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FIRST INVESTMENT REAL ESTATE MANAGEMENT

SITE 5 WREXHAM INDUSTRIAL ESTATE, WREXHAM

NOISE ASSESSMENT REPORT

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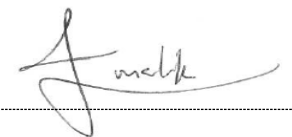
NOISE ASSESSMENT REPORT

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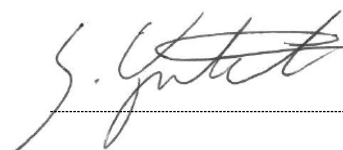
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APPENDICES

Appendix A – Standards and Guidance

Appendix B – Details of Noise Monitoring

Appendix C – Assessment of Background Sound Levels

DRAWINGS TITLE

1200 02-001	Proposed Site Plan
GM11958-001	Noise Monitoring Location Plan
GM11958-002	Proposed Noise Sources
GM11958-003	Development Noise Emissions During the Daytime
GM11958-004	Development Noise Emissions During the Night-time

EXECUTIVE SUMMARY

Wardell Armstrong LLP was commissioned to carry out a noise impact assessment for the proposed Site 5 of the Wrexham Industrial Estate Development.

Planning permission has been previously granted for several units at the site (Ref: P/2018/1087), with a total area of 97,500 sq. ft and approximately 197 parking spaces. As part of the previous application, Wrexham County Borough Council (WCBC) set out planning conditions in their decision notice dated 18th December 2018 (Ref: ABE P/2018/1087). It is understood that the proposed new layout comprises a single industrial unit with a floor area of 145,000 sq. ft and approximately 135 parking spaces. Access will be from Clywedog Road South, located to the west of the site.

A noise assessment has been carried out for the new proposals in accordance with British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound; (BS4142) to fulfil the requirements of the Planning Condition suggested by WCBC.

Background sound levels have been measured during the daytime and night-time periods in proximity to the nearest noise sensitive receptors (NSRs). There are dwellings to the east and of the site and commercial offices to the west.

This assessment considers the potential impact of noise generated by Site 5, on nearby NSRs.

Noise modelling has been undertaken to calculate the potential noise impact at NSRs from the proposed development, and associated noise sources, such as the car park, fixed plant, internal activities, and HGV activity. The number of vehicle movements across the site were interpreted from the Transport Statement prepared by Prime Transport Planning and have been used to inform a computer noise model.

The assessment has shown that, in accordance with BS4142, noise from the proposed development will cause a 'low impact' at sensitive receptors following the implementation of the recommended mitigation measures set out in this report.

As noise levels generated by the proposed development are of a low impact, and do not exceed the existing background sound levels at nearby Noise Sensitive Receptors, the development would meet the requirements of WCBCs proposed noise condition. Therefore, noise impact is not a material consideration for the planning application.

1 INTRODUCTION

- 1.1.1 Wardell Armstrong LLP (WA) has been commissioned by First Investment Real Estate Management to prepare a noise assessment report, to inform a detailed planning application for a single industrial unit within Wrexham Industrial Estate which, will be referred to as Site 5 for the remainder of this report. An original planning application (Ref: P/2018/1087) was approved in 2018 for the proposed development site which, granted approval for several industrial units at the site. This assessment considers a new layout, comprising one industrial unit, with a floor area of 145,000 sq. ft, and 135 parking spaces. The proposed site layout can be seen on Drawing 1200 02-001.
- 1.1.2 It is understood that Site 5 will comprise a distribution warehouse, located to the south of Wrexham Industrial Estate. To the north, the site is bound by existing industrial premises. To the east, the site is bound by residential dwellings on Maes Brenin and Pilgrim Way, with further residential premises beyond. To the south and west the site is bound by Clywedog Road South, with offices and industrial premises beyond.
- 1.1.3 This noise report has been prepared to assess the potential of noise impacts occurring at the nearby noise sensitive receptors, in accordance with relevant guidance, and the Planning Condition proposed by WCBC.

2 ASSESSMENT METHODOLOGY

2.1 Scope of Works

- 2.1.1 The proposed assessment methodology is based upon good practice, our experience of similar projects, and relevant technical and planning guidance. This assessment considers the potential noise impacts caused by proposed operations associated with Site 5 on identified NSRs.

