

Noise Impact Assessment

**Atlas Business Park, Simonsway, Wythenshawe,
Manchester, M22 5PR**

**Presented to: Ridge and Partners LLP c/o AVIVA
Investors**

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About us

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As part of Lucion Services, our combined team of 500 in the UK has a range of specialist skill sets in over 50 environmental consultancy specialisms including asbestos, hazardous materials, ecology, air and water services, geo-environmental and sustainability amongst others.

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Executive Summary

Site and Report Context	Delta-Simons Limited ('Delta-Simons'), was instructed by Ridge and Partners LLP c/o AVIVA Investors (the 'Client') to undertake a Noise Impact Assessment to inform a full planning application for c.411,300sq. ft of B8 type units (the 'Proposed Development'), located at Atlas Business Park, Simonsway, Wythenshawe, Manchester, M22 5PR (the 'Site'). This assessment has been undertaken to identify the key noise sources associated with the proposal, which may have the potential to impact the closest sensitive residential dwellings. Accordingly, this assessment has been completed with due regard to: • National Planning Policy Framework (NPPF); • National Planning Policy Guidance (NPPG); • BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound'; • BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'; • BS 5228-1:2009+A1:2014: 'Code of practice for noise and vibration control on construction and open sites Part 1: Noise'; • BS 5228-2:2009+A1:2014: 'Code of practice for noise and vibration control on construction and open sites Part 2: Vibration'; • Calculation of Road Traffic Noise (CRTN); and • Design Manual for Roads and Bridges (DMRB).
Summary	This assessment has been informed by a noise survey, completed over a weekday and weekend period, to quantify the existing background noise environment at the sensitive receptors. Operational and fixed plant noise assessments have been carried out on the basis that the rating level should be 5dB below the measured background sound level, as required by Manchester City Council. The operational assessment results have shown that the rated level of noise is more than 5dB below the daytime background sound levels at the closest receptors. Results for the night-time scenario have shown that the rated level of noise would be more than 5dB below the background sound levels at the majority of receptors, however at one receptor, the rated level of noise would only be 4dB below background sound levels. The assessment has shown that internal noise levels would still be below guideline levels. Therefore, a negligible impact is predicted. This assessment has set noise limits for fixed plant items at the closest receptors. Provided the noise emission at receptor locations from fixed plant on the Site does not exceed 49dB $L_{Ar,1hour}$ in the daytime and 40dB $L_{Ar,15min}$ at night-time at the closest receptor, a negligible impact is predicted. The BS 8233:2014 night-time L_{AFmax} event assessment has concluded that that the calculated internal noise level from a L_{AFmax} event would not exceed internal noise level criteria at any Noise Sensitive Receptors (NSRs). Therefore, a negligible impact is predicted.

	An indicative construction phase assessment has been undertaken based on typical examples of construction tasks and scheduling, concluding a negligible impact at noise and vibration sensitive receptors. The traffic assessment results have shown that there is up to +0.8 $L_{A10,18\text{hour}}$ change in basic noise level on surrounding roads due to traffic associated with the Site, which indicates a negligible impact.
Recommendations	Noise Levels from fixed plant should not exceed the levels set out in this report.
This is intended as a summary only. Further detail and limitations of the assessment is provided within the main body of the Report.	

Table of Contents

1.0 INTRODUCTION	1
1.1 Appointment.....	1
1.2 Site Location and Context	1
2.0 LEGISLATION AND POLICY	2
2.1 Planning Policy	2
2.2 Local Planning Policy	3
2.3 Guidance	4
3.0 SCOPE AND METHODOLOGY	12
3.1 Local Authority Consultation.....	12
3.2 Scope.....	13
3.3 Identification of Receptors	13
3.4 Plant Noise Limits – BS 4142:2014+A1:2019 Assessment.....	13
3.5 Operational Noise – BS 4142:2014+A1:2019 Assessment.....	14
3.6 Night-Time L_{AFmax} Event – BS 8233:2014 Assessment.....	14
3.7 Construction Phase Assessment – BS 5228:2009+A1:2014: Parts 1&2	14
3.8 Development Traffic Flows – CRTN & DMRB.....	14
3.9 Significance Criteria	15
4.0 BASELINE	16
4.1 Introduction	16
4.2 Noise Measurement Equipment.....	16
4.3 Weather Conditions	17
4.4 Measured Baseline Noise Levels	17
5.0 ASSESSMENT	19
5.1 Acoustic Character Corrections.....	19
5.2 Plant Noise Limits – BS 4142:2014+A1:2019 Assessment.....	19
5.3 Operational Noise – BS 4142:2014+A1:2019 Assessment.....	19
5.4 Night-Time L_{AFmax} event – BS 8233:2014 Assessment.....	21
5.5 Construction Noise and Vibration – BS 5228-1:2009+A1:2014: Part 1 and 2	21
5.6 Road Traffic Noise – CRTN & DMRB Assessment.....	24
6.0 MITIGATION.....	26
7.0 SUMMARY AND CONCLUSIONS	27

Figures

FIGURE 1 – SITE BOUNDARY AND MEASUREMENT LOCATIONS
FIGURE 2 – PROPOSED SITE LAYOUT
FIGURE 3 – LT1 TIME HISTORY PLOT

Appendices

APPENDIX A – LIMITATIONS
APPENDIX B – GLOSSARY
APPENDIX C – TRAFFIC DATA AND CALCULATIONS

1.0 Introduction

1.1 Appointment

- 1.1.1 Delta-Simons Limited ('Delta-Simons'), was instructed by Ridge and Partners LLP c/o AVIVA Investors (the 'Client') to undertake a Noise Impact Assessment to inform a full planning application for c.411,300sq. ft of B8 type units (the 'Proposed Development'), located at Atlas Business Park, Simonsway, Wythenshawe, Manchester, M22 5PR (the 'Site').

1.2 Site Location and Context

- 1.2.1 The Site is currently vacant and is located in an area influenced by the existing commercial premises and existing road network. Manchester Airport is located approximately 750m south.
- 1.2.2 The proposal has the potential to operate during day and night-time periods.
- 1.2.3 The closest existing Noise Sensitive Receptors (hereafter referred to as NSRs) are situated approximately 35m and 37m north off Patch Croft Road, 118m south-east off Cunningham Dive and 148m east off Irvin Drive.
- 1.2.4 Given the context of the proposed Site being of similar nature to the existing surrounding commercial premises it is considered that the Proposed Development is not a new noise source within the area and that the NSRs would have already experienced similar noise levels from the existing commercial premises.
- 1.2.5 Reference should be made to **Figure 1** for a map of the Site boundary and surrounding area.
- 1.2.6 Reference should be made to **Figure 2** for the proposed Site layout.
- 1.2.7 The standard limitations associated with this assessment are presented in **Appendix A**.
- 1.2.8 Whilst every effort has been made to ensure this report is easy to understand, it is technical in nature. A glossary of terms used in this report is provided in **Appendix B**.

2.0 Legislation and Policy

2.1 Planning Policy

- 2.1.1 A summary of the national and local planning policy relevant to the Proposed Development is provided below.

