



Planning Stage Noise Impact Assessment Report

Plot 5000, Hatfield Business Park,
Mosquito Way, AL10 9UH

HRS Services Ltd.

HRS Ref: 125626 – AC - 1v1

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I. Revision History

Revision	Description	Date	Approved
1v1	First issue	24/03/2017	AW

II. Executive Summary

- 0.1 An environmental noise survey and noise impact assessment relating to the proposed Plot 5000 industrial development in Hatfield Business Park has been carried out in line with BS 4142:2014 in order to assess suitability of the proposed scheme against the Welwyn Hatfield Borough Council planning condition criteria understood to be applicable.
- 0.2 Based on HRS' noise survey measurement data and the proposed plant noise data provided, the predicted noise levels at the nearest noise sensitive residential properties are expected to be within the limits understood to be imposed.
- 0.3 Assessment of noise impact has also been carried out at the adjacent school playing fields; predicted levels are expected to be below the relevant available guidance criteria for outdoor school teaching spaces.

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1. Introduction

- 1.4 Kier has appointed HRS Services Limited (HRS) to carry out an environmental noise survey and noise impact assessment relating to the proposed Plot 5000 industrial development in Hatfield Business Park.
- 1.5 The purpose of this report is to provide an assessment of noise impact from the proposed mechanical building services plant associated with the new development, with reference to measured background noise levels and in accordance with BS 4142: 2014.
- 1.6 This document has been prepared for the sole use, benefit and information of Kier for the purposes set out in the document or instructions commissioning the works. The liability of HRS in respect of the information contained herein will not extend to any third party.
- 1.7 This report is limited to addressing the specific acoustic issues contained herein and is based on information and drawings provided by the client.
- 1.8 Whilst every effort has been made to ensure that this report is easy to understand, it is technical in nature; to assist the reader, a glossary of terminology is included in Appendix III.

2. Site Description

- 2.1 The proposed site is located within the land off Mosquito Way in Hatfield, part of the Hatfield Business Park. The surrounding area is mixed industrial / residential in character. The Howe Dell Primary School is located adjacent to the west of site, and nearby residential properties are located on Dragon Road and Waight Close to the west and north-west respectively. The surrounding area to the north, south and east of site comprise commercial / office buildings.
- 2.2 The daytime noise climate at the site was observed to be dominated by local road traffic on Mosquito Way / Dragon Road and (to a lesser extent) aircraft and distant road noise from the A1(M). Noise from teaching and play activities associated with Howe Dell School were also significant during school hours. Distant road noise from the A1(M) was observed to be clearly audible during the evening and night periods.
- 2.3 The proposed building is understood to comprise a large warehouse area with 3 stories of offices at the front elevation. Building services plant is understood to comprise three exposed condenser units located in a ground floor compound on the west elevation which serve each office floor. Toilet and kitchen extract system louvres are located on the east elevation, and supply / extract system louvres associated with the Heat Recovery Units serving the offices are located on the South (front) elevation.
- 2.4 Kier has confirmed that the hours of operation of the proposed development are typically 08:00 - 17:30, with the potential for the warehouse to be operable by a small team of up to 8 staff until midnight.
- 2.5 An indicative layout drawing is provided in Appendix II for reference.

3. Background Noise Survey

- 3.1 Day and night-time noise surveys were carried out in order to establish the current noise climate at the proposed site including at nearby noise sensitive receptor locations. Generally, 15 minute measurement periods were taken as providing representative samples of the noise climate.
- 3.2 Daytime measurements were taken on Wednesday the 15th March 2017 between 12:00 hours and 15:00 hours to provide data representative of the noise climate at the site.
- 3.3 Evening and night-time measurements were carried out over 15 minute sample periods between 22:00 hours and 02:00 hours on Monday 20th - Tuesday 21st March 2017 in order to determine background noise levels at sensitive time periods to assist in specification of noise control measures that may be required for any potential night-time mechanical services plant operation.
- 3.4 All noise levels were measured using a UKAS calibrated B&K 2260 Investigator Class 1 precision integrating sound level meter. The sound level meter was mounted on a tripod at an approximate height of 1.5m and fitted with a proprietary outdoor microphone kit. Calibration checks were carried out both before and after the measurements for each survey period with no significant variance observed. Noise was measured in terms of broadband A-weighted indices and spectral terms to assist with the design of noise control measures. Weather conditions during the daytime survey were dry and calm with measured wind speed less than 5ms⁻¹. Weather conditions during the evening and night-time survey were dry and calm with measured wind speeds of less than 5ms⁻¹.
- 3.5 Measurement positions are indicated in Figure 1 below; the results are detailed in Appendix I and summarised in Table 1 below. The dominant noise source affecting the site was observed to be local road traffic noise from Mosquito Way and the A1(M) highway to the east. Frequent aircraft noise was audible including from light aircraft / private planes. School teaching and playing activities were at times dominant at residential receptors during school hours. Local road traffic and distant road noise from the A1(M) were observed to dictate the baseline background noise level during the evening and night periods.