2.2 Consultation

- 2.2.1 As part of the previous application, Wrexham County Borough Council (WCBC) set out planning conditions in a planning decision dated 18th December 2018 (Ref: ABE P/2018/1087). The conditions pertaining to noise state that:

“11. The rating level of any noise generated by reason of this development shall not exceed the pre-existing background level by more than 5dB(A) at any time. The noise levels shall be determined at nearby noise sensitive premises, and measurements an assessment shall be made in accordance with BS4142:2014 Method of Rating Industrial Noise Affecting Mixed Residential and Industrial Areas (sic).

13. No part of the development shall commence until a noise survey has been submitted to and approved in writing by the local planning authority. The survey shall determine noise levels for both day and night together with a detailed scheme of noise attenuation and/or noise insulation measures to show that the operation of the whole development shall not exceed the pre-existing background level by more than 5dB(A) at any time measured from the nearest noise sensitive properties. The measures as are approved shall be fully implemented prior to the first use of the development.”

- 2.2.2 While conditions 11 and 13 have been set out for the previous application, they considered pertinent to the proposed development.
- 2.2.3 Through consultation with Mr Paul Campini an Enforcement Officer (EF), at the Environmental Health and Housing Standards Team at WCBC, it has been identified that the council has recommended a revised planning condition for the proposed development relating to noise. The proposed condition will be as such:

“The rating level of any noise generated by reason of this development shall not exceed the pre-existing background level at any time. The noise levels shall be

determined at nearby noise sensitive premises, and measurements and assessment shall be made in accordance with BS4142:2014 Methods for rating and assessing industrial and commercial sound”.

- 2.2.4 The proposed Planning Condition places stricter requirements on Site 5, in comparison to Conditions 11 and 13 of the previous permission (Ref: P/2018/1087), and has been considered as part of this noise assessment.

2.3 Noise Survey

- 2.3.1 As part of this assessment, Wardell Armstrong LLP (WA) has carried out attended and unattended noise surveys, to measure the existing ambient and background sound levels at nearby noise sensitive receptors (NSRs). The noise survey is further discussed in Section 3 of this report.

2.4 Noise Modelling

- 2.4.1 Noise modelling software SoundPLAN version 8.2 has been used to calculate noise levels expected to be generated by Site 5 at identified NSRs. The assessment considers noise emissions from Site 5 namely, HGV movements, internal activity, the parking area and proposed fixed plant. Further details on the noise model set-up are presented in Section 5 of this report.

2.5 Assessment Methodology

- 2.5.1 The potential impacts have been assessed with reference to:
- Planning Policy Wales, February 2021 (PPW).
 - Planning Guidance (Wales), Technical Advice Note (TAN) (Wales) 11, “Noise” October 1997.
 - British Standard BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS4142).
 - British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (BS8233:2014).
- 2.5.2 Further details of these documents are included in Appendix A.

3 BASELINE CONDITIONS

3.1.1 The existing baseline situation, including the identification of the NSRs, has been informed by a review of available mapping data and aerial photography.

3.2 Noise Sensitive Receptors

3.2.1 The following NSRs listed below in Table 1 are closest to Site 5. Other NSRs may be affected by Site 5, however, the impacts predicted at these receptors will be equal to, or less than the specified NSRs. The chosen NSRs described in Table 1 below can be referenced to Drawing GM11958-001.

Table 1: Noise Sensitive Receptor Location					
Receptor	Location	Bearing from Site	Co-ordinates of NSR		Approximate Distance to Site Boundary
			Northing	Easting	
NSR1	Residential Dwellings on Maes Brenin	East	337174	349079	41 m
NSR2	16 Wilkinson Business Park	North-West	349155	336994	27 m
NSR3	2 Wilkinson Business Park	South-West	349024	336985	44 m

3.2.2 As NSR1 is representative of residential premises, noise levels during the daytime and night-time periods have been assessed. NSRs 2 & 3 are representative of commercial office spaces therefore, an assessment of only the daytime noise levels is required.

3.3 Details of Noise Monitoring

3.3.1 WA carried out attended and unattended noise surveys to measure representative residual and background sound levels in proximity to the specified NSRs. Monitoring Location 1 (ML1) is representative of NSR1 and MLs 2 & 3 are representative of NSRs2 & 3 respectively.

3.3.2 The noise measurements were made using a Class 1, integrating sound level meter. The microphone was mounted on a tripod 1.5 m above the ground and more than 3.5m from any other reflecting surfaces, with the microphone diaphragm positioned horizontally. The Sound Level Meter (SLM) was calibrated to a reference level of 94 dB at 1 kHz upon, commencement and termination of the noise survey. No significant drift in calibration was noted during the survey.

