THORNTON & ROSS, EFFLUENT TREATMENT PLANT

Noise Impact Assessment

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Thornton & Ross, Effluent Treatment Plant
R0
02 November 2022

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Quality Management (Report)		
Authored by	Dr. Alex Stronach BSc (Hons), Ph.D., PgDip, AMIOA	Consultant – Acoustics
Reviewed by	Christina Ioannidou, MSc Eng. Acoustics, MIOA	Principal Consultant – Acoustics
Authorised by	Lise W. Tjellesen, MSc Eng. Acoustics, MIOA	Technical Director - Acoustics
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Prepared by	Dr. Alex Stronach BSc (Hons), Ph.D., PgDip, AMIOA	Consultant – Acoustics	21/10/2022
Reviewed by	Christina Ioannidou MSc Eng. Acoustics, MIOA	Principal Consultant – Acoustics	01/11/2022
Authorised by	Lise W. Tjellesen MSc Eng. Acoustics, MIOA	Technical Director - Acoustics	02/11/2022

Prepared by:

RPS

Dr. Alex Stronach,
BSc (Hons), Ph.D., PgDip, AMIOA

Consultant - Acoustics

5 New York Street
Manchester, M1 4JB

T +44 161 228 1800
E alex.stronach@rpsgroup.com

Prepared for:

Thornton & Ross

Simon Stubbs
Senior Project Engineer

Linthwaite
Huddersfield, HD7 5DQ

T +44 1484 8 42217
E simonstubbs@thorntonross.com

EXECUTIVE SUMMARY

The acoustics team at RPS Consulting UK (RPS) has been instructed by Thornton & Ross to undertake a noise impact assessment (NIA) to support a planning application for a new effluent treatment system at their headquarters at Manchester Road, Huddersfield, HD7 5HQ. The system will comprise a number of Air Operated Diaphragmatic (AOD) and electrically-driven pumps to process and treat water produced via the site's industrial processes for safe disposal. As part of the planning application, a noise impact assessment is required to assess the impacts of the proposed installation on nearby noise-sensitive receptors in line with the requirements of Kirklees Council (KC).

Representative background sound levels at the nearest noise-sensitive receptor, situated at 20 Barber Row, have been derived with reference to the guidance in BS 4142:2014+A1:2019 – *'Methods for rating and assessing industrial and commercial sound'* from that data obtained via the deployment of long-term noise monitoring equipment at the site. The methodology for both the noise survey and assessment have been agreed with KC prior to commencement.

The proposed installation has been modelled using 3D acoustic modelling software on the basis of a 'worst-case scenario' in which:

- In the absence of manufacturers' data, the plant noise emission levels for the electrically-driven pumps is assumed to be the same as those of the AOD pumps although they are likely to be quieter;
- Since no construction information for the plant building is yet available, a lightweight façade has been assumed with a sound reduction performance of R_w 27 dB, similar to that of a single sheet of steel.

Based on the modelling results, a rating sound level has been derived at the nearest receptor and compared to the existing background sound levels for the day (07:00-23:00 hours) and night-time (23:00-07:00 hours) periods.

An assessment of the predicted rating levels, in line with the guidance in BS 4142:2014+A1:2019, show that the noise emission levels at the nearest receptor due the proposed installation will be below the existing background level. This is indicative of a 'low impact'.

Providing the validity of the conservative assumptions adopted for this assessment are confirmed at a later design stage, it is unlikely that any adverse impacts will arise due to the proposed plant installation.

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1 INTRODUCTION

1.1 The acoustics team at RPS Consulting UK (RPS) has been instructed by Thornton & Ross to undertake a noise impact assessment (NIA) to support a planning application for a new effluent treatment system at their headquarters at Manchester Road, Huddersfield, HD7 5HQ. The site falls under the jurisdiction of Kirklees Council (KC).

1.2 The system will comprise a number of plant items to process and treat water produced via the site's industrial processes for safe disposal. As part of the planning application, a noise impact assessment is required to assess the impacts of the proposed installation on nearby noise-sensitive receptors in line with the requirements of KC.

1.3 An environmental sound survey was undertaken at the site to quantify the existing sound climate and derive appropriate plant noise limits in line with the requirements of the Local Authority.

1.4 An assessment of the operational noise impacts has been undertaken by predicting noise emissions from the proposed installation based on guidance provided in British Standard (BS) 4142:2014+A1:2019. Where necessary, mitigation measures to reduce adverse noise impacts have been specified.

1.5 RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. This report has been prepared with integrity, objectivity, and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.

1.6 The technical content of this NIA has been provided by RPS personnel, all of whom are members of the IOA (the UK's professional body for those working in acoustics, noise, and vibration) at various grades. Personnel and individual qualifications are provided within the Quality Management table at the start of this report, with statements of experience provided in Appendix E. This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Integrated Management System.

2 SITE DESCRIPTION

2.1 The site is situated at Linthwaite Laboratories, Manchester Road, HD7 5QH. The site in the context of the surrounding area is presented in Appendix A.

2.2 The area to the north of the site comprises primarily fields and farmland with a small number of residential and commercial properties. A railway line runs from east to west with trains operating between Slaithwaite and Huddersfield.