Figure 1: Aerial photograph of the existing site with approximate overlay and approximate noise measurement positions

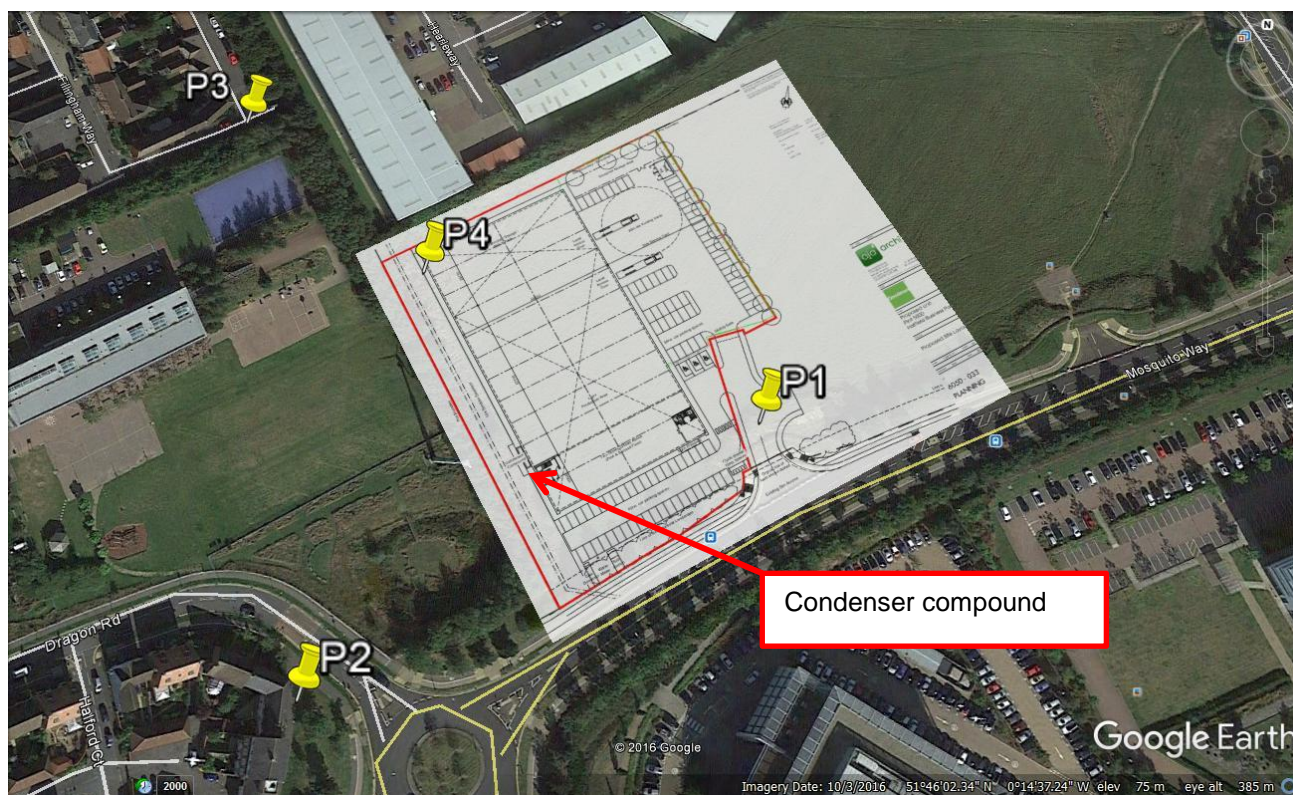


Table 1: Summary of measured noise levels, dB

Measurement Location	Daytime (12:00-15:00 hours)		Evening (22:00-23:00 hours)		Night-time (23:00-02:00 hours)	
	L _{Aeq,15min}	L _{A90,15min}	L _{Aeq,15min}	L _{A90,15min}	L _{A90,15min}	L _{A90,15min}
P1	59-60	53-55	-	-	-	-
P2	59	50-53	56	43-47	47-52	38-40
P3	52-54	44-48	47	44	43-56	41-44
P4	54	48	-	-	-	-

