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BMA SSAS

JOLLY TAR DEVELOPMENT

NOISE AND VIBRATION ASSESSMENT REPORT

JANUARY 2017

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BMA SSAS

JOLLY TAR DEVELOPMENT

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JANUARY 2017

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CA11144-001 Noise Monitoring Locations Plan

1 INTRODUCTION

- 1.1.1 Wardell Armstrong LLP was commissioned by BMA SSAS Ltd to undertake a noise and vibration assessment to support a planning application. The application is for a proposed commercial office development on land currently occupied by a derelict pub - The Jolly Tar. The proposed location for the site is shown on drawing no. CA11144-001 – Noise Monitoring Locations Plan.
- 1.1.2 The proposed development site is located in Carmarthen, Wales at grid reference SN 419218 and is currently occupied by the Jolly Tar Pub. The north of the site is bordered by Coracle way which lies directly adjacent to Little Bridge Street. There are a number of residential properties located on Little Bridge Street. To the east of the site lies Towy Works Ltd, a builders merchant. The south of the site is bordered by the Quay, which lies directly adjacent to the Towy River. Beyond Towy River lies Carmarthen train station. To the west of the site lies existing office buildings.
- 1.1.3 The report comprises an assessment of potential noise and vibration impacts upon existing dwellings from the construction and operational phase of the proposed development. The report assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations for mitigation as appropriate.

2 ASSESSMENT METHODOLOGY

2.1 Consultation and Scope of Works

2.1.1 Wardell Armstrong LLP was commissioned to undertake a noise and vibration assessment in support of an outline planning application for a proposed commercial office development on land currently occupied by the Jolly Tar.

2.1.2 Prior to preparing the full planning application for the development, pre-application advice was sought from Carmarthenshire County Council. Steven Williams, the Environmental Health Practitioner at Carmarthenshire County Council highlighted the requirement for a noise and vibration assessment of the construction phase of the development and a noise assessment of the operational phase of the development.

2.1.3 WA undertook consultation with Steven Williams who then agreed the scope of the noise and vibration assessment works during a telephone call on 13th January 2017.

2.2 Noise Surveys

2.2.1 On 16th January 2017 an attended noise survey was undertaken at 1 location considered representative of noise levels at the existing noise sensitive receptors closest to the proposed development. This data has been used to inform the noise assessment. The noise survey is discussed in Section 3 of this report.

2.3 Assessment Methodology Adopted

2.3.1 Potential noise and vibration issues that are addressed as part of this assessment are as follows:

- Noise from proposed air conditioning equipment associated with the development; and
- Noise and vibration from construction of the development.

2.3.2 This noise and vibration assessment considers the suitability of the site for the proposed uses, and takes into account current guidance including:

- Planning Policy Wales, January 2016;
- The World Health Organisation Guidelines for Community Noise, 1999 (WHO);
- British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS8233);

- British Standard 4142:2014, Methods for rating and assessing industrial and commercial sound (BS4142).
- British Standard 6472-1:2008: Guide to Evaluation of Human Exposure to Vibration in Buildings – Vibration sources other blasting;
- BRE Controlling particles, vapour and noise pollution from construction sites, Parts 1 to 5, 2003;
- British Standard 5228-1 & -2:2009 + A1 2014 ‘Noise and Vibration Control on Construction and Open Sites’;

Planning Policy Wales

2.3.3 Planning Policy Wales (PPW) is the current planning policy guidance within Wales. The planning guidance defines the objectives for PPW. These are detailed in paragraph 13.1.2;

‘The Welsh Government’s objectives are to:

- *maximise environmental protection for people, natural and cultural resources, property and infrastructure; and,*
- *prevent or manage pollution and promote good environmental practice.’*

2.3.4 In particular reference to noise Paragraph 13.13.1 of the PPW states:

‘Noise can affect people’s health and well-being and have a direct impact on wildlife and local amenity. Noise levels provide an indicator of local environmental quality. The objective of a policy for noise is to minimise emissions and reduce ambient noise levels to an acceptable standard. Noise Action Plans, drawn up by the Welsh Ministers in relation to Wales under the Environmental Noise Directive, and the Wales Regulations, aim to prevent and reduce environmental noise where necessary and preserve environmental noise quality where it is good. They are a planning consideration in the use and development of land.’

