

AtkinsRéalis



Noise and Vibration Assessment

Neath Port Talbot County Borough Council

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SKEWEN FLOOD ALLEVIATION SCHEME

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Executive Summary

This report presents a construction noise and vibration assessment for the proposed tunnelling works as part of the Skewen Flood Alleviation Scheme.

A desktop assessment of the site location identified a number of nearby noise sensitive receptors, with the closest being located approximately 10m from construction works. These receptors are expected to experience existing ambient noise levels of between 55 - 65 dB $L_{Aeq,16hr}$ based on local noise mapping data.

A construction noise assessment has been undertaken to assess the potential impacts of the proposed works. The construction noise assessment showed that there is potential for the nearest Noise Sensitive Receptors (NSR) to experience adverse noise impacts. However, noise levels of this magnitude will be sufficiently short in duration, therefore, the temporal thresholds for a significant effect are not expected to be met.

The vibration assessment showed that the closest receptor surrounding the cofferdams have predicted vibration levels above the human comfort criteria. While such vibrations may be perceptible, they are expected to be tolerable provided residents receive prior notice and a clear explanation. There is no predicted exceedance of the building damage criteria. The micro tunnelling generates significantly less vibration and is expected to be imperceptible at distances of less than 10m.

The findings of the indicative construction traffic assessment are that a negligible change in road traffic noise is expected for receptors along the A4230. According to DMRB LA 111, a negligible magnitude of change in the short-term will not cause changes to behaviour or response to noise and as such, will not give rise to a likely significant effect.

Mitigation and control measures to minimise noise and vibration impacts as far as reasonably practicable have been presented.



1. Introduction

Neath Port Talbot County Borough Council (NPTCBC) require a noise and vibration assessment in relation to the proposed Skewen Flood Alleviation Scheme (the Scheme). The purpose of this assessment is to provide consultation regarding potential impacts and mitigation measures during the tunnelling construction phase of the Scheme.

The site of the proposed Scheme is located at Caenant Terrace in the residential area of Skewen, approximately 8km northeast of Swansea and 3km west of Neath in South Wales. The site is located entirely within the administrative boundary of NPTCBC.

It's understood that the Scheme is required to mitigate flooding to properties along Caenant Terrace and the wider Skewen area. The tunnelling works for the Scheme involves the construction of a new buried concrete culvert offline of the existing structure using micro tunnelling / thrust bore technique.

The anticipated duration of the construction works is expected to be 12 weeks. Furthermore, it is anticipated that all construction activities will be limited to daytime weekday hours, from 7:30am to 6pm from Monday to Friday and 8.00am to 1pm Saturdays.

An email outlining the proposed noise and vibration assessment methodology has been submitted to the local planning authority for comment. A response has not yet been received, therefore it is assumed that the proposed methodology was deemed appropriate and the assessment has been conducted in accordance with the guidance outlined in Section 3 of this report.

This report presents a construction noise and vibration impact assessment for the proposed Scheme considering the impacts and durations of any construction work at the identified nearby sensitive receptors.

A glossary of acoustic terms used within this report is included in Appendix A.

1.1 Site Location

The site address is located at Caenant Terrace, Skewen, Neath SA10 6UP. It is located within a residential area and is situated approximately 100m from an operational railway to the north. The site layout is shown in Figure 1-1 below.