4. Noise Assessment Criteria

- 4.1 It is understood that a planning condition is imposed on the development in terms of external noise impact assessment. Kier has provided the following planning condition statement understood to be required by Welwyn Hatfield Borough Council:

“Prior to the commencement of the development of any plot hereby permitted, details relating to noise from the use or from any plant or equipment to be installed on that plot with evidence in the form of an acoustic report showing that noise emissions from the use or plant or equipment will be 10dB (LAeq) below the background noise level (LA90) at the nearest residential property (using the methodology outlined within BS4142:2014) must be submitted to and approved in writing by the Local Planning Authority. Thereafter, the development must not be carried out other than in accordance with the approved scheme.”

5. Noise Impact Assessment

- 5.1 Plant noise data provided by Kier for review include three condenser units located on the west elevation, toilet / extracts located on the east elevation, and Heat Recovery Units (HRUs) which connect to supply and extract louvres on the south (front) building elevation.
- 5.2 The toilet and kitchen extract louvres will be fully shielded from the noise sensitive receptor locations to the west by the building itself, therefore these have not been included in the plant noise prediction.
- 5.3 Supply and extract louvres on the front elevation associated with the HRUs serving the offices have been assessed based on manufacturer's noise levels measured at 1.5 m. Calculations show that noise levels contributions will be negligible during daytime operation and will be partially or fully shielded by the building itself, therefore these have not been shown in the plant noise prediction summary tables below.
- 5.4 The condenser compound on the west elevation will be assessed as the dominant plant noise source affecting the nearby noise sensitive receptors to the west / north-west.
- 5.5 Based on HRS noise survey measurements, and with consideration of the location of the main plant noise source, i.e. the condenser compound located on the west building elevation, assessment of building services noise impact has been made at the nearest residential receptors on Dragon Road and Waight Close for the daytime (0700-2300) and night-time (2300-0700) periods. Assessment has also been made at the adjacent playing fields associated with the Howe Dell School for the daytime period.
- 5.6 Since it is understood that the warehouse will potentially be staffed up until midnight, the background noise levels for assessment at residential receptors have been taken as the lowest measured levels in the late evening (2200-2300) and early part of the night period (2300-0030) as appropriate for the hours of operation.
- 5.7 The lowest daytime background noise measurement at position P3 has been used for assessment at the school field. *Acoustics of Schools – a design guide* (Nov. 2015) gives guidance that noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55 dB $L_{Aeq,30min}$.
- 5.8 Noise from vehicle movements associated with the service yard is not expected to have a significant impact since this activity will be shielded by the building itself. It is understood that service yard vehicle activity will take place during typical daytime business hours only.
- 5.9 Based on the above, Table 2 below gives details of the identified plant noise rating level limits at the nearest noise sensitive location.

Table 2: BS 7445 maximum plant noise limits at nearby residential properties

NSR Location	Daytime BS 7445 rating level, dB L _{Ar,Tr} (0700-2300 hours)	Night-time BS 7445 rating level, dB L _{Ar,Tr} (2300-0700 hours)
Residential property - Dragon Road, 85 m	≤ 33	≤ 30
Residential property - Waight Close, 155 m	≤ 34	≤ 31
School field / nature reserve, 30 m	≤ 55	n/a

5.10 The calculated combined plant noise levels are detailed in the tables below. The office areas are not expected to be occupied at night however an assessment has been made based on one condenser unit potentially running at any one time until midnight for potential occupancy of the office floors and / or for potential night-time protection modes. This should be clarified by the design team.

