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MONCKTON DEVELOPMENTS LIMITED

FORMER MONCKTON COKE WORKS

NOISE AND VIBRATION ASSESSMENT REPORT

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AUGUST 2020

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Appendix B	Noise Monitoring Results

DRAWINGS TITLE

GM10833-001	Noise Monitoring Locations
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EXECUTIVE SUMMARY

Wardell Armstrong has undertaken a noise assessment to support an outline planning application for a residential development at the Former Monckton Coke Works, Royston.

Noise and vibration during the construction phase has the potential to affect the existing sensitive receptors directly to the north west of the proposed development. Best working practice measures should be implemented during each phase of the earthworks and construction works at the site and it is recommended that a noise management plan is drafted once the methodology and construction programmes have been finalised.

The dominant noise sources, which will potentially affect the residents of the proposed development, is road traffic on Lund Hill Lane and to a lesser extent, freight movements on the adjacent railway line.

The results of the assessment indicate that for the large majority of garden areas across the site, garden areas will not require any noise mitigation. However, at dwellings closest to the Lund Hill Lane, external living areas should be placed on the screened side of those dwellings. Alternatively, a 2.1m high close boarded fencing could be installed between the Lund Hill Lane and proposed garden areas.

Facades of dwellings across the development site, with no direct line of sight to Lund Hill Lane will likely achieve internal guideline noise levels even with windows open for ventilation.

However, facades of dwellings closest to and facing Lund Hill Lane will require standard, thermal double glazing and an alternative means of ventilation to remove the need to open windows for ventilation.

Proposed occupiers will not be exposed to unacceptably high noise levels, and the proposed development will meet the appropriate external and internal noise standards, with the use of mitigation where appropriate. The mitigation proposed is usual practice throughout the UK in areas such as this, and is in compliance with national planning policies.

The requirement for glazing and acoustic ventilation will be confirmed, on a plot by plot basis, at the detailed application/reserved matters stage.

1 INTRODUCTION

- 1.1.1 Wardell Armstrong was instructed by Monckton Developments Limited to undertake a noise assessment to support an outline planning application, for a residential development at the Former Monckton Coke Works, Royston.
- 1.1.2 The proposed development site is located at the former Monckton Coke Works, to the west of Royston. To the north, the site is bordered by open land. To the east and south, the site is bordered by Lund Hill Lane, with Rabbit Ings Country Park located beyond. The commercial premises of Naylor Pallets is also located to the east of the site, beyond Lund Hill Lane. To the west, the site is bordered by a railway line in cutting, with open land beyond.
- 1.1.3 It has been confirmed with GBfreights that the railway line is used only for freight trains, delivering glass sand to Ardagh Glass. The line is used up to three times per week, with a single inbound and outbound train on any day.
- 1.1.4 The proposed development site is 16.81ha in area. The development will comprise approximately 500 residential dwellings. The red line boundary is shown on drawing number GM10833-001.
- 1.1.5 A noise assessment report has been prepared in support of the outline planning application. It assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations for noise mitigation as appropriate. Vibration has been assessed for the construction phase of the development only.

2 ASSESSMENT METHODOLOGY

2.1 Scope of Works and Consultation

- 2.1.1 The scope of the noise assessment includes a consideration of noise at the proposed residential areas, specifically in terms of the potential impact of existing transportation noise and is in line with current guidance.
- 2.1.2 An email, requesting confirmation that noise data collected during a previous noise survey in 2017 would be suitable for a 2019 assessment, was sent to the Environmental Health Department at Barnsley Metropolitan Borough Council (BMBC) on the 17th September 2019.
- 2.1.3 Mr Paul Denton of BMBC replied via email on 17th October 2019, confirming that the 2017 noise data would be suitable for a 2019 assessment.
- 2.1.4 Following correspondence in 2019, pre-application advice was received on the 21st February 2020 relating to the development and noise assessment requirements. The pre-application advice received did not correspond with noise assessment methodology agreed with Mr Denton on the 17th October 2019. However, further correspondence with Mr Denton and Ms Elaine Ward, Senior Planning Office of BMBC was made to determine noise assessment requirements.
- 2.1.5 On the 27th April 2020, an email was sent to Ms Ward and Mr Denton which detailed the noise assessment methodology stating that the 2017 noise data would be used for the assessment of road traffic and railway noise, and an outline assessment of construction noise and vibration would be incorporated into the report.
- 2.1.6 On the 15th May 2020, an email was received from Ms Ward confirming she and Mr Denton were happy to agree the noise assessment methodology which was sent on the 27th April 2020.

2.2 Guidance and Standards

- 2.2.1 Noise from road traffic on Lund Hill Lane (B6428), the remaining local road network, rail noise from the railway line adjacent to the western boundary, and the potential impacts during the construction phase have been considered in accordance with current guidance as detailed below:
- National Planning Policy Framework, 2019 (NPPF);
 - Noise Policy Statement for England, 2010 (NPSE);

- Planning Practice Guidance - Noise, 2019 (PPG);
- Pro:PG Planning & Noise: Professional Practice Guidance on Planning and Noise, 2017 (ProPG);
- Department of Transport's technical memorandum Calculation of Road Traffic Noise 1998 (CRTN);
- British Standard 5228 -1:2009+A1:2014 "Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise" (BS5228-1);
- British Standard 5228-2:2009+A1:2014 "Code of Practice for noise and vibration control on construction and open sites – Part 2: Vibration" (BS5228-2); and,
- British Standard 8233: 2014 Guidance on Sound Insulation and noise reduction for buildings (BS8233).

