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WATERFOLD BUSINESS PARK, BURY NOISE ASSESSMENT

NOISE ASSESSMENT WATERFOLD BUSINESS PARK, BURY

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Prepared by **Ryan McNulty---**
Checked by **Dan Doherty**
Approved by **Craig Barson**
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Noise Survey

EXECUTIVE SUMMARY

TPIF (Portfolio No.1) LLP has appointed Ramboll UK Ltd (Ramboll) to prepare a noise assessment in support of a planning application for a new commercial unit with Class B8 use for storage and distribution and associated ancillary office space.

This assessment considers noise emissions from the proposed development in terms of noise breakout from a new warehouse unit, included external plant, and mobile noise sources.

Predicted noise levels are expected to have no impact on receptors furthest from the development, and a minor impact at the closest receptors at night. The effects of noise are expected to be either low or negligible and not expected to change the behaviour of the closest receptors (such as closing windows etc).

A site management plan, and considerate loading and unloading processes are expected to be sufficient to mitigate noise levels to the closest properties.

During all other parts of the day, overall site activities are expected to be less and therefore, the potential impacts to the nearest receptors negligible or have no impact.

1. INTRODUCTION

TPIF (Portfolio No.1) LLP has appointed Ramboll UK Ltd (Ramboll) to prepare a noise assessment for a new warehouse (Class B8 use) used for storage and distribution with associated ancillary office space at Waterfold Business Park, Bury.

Full planning permission is being sought for the redevelopment of existing premises, comprising full demolition; erection of new building for Class B8 purposes with ancillary offices; installation of external plant and gatehouse; hardstanding for servicing and parking; attenuation pond; and boundary enclosure.

The existing premises are considered no longer suited for occupier demand, having been previously built to meet the bespoke requirements of a single occupier. Consequently, operational changes have resulted in the existing office accommodation remaining vacant over a considerable period.

The site plan for the new unit is shown on SGP drawing 22-244-SGP-ZZ-ZZ-DR-A-131001 as reproduced in Figure 1.

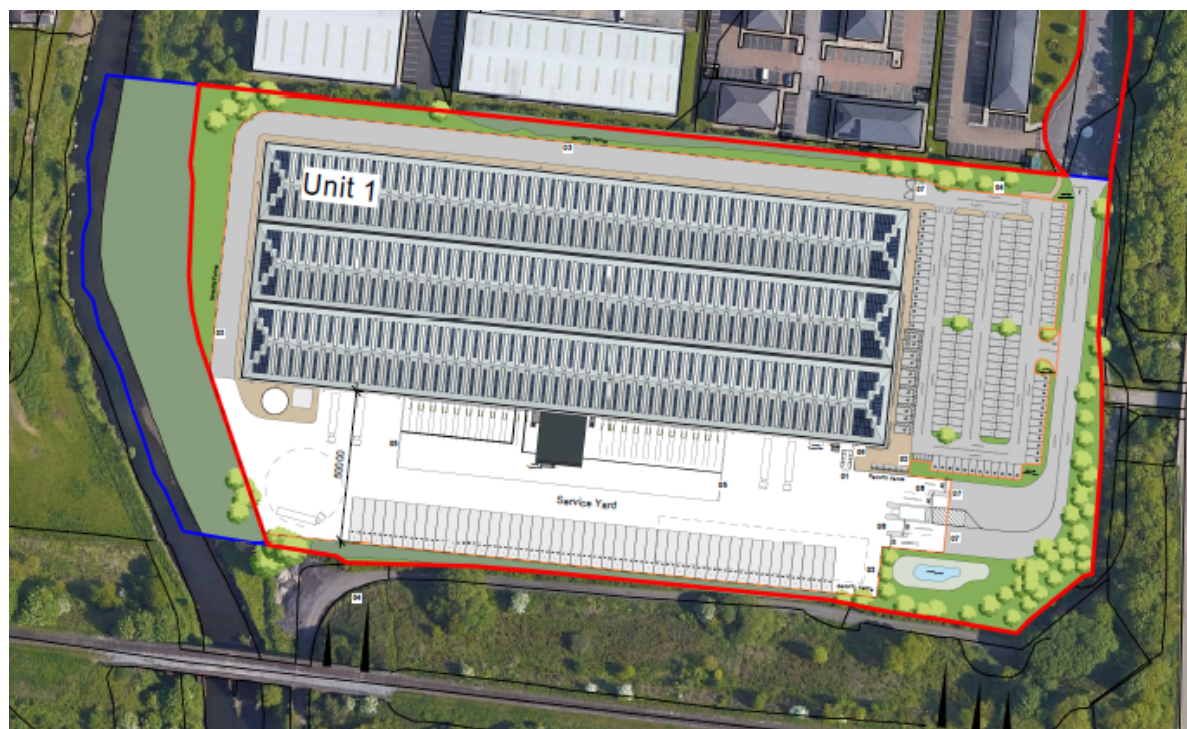


Figure 1: Proposed location of the new warehouse unit

The proposed development has the potential to result in sound of an industrial or commercial nature at the nearby noise sensitive receptors. Sound of this nature would originate from the building services systems associated with the proposed development, as well as from vehicle movements within the site (deemed to be an intrinsic part of the noise emissions from the proposed uses).

For this reason, and an outline assessment of sound of industrial or commercial nature has been carried out, informed by an environmental noise survey carried out in the vicinity of the site. The outline assessment has been carried out in accordance with British Standard 4142:2014+A1:2019.

Currently, vehicular access to the application site is via the Waterfold access road and the trunk road network via Heap Bridge Interchange. This access route remains the same with the proposed development.