National Planning Policy Framework and National Planning Practice Guidance

- 2.1.2 The Government published the revised National Planning Policy Framework (NPPF, 2021) and the National Planning Practice Guidance (NPPG) in July 2019¹. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs while protecting valuable natural and historic environments.
- 2.1.3 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.
- 2.1.4 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or making decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.
- 2.1.5 Local planning authorities' plan-making and decision-making should take account of the acoustic environment and in doing so consider:
- Whether or not a significant adverse effect is occurring or likely to occur;
 - Whether or not an adverse effect is occurring or likely to occur; and
 - Whether or not a good standard of amenity can be achieved.
- 2.1.6 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.
- 2.1.7 The Observed Effect Levels are as follows:
- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
 - Lowest observed adverse effect level: This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
 - No observed effect level: This is the level of noise exposure below which no effect at all on health or quality of life can be detected.
- 2.1.8 **Table 1** summarises the noise exposure hierarchy, based on the likely average response.

¹ Parts of NPPG have been updated in the intervening period, however the Noise section was last updated in July 2019.

Table 1 - Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Adverse Effect Level			
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 the 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 some reported 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 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

2.2 Local Planning Policy

Manchester's Local Development Framework - The Core Strategy Development Plan Document 2012-2027

- 2.2.1 Manchester Core Strategy Development Plan Document was adopted in 11th July 2012. It is the key document in Manchester's Local Development Framework and covers the period from 2012 to 2027. The document outlines the strategic policies for Manchester's future development and forms the framework in which planning applications are assessed.

Policy DM 1 - Development Management

2.2.2 This policy states:

"All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

...

Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise;

..."

Manchester City Council Planning and Noise Document

- 2.2.3 The Manchester City Council Planning and Noise document was written in May 2022. The guidance aims to provide help and advice in relation to noise in a planning context to encourage good acoustic design. It outlines what is expected in relation to current guidance and policy with the aspiration that new developments achieve the highest possible standards without compromising the health and well-being of people that live and work within the City of Manchester.

3.7.1.5 Industrial/Commercial Developments

2.2.4 Manchester City Council states that they:

"[...] consider that new developments should contribute and enhance the area in which they are located and where possible i.e. prevent 'noise creep', contribute to the improvement of people's health and quality of life as per the NPSE. With this in mind, the design objective should be:

'The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.'

Where this criterion cannot be achieved, the various noise control measures considered as part of the assessment should be fully explained (i.e. relocation of noise sources, use of quieter equipment, enclosures, screening, restriction of the hours of operation) and the achievable noise level should be identified. This information will allow a judgement to be made concerning the application and its likely impact on the surrounding area.

[...]

Deliveries and collections are usually controlled by restricting operational hours but depending on the extent of these activities, a Noise Management Plan (NMP) may be requested, which would include an assessment of noise. This would usually involve assessing the noise upon arrival, loading/unloading period and then departure."

Noise and Vibration from fixed plant/equipment

2.2.5 Manchester City Council states that:

"[...] but also its particular characteristics. The noise assessment should be based on BS 4142, and any application for fixed plant, equipment or machinery must demonstrate that:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'."

2.3 Guidance

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

- 2.3.1 This Standard (hereafter referred to as 'BS 4142') describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- 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 processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

2.3.2 The procedure detailed in the Standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical'.

2.3.3 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and
- Night-time (23:00 - 07:00): 15 minutes.

2.3.4 There are a number of 'character corrections' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation. These character corrections vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subjective method):

Table 2 - BS 4142 Subjective Character Correction

Acoustic Feature	Correction (dB)	Comments
Tonality	+2	Where the tonality is just perceptible
	+4	Where the tonality is clearly perceptible
	+6	Where the tonality is highly perceptible
Impulsivity	+3	Where the impulsivity is just perceptible
	+6	Where the impulsivity is clearly perceptible
	+9	Where the impulsivity is highly perceptible
Intermittency	+3	where the intermittency is readily distinctive against the acoustic environment
Other sound characteristics	+3	Where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment at the receptor

2.3.5 Where the assessment is carried out using the objective method, the tonality character correction is either 0dB or 6dB and the impulsivity character correction can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

- 2.3.6 BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.
- 2.3.7 Assessment of the rating level relative to the background noise level can yield the following commentary:
- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
 - 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; and
 - 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.
- 2.3.8 Whilst the Standard does make various references to it not being intended to assess noise impacts at indoor locations, Section 1.1 of the Standard does state:
- 'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident'.
- 2.3.9 Example 6 in the Standard states:
- 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.
- 2.3.10 Furthermore, Example 8, which considers night-time commercial noise impacts at a dwelling, states:
- 'BS 8233 indicates that 40 dBA sound level from the plant, equating to an internal level of around 30 dBA or possibly lower, but with some acoustically distinguishing characteristics, may not be suitable for a bedroom.'
- 2.3.11 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts do not give rise to sleep disturbance in bedrooms, this assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Noise Criteria Limits

- 2.3.12 The scope of this Standard (hereafter referred to as 'BS 8233') is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.
- 2.3.13 The Standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in **Table 3**.

Table 3 - BS 8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting/sleeping conditions	Living Room	35
	Bedroom*	30
*For a Reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting) should not exceed 45dB L_{max}		

2.3.14 BS 8233 goes on to recommend noise levels for gardens as follows:

'It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. 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 might be warranted'.

2.3.15 BS 8233 goes on to say:

'In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited'.

Ventilation Requirements

2.3.16 Where a partially open window cannot be relied upon to provide an adequate level of façade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS 8233 states:

'The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used, and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

Alternatively, acoustic ventilation units (see 7.7.2 [of the Standard] below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.'

2.3.17 Section 7.7.2 of the Standard states:

'NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.'

BS 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise'

2.3.18 BS 5228-1 contains a methodology for predicting construction noise levels taking both stationary and mobile noise sources into consideration within designated construction areas. BS 5228-1 also contains methodology for assessing construction noise levels, and methods of reducing noise emissions from construction sites.

- 2.3.19 Annex E of BS 5228-1 provides broad guidance on the significance of construction noise on residential and commercial sensitive receptors. This includes significance based on absolute limit levels and those according to magnitude of change in ambient levels. In terms of absolute limits, Section E.2 recommends that daytime construction noise should not exceed 70dB(A) in rural & suburban environments and 75dB(A) in urban environments close to main roads or heavy industry, in order to limit overall impact on receptors. This absolute criterion can be applied to both residential and commercial receptors.
- 2.3.20 Section E.3 of BS 5228-1 presents two methods of deriving construction noise criteria, based on pre-construction ambient noise levels. The 5dB change method identifies significance where a 5 dB(A) increase in the ambient noise levels occur, subject to lower cut off values of 65, 55 and 45 dB(A) for the daytime, evening and night-time periods respectively. The ABC method classifies receptors into one of three categories based on ambient baseline noise levels. A threshold for potentially significant construction noise effects is that determined based on the category and time of day for each receptor.
- 2.3.21 **Table 4** sets out the thresholds for potential significant construction noise effects for each receptor category and time of day.

Table 4 - BS 5228-1 ABC Method Categories

Assessment category & threshold value period	Threshold value, dB L _{Aeq,T}		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night-time (2300 – 0700)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (0700-1900) and Saturdays (0700 – 1300)	65	70	75

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

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

Note 3 Applied to residential receptors only.

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

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

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

D) 1900-2300 weekdays, 1300-2300 Saturdays and 0700-2300 Sundays

- 2.3.22 In addition to the general construction assessment criteria, Section E.4 of BS 5228 provides example time periods and noise trigger levels at which consideration to noise insulation should be given. The threshold is the highest of:
- 5 dB(A) above the existing airborne noise level for corresponding times of day; or
 - Noise Levels shown in **Table 5** below.