2.2.2 Further details on the guidance and standards used in this assessment can be found in Appendix A.

2.3 Noise Survey

2.3.1 As part of this assessment, Wardell Armstrong LLP has carried out a survey to assess the current ambient noise levels at proposed receptor locations. The survey is discussed in Section 3 of this report.

2.3.2 Existing Sensitive Receptors

2.3.3 Three existing receptors have been identified as being most likely to be affected by noise from the construction phase, and any noise from proposed plant associated with the proposed development. Other receptors may be affected by noise from the development, however, the impact will be equal to, or less than, at the receptors identified. The existing sensitive receptors are shown in Table 1 below and on Drawing Figure 001.

Table 1 - Existing Construction Noise Sensitive Receptor Locations				
Receptor	Grid Reference		Bearing from Site	Distance from Site boundary
	X	Y		
ESR1	437528	412449	North of the development Boundary	90m
ESR2	437573	411944	East the proposed development boundary	15m

ESR3	437420	411732	South of the development boundary	15m
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3 NOISE SURVEY

- 3.1.1 On the 19th and 20th January 2017 Wardell Armstrong LLP carried out a noise survey to assess the noise levels at the proposed development site.
- 3.1.2 Unattended noise measurements were carried out at two monitoring locations, which are considered to be representative of proposed residential properties closest to Lund Hill Lane and the railway line. The monitoring locations are as follows, and are shown on Drawing Number GM10833-001:
- Monitoring Location 1: In the eastern part of the site, approximately 10m from Lund Hill Lane.
 - Monitoring Location 2: At the western site boundary of the site, and approximately 15m from the railway line.
- 3.1.3 At monitoring location 1, noise monitoring was carried out between 1517 hours on the 19th January and 1324 hours on the 20th January 2017. This included 3 hours of consecutive measurements between 1000 and 1300 hours, in accordance with the shortened measurement procedure in the Department of Transport's technical memorandum 'Calculation of Road Traffic Noise' 1988 (CRTN).
- 3.1.4 A 2m high wall runs along the eastern boundary of the site. Therefore, noise measurements at this location were carried out with the microphone mounted vertically on a tripod 4m above the ground, to negate the noise attenuation effect of the wall.
- 3.1.5 At monitoring location 2, noise monitoring was carried out between 1442 hours on the 19th January and 1337 hours on the 20th January 2016. At the start of the survey, demolition/remedial operations at the coke and coal stocking yard, had ceased for the day, however operations involving mobile plant and HGVs were audible at monitoring location 2 from 0600 hours (verified by playback of audio recording). Therefore, noise data measured after 0600 hours has not been used within the assessment, as it is not considered to be representative of the conditions which will exist when the proposed development is in place.
- 3.1.6 The noise measurements were made using two Class 1, integrating sound level meters. In accordance with guidance the microphones were mounted vertically on a tripod 1.5m above the ground (at ML2 only) and more than 3.5 metres from any other reflecting surfaces.

- 3.1.7 The sound level meters were calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No drift in the calibration during the survey was noted.
- 3.1.8 On the 19th January 2017, the weather conditions during the survey were as follows:
- Westerly winds up to 3m/s;
 - Damp ground;
 - Temperature approximately +5°C; and
 - 40% cloud cover.
- 3.1.9 On the 20th January 2017, the weather conditions during the survey were as follows:
- Westerly winds up to 2m/s;
 - Dry ground;
 - Temperature approximately +3°C; and
 - 30% cloud cover.
- 3.1.10 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.
- 3.1.11 A-weighted¹ L_{eq} ² noise levels have been measured to comply with the requirements of BS8233. A-weighted L_{90} ³ and L_{10} ⁴ noise levels, together with the maximum and minimum sound pressure levels to provide additional information. The measured noise levels are set out in full in Appendix A.
- 3.1.12 Attended observations and playback of audio recordings allow observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels. The observations identified the following significant noise sources at the site:

Road Traffic Noise: Noise from road traffic on Lund Hill Lane was audible at monitoring location 1. Reduced noise levels from road traffic were noted during the night-time.

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.

Rail Traffic Noise: Noise from 2 freight train passes (i.e. inbound and outbound from Ardagh Glass) was audible at monitoring location 2, during the daytime (19th) only.

Other sources: Other contributing noise sources include birdsong during the daytime, and other wildlife during the night-time.

- 3.1.13 A site walk over was also completed during the daytime (1400 to 1600 hours), to check other potential noise sources near to the site. No noise was audible from Naylor Pallets to the east of the site, therefore noise from this source has not been considered further.

3.2 Railway Noise

- 3.2.1 The railway line adjacent to the western site boundary is used only by freight trains, delivering glass sand to Ardagh Glass.
- 3.2.2 Discussion with Paul Balmer of GB Railfreight on the 7th November 2019, revealed that the existing service typically runs up to three times per week, with a single inbound and outbound train on any day. It was stated that the inbound train enters the line during the afternoon, travels to the glassworks to load/unload, and then returns in the evening.
- 3.2.3 At monitoring location 2, the train was witnessed travelling southbound (to the glassworks) at around 1600 hours. Noise measurements were made during this time and analysis of the evening data shows that the train then returned at around 2000 hours.
- 3.2.4 It is believed that no other rail services (freight or passenger) use the railway line, and it is not used at all during the night-time period. The only exception to this, is very occasional network rail maintenance services/vehicles.
- 3.2.5 The measured daytime and night-time noise levels at monitoring location 2, which include one inbound and one outbound train movement, are considered to be representative and robust.