Table 3: Predicted plant noise levels and rating level at Dragon Road residential receptor during daytime plant operation

Plant item	Number of units	Distance to NSR, m	Sound Power Level, dB L _{AW}	Correction for reflections, dB	Distance attenuation dB	Correction for number of units	Screening attenuation dB	Sound Pressure Level at Receiver, dB L _{AP}
Condenser unit MMY-AP3002FT8	3	85	75	-	-47	5	-	33
Total sound pressure level at receptor, L_{Aeq,T} dB								33
Correction for tonality incorporated to result, dB								0
Calculated plant noise rating level, L _{Ar,Tr} dB								33
BS 4142:2014 plant noise rating level criterion, L _{Ar,Tr} dB								33
Difference, dB								0

Table 4: Predicted plant noise levels and rating level at Dragon Road residential receptor during potential night-time plant operation

Plant item	Number of units	Distance to NSR, m	Sound Power Level, dB L _{AW}	Correction for reflections, dB	Distance attenuation dB	Correction for number of units	Screening attenuation dB	Sound Pressure Level at Receiver, dB L _{AP}
Condenser unit MMY-AP3002FT8	1	85	75	-	-47	-	-	28
Total sound pressure level at receptor, L_{Aeq,T} dB								28
Correction for tonality incorporated to result, dB								0
Calculated plant noise rating level, L _{Ar,Tr} dB								30
BS 4142:2014 plant noise rating level criterion, L _{Ar,Tr} dB								30
Difference, dB								-2

Table 5: Predicted plant noise levels and rating level at Waight Close residential receptor during daytime plant operation

Plant item	Number of units	Distance to NSR, m	Sound Power Level, dB L _{AW}	Correction for reflections, dB	Distance attenuation dB	Correction for number of units	Screening attenuation dB	Sound Pressure Level at Receiver, dB L _{AP}
Condenser unit MMY-AP3002FT8	3	155	75	-	-52	5	-	28
Total sound pressure level at receptor, L_{Aeq,T} dB								28
Correction for intermittency incorporated to result, dB								0
Correction for tonality incorporated to result, dB								0
Calculated plant noise rating level, L _{Ar,Tr} dB								28
BS 4142:2014 plant noise rating level criterion, L _{Ar,Tr} dB								34
Difference, dB								-6

Table 6: Predicted plant noise levels and rating level at Waight Close residential receptor during potential night-time plant operation

Plant item	Number of units	Distance to NSR, m	Sound Power Level, dB L _{AW}	Correction for reflections, dB	Distance attenuation dB	Correction for number of units	Screening attenuation dB	Sound Pressure Level at Receiver, dB L _{AP}
Condenser unit MMY-AP3002FT8	1	155	75	-	-52	-	-	23
Total sound pressure level at receptor, L_{Aeq,T} dB								23
Correction for intermittency incorporated to result, dB								0
Correction for tonality incorporated to result, dB								0
Calculated plant noise rating level, L _{Ar,Tr} dB								23
BS 4142:2014 plant noise rating level criterion, L _{Ar,Tr} dB								31
Difference, dB								-8

Table 7: Predicted plant noise levels and rating level at Howe Dell School fields during daytime plant operation

Plant item	Number of units	Distance to NSR, m	Sound Power Level, dB L _{AW}	Correction for reflections, dB	Distance attenuation dB	Correction for number of units	Screening attenuation dB	Sound Pressure Level at Receiver, dB L _{AP}
Condenser unit MMY-AP3002FT8	3	30	75	-	-38	5	-	42
Total sound pressure level at receptor, L_{Aeq,T} dB								42
Correction for intermittency incorporated to result, dB								0
Correction for tonality incorporated to result, dB								0
Calculated plant noise rating level, L _{Ar,Tr} dB								42
BS 4142:2014 plant noise rating level criterion, L _{Ar,Tr} dB								55
Difference, dB								-13

5.11 Based on the predicted plant noise rating levels shown in the tables above, the planning condition requirement for plant noise emissions to be ≤ 10 dB below the background noise level at the nearest residential property have been met.

5.12 Plant noise impact on the adjacent Howe Dell School field has been shown to be within recommended guidance limits for outdoor school teaching areas.