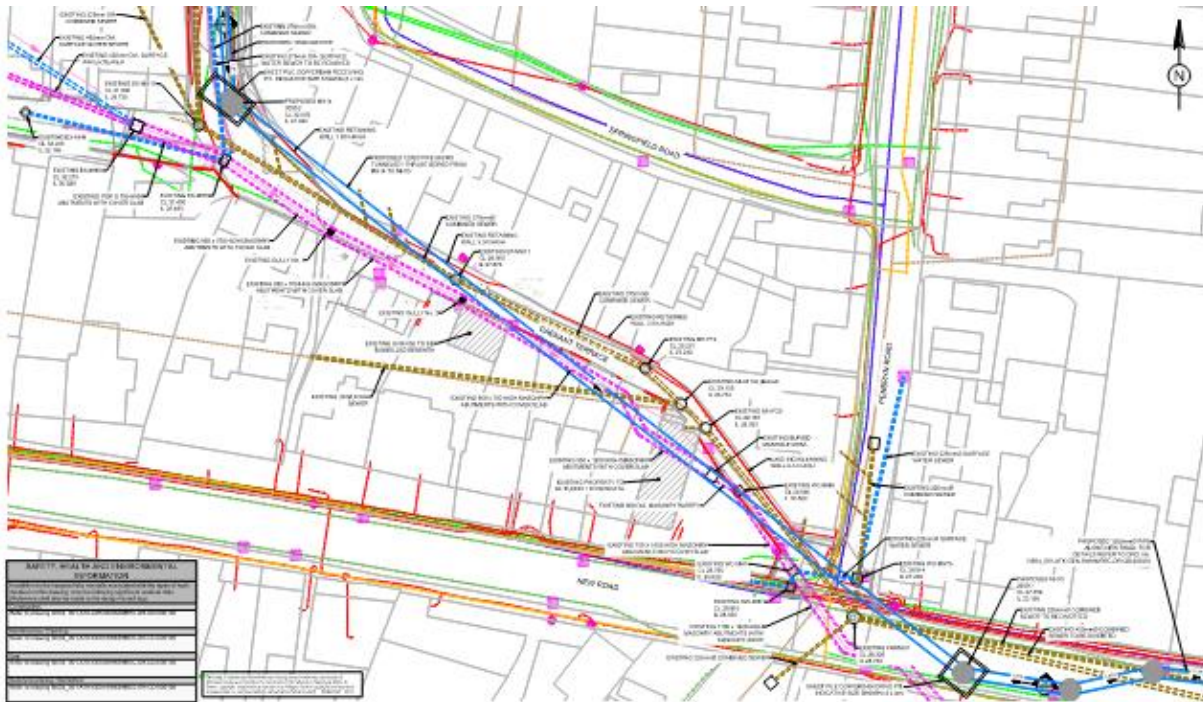


Figure 1-1 – Site Layout

2. Noise Sensitive Receptors

A high-level review of the receptors and baseline acoustic environment in the area surrounding the Scheme has been undertaken and is presented in this section.

The land surrounding the Scheme is comprised predominantly of residential dwellings in every direction. Table 2-1 and Figure 2-1 below outline the location and distance of the nearest noise sensitive receptors (NSR) to the two cofferdam work sites. The NSRs have been identified based on their location to either the cofferdam receiving or driving point, where similar construction activities are expected.

Table 2-1 – Nearest NSRs to the Site

NSR ID	Address	Distance to Works	Type
NSR1	10 Springfield Road	10m	Residential
NSR2	30 Caenant Terrace	30m	Residential
NSR3	17 New Road	17m	Residential
NSR4	6/7 New Road	10m	Residential
NSR5	248/249 New Road	15m	Residential



Figure 2-1 – Site Location and Adjacent NSRs

In addition to the above NSRs exposed to airborne noise, we have also considered the following receptors close to the micro tunnelling activities:

- 7 – 16 New Road
- 1 Penbryn Road
- 11 – 15 Springfield Road

2.1 Background Noise Levels

It is understood that works will take place during the daytime only, from 08:00 until 18:00. Therefore, only daytime baseline noise levels have been considered for this assessment.

Based on a high-level desktop review of DataMap Wales¹ noise maps, the dominant noise source in the area is likely to be road traffic noise from the A4230 (New Road) and Caenant Terrace.

¹ https://datamap.gov.wales/maps/new?layergroup=geonode:Environmental_Noise_Mapping_2022#/
(accessed 09/2025)

The noise map for the site area is shown in Figure 2-2 (Daytime $L_{Aeq,16hr}$). This information was prepared as part of the strategic noise mapping exercise, undertaken by DataMap Wales in 2022.

The noise contours show that the ambient noise levels are expected to be between 55 - 60 dB $L_{Aeq,16hr}$ for properties along Caenant Terrace/ Springfield Avenue and between 60 dB – 65 dB $L_{Aeq,16hr}$ for properties along New Road.