Table 5 - Eligibility of noise insulation (BS 5228 Table E.2)

Time	Relevant time period	Averaging time, T	Noise insulation trigger level $L_{Aeq,T}$, dB(A)
Monday to Friday	07.00 - 08.00	1 h	70
	08.00 - 18.00	10 h	75
	18.00 - 19.00	1 h	70
	19.00 - 22.00	3 h	65
	22.00 - 07.00	1 h	55
Saturday	07.00 - 08.00	1 h	70
	08.00 - 13.00	5 h	75
	13.00 - 14.00	1 h	70
	14.00 - 22.00	3 h	65
	22.00 - 07.00	1 h	55
Sunday and Public Holidays	07.00 - 21.00	1 h	65
	21.00 - 07.00	1 h	55

2.3.23 Noise insulation should be considered where the threshold is exceeded for a period of ten or more days of working in any fifteen consecutive days or for a total of days exceeding 40 in any consecutive 6 month period.

2.3.24 It should be noted that temporary re-housing may be provided by the developer or promoter, where applied by legal occupiers, when construction noise levels are expected to exceed certain criteria (e.g. 10dB above the levels shown in the above table or 10dB above pre-construction ambient) over a defined time period, whichever is higher.

2.3.25 Annexes C and D of the Standard provide generic noise levels for various plant and activities that may be used in assessments in the absence of data for specific items of plant.

BS 5228-2:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration'

2.3.26 BS 5228-2 provides guidance for assessing the impacts of vibration at nearby receptors, including methods for measuring vibration and how to assess its effects on people and the environment. The main vibration impacts are likely to arise from piling activities, compaction, or heavy vehicle construction movements near properties.

2.3.27 Annex B of BS 5228-2 gives guidance on the significance of vibration effects in terms of human response to vibration and structural response to vibration. The human response to vibration levels (measured as Peak Particle Velocity (PPV)) is reproduced in **Table 6**.

Table 6 - BS 5228 Guidance on vibration levels and their effects at dwellings

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

2.3.28 **Table 7** presents the guidance levels at which humans will be disturbed from increasing levels of vibration (PPV).

Table 7 - Transient vibration guide values for cosmetic damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

2.3.29 BS 5228-2 Annex E gives empirical formulae for the prediction of the resultant peak particle velocity (PPV) vibration levels in mm/s for various activities. The formulae found in Annex E can be used to estimate the vibration levels when detailed information about the construction method is known.

Calculation of Road Traffic Noise (CRTN) & Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration

2.3.30 The 'Calculation of Road Traffic Noise' (CRTN), produced by the Department of Transport / Welsh Office, provides a method for the prediction of noise from road traffic. DMRB LA 111, provides guidance on the assessment of noise impacts from roads and contains guidance for assessing the likely impact of noise generated by road traffic. The criteria from DMRB for short-term impact (at year of opening) and long-term impacts (by a future year) are presented in **Table 8**.

Table 8 - DMRB criteria for determining magnitude of impact

Magnitude of impact	Change in noise level $L_{A10,18hr}$	
	Short-term	Long-term
No change	0 dB	0 dB
Negligible	0.1 – 0.9 dB	0.1 – 2.9 dB
Minor	1 – 2.9 dB	3 – 4.9dB
Moderate	3 – 4.9 dB	5 – 9.9 dB
Major	5 dB or more	10 dB or more

3.0 Scope and Methodology

3.1 Local Authority Consultation

- 3.1.1 A consultation exercise was undertaken with the EHO at Manchester City Council (MCC), on the 18th August 2022 to discuss noise monitoring locations and assessment methodology. The email sent is included below:

"[...]

Delta-Simons have been instructed to undertake a Noise Impact Assessment in relation to the development of a Site at Atlas Business Park, Wythenshawe and are seeking Manchester City Council's (MCC) comments regarding our proposed assessment methodology. The site is currently vacant and it is proposed to construct 5 commercial warehouse units (B8 use class) totalling circa 411,000ft², with associated loading bays, parking and landscaping. Figure 1² shows the proposed Site boundary.

From reviewing online mapping, the dominant noise sources in the areas are understood to be the existing road network, existing commercial units, and Manchester Airport.

Existing noise sensitive receptors (NSRs) are located approximately 40m north of the Site off Simonsway and 120m south-east of the Site on Cunningham Drive.

Delta-Simons are proposing to undertake a baseline noise survey to establish existing background and ambient noise levels around the Site. Currently, it is anticipated this will involve one fixed measurement position, covering weekday and weekend day and night periods, representative of the north NSRs in addition to a short-term 1-hour measurement at the east NSRs. If it is found that there are security concerns with leaving equipment unattended at the Site, would MCC view taking short-term attended measurements during daytime, evening and night-time periods as being acceptable?

Following the baseline noise survey, assessment will be undertaken to determine the impact of fixed plant and HGV movements against measured background sound levels at NSRs. This assessment will follow the methodology set out in BS 4142. If information regarding plant and Site operations is not available, noise limits will be set to avoid adverse impacts. It is currently assumed that rating levels from the Site should not exceed existing background sound levels to avoid adverse impacts; do MCC agree with this approach?

An indicative desk-based construction vibration assessment shall be conducted to assess the impacts of the construction phase on the nearby NSRs. The assessment shall be informed by vibration predictions of typical construction activities based on indicative construction tasks. Best Practicable Means shall be identified in addition to recommendations of proposed mitigation if required.

If traffic flow data is available, Delta-Simons will assess the potential road traffic noise impacts at NSRs from the surrounding road network by predicting noise levels both with and without the development in place.

Where necessary, mitigation measures will be recommended to reduce noise impacts to acceptable levels.

Would MCC be happy with the above approach? If you have any further input, I look forward to your response."

² Figure 1" referenced in the consultation email was a satellite image of the surrounding area marked up with the Site red line boundary

3.1.2 At the time of this assessment, a response has not been received from the EHO regarding the proposed assessment methodology, however it is noted from local planning policy that impacts of 5dB below existing background sound levels should be targeted. The assessment methodology has been updated accordingly.

3.2 Scope

3.2.1 The scope of the assessment has been determined in the following way:

- Undertake a baseline noise survey to establish existing ambient and background noise and levels at the closest NSRs;
- Noise modelling software CadnaA has been used to create a 3D noise model of the Site to undertake operational noise calculations to inform the assessment;
- Provide maximum plant noise limits for any proposed fixed plant associated with the development in line with BS 4142:2014+A1:2019, whereby the rated level of noise is 5dB below the background sound level at NSRs;
- Undertake an indicative construction noise and vibration assessment;
- Assess any likely traffic noise impacts as a result of the Proposed Development; and
- Provide advice for suitable mitigation for the proposed development.

3.3 Identification of Receptors

3.3.1 Using online mapping services, the following NSRs have been identified and subsequently assessed. The table below also states the time periods where each receptor is sensitive to noise.