The proposed development, in terms of land use, is the same as the existing consented use. The Transport Consultant has concluded that the distribution of car trips for both the proposed and existing uses is likely to be similar. This means that the transport assessment anticipates a significant net reduction in car trips at the site access. Therefore, it is assumed that there will be a commensurate net reduction in traffic on local junctions as well.

Although there is a net peak hour increase in HGV movements, in terms of the typical daytime or night-time period this increase is no more than 2 % on the access road. The Transport Consultant has stated that the proposed development would therefore have an immaterial impact on local junctions outside of the site.

No further analysis of traffic distribution on the wider highways has been undertaken by the Transport Consultant. Further consideration of changes in road traffic noise outside of the red line boundary due to proposed development is therefore also beyond the scope of this report as the impact will be negligible.

The information in this report is based on the current scheme proposals drawn by SGP Architects (SGP), and information from the wider design team.

Appendix 1 of this report includes an acoustics glossary to assist with the understanding of technical terminology within this report.

2. PLANNING POLICY CONTEXT

2.1 National Planning Policy Framework, 2023

For commercial development, no specific noise criteria are set out in the National Planning Policy Framework (NPPF)¹ or in the Noise Policy Statement for England² (NPSE) to which it refers.

NPPF states the document:

'sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced.'

In relation to noise, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution.

Paragraph 185 of the NPPF states that:

'Planning policies and decisions should also 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 new 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...'*

To achieve these aims, the NPPF refers to the explanatory note to the NPSE.

2.2 Noise Policy Statement for England, 2010

The NPSE sets out the long-term vision of Government noise policy to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

The NPSE outlines the following three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- 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.

NPSE states:

'The application of the NPSE should mean that noise is properly taken into account at the appropriate time. In the past, the opportunity for the cost effective management of noise has often been missed because the noise implications of a particular policy, development or other activity have not been considered at an early enough stage.'

In relation to adverse effects, NPSE provides the following acronyms and definitions:

¹ National Planning Policy Framework (publishing.service.gov.uk)

² Department of Environment, Food and Rural Affairs, 2010. Noise Policy Statement for England.

- **NOEL** – *No Observed Effect Level*. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- **LOAEL** – *Lowest Observed Adverse Effect Level*. This is the level above which adverse effects on health and quality of life can be detected.
- **SOAEL** – *Significant Observed Adverse Effect Level*. This is the level above which significant adverse effects on health and quality of life occur.

Noise criteria are not attributed to the adverse effect levels but are expanded on in the Government's Planning Practice Guidance³ (PPG).

2.3 Planning Practice Guidance

PPG is a web-based resource, which includes a section on noise. This resource provides guidance on how to determine the noise impact in terms of whether a significant adverse effect is likely to occur and/or whether a good standard of amenity can be achieved.

In line with the NPSE, PPG introduces the following concepts:

- Significant observed adverse effect level (SOAEL): This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- Lowest observed adverse effect level (LOAEL): this is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- No observed adverse effect level (NOAEL): this is the level of noise exposure where noise can be heard, but does not cause any change in behaviour, attitude or other physiological response.
- No observed effect level (NOEL): this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 1 below summarises the noise exposure hierarchy, based on the likely average response.

Table 1: Summary of Site Occupants and Activities

Perception	Examples of outcome	Increasing effect level	Action
No Observed Effect Level			
Not noticeable	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some	Observed Adverse Effect	Mitigate and reduce to a minimum

³ GOV.UK. 2018. Noise. [ONLINE] Available at: <https://www.gov.uk/guidance/noise--2>. [Accessed 12 May 2020].

Perception	Examples of outcome	Increasing effect level	Action
No Observed Effect Level			
	reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.		
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.4 Bury Council Local Plan

Bury Council does not set out specific guidance for noise from commercial facilities within their authority. The 'Bury Local Plan – Topic 4 – Health and Wellbeing' document refers to NPPF, which is discussed in section 2.1 above.

2.5 Other Guidance

2.5.1 British Standard 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019⁴ (BS4142) 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.

Condition 12 of the Outline Permission directly refers to BS4142 as the relevant guidance for assessing new commercial businesses within the approved masterplan.

The basis of BS4142 is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background Level, $L_{A90,T}$: defined in the Standard as 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, and quoted to the nearest whole number of decibels;
- Specific Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level at the assessment location due to the specific sound source under consideration, over a given time interval, T; and

⁴ British Standards Institute, 2014 and 2019. British Standard BS 4142+A1:2019: Methods for rating and assessing industrial and commercial sound. BSI.

- Rating Level, $L_{A,T}$: the specific sound level plus any adjustment made for the characteristic features of the noise.

Potential impacts are predicted from the difference between the representative background level at a noise sensitive receptor and the rating level from the noise source considered. The standard suggests that the greater the difference, the greater the magnitude of impact.

Section 11 of BS4142 gives guidance for significance of impacts in reference to comparing rating noise levels against existing background noise levels:

- i. Typically, the greater this difference, the greater the magnitude of the impact;
- ii. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- iii. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- iv. 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.

In determining the significance of the impact, BS4142 requires a consideration of the context of the assessment i.e. the nature of the existing acoustic environment and the new noise source, and the sensitivity of the affected receptors.

In addition, Note 2 of BS4142 states:

'Adverse impacts may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.'

2.5.2 Noise Characteristics and Penalties

BS4142 applies different penalties for noise sources that have an acoustic feature. These penalties are applied to the plant noise level where such features increase attention to the noise, such as tonality and intermittent operation.

BS4142 gives a guide to the level of penalty that should be applied, summarised below.

