

Oldlands Farm, Newlands Road, Bognor Regis

Noise Assessment

784-B027957



Noise Assessment for Proposed Warehouse

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INTRODUCTION

PURPOSE OF THIS REPORT

This report presents the findings of a noise assessment to accompany an application for the erection of a warehouse (Use Class B8) with ancillary office, associated vehicle parking, van storage, plant, ancillary structures, lighting, landscaping and infrastructure works including earthworks to facilitate a flood compensation area at Oldlands Farm, Newlands Road, Bognor Regis. The two-parcel site consists of a 7 ha operations area to the south, and a 11.87 ha flood compensation area and fill extraction area to the north. This version of the report includes an updated red line boundary.

The noise levels from the proposed development have been predicted at local representative receptors using CADNA noise modelling software which incorporates ISO 9613 methodologies and calculations. A list of acoustic terminology and abbreviations used in this report is provided in Appendix A.

LEGISLATIVE CONTEXT (ENGLAND)

PPG24 Planning and Noise was replaced by the National Planning Policy Framework (NPPF) on 27 March 2012; current policy guidance with respect to noise is found in the updated NPPF, published on 19th February 2019. With regard to noise and planning, the NPPF contains the following statement at paragraph 170:

“170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans*

A further 2 short statements are presented at paragraph 180, which state:

“180. 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.”*

Furthermore, paragraphs 182 and 183 state:

“182. 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.

183. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

Planning Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England (NPSE), is 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 PPG and repeated as follows:

Table 1.1 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No Specific Measures Required
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	Significant Observed Adverse Effect	Avoid

Perception	Examples of Outcomes	Increasing Effect Level	Action
	difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.		
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 NPPF, NSPE and PPG: Noise do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents, including the BS 4142 – ‘*Methods for rating and assessing industrial and commercial sound*’ (2014+A1:2019) and BS 8233 – ‘*Guidance on sound insulation and noise reduction for buildings*’ (2014), Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG: Noise also states that *neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.*

ACOUSTIC CONSULTANTS’ QUALIFICATIONS, PROFESSIONAL MEMBERSHIP

The lead project Acoustic Consultant is Lewis Kelter. The report has been checked by Graham Davis. The relevant qualifications, membership and experience are summarised below.

Table 1.2 Qualifications and Experience

Name	Education	Institute of Acoustics Post Graduate Diploma in Acoustic and Noise Control (Pass Date)	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Lewis Kelter	BSc 2016	Dec 2018	June 2016	Dec 2018	-
Graham Davis	BA 2008	Dec 2013	Sep 2011	Jan 2014	-
Nigel Mann	BSc 1997 MSc 1999	Nov 2001	Nov 1998	Nov 2001	Jul 2005

ASSESSMENT CRITERIA

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents the equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from the following standards and design guidance:

- BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'

Table 2.1 Noise Level Criteria and Actions

Effect Level	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level (NOAEL)	BS4142 Score of zero or lower	No Action Required Score of zero or lower is an indication of the sound source having a low impact
	Noise levels less than: Bedrooms (night-time) – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms (daytime) – 30 dB $L_{Aeq,16hours}$	No Action Required Within BS8233
Lowest Observed Adverse Effect Level (LOAEL)	BS4142 Score of +5 or lower	No Action Required Difference of +5 dB likely to be an indication of an adverse effect, depending on context BS4142 Score of plus 5 or lower
	Noise levels exceed: Bedrooms (night-time) – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms (daytime) – 35 dB $L_{Aeq,16hours}$	Mitigate to achieve: Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms – 35 dB $L_{Aeq,16hours}$ Within BS8233
Significant Observed Adverse Effect Level (SOAEL)	BS4142 Score greater than +10	Difference of +10 dB likely to be an indication of a significant adverse effect, depending on context If practicable, mitigate to achieve: BS4142 Score of + 5 or lower
	Noise levels exceed: Bedrooms (night-time)– 35 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms (daytime)– 40 dB $L_{Aeq,16hours}$	Mitigate to achieve: Bedrooms – 30 dB $L_{Aeq,8hours}$ / 45 dB L_{Amax} Living Rooms – 35 dB $L_{Aeq,16hours}$ Within BS8233

