other plant, to determine the operational noise levels at the noise-sensitive receivers we have used the source noise levels taken directly from the tables of BS 5228-1:2009. These are provided below and are considered reasonable assumptions.

Table 5: Source Equivalent Noise Levels at 10 metres

Operation	BS 5228 Table & Ref No.	L_{Aeq(T)} dB at 10m	Onset Time (minutes)¹
Tipper Lorry – Moving	C.8/20	79	n/a ²
Tipper Lorry –Tipping load	C2/30	79	15
Wheel Loader – Loading gravel into plant and lorries	C.10/10	85	10 ³

¹ We have also included the expected onset time (over a one hour period) for each operation.

² For the vehicle movements accessing/departing the site the onset time is based on a site speed of 10mph.

³ We have included this noise level for the loading of the asphalt plant.

6. Noise Modelling

Noise emission prediction calculations have been carried out for the most sensitive receivers. The site operation has also been modelled in the noise modelling software Cadna:A by DataKustik. The parameters within the Cadna:A model are as follows and are considered reasonable assumptions:

- The development location is based on the supplied drawings.
- The building height are based on site observations.
- The order of reflections is 2, and all buildings are reflective.
- The predictions are based on the noise emission levels noted above.
- The ground is considered hard and reflective.
- The topography of the surrounding area site is based on "lle" lidar data.

The Cadna:A noise maps based on the above are provided below. A summary of the results is provided in the table below for each Noise Sensitive Receiver position.

Table 6: Predicted Noise Level

Noise Sensitive Receiver	Predicted $L_{Aeq(T)}$ dB	
	Daytime	Night-time
NSR 1 – Dwellings to East, Wern Bank, Briton ferry	41	36
NSR 2 – Dwellings to South West, Ocean View, Llandarcy	33	34
NSR 3 – Dwellings to North, off of B4290	39	40

The noise maps are provided below in the figures below.

