



Virgin Media, Baguley, Manchester

Noise impact assessment

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6th April 2020

Revision A



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2 Summary

- 2.1 This report has been prepared to assess the noise impact due to new mechanical services equipment at the Virgin Media (VM) facilities in Baguley, Manchester.
- 2.2 Representative background noise levels at the nearest sound sensitive location and the noise levels from existing equipment have been measured.
- 2.3 Noise emission from the proposed plant has been determined and noise propagation modelled with proprietary software CadnaA.
- 2.4 The potential noise impact is calculated and assessed in accordance with BS 4142 and assessed against the local authority desirable noise limits for fixed plant.
- 2.5 Based on the current development proposals it is calculated that the new fixed plant will not exceed the desirable noise limits proposed by the local authority and no mitigation is required.
- 2.6 The highest calculated BS 4142 rating level at the nearby noise sensitive receptors (NSR) is 10 dB below the measured background level, and has a very low risk of a likely adverse effect.
- 2.7 This impact is considered to be below the level of a LOAEL in alignment with the NPPF and NPSE aims.

3 Scope of appointment

- 3.1 Apex Acoustics has been commissioned to undertake a noise impact assessment of the noise from new mechanical services equipment associated with the development.
- 3.2 The scope of our instruction includes:
- Analysis of proposed source noise levels, using manufacturers' data provided by the client;
 - Calculate noise propagation to the noise-sensitive receptor and assess the impact in accordance with BS 4142: 2014;
 - Advise on a scheme for noise mitigation to satisfy Local Authority requirements;

4 Introduction

- 4.1 New mechanical services equipment is to be installed at Virgin Media (VM), Baguley, Manchester. The site location is shown in Figure 1.
- 4.2 This report presents the evaluation of the potential noise impact from the new equipment on the identified noise-sensitive receptors (NSR), to support the Planning Application.
- 4.3 The NSR are identified as the residential properties to the East of the VM site on the opposite side of Southmoor Road.
- 4.4 The potential noise impact from the sources identified is calculated and rated according to the BS 4142 methodology, Reference 1