3.3.3 For the purpose of this assessment, daytime hours are taken to be between 07:00 - 23:00 and night-time 23:00 - 07:00.

3.3.4 A-weighted¹ L_{eqs} ² and L_{90s} ³ were measured in accordance with the requirements of BS4142 and BS8233. The maximum sound pressure levels and A-weighted L_{10s} ⁴ were also measured to provide additional information. The full set of measured noise levels are shown on tables presented in Appendix B.

3.3.5 Table 2 details the measurement periods and the observations taken during each measurement and identifies significant noise sources that were audible. Each ML is shown on Drawing GM11958-001. Observations during the night-time at ML1 were undertaken through analysis of the audio recordings, taken as part of the noise monitoring procedure.

Table 2: Noise Monitoring Periods and Observations			
Monitoring Location	Start Date and Time	Finish Date and Time	Acoustic Environment
ML1 (Residential Dwellings)	10:00 15/09/2021	10:00 16/09/2021	During daytime periods, the dominant noise source is from road traffic on Clywedog Road South including frequent movement of HGVs. To a lesser extent, intermittent activities from the surrounding industrial units also contributed to the sound scape. During night-time periods, the existing background environment at ML1 was dominated by road traffic from Clywedog Road South from around 05:30 – 07:00. Prior to that, outdoor, fixed plant in operation at nearby industrial premises, was dominant.
ML2 (Offices North)	12:20 13:00 16/09/2021	12:35 13:15 16/09/2021	The existing background environment at ML2 was dominated by road traffic on Clywedog Road South, including frequent HGV movement. Plant operating at industrial premises North of ML2 was also audible.
ML3 (Offices South)	12:40 13:20 16/09/2021	12:55 13:35 16/09/2021	The existing background environment at ML3 was dominated by road traffic from Clywedog Road South, including frequent HGV movement.

¹ A' Weighting An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions.

² L_{eqs} Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

³ L_{90} The noise level which is exceeded for 90% of the measurement period.

⁴ L_{10} The noise level which is exceeded for 10% of the measurement period.

3.4 Meteorological Conditions

3.4.1 The weather conditions during the noise survey were recorded. The details are shown below in Table 3.

Table 3: Noise Survey Weather Conditions 15/09/21 to 16/09/21	
Description	Weather Conditions
Average Temperature	10°C to 22°C
Average Wind Speed	<1.0 m/s to 3.0m/s
Cloud Cover	20% to 100%
Precipitation	Dry

3.5 Measured Noise Levels

3.5.1 The measured noise levels have been analysed. The existing residual ($L_{Aeq,t}$) and background ($L_{A90,t}$) levels have been determined for both, daytime and night-time periods. The results are summarised in Table 4.

Table 4: Average Measured Noise Levels at the Monitoring Locations				
Noise Monitoring Location	Daytime $L_{Aeq,t}$ (dB)	Daytime Background $L_{A90,t}$ (dB)	Night-time $L_{Aeq,t}$ (dB)	Night-time Background $L_{A90,t}$ (dB)
ML1	47	37 - 40	45	32 - 37
ML2	57	44	-	-
ML3	55	41 - 42	-	-

3.5.2 The measured sound levels have been used in this report to determine the potential noise impacts, generated by Site 5 at the specified NSRs. Remembering that each ML has its corresponding NSR.

4 ASSUMPTIONS, LIMITATIONS AND UNCERTAINTY

4.1 Introduction

4.1.1 This assessment is affected by the following assumptions and limitations.

4.2 Assumptions

4.2.1 The following assumptions have been made:

- Noise Sensitive Receptors (NSRs) are positioned at a height of 1.5 m above ground level during daytime periods. At NSR1, which represents a residential dwelling, the receptor is positioned at a height of 4.5m above ground during the night-time, to represent the typical usage of a dwelling.
- NSRs 2 & 3 represent office premises which have three floors. The sound level at the worst-case floor will be considered for this assessment.
- Development led road traffic will not significantly affect the level of road traffic noise from Clywedog Road South.
- The walls and roof of the proposed development will be constructed of Kingspan KS1000 or an equivalent product.
- Shutter doors will be open 50% of the time during day and night-time periods to account for the loading and unloading of HGVs.
- The warehouse will be uniformly operational over a 24-hour period.
- Up to 32 HGV movements per hour (data provided by Prime Transport Planning Ltd) have been assumed at the site, for both daytime and night-time periods. Each movement includes a vehicle driving into and out of the site.
- The carpark will comprise of circa 140 car parking spaces, whereby it has been assumed that shift changes could take place between the hours of 06:00 to 07:00 (night-time) and 14:00 to 15:00 (daytime). The carpark is presumed to operate at 75% of its maximum capacity which equates to 105 entering and leaving the spaces within the assessment periods.
- Up to 10 forklifts are assumed to operate internally and uniformly, across the entire floor space of the warehouse, over 24 hours.