Figure 2-2 – Noise Map, Daytime dB $L_{Aeq,16hr}$

3. Assessment Criteria

3.1 Construction Noise

BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' (BS 5228 Part 1) provides guidance on the prediction and assessment of construction noise. Calculation procedures are set out in Annex F for predicting the likely noise levels from specific construction activities at receptors, considering distance, ground absorption, screening, reflections, and the percentage on-time for each activity. Annexes C and D provide generic noise data for various items of plant which can be used for undertaking predictions where no specific information is available.

BS 5228 Part 1 Annex E sets out the need for a pragmatic approach to be taken when assessing the noise effects of a construction project. It goes on to describe example methods for identifying the likely significance of noise levels from construction activity based on a combination of fixed noise thresholds and noise change criteria. This includes the ABC method detailed in Annex E.3.2, where noise limits for residential receptors are set based on baseline noise levels, and which is shown below in Table 3-1.

Table 3-1 – Threshold of potential significant construction impacts at dwellings

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A ^A	Category B ^B	Category C ^C
Night-time (23.00-07.00)	45	50	55
Evenings and weekends ^D	55	60	65
Daytime (07.00-19.00) and Saturdays (07.00-13.00)	65	70	75

NOTE 1 - A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2 - If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

NOTE 3 - Applied to residential receptors only.

^A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

^B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values.

^C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.

^D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

Table Source: BS 5228:2014 Part 1, Annex E.3.2



The ABC method has been used to assess the noise impacts of the construction activities at the NSRs. Using this method, the impact of an activity has potential to be significant if the noise levels from the construction activities are shown to exceed the relevant threshold value.

In addition to the above noise criteria for residential receptors, the consideration of significant effects then needs to take the duration of the activities into account along with the predicted construction noise levels.

A “significant time period” for the threshold values shown in Table 3-1 to be exceeded in order to cause significant effects is:

- a period of 10 or more days of working in any 15 consecutive days during construction; or
- for a total of 40 days or more in any 6 consecutive months during construction.

Based on the baseline acoustic environment discussed in Section 2.1, the estimated daytime ambient noise levels and associated construction noise criteria at the nearest NSRs adjacent to the site are shown in Table 3-2.

Table 3-2 – Estimated Daytime Ambient Noise Levels and Construction Noise Level Criteria

NSR ID	Daytime Ambient Noise Level dB L_{Aeq,16hr}	Daytime Construction Noise Criteria dB L_{Aeq,10hr}
NSR1	55-60	65
NSR2	55-60	65
NSR3	60-65	70
NSR4	60-65	70
NSR5	60-65	70

Section E.4 of BS 5228 Part 1 goes on to provide example noise trigger levels at which additional noise insulation, or reasonable costs thereof, should be offered, where it is applied for by the owners or occupiers of a permanent dwelling. For construction works, the threshold is the highest level of:

- 5 dB above the pre-existing ambient level; or
- 75 dB L_{Aeq,10hr}

Section E.4 of the Standard also provides example noise trigger levels at which temporary rehousing, or reasonable costs thereof, should be offered, where it is applied for by the owners or occupiers of a permanent dwelling. For construction works, the threshold is the highest level of:

- 10 dB above the pre-existing ambient level; or
- 85 dB L_{Aeq,10hr}

The noise insulation and temporary rehousing noise trigger levels will need to be exceeded for the same “significant time period” as stated above in order for these control measures to be considered.

3.2 Construction Vibration

BS 5228 Part 2 gives guidance on vibration levels that could be used to assess the likely impacts of construction activities on the environment and people. The main vibration generating works are expected to be the breakout



works and piling. The micro tunnelling generates significantly less vibration and is expected to be imperceptible at distances of less than 10m. Annex B of BS 5228 Part 2 gives guidance on vibration levels and associated effects in terms of human and structural response, and tables providing guidance values are reproduced in Table 3-3 and Table 3-4 below.