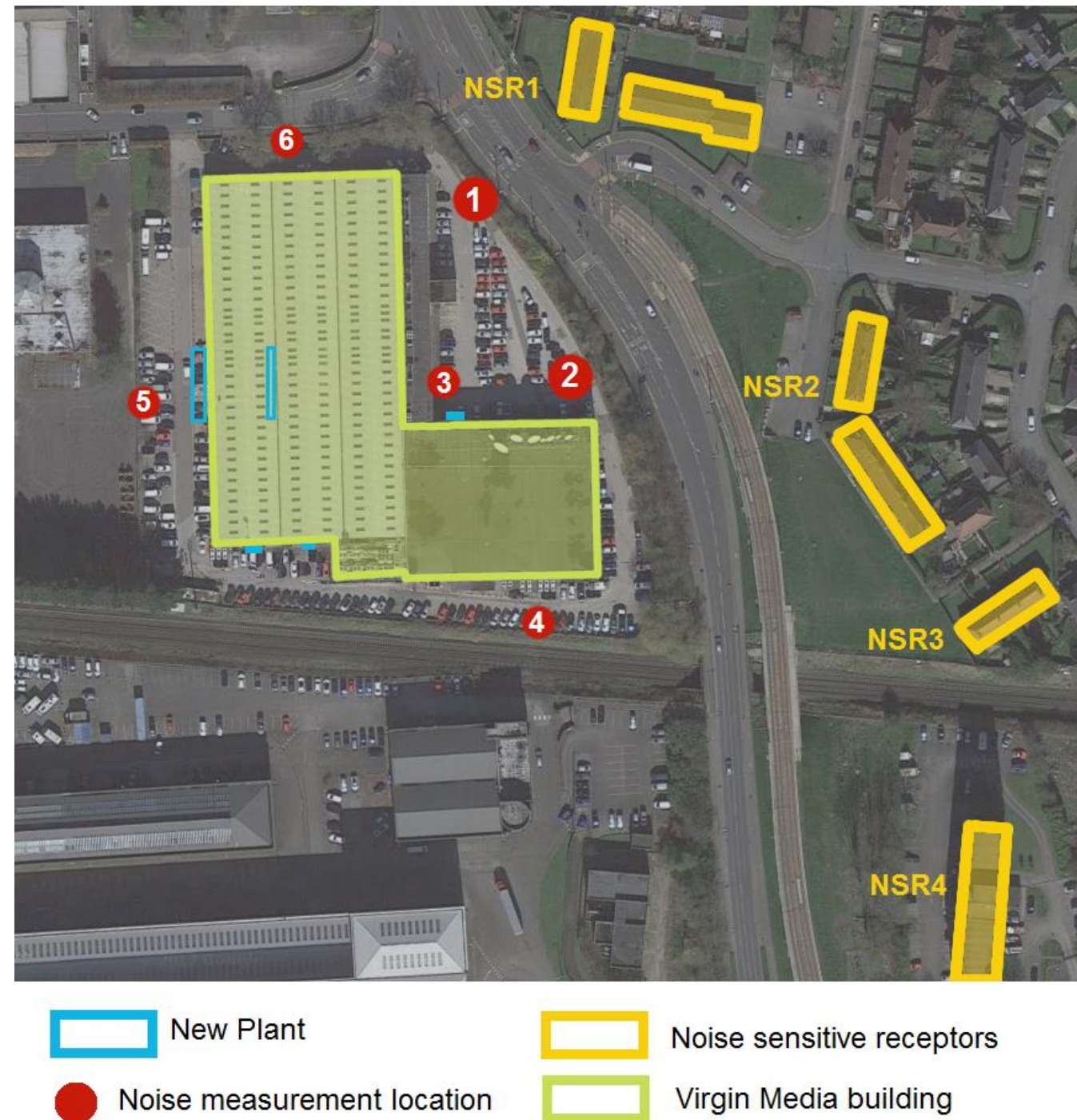


Figure 1: Site, measurement position and identified NSRs

5 Planning policy and noise criteria

- 5.1 The National Planning Policy Framework (NPPF, 2012), Reference 2, sets out the Government's economic, environmental and social planning policies for England and "these policies articulate the Government's vision of sustainable development".
- 5.2 The NPPF is consistent with the Noise Policy Statement for England (NPSE, 2010), Reference 3.
- 5.3 The aims of the NPPF and NPSE are consistent with the terminology used in BS 4142: 2014 to describe the various levels of potential adverse impact, as summarised in Appendix 1.
- 5.4 Further guidance on the various levels of adverse impact due to noise is provided in the Planning Practice Guidance notes, Reference 4.
- 5.5 **Local Authority requirements**
- 5.6 Manchester City Council, Planning and Noise – Technical Guidance, Reference 5, details the relevant local policies and provides criteria for new developments.
- 5.7 For developments which introduce fixed plant noise sources the design objective should be:
'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'.

6 Existing acoustic environment

- 6.1 The existing acoustic environment was measured during the evening and night of Monday 9th October 2017.
- 6.2 The measurement positions are shown in Figure 1.
- 6.3 At each noise measurement position, the microphone was located 1.5 metres above ground level and located more than 3.5m from any other sound reflecting surface.
- 6.4 This positions 1 and 2 are considered to be representative of the acoustic environment at the NSRs.
- 6.5 Locations 3,4,5 and 6 were selected to establish the noise levels at the perimeter of the site and assess the contribution from existing plant, which will be used for the potential changes in the future.
- 6.6 Data was recorded in single-octave band frequencies at one-second intervals throughout measurement period.
- 6.7 The most significant noise source at locations 1 and 2 was road traffic from Southmoor Road and intermittent traffic from local roads and the tram line.
- 6.8 Locations 3 and 4 included dominant existing plant noise and location 6 was influenced by a loud vehicle on Timpson Road.
- 6.9 The equipment used is listed in Table 1.

Equipment	Model	Serial no.
Sound Level Meter	NTi XL2	A2A-12479-E0
Calibrator	Larson Davis CAL 200	13405

Table 1: Equipment used

- 6.10 Both meter and calibrator have current calibration certificates traceable to national standards; calibration certificates are available on request.
- 6.11 The equipment was field-calibrated before and after the measurements with no significant drift in sensitivity noted.
- 6.12 At the start of the measurement the temperature was around 14°C, the wind speed measured was approximately 1 m/s, cloud coverage was approximately 90% and no rain occurred.