Guidance Noise Levels at Proposed Sensitive Receptors

2.3.5 The WHO Guidelines for Community Noise 1999 suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set, based on the lowest effect levels for general populations. Guideline values for

annoyance which relate to external noise exposure are set at 50 or 55 dB(A), representing day time levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed respectively.

2.3.6 The following guideline values are suggested by WHO:

- 35 dB $L_{Aeq(16 \text{ hour})}$ during the day time in noise sensitive rooms
- 30 dB $L_{Aeq(8 \text{ hour})}$ during the night time in bedrooms
- 45 dB $L_{Amax(fast)}$ during the night time in bedrooms
- 50 dB $L_{Aeq(16 \text{ hour})}$ to protect majority of population from becoming moderately annoyed
- 55 dB $L_{Aeq(16 \text{ hour})}$ to protect majority of population from becoming seriously annoyed

2.3.7 British Standard 8233 'Guidance on sound insulation and noise reduction for buildings', 2014 bases its advice on the WHO Guidelines. In addition, for internal noise levels it states;

"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

British Standard 4142:2014, Methods for rating and assessing industrial and commercial sound (BS4142):

2.3.8 BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

2.3.9 The standard is applicable to the determination of the following levels at outdoor locations:

- rating levels for sources of sound of an industrial and/or commercial nature; and

- ambient, background and residual sound levels, for the purposes of:
 - 1) Investigating complaints;
 - 2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
 - 3) Assessing sound at proposed new dwellings or premises used for residential purposes.

2.3.10 The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

2.3.11 BS4142 refers to noise from the industrial source as the 'specific noise' and this is the term used in this report to refer to noise which is due to activities associated with the proposed air conditioning equipment associated with the development.

2.3.12 BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}). Section 3 of this report provides details of the background noise survey undertaken.

2.3.13 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

2.3.14 The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB 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.

2.3.15 During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

2.3.16 Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

British Standard 6472 Part 1 - 2008, "Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting (BS6472-1).

2.3.17 Human perception of vibration is extremely sensitive. People can detect and be annoyed by vibration long before there is any risk of structural damage. Cases where damage to a building has been attributed to the effects of vibration alone are extremely rare, even when vibration has been considered to be intolerable by the occupants.

2.3.18 It is not possible to establish exact vibration damage thresholds that may be applied in all situations. The likelihood of vibration induced damage or nuisance will depend upon the nature of the source, the characteristics of the intervening solid and drift geology and the response pattern of the structures around the site. Most of these variables are too complex to quantify accurately and thresholds of damage, or nuisance, are therefore conservative estimates based on a knowledge of engineering.

2.3.19 Where ground vibration is of a relatively continuous nature, there is a greater likelihood of structural damage occurring, compared to transient vibration; for example that caused by transiting vehicles.

2.3.20 With regard to structural response to vibration it is known that actual damage to structures or their finishes due solely to vibration is rare, and that where damage is noted it is often incorrectly ascribed to vibration.

2.3.21 The response of a building to vibration depends upon the type of foundation the building has, the underlying ground conditions, the building construction and the state of repair of the building.

2.3.22 BS6472-1 (2008) provides guidance regarding the significance of VDV values within buildings in terms of human response, as detailed in Table 1.

Table 1: Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings			
Place and time	Low probability of adverse comment $m/s^{-1.75}$ *	Adverse Comment possible $m/s^{-1.75}$	Adverse Comment Probable $m/s^{-1.75}$**
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

*Below these ranges adverse comment is not expected

**Above these ranges adverse comment is very likely

Noise from Earthworks and Construction Phase Activities

2.3.23 The activities associated with the earthworks and construction phase of the proposed development will have the potential to generate noise and create an impact on the surrounding area.

2.3.24 Guidance on the prediction and assessment of noise from development sites is given in British Standard 5228 -1:2009 “Code of Practice for noise and vibration control on construction and open Sites – Part 1: Noise” (BS5228-1), and BRE Controlling particles, vapour and noise pollution from construction Sites, Parts 1 to 5, 2003.