6. Conclusions

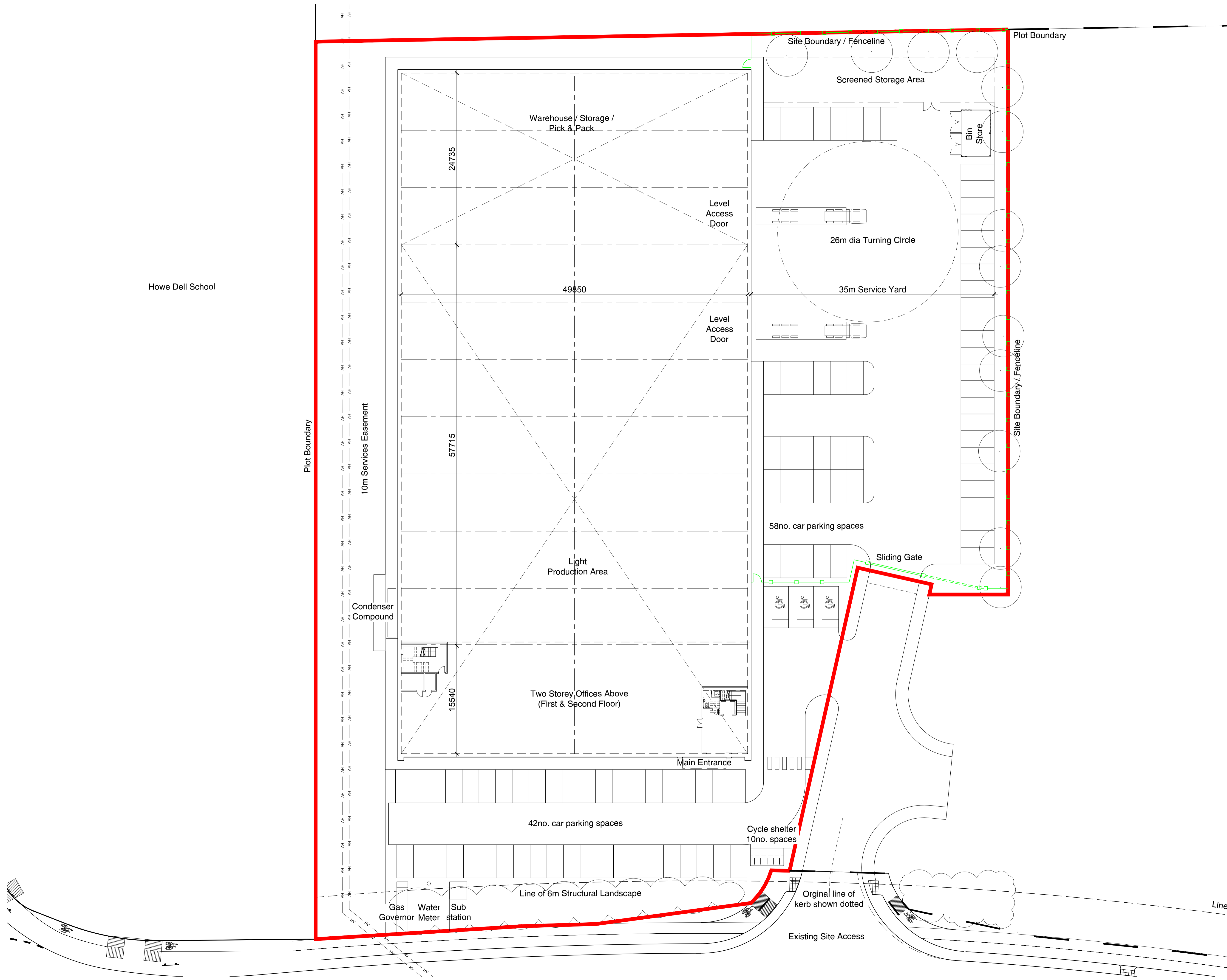
- 6.1 An environmental noise survey has been carried out in relation to the proposed Plot 5000 development scheme in Hatfield Business Park in order to obtain baseline noise data for the purpose of assessing potential noise impact on nearby noise sensitive receptors.
- 6.2 A noise impact assessment has been carried out in line with BS 4142:2014 guidance. The predicted plant noise rating levels at nearby noise sensitive residential receptors have been shown to be within the Welwyn Hatfield Borough Council planning limits understood to be applicable. Noise impact on the adjacent Howe Dell School playing fields has been shown to be minimal, based on available guidance for outdoor school teaching spaces.