ASSESSMENT METHODOLOGY

NOISE MODELLING METHODOLOGY

The development has been assessed using three-dimensional noise modelling of source noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. 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 – around site	Ordnance Survey	Ordnance Survey
Building heights – around site	Tt Observations	8 m height for two storey residential properties, with 3 m per additional storey and 4 m for Bungalows.
Barrier heights	Tt Observations	All existing garden barriers at 1.8 m or as observed, with the exception of hedges and individual trees which are assumed to offer no noise protection.
Receptor positions	Tt	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties. 1.5 m height for model grid.
Proposed Plans	SMR Architects	Drawing No: SMR-11-ZZ-DR-A-8008-S3-P1 Dated: 09/04/2021
	Ashton Smith Design	Drawing No: 21023-ASA-V0-XX-DR-A-PL01-(S2-P3) Dated: 19/05/2021

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.

MODEL INPUT DATA

Noise of a delivery event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 5 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 HGVs and vans delivering and loading goods. 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 beepers. The assessment is based on 100% of the docking bays having an HGV/van arrive, unload and depart in any 1-hour period during daytime and any given 15-minute night-time period; events are modelled as point sources.

HGV Unloading Event Noise Data

2 minutes at L_p 67.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
30 minutes at L_p 76.8 dB at 3 m distance	(vehicle unloading)
1 minute at L_p 67.5 dB at 3 m distance	(vehicle leaving)
27 Minutes of quiet with engine off	

$$\text{Daytime } L_{Aeq} (1\text{hour}) = 10\log(1/60)(2 \text{ mins} \times 10^{0.1 \times 67.5\text{dB}} + 30 \text{ mins} \times 10^{0.1 \times 76.8\text{dB}} + 1 \text{ mins} \times 10^{0.1 \times 67.5\text{dB}})$$

$$= 73.8 \text{ dB at 3 m distance}$$

2 minutes at L_p 67.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
13 minutes at L_p 76.8 dB at 3 m distance	(vehicle unloading)

$$\text{Night-time } L_{Aeq} (15\text{mins}) = 10\log(1/15)(2 \text{ mins} \times 10^{0.1 \times 67.5\text{dB}} + 13 \text{ mins} \times 10^{0.1 \times 76.8\text{dB}})$$

$$= 76.3 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 89.4 \text{ dB at 3m distance}$$

HGV Movement Noise Data

The following calculations have been used to represent HGVs arriving/existing along the access road. A worst-case daytime hour period 4 HGVs are predicted to arrive/leave along the access road during the daytime and night-time. Worst-case noise-levels have been calculated using this data to represent a worst-case in any 1-hour daytime (07:00 – 23:00) period and 15-minute period during the night-time (23:00 – 07:00). This has included as a line source in the model.

4 x 10 seconds at L_p 67.5 dB at 3m distance (Single HGV vehicle arriving and leaving)

$$\text{Daytime } L_{Aeq} (1\text{hour}) = 10\log(1/60)(40 \text{ seconds} \times 10^{0.1 \times 67.5\text{dB}})$$

$$= 47.9 \text{ dB at 3 m distance}$$

$$\text{Night-time } L_{Aeq(15mins)} = 10\log(1/15)(40 \text{ seconds} \times 10^{0.1 \times 67.5 \text{ dB}})$$

$$= 53.9 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 73.0 \text{ dB at 3m distance}$$

Van Unloading Event Noise Data

2 minutes at L_p 65.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
36 minutes at L_p 61.9 dB at 3 m distance	(vehicle unloading)
2 minutes at L_p 65.5 dB at 3 m distance	(vehicle leaving)

$$\text{Daytime } L_{Aeq(1hour)} = 10\log(1/60)(2\text{mins} \times 10^{0.1 \times 65.5 \text{ dB}} + 36 \text{ mins} \times 10^{0.1 \times 61.9 \text{ dB}} + 2 \text{ mins} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 60.6 \text{ dB at 3 m distance}$$

2 minutes at L_p 65.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
13 minutes at L_p 61.9 dB at 3 m distance	(vehicle unloading)

$$\text{Night-time } L_{Aeq(15mins)} = 10\log(1/15)(2\text{mins} \times 10^{0.1 \times 65.5 \text{ dB}} + 13 \text{ mins} \times 10^{0.1 \times 61.9 \text{ dB}})$$

$$= 62.5 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 80.3 \text{ dB at 3m distance}$$