2.3.25 For the purposes of this assessment, the occupants of residential properties on Little Bridge Street are considered to be the receptors most likely to be affected by the construction phases of the proposed development. A noise impact at all other existing sensitive receptors may be felt, but will be less than the assessed locations. Details of the receptors are set out in Table 2.

Table 2 Noise Sensitive Receptor Locations						
Receptor	Address	Receptor Type	Grid Ref		Bearing from Site	Approximate Distance to Site Boundary
			Easting	Northing		
ESR 1	Little Bridge Street	Residential	241179	219918	North	22.5m

- 2.3.26 The enabling and construction works will be restricted to daytime hours, defined by the local authority. The appropriate category value has been determined for the sensitive receptors in the immediate vicinity of the site, based on the ambient noise levels measured during the daytime period, as detailed in Table 4. Details of the noise survey carried out at the sensitive receptors are set out in this report.
- 2.3.27 In addition to the guidance from the local authority, the Control of Pollution Act 1974 (COPA 1974) gives the local authority power to serve a notice under Section 60 imposing requirements as to the way in which works are to be carried out. This could specify times of operation, maximum levels of noise which should be emitted and the type of plant which should or should not be used.
- 2.3.28 However it might be preferable for the chosen contractor to obtain prior consent under Section 61 of COPA 1974. Section 61, enables anyone who intends to carry out works to apply to the local authority for consent. Under Section 61 the local authorities and those responsible for construction work, have an opportunity to settle any problems, relating to the potential noise, before work starts.
- 2.3.29 In addition to COPA 1974, BS5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of large projects. For the purposes of this noise assessment, the noise likely to be generated by the earthworks and construction phase, have been assessed against significance criteria established, using the BS5228-1 ABC Method.
- 2.3.30 The ABC method for determining significance criteria requires the ambient noise levels at existing sensitive receptors to be determined. The ambient noise levels at each existing receptor location are then rounded to the nearest 5dB(A) to determine the appropriate threshold value in accordance with the category value A, B or C, as detailed in Table 3.

Table 3: Thresholds of Significant Impact from Construction Noise at Residential Receptors in accordance with the ABC Method of BS5228-1			
Assessment Category and Threshold Value Period (LAeq)	Threshold Value, in decibels (dB)		
	Category A *1	Category B *2	Category C *3
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	65	70	75
*1 Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.			
*2 Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
*3 Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.			

2.3.31 The noise level likely to be generated at the receptors during the construction phase, i.e. the ambient noise level plus construction noise, is then compared to the appropriate category value. If the noise level is greater than the appropriate category value, a significant noise impact may be registered.

Vibration from Construction Plant and Vehicles

2.3.32 Work involving heavy plant on an open site is likely to generate vibration and nearby properties may experience ground-borne vibration.

2.3.33 Guidance on the assessment of vibration from development sites is given in British Standard 5228 -2:2009 “Code of Practice for noise and vibration control on construction and open sites – Part 2: Vibration” (BS5228-2). BS5228-2 2009 indicates that vibration can have disturbing effects on the surrounding neighbourhood; especially where particularly sensitive operations may be taking place. The significance of vibration levels which may be experienced adjacent to a site is dependent upon the nature of the source.

2.3.34 It is not possible to mitigate vibration emissions from an open site. It is important therefore to examine the proposed working method to ascertain what, if any, operations would be likely to cause unacceptable levels of vibration at nearby sensitive locations. It is possible that these operations could be modified to reduce their vibration impacts.

2.3.35 BS5228-2 indicates that the threshold of perception is generally accepted to be between a peak particle velocity (PPV) of 0.14 and 0.3mm/sec. In an urban situation it is unlikely that such vibration levels would be noticed. BS5228 also indicates that it is likely that vibration of 1.0 mm/s in residential environments will cause complaint,

but can be tolerated if prior warning and explanation have been given to residents. The standard also indicates that 10 mm/s is likely to be intolerable for any more than a very brief exposure to this level.

