



Network Space Developments Ltd

Ashroyd Business Park, Barnsley

Noise Report

April 2018

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4		



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1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment undertaken for a full application for the erection of 4 No. buildings totalling 5,000 sqm for use within Use Classes B1(b) (Research & Development), B1(c) (Light Industry), B2 (General Industrial) and B8 (Storage and Distribution) with ancillary offices and associated access, parking and circulation/ service areas, infrastructure works and landscaping at Ashroyd Business Park, Royston, Barnsley

A description of the existing noise environment in and around the site is provided in this report. A baseline noise survey was undertaken and the results were used to verify predictions of the short-term and long-term effects of noise associated with the proposed development. The noise levels from the proposed development have been predicted at local representative receptors using CADNA noise modelling software which incorporates CRTN and ISO 9613 methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and a set of location plans and noise contour plots relevant to the assessment are presented in Appendix B. Report Conditions are presented in Appendix C.

1.2 Legislative Context (England)

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in National Planning Policy Framework. With regard to noise and planning, NPPF contains the following 4 short statements (section 123):

- A. Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- B. Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- C. Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- D. Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

In support of the NPPF, Planning Practice Guidance (PPG): Noise was launched in March 2014. The overall aim of this guidance is, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England, to, *'identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'*

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the NPPG and repeated as follows:

Table 1.1 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No Specific Measures Required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. 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 Observed Adverse Effect	Prevent

2.0 Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified.

Table 2.1 Noise Level Criteria and Actions

Effect Level	Assessment	Noise Level Criteria	Action / Justification
No Observed Adverse Effect	Building Services Plant Goods Deliveries	Source noise levels below background L_{A90} noise levels	No Action Required Source noise levels below the background noise is an indication of the sound source having a low impact and that complaints would be unlikely
	Absolute Criteria Goods Deliveries/Car Parking	Noise levels are below: <i>Bedrooms: 30 $dBL_{Aeq,8hours}$ / 45 dBL_{Amax}</i> <i>Living Rooms: 35 $dBL_{Aeq,16hours}$</i> <i>External Amenity Space:</i> <i>50 $dBL_{Aeq,16hours}$</i>	Within BS8233 / WHO guideline criteria
Lowest Observed Adverse Effect Level (LOAEL)	Building Services Plant Goods Deliveries	Difference between source noise levels and existing background levels of zero to 5 dB	Action: None Justification: + 5 dB above background is considered an indication of an impact of marginal significance.
	Absolute Criteria Goods Deliveries/Car Parking	Noise levels are below: <i>Bedrooms: 30 $dBL_{Aeq,8hours}$ / 45 dBL_{Amax}</i> <i>Living Rooms: 35 $dBL_{Aeq,16hours}$</i> <i>External Amenity Space:</i> <i>55 $dBL_{Aeq,16hours}$</i>	Within BS8233 / WHO guideline criteria
Significant Observed Adverse Effect Level (SOAEL)	Building Services Plant Goods Deliveries	Difference between source noise levels and existing background levels of greater than 10 dB	Action: Mitigate to achieve less than 5dB above background if possible: Justification: Depending on context, a difference of +10dB to be an indication that complaints are likely.
	Absolute Criteria Goods Deliveries/Car Parking	Noise levels are exceeded: <i>Bedrooms: 30 $dBL_{Aeq,8hours}$</i> <i>45 dBL_{Amax} (More than 10 – 15 times per night)</i> <i>Living Rooms: 35 $dBL_{Aeq,16hours}$</i> <i>External Amenity Space:</i> <i>55 $dBL_{Aeq,16hours}$</i>	Mitigate and reduce to achieve (with windows closed): <i>Bedrooms: 30 $dBL_{Aeq,8hours}$</i> <i>Living Rooms: 35 $dBL_{Aeq,16hours}$</i> <i>External Amenity Space (where practicable):</i> <i>55 $dBL_{Aeq,16hours}$</i>



Effect Level	Assessment	Noise Level Criteria	Action / Justification
Unacceptable Observed Adverse Effect Level (UOAEI)	Building Services Plant Goods Deliveries	Difference between source noise levels and existing background levels of greater than 15 dB	Action: Reduce as far as practicable depending on context Justification: +10dB above existing background is an indication of a likely significant adverse impact
	Absolute Criteria Goods Deliveries/Car Parking	Internal noise levels exceed: Bedrooms: 51 dBL _{Aeq,8hours} , 67 dBL _{Amax}	Mitigate and reduce to achieve as far as practicable



3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three dimensional noise modelling has been undertaken to predict source noise levels at a large number of locations both horizontally and vertically. This model is based on the Department of Transport Calculation of ISO 9613 noise propagation methodology.

The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table below have been used.

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels	Ordnance Survey	2m OS Contours and proposed on-site topographical levels
Building heights – around site	WYGE Observations	8 m height for two storey residential properties. Proposed buildings as per elevations drawings
Receptor positions	WYGE	1 m from façade, height of specified in Section 3.3
Barriers	WYGE	No existing barriers are included.
Reflections	WYGE	First order reflections have been applied based on mirror image sources
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.
Proposed Plans	The Harris Partnership	Proposed Site Masterplan

It is acknowledged that a number of these assumptions will affect the overall noise levels presented in this report. However, it should be noted that certain assumptions made, as identified above, are worst-case.



3.2 Model Input Data

3.2.1 HGV Delivery Event Noise Data

Noise of a delivery event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 3 m distance even with the same vehicle type. Similarly, individual events using the same vehicle and at the same location have been recorded to vary by as much as 14 dB.

As such, the following worst-case calculations have been based on measurements of refrigerated, articulated HGVs delivering consumables. All measurements were undertaken in free-field conditions. In addition to noise from the unloading process, the levels used in the assessment include noise from the vehicle pulling up to the unloading bay, manoeuvring into position and then pulling away once unloading/loading is complete, together with other sources such as trolleys and reversing alarms.

The calculations are based on a maximum of one event per hour for both daytime and night-time periods at all proposed employment units and are considered to be a reasonable worst-case assumption.