Tonality

- Tone just perceptible at the noise receptor: +2dB
- Tone clearly perceptible: +4dB
- Tone highly perceptible: +6dB

Intermittency

- Identifiable on/off conditions, readily distinctive against the residual acoustic environment: +3dB

2.5.3 Acoustic penalties for this assessment

Since the current use of the site is a commercial unit and distribution hub some noise from HGV movements and loading/unloading likely to be audible at some of the receptors. However, to allow for intermittency/impulsivity from loading activities a +3dB acoustic feature correction is considered reasonable.

2.5.4 Relating BS4142 to PPG Observed Adverse Effect Levels

Table 2 below aims to relate the PPG 'Observed Adverse Effect Levels' to the significance of impacts set out in BS4142 when comparing a noise source relative to the prevailing background noise levels.

Table 2: Operational noise significance criteria

Noise level in relation to background noise	Magnitude of Impact	Significance of Effect
Predicted Rating level $L_{A_{r,Tr}}$ at receptor is -5dB or more below the prevailing Background level $L_{A90,T}$	No effect (NOEL)	Not significant
Predicted Rating level $L_{A_{r,Tr}}$ at receptor is equal to background or up to -4.9dB below the prevailing Background level $L_{A90,T}$	Negligible (Below NOAEL)	
Predicted Rating level $L_{A_{r,Tr}}$ at receptor is between 0dB and +4.9 above the prevailing Background level $L_{A90,T}$	Minor (LOAEL)	
Predicted Rating level $L_{A_{r,Tr}}$ at receptor is between around +5dB to around 10 dB above the prevailing Background level $L_{A90,T}$	Moderate (between LOAEL and SOAEL)	Potentially significant
Predicted Rating level $L_{A_{r,Tr}}$ at receptor is around +10 dB or more above the prevailing Background level $L_{A90,T}$	Major (SOAEL)	

Based on the table above, noise levels from the proposed development should be controlled to avoid any significant effects. Where practicable, it is proposed that noise emissions from the site should be no greater than existing background noise levels at the closest receptors.

3. NEAREST NOISE-SENSITIVE RECEPTORS

The nearest receptors to the new unit are shown on the figure below.



Figure 2: Approximate red line boundary showing location of closest receptors

Table 3: Nearest Sensitive Receptors

Receptor	X (Eastings)	Y (Northings)
NSR 1 - School Street, Pimhole, Gigg, Bury, Greater Manchester, England, BL9 7EX	381627	410342
NSR 2 - School Street, Pimhole, Gigg, Bury, Greater Manchester, England, BL9 7EX	381564	410258
NSR 3 - Heap Bridge, Rochdale, Greater Manchester, England, BL9 7JT	382314	410132
NSR 4 - Waterfold Lane, Heap Bridge, Rochdale, Greater Manchester, England, BL9 7JY	382206	410274
NSR 5 - Roch Valley Greenway, Gigg, Hollins, Bury, Greater Manchester, England, BL9 8RQ	381660	409803

4. ENVIRONMENTAL NOISE SURVEY

4.1 Noise survey

To understand the existing noise climate surrounding the site of the new building Ramboll measured noise levels between Tuesday 05/09/2023 and Friday 09/09/2023.

Since access to several receptors was not possible due to private access, a long-term sound level meter was used to acquire ambient and background noise level measurements. The location of the sound level meter is approximately 270m to the west of the M66 motorway, and measurements considered broadly representative of the background levels experienced at the NSRs in Table 3.

Full details are presented in Appendix 2, with the selected measurement location and data presented below.