- 2.3.36 The Highways Agency Research report No. 53 “Ground Vibration caused by Civil Engineering Works” 1986 suggests that, when vibration levels from an unusual source exceed the human threshold of perception, complaints may occur. The onset of complaints due to continuous vibration is probable when the PPV exceeds 3mm/sec.
- 2.3.37 British Standard BS6472: 2008 “Guide to Evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting” (BS6472-1) suggests that adverse comments or complaints due to continuous vibration are rare in residential situations below a PPV of 0.8mm/sec. Continuous vibration is defined as “vibration which continues uninterrupted for either a daytime period of 16 hours or a night-time period of 8 hours”. The proposed earthworks and construction works at the site will not cause continuous vibration as defined in BS6472-1.
- 2.3.38 Human perception of vibration is extremely sensitive. People can detect and be annoyed by vibration before there is any risk of structural damage. Cases where damage to a building have been attributed to the effects of vibration alone are extremely rare; even when vibration has been considered to be intolerable by the occupants.
- 2.3.39 It is not possible to establish exact vibration damage thresholds that may be applied in all situations. The likelihood of vibration induced damage or nuisance will depend upon the nature of the source, the characteristics of the intervening solid and drift geology and the response pattern of the structures around the site. Most of these variables are too complex to quantify accurately and thresholds of damage, or nuisance, are therefore conservative estimates based on a knowledge of engineering.
- 2.3.40 Where ground vibration is of a relatively continuous nature, there is a greater likelihood of structural damage occurring, compared to transient vibration; for example that caused by transiting vehicles.
- 2.3.41 BS5228-2 2009 suggests that the onset of cosmetic damage is 15mm/sec (15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz for residential or light commercial type buildings).

3 NOISE AND VIBRATION SURVEY

3.1 Noise Survey

3.1.1 Wardell Armstrong LLP carried out a noise survey at the development site on the 16th January 2017.

3.1.2 Attended noise measurements were taken at one monitoring location (shown on drawing No. CA11144-001). Location 1 is considered representative of the existing residential receptors closest to the proposed development. The monitoring location is as follows:

- Monitoring Location 1: Adjacent to existing noise sensitive receptors on Little Bridge Street, approximately 3.5m from Coracle Road and 18m from the northern site boundary

3.1.1 As the operational and construction hours of the proposed development will be during the daytime only, a night-time survey and assessment has not been carried out. For the purpose of this assessment daytime hours are taken to be 0700 to 2300 hours and night-time hours to be 2300 to 0700 hours.

3.1.2 Attended noise monitoring was carried out at location 1 on the 16th January 2017. Monitoring was undertaken between 1116 and 1416 at the existing noise sensitive receptors closest to the proposed development. These hours are considered to be representative of the existing background noise levels during the quieter part of the day when construction and operational hours of the proposed development are likely to be.

3.1.3 The noise measurements were made using a Class 1, integrating sound level meter. The sound level meter was mounted vertically on a tripod 1.5m above the ground and more than 3.5 metres from any other reflecting surfaces.

3.1.4 Noise monitoring took place during dry and calm weather conditions. The sound level meter was calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No drift in calibration over 0.5dB was measured during the survey.

3.1.5 A-weighted¹ L_{eq} ² and maximum noise levels were measured to comply with the requirements of WHO. The L_{90} ³, L_{10} ⁴ and minimum sound pressure levels were also measured to provide additional information. The measured noise levels are set out in full in Appendix A.

3.1.6 During the survey observations were made of the significant noise sources which contribute to the noise levels at the site. The observations identified the following:

Road Traffic Noise: Road noise from Coracle Road and the surrounding road network was audible throughout the survey.

Other Sources: Passing pedestrians were occasionally audible.

¹ A' Weighting An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions

² L_{eqs} Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

³ L_{90} The noise level which is exceeded for 90% of the measurement period.

⁴ L_{10} The noise level which is exceeded for 10% of the measurement period.

4 NOISE IMPACT ASSESSMENT

4.1 Existing Noise Levels

4.1.1 The individual measured levels have been arithmetically averaged to give a single daytime noise level at monitoring location 1.