3.3 Existing Noise Levels

- 3.3.1 The measured noise levels from monitoring locations 1 and 2 have been divided into daytime (0700-2300 hours) and night-time (2300-0700 hours) categories. The results for each of the monitoring locations are presented in Appendix B.
- 3.3.2 The results for each of the monitoring locations are presented in Table 1.

Table 1: Average Daytime and Night-time Noise Levels		
Time	Monitoring Location	Measured Noise Level (Figures in dB L _{Aeq})
0700-2300	1	65
2300-0700		57
0700-2300	2	46
2300-0700		30

3.3.3 An analysis of the measured levels has been undertaken to determine a representative maximum noise level at ML1 and ML2. In accordance with ProPG, the 10th highest maximum noise level measured during the night-time period on the 19th and 20th January 2017, at ML1 and ML2, has been selected. The maximum noise levels shown in Table 2 and Appendix B are therefore considered representative.

Table 2: Summary of the Maximum Night-time Noise Levels (Figures in dB L _{Amax,f})	
Monitoring Location	Maximum Measured Noise Level
1	79
2	54

3.3.4 As detailed in Section 2.3 of this report, CRTN and TRL define a method to calculate L_{A10,16Hour} from three consecutive one-hour measurements, taken between 1000 and 1700 hours. The assessment is shown for ML1 in Table 3.

3.3.5 At ML1, a daytime noise level of 66.4dB L_{Aeq} was calculated from the three, consecutive one hour measurements using the CRTN shortened measurement procedure, and the L_{A10} to L_{Aeq} adjustment method. The average measured daytime noise level, including peak hour traffic (0700 to 1000 hours), was 64.5dB L_{Aeq}. To be robust, the higher level of 66.4dB L_{Aeq} (rounded to 66dB) has been used in this assessment.

Table 3: Measured Noise Levels (Figures in dB(A))	
Time	ML1
	Measured L _{A10}
Hour 1 L _{A10, 1hour}	69.2
Hour 2 L _{A10, 1hour}	69.0
Hour 3 L _{A10, 1hour}	69.9
Average L _{A10,3hour}	69.4

LA10,18hour	68.4
LAeq,16hour Daytime (Calculated in accordance with TRL)	66.4

3.3.6 Based on the results obtained, a robust assessment can be made of the measured noise levels at the site and of the mitigation necessary to achieve the required noise levels at the development.

4 NOISE IMPACT ASSESSMENT

4.1 Introduction

4.1.1 In accordance with ProPG, a Site Noise Risk Assessment (SNRA) has been carried out. The Site Noise Risk Assessment (SNRA) identifies the initial risk of noise from transportation sources as having an adverse impact on a potential development, based on the overall measured levels with no mitigation in place.

4.1.2 The measured daytime and night-time L_{Aeq} noise levels, are presented in Table 4 and are compared to the criteria provided in Figure 1 of ProPG.

Table 4: Stage 1 Risk Assessment of Distance Corrected Noise Levels.					
Monitoring Location	Residential Dwelling Location	Day time Noise Level (Figures in dB L_{Aeq})	Risk of Adverse Effect	Night-time Noise Level (Figures in dB L_{Aeq})	Risk of Adverse Effect
1	Residential properties in eastern parts of the development site nearest to Lund Hill Lane i.e. Monitoring Location 1.	66	Medium	57	Medium
2	Residential properties in western parts of the development site nearest to the railway line, i.e. Monitoring Location 2.	46	Negligible	30	Negligible

4.1.3 Table 4 indicates that during the daytime and night-time, proposed receptors located towards the eastern edge of the residential area, would be at a medium risk of experiencing an adverse noise impact due to road traffic noise.

4.1.4 With regard to medium risks, ProPG states that;

‘As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS (Acoustic Design Statement) which confirms how the adverse impacts of noise will be mitigated and minimised and which clearly demonstrated that a significant adverse noise impact will be avoided in the finished development.’

4.1.5 Table 4 also indicates that that during the daytime and night-time, potential receptors in the western part of the development, would be at negligible risk of experiencing an

adverse noise impact due to rail traffic noise. This would also be true for the central part of the development.

4.1.6 With regard to negligible risks, ProPG states that;

'These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.'

4.1.7 ProPG states if there is be more than 10 $L_{A_{fmax}}$ noise events at night greater than 60dB, this is an indication that a site may not be regarded as negligible. Measurements at ML2, have $L_{A_{fmax}}$ levels lower than 60dB. Therefore, the western part of proposed development site can be regarded as negligible.

4.1.8 The SNRA shows that local noise mitigation and good acoustic design will be required across the site to ensure that any noise impact is minimised, and internal and external noise guideline levels are achieved.

4.1.9 In accordance with ProPG, a Stage 2 noise assessment is required to ensure future residents are protected and good acoustic design has been implemented.

5 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

Noise from Earthworks and Construction Phase Activities

5.1.1 The enabling and construction works are likely to be restricted to daytime hours. The appropriate category value has been determined for the sensitive receptor in the immediate vicinity of the site, based on the ambient noise levels measured during the daytime period.