2.3 The village of Linthwaite is situated to the east and south of the site and comprises a number of residential areas, industrial units, commercial properties, and food outlets. The village is situated approximately 6.5 km west of Huddersfield.

2.4 The village of Slaithwaite is situated to the west of the site and contains a large number of residential and commercial properties. The area further to the west is predominantly rural.

3 PLANNING POLICY & GUIDANCE

3.1 National Noise Policy

3.1.1 National noise policy relevant to this development is provided in the Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF) and the Planning Practice Guidance – Noise (PPG-N).

3.1.2 A summary of the relevant sections of these documents is provided in Appendix B. The NPSE and PPG-N are also directly referred to in the relevant Local Noise Policy described below.

3.2 Local Authority Guidance

3.2.1 The Kirklees Local Plan (Adopted 2019) and supplementary planning guidance do not contain any quantified noise criteria for use in the assessment of commercial/industrial noise sources.

3.2.2 However, Policy LP52 - 'Protection and improvement of environmental quality' outlines that all potential impacts must be assessed to minimise impacts on local amenity. The policy states the following:

"Proposals which have the potential to increase pollution from noise, vibration, light, dust, odour, shadow flicker, chemicals and other forms of pollution or to increase pollution to soil or where environmentally sensitive development would be subject to significant levels of pollution, must be accompanied by evidence to show that the impacts have been evaluated and measures have been incorporated to prevent or reduce the pollution, so as to ensure it does not reduce the quality of life and well-being of people to an unacceptable level or have unacceptable impacts on the environment.

Such developments which cannot incorporate suitable and sustainable mitigation measures which reduce pollution levels to an acceptable level to protect the quality of life and well-being of people or protect the environment will not be permitted.

Where possible, all new development should improve the existing environment"

3.3 Consultation

3.3.1 In the absence of specific criteria pertaining to commercial and industrial noise, consultation was sought via email with Mr Mohammed Nasim (Senior Technical Officer – Environmental Health) at KC to agree our proposed sound survey and assessment methodology and ensure that the requirements of Policy LP52 are being adhered to.

3.3.2 A response was received on Monday 10th October 2022 whereby Mr Nasim accepted our proposals. It was agreed that the following criterion should be applied to noise emission levels from the proposed plant installation at nearby receptors to avoid significant adverse impacts and minimise adverse impacts:

"The difference between the cumulative rating sound level $L_{Ar,T}$ for the relevant operational period and the representative background sound level $L_{A90,T}$ is less than +5 dB (associated with 'adverse impacts' in BS 4142:2014+A1:2019)."

3.4 British Standard 4142:2014+A1:2019

3.4.1 BS 4142:2014+A1:2019 – '*Methods for rating and assessing industrial and commercial sound*' provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

3.4.2 In summary, this standard provides guidance on determining rating noise levels by correcting the specific sound level from the site or operations under consideration for acoustic character corrections such as tonality, impulsivity, and intermittency. The standard provides the following corrections to be applied where each is appropriate:

*"**Tonality***

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

NOTE 2 If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. … If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

3.4.3 An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level of the specific sound. In the context of the Standard, adverse impacts include, but are not limited to, annoyance and sleep disturbance. Typically, the greater this difference, the greater the magnitude of the impact:

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

- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.4.4 Table 3.1 below provides definitions for some of the key acoustic terminology adopted within this report.

Table 3.1 Definitions of acoustic terms.

Terminology	Definition
Rating Level, $L_{Ar,T}$	The specific sound level plus any adjustment for the characteristic features of the sound.
Background Sound Level, $L_{A90,T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T,* measured using fast time-weighting, *F*, and quoted to the nearest whole number of decibels.
Ambient Sound Level, $L_{Aeq,T}$	The steady sound level which, over a period of time *T*, contains the same amount of A-weighted sound energy as the time varying sound over the same period. Also known as the equivalent continuous sound pressure level. *NOTE The ambient sound level is a measure of the residual sound and the specific sound when present.*
Specific Sound Level, $L_{Aeq,T}$	The equivalent continuous A-weighted sound pressure level produced by the specific noise source at the assessment location over a given reference time internal, *T*.

4 BASELINE SOUND SURVEY

4.1 Noise Sensitive Receptors

4.1.1 The nearest noise-sensitive receptor to the site is presented in Appendix A and is described in Table 4.1 below:

Table 4.1 Description of nearest noise-sensitive receptors to proposed installation.

Receptor	Description
20 Barber Row	Residential dwelling situated approximately 12 m from the eastern site boundary.

4.2 Methodology & Instrumentation

4.2.1 An unattended sound survey was undertaken at the site commencing at 10:15 hours on Wednesday 28th September and concluding at 12:30 hours on Wednesday 5th October 2022.

4.2.2 Continuous noise measurements were undertaken at a single measurement position presented as LT1 in Appendix A and described below.

- LT1 – Free-field measurement position at 1.5 m above local ground level on the eastern boundary of the site.

4.2.3 This position was selected to be representative of the noise climate at the nearest receptor described in Table 4.1 above.

4.2.4 Measurements of the L_{Aeq}, L_{Amax}, and L_{A90} were undertaken at 100 ms intervals and temporally averaged over 15-minute periods for the duration of the survey. The equipment listed in Table 4.2 below was used to undertake the survey.