Delivery Vehicle Docking and Unloading

- *Daytime and Night-time $L_{Aeq,1hr}$ Noise Level*

5 minutes at L_p 75 dB at 3 m distance (vehicle arriving and manoeuvring)
 38 minutes at L_p 70 dB at 3 m distance (vehicle unloading)
 2 minutes at L_p 72 dB at 3 m distance (vehicle leaving)
 15 minutes of quiet (associated with documentation and waiting with engine off)

$$\begin{aligned} L_{Aeq(60 \text{ mins})} &= 10\log(1/60)(5\text{mins} \times 10^{0.1 \times 75\text{dB}} + 38\text{mins} \times 10^{0.1 \times 70\text{dB}} + 2\text{mins} \times 10^{0.1 \times 72\text{dB}}) \\ &= 69.8 \text{ dB at 3 m distance } [L_w = 87.3 \text{ dB}] \end{aligned}$$

- *L_{Amax} Noise levels*

L_{Amax} used is as 85.4dB at 3 m distance [$L_w = 102.9 \text{ dB}$]

Delivery Vehicle Arriving/Exiting along service yard access road

The following calculations have been used to represent this as a line source in the model.

- *Daytime and Night-time $L_{Aeq,1hr}$ Noise Level*

1 x 10 seconds $L_p = 69.3 \text{ dB}$ at 3 m distance (vehicle arriving and leaving)

$$\begin{aligned} L_{Aeq(60 \text{ mins})} &= 10\log(1/60)(10 \text{ sec} \times 10^{0.1 \times 69.3 \text{ dB}} + 10 \text{ sec} \times 10^{0.1 \times 69.3 \text{ dB}}) \\ &= 46.7 \text{ dB at 3 m distance} \end{aligned}$$



- *L_{Amax} Noise levels*

L_{Amax} used is as 81.0 dB at 3 m distance [L_w = 92.5 dB]

It is considered that the proposed approach is likely to over-estimate the level of noise generation from the site based on typical operations from such developments. With the regard to the night-time period, it is considered that reference to the L_{Aeq,1hour} presents a stringent assessment as it is highly unlikely there would be a situation where loading and unloading activities were occurring at all units during the same 15 minute period. Additionally, the 1 hour assessment period is more stringent than the BS 8233 8 hour night-time assessment period.

3.2.2 Proposed Commercial Uses - Car Park Noise Data

Noise levels from the proposed car parking area have been determined based upon observations within existing retail parks during busy daytime periods which presents a worst case when considering car parking events during staff change-over periods. L_{Aeq} noise levels, are modelled as area sources across proposed car parking areas and L_{Amax} noise levels as point sources.

- L_{Aeq,1hr} Noise Level = 54 dB at 1.5m height
- L_{Amax} Noise Level = 76 dB at 3m distance

3.2.3 Building Services Plant (BSP) Noise Data

As the proposed plant design and end users are not confirmed at this stage a detailed plant noise assessment cannot be undertaken. Therefore, point sources have been defined in the model to represent potential plant associated with the proposed development within assumed external plant areas to the rear of the proposed units. The maximum sound pressure levels of the point sources at 3 and 10 metres were estimated in the model as a conditional maximum level that the noise levels at nearby receptors were predicted to meet the required criteria which is outlined in Section 5.1.

3.3 Sensitive Receptors

The table below summarises receptor locations that have been selected to represent worst-case existing residential receptors with respect to direct noise from the proposed employment use. Ground and first floor facades (adjacent to and facing the proposed development) of nearest existing properties have been represented. The locations of existing receptors are shown on SK02 in Appendix B respectively.

**Table 3.4 Existing and Proposed Receptor Locations**

Ref.	Description	Assessed Height (m)
R1	72 Hawshaw Avenue	1.5 / 4.0
R2	78 Hawshaw Avenue	1.5 / 4.0
R3	20 Hawshaw Bank	1.5 / 6.5
R4	3 Upper Holroyd Road	1.5 / 6.5
R5	15 Upper Holroyd Road	1.5 / 6.5
R6	17 Upper Holroyd Road	1.5 / 6.5
R7	103 Upper Holroyd Road	1.5 / 4.0
R8	1 Stonehill Close	1.5 / 4.0
R9	8 Stonehill Close	1.5 / 4.0
R10	127 Upper Holroyd Road	1.5 / 4.0
R11	64 Hawshaw Avenue	1.5 / 4.0

3.4 Tranquillity Rating

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zones 2-3.



4.0 Noise Survey

4.1 Noise Survey Methodology

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Norsonic 140	Environmental Noise Analyser	s/n	1402987
Norsonic 1251	Sound Calibrator	s/n	31291
Rion NL-52	Environmental Noise Analyser (WYG19)	s/n	253701
Rion NL-52	Environmental Noise Analyser (WYG23)	s/n	732146
Rion NC-74	Sound Calibrator	s/n	35046823

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, and no drift was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at six locations (as specified in the following table and shown in SK01 of Appendix B) from Wednesday 14th March 2018 to Wednesday 21st March 2018. Attended short term measurements were undertaken at four locations during day, evening and night-time periods with two additional locations being measured unattended over a 169-hour period. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*. Weather conditions during the survey period were observed as being dry with scattered showers. Anemometer readings confirmed that wind speeds were less than 5 ms⁻¹ at all times during the survey, with a predominant easterly wind direction.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	South of the site near Hawshaw Bank
LT2	West of the site near Stonehill Close
ST1	On site North of LT2
ST2	Upper Hoyland Road
ST3	B6096 in front of NMTF
ST4	B6096 opposite Metalliform Holdings

4.2 Noise Survey Results

The dominant noise sources found in the area include road traffic from Hawshaw Lane and the A6195 (Dearne Valley Parkway).

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period).

Table 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	21/03/2018 12:05	7	2-3	E	4	Traffic along A6195.
Day ST2	21/03/2018 11:39	7	2-3	E	3	Traffic along Upper Hoyland Road.
Day ST3	21/03/2018 11:04	7	1-2	E	3	Traffic along Halshaw Lane.
Day ST4	21/03/2018 10:45	7	1-2	E	2	Traffic along Halshaw Lane.
Evening ST2	20/03/2018	5	0-1	E	4	Traffic along A6195.
Evening ST3	20/03/2018	4	1-2	E	4	Traffic along Halshaw Lane.
Evening ST4	20/03/2018	4	1-2	E	3	Traffic along Halshaw Lane.
Night ST2	20/03/2018	1	0-1	E	2	Traffic along A6195.
Night ST3	20/03/2018	2	1-2	E	2	Traffic along Halshaw Lane.
Night ST4	20/03/2018	2	1-2	E	3	Traffic along Halshaw Lane.