- An air conditioning unit, with a sound power level of 70.3 dB, has been assumed to provide ventilation to the proposed office area of the building. The rooftop plant is assumed to operate uniformly over a 24-hour period.
- A window open at 20% provides around 13 dB of noise attenuation.

4.2.2 The noise source emissions and specifications are listed in Table 5 (Section 5) and describe the noise sources which have been included in the computer noise model. Each source is situated in an estimated location for a robust assessment. The location of each noise source is shown on Drawing No. GM11958-002.

4.3 Limitations

- 4.3.1 The accuracy of the noise model is limited by the lack of data regarding, the operations and construction associated with the proposed industrial unit thus, reasonable assumptions have been made.
- 4.3.2 Finished site ground levels have not been included into this assessment.

4.4 Uncertainty

- 4.4.1 To reduce the level of uncertainty within this assessment, the following steps have been taken:
- The background noise measurement locations were selected to be representative of the background noise levels at the specified NSRs.
 - In accordance with guidance, the microphone was mounted on tripod 1.5 m above the ground, with the diaphragm positioned horizontally. The monitoring locations represent free field measurements.
 - The closest NSRs have been determined from scale maps.
 - The background sound measurements were undertaken during suitable weather conditions over 24 hours and proposed operational hours.
 - The daytime background noise levels are assessed over 1-hour periods in accordance with BS41412.
 - The night-time background noise levels are assessed over 15-minute periods in accordance with BS4142.
 - The results of each measurement period are reported to the nearest 0.1 dB.

- Noise measurements were made using a Class 1, integrating Sound Level Meter (SLM) with audio recording and playback.
- The SLM was calibrated upon commencement and termination of the noise surveys. No significant drift in the calibration was recorded.

5 BS4142 NOISE IMPACT ASSESSMENT

5.1 Introduction

- 5.1.1 This section of the report sets out the assessment of noise emissions from Site 5, and the potential impacts they have on existing Noise Sensitive Receptors.

5.2 Noise Model

- 5.2.1 The assessment sound emanating from Site 5 to the adjacent NSRs has been undertaken by means of computer noise modelling software, SoundPLAN version 8.2.
- 5.2.2 The SoundPLAN software uses geographical information to create a model of the study area on which to generate noise contours, i.e. plans demonstrating the levels of proposed industrial noise at the facades of identified NSRs. This includes objects that affect the propagation of noise such as buildings and topography. The model uses the noise prediction methodology set out in ISO 9613-2:1996 'Attenuation of sound during propagation outdoors'.
- 5.2.3 The noise emissions from Site 5 have been assessed at the facades of the identified NSRs. For the residential dwellings, the daytime and night-time periods have been assessed at the façades on the ground floor and the 1st floor respectively. The buildings situated in Wilkinson Business Park have three floors. In this case it the worst of the predicted sound level, at each office, will be assessed.

5.3 Identification of Proposed Noise Sources

- 5.3.1 Through discussion with the client, Site 5 is intended for B1 and B8 use only and is therefore, likely to be utilised for storage and distribution. Thus, any potential increase of Sound Pressure Levels caused by Site 5, at identified NSRs, will be caused by one of, or a combination of the sources listed below in Table 5.
- 5.3.2 Noise emissions from the proposed development are likely to be a cause of HGV movements (including reversing alarms) and carpark activity across the western parts of Site 5, as well as fixed rooftop plant and mobile internal plant associated with the proposed operations.

Table 5: Noise Sources Used in Computer Modelling						
Noise Source	Source Type	Sound Power Level (dB)	No. of Sources	On-Time	Location	Source Reference
Forklift Movements	Area Source	111.0	10	100% of the time	Inside Warehouse	SoundPlan Data Library
HGV Movements	Moving Point Source	61.0	2	16 movements per hour, 24 hours a day	Outside Warehouse	SoundPlan Data Library
HGV Reversing (inclusive of reversing alarms)	Moving Point Source	84.8	8	4 movements per hour, 24 hours a day	Outside Warehouse	WA Measured Data
Carpark	Areas Source	93.75	105	06:00 to 07:00 14:00 to 15:00	Outside Warehouse	SoundPlan Data Library
Rooftop Plant	Point Source	70.3	1	100% of the time	Rooftop	Axial fan, SoundPlan Data Library