Table 4.2 Equipment used during the unattended noise survey.

Measurement Location	Make/Model	Serial Number	Calibration Start (dB) (Ref: 94.0 dB)	Calibration End (dB) (Ref: 94.0 dB)	Last Manufacturers' Calibration Date
Calibrator	Rion NC-74	110090	N/A	N/A	25/04/2022
LT1	Rion NL-52	164423	94.0	93.9	16/06/2021

4.2.5 This equipment was installed within a weatherproof enclosure and calibrated before and after the sound survey to ensure a reasonable degree of accuracy.

4.2.6 Measurements undertaken in accordance with British Standard 7445-2:1991 – '*Description and measurement of environmental noise – Part 2: Guide to the acquisition of data*'. All sound level meters used meet the 'Class 1' criteria defined within BS EN 61672-2:2013+A1:2017 – '*Electroacoustics. Sound level meters – Pattern evaluation tests*'. All calibrators used meet the 'Class 1' criteria defined within BS EN IEC 60942 – '*Electroacoustics. Sound Calibrators'*.

4.3 Meteorological Conditions

4.3.1 A weather station was installed alongside the sound monitoring equipment at LT1 to log the meteorological conditions on site. Unfortunately, the console for the station malfunctioned and thus no weather data was recorded.

4.3.2 In the absence of measured data, publicly available weather data has been obtained from the closest weather station available to our site[1]. This has been cross-referenced against other weather stations in the area and shows good agreement.

4.3.3 The data shows that unfavourable weather conditions (either rain or wind speeds above 5 m/s) were recorded during periods of the noise survey. These periods can be seen on the attached time-history in Appendix C. Consequently, the noise levels recorded during the affected periods have been omitted from our assessment.

4.4 Noise Climate

4.4.1 Subjectively, the sound climate whilst on site was noted to be dominated by traffic noise on Manchester Road. It was noted upon collection of the sound survey equipment that trains could be heard on the railway line to the north of the site.

4.4.2 The sound climate also contained influence from on-site activity such as operational mechanical services plant, HGVs entering and leaving the site, and conversations between staff members. Measurement position LT1 was selected to minimise the influence on the measured levels from operational site activity whilst still being suitably representative of the nearest receptor on Barber Row.

4.5 Results

4.5.1 The results of the unattended sound survey at measurement position LT1 are presented on the attached time-history graph in Appendix C.

4.5.2 The representative background noise levels have been determined with reference to the guidance in BS 4142:2014+A1:2019. The guidance states the following when considering 'representative' background levels:

"A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value."

4.5.3 The residual sound level has been calculated by temporally averaging the measured $L_{Aeq,15min}$ noise levels over a 16-hour and 8-hour period for the day and night-time, respectively. The residual sound level presented is the *minimum* day and night level measured on a day where the measurements were unaffected by adverse weather conditions.

4.5.4 The representative background sound level has been derived through statistical analysis of the measured noise data. In this case, the level has been derived by calculating the sound level at which the cumulative frequency of occurrence is equal to or greater than 20%. The results are presented in Table 4.3 below.

[1] Wunderground Station ID IHUDDE42, https://www.wunderground.com/dashboard/pws/IHUDDE42

Table 4.3 Measured residual sound levels $L_{Aeq,T}$ and representative background sound levels $L_{A90,T}$

Location	Measured Noise Level, (dB)			
	Day (07:00 to 23:00 hours)		Night (23:00 to 07:00 hours)	
	Residual Sound Level, $L_{Aeq,16h}$	Representative Background Sound Level, $L_{A90,15min}$	Residual Sound Level, $L_{Aeq,8h}$	Representative Background Sound Level, $L_{A90,15min}$
LT1 – Northern boundary of Buse Gases site.	47	41	42	38

5 NOISE IMPACT ASSESSMENT

5.1 Proposed Installation

5.1.1 The proposed effluent treatment system is made up of a series of neutralisation and filtration processes. At each stage of the processes, the wastewater is stored in a large tank and is driven through the system by various pumps operating intermittently which are the primary noise sources associated with the installation. The proposed installation comprises:

- 4 x Air Operated Diaphragm (AOD) Pumps;
- 4 x Electrically-Driven Pumps.

5.1.2 We understand that all pumps will be housed internally within a building and thus there are no external noise sources proposed.

5.1.3 We have been informed by the plant designers that the dominant noise sources associated with this system are the AOD pumps. The electrically-driven pumps are likely to have much lower noise emission levels than the AOD pumps.

5.1.4 At the time of writing, noise data was only available for the AOD pumps. The technical datasheet[2] provided shows these plant items to have a sound pressure level of 62.3 dB(A) measured at 3 feet from the pump in a 'sound-proof room'[3].

5.1.5 In the absence of full spectral data for these pumps, a reference noise spectrum for a similar item has been obtained from the CIBSE Guide B4 – *'Noise and vibration control for building services systems'*[4] to ensure a full and robust assessment of the proposed plant items is undertaken.

5.1.6 The sound power level of the source has been estimated by defining a calculation area based on the dimensions of the pump and the measurement distance. It has been assumed that the source was measured on a reflective surface.

