Hochtief (UK) Construction Ltd

Minffordd Quarry Processing Site

Noise Assessment

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BUREAU VERITAS

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Contents

Executive Summary

Bureau Veritas was instructed by Hochtief (UK) Construction Ltd to undertake an environmental noise assessment of the proposed excavated material processing operations within the Minffordd Quarry site.

An assessment of the operational noise impact has been carried out in accordance with the relevant British Standards to consider the potential noise impact on the nearby residential receptors.

To establish ambient and background sound levels at the nearest sensitive receptors, a review of the baseline sound level measurements undertaken between December 2018 and February 2019 was carried out.

A computational noise model of the proposed development was assembled and populated with the noise emission data of the new sound sources. Standard noise propagation calculations were used to predict the site operation noise levels at the nearest residential receptors.

The assessment concludes that the noise impact of the site operation would be Low at the nearest residential receptors, and that operational traffic generated by the proposed development would have negligible noise impacts on off-site receptors.

1. Introduction

1.1 Bureau Veritas was instructed by Hochtief (UK) Construction Ltd to undertake an environmental noise assessment of the proposed excavated material processing operations within the Breedon Minffordd Quarry and Asphalt Plant site, Penrhyndeudraeth.

1.2 The purpose of this assessment is to provide an indication of its potential impacts on sensitive receptors off site in terms of noise, based on current guidance and best practice.

1.3 The report also details the baseline noise surveys, assessment methods used, and mitigation measures if required.

1.4 A glossary of acoustic terminology is included in **Appendix One**.

2. Site location

2.1 The site is in the south of the existing Minffordd Quarry located near to the village of Minffordd, Penrhyndeudraeth. The A487 runs immediately to the south of the site. To the further south of the site, and west and east of the site are green areas covered by grass and trees.

2.2 The nearest noise sensitive receptors (NSRs) are identified as the residential dwelling approximately 230 m to the northeast (NSR1) of the nearest site boundary, residential dwellings off Quarry Lane approximately 220 m to the south (NSR2) of the nearest site boundary, the residential dwellings approximately 300 m to the southeast (NSR3) of the nearest site boundary, and the residential dwellings approximately 320 m to the east (NSR4) of the nearest site boundary.

2.3 The site location and the locations of the NSRs are shown in **Appendix Two**.

3. Details of Development

3.1 Within the existing quarry land, an excavated material processing site will be established to store and screen the tunnel arisings from the Snowdonia Visual Impact Provision (SVIP) project.

3.2 The site facility will comprise operation of:

- 1 no. Loading shovel (CAT 972M);
- 1 no. Excavator (CAT 349);
- 1 no. Mobile screener (Warrior 1800); and,
- 1 no. Road sweeper (Leyland DAF LF).

3.3 It is expected that operation of the site would be as per the operations permit for the SVIP Garth Site (core daytime hours):

- Mon - Friday 08:00-17:00hrs

3.4 It is noted the site operation may be extended by 10-15 mins haulage time from the Garth Site to the Minffordd Quarry.

3.5 The application boundary of the proposed development is shown in **Appendix Three**.

4. Criteria for Assessment

Assessment Methodology

4.1 The sounds caused by the proposed development are all considered as industrial noise, therefore British Standard 4142: 2014+A1: 2019 is the main guidance for the assessment, along with the other relevant references, to assess the potential noise impact on the nearby sensitive receptors.

4.2 The relevant guidance documents are listed below:

- Planning Policy Wales (Ed. 12, February. 2024)
- British Standard 4142; 2014+A1:2019, "Methods for rating and assessing industrial and commercial sound" (BS4142);
- British Standard 8233: 2014, "Guidance on sound insulation and noise reduction for buildings"; and
- The Design Manual for Roads and Bridges Vol 11;
- ISO 9613-2:2024 'Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation'.

Planning Policy

Planning Policy Wales (Ed. 12, February. 2024)

4.3 Planning Policy Wales (PPW) defines the latest land use planning policies of the Welsh Government. The consideration of noise impacts and the overall encouragement of good soundscapes is widely discussed within the document and, of particular importance to this report, paragraph 6.7.14 of PPW states:

> *"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."*
>
> *6.7.15 For the purposes of this section, potentially polluting development includes commercial, industrial, energy and agricultural or transport infrastructure. Such development should be located in areas where there is low potential for public exposure, or where its impact can be minimised. Novel or new development types may potentially cause pollution and should be carefully considered, and where appropriate, decisions should be based on the precautionary principle.*
>
> *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."*

4.4 PPW is supplemented by a series of Technical Advice Notes, including the TAN11: Noise 1997 relating to the consideration of noise at the planning stage. TAN11 is currently under review. A number of proposed changes and updates are included in the consultation version

of TAN 11. The consultation ended on 20th January 2023 but the new version of TAN11 is not yet available.