3.3.2 The location of these receptors is shown in **Figure 1**.

Table 9 - Sensitivity of Receptors

ID	Receptor	Direction and Distance from Site Boundary	Sensitive Time Period
R1	Residential dwelling off Patch Croft Road	35m North	Daytime and Night-time
R2	Residential dwelling off Patch Croft Road	37m North	Daytime and Night-time
R3	Residential dwelling off Cunningham Drive	118m South-East	Daytime and Night-time
R4	Residential dwelling off Irvin Drive	148m East	Daytime and Night-time

3.4 Plant Noise Limits - BS 4142:2014+A1:2019 Assessment

3.4.1 At this stage the exact details and location of fixed plant (e.g. air handling units and transformers) to be installed on the proposed units is not known. Therefore, as a conservative approach, a plant noise limit is provided that the development should not exceed when measured in free-field conditions at each NSR.

3.5 Operational Noise – BS 4142:2014+A1:2019 Assessment

- 3.5.1 A 3D noise model has been built to calculate the noise levels associated with operational HGV movements and deliveries on the Site at the closest NSRs.
- 3.5.2 The assessment has considered noise impacts during daytime and night-time periods. This has been undertaken to demonstrate a worst-case assessment where only external noise sources are assessed (i.e HGV movements and loading/unloading of trailers).
- 3.5.3 To determine the impact as noise levels that could be produced from the proposed operations on the Site, the assessment has been undertaken using methods from BS 4142:2014+A1:2019. The rating levels of the operational processes are assessed against 5dB below the background sound level at the identified receptors.
- 3.5.4 This assessment considers a 1-hour reference time for the daytime period, and a 15-minute reference time for the night-time period.
- 3.5.5 The operational assessment has assumed all 52 loading bays would be active in a single 1 hour daytime assessment period. At night, a reasonable worst case of 50% of bays being active in a single 15 minute assessment period has been assumed.

3.6 Night-Time L_{AFmax} Event – BS 8233:2014 Assessment

- 3.6.1 Maximum noise events associated with deliveries during the night-time period attributable to doors shutting, clicks, and bangs are also considered within the assessment.
- 3.6.2 The following table details the L_{AFmax} noise levels associated with vehicle door slams as measured set out in Bayerisches Landesamt für Umwelt Parking Area Noise (2007):

Table 10 – Vehicle Door Slams – L_{AFmax} Noise Level

Event	Measurement Distance (m)	Measured dB L_{AFmax}
Vehicle Door Slam	7.5	72.1

- 3.6.3 BS 8233 notes that, individual noise events should not exceed 45dB L_{AFmax} internally.
- 3.6.4 It is widely accepted that a partially open window will provide 15dB noise attenuation and therefore internal noise levels have been calculated and assessed against a limit of 45dB L_{AFmax} .

3.7 Construction Phase Assessment – BS 5228:2009+A1:2014: Parts 1&2

- 3.7.1 At this stage, construction schedule details are not available. It is anticipated that the majority of work would be conducted during normal daytime hours. The nearest receptors to the construction works are highlighted in **Table 9**. At these distances, typical worst-case noise and vibration levels from an indicative example of the works can be predicted.

3.8 Development Traffic Flows – CRTN & DMRB

- 3.8.1 Given the location of the Site directly onto an arterial route, it is considered that a spreadsheet calculation of basic traffic noise changes would be sufficient to identify the level of impact from the proposed development.
- 3.8.2 Baseline traffic flows and traffic flows with the proposed development have been provided by the Client and are presented in **Table C 1**, with calculations set out in **Table C 2** in **Appendix C**.
- 3.8.3 An assessment has been carried out using these traffic flows following the methodology set out in CRTN and assessed using the impact scale set out in DMRB LA 111.

3.9 Significance Criteria

Noise Generated by the Site

- 3.9.1 Where the rated level of noise exceeds the adopted noise criteria level, as per BS 4142:2014+A1:2019 and local planning guidance, at the residential receptors, a substantial adverse impact will be observed depending on the context and level of exceedance.
- 3.9.2 Where the change in noise level as a result of road traffic development flows significantly exceeds the noise criteria of DMRB at the residential receptors a substantial adverse impact will be observed.

4.0 Baseline

4.1 Introduction

- 4.1.1 A noise monitoring survey was undertaken to characterise levels currently experienced on the Site. Measurements were undertaken at the following locations:

Table 11 - Measurement Locations

Measurement Location	Latitude	Longitude	Date and Time	Observations
L1	53.371613	-2.244177	11:57 26 th August 2022 to 12:27 30 th August 2022	Road traffic noise from Simonsway in addition to overhead aircraft noise was dominant. Birdsong could be heard in addition to pedestrians passing on Simonsway.
S1	53.369220	2.241376	10:07 to 11:07 26 th August 2022	Dominant road traffic noise from Styal Road in addition to overhead aircraft noise was dominant. In periods of no road and air traffic plant noise could be heard from extraction fans at the Flying Horse pub.

- 4.1.2 The noise monitoring locations are shown in **Figure 1**.

4.2 Noise Measurement Equipment

- 4.2.1 The following noise monitoring equipment was used throughout the survey.

Table 12 - Noise and Vibration Measurement Equipment

Measurement Position	Equipment	Model Type	Serial Number	Date of Last Laboratory Calibration before Survey Date
L1 and S1	Sound Level Meter	Rion NL-52	00510142	25 th February 2022
	Pre-amplifier	Rion NH-25	319285	
	Microphone	Rion UC-59	02847	
	Calibrator	01dB CAL-31	93438	6 th January 2022

- 4.2.2 The sound measurement equipment was checked against the appropriate acoustic calibrator at the beginning and end of the measurements, in accordance with recommended practice, with no notable drift recorded. Calibration certificates for all equipment used are available on request.

4.3 Weather Conditions

4.3.1 The table below summarises the periods of adverse meteorological conditions during the survey period.

Table 13 - Adverse Meteorological Conditions during the Survey

Adverse Condition	Time period
Wind Speeds $>5\text{ms}^{-1}$	None
Precipitation	None

4.4 Measured Baseline Noise Levels

4.4.1 The table below summarises the measured data at location L1. A graphical representation of the survey data at L1 is shown in **Figure 3**.

Table 14 - L1 Survey Summary Results

Period		Duration	Measured Levels, dB				
			$L_{Aeq,T}$	$L_{AFmax,T}$	$L_{A10,T}$	$L_{A90,T}$	
						Arithmetic Average	Modal Average
Weekday	Daytime	32 hours 57 minutes	73.4	100.5	72.4	55.5	57
	Night-time	16 hours	68.6	99.8	61.1	42.7	40
Weekend	Daytime	32 hours	69.7	96.9	69.8	53.9	55
	Night-time	16 hours	67.6	94.4	65.4	47.5	45
Overall	Daytime	64 hours 57 minutes	72.0	100.5	71.1	54.7	55
	Night-time	32 hours	68.2	99.8	63.2	45.2	45

4.4.2 The table below summarises the results of the attended measurement at S1 representative of receptors to the east of the Site.

Table 15 - S1 Survey Summary Results

Measurement Location	Period	Measured Levels, dB				
		L _{Aeq,T}	L _{Amax,T}	L _{A10,T}	L _{A90,T}	
					Arithmetic Average	Modal Average
S1	Daytime 10:07 - 11:07	71.7	89.5	73.2	51.9	54

5.0 Assessment

5.1 Acoustic Character Corrections

- 5.1.1 Given the context of the Proposed Development being of a similar nature to the existing surrounding commercial premises, it is considered that the proposed development is not a new noise source within the area and that the NSRs would have already experienced similar noise levels from existing commercial premises. However, to present a reasonable worst-case assessment, a +3dB correction for intermittency has been included in the assessment.