Van Parking Event Noise Data

2 minutes at L_p 65.5 dB at 3 m distance	(vehicle arriving and manoeuvring)
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$$\text{Daytime } L_{Aeq(1hour)} = 10\log(1/60)(2\text{mins} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 50.7 \text{ dB at 3 m distance}$$

$$\text{Night-time } L_{Aeq(15min)} = 10\log(1/60)(2\text{mins} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 56.7 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 80.3 \text{ dB at 3m distance}$$

Van Movement Noise Data

The following calculations have been used to represent Vans arriving/existing along the access road. According to the traffic data provided, a worst-case daytime hour period 200 Vans are predicted to arrive/leave along the access road during the daytime, with 40 Vans predicted to arrive/leave during the night-time period. Worst-case noise-levels have been calculated using this data to represent a worst-case in any 1-hour daytime (07:00 – 23:00) period and 15-minute period during the night-time (23:00 – 07:00). This has included as a line source in the model.

200 x 10 seconds at L_p 65.5 dB at 3m distance (Single Van vehicle arriving and leaving)

$$\text{Daytime } L_{Aeq(1hour)} = 10\log(1/60)(2000 \text{ seconds} \times 10^{0.1 \times 65.5 \text{ dB}})$$

$$= 62.9 \text{ dB at 3 m distance}$$

40 x 10 seconds at Lp 65.5 dB at 3m distance (Single Van vehicle arriving and leaving)

$$\text{Night-time } L_{Aeq} (15\text{mins}) = 10\log(1/15)(300 \text{ seconds} \times 10^{0.1 \times 65.5\text{dB}})$$

$$= 62.0 \text{ dB at 3 m distance}$$

Maximum Noise Level

$$L_{Amax} = 73.0 \text{ dB at 3m distance}$$

Car Park Noise Data

Noise levels within the proposed car parks have been based on measurements of a distribution centre during a shift change at the centre of the car park to represent a worst-case scenario.

$$L_{Aeq,1\text{hour}} = 53.0 \text{ dB @ 1.5m height}$$

Building Services Plant Noise Data

Although specific manufacturer details are unavailable, point sources have been used in the model to represent the worst-case plant locations. The maximum sound pressure levels of the point sources at 1 and 3 metres were estimated in the model as a conditional maximum level that the noise levels at nearby receptors were predicted to meet the BS 4142 assessment criteria. Noise emission limits have been specified to ensure that plant noise rating levels are at least 10 dB below the existing night-time background noise level at all surrounding receptors.