Technical Advice Note (Wales) 11, Noise (TAN11)

4.5 TAN 11 was introduced by the Welsh Government in October 1997. Paragraph 3 on page 1 of TAN11 indicates that it is intended to provide *"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."*

4.6 In relation to the assessment of new noise generating sources, TAN11 states that:

> *"8. Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions.*

4.7 Annex B of TAN 11 specifies that the assessment of potential noise disturbance from industrial and commercial developments should be undertaken in accordance with BS4142:1990 (superseded by 2019 version, see below).

Technical Guidance

British Standard 4142: 2014+A1: 2019 'Methods for rating and assessing industrial and commercial sound'

4.8 The Standard provides a method for assessing whether a sound from industrial or commercial premises (e.g., fixed mechanical and electrical (M&E) plant, loading activities etc.) is likely to cause a disturbance to persons living in the vicinity of the site.

4.9 BS 4142 assesses potential significance of effect by comparing the 'specific sound level' of an industrial source to the typically representative background sound level (L_{A90}). Certain acoustic features can increase the potential for a sound to attract attention, and therefore increase its relative significance than that expected from a simple comparison between the specific sound level and the background sound level. In particular, BS 4142 identifies noise that contains discrete impulses and/or audible tonal qualities and in these cases recommends that a correction be added to the specific sound level. The specific sound level along with any applicable correction is referred to as the 'rating level'.

4.10 The greater the difference between the rating level and the background sound level; the greater the likelihood of complaints. The assessment criteria given by BS 4142 are as follows:

- A difference of +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of +5 dB could 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 there will be an 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.
- Also, to take into account the absolute level, risk that it will cause annoyance/interference with everyday activities, context of the sound, frequency and temporal variations to the sound.

4.11 During the daytime and evening, BS 4142 requires that sound levels are assessed over 1-hour periods. During the night-time, because sleep disturbance is the important issue and individual sound events are, therefore, more important, sound levels are assessed over 15-minute periods.

British Standard 8233: 2014 Guidance on Sound Insulation and Noise Reduction for Buildings

4.12 BS 8233:2014 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.

4.13 With regards to external sound sources affecting habitable residential spaces, Table 4 of BS 8233:2014 provides guideline values that it is desirable to not exceed during daytime and night-time periods. These guideline values are reproduced in **Table 4.1**.

Table 4.1: Indoor ambient sound levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

4.14 For traditional external areas that are used for amenity space, such as gardens and patios, BS8233 states that it is desirable that the external sound level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

The Design Manual for Roads and Bridges Vol 11

4.15 The Highways Agency guidance document *Design Manual for Roads and Bridges* (DMRB) (LA 111 Noise and Vibration, Rev 2, 2020) includes guidance on the interpretation of changes in road traffic noise levels ($L_{A10,\ 18hr}$) for determining the potential magnitude of effect. The suggested criteria for short-term (immediate at point of opening) effects are presented in **Table 4.2**.

Table 4.2 DMRB Classification of Magnitude of Traffic Noise Impacts in the Short Term

Noise Change $L_{A10,18h}$	DMRB Magnitude of Impact
0	No change
0.1 - 0.9	Negligible
1.0 - 2.9	Minor
3.0 - 4.9	Moderate
5+	Major

Source: DMRB LA 111, Table 3.54a

ISO 9613-2:2024 'Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation'

4.16 ISO 9613-2:2024 specifies methods for the description of sound outdoors in community environments. ISO 9613 can be applied to a wide variety of sound sources and includes methods to determine most of the major mechanisms of sound attenuation, such as:

- Geometric divergence (A_{div}) – spherical spreading of sound energy;
- Atmospheric absorption (A_{atm}) – attenuation of sound due to interaction with the air (dependant on frequency of sound and negligible at short distances);
- Ground effect (A_{gr}) – sound reflecting by the ground surface interfacing with the sound propagating directly from source to receiver;
- Reflection from surfaces (image source method, included in A_{gr} calculation) – sound is reflected from hard surfaces such as building facades due to atmospheric impedance of the surface. This effect increases the sound level when compared to a location free of buildings (i.e., free field); and
- Screening by obstacles (A_{bar}) – Hard obstacles such as close-boarded timber fences and varying topography, including hills attenuate the sound from a source due to the insertion loss properties of the obstacle. However, there is an element of the sound which will diffract around the obstacle, especially at lower frequencies. The diffraction effect is determined using the path differences between the direct and diffracted sound. It should be noted that the screening effect provided by trees and foliage is negligible in the majority of cases; the exception is large areas of dense forest or plantations.