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2×10^{-5} Pa). For the LT locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.3 Results of Baseline Noise Monitoring Survey

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Daytime 07:00 – 23:00	82 Hours	14/03/2018 – 21/03/2018 11:13 – 12:23	LT1	52.2	89.9	31.9	52.9	50
Weekday Night-time 23:00 – 07:00	41 Hours	14/03/2018 – 12/03/2018 23:00 – 07:00		47.5	76.7	27.4	46.6	38



Period	Duration (T)	Monitoring Date and Times	Location	L _{Aeq,T} (dB)	L _{Amax,T} (dB)	L _{Amin,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)
Weekend Daytime 07:00 - 23:00	32 Hours	17/03/2018 - 18/03/2018 07:00 - 23:00		52.0	79.1	32.4	52.7	48
Weekend Night-time 23:00 - 07:00	16 hours	17/03/2018 - 18/03/2018 23:00 - 07:00		47.5	70.8	29.7	49.0	36
Weekday Daytime 07:00 - 23:00	82 Hours	14/03/2018 - 21/03/2018 11:24 - 12:19	LT2	52.0	90.9	29.5	52.6	50
Weekday Night-time 23:00 - 07:00	41 Hours	14/03/2018 - 12/03/2018 23:00 - 07:00		47.1	86.4	25.0	45.6	32
Weekend Daytime 07:00 - 23:00	32 Hours	17/03/2018 - 18/03/2018 07:00 - 23:00		52.5	76.7	32.4	53.5	48
Weekend Night-time 23:00 - 07:00	16 hours	17/03/2018 - 18/03/2018 23:00 - 07:00		47.8	69.4	28.2	49.5	38
Daytime 07:00 - 19:00	15 Mins	21/03/2018 12:05	ST1	53.5	66.0	38.6	55.8	49.8
	15 Mins	21/03/2018 11:39	ST2	52.5	73.0	38.7	52.0	46.7
	30 Mins	21/03/2018 11:04	ST3	64.2	80.1	43.8	68.8	49.0
	15 Mins	21/03/2018 10:45	ST4	68.0	83.8	46.8	72.5	52.5
Evening 19:00 - 23:00	30 Mins	20/03/2018 19:58	ST2	47.3	68.8	40.2	47.8	43.6
	15 Mins	20/03/2018 20:34	ST3	65.4	79.6	41.1	70.2	46.0
	15 Mins	20/03/2018 20:58	ST4	67.3	84.3	38.6	71.1	44.0
Night-time 23:00 - 07:00	30 Mins	20/03/2018 23:57	ST2	40.5	53.2	32.1	42.9	36.8
	15 Mins	20/03/2018 23:37	ST3	55.4	77.2	36.3	47.6	39.2
	15 Mins	20/03/2018 23:20	ST4	61.7	82.8	36.0	59.9	39.5

All values are sound pressure levels in dB re: 2x 10⁻⁵ Pa



5.0 Assessment of Key Effect

5.1 Building Services Plant Noise Assessment

The assessment compares the predicted noise levels from building service plant (BSP) with the existing measured background noise L_{A90} at the surrounding existing residential receptors. The representative existing measured background noise level for each receptor has been established from a statistical analysis of the LT noise survey data.