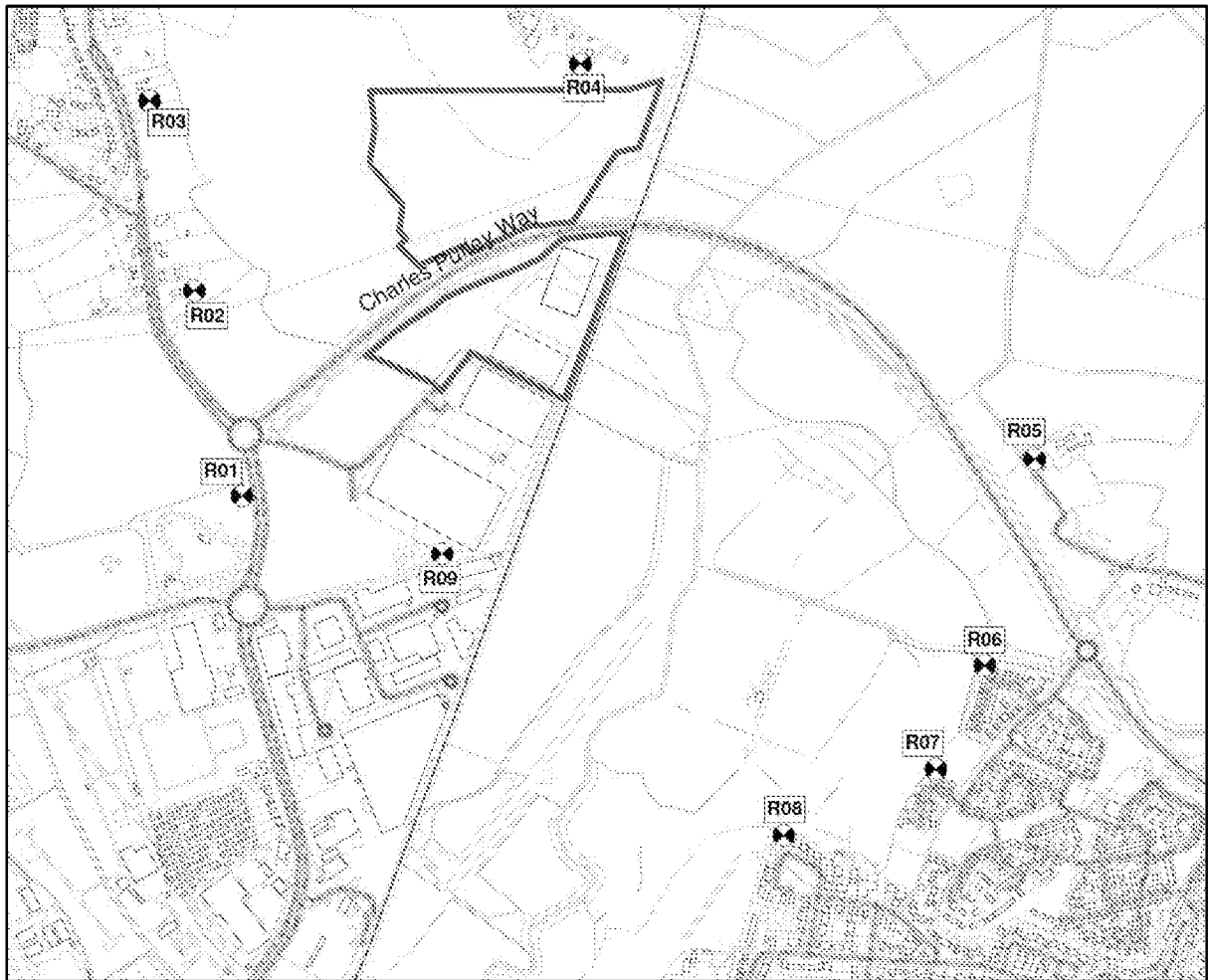
SENSITIVE RECEPTORS

The table below summarises receptor locations that have been selected to represent worst-case residential receptors with respect to direct noise from the site. These are shown illustratively on Figure 3.1 below.

Table 3.2 Sensitive Receptor Locations

Ref.	Description	Use Classification	Height (m) Daytime / Night-time
R01	Rowan Park Caravan & Motorhome Club site	Holiday Caravan Park	1.5
R02	Gares Wood, Shripney Road	Residential	1.5 / 4.0
R03	Haddan House, Shripney Road	Residential	1.5 / 4.0
R04	Harvest Home, Sack Lane	Residential	1.5 / 4.0
R05	Westward Hoe, Hoe Lane	Residential	1.5 / 4.0
R06	16 Bridger close	Residential	1.5 / 4.0
R07	6 Wellers Close	Residential	1.5 / 4.0
R08	26 Golf Links Road	Residential	1.5 / 4.0
R09	1 Oldlands Farm Cottages	Residential	1.5 / 4.0

Figure 3.1 Sensitive Receptor Locations



Not to scale
OS Licence No. AL553611

NOISE SURVEY

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:

Rion NL-52	Environmental Noise Analyser	s/n	1276552
Rion NL-52	Environmental Noise Analyser	s/n	264490
Rion NL-52	Environmental Noise Analyser	s/n	1276552
Rion NC-75	Sound Calibrator	s/n	35480543

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a maximum drift of 0.1 dB was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