6.13 The measured noise levels are shown in Table 2.

Noise Measurement Location	Time period	L _{Aeq,T} / dB	L _{A90,T} / dB
1	21:15 to 21:35	59	45
1	23:00 to 23:20	53	43
2	21:45 to 22:05	57	47
2	23:25 to 23:45	51	46
3	22:15 to 22:20	51	48
4	22:25 to 22:30	54	53
5	22:40 to 22:45	44	41
6	22:55 to 23:00	59	42

Table 2: Measured noise levels

- 6.14 The measured background levels at locations 1 and 2 were steady throughout the measurement periods and decreased slightly during the evening.
- 6.15 The measured levels at 5 and 6 were generally shielded from the main transportations sources and give an indication of the lowest levels for shielded facades.

7 Noise sources

7.1 Proposed plant and associated noise levels

- 7.2 The details of the proposed new plant are included within the planning drawings, Reference 6, and the noise levels for each item are summarised in Table 3.
- 7.3 The sound power level of the roof mounted inlets have been calculated using CIBSE guidance, based on the fan power of 2.1 kW and a pressure drop of 100 Pa.

Fixed Plant	No Units	L _{Aeq,T} / dB	L _{WA} / dB
Vertiv External Condensers	15	62 dB at 5m	84 dB
Mitsubishi RPI140KVA	2	-	70 dB
Roof mounted inlets	3	-	90 dB

Table 3: Proposed plant noise levels

7.4 Façade Louvres

- 7.5 The new noise sources include façade mounted louvres which are open to plenum spaces within the building.
- 7.6 Our experience of typical highest noise levels within the data hall is 78 dB L_{Aeq,T} as a reverberant level and this has been used to model the breakout from the louvres.

7.7 Operation times

- 7.8 The fixed plant is understood to operate continuously.

7.9 Noise transmission and propagation

- 7.10 Noise transmission and propagation is modelled to the NSRs based on the noise source data detailed, using proprietary software, CadnaA, Reference 7.
- 7.11 This models noise propagation outdoors according to ISO 9613, Reference 8.
- 7.12 The model is detail in Appendix 3.
- 7.13 The height of the NSRs has been set at 4 m for NSR 1, 2 and 3. NSR 4 was been set at 15m to represent the fifth floor of the apartment block.

8 Assessment results

8.1 Fixed plant

- 8.2 The local authority requires the noise rating levels of the fixed plant to be 5dB, or more; below the typical background levels.
- 8.3 The typical background levels during the early part of the night-time when people are most likely to be getting to sleep are in the low 40s dB L_{A90}. For this assessment we therefore set the noise rating limit as 35 dB L_{Ar,Tr} to meet the local authority requirements.
- 8.4 The calculated worst-case specific noise levels and rating level at the NSR is compared against the pre-existing background noise limit as shown in Table 4.

Location	Predicted specific sound level L _{Aeq,Tr} dB	Predicted rating level L _{Ar,Tr} , dB	Noise rating limit L _{Aeq,T} dB	Limit exceeded?
NSR 1	33	33	35	NO
NSR 2	32	32		NO
NSR 3	31	31		NO
NSR 4	31	31		NO

Table 4: Predicted noise levels at each receptor

- 8.5 The calculated noise contours showing the impact across the site are shown in Figure 2 and the impact is highest at NSR 1.
- 8.6 The noise impact assessment is shown in Table 5 and demonstrates a very low risk of an adverse effect; and that the predicted rating level meets with the local authority requirements.