Figure 1 LT1 Daytime Background Sound Level

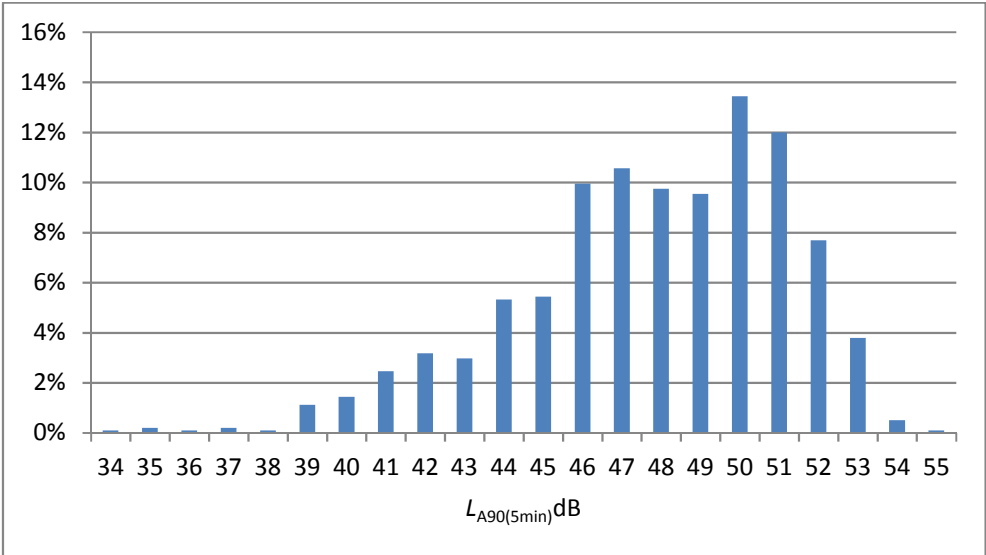


Figure 2 LT1 Night Time Background Sound Level

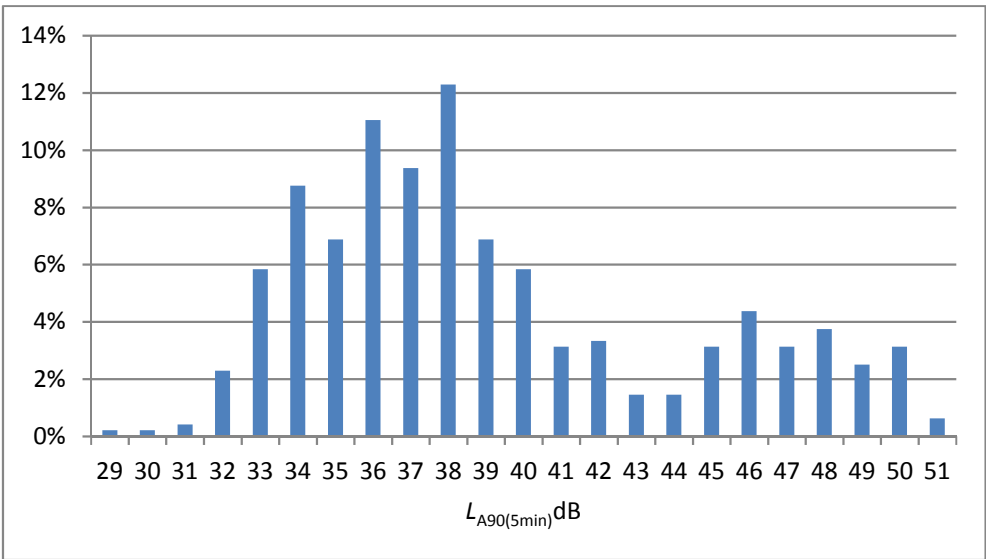
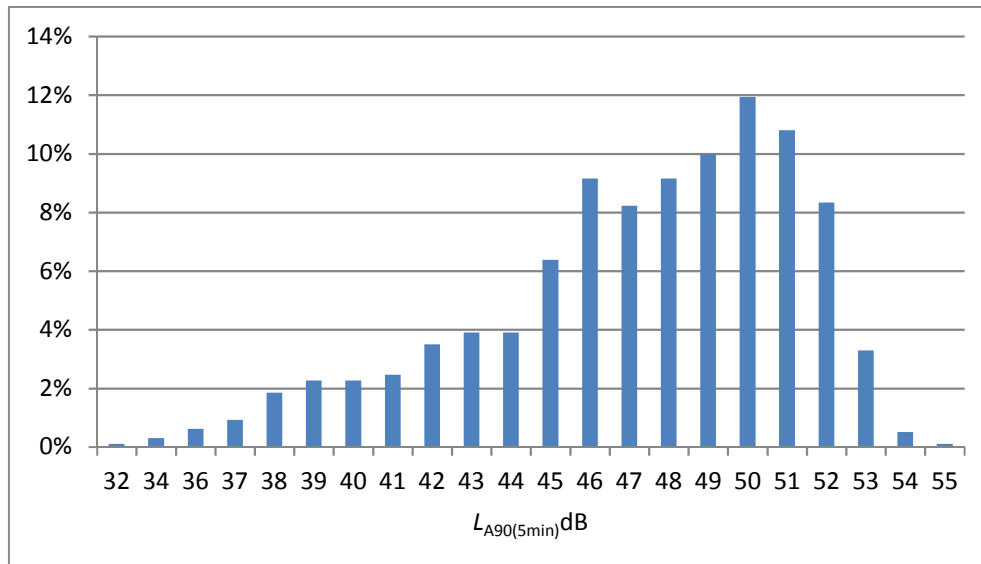
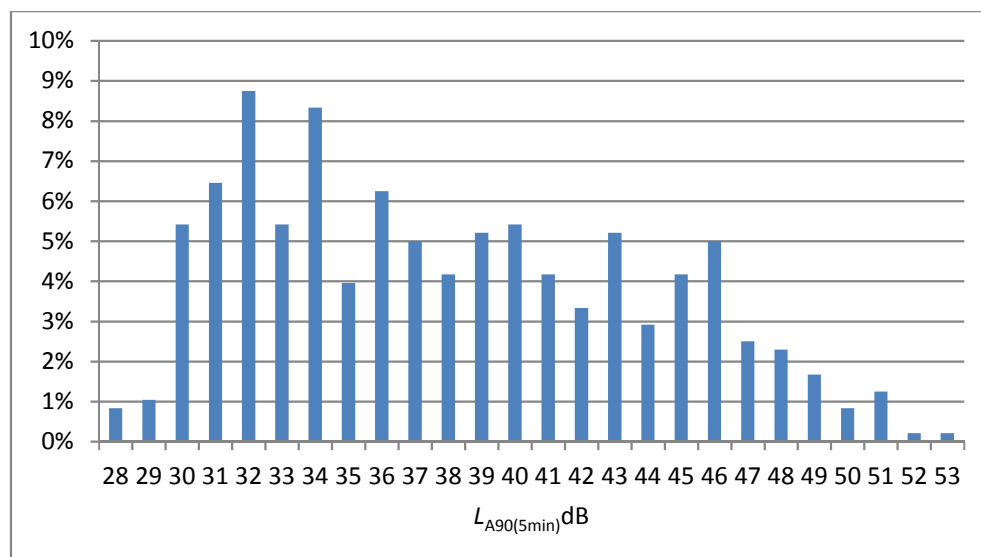


Figure 3 LT2 Daytime Background Sound Level**Figure 4 LT2 Night Time Background Sound Level**

Based on the statistical analysis of the measured background noise level over the survey period as shown in Figures 1 to 4 above and a review of the noise survey data, the reference background noise levels at each receptor is presented below:

- R1 – R6 and R11 (LT1): Daytime: 46 dB L_{A90} , Night-time: 36 dB L_{A90}
- R7 – R10 (LT2): Daytime: 44 dB L_{A90} , Night-time: 34 dB L_{A90}



As details relating to proposed BSP are currently not known, noise from a series of predictions were made by defining different sound power levels (assuming hemi-spherical radiation) at the point source. When the sound pressure levels are set as shown in Table 5.1 (which is considered to be achievable), the rating levels at all the representative receptors are predicted to be 5 dB below the background levels during the period when the plant could be operational as shown in Table 5.2. The assessed plant locations are presented in SK02. Typically, when considering noise generation from such developments, the noise character is considered to be 'bland' without a distinguishable tonal or impulsive characteristic. However, to account for any uncertainty, a +2 dB correction has been applied to the predicted noise level to create the 'Rating Level'.

Table 5.1 BSP Emissions as Modelled

BSP Location	Noise Emission - Sound Pressure Level *	
	Daytime	Night-time
All Units (North side of each unit in service yard)	72.0 dB(A) at 3 m OR 61.5 dB(A) at 10 m	58.0 dB(A) at 3 m OR 47.5 dB(A) at 10 m

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

*Different plant configurations could apply depending on a number of variables, including operating periods, which would be established during the detailed M&E design

Table 5.2 Proposed BSP Assessment

Reference	Existing Measured Background L_{A90}		Rating level from plant ($L_{A,Tr}$)		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R1	46	36	33	19	-13	-17
R2	46	36	30	17	-16	-19
R3	46	36	30	18	-16	-19
R4	46	36	29	14	-18	-22
R5	46	36	31	18	-15	-18
R6	46	36	32	17	-14	-19
R7	44	34	39	25	-5	-9
R8	44	34	34	28	-10	-6
R9	44	34	35	29	-10	-5
R10	44	34	28	16	-16	-18
R11	46	36	32	17	-14	-19

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

All calculations used to derive the above tables (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 Para 8.6, the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic in the above table may appear to be up to 1 dB incorrect due to this rounding.