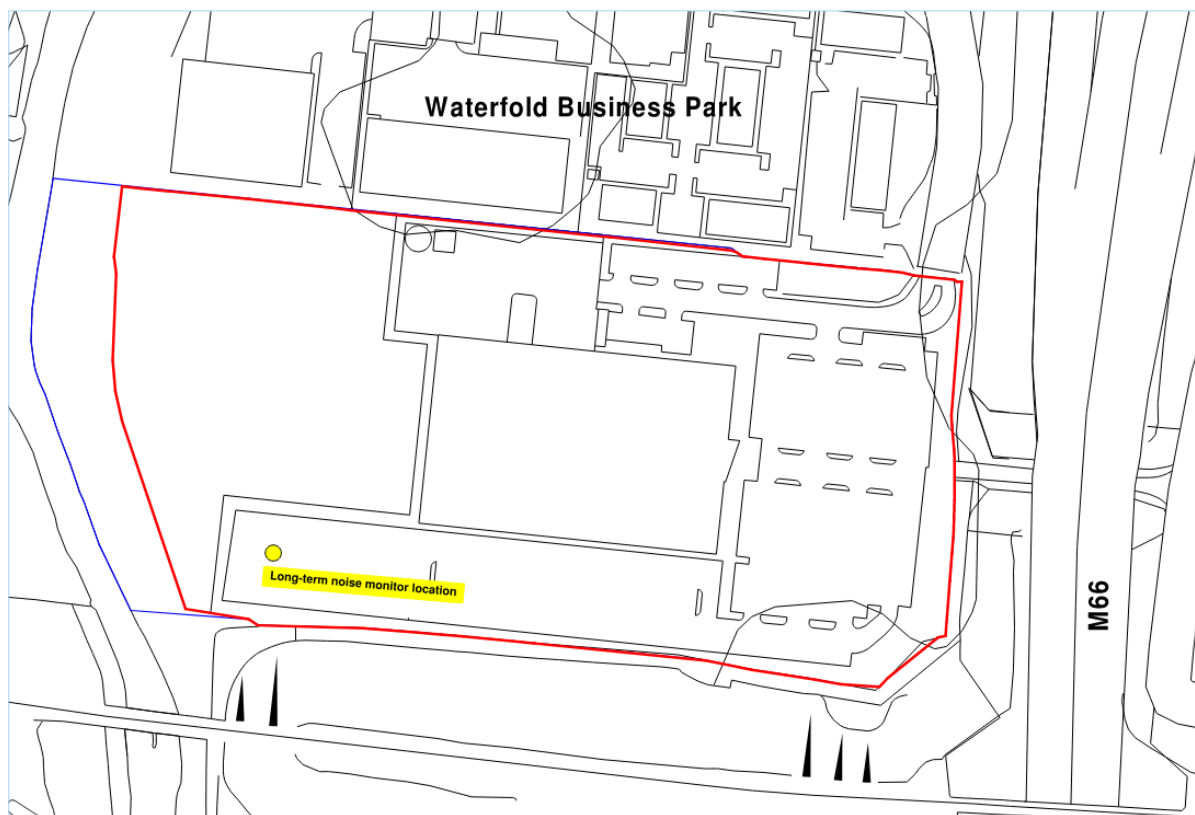


Figure 3: Red line boundary showing noise monitor location

Based on the measured data the average ambient levels for each daytime and night-time period have been calculated together with a statistical analysis of background noise levels.

Table 4: Unattended noise survey results summary at LT1

Date	Long-term equivalent continuous SPL, dB		Typical maximum SPL, dB*	Most commonly occurring background sound level, dB	
	L _{Aeq} ,16 hour	L _{Aeq} ,8 hour	L _{AFmax} ,5 min	dB L _{A90} ,15 min	
	Daytime 07:00-23:00	Night-time 23:00-07:00	Night-time 23:00-07:00	Daytime 07:00-23:00	Night-time 23:00-07:00
Tue 5 Sep 2023	-	51	63	53	44
Wed 6 Sep 2023	51	50	63	45	44
Thu 7 Sep 2023	53	49	63	49	42
Fri 8 Sep 2023	-	-	-	46	-
Overall	51 to 53	49 to 51	63	45 (45 to 53)	44 (42 to 44)

As can be seen from the data above, the ambient noise levels are fairly consistent over the days measured. Daytime background levels vary, and again are more consistent at night.

Noise levels measured using the long-term monitor were due to the road traffic sources on the M66 motorway.

Based on statistical analysis of the most commonly occurring background level measured over 15-minute intervals a daytime background level of 45dB L_{A90} is considered representative with 44 dB L_{A90} considered representative of the night.

Given that NSRs 1 and 2 are further from the M66 than the other receptors, a 2 dB correction would apply were the long-term measurements have been taken at these locations.

Background noise levels were measured without the operation of the current building that occupies the site and therefore represents a worst case baseline for assessment.

5. NOISE MODEL AND INPUT SOURCES

5.1 Noise model

A 3D computer noise model has been prepared to calculate noise emissions from the new warehouse, including on site noise sources such as external plant and vehicle movements.

Daytime and night-time levels are predicted at a height of 4 m at the nearest sensitive properties as per the locations detailed in Table 3.

The noise predictions within the model have been undertaken in accordance with *ISO 9613-2:1996 - Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*.

The surrounding ground to the unit is generally hard and reflective, with softer ground in between the unit and receptors. A reflection coefficient of 0.2 is used in the model for the warehouse footprint and remaining business park, and a reflection coefficient of 1.0 is used for the areas of soft ground between the development and sensitive receptors (0 = fully reflective, 1 = fully absorptive).

The height of the warehouse is based on the Architect's drawings and houses are modelled at 8 m.

The order of reflections in the model is set to 2. All buildings are inputted as fully reflective surfaces.

The noise emissions from loading activities, HGVs and vans have been modelled at a height of 1.0 m above ground level.

All topography is based on information provided by the wider project team or based on LIDAR data from the Government's website.

5.2 Noise sources

Once occupied the warehouse has the potential to generate noise impacts on the nearest sensitive receptors from various static and mobile noise sources. This section identifies each noise source associated with the development and the data used in the subsequent noise model.

5.2.1 External plant

The proposed outdoor noise sources comprise four outdoor condensers external to the warehouse as well as a 1000 kVA transformer.

The locations of these items are shown on Figure 4 below, with their sound pressure levels in Table 5. Any alternative selections should be no greater than these noise levels unless agreed suitable by an acoustician.