Figure 4: Predicted Daytime $L_{Aeq, 60min}$ dB

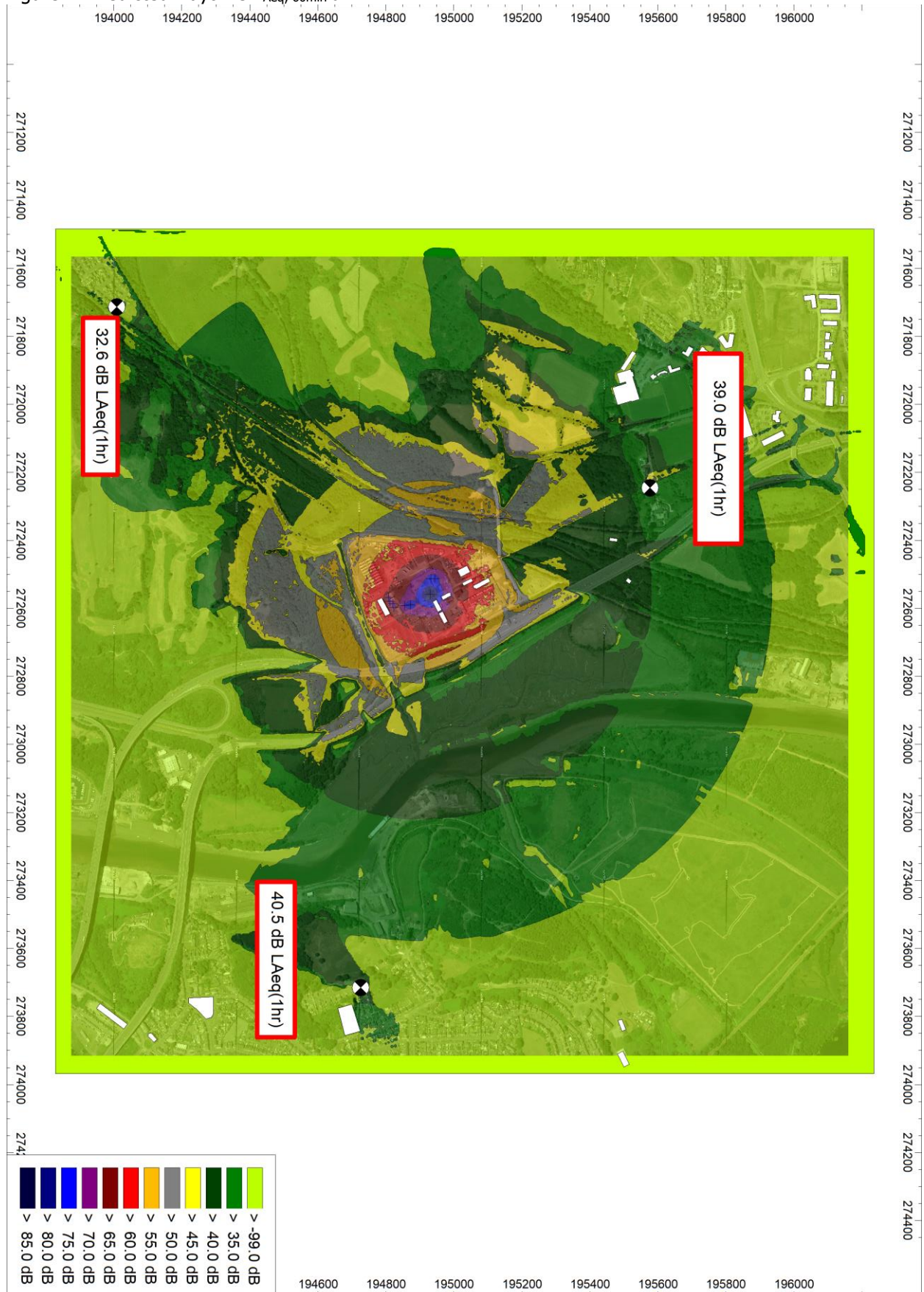
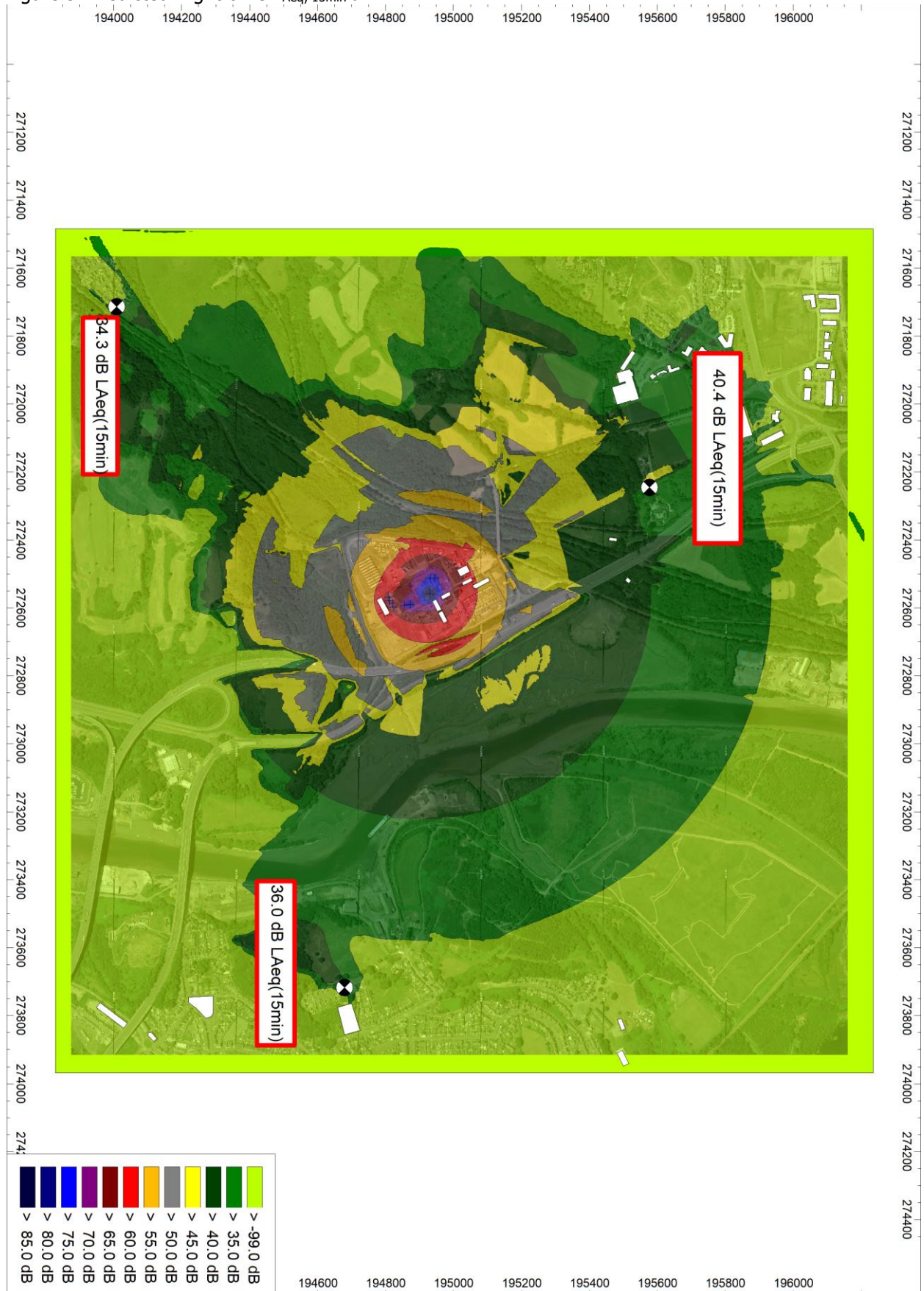