5.1.2 The daytime measured noise levels at ML1, from the baseline noise survey, representative of the existing sensitive receptors, are provided below in Table 5.

Table 5: Construction Noise Assessment Criteria					
Receptor	Representative Noise Monitoring Location	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})
ESR1, ESR2 and ESR3	ML1	65	65	A	65

Based on the ambient noise levels measured during the daytime period, the appropriate category for this site has been determined as Category A. Therefore, the noise level above which activities from the construction phase might cause an impact is 65dB(A).

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.

5.1.3 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. ground excavation, levelling of ground, trenching, trench filling, unloading and levelling of hardcore and compacting filling; and
- Construction of the proposed development including construction of access roads, fabrication processes e.g. planing, sanding, routing, cutting, drilling and laying foundations.

- 5.1.4 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.
- 5.1.5 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 likely to be significant. 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.
- 5.1.6 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 09:00 to 12:00 hours on a Saturday, with no work on Sundays and Bank Holidays.
- 5.1.7 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.
- 5.1.8 Proposed dwellings may become occupied before the completion of the construction phase of the proposed development. These may experience a similar noise impact depending on the phase of the proposed development under construction and, given the potentially small distances between the construction activities and residential dwellings, noise levels at the receptors 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 A in BS5228, for short periods, at the existing and proposed sensitive receptors located in the immediate vicinity of the construction phases of the proposed development.
- 5.1.9 It is therefore recommended that mitigation measures are put in place that will reduce the scale of the potential effect. Details are set out in the Acoustic Design Statement of this report.

Vibration from Earthworks and Construction

5.1.10 WA'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 WA 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

5.1.11 The nearest sensitive receptors could include proposed dwellings which become occupied before the completion of the construction phase of the proposed development. As a worst-case scenario, earthworks and construction works may potentially take place at a distance of approximately 15 metres from existing residential properties.

5.1.12 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.

5.1.13 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.

5.1.14 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.

5.1.15 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.

5.1.16 The receptors likely to be affected by piling will vary depending of 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. Mitigation measures are discussed within the Acoustic Design Statement of this report.

6 NOISE IMPACT ASSESSMENT

6.1 Introduction

6.1.1 The results from the ProPG Stage 1: Initial Site Noise Risk Assessment show that proposed receptors in the western part of the proposed development are likely to be at negligible risk of experiencing an adverse noise impact due to road traffic during daytime and night-time periods. Noise levels measured in the eastern part of the site suggest that proposed receptors are likely to be at medium risk of experiencing an adverse impact during the daytime and night-time.

6.2 Assessment of Daytime Noise Levels in Outdoor Living Areas

6.2.1 The calculated noise level at ML1 and the measured noise level at ML2, together with the level of attenuation required to achieve the upper guideline value of 55dB L_{Aeq} recommended in BS8233, during the daytime, in outdoor living areas, are summarised in Table 7.

Table 7: Noise Levels at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Recommended External Daytime Guideline Value (Figures in dB(A))		
Residential Properties	Noise Level in Outdoor Living Areas	Level of Attenuation Needed To Achieve Noise Guideline Value in Outdoor Living Areas
Residential properties at eastern edge of the development site nearest to Lund Hill Lane i.e. Monitoring Location 1.	66	11
Residential properties at western edge of the development site nearest to the railway line, i.e. Monitoring Location 2.	46	0

6.2.2 Table 7 shows that during the daytime, the noise level affecting the eastern edge of the development site is 66dB L_{Aeq} , which is above the guideline value of 55dB L_{Aeq} . Therefore, mitigation is required in the eastern part of the site.

6.2.3 The noise level at the western edge of the development site is 46dB L_{Aeq} , which is below the guideline value of 55dB L_{Aeq} . Therefore, mitigation is not required in the western part of the site.

6.2.4 The outdoor living areas of the properties situated further away from the eastern boundary of the site, will be screened by intervening buildings. It is considered that the noise levels within these garden areas will comply with the guideline value without the need for any specific mitigation.

6.3 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

6.3.1 The calculated noise level at ML1 and the measured noise level at ML2, have been used to determine the noise levels likely at the façades of dwellings in the vicinity of the monitoring locations during the daytime period.

6.3.2 Before internal noise levels can be calculated 3dB(A) must be added to the freefield measured levels to allow for the reflection of noise from the proposed housing façades when the buildings are in place.

6.3.3 The calculated noise levels at the façades of the dwellings, together with the level of attenuation required to achieve 35dB L_{Aeq} during the daytime, in the living room and bedroom areas, are summarised in Table 8.

Table 8: Façade Noise Level at Dwellings in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Daytime Guideline Value (Figures in dB(A))		
Residential Properties	Noise Level at the Façade of the Dwelling	Level of Attenuation Needed To Achieve the Noise Guideline Value in Living Room Areas
Residential properties at the eastern edge of the development site nearest to Lund Hill Lane i.e. Monitoring Location 1.	69	34
Residential properties at the western edge of the development site nearest to the railway line, i.e. Monitoring Location 2.	49	14

6.3.4 The noise levels at facades further into the site, will be lower than those detailed in Table 8.

6.4 Assessment of Night-time Noise Levels in Bedrooms

6.4.1 The measured night-time noise levels, as detailed in Tables 2 and 3, have been used to determine the noise levels likely at the façades of dwellings in the vicinity of the monitoring locations, during the night-time period.