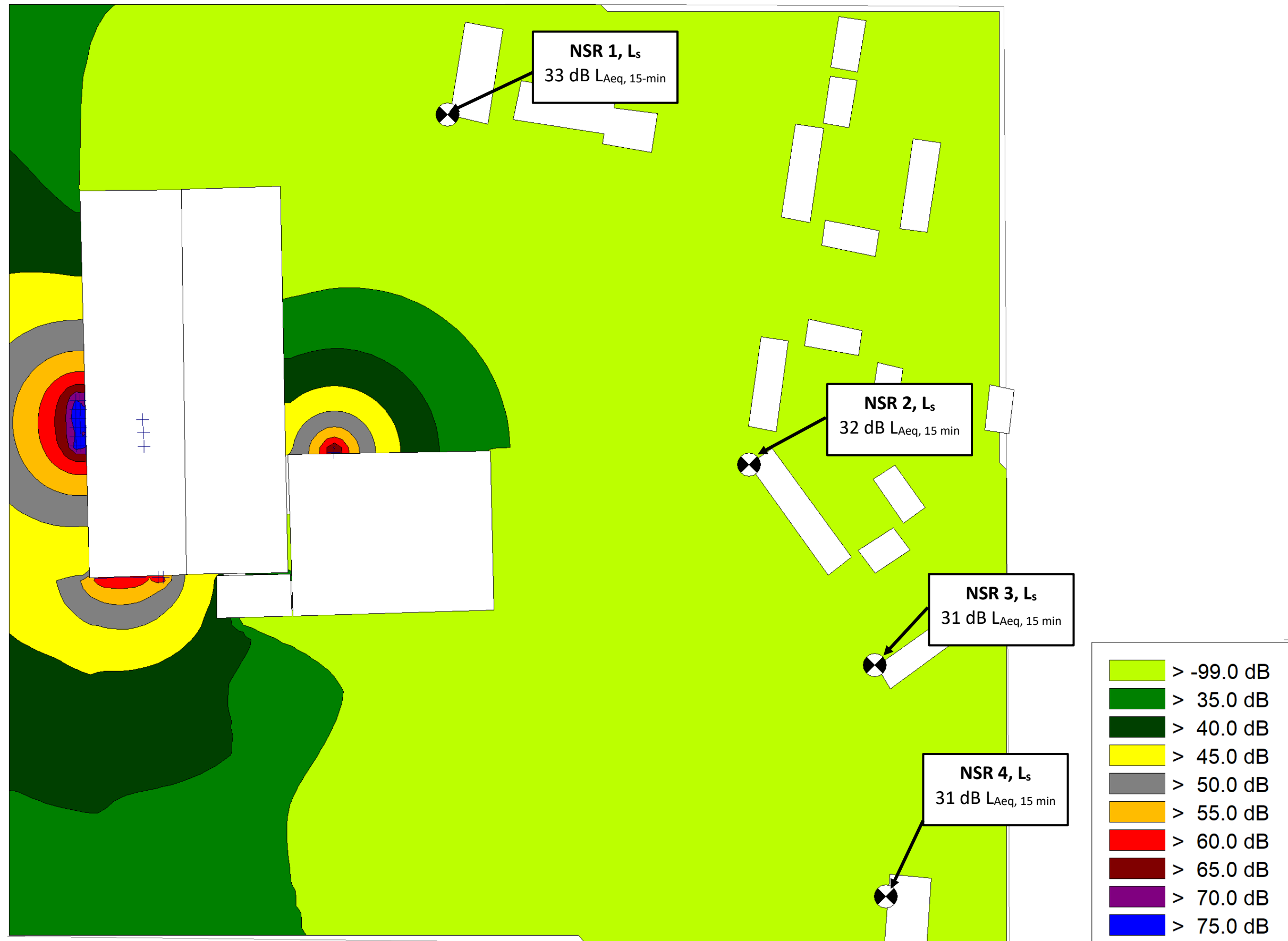


Figure 2: Sound contours at a height of 4 m, showing the calculated specific sound level, $L_{Aeq, 15\text{ min}}$ based on current proposals

Parameter	Night-time assessment	Relevant clause of BS 4142	Commentary
Background sound level	43 dB $L_{A90, 15min}$	8.1.2 8.1.4	Measured during the night-time period. Considered representative of the assessment period when people would be going to sleep..
Specific sound level L_s , due to all sources for the required assessment interval	33 dB $L_{Aeq, 15min}$	7.2 7.3.6	The calculated L_s contours across the site due to all sources during the assessment period are shown in Figure 2; the L_s assessed is the highest calculated level at NSR 1.
Acoustic feature correction	0 dB	9.2	A subjective assessment to determine acoustic features is undertaken, and the following penalties are considered applicable: • Tonality – 0 dB; The sources will considerably quieter than the existing ambient noise and will consist of several different items of fixed plant, running at different speeds. • Impulsivity – 0 dB; The fixed plant has no impulsive characteristics. • Intermittency – 0 dB; The plant will run continuously for the majority of time and will have gradual start and finish cycles which would not be noticeable at the receptors. • Other – 0 dB;
Rating level, $L_{Ar,Tr}$	33 dB		
Uncertainty of assessment	-	10	The measurement period was taken to be representative of what is considered to be a typical operational period during the late evening, early night-time when people are most sensitive to external plant noise disturbing sleep. Uncertainty in the calculated impact has been reduced by the use of a calculation method in accordance with ISO 9613-2. The sound level used are for equipment working at the highest duty, and with all plant operating at the same time. This may occur very rarely, during the warmest days, and is unlikely to occur at night. The excess of the $L_{Ar,Tr}$ below the background sound level is large and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment.
Excess of $L_{Ar,Tr}$ over background sound level	- 10 dB	11	Considering the context of Appendix 4 the assessment result indicates a very low risk of adverse effects