- 5.3.3 The Sound Power Levels of an axial fan and HGV movement have been taken from SoundPLAN database library and are considered to be representative of both noise sources.
- 5.3.4 These noise sources have been inputted into SoundPLAN Version 8.2 modelling software to predict potential noise impacts at identified NSRs. Full details are provided below in Section 5.3.
- 5.3.5 The noise emissions and specifications in Table 5 describe the noise sources which, have been included in the computer noise model at the approximate locations in which they are expected to operate. The locations of the noise sources are shown on Drawing GM11958-002.
- 5.3.6 The information required to determine potential HGV movements has been acquired from a transport planning consultancy, Prime Transport Planning. Whereby, they have predicted a net total of up to 790 HGV movements over a 24-hour period. Thus, the noise model includes 8-line sources that represent HGV movements. Each line source has been modelled as 4 events per hour during the day and night-time periods. This equates to 512 HGV movements during the daytime and 256 movements during the

night-time, this is considered to be representative of the traffic movements established by Prime Transport Planning.

- 5.3.7 If proposed sources or operations are found to differ greatly from those outlined above at a later design stage, a supplementary noise assessment will be required to account for the changes to the proposals.

5.4 BS4142 Assessment

Identification of the Specific Sound

- 5.4.1 Noise modelling using SoundPLAN has been used to calculate noise levels at the identified NSRs emanating from Site 5, using the details outlined in Table 5.
- 5.4.2 The predicted specific sound levels during the daytime and night-time periods at the NSRs are presented below in Table 6. The noise contour plots are shown in the following drawings:
- Drawing GM11958-003: Daytime Noise Contour Plot
 - Drawing GM11958-004: Night-time Noise Contour Plot

Table 6: Predicted Specific Sound Level at Sensitive Receptors			
Receptor	Location	Predicted Specific Sound Level	
		Daytime, dB LAeq, 1hr	Night-time, dB LAeq, 15mins
NSR1	East of the site	33	33
NSR2	Office North	41	-
NSR3	Office South	38	-

Identification of the Background Sound Level

- 5.4.3 Section 8 of BS4142 provides guidance on the selection of the background sound to be used in the assessment. BS4142 states that the background sound levels used for the assessment should be representative of the period being assessed (i.e., daytime and night-time periods), and that there is no “single” background sound level.
- 5.4.4 Therefore, analysis of the measured sound levels is required to select the most appropriate and representative background sound levels (L_{A90}) at the NSRs identified in Table 1. An assessment has been carried out based upon the measured sound levels during the daytime and night-time periods.
- 5.4.5 A detailed breakdown and analysis of the long term measured data at ML1 for both day and night-time periods is shown in Appendix B. The L_{90s} for NSR1 have been assessed using the mean average. NSRs 2 & 3 have been calculated using the most commonly occurring value, as shown in Appendix C. From this the most representative

LA₉₀ sound level, at the NSRs, have been determined, during the daytime and night-time periods.

5.4.6 Noise measurements, to establish the daytime background sound levels at ML2 and ML3 have been carried out during the daytime period, between 1220hrs and 1336 hours. This is considered to be a quiet daytime period, therefore these levels provide a robust representation of the existing acoustic environment at NSRs 2 & 3. Analysis of the long term measurements carried out at ML1, together with site observations, indicates that this monitoring period represents the quiet daytime, and that background sound levels do not fluctuate significantly over the daytime. The measurements undertaken at both ML2 and ML3 are within 1dB, respectively, at each location. Therefore, these are representative of the background sound levels throughout the daytime period.

5.4.7 A summary of the representative background sound levels at NSRs are shown in Table 7 below.

Table 7: Representative Background Sound Levels at NSRs		
Receptor	Representative Background Sound Level	
	Daytime, dB LA ₉₀ , 1hr	Night-time, dB LA ₉₀ , 15min
NSR1	39	33
NSR2	44	-
NSR3	41	-

Application of Weighting for Characteristics of Specific Sound

5.4.8 BS4142 includes guidance on the application of additional weightings which include tonality, impulsivity or intermittency. Where such features are present at the assessment location characteristic corrections to the specific sound should be added to obtain a rating level.

5.4.9 Table 8 shows that the calculated specific noise levels, generated by Site 5, at NSR1 are expected to be **6 dB** below the measured background sound level during the daytime and the same during night-time periods. In addition, any potential acoustic characteristics arising from HGV movements are expected to be screened by the proposed building. It is therefore considered that no acoustic corrections are required at NSR1.