As can be seen all BSP noise levels at proposed receptors are around 5 dB or greater below the background noise level and thus below the LOAEL.

5.2 Delivery Noise Assessment

5.2.1 Delivery Noise Assessment

Internal L_{Aeq} and L_{Amax} noise levels, at nearby sensitive receptors from deliveries (on the basis of worst case assumptions) have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of single glazing with a sound reduction of 30 dB has been used. As there is the potential that the deliveries could be received during the night-time period, a night-time L_{Aeq} and L_{Amax} assessment has also been undertaken. It should be noted that the predicted noise levels are inclusive of a +6 dB correction for loading / unloading activities. The results are presented in Tables 5.3 to 5.5.

Table 5.3 Daytime Noise Intrusion Levels $L_{Aeq,1hour}$ (Deliveries Only)

Location	External L_{Aeq} Noise Level at 1 metre from façade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R1	33.9	18.9	3.9	35
R2	32.2	17.2	2.2	35
R3	32.7	17.7	2.7	35
R4	35.2	20.2	5.2	35
R5	37.4	22.4	7.4	35
R6	37.0	22.0	7.0	35
R7	39.9	24.9	9.9	35
R8	37.6	22.6	7.6	35
R9	38.2	23.2	8.2	35
R10	29.9	14.9	0.0	35
R11	31.6	16.6	1.6	35

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.4 Night-time Noise Intrusion Levels $L_{Aeq,1hour}$ (Deliveries Only)

Location	External L_{Aeq} Noise Level at 1 metre from façade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R1	34.1	19.1	4.1	30
R2	33.7	18.7	3.7	30
R3	34.7	19.7	4.7	30
R4	35.4	20.4	5.4	30
R5	37.6	22.6	7.6	30
R6	36.9	21.9	6.9	30
R7	39.9	24.9	9.9	30
R8	43.9	28.9	13.9	30
R9	43.7	28.7	13.7	30
R10	31.6	16.6	1.6	30
R11	31.2	16.2	1.2	30

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

**Table 5.5 Night-time Noise Intrusion Levels L_{Amax} (Deliveries Only)**

Location	External L_{Amax} Noise Level at 1 metre from façade	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria Internal L_{Amax}
R1	41.3	26.3	11.3	45
R2	40.3	25.3	10.3	45
R3	42.2	27.2	12.2	45
R4	50.9	35.9	20.9	45
R5	50.1	35.1	20.1	45
R6	48.4	33.4	18.4	45
R7	45.2	30.2	15.2	45
R8	49.5	34.5	19.5	45
R9	50.1	35.1	20.1	45
R10	37.1	22.1	7.1	45
R11	37.6	22.6	7.6	45

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

The assessment presented in the tables above shows that internal L_{Aeq} and L_{Amax} noise levels from deliveries are predicted to be within the BS 8233/WHO noise intrusion criteria at all existing receptors with windows open or closed during both daytime and night-time periods. The predicted noise levels at all existing receptors fall within the LOAEL.

5.2.2 Delivery Noise Assessment - Background Noise Comparison

The assessment, presented on the table overleaf compares existing typical background noise levels (L_{A90}) with predicted delivery noise at the nearest residential dwellings. With regard to generating the noise rating level, a correction of +6dB has been applied within the noise models with regard to loading / unloading sources.

Table 5.5 Proposed Delivery Background Noise Level Comparison Assessment

Reference	Existing Measured Background L _{A90}		Rating level from Deliveries (L _{A,Tr})		Difference between background and noise rating level	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R1	46	36	34	34	-12	-2
R2	46	36	32	34	-14	-2
R3	46	36	33	35	-13	-1
R4	46	36	35	35	-11	-1
R5	46	36	37	38	-9	2
R6	46	36	37	37	-9	1
R7	44	34	40	40	-4	6
R8	44	34	38	44	-6	10
R9	44	34	38	44	-6	10
R10	44	34	30	32	-14	-2
R11	46	36	32	31	-14	-5

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

All calculations used to derive the above table (including averaging of background noise levels and predicted source noise levels) have been undertaken to 1 decimal place to avoid perpetuation of rounding errors. However, in accordance with BS4142 Para 8.6, the levels are expressed as integers (with 0.5 dB being rounded up). This may mean that the arithmetic in the above table may appear to be up to 1 dB incorrect due to this rounding.

The assessment shows that noise levels from deliveries are predicted to be below or around background noise levels during all daytime and night-time periods. At receptors R8 and R9, noise rating levels are predicted to be 10 dB above background noise levels. Therefore, predicted noise levels do not exceed the SOAEL and, including consideration of absolute noise levels, proposed deliveries will not have a significant impact.

With regard to the assessment associated with industrial sources of noise, it is considered that uncertainty in the assessment approach has been reasonably factored into the assessment because:

- There is unlikely to be significant uncertainty in the reference background noise level, particularly given the duration of the survey including weekday and weekend daytime and night-time periods.
- The use of Cadna noise modelling software which incorporates the method of ISO 9613 – 2 “Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.
- Source noise levels are based on worst-case measurements undertaken by WYG at existing industrial and distribution premises which are comparable to those proposed.
- A number of noise sources have been considered to be occurring simultaneously which is likely to be an over-estimate of what will occur at the same time in practice.

5.3 Car Park Noise Assessment

Internal L_{Aeq} noise levels, at nearby sensitive receptors from proposed car parking from all employment units have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of single glazing with a sound reduction of 30 dB has been used. The findings are presented in Tables 5.6 to 5.8 below.