5.1.7 The estimated sound power spectrum, based on the rounded single figure level of 62 dB(A), is presented in Table 5.1 below.

Table 5.1 Estimated plant noise emission spectrum for AOD pumps.

	Estimated Sound Power Level (dB) at Octave Band Centre Frequency (Hz)								
Unit	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dB(A)**
AOD Pump	62	65	69	69	65	62	59	54	71

5.1.8 As mentioned above, no data is yet available for the electrically-driven pumps and, as such, the spectrum above has been used for these units to form the basis of a 'worst-case' scenario since anecdotal appraisal from the plant designers suggest that these units will be significantly quieter than the AOD pumps.

[2] Datasheet: *ARO-PX01X-XXX-AXXX-1-4-Inch-Non-Metallic-Diaphragm-Pump-Datasheet.pdf.*

[3] Information obtained from the pump manufacturer *ARO®* via email on 19th October 2022.

[4] The Chartered Institute of Building Services Engineers (2016), *'CIBSE Guide B4 – Noise and vibration control for building services systems'*

5.1.9 Furthermore, we have also been informed that the pumps will be regulated and controlled via a needle valve thereby reducing the noise levels presented in Table 5.1 and strengthening the 'worst-case' assumptions of this assessment.

5.2 Assessment Methodology

5.2.1 Plant noise emission levels due to the proposed plant installation have been predicted at the nearest noise-sensitive receptors via the construction of a computational 3D acoustic model using SoundPLAN v8.2. This modelling software implements the propagation method outlined in ISO 9613-2:1996[5] and allows for the prediction of sound levels under light, down-wind conditions based upon hemispherical radiation, and includes corrections for atmospheric absorption, ground effects, screening, and directivity.

5.2.2 The topography of the site and the surrounding area has been obtained from site surveyed topographical data and Ordnance Survey (OS) open data (Terrain 50).

5.2.3 The effect of screening from solid structures (buildings) has been incorporated into the modelling process by importing OS Open Data 'Settlement Area' shape file data into the model.

5.2.4 The surrounding area is predominantly rural. Thus, the site area has been assumed to be 'acoustically rigid' with a ground factor of G=0. The area situated between the proposed installation and nearest receptor has been modelled as 'acoustically soft' with a ground factor of G=1.

5.2.5 The specific sound levels output by the 3D model have informed an assessment in line with the guidance in BS 4142:2014+A1:2019 as detailed above.

5.2.6 Further site-specific assumptions forming the basis of the noise model are listed below:

- The plant is assumed to operate intermittently 24 hours a day.
- An acoustic character correction of +3 dB has been applied to the specific sound level at the receptor to obtain a rating level which accounts for the intermittent nature of the pumps' operation.
- The electrically-driven pumps emit equivalent sound power levels as the AOD pumps.
- The plant building has been modelled as a small industrial building with all pumps modelled as point sources within. The electrically-driven neutralisation tank pump has been modelled as a point source with a height of 1.9 m, and all other pumps as point sources with a height of 0.8 m above local ground level.
- At present, no information is available on the proposed construction of the plant building. As such, a concrete floor has been assumed along with a lightweight façade construction with a sound reduction performance of R_W 27 dB, corresponding to that of a single steel sheet. This assumption is highly pessimistic and forms the basis of a 'worst-case scenario'..

5.3 Results & Assessment

5.3.1 The assessment of the potential impacts at the nearest noise-sensitive receptor are presented in Table 5.2 below with reference to the guidance in BS 4142:2014+A1:2019.

[5] International Organisation for Standardisation (1996), '*ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'*

Table 5.2 Assessment of impacts (with reference to BS 4142:2014+A1:2019).

Noise-Sensitive Receptor	Background Sound Level, $L_{A90,T}$ (dB)		Specific Sound Level, $L_{Aeq,T}$ (dB)		Character Correction	Rating Level, $L_{Ar,T}$ (dB)		Rating Level minus Background (dB)		Impact	
	Day	Night	Day	Night	Intermittency	Day	Night	Day	Night	Day	Night
20 Barber Row	41	38	28	28	+3	31	31	-10	-7	Low	Low

5.3.2 t The assessment results show that in the current layout, the proposed effluent treatment system is not predicted to have any adverse impacts on nearby noise-sensitive receptors, depending on the context.

5.3.3 Context may be applied to the above impacts by considering the assessment methodology was formed based on pessimistic assumptions which include:

- The overestimation of the noise emission levels arising from the plant items, particularly the electrically-driven pumps;
- The underestimation of the sound reduction performance of the façade;
- The application of an acoustic character correction to the specific sound level predicted at the nearest receptor for intermittency which is unlikely to be audible in reality.

5.3.4 Whilst these assumptions are considered ‘worst-case’ in nature, it should be ensured that the noise emission levels of the electrically-driven pumps are not greater than those for the AOD pumps and that the façade performance is no less than that which has been assumed.

5.4 Summary

5.4.1 In summary, the proposed installation is not predicted to have any ‘adverse impacts’ on nearby receptors.

5.4.2 However, the validity of the pessimistic assumptions adopted for this assessment should be confirmed once the design progresses and information regarding the electrically-driven pumps and sound reduction performance of the building fabric becomes available.