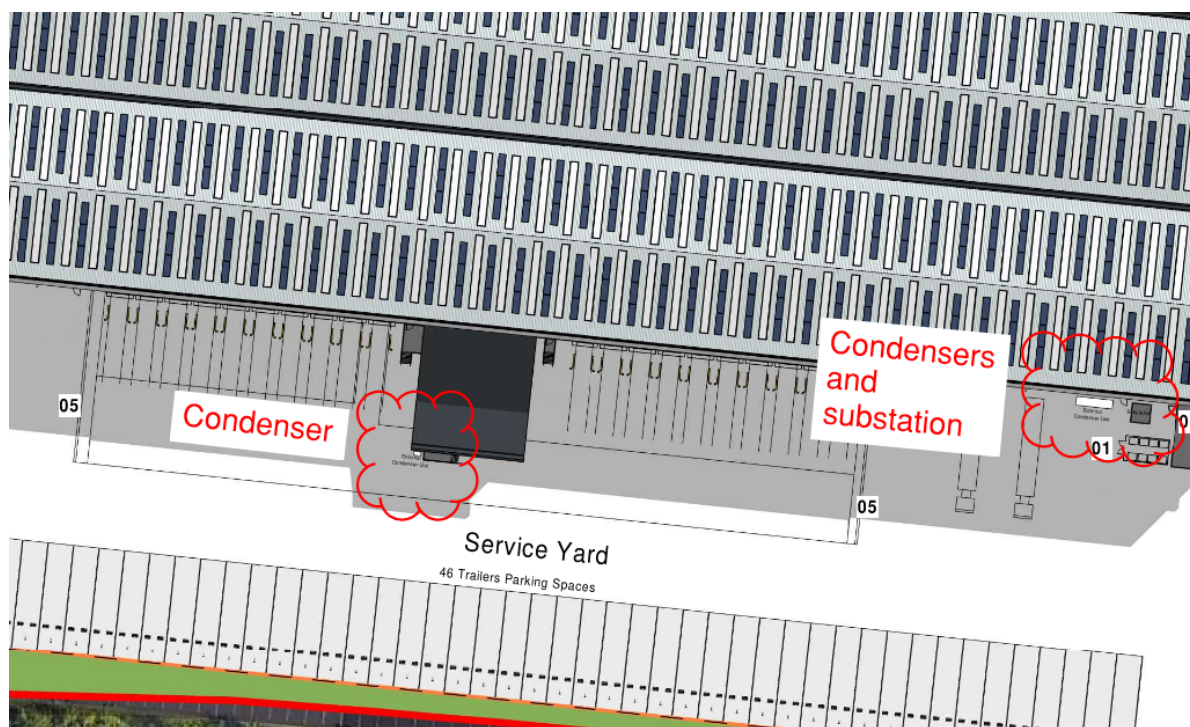


Figure 4: Location of external plant

Table 5: External plant noise data

Description	Overall, dBA	Sound pressure level @ 1m, dB @ octave band centre frequency							
		63	125	250	500	1k	2k	4k	8k
1 - PURY-M300YNW-A1	61	76	63	63	60	54	50	45	40
2 - PUZ-ZM100YKAR1	51	54	54	53	49	46	41	36	29
3 - PURY-M300YNW-A1	61	76	63	63	60	54	50	45	40
4 - PURY-M300YNW-A1	61	76	63	63	60	54	50	45	40
Description	Overall, dBA	Sound power level, dB @ octave band centre frequency							
Transformer*	59	46	63	66	53	42	29	21	<20

* spectrum based on Ramboll data for a transformer

5.2.2 Internal plant with atmospheric connections

The office areas in the eastern part of the warehouse and hub are served by ventilation systems ducted to atmosphere, with extract fans (to toilets). Such atmospheric connections are typically not noisy at the distances considered to the nearest receptors, and such building services items usually include an atmosphere side attenuator. As a result, these items have not been included in the noise model.

Noise levels from any grille should be limited to no more than 50dBA at 1m.

5.2.3 On site mobile noise sources

The Transport Consultant has provided details of the predicted number of vehicles on site during various times of the day and night. This information has been used in the model to reflect worst-

case vehicular movements on site during a peak one-hour daytime period, and a peak one-hour night-time period.

Table 6 below shows the predicted hourly periods with the worst-case day and night-time periods highlighted.

Table 6: Expected vehicle trips provided by the Transport Consultant

Time	Proposed Development Trips								
	Cars/Vans/Motorcycles			HGVs			Total Vehicles		
	Arr	Dep	Tot	Arr	Dep	Tot	Arr	Dep	Tot
00:00	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0
05:00	51	11	62	14	21	35	65	32	97
06:00	86	14	100	16	30	46	102	44	146
07:00	49	13	62	10	18	28	60	31	91
08:00	43	18	61	10	17	27	53	35	88
09:00	34	17	50	9	7	16	43	23	66
10:00	19	18	37	14	13	26	33	31	64
11:00	20	19	38	13	15	28	32	33	66
12:00	21	21	41	16	9	25	37	29	66
13:00	26	25	51	10	10	21	37	35	72
14:00	22	32	54	12	9	21	34	41	75
15:00	18	40	58	15	11	27	33	51	85
16:00	13	43	56	16	14	30	29	56	86
17:00	11	51	62	18	11	30	30	62	92
18:00	4	34	38	9	6	14	13	40	52
19:00	14	35	49	4	11	14	18	46	64
20:00	14	7	21	5	9	14	19	16	35
21:00	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0

The busiest periods used within the noise model are as follows:

Daytime - 17:00 to 18:00

- 30 HGV movements
- 62 car/van/motorbike movements

Night - 06:00 to 07:00

- 46 HGV movements
- 100 car/van/motorbike movements

For vehicles on site, it is understood that all vehicles will enter the site through the access point in the eastern part of the site, and either use the available car park spaces or traverse a route along the south of the site to access the loading bays/doors. The exit route will be similar.

To assess the impact of HGVs and light vehicles on site, Ramboll has used archive data as presented in Table 7 below.

Table 7: Sound power levels for vehicles on site

Area/Plant Item	Noise level	Reference
On site HGV	99 dB L _{WA} moving point sources	Measurement at an existing site, representative of HGV moving up to 9mph on site. Measurement taken at 1.5m above hard ground, and 5m from the HGV noise source.
Vans/cars/motorbikes on site	84 dB L _{WA} moving point sources	Based on archive data, smaller vehicles such as cars and vans are around dB lower than HGVs when traversing the same routes.

5.2.4 Loading and unloading activities

Ramboll has measured noise levels associated with loading and unloading activities at other sites within the UK as well as referred to online resources for similar source noise levels. Table 8 below identifies typical noise levels associated with HGVs and unloading of such vehicles over a short duration of time.

Table 8: Noise levels for typical loading and unloading activities

Activity	Noise level, dB L _{Aeq}
Unloading/loading @ 10m from HGV	65

As with any commercial business near to noise sensitive receptors it is expected that the site will be managed with consideration to the local neighbours for activities such as loading.

To provide a robust assessment, the daytime and night-time models assume 20 loading bay/doors may be in use concurrently at any time. The noise model assumes the noise source is localised at the bay/door and rear of the HGV. Since the HGV trailer bodies back into the building, the model includes the trailer bodies as would be expected.