5.4.10 The specific noise levels, expected to be experienced at NSR 2 & 3, are **3 dB** below the background sound level, respectively. Therefore, the majority of distinctive acoustic characteristics are expected to not be audible at NSRs 2 and 3. However, as HGV

movements on site are expected to include reversing alarms, a +2dB correction has been applied for any tonal elements that may be slightly perceivable.

5.4.11 Proposed HGV movements and associated operations at Site 5 will contribute, to the noise levels at NSRs 2 & 3. It is thought, while the proposed noise sources are mainly HGV movements and may operate intermittently, they are in keeping with the existing acoustic environment, which consists of industrial noise. The existing acoustic environment at NSRs 2 and 3 includes noise from R.F. Bellis Haulage adjacent to NSR2 and frequent road traffic on Clywedog Road South, thus the majority of potential noise emissions from Site 5 are in keeping with the existing acoustic environment, and unlikely to be distinguishable against the background conditions. It is therefore considered that no further corrections for acoustic characteristics, of the specific noise experienced at NSRs 2 and 3 are required.

BS4142:2014+A1:2019 Assessment

5.4.12 In accordance with BS4142, the noise rating levels from Site 5, as received at the NSRs, have been compared with the corresponding measured background sound levels L_{A90} and are shown below in Table 8.

Table 8: BS4142 Assessment of the Noise from the Proposed Development as received at NSRs during the Daytime and Night-time						
Description	Daytime (dBA) (0700-2300 hours)			Night-time (dBA) (2300-0700 hours)		
	NSR1	NSR2	NSR3	NSR1	NSR2	NSR3
Specific Sound Level at NSRs, dB $L_{Aeq, T}$	33	41	38	33	-	-
Noise Penalty, dB	0	2	2	0	-	-
Rating Level, dB (A)	33	43	40	33	-	-
Background Sound Level, dB $L_{A90, T}$	39	44	41	33	-	-
Excess of rating over Background level, dB(A)	-6	-1	-1	0	-	-

5.4.13 The results displayed in Table 8 have been calculated and assessed in accordance with BS4142. The results for NSR1 indicate that the rating level predicted from Site 5 during daytime periods are **6 dB** below the measured L_{90s} and **0 dB** for night-time periods. This indicates that noise associated with Site 5 will generate a '**low impact**' (the lowest category stated within BS4142) at NSR 1 during the daytime and night-time periods, depending upon the context.

5.4.14 The rating levels at NSRs 2 & 3 are **1 dB** below the measured background sound level L_{A90} respectively. Therefore, the rating levels are expected to generate a ‘**low impact**’ at NSRs 2 & 3, depending upon context.

BS4142 Context Assessment

5.4.15 BS4142:2014 States; “the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs”.

5.4.16 The first requirement of the above statement has been determined in the noise impact assessment section above. To establish the context in which the industrial sound will reside three pertinent factors must be considered, these are;

- The absolute sound level;
- The character and level of the residual sound compared to the character and level of the specific sound; and,
- The sensitivity of the receptor.

Absolute level of Sound

5.4.17 To determine the first context test in BS4142 it is necessary to determine whether the residual and background sound levels are high or low. Section 11 of BS4142 states;

“Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.”

5.4.18 The rating sound levels at the NSRs are between 33dB(A) and 43dB(A) during the daytime, and 33dB(A) at NSR 1 during the night-time. Background sound levels at the NSRs are between 39dB and 44dB L_{A90} during the daytime, and 33dB L_{A90} at NSR1 during the night-time. The rating levels are low, however the background sound levels are considered to be moderate. Thus, in terms of the absolute level of sound, the difference presented in Table 8 provides a good indication of the potential noise impact at the NSRs.