5. Baseline Sound Levels

5.1 To establish the ambient and background sound levels at the nearest receptors, a review of the baseline noise level measurements undertaken between December 2018 and February 2019 was carried out (ref. Visual Impact Provision (VIP) Snowdonia Project, Environmental Appraisal Volume 1 – Noise and Vibration). It is believed that the baseline sound climate is very unlikely to have materially changed since then.

5.2 The measurement location (LT1) is shown in **Appendix Two**. The measurement location was adjacent to NSR2. The Minffordd Quarry site noise and the A487 traffic noise are dominant. The monitoring location is considered representative for the locations of NSR1 and NSR2, given their similar distances to the A487 and the Minffordd Quarry.

5.3 The measurement location (ST1) is shown in **Appendix Two**. The measurement location was adjacent to NSR3. Same reason as above, the monitoring location is considered representative for the locations of NSR3 and NSR4.

5.4 At LT1, 15 days of usable data was obtained. **Table 5.1** presents a summary of the sound level survey results during the long-term monitoring.

Table 5.1: Summary of baseline noise survey data – Long term monitoring

Location	Period	Time	Sound Pressure Level, dB re: 20µPa (Fast, Free-field)	
			$L_{Aeq,T}$*	$L_{A90,T}$*
LT1	Weekday Daytime	0700 - 1900	54.0	47.8
	Weekday Evening	1900 - 2300	46.3	35.5
	Weekend Daytime	0700 - 1900	56.4	43.7
	Weekend Evening	1900 - 2300	46.7	34.8
	Night-time	2300 - 0700	44.4	32.8

5.5 The representative background sound levels were determined to be **54** dB $L_{Aeq,1hour}$ and **48** dB L_{A90} for NSR1 and NSR2 during the weekday daytime period.

5.6 Short duration attended baseline surveys were carried out for a duration of 4 hours at ST2. **Table 5.2** presents a summary of the sound level survey results during the short-term monitoring.

5.7 The representative background sound levels were determined to be **50** dB $L_{Aeq,1hour}$ and **38** dB L_{A90} for NSR3 and NSR4 during the weekday daytime period.

Table 5.2: Summary of baseline noise survey data – Short term monitoring

Location	Period	Time	Sound Pressure Level, dB re: 20µPa (Fast, Free-field)	
			$L_{Aeq,T}$*	$L_{A90,T}$*
ST1	Weekday Daytime	1030 - 1430	49.8	37.9

5.8 It is noted that although LT1 are further from A487, the ambient sound levels are higher than those at ST1, of which the reason might be the dominance of Minffordd Quarry noise and a shorter distance of LT1 to the Minffordd Quarry.

6. Noise Assessment

Introduction

6.1 For the Development, the impact assessment with respect to noise on the existing environment covers the following issues:

- Potential operational noise associated with fixed/mobile plant and vehicles (deliveries by HGV); and
- Potential increase in local road traffic noise due to vehicle movements generated by the development once operational.

6.2 The assessment of the noise impact of the site operation is based on the ambient sound levels ($L_{Aeq,T}$) and the background sound levels ($L_{A90,T}$) measured/derived in Section 5. The sound levels of site operation at the nearest sensitive receptors are predicted by noise modelling, using CadnaA.

6.3 Noise propagation was predicted using algorithms described in ISO 9613-2, as incorporated within the noise modelling software.

6.4 The following assumptions have been incorporated into the noise model:

- The topography of the site and the surrounding area has been obtained from the site layout and the Defra survey terrain data;
- The effects of screening from solid structures (buildings) have been incorporated into the modelling process by importing the OpenStreetMap data; and
- The ground type in the model has been set to hard for the site (G=0) and soft for the wider area (G=0.5)

6.5 Due to the typically low vibration levels that are likely to be generated, primarily by on site vehicle movements, and the separation distances it is expected that operational activities would not result in perceptible vibration impacts on any of the sensitive receptors. Therefore, no further assessment of operational vibration was undertaken.

Operational Plant Noise

Identification of Sound Sources

6.6 Noise emissions from the various processes, equipment and activities understood to be associated with the operation of the plants have been predicted in order that an assessment of the impact of the noise generated can be performed.