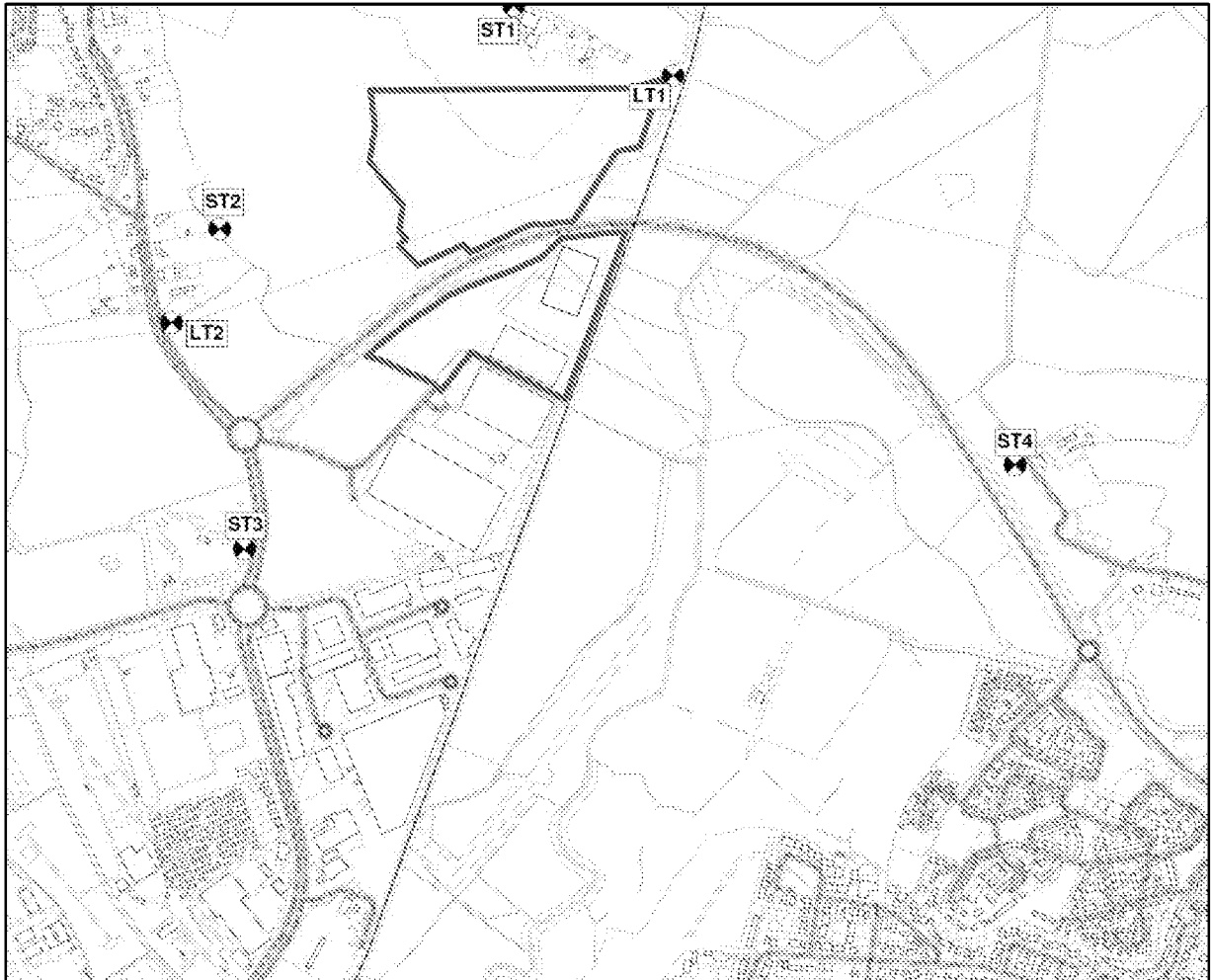
A baseline monitoring survey was undertaken at six locations (as specified in the following table and shown in SK01 of Appendix B) from Monday 8th March 2021 to Monday 22nd March 2021. Attended short-term measurements were undertaken at four locations during day, evening and night-time periods with two additional locations being measured unattended over a 167-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 fair. Anemometer readings confirmed that wind speeds were less than 5 ms⁻¹ at all times during the survey, with a mainly south-westerly wind direction during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	North of the site, adjacent to railway line
LT2	West of the site, adjacent to A29
ST1	North of the site, Sack Lane
ST2	North-west of the site, to rear of properties on Shripney Road
ST3	South-west of the site, adjacent to A29
ST4	East of the site, Hoe Lane

Figure 4.1 Noise Monitoring Location



NOISE SURVEY RESULTS

The existing noise climate is characterised by road traffic noise from A259 (Charley Purley Way) located to the north of the site and the A29 (Shripney Road) to the west of the site.

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). For the long-term (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 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Observed Noise Sources
Daytime ST1	22/03/2021 12:21	9	0 – 1	SSW	5	Distant road traffic noise
Daytime ST2	22/03/2021 12:39	9	0 – 1	SSW	5	Road traffic noise A29
Daytime ST3	22/03/2021 12:00	9	0 – 1	SSW	5	Road traffic noise A29
Daytime ST4	22/03/2021 11:30	9	0 – 1	SSW	5	Road traffic noise A259
Evening ST1	22/03/2021 21:36	6	0 - 1	SW	1	Distant road traffic noise
Evening ST2	22/03/2021 21:54	6	0 - 1	SW	1	Road traffic noise A29
Evening ST3	22/03/2021 21:15	6	0 - 1	SW	1	Road traffic noise A29
Evening ST4	22/03/2021 20:52	6	0 - 1	SW	1	Road traffic noise A259
Night-time ST1	22/03/2021 23:40	4	0 - 1	SW	1	Distant road traffic noise
Night-time ST2	22/03/2021 23:59	4	0 - 1	SW	1	Road traffic noise A29
Night-time ST3	22/03/2021 23:19	4	0 - 1	SW	1	Road traffic noise A29
Night-time ST4	22/03/2021 23:00	4	0 - 1	SW	1	Road traffic noise A259

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).