Table 5.6 Noise Intrusion Levels $L_{Aeq,1hour}$ (Daytime Car Parking only)

Location	External L_{Aeq} Noise Level at 1 metre from façade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	20.7	5.7	0.0	35
R2	18.2	3.2	0.0	35
R3	17.9	2.9	0.0	35
R4	25.6	10.6	0.0	35
R5	29.0	14.0	0.0	35
R6	27.6	12.6	0.0	35
R7	29.5	14.5	0.0	35
R8	18.9	3.9	0.0	35
R9	18.9	3.9	0.0	35
R10	13.3	0.0	0.0	35
R11	18.6	3.6	0.0	35

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.7 Noise Intrusion Levels $L_{Aeq,1hour}$ (Night-time Car Parking only)

Location	External L_{Aeq} Noise Level at 1 metre from façade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria (Internal L_{Aeq} dB)
R1	20.9	5.9	0.0	30
R2	19.9	4.9	0.0	30
R3	20.9	5.9	0.0	30
R4	25.4	10.4	0.0	30
R5	28.4	13.4	0.0	30
R6	26.5	11.5	0.0	30
R7	29.5	14.5	0.0	30
R8	26.2	11.2	0.0	30
R9	26.3	11.3	0.0	30
R10	15.0	0.0	0.0	30
R11	20.2	5.2	0.0	30

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.8 Noise Intrusion Levels L_{Amax} (Night-time Car Parking only)

Location	External L_{Amax} Noise Level at 1 metre from façade	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria (Internal L_{Amax} dB)
R1	38.0	23.0	8.0	45
R2	33.1	18.1	3.1	45
R3	34.5	19.5	4.5	45



Location	External L_{Amax} Noise Level at 1 metre from façade	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria (Internal L_{Amax} dB)
R4	47.2	32.2	17.2	45
R5	48.1	33.1	18.1	45
R6	43.7	28.7	13.7	45
R7	36.1	21.1	6.1	45
R8	37.2	22.2	7.2	45
R9	37.3	22.3	7.3	45
R10	26.3	11.3	0.0	45
R11	40.6	25.6	10.6	45

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

The assessment presented in the tables above shows that internal L_{Aeq} and L_{Amax} noise levels from car parking are predicted to be within the BS 8233/WHO noise intrusion criteria at all existing receptors with windows open or closed during both daytime and night-time periods. The predicted noise levels at all existing receptors fall within the LOAEL.

5.4 Combined Noise Intrusion Assessment

An assessment has been undertaken to compare worst-case noise levels from the 'existing noise levels' (L_{Aeq}) to the 'proposed scheme' noise (L_{Aeq}) at identified existing receptors during both daytime and night-time periods. The differences between the 'existing' and the 'proposed' development scenarios including deliveries and car parking are presented in the following tables. For indicative purposes, the night-time noise contour plot is presented as SK03.

Table 5.9 Difference between Existing Conditions and Contribution From Proposed Scenario during the Daytime (Commercial Uses Combined)

Ref.	Existing L_{Aeq} (monitored)	Proposed L_{Aeq} (modelled)	Combined L_{Aeq}	Contribution from Proposed Scheme
R1	52.0	34.1	52.1	0.1
R2	52.0	32.3	52.0	0.0
R3	52.0	32.9	52.1	0.1
R4	52.0	35.7	52.1	0.1
R5	52.0	38	52.2	0.2
R6	52.0	37.5	52.2	0.2
R7	52.0	40.3	52.3	0.3
R8	52.0	37.7	52.2	0.2
R9	52.0	38.3	52.2	0.2
R10	52.0	30	52.0	0.0
R11	52.0	31.8	52.0	0.0

All values are sound pressure levels in dB re: 2×10^{-5} Pa.



Table 5.10 Difference between Existing Conditions and Contribution From Proposed Scenario during the Night-time (Commercial Uses Combined)

Ref.	Existing L_{Aeq} (monitored)	Proposed L_{Aeq} (modelled)	Combined L_{Aeq}	Contribution from Proposed Scheme
R1	47.5	34.3	47.7	0.2
R2	47.5	33.9	47.7	0.2
R3	47.5	34.9	47.7	0.2
R4	47.5	35.8	47.8	0.3
R5	47.5	38.1	48.0	0.5
R6	47.5	37.2	47.9	0.4
R7	47.1	40.3	47.9	0.8
R8	47.1	44	48.8	1.7
R9	47.1	43.8	48.8	1.7
R10	47.1	31.7	47.2	0.1
R11	47.5	31.5	47.6	0.1

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

When the differences between the 'existing' and 'proposed' ambient noise levels are compared, the impact of the proposed development is 'negligible' at all existing receptors during the daytime and night-time periods. The predicted changes are less than 3 dB at all receptors and fall within the LOAEL at all existing receptors.

5.5 Tranquillity Assessment

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zones 2-3. Therefore the site is not located in an area prized for its tranquillity value. There are public rights of way bordering the site to the north, west and south. The proposed development is unlikely to affect the current tranquillity of the area and will not disrupt current public rights of way. Therefore, the development is considered to have a negligible effect on local access to areas of tranquillity.



6.0 Conclusions of Noise Assessment

NPPF 123 A & B

In considering the NPPF test in section 123, points A & B. The proposed development is not expected to have an 'adverse impact' on health or quality of life. Noise intrusion assessments of the deliveries and car parking have shown that L_{Aeq} and L_{Amax} noise levels from the proposed employment uses are predicted to be within BS 8233 criteria at existing sensitive receptor locations on the basis of worst-case assumptions during both daytime and night-time periods. When comparing predicted noise rating levels associated with deliveries, based on worst-case assumptions, no significant impacts are predicted.

Noise rating levels from proposed building services plant have been predicted based on design noise limits which are achievable and it has been demonstrated that predicted noise levels will be 5 dB below the background noise level at nearby existing noise sensitive receptors.

NPPF 123 C & D

An assessment of the existing tranquillity level of the site has been undertaken and identified that the site is not highly prized for its tranquillity and recreational value in terms of noise. No businesses are located nearby the site which would be adversely affected by the proposals.

Planning Practice Guidance: Noise

Noise levels at both existing and proposed receptors are predicted to fall below the Significant Observed Adverse Effect Level (SOAEL) during both daytime and night-time periods.



Appendices



Appendix A – Acoustic Terminology and Abbreviations

An explanation of the specific acoustic terminology referred to within this report is provided below.

dB Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq, 07:00 - 23:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower than the $L_{Aeq, 07:00 - 23:00}$.

L_{Amin} The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say, 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10, 1 hr} = x$ dB.



The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90} , the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.



An explanation of abbreviations used within this report is provided below.