6.4.2 Before internal noise levels can be calculated 3dB(A) must be added to the freefield measured levels to allow for the reflection of noise from the proposed housing facades when the buildings are in place.

6.4.3 The calculated noise levels at the façades of dwellings, together with the level of attenuation required to achieve 30dB L_{Aeq} and 45dB $L_{Amax,f}$ in the bedrooms, are summarised in Table 9.

Table 9: Façade Noise Level at Dwellings in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Night-time Guideline Values (Figures in dB(A))			
Residential Properties	Noise Level at the Façade of the Property (L_{Aeq})	Maximum Noise Level at the Façade of the Property ($L_{Amax,f}$)	Level of Attenuation Needed To Achieve the Noise Guideline Values in Bedrooms
Residential properties in eastern parts of the development site nearest to Lund Hill Lane i.e. Monitoring Location 1.	60	79	33 (34?)
Residential properties in western parts of the development site nearest to the railway line, i.e. Monitoring Location 2.	33	54	9

6.4.4 The noise levels at facades further into the site, will be lower than those detailed in Table 9.

7 NOISE ATTENUATION SCHEME

7.1 Introduction

7.1.1 The results of the noise assessment, for the proposed residential areas of the development, indicate that noise mitigation measures would need to be incorporated into the proposed site design to ensure that the required noise levels are achieved within those outdoor living areas, living rooms and bedrooms closest to Lund Hill Lane.

7.2 Daytime Noise Levels in Outdoor Living Areas

7.2.1 The noise levels, as detailed in Table 4, indicate that outdoor living areas towards the western edge of the site, nearest to the railway line, will meet the required daytime noise level of 55dB L_{Aeq} . Therefore, mitigation is not required in these outdoor living areas.

7.2.2 Noise levels in outdoor living areas towards the eastern edge of the site, nearest to Lund Hill Lane, will not achieve the required daytime noise level of 55dB L_{Aeq} .

7.2.3 To mitigate noise in outdoor living areas located closest to, and with a direct line of sight of Lund Hill Lane, it is recommended that gardens are located on the screened sides of dwellings, furthest away from the road.

7.2.4 Alternatively, close boarded fences with a height of at least 2.1m could be constructed between garden areas of proposed residential dwellings and Lund Hill Lane.

7.2.5 With the above mitigation measures in place at the eastern edge of the site, all plots across the site will meet the guidance level of 55dB L_{Aeq} suggested by BS8233 for outdoor living areas.

7.2.6 It should be noted that the final height and location of any noise fence will depend upon the final layout of the site, and mitigation requirements can be confirmed on a plot by plot basis, at the detailed application/reserved matters stage.

7.3 Glazing Requirements for Living Rooms and Bedrooms during the Daytime

7.3.1 When assessing daytime noise levels in living rooms the noise attenuation provided by the overall building facade should be considered. To mitigate noise levels, the composition of the building facade can be designed to provide the level of attenuation required. Glazing is generally the building element which attenuates noise the least, so the proportion of glazing in a building facade is an important consideration when assessing overall noise attenuation.

- 7.3.2 In the absence of design details for the building facades, it has been assumed that the glazing to noise sensitive rooms would comprise about 25% of the facade area. To calculate the overall attenuation provided by this percentage of glazing in a brick or block facade, a non-uniform partition calculation can be used.
- 7.3.3 The calculation combines the different degrees of attenuation of the wall element and the window element. A facade element comprising a solid brick or blockwork, will attenuate by 45dB (British Standard 8233: "Guidance on sound insulation and noise reduction for buildings" 2014) whereas standard double glazing will attenuate road traffic noise by 26-29dB(A) (BRE Digest 379 "Double glazing for heat and sound insulation"). The overall noise attenuation provided by this combination is, therefore, between 32dB(A) and 35dB(A).
- 7.3.4 The noise attenuation requirements for living rooms in properties in different areas of the site are summarised in Table 6. The requirements indicate that standard thermal double glazing will be sufficient to ensure that internal noise levels are met, even with the windows open, except for those facades nearest to and facing Lund Hill Lane.
- 7.3.5 With windows open, the attenuation provided by the façade will be approximately 15dB(A). This would mean the recommended noise guideline value in living rooms would be exceeded, in dwellings nearest to Lund Hill Lane.
- 7.3.6 On occasions this may be acceptable to the resident, but when quiet conditions are required, the resident should be able to close the windows whilst maintaining adequate ventilation. Some form of alternative ventilation would therefore need to be installed in some of the living rooms to avoid the need to open windows for ventilation.
- 7.3.7 Alternatively, to meet the required noise levels, living rooms could be located on the screened side of the proposed dwellings, facing away from Lund Hill Lane. With only non-noise sensitive facades facing the road, all windows could be opened for ventilation.
- 7.3.8 Proposed dwellings further away from Lund Hill Lane will not require an alternative means of ventilation and all windows could be opened for ventilation.
- 7.3.9 Glazing requirements can be confirmed, on a plot by plot basis, at the detailed application/reserved matters stage.