Table 3-3 – Guidance on effects of vibration levels

Vibration level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration
0.3 mm/s	Vibration might be just perceptible in residential environments
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level

Table 3-4 – Transient vibration guide values for cosmetic damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15Hz and above
Reinforced or framed structures	50mm/s at 4Hz and above	50mm/s at 4Hz and above
Industrial and heavy commercial buildings		
Unreinforced or light framed structures	15 mm/s at 4Hz increasing to 20 mm/s at 15Hz	20 mm/s at 15Hz increasing to 50 mm/s at 40Hz and above
Residential or light commercial buildings		

BS 5228 Part 2 also states that if the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, the guide values in Table 3-4 might need to be reduced by up to 50%. In addition, BS 7385-2 notes that the probability of damage tends towards zero at 12.5 mm/s PPV. Based on the above, the trigger level for potential of cosmetic damage to surrounding dwellings are typically recommended to be 10 mm/s PPV.

The trigger level for potential adverse impacts to humans at surrounding properties are recommended to be 1.0 mm/s PPV. The consideration of significant effects from vibration levels also needs to take the duration of the activities into account outlined in Section 3.1.



3.3 Construction Traffic Criteria

DMRB LA 111 specifies that a change in road traffic noise due to construction traffic in the short-term of less than 1 dB $L_{A10,18h}$ is negligible. Furthermore, a negligible noise change will not give rise to a likely significant effect. As an example, to increase the BNL by 1 dB, the traffic volume would need to increase by 25% assuming all other factors are unchanged (i.e. speed and % HDV).



4. Construction Noise Assessment

A construction noise assessment has been undertaken to assess the proposed impact of the Scheme. The assessment considers factors such as working hours, durations and types of plant and equipment used.

4.1 Prediction Methodology

A methodology for construction noise assessment is provided by BS 5228 Part 1. This standard gives recommendations for basic methods of noise control relating to construction and open sites and gives guidance concerning methods of predicting and measuring noise and assessing its impact. Annex F of the Standard provides a prediction methodology to determine an 'activity noise level' for a given construction activity based on the plant or equipment involved, their sound emissions and time of usage during the construction activity. BS 5228 Part 1 provides empirical acoustic data for a variety of construction plant that can be used for these calculations. The activity noise levels are then used to calculate the resultant free-field noise levels at locations of interest taking into account distance, ground absorption and the presence of obstacles that can screen noise, such as boundary walls and intervening buildings.

Construction noise levels have been calculated for the cofferdam drive and receiver pits at the nearest identified NSRs following the BS 5228 Part 1 methodology for each of the construction activities listed in Table 4-1. The resultant noise levels for each construction activity were then compared against the relevant assessment criteria to determine whether a potential significant effect would occur, considering the context.

Underground construction activities have not been included in the noise calculations as the airborne noise generated is not expected to be audible above ground, however vibration levels from the micro tunnel boring machine (TBM) are assessed in Section 5.1.1.

4.2 Activity Noise Levels

The main plant and equipment anticipated to be used for each construction phase and the corresponding noise levels at a distance of 10m from the source, are shown in Table 4-1. Noise levels have been based on construction activities provided by the design team, sound level data in BS 5228 Part 1 and the appropriate "on-time" levels of the equipment per activity. A summary of the total noise level for each construction activity is shown in Table 4-1. The full construction activity plant list and noise levels are shown in Appendix B.

Table 4-1 – Construction Activity Noise Levels at 10m

Activity	Activity Noise Level @ 10m, dB L _{Aeq}
1. Excavation of road surface	83
2. Sheet Piling - Vibratory	85
3. Excavation of cofferdam	80
4. Tunnelling, including removal of spoil	70
5. Reinstatement	76

The highest activity noise levels are caused by piling works, which are anticipated to be undertaken for up to 9 days (Monday-Friday only) in each location.



4.3 Predicted Noise Levels at NSRs

Predicted construction noise levels at nearby NSRs for each activity are shown in Table 4-2. These levels take into account the various correction factors described above. Hard ground has been assigned for all NSRs due to the residential location. Existing solid property boundary walls near to NSR1, NSR2 and NSR3 have been assumed to give a small noise reduction of 5 dB(A). NSR4 and NSR5 have line-of-sight to the works with no screening. NSR4 and NSR5 have been excluded from the assessment of removal of soil during tunnelling activities as these activities are expected to be undertaken at Caenant Terrace.