5.3 Noise breakout from the warehouse building

5.3.1 Internal noise levels

Internal noise levels within an existing warehouse/sorting/distribution unit site have been measured by Ramboll. Internal activities included moving items around the unit, conveyor belts, and general warehouse activities. Table 9 below presents the spectrum used for the model input.

Table 9 Noise levels for internal parcel sorting and distribution operations:

Description	Overall, dB	Sound pressure level, dB @ octave band centre frequency							
		63	125	250	500	1k	2k	4k	8k
Typical operations, including conveyor belts running, parcels unloaded from an HGV, warehouse activities	Ambient noise level								
	74 L _{Aeq}	76	74	75	73	68	64	61	57

5.3.2 Building fabric

It is understood that the building envelope will be built using insulated cladding panels and triple skin polycarbonate rooflights (10% of roof area) and insulated sectional panel doors. All other building elements such as pedestrian doors are understood to be solid core or steel doors which will be well fitting and generally maintain the acoustic performance of the main envelope when closed.

Table below 10 identifies the main components for the building envelope and typical acoustic performances based on test data from manufacturers of these products.

Table 10: Sound insulation of building envelope main constructions as used in the noise model

Description	Overall dB R _w	Sound reduction, R, dB @ octave band centre frequency							
		63	125	250	500	1k	2k	4k	8k
Insulated cladding panel	25	20	18	20	24	20	29	39	47
Triple skin roof light	24	11	15	19	21	19	25	>35	>35
Insulated sectional panel door	31	11*	23	25	25	30	43	>40	>40
*estimated									

6. ASSESSMENT

6.1 Noise limits from operational noise

The following noise targets are proposed at the nearest sensitive receptors which are based on noise emissions being controlled to no greater than existing background levels during the day and overnight.

Table 11: Background noise levels for different times of the week

Description	Day 07:00 to 23:00	Night 23:00 to 07:00
Background level – Long term measurement location	45 dB L _{A90}	44 dB L _{A90}
Proposed Rating level at NSRs 3, 4 and 5	45 dB L _{Ar,Tr}	44 dB L _{Ar,Tr}
Proposed Rating level at NSRs 1 and 2	43 dB L _{Ar,Tr}	42 dB L _{Ar,Tr}

As per Table 2, achieving a Rating level which is -5dB below background would result in 'no effect' (NOEL), whereas a rating level equal to background would result in a negligible impact with negligible effects (NOAEL). An exceedance of up to +4.9 dB above background is expected to result in a minor impact and equates to the lowest observed adverse effect level (LOAEL).

BS4142 states that:

'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.'

6.2 Acoustic feature corrections

Since the loading/unloading of HGVs could be intermittent or impulsive in nature, a +3 dB correction has been applied to the Specific noise levels predicted using the model. At this stage, there is no evidence that any of the on site noise sources will be tonal or feature any other characteristics warranting penalties to be applied under BS4142.

6.3 BS4142 Assessment

Table 12 below presents the predicted noise levels at each of the nearest receptors considered as a cumulative level of all on site noise sources discussed previously operating together, and background noise levels discussed as per Table 11.

The specific and rating noise levels are in terms of daytime 1-hour periods and 15 minute night-time periods, over the worst-case hourly intervals discussed previously. All noise levels and rating level excesses have been rounded to the nearest whole decibel.

Table 12: BS4142 assessment of predicted noise levels from noise associated with the new development

Receptor	Background Level, L _{A90,T} (dB)		Predicted Specific Noise, L _{Aeq,T} (dB)		Resulting Rating Level, L _{Ar,T} (dB)		Excess of rating level over background noise level (dB)	
	Daytime	Night	Daytime 1-hour	Night 15-mins	Daytime 1-hour	Night 15-mins	Daytime	Night
NSR 1	43	42	31	31	34	34	-9	-8
NSR 2	43	42	40	40	43	43	0	+1
NSR 3	45	44	42	42	45	45	0	+1
NSR 4	45	44	31	31	34	34	-11	-10
NSR 5	45	44	31	31	34	34	-11	-10

6.3.1 NSRs 1, 4 and 5

The above assessment identifies that the Rating levels are expected to be lower than existing background levels during the day and at night at NSR 1, 4, and 5. based on the worst-case one hour periods of operation.

Where the Rating level -5dB below background this is expected to result in 'no effects' (NOEL). No mitigation is required to these receptors.

6.3.2 NSRs 2 and 3

At NSR 2 and 3, the Rating levels are expected to be no greater than existing background levels during the day, and +1 dB greater than night-time background levels.

A marginal exceedance of 1 dB above background is expected to result in a minor impact and equates to the lowest observed adverse effect level (LOAEL). However, it should be noted that above assessment relates to the most commonly occurring night-time background level, and during 05:00 to 07:00 as per the expected number of HGV trips in Table 6, background noise levels would be 2 to 3 dB higher which would effectively resolve this exceedance.

Given the context of the surrounding business park and scrap merchant to the west a marginal exceedance over existing background noise levels is not expected to result in any change in behaviour at the closest receptors (such as closing windows etc). A site management plan, and considerate loading and unloading processes are expected to be sufficient to mitigate noise levels to these properties.

During all other parts of the day, overall site activities are expected to be less and therefore, the potential impacts to the nearest receptors negligible or have no impact.

7. CONCLUSION

This assessment has considered noise emissions from the site of a new proposed warehouse unit, included external plant, and mobile noise sources.

Predicted noise levels are expected to have no impact on receptors furthest from the development, and a minor impact at the closest receptors during the night. The effects of noise are expected to be either low or negligible and not expected to change the behaviour of the closest receptors (such as closing windows etc).