7.4 Glazing Requirements for Bedroom Areas during the Night-Time

- 7.4.1 The noise attenuation requirements for bedrooms across the site areas are summarised in Table 7.
- 7.4.2 The requirements indicate that dwellings in the western part of the site closest to the railway line will achieve internal guideline noise levels during the night-time with windows open. Therefore, no mitigation will be required.
- 7.4.3 The requirements also indicate that standard thermal double glazing, with windows closed, would be required to ensure that the internal noise limits are met for proposed dwellings closest to Lund Hill Lane.
- 7.4.4 With windows open, the attenuation provided by the façade will be approximately 15dB(A). This would mean the recommended internal noise guideline value for bedrooms could be exceeded in dwellings closest to Lund Hill Lane where facades face the road.
- 7.4.5 Some form of alternative ventilation would therefore need to be installed in the facades of bedrooms closest to and facing Lund Hill Lane. Alternatively, bedrooms could be located on the screened side of the proposed dwellings facing, away from Lund Hill Lane.
- 7.4.6 Proposed dwellings further away from Lund Hill Lane, will be able to open all windows for ventilation.
- 7.4.7 Glazing requirements can be confirmed, on a plot by plot basis, at the detailed application/reserved matters stage.

7.5 Acoustic Ventilation Requirements

- 7.5.1 It is recommended that the acoustic ventilation proposed at the site should, as a minimum, comply with Building Regulations 2000 Approved Document F1 Means of Ventilation and British Standard BS5925 1991: "Code of Practice for Ventilation Principles and Designing for Natural Ventilation". Acoustic ventilation is only recommended for noise sensitive rooms, which are bedrooms and living rooms.
- 7.5.2 The implementation of standard thermal double glazing together with appropriate acoustic ventilation should ensure that the required internal daytime and night-time noise values are achieved in dwellings closest to Lund Hill Lane.
- 7.5.3 An alternative means of ventilation will not be required for dwellings across the remainder of the site. The requirement for acoustic ventilation can be confirmed on a plot by plot basis, at the detailed application/reserved matters stage.

7.6 Construction Phase

Noise from Earthworks and Construction

- 7.6.1 To reduce the potential impact of noise levels generated by the construction phase of the proposed development at existing receptor locations in the immediate vicinity of the site, mitigation measures will be required.
- 7.6.2 Best working practice will be implemented during each phase of the earthworks and construction works at the site. The construction works will follow the guidelines in BS5228-1 and the guidance in BRE Controlling particles, vapour and noise pollution from construction Sites, Parts 1 to 5, 2003.
- 7.6.3 The following measures will be put in place to minimise noise emissions:
- When works are taking place close to the sensitive receptors, screening of noise sources by temporary screen may be employed;
 - All plant and machinery should be regularly maintained to control noise emissions, with particular emphasis on lubrication of bearings and the integrity of silencers;
 - Site staff should be aware that they are working adjacent to a residential area and avoid all unnecessary noise due to misuse of tools and equipment, unnecessary shouting and radios;
 - A further measure to reduce noise levels at the sensitive receptors would include, as far as possible, the avoidance of two noisy operations occurring simultaneously in close proximity to the same sensitive receptor;
 - Adherence to any time limits imposed on noisy works by the local authority;
 - Implement set working hours during the week and at weekends;
 - Ensure engines are turned off when possible; and
 - Should earthworks and construction activities need to be carried out during night-time hours, the local authority could include a planning condition which requests advance notice and details of any night working to be provided.

Noise from Construction Vehicles at Existing Sensitive Receptors

- 7.6.4 Mitigation measures will be required to reduce the noise and vibration impact of construction vehicles at existing sensitive receptors, this will consist of management of construction vehicles to minimise the noise and vibration impact.
- 7.6.5 The management is likely to include;
- Times of vehicle movements;
 - Frequency of movements, (i.e. maximum HGVs permitted per hour); and,
 - Site speed limit.
- 7.6.6 In addition, the maintenance of the road surface, including road sweeping and repair of potholes will also aid in reducing the likelihood of complaints at future existing sensitive receptors.
- 7.6.7 Mitigation requirements will be confirmed at the detailed design stage.

Vibration from Earthworks and Construction

- 7.6.8 It is considered that mitigation will not be required to control vibration from construction work. However, if piling is required, mitigation may need to be considered.
- 7.6.9 BS5228-2 recognises that the most common form of vibration associated with piling is the intermittent type derived from conventional driven piling.
- 7.6.10 To minimise the potential for vibration to be generated by any necessary piling it is recommended that careful consideration is given to the type of piling to be used. For example, auger bored piles would be preferable to driven piles with regards to a reduced potential for noise and vibration to be generated. However, it is recognised that the piling process will need to be selected on the basis of the strata to be encountered, the loads to be supported and the economics of the system.
- 7.6.11 The receptors likely to be affected by piling will vary depending of 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.
- 7.6.12 To keep ground borne vibration to a minimum the following measures, as referred to in BS5228-2, should be put in place:

- Substitution: Where reasonably practicable, plant and or methods of work likely to cause significant levels of vibration at the receptors identified, should be replaced by less intrusive plant/methods of working; and
- Vibration Isolation of plant at source: This may prove a viable option where the plant is stationary (e.g. a compressor, generator) and located close to a receptor.

7.6.13 There are a number of measures which can be implemented, depending upon the type of piling chosen. BS5228-2 indicates that mitigation might include; use of alternative methods, removal of obstructions, provision of cut-off trenches, reduction of energy input per blow, reduction of resistance to penetration. Continuous flight auguring would cause minimal vibration even when very close to the sensitive receptor.

7.6.14 As the construction programme and methodologies become more defined it is suggested that any possible piling vibration be reconsidered and that a detailed strategy for control be implemented.