5.2 Plant Noise Limits - BS 4142:2014+A1:2019 Assessment

- 5.2.1 The positioning and details of the fixed plant associated with the Site were not available at the time of this assessment. Therefore, plant noise limits at each receptor are provided.
- 5.2.2 The table below presents the rating limits at NSRs for both daytime and night-time periods, on the basis that the rating level should be 5dB below the measured background sound level, as required by MCC.

Table 16 - Plant Limits BS 4142:2014+A1:2019 Assessment

Receptor	Period	Measured Modal Background Sound Level , $L_{A90,T}$ (dB)	Target Rating Noise Level
R1	Daytime	55	50
	Night-time	45	40
R2	Daytime	55	50
	Night-time	45	40
R3	Daytime	54	49
	Night-time	45	40
R4	Daytime	54	49
	Night-time	45	40

- 5.2.3 The rating levels presented in the table above are inclusive of any acoustic feature corrections.
- 5.2.4 Provided the Rating Noise Level at the NSRs do not exceed levels shown in the table above, there would be **no adverse impact**.

5.3 Operational Noise - BS 4142:2014+A1:2019 Assessment

- 5.3.1 To present a worst-case assessment, it has been assumed that all the 52 proposed HGV bays will be operational at any one time for the daytime and 50% will be operational at any one time for the night-time period.
- 5.3.2 **Table 17** completes the BS 4142:2014+A1:2019 assessment for both the daytime and night-time periods, on the basis that the rating level should be 5dB below the measured background sound level, as required by MCC.

Table 17 - Operational BS 4142:2014+A1:2019 Assessment

Receptor	Period	Specific Noise Level at Receptor, $L_{Aeq,T}$ (dB)	Acoustic Feature Corrections, dB	Calculated Rating Level (dB)	Measured Modal Background Sound Level, $L_{90,T}$ (dB)	Difference +/- (dB)
R1	Daytime	30	+3	33	55	-22
	Night-time	31	+3	34	45	-11
R2	Daytime	37	+3	40	55	-15
	Night-time	38	+3	41	45	-4
R3	Daytime	30	+3	33	54	-21
	Night-time	30	+3	33	45	-12
R4	Daytime	32	+3	35	54	-19
	Night-time	33	+3	36	45	-9

5.3.3 The assessment indicates that the rated level of noise will be at least 5dB below the measured background sound level at all NSRs for the daytime period. Therefore, daytime impacts are considered to be **negligible**.

5.3.4 At receptor R2, the rated level of noise is 4dB below existing background. This exceeds the MCC requirement for rating levels to be 5dB below background sound levels. However, for the night-time period it is not reasonably expected that occupiers of the dwelling will use their garden area during night-time hours and so it is necessary to consider sound levels within bedrooms. **Table 18** calculates the specific level of sound in a bedroom of the dwelling.

Table 18 - Internal Noise Operational BS 4142:2014+A1:2019 Assessment

Receptor	Night-time Sound Level at Receptor $L_{Aeq,15min}$ (dB)	Sound Reduction of a Partially Open Window (dB)	Calculated Internal Sound Level (dB)	Internal Noise Criteria for Bedrooms (dB)	Difference +/- (dB)
R1	31	-15	16	30	-14
R2	38	-15	23	30	-7
R3	30	-15	15	30	-15
R4	33	-15	18	30	-12

5.3.5 As shown in the table above, internal noise level criteria would not be exceeded during night-time hours. Therefore, it is considered that night-time noise levels would have a **negligible** impact.

5.4 Night-Time L_{AFmax} event - BS 8233:2014 Assessment

5.4.1 A typical L_{AFmax} noise event is assumed to occur when the Site is operational and would typically be attributable to vehicle door slams. The assessment uses the L_{AFmax} noise event level set out in **Table 10** and calculates the internal noise level from this.

5.4.2 The table below calculates the internal noise level based on the L_{AFmax} noise event level.

Table 19 - Highest Predicted L_{AFmax} Noise Level

Receptor	External L_{AFmax} Noise Event Level (dB)	Attenuation for a Partially Open Window (dB)	Internal Noise Level Criteria L_{AFmax} (dB)	Calculated Internal Noise Level L_{AFmax} (dB)	Difference +/- (dB)
R1	42	-15	45	27	-18
R2	50	-15	45	35	-10
R3	44	-15	45	29	-16
R4	46	-15	45	31	-14

5.4.3 The table above shows that the calculated internal noise level from a L_{AFmax} event would not exceed internal noise level criteria at any NSR. Therefore, a **negligible** impact is predicted.

5.5 Construction Noise and Vibration - BS 5228-1:2009+A1:2014: Part 1 and 2 Noise

5.5.1 The assessment of construction noise uses the ABC Method set out in BS 5228-1 to determine the significance of impacts at sensitive residential receptors.

5.5.2 As a conservative approach, construction activities are assumed to occur on the Site boundaries at the closest point to each receptor. In reality these tasks are likely to occur further away from receptors for the majority of the construction period.

5.5.3 The NSRs detailed in **Table 9** have been used to inform the assessment.

5.5.4 Construction works are assumed to take place during the weekday daytimes only and therefore the evening, weekend and night-time periods has not been included in this assessment.

5.5.5 Ambient daytime noise levels were measured as being 73dB L_{Aeq} during the weekday daytime, putting the residential receptors into Category C for this period.

5.5.6 An indicative construction activity and plant list has been derived to assess the potential construction phase noise impact upon NSRs. These are detailed in the table below.

Table 20 - Assumed Plant List

Activity	Plant	BS 5228-1 Reference	Number of Plant Items	A-weighted SPL, dB(A) (at 10m)	% on Time	Total Correction dB	Total L_p at 10m dB(A)
Earth work	Tracked excavator	C2.3	1	78	60	-14.4	63.6

Activity	Plant	BS 5228-1 Reference	Number of Plant Items	A-weighted SPL, dB(A) (at 10m)	% on Time	Total Correction dB	Total L _p at 10m dB(A)
	Dozer	C5.12	1	77	50	-16.0	61.0
	Articulated dump truck	C2.32	1	74	50	-16.0	58.0
Foundations	Pump (water)	C4.88	1	68	100	-10.0	58.0
	Cement mixer truck (discharging)	C4.28	1	75	60	-14.4	60.6
	Cement mixer truck (idling)	C4.26	1	75	40	-18.0	57.0
	Mobile telescopic crane	C4.39	1	77	30	-20.5	56.5
	Hydraulic breaker power pack	C1.8	1	74	70	-13.1	60.9
	Generator	C4.78	1	66	100	-10.0	56.0
	Piling	C3.9	1	63	60	-14.4	48.6
General Construction	Concrete Mixer Truck	C4.20	1	80	50	-16.0	64.0
	Mini Tracked Excavator	C4.68	1	65	50	-16.0	49.0
	Vibratory roller	C2.39	1	74	50	-16.0	58.0
	Asphalt paver + tipper lorry	C5.31	1	77	50	-16.0	61.0
	Dozer	C5.12	1	77	50	-16.0	61.0
	Articulated dump truck	C2.32	1	74	50	-16.0	58.0
	Lorries	C11.10	1	77	50	-16.0	61.0

5.5.7 The table below concludes the BS 5228 noise assessment for the weekday daytime period.

Table 21 - Predicted Noise Levels at the Closest Receptor from the Boundary of the Site

Receptor	Period	Total of Plant at 10m dB(A)	Distance from Site Boundary to Receptor (m)	Distance Attenuation (dB)	Resultant Noise Level dB(A)	BS 5228 Category C Criteria	Difference (+/-)
R1	Weekday	72.1	35	11.6	60.5	75	-14.5
R2	Weekday	72.1	37	12.2	59.9	75	-15.1
R3	Weekday	72.1	118	24.8	47.3	75	-27.7
R4	Weekday	72.1	148	27.3	44.8	75	-30.2

5.5.8 As can be seen in the table above, the resultant noise level is below the significant effect threshold value. Therefore, a **negligible** impact is predicted at this time.