Figure 5: Predicted Night-time $L_{Aeq, 15min}$ dB



7. BS4142:2014 Assessment

Noise from industrial activity has the potential to affect the proposed residential properties and is assessed in accordance with BS4142:2014.

7.1. Character Correction

Character corrections should be added to the “specific sound level” if the “specific sound level” exhibits any *tonality, impulsivity, other specific characteristics and/or intermittency* at the assessment location.

Based on our site visit we have not applied any character for the sources of noise. The M4 noise is expected to be dominant over the industrial use.

7.2. Estimate of Impact

On the basis of the above, the British Standard 4142:2014 initial estimate at the most sensitive location is as follows.

Table 7: British Standard 4142:2014 Initial Estimate at NSR1

Parameter	Daytime	Night-time
Background Level, $L_{A90}(T)$	41 dB	41 dB
Specific Sound Level, $L_{Aeq}(T)$	41 dB	36 dB
Acoustic Character Correction	0 dB	
Rating Level	41 dB	36 dB
Excess of rating over background level	0 dB	-5 dB

Table 8: British Standard 4142:2014 Initial Estimate at NSR2

Parameter	Daytime	Night-time
Background Level, $L_{A90}(T)$	37 dB	41 dB
Specific Sound Level, $L_{Aeq}(T)$	33 dB	34 dB
Acoustic Character Correction	0 dB	
Rating Level	33 dB	34 dB
Excess of rating over background level	-4 dB	-7 dB

Table 9: British Standard 4142:2014 Initial Estimate at NSR3

Parameter	Daytime	Night-time
Background Level, $L_{A90}(T)$	51 dB	41 dB
Specific Sound Level, $L_{Aeq}(T)$	39 dB	40 dB
Acoustic Character Correction	0 dB	
Rating Level	39 dB	40 dB
Excess of rating over background level	-12 dB	-1 dB

This means that the rating noise level will be of a low impact when assessed to BS4142.

7.3. Contextual Assessment

Section 11 of British Standard 4142:2014, entitled 'Assessment of the Impacts', states the following regarding context.

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

We do not consider context needs to be taken into account in this instance.

7.4. Uncertainty

The uncertainty in the survey, predictions and assessment is in the region of +/-1dB. This is minimal and is not expected to affect the conclusions.

8. Summary & Conclusions

Gerald D Harries & Sons Limited appointed Acoustic Consultants Limited to carry out a noise impact assessment and provide a noise impact assessment for the proposed roping the construction and operation of an asphalt plant on land at Llandarcy, Neath Port Talbot.

The assessment takes into consideration the noise impact of the proposed development on the dwellings in the area.

The report assesses the suitability of the site with respect to TAN 11 and British Standard 4142:2014+A1:2019.

The author of this report is a Member of the Institute of Acoustics (MIOA) with a recognised acoustic qualification and over 14 years' experience within the field.

We have assessed noise using previously measured manufacturers and library data, and our measured background noise data from the site survey. This has been used to inform an assessment to BS4142 at the nearest sensitive receivers.

The outcome of the BS4142 assessment is that development noise will be of a low impact when assessed at the receivers in the area.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure p_A – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} – quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$$L_{pA} = 10 \log_{10} (p_A/p_0)^2$$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
 p_0 is the reference sound pressure (20 μ Pa)

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

Break-in - noise transmission into a structure from outside.

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.

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:

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

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.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

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.

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.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

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 .

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, L_{A_r,T_r} – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, $eVDV$ – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

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