Table 5: BS 4142 assessment results

9 Conclusion

- 9.1 Based on the current development proposals it is calculated that the new fixed plant will not exceed the desirable noise limits proposed by the local authority and no mitigation is required.
- 9.2 The calculated BS 4142 rating level at the NSR is 10 dB below the measured background level, and has a very low risk of a likely adverse effect.
- 9.3 This impact is considered to be below the level of a LOAEL in alignment with the NPPF and NPSE aims.

10 References

- 1 BS 4142: 2014, Method for rating and assessing industrial and commercial sound.
- 2 National Planning Policy Framework, Department for Communities and Local Government, March 2012.
- 3 Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, March 2010.
- 4 Planning Practice Guidance:
<http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/>
- 5 Planning & Noise –Technical Guidance, December 2015, Manchester City Council.
- 6 AL(0)20 Proposed Ground Floor Plan; AL(0)21 Proposed Elevations; AL(0)22 Proposed First Floor Plan; AL(0)23 Proposed Roof Plan
- 7 CadnaA environmental noise modelling software, version 2017, Datakustik GmbH.
- 8 ISO 9613: Acoustics - Attenuation of sound during propagation outdoors.
- 9 ISO 12913-1:2014 Acoustics, Soundscape, Part 1: Definition and conceptual framework

11 Appendix 1: Planning policy aims and BS 4142

Noise Policy Statement for England aims	National Planning Policy Framework aims	BS 4142: 2014 assessment of impact
Avoid significant adverse impacts on health and quality of life. <i>“Significant adverse” - Significant Observed Adverse Effect Level (SOAEL). This is the level above which significant adverse effects on health and quality of life occur.</i>	Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.	Typically, the greater the difference between measured background sound level and the calculated rating level, provides an initial estimate of the impact, where the difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
Mitigate and minimise adverse impacts on health and quality of life. <i>“Adverse” - Between the SOAEL and the Lowest Observed Adverse Effect Level (LOAEL). The LOAEL is the level above which adverse effects on health and quality of life can be detected. A No Observed Effect Level (NOEL) 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.</i>	Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.	A difference of around + 5dB is likely to be an indication of an adverse impact, depending on the context. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific source having a low impact, depending on the context.
-	Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restriction put on them because of changes in nearby land uses since they were established.	Where the initial assessment of the impact needs to be modified due to the context, take all pertinent factors into consideration, including: - The absolute sound level; - The character and level of the residual sound compared to the character and level of the specific sound; - The sensitivity of the receptor.
Where possible, contribute to the improvement of health and quality of life	Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”	-

Table 6: Planning policy aims and alignment with BS 4142 assessment methods

14 Appendix 2: Noise transmission and propagation

14.1 Noise transmission and propagation is modelled using proprietary software, CadnaA. This models noise propagation outdoors according to ISO 9613. The parameters used, source of data and details are described in Table 7.

Parameter	Source	Details
Model dimensions	Google Earth	British Transverse Mercator coordinates
Site location and layout	Architects drawings	Design and Access Statement Reference 6
Topography – within site	Site observations and Google Street view	Modelled with no changes in topography
Topography – Outside of site	Site observations and Google Street view	Modelled with no changes in topography
Building heights – proposed buildings	Site observations and Google Street view	-
Building heights – outside of site	Site observations and Google Street view	3 m per storey + 2 m roof (residential properties)
Receptor positions	Site observations and Google Street view	On the NSR façade closest to the source at a height of 4 m to represent ground and first floor 15m was used for generator assessment to represent higher floor levels of NSR 4
Building and barrier absorption coefficient	ISO 9613-2	0.21 to represent a reflection loss of 1 dB
G, Ground factor	ISO 9613-2	Hard ground, G = 0
Max. order of reflections	Apex Acoustics	Three

Table 7: Modelling parameters and assumptions

15 Appendix 3: Context of acoustic environment

15.1 The context can be expressed in relation with the soundscape, as defined in BS ISO 12913-1, Reference 9.

15.2 ISO 12913-1 states that:

“The context may influence soundscape through the auditory sensation, the interpretation of auditory sensation and the responses to the acoustic environment.”