A site management plan, and considerate loading and unloading processes are expected to be sufficient to mitigate noise levels to the closest properties.

During all other parts of the day, overall site activities are expected to be less and therefore, the potential impacts to the nearest receptors negligible or have no impact.

8. STATEMENT OF UNCERTAINTY

An assessment in accordance with BS 4142:2014+A1:2019 requires consideration of the potential effects of uncertainty on the assessment outcome. The effect of some types of uncertainty cannot be easily quantified.

For this reason, the approach taken during this assessment has been to ensure control measures are in place to minimise uncertainty as far as practicable. The control measures are listed below.

Primarily, the assessment was undertaken by suitably qualified practitioners, using established best practice methods of measuring, and predicting sound levels and applying professional judgement throughout the assessment.

After minimising uncertainty through these measures, the resulting assessment is deemed suitable for establishing the potential for long-term effects due to operational industrial noise.

Table 13: Control measures taken to reduce uncertainty

Possible source of uncertainty	Control measures to reduce uncertainty
Selection of representative assessment locations	Initial appraisal and desk study carried out beforehand.
Background sound level: measurement uncertainty	Measurements carried out with Class 1 (BS EN 61672-1:2013) instrumentation with effective windshield to minimise turbulence at the microphone. Calibration level checked before and after the survey. Background sound level measured over a period of several days to include the day and night. Representative value then determined using the typical average background sound level while excluding periods deemed to be atypical (due to high background sound levels).
Background sound level: effects of weather	Noise survey carried out under suitable weather conditions for environmental noise measurement, and weather conditions reported. Measurement results affected by periods of rain excluded from the analysis. Wind velocity during the survey was not sufficient to affect the measured background sound level. The background sound levels presented are considered representative of typical conditions in the absence of adverse weather conditions.
Specific sound level: source level uncertainty	Source emission levels for new sources, and/or number of sources were agreed with relevant design team members and client beforehand.
Sound propagation uncertainty	Sound propagation predictions carried out using best industry practice (computational modelling applying ISO 9613-2). Industrial sound level predictions apply under moderate downwind conditions at the assessment location (a moderate wind between source and receptor). This is considered suitable for evaluating the worst-case condition.
Rating level: acoustic feature corrections	Acoustic feature corrections applied based on subjective observations at the assessment location and analysis of noise measurement frequency data for existing sources. A penalty was applied to account for the distinctive nature of some of the internal sound sources on precautionary basis.
Context	Observations carried out during noise survey to assess the context into which the sound sources will be introduced. Consideration of the existing industrial sound level context forms part of the assessment.

APPENDIX 1

ACOUSTIC GLOSSARY

Table A1-1: Glossary of acoustic terminology

Terminology	Definition
Ambient sound level	The total sound pressure level in a given position from all surrounding sources of noise, both near and far. Normally expressed as an equivalent continuous A-weighted sound pressure level, dB $L_{Aeq,T}$.
A-weighting	The process of weighting the observed sound pressure level at each frequency band, to approximate the sensitivity of the human ear to sounds of different frequencies. A-weighted sound pressure levels are expressed as dB(A) or dB L_{Ap} .
Decibel	A logarithmic value quantifying the sound pressure at a specified position or sound power, relative to a reference sound pressure or sound power (20 μ Pa for sound pressure, 10^{-12} W for sound power).
Façade	A sound monitoring position is a "façade" position when it includes a strong reflection from an adjacent building or structure. This corresponds with a position that is between 1 and 2 metres away from a reflecting building or structure.
Free-field	A sound monitoring position is a "free-field" position when it is not affected by sound reflections from surrounding buildings and structures. This corresponds with a position at least 3.5 metres away from reflecting buildings or structures.
Frequency	The number of oscillations per second of a vibrating particle in a medium, measured in Hertz (Hz) or cycles per second.
$L_{A90,T}$	The A-weighted sound pressure level exceeded during 90% of the time interval, T. Typically used to quantify the background sound level at a specified position.
$L_{Aeq,T}$	The equivalent continuous A-weighted sound pressure level over a time interval, T. This is an energy-average sound pressure level over the specified time period.
$L_{AFmax,T}$	The maximum A-weight sound pressure level during a specified time interval, T. Measured with "fast" time-weighting (which approximates the time-response of the human ear).
Noise	Unwanted or undesirable sounds observed by a listener.
Octave band	A frequency band used in acoustical measurements. An octave is a frequency interval between two sounds where the frequency of the lower sound is half the frequency of the upper sound. The human hearing range is divided into ten logarithmically equal frequency divisions called octave bands, with centre-band frequencies as follows: (16 Hz, 32 Hz,) 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, 16000 Hz.
Rating level, $L_{Ar,Tr}$	The specific sound level plus a correction accounting for acoustic features such as impulses, tones, intermittent features, or any other characteristics that draw more attention to the sound source.
Residual sound level	The equivalent continuous A-weighted sound pressure level of the ambient sound remaining at a specified position when the specific sound source (the sound source being assessed) does not contribute to the ambient sound.
Reverberation	The reflection of sound from room surfaces, resulting in the prolongation or persistence of a sound in a room.