Appendix I. Noise Survey Data

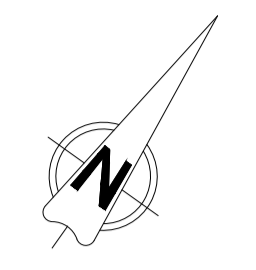
Noise levels measured, free-field, dB

Date	Start Time	L _{Aeq,15mins}	L _{A90,15mins}	L _{AF10,15mins}	L _{AFmax,15mins}	Comments
Location P1: Mosquito Way, proposed building facade						
15.03.17	11:56	59.7	55.0	61.8	75.0	L _{A90} levels may be elevated due to drilling survey on site
	12:19	59.8	54.2	62.4	77.5	
	12:33	58.6	52.6	61.2	73.5	
	14:00	59.6	53.8	62.2	73.8	
Location P2: Dragon Road residential housing / Howe Dell playing fields						
15.03.17	12:53	59.4	53.4	62.4	82.8	School activity audible
	13:33	59.1	49.8	62.4	77.2	
20.03.17	22:02	55.9	46.8	59.6	72.9	Road traffic dominant
	22:45	56.0	42.6	60.4	70.8	
	23:37	47.1	43.4	47.8	61.9	
21.03.17	00:16	50.6	40.0	52.2	71.2	Distant road traffic dominant
	00:33	48.6	38.2	51.2	67.7	
	01:15	51.6	38.0	49.6	74.4	
Location P3: Residential receptor, Waight Close / Howe Dell School						
15.03.17	13:16	53.7	48.0	56.2	69.7	School activity audible
	14:23	53.3	44.2	55.8	73.5	
	14:43	51.5	46.2	54.0	67.8	
20.03.17	22:22	46.8	44.2	48.2	61.4	Distant road traffic dominant
	23:00	55.7	43.6	59.4	70.7	
	23:15	55.0	41.6	58.6	72.6	
	23:53	44.7	42.4	46.2	61.9	
21.03.17	00:52	43.2	40.8	44.6	60.1	
Location P4: north-west boundary of development site						
15.03.17	13:51	53.9	48.2	56.8	62.5	Bi-plane circling

Appendix II. Proposed Site Layout Plan



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Schedule of Accommodation
 All areas are gross internal

Ground Floor		
Production / Warehouse / Storage	51,570 sq.ft.	(4,791 sq.m.)
Stair Cores(Entrance Area+FE Stairs)	936 sq.ft.	(87 sq.m.)
First & Second Floor Offices	16,685 sq.ft.	(1,550 sq.m.)
Total	69,191 sq.ft.	(6,428 sq.m.)
Total Parking	100no. car spaces	(6,428 sq.m.)
	10no. cycle spaces	
Site Area	2.81 acres approx.	
Haunch Height	12m	

Howe Dell School

Plot Boundary

10m Services Easement

Plot Boundary

Site Boundary / Fenceline

no.	date	revision	by



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client
 Goodman



project

Proposed Unit
 Plot 5000
 Hatfield Business Park

drawing

Proposed Site Layout Plan

scale 1:250 @ A1 drawn up

checked spp date 28/02/17

no
6050 - 033
PLANNING

Appendix III. Acoustic Glossary

Sound pressure level and the decibel, dB

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. The decibel is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Frequency and hertz, Hz

Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz. The human range of hearing is commonly accepted to be 20 Hz to 20,000 Hz. Additionally, an octave can be used to describe the interval between a frequency in Hz and either half or double that frequency.

Frequency weighting

Different weighting networks can be applied to a given sound level in each stated octave band by a specified amount, in order to better represent the response of the human ear. The most commonly used weighting network is the 'A' weighting, and the letter 'A' will be included within a descriptor to indicate that the value has been 'A' weighted, e.g. $L_{Aeq,T}$ or L_{A90} . An 'A' weighted noise level may also be written as dB(A). Other weightings less commonly used are 'C' and 'D' weighting.

Noise indices

When a noise level varies with time, the measured 'A' weighted dB level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple 'A' weighted dB value. In order to describe noise where the level is continuously varying, a number of other indices, including statistical parameters, are used. The various indices used are described as below:

$L_{Aeq,T}$	The 'A' weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period, T
L_{Amax}	The maximum 'A' weighted noise level that was recorded during the monitoring period.
L_{A10}	The 'A' weighted noise level that was recorded for at least 10% of the monitoring period.
L_{A90}	The 'A' weighted noise level that was recorded for at least 90% of the monitoring period, usually taken as the underlying 'background' noise level.

Sound level difference, D

The sound level difference between two internal spaces, or between internal and external spaces. The ' D ' value is used to denote the differences at each third octave or octave band, with a single figure 'weighted' value to describe an overall performance. Note that the ' D ' value will always describe an in-situ or on-site acoustic performance. All values are described using the decibel.