8 CONCLUSIONS

- 8.1.1 Wardell Armstrong has undertaken a noise assessment to support an outline planning application for a residential development at the Former Monckton Coke Works, Royston.
- 8.1.2 During the construction phase of the development there is potential for adverse noise and vibration impacts to occur on the existing residential dwellings in the vicinity of the proposed development. However, if the mitigation measures outlined in Section 7 of this report are implemented the impact can be minimised. As the construction programme and methodologies are finalised a detailed noise and vibration management plan will be implemented.
- 8.1.3 The noise sources, which will potentially affect the residents of the proposed development, is road traffic on Lund Hill Lane and freight movements on the adjacent railway line.
- 8.1.4 Unattended noise monitoring was carried out at two monitoring locations, in the eastern and western parts of the site, nearest to Lund Hill Lane and the railway line, on the 19th and 20th January 2017.
- 8.1.5 The results of the noise survey and assessment indicate that to meet the guideline value of 55dB_{L_{Aeq} (16 Hour)} in outdoor living areas, acoustic mitigation should be provided for those gardens located nearest to Lund Hill Lane, in the eastern part of the development.
- 8.1.6 Gardens could be located on the screened sides of dwellings furthest away from Lund Hill Lane. Alternatively, standard close boarded fencing or walls of 2.1m in height could be installed between the gardens and Lund Hill Lane.
- 8.1.7 Gardens of dwellings further away from Lund Hill Lane are likely to meet the noise guideline level, without the need for any mitigation measures.
- 8.1.8 With regard to indoor noise guideline levels, these will be met in the large majority of the development, even with windows opened for ventilation. However, to achieve noise limits in some living rooms and bedrooms at the eastern edge of the site, closest to Lund Hill Lane, it is likely that an alternative means of ventilation will need to be provided to enable windows to remain closed if desired.
- 8.1.9 The requirement for glazing and acoustic ventilation will be confirmed, on a plot by plot basis, at the detailed application/reserved matters stage.

APPENDICES

Policy, Standards and Guidance

Appendix A

National Planning Policy Framework

In February 2019 the 'National Planning Policy Framework' (NPPF) was amended as the current planning policy guidance within England.

Paragraph 180 of the NPPF states:

'Planning policies and decisions should also ensure that new development is appropriate for its location taking in account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impact that could arise from the development. In doing so they should:

- a. Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impact on health and the quality of life;
- b. Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'...

Paragraph 182 of the NPPF states:

'Planning policies and decisions should ensure that new development can be integrated with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'

Noise Policy Statement for England

With regard to 'significant adverse impacts on health and the quality of life' the NPPF refers to the 'Noise Policy Statement for England' (NPSE).

The Noise Policy Statement for England refers to the World Health Organisation when discussing noise impacts and introduces observed effect levels which are based on

established concepts from toxicology that are applied to noise impacts by WHO.

Three levels are defined as follows:

‘NOEL – No Observed Effect Level

- This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

- This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

- This is the level above which significant adverse effects on health and quality of life occur’.

The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

Planning Practice Guidance – Noise

The Planning Practice Guidance (PPG) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table 1 summarises the noise exposure hierarchy.

Table 1 - National Planning Practice Guidance noise exposure hierarchy			
Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The PPG summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:

“Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other

environmental dimensions of proposed development”

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise

ProPG Planning and Noise provides professional practice guidance in relation to new residential development exposed to noise from transport sources. It provides practitioners with a recommended approach to the management of noise within the planning system in England.

The guidance reflects the Government’s overarching National Planning Policy Framework, the Noise Policy Statement for England, and Planning Practice Guidance (including PPG-Noise) and draws on other authoritative sources of guidance. It provides advice for Local Planning Authorities and developers, and their professional advisors, on achieving good acoustic design in and around new residential developments.

Guidance on Assessment of Road Traffic Noise

The Department of Transport’s memorandum, “Calculation of Road Traffic Noise” (CRTN), 1998 defines a shortened measurement procedure which is used to calculate the $L_{A10,18\text{hour}}$ noise level from a measured 3-hour period. The method requires the measurement of noise over 3 consecutive hours between 1000 and 1700 hours.

From the measured 3-hour period, the arithmetic average of the three $L_{A10,1\text{Hour}}$ measurements is taken. The $L_{A10,18\text{Hour}}$ noise level is then determined using the following calculation method;

- $L_{A10,18\text{Hour}} = L_{A10,3\text{hour}} - 1$

The document “*Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping*” by P G Abbott and P M Nelson (The TRL Method) provides a calculation method to convert the calculated $L_{A10,18\text{Hour}}$ into a daytime L_{Aeq} as described below.

- $L_{\text{day}} = 0.95 \times L_{A10,18\text{hour}} + 1.44\text{dB}$

The calculation for the night-time period is shown below.

- $L_{\text{night}} = 0.90 \times L_{A10,18\text{hour}} - 3.77$

British Standard 5228: 2014 - Code of Practice for noise and vibration control on construction and open sites

Noise from Construction Plant and Vehicles

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.

Guidance on the assessment of noise from development sites is given in British Standard 5228-1:2009+A1:2014 “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.

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 may be emitted and the type of plant which should or should not be used.

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.

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.

Table 2 - 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 (L_{Aeq})	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.			

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 2.

The noise level likely to be generated at the receptor 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.