4.1.2 The average daytime noise level at the monitoring location is presented in Table 4.

Time	Monitoring Location	Average Measured Noise Level (Figures in dB L _{Aeq})
0700-2300	1	71.9

4.1.3 Based on the results obtained, a robust assessment can be made of the noise levels at the existing noise sensitive receptors closest to the proposed development and of the mitigation measures necessary to achieve the required noise levels during the daytime.

4.2 Construction Phase Assessment

Noise from Earthworks and Construction Phase Activities

4.2.1 During the earthworks and construction phase, any work carried out at the proposed development is likely to generate noise that may propagate beyond the site boundary.

4.2.2 The daytime measured noise levels, from the baseline noise survey representative of the existing sensitive receptors in the vicinity of the site, have been provided below in Table 5.

Receptor	Measured Noise Levels (dB L _{Aeq})	Ambient Noise Level Rounded to the nearest 5dB(A) (dB L _{Aeq})	Appropriate Category Value A, B or C in accordance with BS5228-1	Noise Level above which activities of the Construction Phase may cause a significant impact at the Receptor (dB L _{Aeq})
ESR 1 (Monitoring Location 1)	71.9	70	C	75

4.2.3 The noise assessment for the construction phase details baseline daytime noise levels measured at sensitive receptor locations and outlines the main construction activities

that could give rise to noise impacts at receptors in the vicinity of the proposed development. It also sets out details of 'best practice' management and control measures to ensure that impacts are minimised as far as possible.

- 4.2.4 At this stage, detailed information regarding the nature and timescales of activities likely to take place during the earthworks and construction phase is not known. Activities on the site, which could give rise to construction noise impacts include (but are not limited to):
- Site preparation i.e. building demolition, ground excavation, levelling of ground, trenching, trench filling, unloading and levelling of hardcore and compacting filling; and
 - Construction of the proposed redevelopment including piling, construction of access roads, fabrication processes e.g. planing, sanding, routing, cutting, drilling and laying foundations.
- 4.2.5 Construction vehicle movements to and from the proposed development have the potential to generate noise at existing sensitive receptors, in the immediate vicinity of the local road network.
- 4.2.6 At this stage, detailed traffic data relating to the likely numbers of construction vehicles is not available. However, the number of construction vehicles is not considered to be significant relative to the existing flows on the road links surrounding the site. It is therefore considered that the level of road traffic noise at sensitive receptor locations will not change significantly, due to construction vehicles, during the construction phases of the proposed development and this impact has not therefore been considered further.
- 4.2.7 The contractor undertaking the enabling and construction works has not yet been appointed. However, it is considered that the enabling and construction works are likely to be restricted to daytime hours, i.e. between 08:00 and 17:00 hours Monday to Friday and 08:00 to 13:00 hours on a Saturday, with no work on Sunday and Bank Holidays. Based on the ambient noise levels measured during the daytime period, the appropriate category value has been determined for the sensitive receptors, as detailed in Table 5.
- 4.2.8 Some of the demolition works may need to be carried out during weekend hours outside of those described above, however any demolition works carried out outside of these hours will not require the use of any loud machinery or equipment.
- 4.2.9 The earthworks and construction phase activities have the potential to generate short

term increases in noise levels, above those recommended in BS5228-1. The levels of noise received at the receptors closest to the proposed development would depend on the sound power levels of the machines used, the distance to the properties, the presence of screening or reflecting surfaces and the ability of the intervening ground to absorb the propagating noise.

4.2.10 The distance between the nearest noise sensitive receptor, ESR1, and noise sources associated with construction works, will vary depending on the phase of the proposed development under construction. Given the potentially small distances between the construction activities and receptor, noise levels may occur above those detailed in Table 5. The noise generated by the earthworks and construction phases of the proposed development may therefore exceed Category C in BS5228 at the existing and proposed sensitive receptors located in the immediate vicinity of the construction phases of the proposed development.

4.2.11 It is therefore recommended that mitigation measures be put in place that will reduce the scale of the potential effect. These measures are described in section 5 of this report.

Vibration from Earthworks and Construction

4.2.12 Wardell Armstrong’s archives contain field trial measurements of ground vibration associated with types of plant likely to be used at the proposed development. The representative, measured levels, made by Wardell Armstrong using a Vibrock B801 Digital Seismograph, are set out in Table 6.