6 CONCLUSIONS

6.1 The acoustics team at RPS Consulting UK (RPS) was instructed by Thornton & Ross to undertake a noise impact assessment (NIA) to support a planning application for a new effluent treatment system at their headquarters at Manchester Road, Huddersfield, HD7 5HQ. The system will comprise a number of plant items to process and treat water produced via the site's industrial processes for safe disposal. As part of the planning application, a noise impact assessment is required to assess the impacts of the proposed installation on nearby noise-sensitive receptors in line with the requirements of Kirklees Council (KC).

6.2 A baseline sound survey was undertaken at the site to quantify the existing noise climate at the nearest receptors. The survey and assessment methodology have been agreed via written consultation with the Environmental Health Department at KC.

6.3 A 3D noise model of the site has been constructed based on layouts and noise data provided by the client for the proposed plant items. Subsequently, an assessment has been undertaken on the basis of assumptions which form a 'worst-case' scenario such as:

- Intermittent 24/7 operation of all proposed plant items;
- A likely overestimation of the noise levels from the electrically-driven pumps;
- A likely underestimation of the sound reduction performance of the plant room building fabric

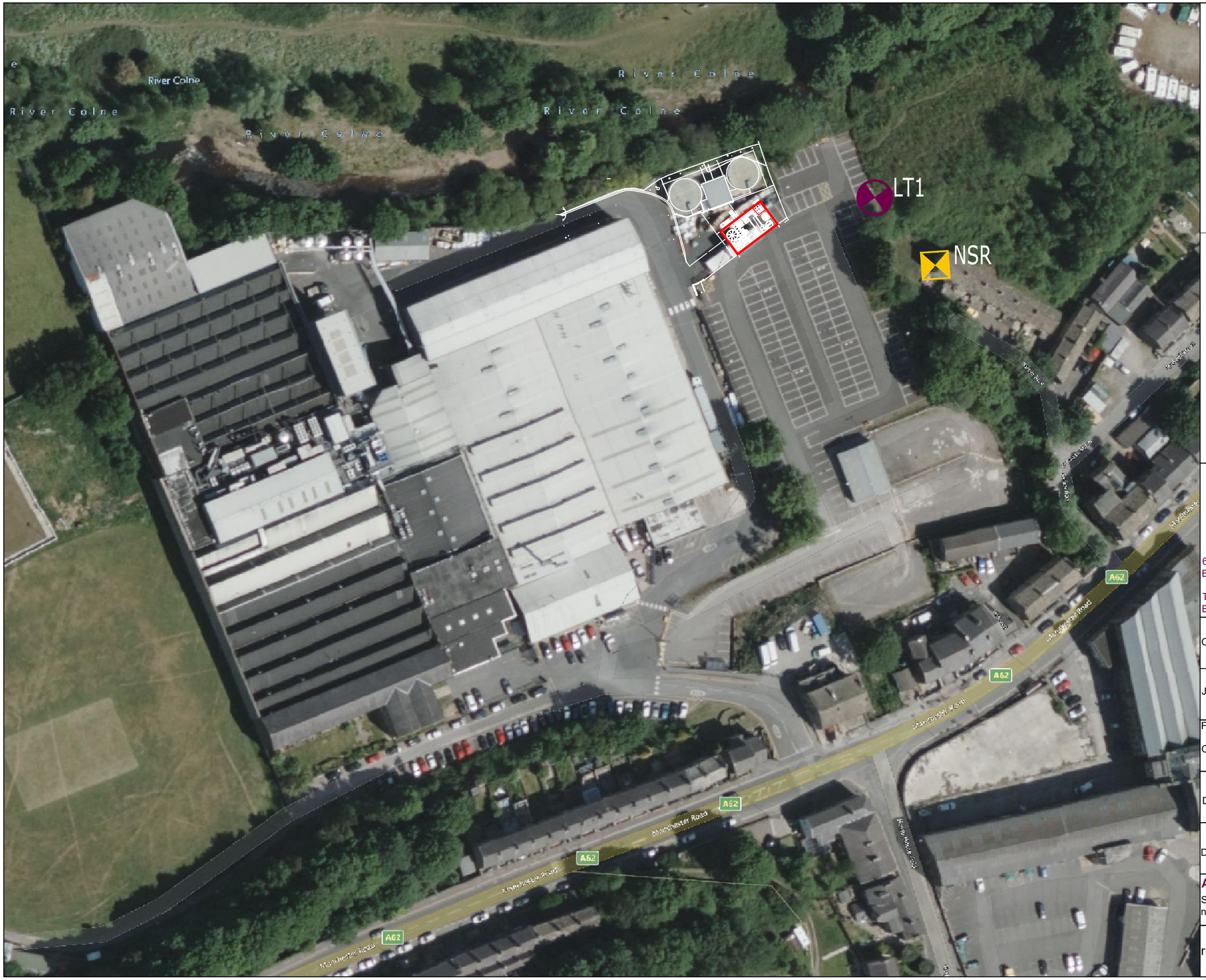
6.4 An assessment of the potential noise impacts was undertaken with reference to the guidance in BS 4142:2014+A1:2019 which shows that despite the assessment being formed on the basis of worst-case assumptions, the proposed installation is likely to have a 'low impact' overall at nearby receptors.