6.7 Noise levels have been predicted from sound power levels (SWL). SWLs for standard equipment, such as dozer and loaders have been sourced from BS 5228. Levels for specialised processing plant equipment have been sourced from manufacturers' data provided by the client. The levels used are thought to be representative of the proposed plants, if not worst-case.

6.8 The available noise data refer to the sound pressure levels at 10 m distance. This in turn means that the SWL can be calculated for use in the prediction of environmental noise levels, provided that the overall dimensions of the noise-emitting elements are known.

6.9 All HGV arrival and departure movements are via one access located south of the application Site.

6.10 The site is typically expected to receive 600-700m^3, and up to a maximum of 1250m^3, waste per week. There are likely an average of 88, up to 156, loads per week to site. Given five weekdays for site operation, the maximum number of loads to the site is 31 per day and the maximum number of HGV movements is 62 per day.

6.11 Significant operational sound sources comprise:

- 1 no. Loading Shovel (CAT 972M);
- 1 no. Excavator (CAT 349);
- 1 no. Mobile screener (Warrior 1800);
- 1 no. Road sweeper (Leyland DAF LF); and
- HGV movements.

6.12 Operational hours will be within normal operational hours of Garth site as per the existing planning permission (core daytime hours only).

6.13 The modelled sound emission rates comprise:

Table 6.1: Plant Noise Emission Data

Plant		Sound Pressure Level dB L_{Aeq}	Sound Power Level, dB L_{WA}	Operation % time (0700-2300)	Note
Loading shovel		86 at 10 m	114	50	BS5228 C.9.8
Excavator		83 at 10 m	111	50	BS5228 C.9.5
Processing Plant	Power unit	83 at 10 m	111	50	At 2.5 m high
	Front loader	78 at 10 m	106	50	At 1.5 m high
	Distribution conveyors	-	80 per unit length	50	-
Road Sweeper		76 at 10 m	104	50	BS5228 C.4.90

Plant	Sound Pressure Level dB L_{Aeq}	Sound Power Level, dB L_{WA}	Operation % time (0700-2300)	Note
HGV movement	-	82 per HGV	-	31 loads/62 movements a day

6.14 The predicted specific sound levels at the nearest receptors during the daytime are shown in **Table 6.2** below.

Table 6.2: Summary of Predicted Sound Levels on the nearest facades

Receptors	X (Easting), Y (Northing)	Sound Pressure Level, dB $L_{Aeq,T}$ (Ground floor façade)
NSR1	259860, 339073	26
NSR2	259506, 338708	45
NSR3	259834, 338697	39
NSR4	259974, 338869	37

6.15 **Figures A4.1** in **Appendix Four** show the predicted sound propagation grids at ground floor (1.5 m) at daytime.

BS4142:2014 Assessment - Residential receptors

6.16 The indicative assessments to BS 4142:2014 are provided in **Table 6.3**:

Table 6.3: Indicative BS 4142:2014 Assessment - Daytime

Description	Result	Relevant Clauses of BS 4142:2014	Commentary
Specific Sound Level (free-field), dB $L_{Aeq,1hr}$	26 (NSR1) 45 (NSR2) 39 (NSR3) 37 (NSR4)	7.3.6	Predicted level (free-field) at ground floor level at the nearest receptor. Determined by calculation using CadnaA.
Background sound level, dB $L_{A90,1hr}$	48 (NSR1) 48 (NSR2) 38 (NSR3) 38 (NSR4)	8.1 and 8.2	The background noise levels (free-field) were measured at the monitoring locations close to the noise-sensitive receptors.
Acoustic features correction, dB	0	9.2	No perceptible tonality of operation of the plants due to the plant noise levels being much lower than ambient noise levels at NSRs. The Minffordd Quarry noise is very likely to largely mask the proposed site noise due to their similar nature.
Rating Level, dB $L_{Ar,1hr}$	26 (NSR1) 45 (NSR2) 39 (NSR3)		

Description	Result	Relevant Clauses of BS 4142:2014	Commentary
	37 (NSR4)		
Excess of Rating Level over Background Sound Level, dB	-22 (NSR1) -3 (NSR2) +1 (NSR3) -1 (NSR4)		
Assessment of impact: Assessment indicates a low impact due to proposed site noise at the NSRs		11	
Context		11 8.2	This is the worst-case scenario with representative background sound level. Predicted noise levels are at least 9 dB below existing ambient sound levels and there would be no perceptible difference in acoustic character.
Uncertainty of the assessment		10	The specific noise level has been predicted by CadnaA, which utilises ISO9613 calculations, which have a claimed uncertainty of +/- 3 dB.