15.3 The process of experiences that describe soundscape and illustrated in Figure 3.

15.4 The acoustic environment is defined as being:

“... the sound from all sound sources modified by the environment. Modification by the environment includes effects on sound propagation, resulting for example from meteorological conditions, absorption, diffraction, reverberation and reflection.”

15.5 The auditory sensation is described as:

“... a function of neurological processes that begin when auditory stimuli reach the receptors of the ear. This is the first stage in detecting and representing the acoustic environment. Auditory sensation is influenced by masking, spectral contents, temporal patterns and spatial distribution of the sound sources.”

15.6 The interpretation of auditory sensation refers to

“... unconscious and conscious processing of the auditory signal to create useful information, which may lead to awareness or understanding of the acoustic environment. Awareness of the acoustic environment, in context, represents an experience of the acoustic environment.”

15.7 Responses describe the short-term reactions and emotions while the outcomes refer to the overall, long-term consequences facilitated or enabled by the acoustic environment.

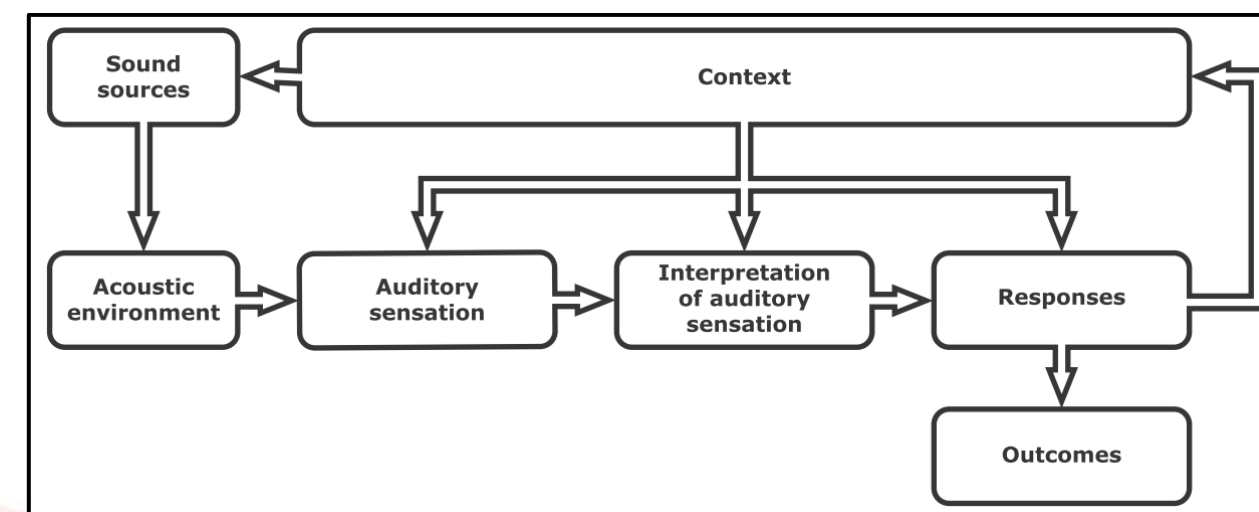


Figure 3: Elements in the perceptual construct of soundscape

15.8 The Planning Practice Guidance notes on noise state that the impact is categorised as SOAEL when “noticeable and disruptive”. It details:

“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.”

15.9 Such effect is typically defined as a difference between the BS 4142 rating level and the background level of +10 dB, depending on the context, and should be avoided on a regular basis.

15.10 Assessment of context – with mitigation

15.11 BS4142 states that the absolute level of the noise should be considered as part of the context and for this assessment the predicted specific noise levels are below the levels considered to have observed adverse effect.

16 Appendix 4: Professional qualifications and competence

- 16.1 All Apex Acoustics consultants work under the close supervision of a member who holds qualification in acoustics and is a member of the IOA.
- 16.2 This can be verified by searching the Institute of Acoustics' list of Members, available here, with the surname of the consultant.
- <http://www.ioa.org.uk/membership-check>
- 16.3 Apex Acoustics is a member of the Association of Noise Consultants (ANC). The ANC is a trade organisation which seeks to raise the standards of acoustic consultancy and as such there are barriers to entry to ensure member's competency.
- 16.4 This report has been completed and checked by an appropriately qualified and experienced acoustic consultant.