Character and level of the Residual and Specific Sound

- 5.4.19 The proposed sources which contribute to the specific sound associated with Site 5 (i.e. HGV movements, fixed rooftop plant, and mobile plant), outlined in Table 5, will be similar in character to that of the residual sound (activity from existing industrial premises) which comprises predominantly low to mid frequency noise from HGV movements and equipment. Therefore, it is considered that noise from the proposed development will be in keeping with the character of the existing acoustic environment, which will potentially further reduce any noise impacts caused by Site 5 on existing NSRs. Noise from reversing alarms will be generated at Site 5 however, they will be short in duration and likely to inaudible at the identified NSRs.
- 5.4.20 Table 4 shows, the residual sound levels at NSR 1 for both day and night-time periods to be 47 dBA and 45 dBA respectively. Table 8, shows the predicted specific sound levels to be 33 dBA for both day and night-time periods. Therefore, as the specific noise levels are expected to be significantly lower at NSR 1, than the measured residual sound levels, It can be concluded that this difference is likely to further reduce any potential impact at NSR1.
- 5.4.21 The daytime residual sound levels at NSRs 2 & 3 are 57 dBA and 55 dBA respectively. As shown in Table 8, the specific sound levels at these NSRS are expected to be 41 dBA and 38 dBA respectively. Therefore, the specific sound levels at NSRs 2 & 3 are expected to be 16 dBA and 17 dBA respectively. The difference between the residual sound levels and the calculated specific noise levels at NSRs 2 and 3, is therefore expected to further reduce any potential noise impacts at these receptors.

Sensitivity of Receptor

- 5.4.22 With regard to pertinent factors to be taken into consideration, Section 11 of BS4142 states;

“The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal design and/or outdoor acoustic conditions, such as:

- i. Façade insulate treatment;*
- ii. Ventilation and/or cooling that will reduce the need to have windows open as to provide rapid or purge ventilation; and*
- iii. Acoustic screening.”*

- 5.4.23 The glazing and ventilation specifications of the identified NSRs are not known. However, to be robust it is assumed that the identified NSRs do not have the benefit of alternative ventilation methods. Therefore, they are likely relying on open windows to achieve sufficient background ventilation.
- 5.4.24 The existing façade mitigation will provide some attenuation of the noise from the proposed development. It is generally agreed that a partially open window provides approximately 13 dB of attenuation, this would therefore further reduce the impact at all receptors during daytime and night-time periods when considering internal living areas.
- 5.4.25 Notwithstanding, as the specific noise levels generated by the proposed development are low level, and significantly below the background sound level L_{A90} , the internal and external sound levels are likely to remain unchanged.
- 5.4.26 In addition, the identified NSRs are located in an established industrial area, therefore, they are likely to be less sensitive to the proposed industrial noise generated by Site 5.

BS4142 Assessment Summary

- 5.4.27 A BS4142 assessment has been undertaken to assess the potential noise impacts caused by Site 5 on nearby NSRs.
- 5.4.28 The calculated noise levels, expected to be generated by Site 5 are significantly below the measured background sound level at NSR1 during the daytime and night-time.
- 5.4.29 The calculated noise levels generated by Site 5 are below the measured background sound level at NSRs 2 & 3 during the daytime.
- 5.4.30 A context assessment shows that the noise associated with the proposed development will generate a **low impact** at all NSRs, when considered in context. This is the lowest category stated in BS4142.
- 5.4.31 Therefore, mitigation measures will not be required to reduce noise levels from the plant.

5.5 HGV Movements on Local Roads

- 5.5.1 The proposed development will increase HGV movements on local roads adjacent to NSRs 2 & 3, namely Clywedog Road South. These additional HGV movements have the potential to adversely affect the identified NSRs.

- 5.5.2 However, NSRs 2 & 3 are located within an industrial area, which, currently experiences a significant number of HGV movements. Traffic planning consultants have predicted Site 5 will generate up to 33 HGV movements per hour, over a 24-hour period. Therefore, this is not expected to significantly increase the number of HGV on the local road network.
- 5.5.3 Therefore, on balance, noise from HGVs associated with the proposed development will not adversely affect NSRs 2 and 3.

6 CONCLUSIONS

- 6.1.1 Wardell Armstrong LLP have been commissioned by First Investment Real Estate Management to carry out a noise impact assessment for a proposed industrial unit intended for B1 and B8 usage, i.e. storage and distribution, at noise sensitive receptors.
- 6.1.2 WA has been informed that Wrexham County Borough Council intend to set out the following Planning Condition:
- “The rating level of any noise generated by reason of this development shall not exceed the pre-existing background level at any time. The noise levels shall be determined at nearby noise sensitive premises.”*
- 6.1.3 The operational noise assessment has been carried out in accordance with British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound; (BS4142).
- 6.1.4 To establish background noise levels at the nearby noise sensitive receptors, attended and unattended noise surveys have been carried out during daytime and night-time periods at locations considered to be representative of existing sensitive receptors. This includes office spaces adjacent Clywedog Road South and Residential Dwellings on Bridge Road South.
- 6.1.5 This assessment considered the noise impacts caused by the proposed development, on noise sensitive receptors, during the daytime and night-time, where appropriate.
- 6.1.6 Noise modelling of the proposed development has been undertaken. The model included noise emissions associated with potential HGV activity, rooftop plant and internal forklift operations. Construction details of the proposed unit have been assumed to inform the assessment. The results of the computer noise modelling have been used to establish the likely noise impacts caused by the proposed development at the identified noise sensitive receptors, during the operational phase of the development.
- 6.1.7 In accordance with BS4142 assessment procedure, the proposed development will cause only a **low impact** at existing noise sensitive receptors. Therefore, no mitigation measures are required to protect the amenity of the identified noise sensitive receptors.