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	L _{Avg,T} (dB)	L _{Amax,T} (dB)	L _{Amin,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)
Weekday Daytime 07:00 - 23:00	79 Hours	08/03/2021 – 15/03/2021 17:00– 15:30	LT1	63.9	93.9	29.9	56.3	54.0
Weekday Night-time 23:00 – 07:00	40 Hours	08/03/2021 – 15/03/2021 23:00 – 07:00		63.0	92.9	24.7	50.9	28.0
Weekend Daytime 07:00 - 23:00	32 Hours	13/03/2021 – 14/03/2021 07:00 – 23:00		62.8	91.6	30.6	54.2	45.0
Weekend Night-time 23:00 – 07:00	16 Hours	13/03/2021 – 14/03/2021 23:00 – 07:00		60.1	89.8	27.1	52.8	34.0
Weekday Daytime 07:00 - 23:00	79 Hours	08/03/2021 – 15/03/2021 16:37– 15:12	LT2	69.7	95.2	33.3	72.6	58.0
Weekday Night-time 23:00 – 07:00	40 Hours	08/03/2021 – 15/03/2021 23:00 – 07:00		63.4	85.1	25.6	56.4	38.0
Weekend Daytime 07:00 - 23:00	32 Hours	13/03/2021 – 14/03/2021 07:00 – 23:00		69.0	103.3	34.4	71.5	54.0
Weekend Night-time 23:00 – 07:00	16 Hours	13/03/2021 – 14/03/2021 23:00 – 07:00		60.0	86.7	28.5	55.6	52.0
Daytime 07:00 - 19:00	15 Mins	22/03/2021 12:21	ST1	44.6	59.5	39.2	47.1	41.8
	15 Mins	22/03/2021 12:39	ST2	51.3	72.7	44.2	52.8	47.6
	15 Mins	22/03/2021 12:00	ST3	76.9	88.1	49.5	80.3	68.0
	15 Mins	22/03/2021 11:30	ST4	58.6	83.6	45.8	59.6	53.8

Period	Duration (T)	Monitoring Date and Times	Location	L _{Aeq,T} (dB)	L _{Amax,T} (dB)	L _{A90,T} (dB)	L _{A10,T} (dB)	L _{A50,T} (dB)
Evening 19:00 - 23:00	15 Mins	22/03/2021 21:36	ST1	43.2	65.3	36.0	44.8	39.4
	15 Mins	22/03/2021 21:54	ST2	50.2	61.7	39.2	52.8	44.4
	15 Mins	22/03/2021 21:15	ST3	70.5	87.5	45.7	72.7	51.0
	15 Mins	22/03/2021 20:52	ST4	59.3	67.8	43.6	62.8	51.7
Night-time 23:00 - 07:00	15 Mins	22/03/2021 23:40	ST1	41.2	60.2	34.7	42.6	36.9
	15 Mins	22/03/2021 23:59	ST2	46.5	62.4	35.2	50.2	38.4
	15 Mins	22/03/2021 23:19	ST3	68.6	87.0	44.9	68.6	50.3
	15 Mins	22/03/2021 23:00	ST4	58.3	68.7	42.3	62.3	48.0

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

ASSESSMENT OF KEY EFFECTS

PLANT NOISE ASSESSMENT

This assessment has been undertaken to establish the maximum external noise levels from the proposed development. The assessment compares the predicted permissible plant noise levels with the typical measured night-time background noise L_{A90} at the closest existing residential receptors.

When the sound pressure levels are set as shown in Tables 5.1 (which are considered to be achievable), the noise levels at all the existing receptors are predicted to be at least 10 dB below the existing background levels during the worst-case night-time period, as shown in Table 5.2.

The assessment presented below has been undertaken with the plant operating at full capacity, simultaneously.