The predicted noise levels in Table 4-2 are worst-case noise level for each construction activity. Noise levels exceeding the threshold value for potential significant effects are coloured red.

Table 4-2 – Predicted Construction Noise Levels (dB L_{Aeq,10hr}) at Nearby NSRs

NSR	Excavation of road surface	Sheet Piling	Excavation of cofferdam	Tunnelling	Reinstatement
NSR1	78	80	75	65	71
NSR2	68	70	65	55	61
NSR3	73	75	70	60	66
NSR4	83	85	80	N/A	76
NSR5	79	81	77	N/A	72

*Noise levels have been predicted based on a 10-hour working day.

4.4 Assessment of Potential Significant Effects

Construction noise levels are predicted to exceed the threshold value for potential significant effects at all NSRs, due to their close proximity to the construction works. Piling and ground excavation activities are predicted to create the highest noise levels; however, the combined duration of excavation and piling activities is not expected to exceed the temporal threshold of 10 days in any 15-day consecutive period at either site. Consequently, noise from the construction activities is not expected to cause a significant effect.

Noise from the construction works should be minimised through the implementation of the mitigation and control measures set out in Section 6.

4.5 Assessment of Construction Traffic

Construction traffic noise levels are determined using methodology given in the Calculation of Road Traffic Noise (CRTN, Department for Transport Welsh Office, 1988). Using the guidance provided in CRTN, Basic Noise Levels (BNL) are calculated with and without the contribution of construction traffic on the public roads. The BNL is a reference noise level at 10 metres from the road edge only taking into account traffic volume, speed and percent HDV. Comparing the BNL with and without construction traffic on public roads provides an assessment of the potential change in noise along public roads that construction traffic is expected to use.



There will be additional traffic associated with the Scheme in the form of additional staff vehicles, vans and HDVs servicing site during the construction stage. Most of these vehicles are expected to be HDVs. The table below presents the number of additional HDVs for construction traffic noise levels to exceed the DMRB LA 111 criteria (see section 3.3) of a 1.0 dB BNL increase on public roads.

Table 4-3: Indicative Construction Traffic Noise Assessment

	AADT	% HDV	Number of HDVs	Speed Limit (mph)	BNL (dB L _{A10,18h})	Change in Noise Level (dBA)
Existing	11,067	1.0	116	40	68.7	1.0
Including construction traffic	11,396	3.9	445	40	69.7	

Table 4-3 shows that an additional 329 HDVs would be needed to increase the prevailing BNL by 1.0 dB L_{A10,18h}. Therefore, as less than 100 HDVs are expected to access the site via the A4230 per day, construction traffic on this road would bring about a negligible change in road traffic noise. According to DMRB LA 111, a negligible magnitude of change in the short-term will not cause changes to behaviour or response to noise and as such, will not give rise to a likely significant effect.

4.5.1 Assumptions and Limitations

To determine the Basic Noise Level (BNL) change, the level of road traffic noise from the road network has been predicted using publicly available, historic traffic data. That is, the Department for Transport's website (<https://roadtraffic.dft.gov.uk>).

To determine the BNL in accordance with CRTN, the Annual Average Daily Flow (AADF) has been used as a proxy for the Annual Average Weekday Traffic (AAWT) flow.

It has been assumed that all construction related traffic will enter the site via the A4230 and that the speed limit on this road is 40mph. The operation of the Scheme is expected to cause minimal noise and therefore, apart from occasional inspections, no site related traffic is expected. Finally, it has been assumed that all additional site traffic comprise HDVs.



5. Construction Vibration Assessment

The main activities likely to result in significant levels of vibration are piling and tunnelling activities, which have been assessed in this section.

5.1.1 Tunnelling Activities

Tunnel excavation involves dissipation of energy into the ground which gives rise to groundborne vibration. It is understood that tunnel boring activities will be undertaken for a period of 8 weeks using a 1.2m diameter micro tunnel boring machine (TBM), that is expected to operate at approximately 4.75m below ground level. The tunnelling route is shown on the site location plan in Figure 1-1.