Terminology	Definition
Reverberation time	Time, in seconds, required for the sound pressure level in a room to decrease by 60 dB after a sound source has stopped. Long reverberation times are present in large empty rooms with hard surfaces (e.g. a cathedral); short reverberation times are present in smaller rooms with soft furnishing (e.g. typical living room, a recording studio).
Sound	The vibration, or oscillation, of particles in a medium, such as air, which may be detected by the human ear.
Sound absorption	The reduction of sound energy by transmission through an absorbing medium such as an "acoustically soft" material or surface which results in a reduced reflection of incident sound.
Sound insulation	The ability of architectural elements or structures to reduce the transmission of sound, predominantly due to the reflection of sound incident on the element or structure. Typically measured as the difference in sound pressure levels between a "source" room containing a loudspeaker and an adjacent "receiving" room.
Sound power level	A logarithmic measurement that quantifies the total sound power of a source emitted in all directions relative to a reference sound power ($W_{ref} = 1 \text{ pW}$ or 10^{-12} W). Equal to $10 \log_{10} (W / W_{ref})$ and expressed in decibels.
Sound pressure level	A logarithmic measurement that quantifies the sound pressure at a specified position relative to a reference sound pressure ($p_{ref} = 20 \text{ } \mu\text{Pa}$). Equal to $20 \log_{10} (p / p_{ref})$ and expressed in decibels.
Specific sound level	The equivalent continuous A-weighted sound pressure level at a specified position due to the specific sound source (the sound source being assessed).

APPENDIX 2

NOISE SURVEY

Waterfold Business Park, Bury

Date, time

Tuesday 5 September 2023 to Friday 8 September 2023

Personnel

Matt Bull (Ramboll)

Noise Sources

Measured noise levels were due to road traffic sources on the M66 motorway to the east.

Weather

Unattended survey:

Temperatures in the range of up to 25°C and lower overnight.

Wind speed (average) <2 m/s (generally from the east)

Equipment

- i. 01dB FUSION Class 1 Sound Level Meter (serial no. 14941)
- ii. GRAS 40Cd microphone (serial no. 504868);
- iii. CIRRUS CR:515 Sound Calibrator (serial no. 95406).

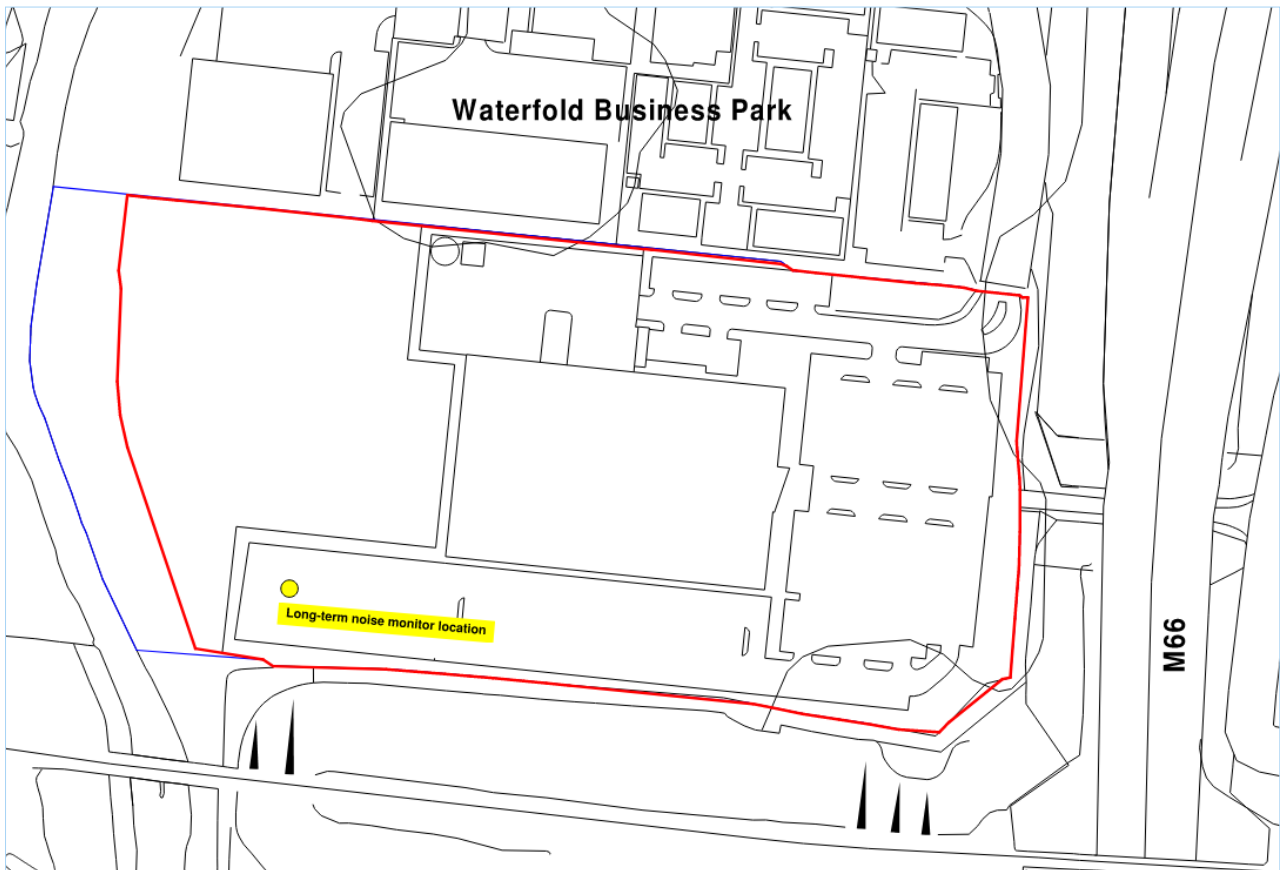
Before and after the survey the sound level meter was check calibrated to an accuracy of ± 0.3 dB using the sound level calibrator.

The microphone was installed on a tripod at a height of around 1.5m above the relative ground level.

Noise levels are as reported in the main report body and below. Further data, spectral information, and calibration certificates are available on request.

NOISE ASSESSMENT

WATERFOLD BUSINESS PARK, BURY



Red line boundary showing noise monitor location

Location – LT1 – All data