As the plant has the potential to operate 24/7, background L_{A90} noise levels measured over the entire night-time period (as sourced from long-term measurements) have been used within the assessment.

Table 5.1 Proposed Emission Limits for BSP as Modelled

BSP Description & Location	Noise Emission Limit - Sound Pressure Level (Each Unit)
4 x Roof-mounted BSP Units	74.6 dB(A) at 1m distance OR 55.0 dB(A) at 3m distance

Table 5.2 BS 4142 Assessment for Proposed Plant

Reference	Measured Background L_{A90}	Rating level from plant	BS 4142 Score
R01	38	18	-20
R02	38	18	-20
R03	38	15	-23
R04	28	18	-10
R05	48	14	-34
R06	48	13	-35
R07	48	12	-36
R08	48	13	-36
R09	48	16	-32

OPERATIONAL NOISE ASSESSMENT

Tables 5.3 – 5.5 below present the external noise levels at nearby sensitive receptors from all sources of potential operational noise associated with the proposed development operating simultaneously (including HGV/van movements, unloading, parking, staff parking). Internal L_{Aeq} and L_{Amax} noise levels have been assessed both with windows-open, where a reduction from a partially open window of 15 dB (allowing for localised facade effects, typical window and rooms dimensions and micro-effects of building forms such as eaves, parapets and bay windows) has been used, and with windows-closed where an assumption of single glazing with a sound reduction of 30 dB has been used.

Table 5.3 Noise Intrusion Levels L_{Aeq} (Daytime)

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 Daytime)
R01	37.6	22.6	7.6	35
R02	30.9	15.9	0.9	35
R03	27.6	12.6	0.0	35
R04	33.7	18.7	3.7	35
R05	28.5	13.5	0.0	35
R06	27.5	12.5	0.0	35
R07	25.3	10.3	0.0	35
R08	25.3	10.3	0.0	35
R09	21.8	6.8	0.0	35

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

Table 5.4 Noise Intrusion Levels L_{Aeq} (Night-time)

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 Night-time)
R01	40.7	25.7	10.7	30
R02	35.4	20.4	5.4	30
R03	32.1	17.1	2.1	30
R04	39.8	24.8	9.8	30
R05	34.1	19.1	4.1	30
R06	33.3	18.3	3.3	30
R07	31.9	16.9	1.9	30
R08	31.9	16.9	1.9	30
R09	27.1	12.1	0.0	30