Vibration

5.5.9 Construction related vibration may arise from piling and earth compaction activities around the Proposed Development.

5.5.10 As these works are transient and will not be taking place in close proximity to receptors for extended periods of time, it is considered that PPV levels up to 1 mm/s would be acceptable provided residents are given advance notice of the work. The assessment has used a threshold where there is a 33.3% probability that this level may be exceeded.

5.5.11 The calculations below have been undertaken in line with guidance presented in BS 5228 Part 2. The formulae presented in this standard are based on distances up to 111m for percussive piling, 100m for vibratory piling and 110m for vibratory compaction. Therefore, receptors R3 and R4 have not been included within this assessment.

5.5.12 Piling works are assumed to take place at the proposed warehouse units, the closest façade to each receptor has been taken to calculate the distance.

5.5.13 At the time of the assessment, it is unknown what type of piling will be used and therefore, calculations have been carried out for both percussive and vibratory piling. The results of the calculations are shown in the tables below.

Table 22 - Percussive Piling Construction Vibration Assessment

Receptor	Scaling Factor	Nominal Hammer Energy (J)	Slope Distance (m)	Pile Toe Depth (m)	Distance from Receptor	Resultant PPV (mm/s)
R1	3	3000	50	5	50	1
R2	3	3000	65	5	65	0.7

Table 23 - Vibratory Piling Construction Vibration Assessment

Receptor	Scaling Factor	Parameter Range	Distance from Receptor	Resultant PPV (mm/s)
R1	126	1.3	50	0.8
R2	126	1.3	65	0.6

5.5.14 As can be seen in the tables above, both methods of piling result in a vibration level of around 1.0mm/s. Therefore, it is likely that vibration of this level in residential environments will cause complaints but can be tolerated if prior warning and explanation has been given to residents.

5.5.15 Calculations of vibration from earth compaction have been based on manufacturer data for a Cat CC2.6 Tandem Vibratory Roller, with two drums of 1.2m width, and a nominal maximum amplitude of vibration of 0.56 mm.

5.5.16 Earth compaction works are assumed to take place at the site boundary. The results of the calculations are shown below for both start up, rundown and steady state activities in the tables below.

Table 24 - Start Up/Rundown Vibratory Compaction Construction Vibration Assessment

Receptor	Number of Vibrating Drums	Scaling Factor	Maximum Amplitude of Drum Vibration (mm)	Vibrating Roller Drum Width (m)	Distance from Receptor	Resultant PPV (mm/s)
R1	2	106	0.56	1.2	35	0.6
R2	2	106	0.56	1.2	37	0.6

Table 25 - Steady State Vibratory Compaction Construction Vibration Assessment

Receptor	Number of Vibrating Drums	Scaling Factor	Maximum Amplitude of Drum Vibration (mm)	Vibrating Roller Drum Width (m)	Distance from Receptor	Resultant PPV (mm/s)
R1	2	143	0.56	1.2	35	0.4
R2	2	143	0.56	1.2	37	0.4

5.5.17 As can be seen in the tables above, earth compaction result in a vibration level of around 1.0 mm/s. Vibration of this level in residential environments may cause complaints but can be tolerated if prior warning and explanation has been given to residents.

5.6 Road Traffic Noise - CRTN & DMRB Assessment

5.6.1 The existing and predicted traffic flows on roads surrounding the Site have been provided by the project transport consultant. The data provided is shown in **Table C 1** with supporting calculations in **Table C 2**.

5.6.2 Basic Noise Level (BNL) calculations have been undertaken for the without scheme (Do Minimum) and with Proposed Development (Do Something) scenarios. BNLs have not been corrected for any gradients, barriers, or road surface types.

5.6.3 The results of the Basic Noise Level (BNL) calculations are shown in **Table 26**.

Table 26 - Basic Noise Level, $L_{A10,18\text{hour}}$ dB, with and without the development

ID	Road	BNL $L_{A10,18\text{hour}}$ dB		Impact $L_{A10,18\text{hour}}$ dB
		Do Minimum	Do Something	
1	Tuffley Road	67	66.9	+0.1
2	M56	86	86.5	+0.1
3	Simonsway	68	69.1	+0.8
4	Simonsway	68	69.1	+0.8
5	Simonsway	68	68.7	+0.8
6	Simonsway	68	68.9	+0.7
7	Styal Road	67	67.2	+0.2
8	Finney Lane	68	67.6	0.0
9	Styal Road	70	70.5	+0.3
10	A555	77	76.6	0.0
11	Styal Road	69	68.8	+0.1
12	A555	75	74.6	0.0
13	A556	74	74.1	+0.1
14	A557	80	80	+0.1
15	M56	86	85.6	0.0

5.6.4 It can be seen in the table above that there is up to +0.8 $L_{A10,18\text{hour}}$ change in basic noise level on surrounding roads due to traffic associated with the Site, which indicates a **negligible** impact.

6.0 Mitigation

6.1.1 No mitigation is proposed for the Site following the results of the assessment.

7.0 Summary and Conclusions

- 7.1.1 Delta-Simons was instructed by Ridge and Partners LLP c/o AVIVA Investors to undertake a Noise Impact Assessment to inform a full planning application for c.411,300sq. ft of B8 type units, located at Atlas Business Park, Simonsway, Wythenshawe, Manchester, M22 5PR.
- 7.1.2 This assessment has been undertaken to identify the key noise and vibration sources associated with the proposal, which may have the potential to impact the closest sensitive noise sensitive receptors. Accordingly, this assessment has been completed with due regard to:
- National Planning Policy Framework (NPPF);
 - National Planning Policy Guidance (NPPG);
 - BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound';
 - BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings';
 - BS 5228-1:2009+A1:2014: 'Code of practice for noise and vibration control on construction and open sites Part 1: Noise';
 - BS 5228-1:2009+A1:2014: 'Code of practice for noise and vibration control on construction and open sites Part 2: Vibration';
 - Calculation of Road Traffic Noise (CRTN); and
 - Design Manual for Roads and Bridges (DMRB).
- 7.1.3 This assessment has been informed by a noise survey, completed over a weekday and weekend period, to quantify the existing background noise environment at the sensitive receptors.
- 7.1.4 Operational and fixed plant noise assessments have been carried out on the basis that the rating level should be 5dB below the measured background sound level, as required by Manchester City Council.
- 7.1.5 The operational assessment results have shown that the rated level of noise is more than 5dB below the daytime background sound levels at the closest receptors.
- 7.1.6 Results for the night-time scenario have shown that the rated level of noise would be more than 5dB below the background sound levels at the majority of receptors, however at one receptor, the rated level of noise would only be 4dB below background sound levels. The assessment has shown that internal noise levels would still be below guideline levels. Therefore, a **negligible impact** is predicted.
- 7.1.7 This assessment has set noise limits for fixed plant items at the closest receptors. Provided the noise emission at receptor locations from fixed plant on the Site does not exceed 49dB $L_{Ar,1hour}$ in the daytime and 40dB $L_{Ar,15min}$ at night-time at the closest receptor, a **negligible impact** is predicted.
- 7.1.8 The BS 8233:2014 night-time L_{AFmax} event assessment has concluded that the calculated internal noise level from a L_{AFmax} event would not exceed internal noise level criteria at any NSR. Therefore, a **negligible impact** is predicted.
- 7.1.9 An indicative construction phase assessment has been undertaken based on typical examples of construction tasks and scheduling, concluding a **negligible impact** on noise and vibration sensitive receptors.
- 7.1.10 The traffic assessment results have shown that there is up to +0.8 $L_{A10,18hour}$ change in basic noise level on surrounding roads due to traffic associated with the Site, which indicates a **negligible impact**.