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

WYGE – WYG Environment

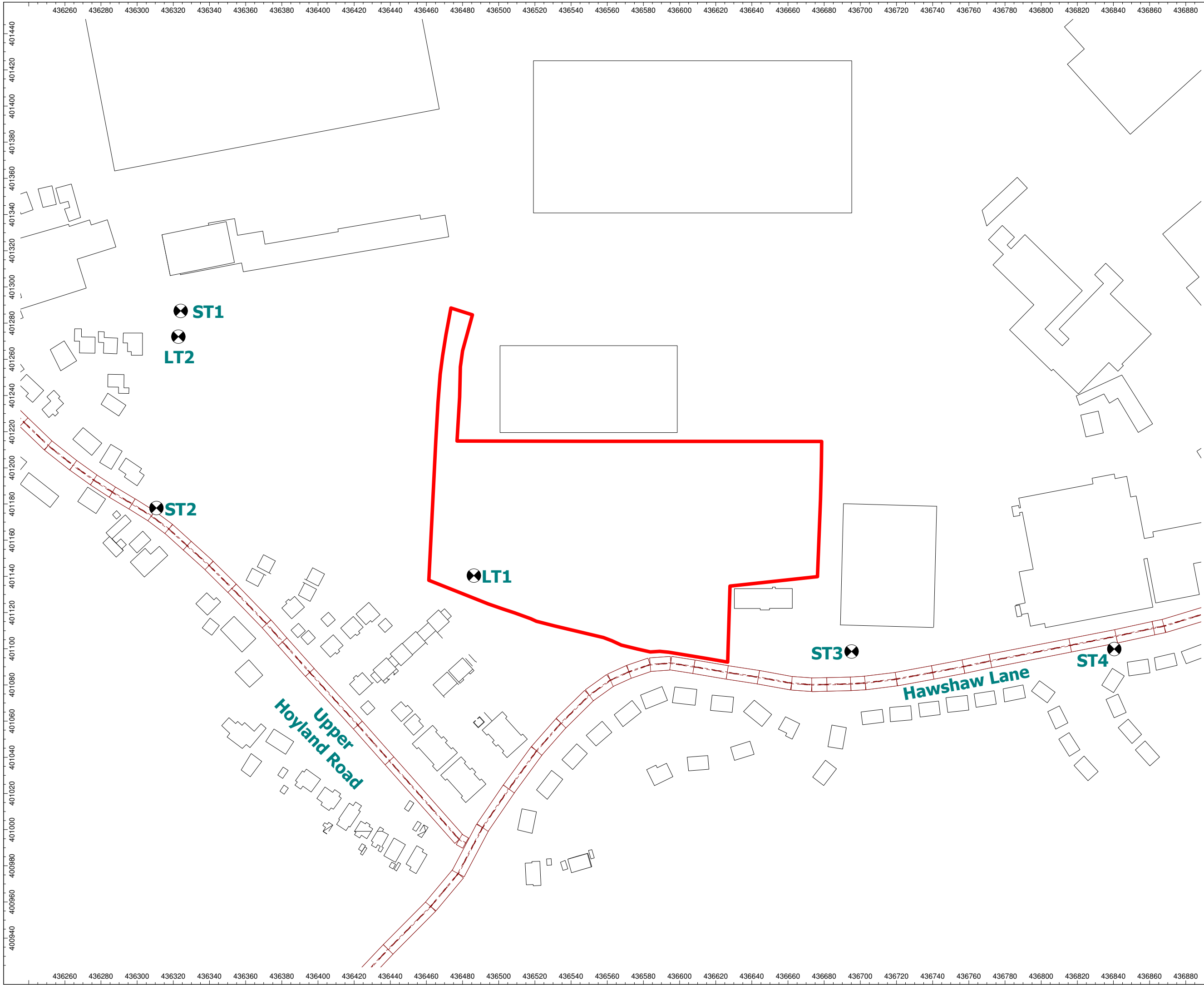


Appendix B – Sketches

SK01 Noise Monitoring Locations

SK02 Receptor and Proposed BSP Location Plan

SK03 Proposed Combined Night-time Noise Contour Plot $L_{Aeq,1hour}$



Client:
**Network Space
Developments Ltd**

Project:
**Ashroyd Business Park,
Barnsley**

Project Number:
A099897

Drawing Title / Scenario:
**Noise Monitoring
Location Plan**

Drawing Number:
SK01

Key:

Noise Monitoring
Locations: 

Site Boundary: 