Although Annex E of BS 5228-2 outlines a method for predicting vibration from tunnelling activities, it is based on tunnel boring machines that are considerably larger than those proposed for this project. Consequently, the method would significantly overestimate the resulting peak particle velocity (PPV). To provide more appropriate guidance, reference has been made to source data in Transport Research Laboratory Report 429, *Groundborne Vibration Caused by Mechanised Construction Works* (TRL 429) for the tunnelling activities.

Existing vibration levels from micro TBMs have been assessed² and it is understood that the resultant PPV from TBM operations will be 0.05 mm/s at a distance of 10m. This level is not considered perceptible, although it is expected that groundborne noise might be audible and vibration might be felt when the TBM is operating right underneath the property. As the TBM activity is not expected to last more than one day close to or directly underneath any one property, vibration from tunnelling activities is not expected to cause a significant impact.

Section 6 provides mitigation and control measures that should be considered to minimise vibration impacts as far as reasonably practicable.

5.1.2 Piling Activities

The assessment below accounts for where the piling works are at their closest to sensitive building receptors. Therefore, the overall duration of exposure to the predicted vibration levels will be limited. The predicted 'steady state' Peak Particle Velocity (PPV) levels in mm/s are shown in Table 5-1.

Table 5-1 - Predicted Peak Particle Velocities (PPV) in mm/s for Steady State Vibratory Piling

Building Receptors	Distance from Piling (m)	Predicted Vibration Velocity (mm/s PPV)*
NSR1	10m	5.0
NSR2	30m	1.1
NSR3	17m	2.4
NSR4	10m	5.0
NSR5	15m	2.8

² Highways Agency, Groundborne Vibration Caused by Mechanised Construction Works, TRL Report 429, (May 2000) Page 66



*with 33% probability confidence

The calculations show that the closest receptor surrounding the cofferdams have predicted vibration levels above the human comfort criteria. While such vibrations may be perceptible, they are expected to be tolerable provided residents receive prior notice and a clear explanation. There is no predicted exceedance of the building damage criteria.

During start up and run-down there may be periods during which a higher vibration than predicted above could occur, but these periods will be brief. Vibration levels generated by the wider construction activities (i.e. other than piling) will be lower than those predicted above.

Section 6 provides mitigation and control measures that should be considered to minimise vibration impacts as far as reasonably practicable.



6. Mitigation Measures

6.1 Community Liaison

An important element of the proactive approach to limiting the potential significant effects is to ensure that the public and residents are kept fully informed over the scale and nature of the works, when they are to take place, and whom to contact if disturbed by the construction activities. To ensure good community engagement for the project, a letter drop would be recommended to be undertaken in the locality, informing residents of the programmed works and its schedule. Residents would be made aware of the contact number to call in case of any disturbances caused during construction period.

6.2 Best Practicable Means (BPM)

Best Practicable Means (BPM) are defined in Section 72 of the Control of Pollution Act 1974 and Section 79 of the Environment Protection Act 1990 as those measures which are 'reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications'.

BPM should be applied during the construction works to minimise noise at neighbouring residential properties and other sensitive receptors arising from the works whilst having due regard to the practicability and economic implication of any control or mitigation measure.

There are many general measures that can reduce noise levels at source, and the following are examples of items that are considered under BPM:

- Avoid unnecessary revving of engines and switch off equipment when not in use;
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise;
- Minimise drop height of materials;
- Start-up plant and vehicles sequentially rather than all together;
- Exhaust silencing and plant muffling equipment should be fitted and maintained in good working order;
- Each item of plant used should be selected so as to comply with the noise limits quoted in the relevant European Commission Directive 2000/14/EC/United Kingdom Statutory Instrument (SI) 2001/1701 as transposed into UK legislation by the Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001/1701;
- Consideration should be given to the recommendations set out in Annex B of BS 5228-1, noise sources, remedies and their effectiveness;
- Equipment should be well maintained and where possible should be used in the mode of operation that minimises noise;
- Semi-static equipment should be sited and orientated as far as is reasonably practicable away from building receptors and, where feasible, will be fitted with suitable enclosures or screened using temporary noise barriers;
- Vibratory sheet piling which generates less vibration compared to percussive impact piling.
- All appropriate personnel should be instructed on BPM measures to reduce noise and vibration as part of their induction training and followed up by 'tool-box' talks;



- The movement of plant onto and around the site should have regard to the normal operating hours of the site and the location of any noise sensitive premises as far as is reasonably practicable.
- Utilise temporary local acoustic barriers (such as Heras fencing with acoustic blankets), where practicable, close around noisy activities and plant such as breakout and piling.