6.17 The results of BS4142 assessment in **Table 6.3** indicate that, during the daytime period the predicted sound levels generated by the site would result in a low impact at the NSRs.

BS8233 Internal Noise Level

6.18 Internal noise levels have been calculated based on the now surpassed, BS 8233:1999, which stated that a partially open window, which allows for ventilation, provides approximately 10 – 15 dB(A) attenuation and for the purposes of this assessment we have assumed 13 dB(A) attenuation. The criteria provided in BS 8233 has been used to benchmark the internal noise levels calculated. It can be seen in the **Tables 6.4** that internal levels required by BS8223 would be met at the nearest sensitive receptors.

6.19 As stated above, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

6.20 As shown in Figure A4.1, all the external amenity areas (residential gardens) have the sound levels below 55 dB $L_{Aeq,T,}$ which achieves the requirement in BS 8233.

6.21 **Table 6.4** shows that the internal noise levels of the nearest residential receptors can all achieve the limit of 35 $L_{Aeq,T}$ dB at daytime.

Table 6.4: Calculated Internal Noise Levels $L_{Aeq,T}$ from plant noise at NSRs at daytime

	NSR1	NSR2	NSR3	NSR4
Highest Façade Level $L_{Aeq,T}$ dB	26	45	39	37
Open Window Attenuation dB	-13	-13	-13	-13
Internal Level $L_{Aeq,T}$ dB	**13**	**32**	**26**	**24**
BS 8233 Criteria $L_{Aeq,T}$ dB	35	35	35	35
Criteria Met?	✓	✓	✓	✓

6.22 Therefore, the limits in BS8233 can be all achieved without any noise mitigation measures.

6.23 The assessment concludes that the noise impact of the site operation would be Low at the nearest residential receptors.

Operational Traffic noise

6.24 Vehicular access to the proposed development would continue to be gained from the Porthmadog Bypass/A487.

6.25 Based on the GB Road Traffic Counts[1], the overall daily movements of the baseline traffic data of A487 in 2019 are 450 HGV movements and 7,878 motor vehicle movements in total.

6.26 An increase of traffic flow in and out the site will bring about the increase in traffic noise levels along local roads. An increase in traffic flows in excess of 25% can bring about increases in noise levels above 1 dB.

6.27 As mentioned above in this section that the development could generate the following vehicle movements during a typical weekday:

- 62 two-way movements by HGVs per day (31 daily loads spread throughout the day)

6.28 Given the number of plants in site, there would be a small number of staff and therefore small number of staff car movement. It is believed that the staff car movement would not significantly contribute to the site traffic.

6.29 Compared with the existing traffic volume on the A487, the traffic caused by the proposed development is a significantly smaller number, based on the estimated total 62 movements per day to site. The percentage increase in total vehicles on the A487 would be well below 25% (less than 1dB increase).

6.30 In this case, according to guidance in DMRB above, the change of noise level will be lower than 1 dB, which results in negligible impact on the receptors off the A487.

6.31 The operational traffic noise is therefore not considered to have adverse impacts on the off-site receptors.

[1] Department for Transport, GB Road Traffic Counts: https://data.gov.uk/dataset/208c0e7b-353f-4e2d-8b7a-1a7118467acc/gb-road-traffic-counts

8. Conclusions

7.1 Bureau Veritas was instructed by Hochtief (UK) Construction Ltd to undertake an environmental noise assessment of the proposed excavated material processing site at Minffordd Quarry.