6.5 The validity of the pessimistic assumptions forming the basis of this assessment should be confirmed as the design progresses, however it is unlikely that the final design will result in any 'adverse impacts' on nearby receptors based on the results of this assessment.

APPENDICES

Appendix A

Site Plan



Key:

- Long-Term (LT) Measurement Position
- Noise-Sensitive Receptor (NSR)
- Proposed Plant Area

Notes

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6-7 Lovers Walk
Brighton East Sussex BN1 6AH

T 01273 546800 F 01273 546801
E rpsbn@rpsgroup.com W rpsgroup.com

Client: Thornton & Ross

Job Ref: JAJ03251

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Appendix A

Site plan showing long-term measurement positions, noise-sensitive receptors, and indicative plant location.

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Appendix B

National Planning Policy

PLANNING POLICY & GUIDANCE

National Planning Policy Framework

The National Planning Policy Framework (NPPF) [i] sets out the Government's planning policies for England and how these are expected to be applied. The emphasis of the Framework is to allow development to proceed where it can be demonstrated to be sustainable. In relation to noise, Paragraph 185 of the Framework states:

> **"Planning policies and decisions should ensure that new development is appropriate for its location taking into 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 impacts 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 the development – and avoid noise giving rise to significant adverse impacts 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; and**
>
> **c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'**

The point 'a)' refers to 'significant adverse impacts' which relates to the 'significant observed adverse effect level' (SOAEL) in the Noise Policy Statement for England (NPSE), although the term 'effect' is used instead of the term 'impact'. However, these have been deemed to be interchangeable in this context. Therefore, given the comments above on the NPSE with regard to assessment methods and criteria, the current content of the NPPF does not require any change in previously adopted approaches.

Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) [ii], published in March 2010 by Defra, aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy:

> **"Noise Policy Vision**

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

"Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- ***avoid significant adverse impacts on health and quality of life;***
- ***mitigate and minimise adverse impacts on health and quality of life; and***
- ***where possible, contribute to the improvement of health and quality of life."***

The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

With regard to the terms 'significant adverse' and 'adverse' included in the 'Noise Policy Aims', these are explained further in the 'Explanatory Note' as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation which are:

'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 human health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level

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

Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

'SOAEL – Significant Observed Adverse Effect Level

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

The accompanying explanation states:

'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available'.

Planning Practice Guidance - Noise (PPGN)

The Government has published Planning Practice Guidance on a range of subjects including noise [iii]. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPGN reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards (BSs) and contains examples of acoustic environments commensurate with various effect levels. Paragraph 006 of the PPGN explains that:

> **'The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.'**

According to the PPGN, factors that can influence whether noise could be of concern include:

- "the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- for a new noise making source, how the noise from it relates to the existing sound environment;
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise i.e. whether or not the noise contains particular tonal characteristics or other particular features); and
- the local arrangement of buildings, surfaces and green infrastructure, and the extent to which it reflects or absorbs noise.
- More specific factors to consider when relevant include:
- the cumulative impacts of more than one source;
- whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.
- in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;
- Noise Action Plans (where they exist), and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account. Defra's website has information on Noise Action Plans and Important Areas. Local authority environmental health departments will also be able to provide information about Important Areas.
- the effect of noise on wildlife. Noise can adversely affect wildlife and ecosystems. Particular consideration needs to be given to the potential effects of noisy development on international, national and locally designated sites of importance for biodiversity;
- where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.
- some commercial developments including restaurants, hot food takeaways, night clubs and public houses can have particular impacts, not least because activities are often at their peak in

the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity."

Note that the NPPF was revised in July 2021 such that the third bullet of paragraph 123 of the NPPF is now contained within paragraph 187 of the NPPF. This now states:

> **'187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses 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.'**

The PPGN provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF. This is reproduced in the table below.

Noise Exposure Hierarchy Based on the Likely Average Response

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The PPGN describes sound that is not noticeable to be at levels below the NOEL. It describes exposures that are noticeable but not to the extent there is a perceived change in quality of life as below the LOAEL and need no mitigation. With reference to the definition of noise in the NPSE, such immissions are ‘sound’ and not ‘noise’. On this basis, the audibility of sound from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.

The PPGN suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPGN is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some of the time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPGN states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.

The PPGN suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPGN are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPGN states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

The PPGN suggests that a noise impact may be partially offset if the residents of affected dwellings have access to a relatively quiet part of their dwelling, private external amenity area and/or external public or private amenity space nearby.

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[i] Ministry of Housing, Communities and Local Government. National Planning Policy Framework: HMSO. July 2021.

ii Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. Defra. 2010.