The noise assessment for the construction phase details baseline daytime noise levels measured at a representative sensitive receptor location 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.

In addition to the earthworks and construction activities, 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. Where such noise is likely to be significant, its effect can be assessed with reference to the Calculation of Road Traffic Noise Memorandum (CRTN 1998).

British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings

British Standard 8233 “Guidance on sound insulation and noise reduction for buildings” 2014, suggests the following guideline noise levels and states that they are based on guidelines issued by the World Health Organisation;

- 35 dB L_{Aeq} (16 hour) during the day time in noise sensitive rooms
- 30 dB L_{Aeq} (8 hour) during the night time in bedrooms
- 45 dB $L_{Amax,F}$ during the night time in bedrooms
- 50 dB L_{Aeq} (16 hour) desirable external noise levels for amenity space such as gardens and patios
- 55 dB L_{Aeq} (16 hour) upper guideline value which would be acceptable in noisier environments.

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.”

Furthermore, with regard to external noise, the Standard states;

“However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.

Appendix B

Noise Monitoring Results

Monitoring Location 1 – Approximately 10m from Lund Hill Lane						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
19/01/2017 Daytime						
1517-2300	63.9	22.8	91.6	33.9	68.7	Unattended – Noise from road traffic on Lund Hill Lane.
20/01/2017 Night Time						
2300-0700	57.2	22.2	79.8	24.5	57.1	Unattended – Noise from road traffic on Lund Hill Lane.
20/01/2017 Daytime						
0700-1517	65.0	36.3	87.2	45.5	69.6	Unattended – Noise from road traffic on Lund Hill Lane. Birdsong
1000-1100	64.4	40.9	78.4	46.4	69.2	CRTN = 66.4dB L _{Aeq,16hr}
1100-1200	64.4	39.4	80.6	43.5	69.0	
1200-1300	65.8	36.6	87.2	44.4	69.9	

Monitoring Location 2 – Western Site Boundary						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
19/01/2017 Daytime						
1500-1600	51.2	30.0	75.1	32.1	39.0	Unattended – Noise from distant road traffic. Birdsong. Train pass at 1600 and 2000 hours.
1600-1700	36.3	30.1	50.1	31.9	39.1	
1700-1800	34.7	27.9	48.5	31.0	36.5	
1800-1900	33.8	27.1	50.7	29.2	36.1	
1900-2000	35.3	26.4	49.6	29.8	37.7	
2000-2100	53.1	21.4	78.5	24.4	36.9	
2100-2200	29.0	20.5	48.6	21.8	31.9	
2200-2300	26.6	19.5	37.5	21.0	29.8	
Overall	34.5	19.1	62.4	19.8	32.2	
20/01/2017 Night Time						
2300-2315	23.6	19.1	40.2	19.6	26.0	Unattended – Noise from distant road traffic. Birdsong. Train pass at 1600 and 2000 hours.
2315-2330	29.4	19.6	44.7	20.3	33.4	
2330-2345	39.8	19.2	67.3	19.7	38.2	
2345-0000	27.3	19.4	42.6	20.2	31.4	
0000-0015	26.7	19.2	43.7	19.8	30.3	
0015-0030	24.3	20.4	35.2	20.9	26.9	
0030-0045	28.9	20.6	46.2	21.2	33.5	
0045-0100	23.5	20.0	42.2	20.4	24.1	
0100-0115	27.6	19.8	45.3	20.7	31.9	
0115-0130	26.3	20.1	43.2	20.4	30.5	
0130-0145	27.9	20.3	45.6	21.0	29.0	
0145-0200	31.3	19.9	51.2	20.4	31.7	
0200-0215	21.3	19.5	32.3	19.7	22.3	
0215-0230	22.9	20.8	34.6	21.1	24.0	
0230-0245	27.5	22.5	39.5	24.2	29.3	
0245-0300	28.9	22.5	45.8	23.5	29.9	
0300-0315	25.6	22.5	35.4	23.5	27.6	
0315-0330	29.5	23.6	40.7	25.2	31.6	
0330-0345	29.1	26.5	39.9	27.5	30.5	
0345-0400	30.7	26.8	40.6	28.0	32.8	
0400-0415	29.8	25.9	37.8	27.6	31.6	
0415-0430	28.4	25.4	39.6	26.6	29.8	
0430-0445	30.7	26.2	42.0	27.1	33.6	

0445-0500	29.9	26.1	42.3	27.3	31.6	
0500-0515	30.8	27.2	48.1	28.2	32.3	
0515-0530	30.6	26.4	44.0	27.7	32.8	
0530-0545	37.1	28.2	53.1	30.2	39.2	
Overall	34.6	29.6	52.9	30.9	34.4	

DRAWINGS



KEY

- Site Boundary
- Noise Monitoring Locations
- Existing Sensitive Receptors

Notes:

A	FIRST ISSUE	30/07/20	CT	TD	CMD
REVISION	DETAILS	DATE	DRAWN	CHKD	APPD

CLIENT	MONCKTON DEVELOPMENTS LTD
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PROJECT	FORMER MONCKTON COKE WORKS
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DRAWING TITLE	NOISE MONITORING AND EXISTING SENSITIVE RECEPTOR LOCATION PLAN
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DRG No.	GM10833-001	REV	A
DRG SIZE	A3	SCALE	1:5,000
DRAWN BY	CT	CHECKED BY	TD
		APPROVED BY	CMD



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