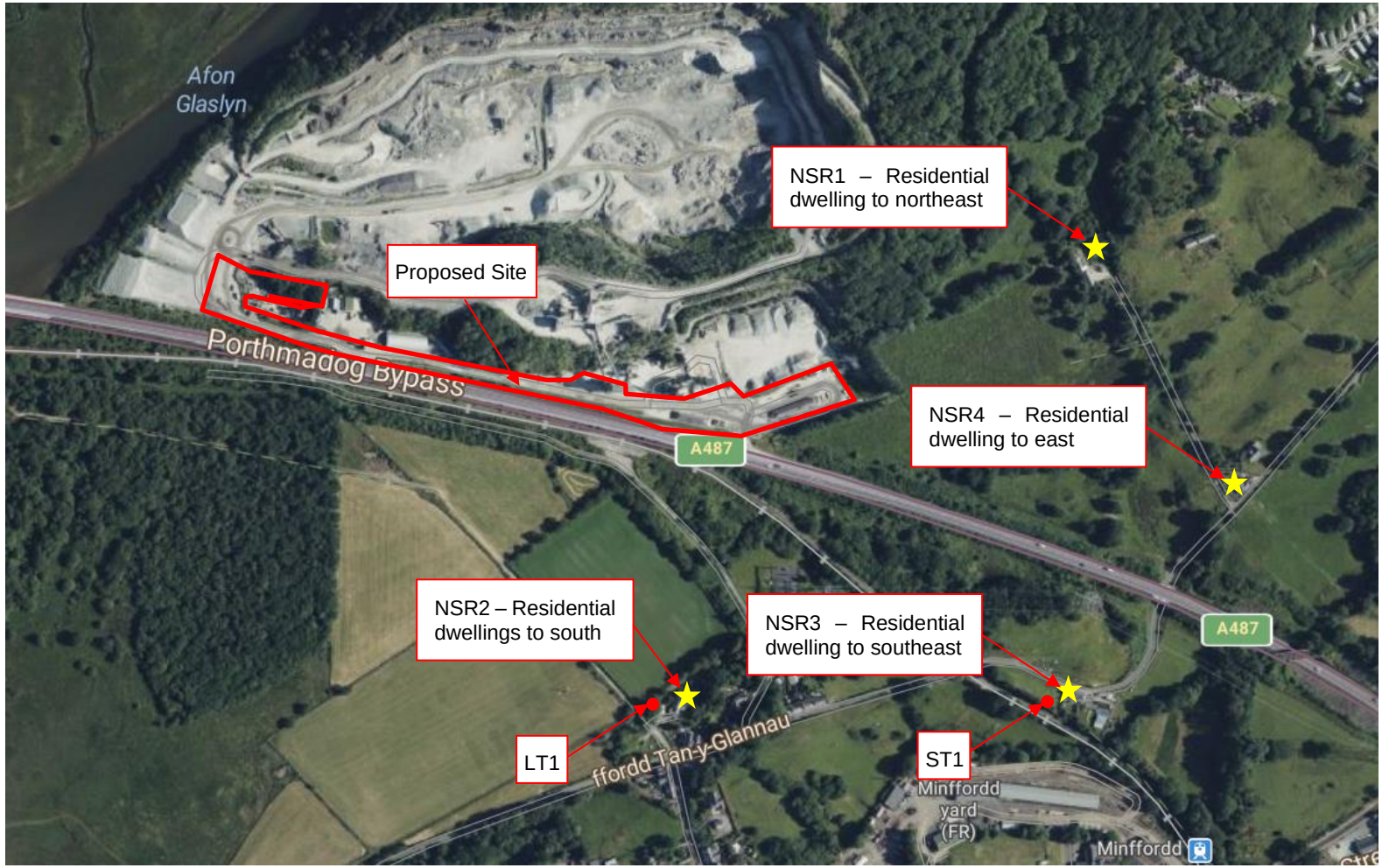
7.2 An assessment of the operational noise impact has been carried out in accordance with British Standard 4142: 2014 to consider the potential noise impact on the nearby residential receptors.

7.3 The assessment concludes that the noise impact of the site operation would be Low at the nearest residential receptors, and that operational traffic generated by the development would have negligible noise impacts on off-site receptors.

Appendix One – Glossary of Acoustic Terminology

Sound power level	A logarithmic measure of the power of a sound relative to a reference value.
"A" Weighting (dB(A))	The human ear does not respond uniformly to different frequencies. "A" weighting is commonly used to simulate the frequency response of the ear. It is used in the assessment of the risk of damage to hearing due to noise.
Decibel (dB)	The range of audible sound pressures is approximately 2 x 10^{-5} Pa to 200 Pa. Using decibel notation presents this range in a more manageable form, 0 dB to 140 dB.
Ambient sound level, $L_{Aeq,T}$	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, $L_{90,T}$	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.
Maximum sound level, $L_{Amax,T}$	The maximum RMS A-weighted sound pressure level occurring within a specified time period.
Noise	Unwanted sound.
Ambient sound	Totally encompassing sound in a given situation at any given time composed of noise from many sources, near and far.
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.
Rating level	Specific sound level plus any adjustment for the characteristic features of the sound.

Appendix Two – Site Location and Monitoring Locations



Appendix Three – Site Layout

Appendix Four – Noise Contours

Figure A4.1: Indicative Prediction of Specific Sound Level (Day) – 1.5 m above ground