Figure 1 - Site Boundary and Measurement Locations

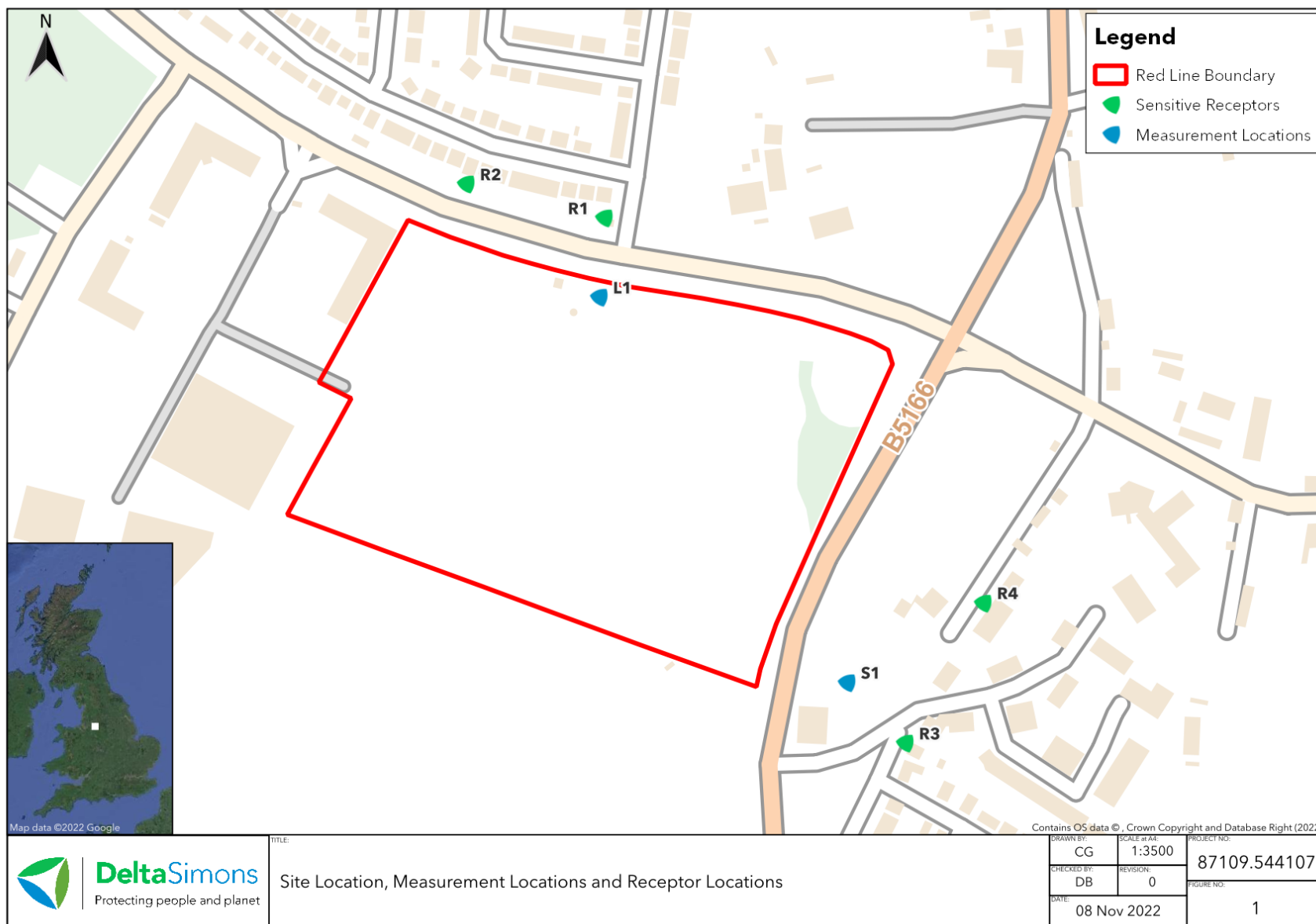
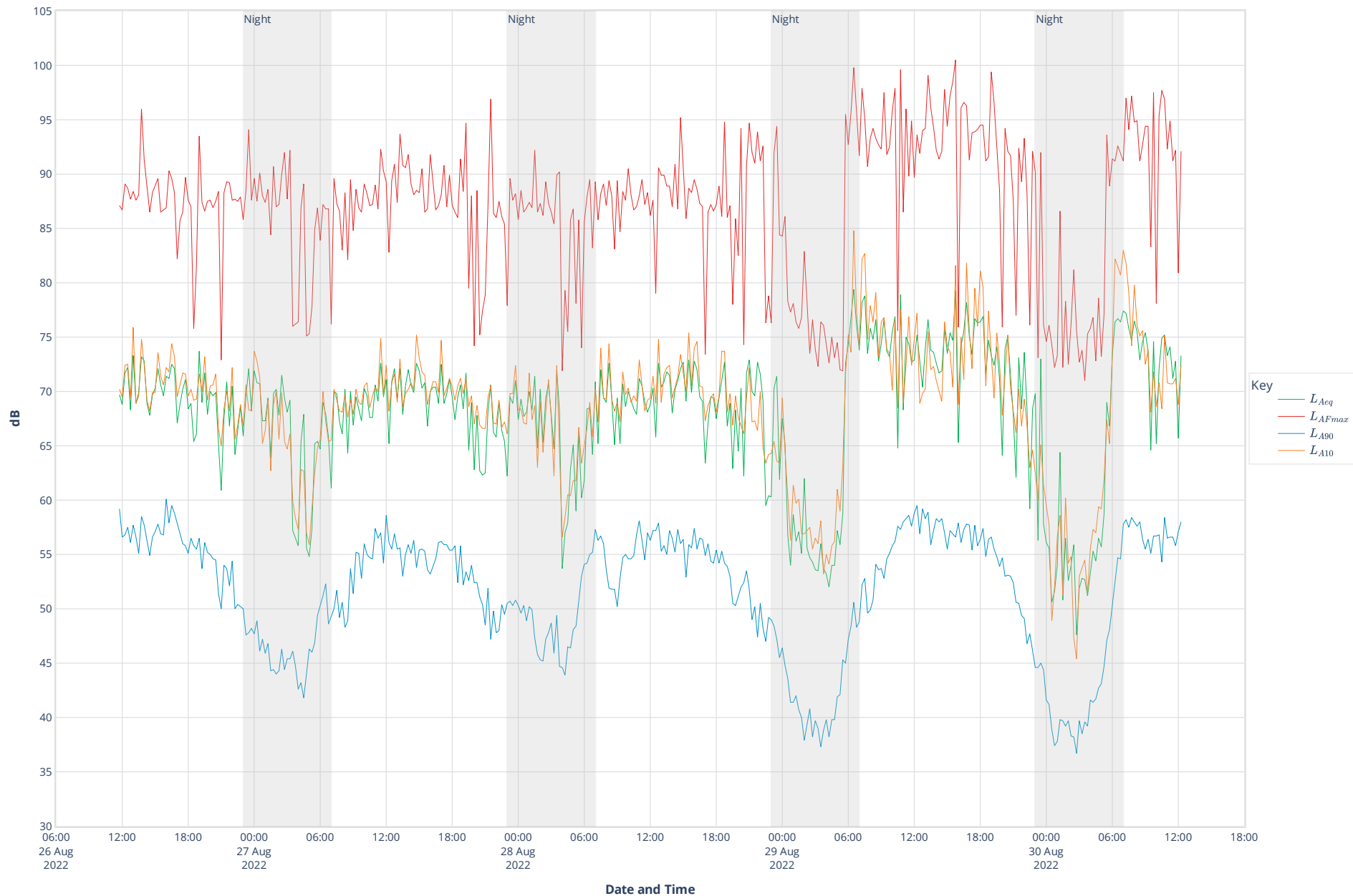