- D_w Single figure weighted sound level difference, simply the measured source noise level minus receiver noise level, not adjusted to reference conditions
- $D_{nT,w}$ Weighted normalised sound level difference – a single, weighted sound insulation value, normalised to a reference reverberation time using the measured reverberation time in the receive room
- $D_{nT,w} + C_{tr}$ As above, with a spectral adaptation term applied to account for the effects of low frequency noise, and based on urban traffic noise
- $D_{nf,w}$ Overall flanking normalised level difference - A parameter that defines the flanking transmission of sound from room to room where a dividing partition or floor construction abuts a flanking building element common to both rooms, such as the building façade or ceiling

Sound reduction index, R

This describes the sound transmitted through a material or building element, such as a wall, door or window. It is measured in a laboratory with suppressed flanking transmission. The ' R ' value is used to denote the differences at each third octave or octave band, with a single figure 'weighted' value to describe an overall performance. All values are described using the decibel.

- R_w Weighted single figure sound reduction index
- $R_w + C_{tr}$ As above, with a spectral adaptation term applied to account for the effects of low frequency noise, and based on urban traffic noise
- R'_w The 'apparent sound reduction index', a field measurement to obtain the sound reduction index of a material or element, with all effects of site installation accepted.

Standardised impact sound pressure level, $L'_{nT,w}$

$L'_{nT,w}$ is the single figure used to characterise the impact sound pressure level in a receiving room, normalised to a reference reverberation time. Impact noise can be classified as (but is not limited to) the result of footfall impact on a separating floor to a habitable space below. All values are described using the decibel.

Reverberation time, T and T_{mf}

The reverberation time of a space is a measure of the rate at which sound decays, measured in seconds. It is defined as the time taken for the sound pressure level to reduce by 60 dB from its original impulse level. Reverberation time is commonly quoted in terms of the mid-frequency reverberation time, T_{mf} , the arithmetic average of the reverberation times in the 500 Hz, 1 kHz and 2 kHz octave bands.

Noise rating, NR

The noise rating or NR system is commonly used in the design of noise emitted by internal building services systems. The system is frequency dependent, and was empirically derived to prevent disturbance to occupants in habitable or working areas from building services noise that exhibits 'tonal' elements, e.g. rumbles, whines, whistles etc. There is no direct relationship between the average 'A' weighted noise level in dB and the NR. However, as a guide, and assuming the absence of strong low frequency content in a given noise, the NR could generally be said to be 6 dB less than the average 'A' weighted dB value.

Privacy

Privacy is the addition of the level of sound insulation between two rooms and the background noise within a receiving room. It can be used to assess the level of privacy afforded in the 'receiving room' for speech from the 'source room'. The 'privacy factor' is a unit-less value that is the combination of the average 'A' weighted background noise level in dB and the weighted sound level difference (D_w) in dB.

Appendix IV. HRS Acoustic Credentials

HRS Services Ltd. (HRS) have specialised in providing the UK Construction Industry with a range of acoustics services since 2006. Specialising in Building Acoustics, all HRS acousticians are members of the Institute of Acoustics.

HRS has been accredited for on-site acoustic testing by United Kingdom Accreditation Service (UKAS) since 2006 (Testing Laboratory Number 2587).

HRS meet the relevant acoustic requirements typically required in the UK, including for sound insulation testing as defined in Approved Document E for the purposes of testing for Part E to the Building Regulations 2010.

Choose a building block.

Appendix V. Report Conditions

This document has been prepared for the sole use, benefit and information of the Client. The liability of HRS Services Ltd. in respect of the information contained herein will not extend to any third party unless prior agreement is obtained in writing from HRS Services Ltd.

This report is limited to addressing the specific acoustic issues contained herein. Advice has been provided for acoustic reasons only and it is recommended that appropriate expert advice be sought on all the ramifications, e.g. safety, fire, structural, CDM etc., associated with any proposals contained herein.

The in-situ performance of acoustic measures is influenced to a large extent by the quality of workmanship and compliance with the specifications on-site during construction, as such, HRS Services Ltd. accepts no liability for issues with acoustic performance arising from such factors.

Acoustic survey and testing work carried out for the project is representative of the prevailing conditions at the time of the work. Conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

In particular, it should be noted that where calculations are carried out that are based on assumptions regarding certain aspects where information has not been supplied, these are provided for indicative purposes only and should be treated as such.