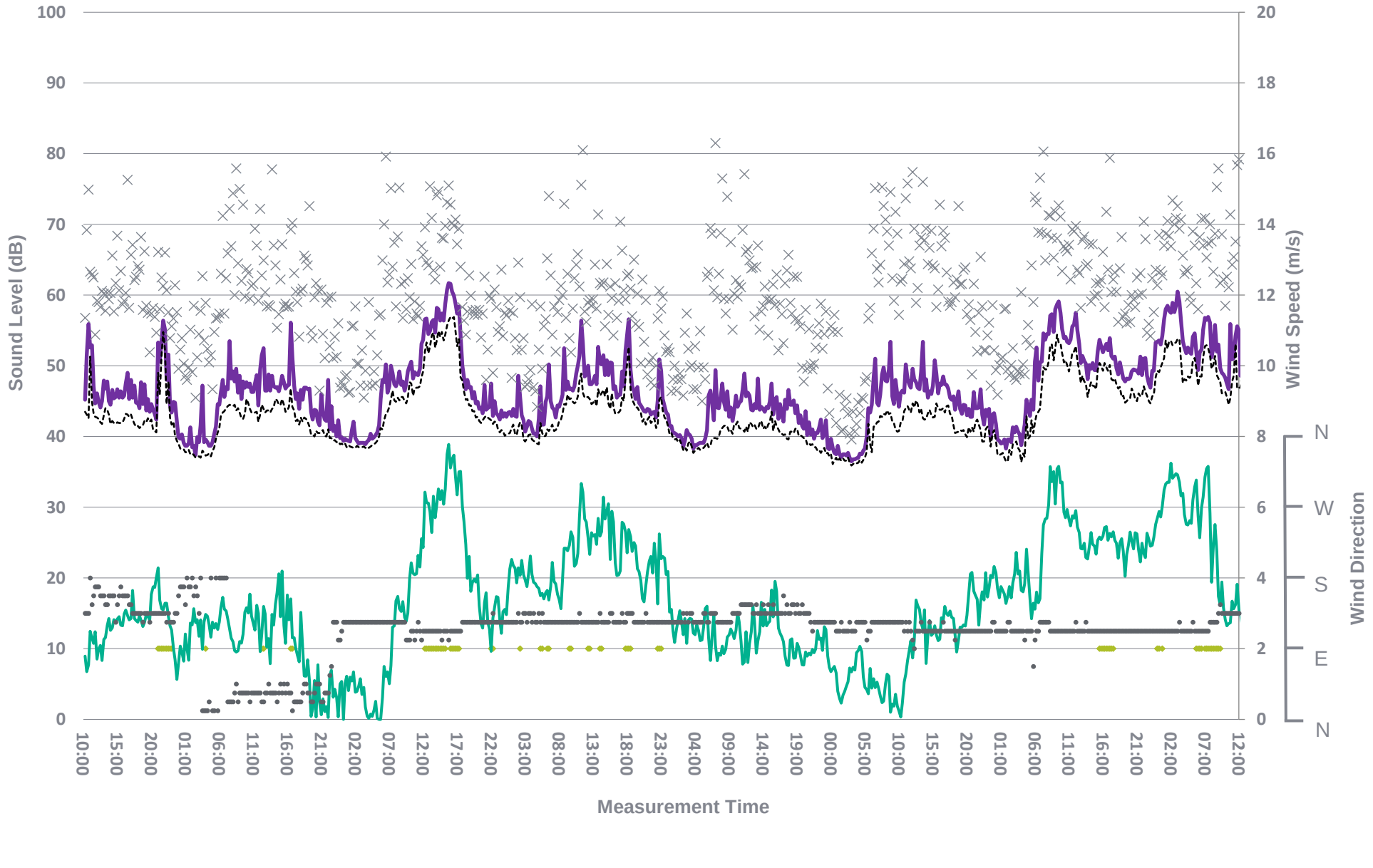
iii Ministry of Housing, Communities and Local Government. National Planning Practice Guidance – Noise. March 2019

Appendix C

Time-History Graph

Appendix C

Measured Noise Levels at LT1, 28 September to 5 October 2022



Appendix D

Survey Notes

Location			Northeastern Site Boundary			
Purpose of Monitoring			Baseline			
Relevant Guidance / Standard			BS4142			
Sound Measurement System						
RPS ID	Manufacturer / Model		Serial Number	Last Lab Verification	Filename	Memory Card ID
116	Rion-NL-52		943367	19/04/2021	0101	-
Mic Height	Measurement Interval	Dynamic Range (dB)	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?
1.5 m	100ms/15min	25 - 138	F	A	Freefield	✓
			START		**END**	
Personnel			AS		AS	
Date / time			28/09/2022 10:15		05/10/2022 12:30	
Calibrator	RPS ID		14		14	
	Manufacturer / Model		RION-NC-74		RION-NC-74	
	Serial Number		110118		110118	
	Date last verification		17/10/2022		17/10/2022	
	Reference level (dB)		94.0		94.0	
	Meter reading (dB)		94.0		93.9	
	Wind speed (m/s) & dir'n Av.		3.0	WNW	3.6	N
	Cloud cover (100%= 8 oktas)		4		7	
	Temperature (degrees Celsius)		8		13	
	Relative Humidity (%)		80%		78	

Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)	TI	P	F	S	TI	P	F	S
	×	×	×	×	×	×	×	×

Subjective description / additional details		-

Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))

Equipment installed on NE site boundary in the car park as close to residence on Manchester Road as possible. Ground between receptor and site is predominantly hard with the exception of the green garden space. Topography is quite varied since the site sits below Manchester Road down a steep hill. Receptor is on same level as site.

Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)

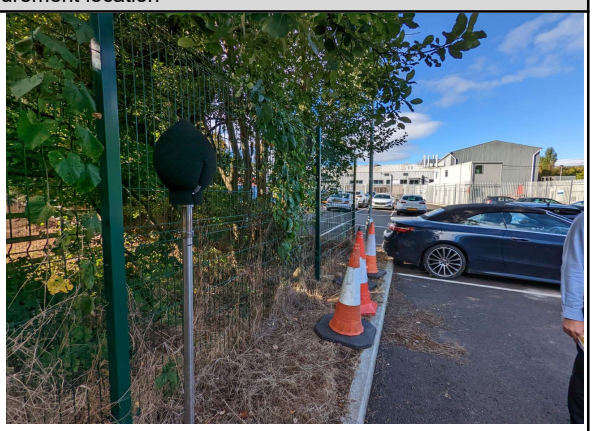
The on-site noise dominates with operating plant and deliveries being the primary source. There was influence from local traffic as well as railway pass-bys to the north.

Description of sound environment at end of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)

As above.

Location	Northeastern Site Boundary

Photographs of measurement location



Appendix E

BS 4142:2014+A1:2019 – Statements of Experience

Dr. Alex Stronach – Consultant – Acoustics

BSc (Hons) Physics, Ph.D. Acoustics, PgDip, AMIOA

A.1 Alex is a consultant working within the RPS acoustics team. He joined the team in 2022, based out of the Manchester office. Alex has over 3 years' experience in consultancy and has strong experience in areas of architectural and environmental acoustics over a wide range of sectors such as commercial, residential, and education. Alex has a Ph.D. in Acoustics with a focus on outdoor sound propagation and has presented several conference papers on the subject area internationally.

A.2 Alex has been involved BS 4142 noise assessments for both the previous and current 2014 version of BS 4142. He is familiar with the Standard and received training regarding the revised 2014 version of the Standard. On the basis of Alex's overall experience in acoustics, combined with particular focus on BS 4142 and with the assistance of more experienced colleagues, he is deemed competent for BS 4142 assessments.

A.3 For this project Alex has taken on the role of:

- Project Manager and has been responsible for overseeing the project.
- Consultant responsible for carrying out the acoustic surveying.
- Consultant responsible for carrying out the acoustic modelling and assessment
- Consultant responsible for the production of the noise impact assessment report.

Christina Ioannidou – Principal Consultant – Acoustics

MSc Engineering Acoustics; Member of the Institute of Acoustics; MSc Telecommunications; Electrical and Computer Engineering;

A.4 Christina is an Acoustic Consultant and environmental acoustics specialist with more than seven years' experience. She has an Electrical and Computer Engineering Degree Bachelor and Master's Degree and has also a Master's Degree in Engineering Acoustics. She has been a member of the Institute of Acoustics since 2015.

A.5 Christina has project managed and undertaken noise assessments for a variety of developments, including: large scale mixed-use developments, incorporating commercial, retail, leisure and residential elements; energy from waste facilities; manufacturing facilities; distribution centers; retail units and minerals extraction and exploration. She has provided input into Environmental Impact Assessments (EIAs) since the start of her career in 2015 for residential, industrial, educational and mixed-use developments (including residential, hotel, commercial uses). She has also undertaken noise

assessments to support planning applications and discharge planning conditions. She has a Continuous Professional Development (CPD) Record to support this competency and experience.

A.6 Within the past years Christina has been involved BS 4142 noise assessments for both the previous and current 2014 version of BS 4142. She is familiar with the Standard and has attended relevant talks organised by the Institute of Acoustics. On the basis of Christina's overall experience in acoustics, combined with particular focus on BS 4142 and with the assistance of more experienced colleagues, she is deemed competent for BS 4142 assessments.

A.7 For this project Christina has supported the Project Manager in the assessment and noise modelling. She was also responsible for reviewing the modelling and the report, figures and appendices.

Lise W. Tjellesen – Technical Director – Acoustics

MEngSc Acoustics; Member of the Institute of Acoustics; Member Acoustical Society of America; Member of Danish Acoustic Society; Member of Audio Engineering Society

A.8 Lise is Technical Director of the RPS Acoustics Team with more than 20 years of experience in acoustics. She is a specialist acoustic consultant with a wide range of experience gained in the UK, Denmark and worldwide. She has worked with electroacoustics, psychoacoustics, architectural acoustics, vibrations and environmental acoustics. She has gained particular experience in the fields of architectural acoustics (building and room) working with the construction industry on a variety of projects, including residential, commercial, education, health and entertainment.

A.9 Lise is an expert on the subject of room acoustics and room acoustic computer simulations, as well as a leading expert on the emerging field of archaeoacoustics. She has published several papers on the above subjects and on acoustics of offices.

A.10 Lise has been involved in many BS 4142 noise assessments for both the previous and current 2014 version of BS 4142. She has given evidence at public inquiries where BS 4142 has been the primary assessment methodology. On the basis of Lise's overall experience in acoustics (particularly in relation to environmental noise) combined with particular focus on BS 4142, she is deemed competent for BS 4142 assessments.

A.11 For this project Lise has taken on the role of Project Director, responsible for overseeing the delivery of the project.

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Contact

RPS Consulting Services Ltd 6-7
Lovers Walk
Brighton
T: +44(0) 1273 546 800
Matthew.Hyden@rpsgroup.com