7. Conclusion

A construction noise and vibration assessment has been undertaken for the Skewen Flood Alleviation Works.

The desk-top assessment identified a number of nearby noise sensitive receptors, with the closest approximately 10m from works. These receptors are expected to experience existing ambient noise levels of between 55 - 65 dB $L_{Aeq,16hr}$ based on local noise mapping data.

The construction noise assessment showed that there is potential for the identified NSRs to experience adverse noise impacts. However, the predicted noise levels are expected to be sufficiently short in duration, therefore, the temporal thresholds for a significant effect are not expected to be exceeded.

The vibration assessment showed that the closest receptor surrounding the cofferdams have predicted vibration levels above the human comfort criteria. While such vibrations may be perceptible, they are expected to be tolerable provided residents receive prior notice and a clear explanation. There is no predicted exceedance of the building damage criteria.

The findings of the indicative construction traffic assessment are that a negligible change in road traffic noise is expected for receptors on the. According to DMRB LA 111, a negligible magnitude of change in the short-term will not cause changes to behaviour or response to noise and as such, will not give rise to a likely significant effect.

Noise and vibration mitigation measures to minimise any potential adverse effects as far as reasonably practicable are outlined in Section 6.



APPENDICES

Appendix A. Glossary of Acoustic Terms

Table A-1 – List of Common Acoustic Terms

Acoustic term	Explanation
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
dB	Decibel. The unit of sound level.
dBA or dB(A)	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear
$L_{Aeq,T}$	The A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. It is the level of a continuous noise that has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. The suffix "T" represents the time interval over which the sound level is determined, e.g. "15min" represents a period of 15 minutes.
$L_{A90,T}$	The A-weighted sound level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background sound level. The suffix 'T' represents the time interval over which the sound level is determined, e.g. '15 min' represents a period of 15 minutes.
$L_{AFmax,T}$	The A-weighted maximum sound level. The highest level that occurs over a time interval 'T', with a specified time weighting. Typically used time weightings are fast 'F' (with 125 ms duration used to establish the sound level) and slow 'S' (1 s duration), resulting in $L_{AFmax,T}$ and $L_{ASmax,T}$ measurements respectively. The suffix 'T' represents the time interval over which the sound level is determined, e.g. '15 min' represents a period of 15 minutes.
L_{WA}	A-weighted sound power level. This is a measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.



Appendix B. Construction Activity Noise

Table B-1 – Construction Activities, Associated Plant and Assumed Sound Pressure Levels at 10m

Activity	Plant	BS 5228 Reference (Table and Ref No.)	A-Weighted Sound Pressure Levels @ 10m dB(A)	Assumed “on-time” %
Excavation of road surface	Petrol road saw	C4 #71	85	50%
	3t Dumper	C4 #9	77	10%
	Mini excavator with hydraulic breaker	C5 #2	83	10%
	5t Dumper	C3 #1	78	10%
Sheet Piling - Vibratory	Vibratory sheet piling rig	C3. #8	88	50%
Excavation of cofferdam	Generator	C4. #86	65	100%
	3t Dumper	C4 #9	77	10%
	5t Dumper	C3 #1	78	10%
	Road lorry	C11 #5	71	10%
	Water pump	C2 #45	62	100%
	Excavator - 30T	C3 #16	75	75%
Tunnelling, including removal of spoil	Mobile telescopic crane	C4 #46	67	50%
	Road lorry	C11 #5	71	10%
	Cement mixer truck (idling)	C4 #19	71	10%
	3t Dumper	C.4 #9	77	10%
	5t Dumper	C3 #1	78	10%
Reinstatement	Asphalt paver (+ tipper lorry)	C5. #30	75	25%
	Roller	C2 # 38	73	25%
	Lorry	C2 #34	80	25%



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