Table 6: Measured Vibration Levels of Plant Under normal Operating Conditions			
Plant Type	Distance from Source		
	10m (mm/s)	20m (mm/s)	30m (mm/s)
25-30 tonne excavator	0.175	0.075	Background
25 tonne dumptruck (Volvo A25)			
Loaded	1.000	0.150	Background
Empty	0.225	0.050	Background
Dozer	1.050	0.400	Background
Vibrating roller Drum			
Vibrator on	4.470	3.270	2.350
Vibrator off	0.500	0.150	0.050
Loading shovel	1.025	0.150	Background

4.2.13 The distance between nearest noise sensitive receptors, ESR1, and vibration sources associated with construction works, will vary depending on the phase of the proposed

development under construction. As a worst case scenario, earthworks and construction works may potentially take place at a distance of approximately 22m metres from existing residential properties.

4.2.14 At this distance, it is possible that vibration due to the operation of various construction plant, and in particular a vibratory roller, may be above the threshold of complaint. However, the vibration levels are highly unlikely to be above the threshold of structural damage. It is possible that residential properties would therefore potentially experience some adverse impact. However these would be transient only and for very limited periods during the works, i.e. when activities take place at the proposed development boundaries.

4.2.15 In addition to the earthworks and construction works described, it is possible that piling will be required. At this time, the type(s) of piling which would be used at various locations across the site is not known and it is likely that the contractor responsible for undertaking the works at the site would decide the method of piling.

4.2.16 BS5228-2 recognises that the most common form of vibration associated with piling is the intermittent type derived from conventional driven piling. The intensity of vibration disturbance, which may be registered at a receptor, will be a function of many factors. These are set out in BS5228-2 and include:

- Energy per blow or cycle;
- Distance between source and receptor;
- Soil structure interaction i.e. nature of connection between soil and structure being monitored; and
- Construction of structure and location of measuring points e.g. soil surface, building foundation and internal structural element.

4.2.17 As the responsible contractor has not yet been appointed, detailed information regarding the above is not known. It is not therefore possible to assess the potential impacts of vibration generated by piling.

4.2.18 The receptors likely to be affected by piling will vary depending on the phase of the proposed development under construction. Once the precise building locations, ground conditions for each location and type(s) of piling are confirmed, vibration levels could be estimated and recommendations for control made as appropriate. Therefore, at this stage of the development mitigation measures have not been suggested.

4.3 BS4142 Assessment of Air Conditioning Equipment Associated with the Proposed Development

- 4.3.1 The operation of the proposed air conditioning associated with the proposed development may have the potential to impact noise levels at the existing noise sensitive receptors on Little Bridge Street.
- 4.3.2 The air conditioning will only be running during the daytime, therefore only a daytime (0700-2300) assessment has been carried out.
- 4.3.3 At this stage, the detailed information about the specific air conditioning equipment to be used is not available. However, for the purposes of this assessment calculations have been carried out in order to establish a maximum 'specific noise' level of the selected equipment to ensure that it meets the BS4142 requirements.
- 4.3.4 The noise monitoring data in Appendix A show that the lowest background noise level at the noise sensitive receptors on Little Bridge Street is 60.4dB(A).
- 4.3.5 BS4142 includes guidance on the application of an additional weighting which should be applied should the industrial noise be considered to be either tonal, impulsive, or intermittent at the existing sensitive receptor. It is considered likely that the air conditioning equipment will be tonal in nature, therefore, in accordance with BS4142, a 2dB weighting should be applied to calculate the maximum 'specific noise' level of the proposed equipment.

BS4142 Assessment - Daytime

- 4.3.6 In accordance with BS4142, a maximum 'specific noise' level for the proposed air conditioning equipment has been calculated taking into account the following:
- Existing background noise levels at the noise sensitive receptors;
 - Tonal weighting; and
 - The distance between the proposed development and the existing noise sensitive receptors.
- 4.3.7 The results of the calculations are shown in table 8 below.