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

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

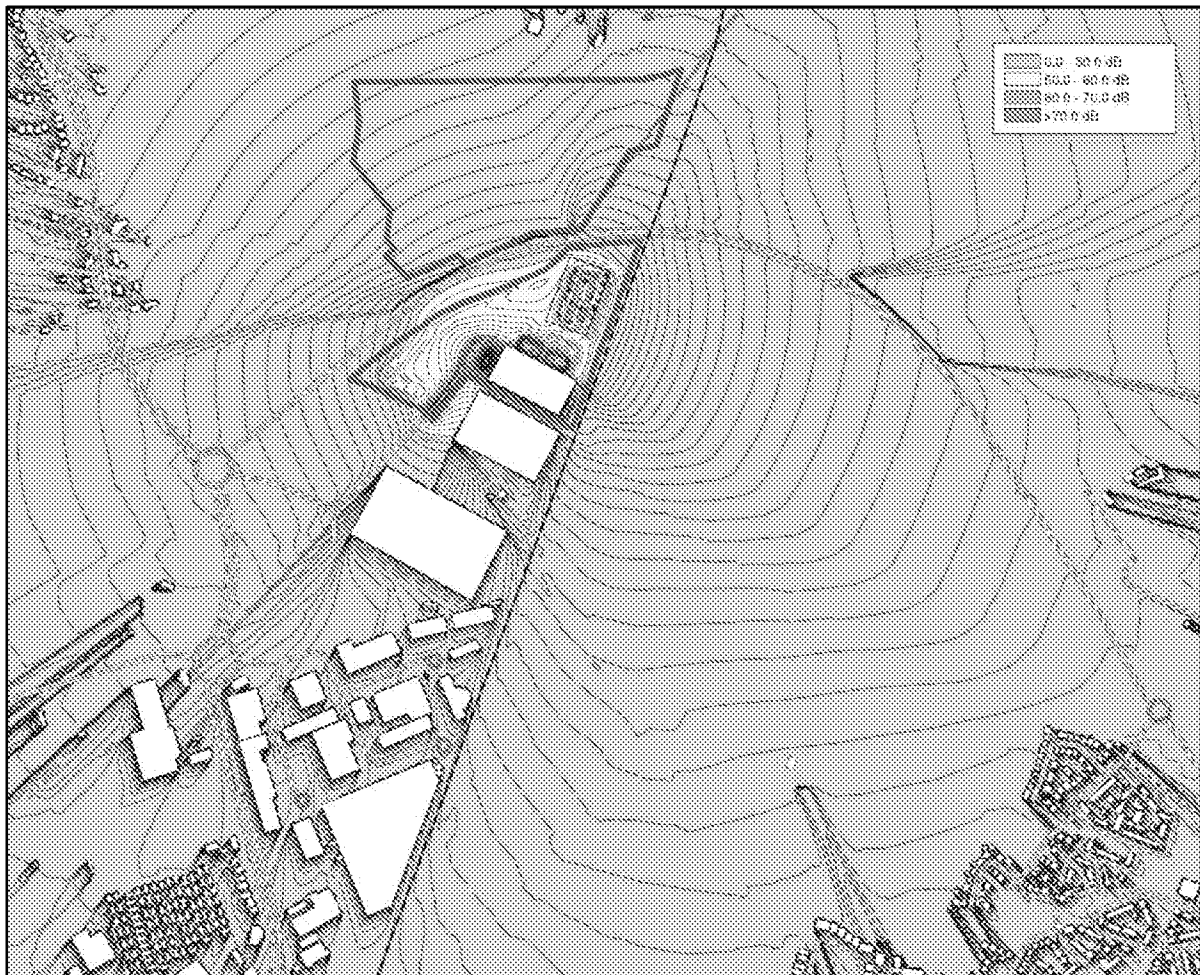
Location	External L_{Amax} Noise Level at 1 metre from façade	Internal L_{Amax} with windows-open	Internal L_{Amax} with windows-closed	Criteria (Internal L_{Amax} dB Night-time)
R01	43.9	28.9	13.9	45
R02	39.4	24.4	9.4	45
R03	33.9	18.9	3.9	45
R04	43.2	28.2	13.2	45

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 Night-time)
R05	37.9	22.9	7.9	45
R06	36.9	21.9	6.9	45
R07	36.3	21.3	6.3	45
R08	34.5	19.5	4.5	45
R09	31.6	16.6	1.6	45

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

The assessments presented in the tables above demonstrate that internal daytime and night-time L_{Aeq} and night-time L_{Amax} noise levels from the proposed development are predicted to be below the BS 8233/WHO noise intrusion criteria at all receptors with windows-open and windows-closed. Therefore, operational noise intrusion levels are predicted to be within the No Observed Adverse Effect Level.

Figure 5.1 Worst-case Daytime $L_{Aeq,1hour}$ Noise Levels



Not to scale
Noise Contour Plot 4.0m Height above ground level.

CONCLUSIONS OF NOISE ASSESSMENT

A noise assessment has been undertaken to assess the impact of using the site for a proposed warehouse, located in Bognor Regis. The NPPF gives a number of test points relating to noise; considering each of these points, the following conclusions can be drawn in relation to the Development:

NPPF 170 (e) and 180 (a)

Maximum noise levels have been assessed for proposed building services plant which are predicted to result in a noise rating level which are at least 10 dB below the existing background noise level during the worst-case night-time period at the closest sensitive receptor locations.

Accordingly, building services plant is expected to have no adverse impact at the closest sensitive receptors.

Operational noise levels during the daytime and night-time periods are predicted to be below the guideline noise intrusion criteria at nearby properties assuming both a windows-open and a windows-closed scenario.

Therefore, operational noise levels are considered to be within the No Observed Adverse Effect Level and as such, the proposed development site is not expected to have a significant adverse impact on health or quality of life.

NPPF 180 (b), 182 and 183

The results of the assessments presented above demonstrate that the proposed development is not expected to adversely affect nearby properties and considering the existing industrial use of the site, it is not considered that any existing businesses wanting to develop would be restricted by the proposals.

Planning Practice Guidance: Noise

It has been predicted that on-site operational noise effects associated with the Development will be within the No Observed Adverse Effect Level (NOAEL).

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
PPG – Planning Practice Guidance
UDP – Unitary Development Plan
UKAS – United Kingdom Accreditation Service

APPENDIX B – REPORT CONDITIONS

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