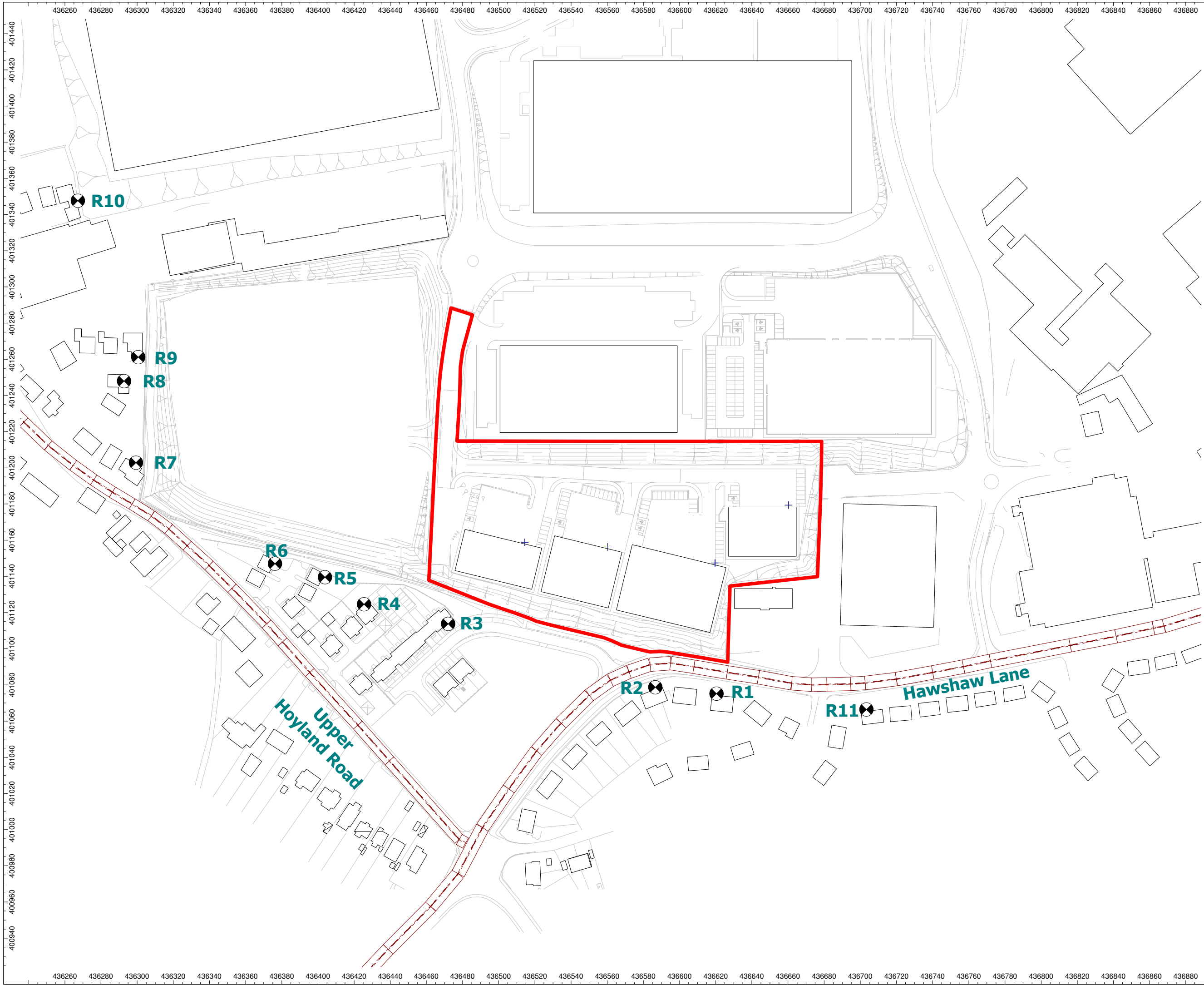
Scale : Not to scale

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Executive Park
Avalon Way
Anstey
Leicestershire
LE7 7GR
Tel 0116 234 8000

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Client:
Network Space
Developments Ltd

Project:
Ashroyd Business Park,
Barnsley

Project Number:
A099897

Drawing Title / Scenario:
Receptor and Proposed
BSP Location Plan

Drawing Number:
SK02

Key:

Receptor
Locations: 

Proposed BSP
Locations: 

Site Boundary: 

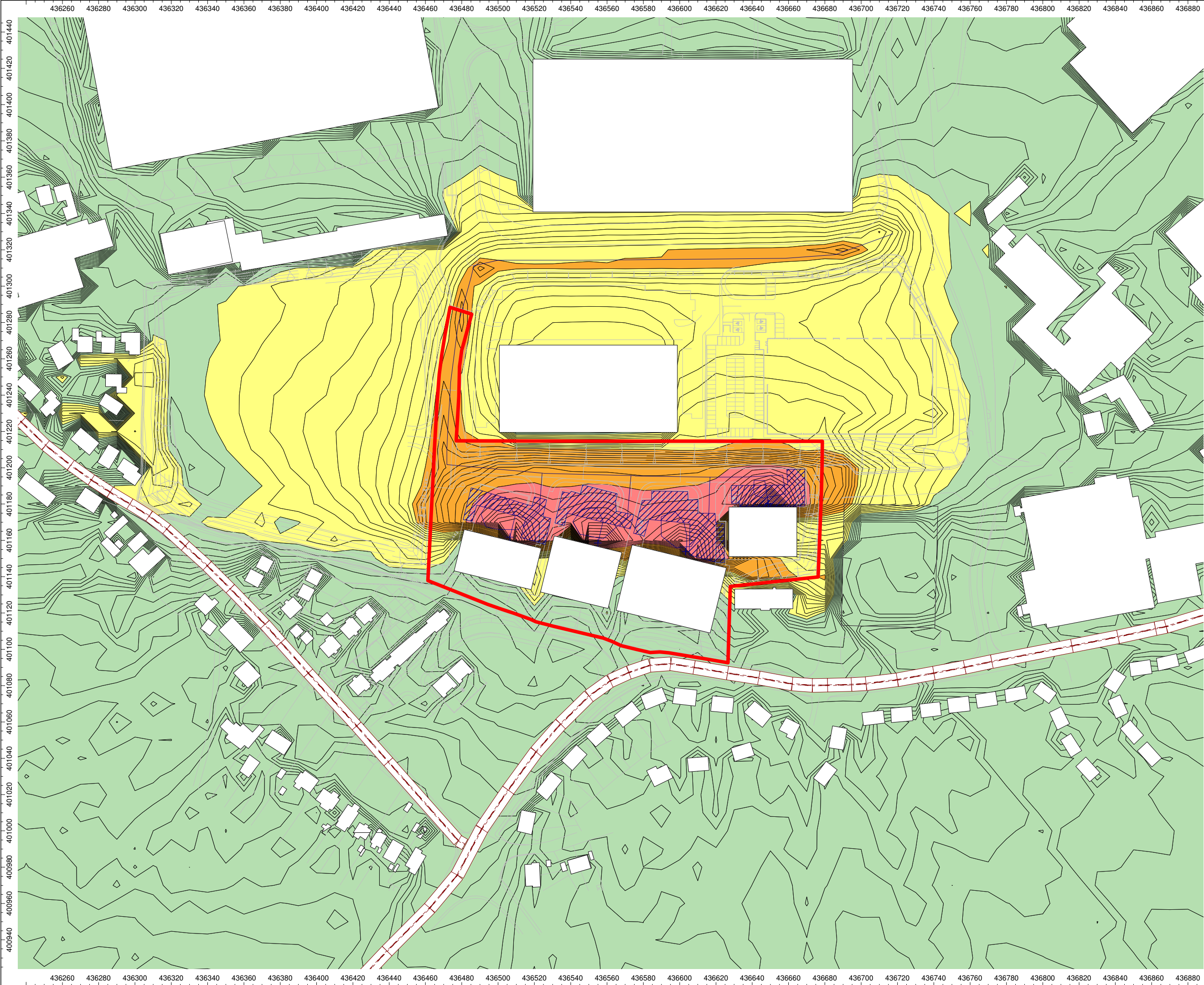
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Client:
Network Space
Developments Ltd

Project:
Ashroyd Business Park,
Barnsley

Project Number:
A099897

Drawing Title / Scenario:
Proposed Combined
Night-time Noise
Contour Plot
LAeq,1hour

Drawing Number:
SK03

Key:

Site Boundary: —

0 - 40 dB(A)
40 - 50 dB(A)
50 - 60 dB(A)
>60 dB(A)

Contour plot for indicative
purposes only.

Contour Plot at 4.0m Height

Scale : Not to scale

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Executive Park
Avalon Way
Anstey
Leicestershire
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Appendix C – Report Conditions



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