Description	(Figures in dB(A))
Background Noise level at Monitoring Location 1	60.4
Tonal Acoustic Feature Correction	-2
Distance correction	+3
Maximum 'Specific Noise' level to remain below 0dB excess of rating level over Background level	61.4

Summary of the BS4142 Assessment

- 4.3.8 In order to satisfy the BS4142 requirements, the selected air conditioning equipment should have an associated sound pressure level below 61.4dB(A) measured at 10m from the plant. If the selected air conditioning equipment has a sound pressure level below 61.4dB(A) it will cause a **low impact** at existing noise sensitive receptors during the daytime and no mitigation would be required.
- 4.3.9 It is likely that the selected equipment will have an associated sound pressure level below 61.4dB(A), therefore no mitigation measures have been suggested.

5 ATTENUATION SCHEME

5.1 Construction Phase

- 5.1.1 The activities carried out during the earthworks and construction phase of the proposed development will have the potential to generate short term increases in noise levels above the recommended noise limits, set in accordance with current guidance. The use of heavy plant associated with the earthworks and construction works also has the potential to give rise to ground borne vibration.
- 5.1.2 To minimise the potential impact of construction works, mitigation measures would be put in place. These will include restrictions on working hours, the implementation of temporary screening where possible, and best working practices.
- 5.1.3 With the implementation of best working practice and restriction on working hours, the noise and vibration impacts of earthworks and construction phases, are expected to be negligible, with the possibility of brief periods of slight to moderate impacts in the short term at local level.

6 CONCLUSIONS

6.1 Construction Phase

- 6.1.1 The activities carried out during the earthworks and construction phase of the proposed development will have the potential to generate short term increases in noise levels above the recommended noise limits, set in accordance with current guidance. The use of heavy plant associated with the earthworks and construction works also has the potential to give rise to ground borne vibration.
- 6.1.2 To minimise the potential impact of construction works, mitigation measures would be put in place. These will include restrictions on working hours, the implementation of temporary screening where possible, and best working practices.
- 6.1.3 With the implementation of best working practice and restriction on working hours, the noise and vibration impacts of earthworks and construction phases, are expected to be negligible, with the possibility of brief periods of slight to moderate impacts in the short term at local level.

6.2 Operational Phase

- 6.2.1 The dominant noise sources at the proposed development will be the air conditioning equipment.
- 6.2.2 It is not yet known the specific air conditioning equipment that will be used at the development therefore, in accordance with the BS4142 guidance a maximum sound pressure level for the proposed equipment has been calculated.
- 6.2.3 In order to satisfy the BS4142 requirements, the selected air conditioning equipment should have an associated sound pressure level below 61.4dB(A), measured at 10m from the plant.
- 6.2.4 It is likely that the selected equipment will have an associated sound pressure level below 61.4dB(A), therefore no mitigation measures have been suggested.
- 6.2.5 It is considered that the mitigation measures suggested within this assessment would provide an appropriate level of noise control to support approval of the planning application.

APPENDICES

Appendix A
Noise monitoring results

Appendix A
Noise Monitoring Results

Monitoring Location 1 – Adjacent to existing noise sensitive receptors on Little Bridge Street, approximately 3.5m from Coracle Road and 18m from the northern site boundary						
Time	L_{Aeq} (dB)	L_{A min} (dB)	L_{A max} (dB)	L_{A90} (dB)	L_{A10} (dB)	Comments
16/01/2017 - Daytime						
1116-1216	71.6	51.0	83.0	60.4	75.1	Constant traffic with short lulls. Occasional pedestrians. 1405 – vehicle reversing alarm Little Bridge Street
1216-1316	71.9	50.1	85.3	62.3	75.2	
1316-1416	72.1	52.4	82.5	61.2	75.6	

DRAWINGS



DO NOT SCALE FROM THIS DRAWING

REFERENCE

Site boundary ---

Noise monitoring location * **ML1**

REVISION	DETAILS	DATE	DRN	CHK'D	APP'D

CLIENT
BMA SSAS

PROJECT
JOLLY TAR DEVELOPMENT
CARMARTHEN

DRAWING TITLE
NOISE MONITORING LOCATION PLAN

DRG No.	CA11144-001	REV	
DRG SIZE	A3	SCALE	1:1250
DRAWN BY	RJH	CHECKED BY	RP
		APPROVED BY	AK

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