Figure 2 - Proposed Site Layout



Figure 3 - LT1 Time History Plot



Appendix A - Limitations

Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Appendix B - Glossary

Glossary

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table B1 - Typical Sound Pressure Levels

Sound Pressure Level (dB)	Location/Example
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140	Threshold of pain

Table B2 - Terminology

Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

Appendix C - Traffic Data and Calculations

Table C 1 - Traffic Data, AAWT 18hour

ID	Road	Speed (km/h)	Do Minimum		Do Something	
			Flow	% HGV	Flow	% HGV
1	Tuffley Road	32	14240	4%	14310	4%
2	M56	113	183600	6%	185657	6%
3	Simonsway	48	15657	3%	17784	4%
4	Simonsway	48	14865	4%	16992	5%
5	Simonsway	48	14661	3%	16922	4%
6	Simonsway	48	16882	2%	18114	3%
7	Styal Road	48	13628	1%	14116	1%
8	Finney Lane	48	15153	2%	15258	2%
9	Styal Road	64	19319	1%	19957	2%
10	A555	80	41616	3%	41826	3%
11	Styal Road	64	11959	3%	12172	3%
12	A555	64	45062	4%	45280	4%
13	A556	64	38627	4%	38844	4%
14	A557	97	64298	3%	64515	3%
15	M56	113	145306	7%	145524	7%

Table C 2 - Traffic Calculations

ID	Road	Scenario	Flow (vehicles)	Time Basis (hours)	Vehicle speed (km/h)	HGVs	% HGV	Gradient Correction (dB)	Concrete (C) or Bituminous (B) Surface	Pervious (P) or Impervious (I) Surface	Texture Depth (mm)	Surface Correction to Use (dB)	Basic value for 18 hour flows data	BNL (dB)	Change (dB)
1	Tuffley Road	Do Minimum	14240	18	32	501	4	0	B	I	2	0	29.1	67.0	-
		Do Something	14310	18	32	504	4	0	B	I	2	0	29.1	66.9	+0.1
2	M56	Do Minimum	183600	18	113	10746	6	0	B	I	2	0	29.1	86.0	-
		Do Something	185657	18	113	10977	6	0	B	I	2	0	29.1	86.5	+0.1
3	Simonsway	Do Minimum	15657	18	48	501	3	0	B	I	2	0	29.1	68.3	-
		Do Something	17784	18	48	694	4	0	B	I	2	0	29.1	69.1	+0.8
4	Simonsway	Do Minimum	14865	18	48	566	4	0	B	I	2	0	29.1	68.3	-
		Do Something	16992	18	48	772	5	0	B	I	2	0	29.1	69.1	+0.8
5	Simonsway	Do Minimum	14661	18	48	404	3	0	B	I	2	0	29.1	67.9	-
		Do Something	16922	18	48	593	4	0	B	I	2	0	29.1	68.7	+0.8
6	Simonsway	Do Minimum	16882	18	48	339	2	0	B	I	2	0	29.1	68.2	-
		Do Something	18114	18	48	539	3	0	B	I	2	0	29.1	68.9	+0.7
7	Styal Road	Do Minimum	13628	18	48	194	1	0	B	I	2	0	29.1	67.0	-

ID	Road	Scenario	Flow (vehicles)	Time Basis (hours)	Vehicle speed (km/h)	HGVs	% HGV	Gradient Correction (dB)	Concrete (C) or Bituminous (B) Surface	Pervious (P) or Impervious (I) Surface	Texture Depth (mm)	Surface Correction to Use (dB)	Basic value for 18 hour flows data	BNL (dB)	Change (dB)
		Do Something	14116	18	48	201	1	0	B	I	2	0	29.1	67.2	+0.2
8	Finney Lane	Do Minimum	15153	18	48	242	2	0	B	I	2	0	29.1	67.6	-
		Do Something	15258	18	48	244	2	0	B	I	2	0	29.1	67.6	0
9	Styal Road	Do Minimum	19319	18	64	242	1	0	B	I	2	0	29.1	70.2	-
		Do Something	19957	18	64	364	2	0	B	I	2	0	29.1	70.5	+0.3
10	A555	Do Minimum	41616	18	80	1164	3	0	B	I	2	0	29.1	76.6	-
		Do Something	41826	18	80	1170	3	0	B	I	2	0	29.1	76.6	0
11	Styal Road	Do Minimum	11959	18	64	388	3	0	B	I	2	0	29.1	68.7	-
		Do Something	12172	18	64	395	3	0	B	I	2	0	29.1	68.8	+0.1
12	A555	Do Minimum	45062	18	64	1617	4	0	B	I	2	0	29.1	74.6	-
		Do Something	45280	18	64	1734	4	0	B	I	2	0	29.1	74.6	0
13	A556	Do Minimum	38627	18	64	1568	4	0	B	I	2	0	29.1	74.0	-
		Do Something	38844	18	64	1687	4	0	B	I	2	0	29.1	74.1	+0.1
14	A557	Do Minimum	64298	18	97	1714	3	0	B	I	2	0	29.1	79.9	-

ID	Road	Scenario	Flow (vehicles)	Time Basis (hours)	Vehicle speed (km/h)	HGVs	% HGV	Gradient Correction (dB)	Concrete (C) or Bitumous (B) Surface	Pervious (P) or Impervious (I) Surface	Texture Depth (mm)	Surface Correction to Use (dB)	Basic value for 18 hour flows data	BNL (dB)	Change (dB)
		Do Something	64515	18	97	1829	3	0	B	I	2	0	29.1	80.0	+0.1
15	M56	Do Minimum	145306	18	113	10660	7	0	B	I	2	0	29.1	85.6	-
		Do Something	145524	18	113	10786	7	0	B	I	2	0	29.1	85.6	0