- 6.1.8 The predicted noise levels generated, by the proposed development do not exceed the existing background sound levels at the identified noise sensitive receptors. Therefore, it is considered that the proposed development, achieves the Planning Condition suggested by Wrexham County Borough Council. Noise therefore, is not a material consideration when determining the planning application for the proposed development.

APPENDICES

Appendix A

Standards and Guidance

Appendix A

Guidance and Legislation

Planning Policy Wales

- A.1 Planning Policy Wales (PPW) is the current planning policy guidance within Wales. The planning guidance defines the primary objective of the document in paragraph 1.2 as follows:

“...to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales...”

- A.2 In particular reference to noise Paragraph 6.7.3 of the PPW states:

“Problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health or a nuisance. Noise action plans drawn up by public bodies aim to prevent and reduce noise levels where necessary and preserve soundscape quality where it is good. Noise levels used to identify priority areas contained in noise actions plans are usually set quite high in order to focus resources on the most polluted areas and noise must meet a number of tests before it qualifies as a statutory nuisance. Lower levels of noise however, can still be annoying or disruptive and impact on amenity and as such should be protected through the planning process wherever necessary.”

Technical Advice Note 11: Noise (TAN 11)

- A.3 TAN 11 is used to categorise noise levels for proposed residential developments. TAN 11 presents four noise exposure categories (NECs), ranging from A to D, where A represents the lowest noise levels, and D is for sites with higher noise levels. A breakdown of the NECs, and subsequent advice is provided below in Table 1 and 2.

Table 1: Noise exposure categories for road traffic noise and mixed sources ¹				
Time	Noise Exposure Category			
	A	B	C	D
0700-2300	<55	55 - 63	63 - 72	>72
2300-0700 ²	<45	45 - 57	57 - 66	>66

¹ **Noise levels:** the noise level(s) ($L_{Aeq,T}$) used when deciding the NEC of a site should be representative of typical conditions.

² **Night-time noise levels (2300-0700):** sites where individual noise events regularly exceed 82dB L_{Amax} (S time weighting)

Table 2: Advice relating to noise exposure category		
NEC	Significance	Advice
A	Negligible	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.
B	Minor	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.
C	Moderate	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Major	Planning permission should normally be refused.

A.4 TAN 11 also states that:

“This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.”

BS8233 Guidance on sound insulation and noise reduction for buildings

A.5 British Standard 8233 “Guidance on sound insulation and noise reduction for buildings” 2014 bases its advice on the WHO Guidelines. In addition, for internal noise levels it states:

“Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.”

A.6 Furthermore, with regard to external noise, the Standard states:

several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8H}$ (except where the $L_{Aeq,8H}$ already puts the site in NEC D).

“For traditional external areas that are used for amenity space such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guidance value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

British Standard 4142:2014+A1:2019 (BS4142), Method for rating and assessing industrial and commercial sound:

- A.7 BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:
- sound from industrial and manufacturing processes;
 - sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.
- A.8 The standard is applicable to the determination of the following levels at outdoor locations:
- rating levels for sources of sound of an industrial and/or commercial nature; and
 - ambient, background and residual sound levels, for the purposes of:
 - 1) Investigating complaints;
 - 2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

3) Assessing sound at proposed new dwellings or premises used for residential purposes.

- A.9 The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.
- A.10 BS4142 refers to noise from the industrial source as the 'specific noise' and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with Ridgewood Industrial Park. The 'specific noise' levels, of the existing industrial premises that have been measured are detailed in Section 4 of this report.
- A.11 BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}). Section 4 provides details of the background noise survey undertaken.
- A.12 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.
- A.13 The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
 - The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- A.14 During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

A.15 Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Appendix B

Details of Noise Monitoring

Appendix B

Noise Monitoring Results

Monitoring Location 1 – To the North of Unit 1, Representative of Noise Levels at Nearby Receptors						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
15/09/2021 – Daytime						
1000-1100	50.5	47.0	62.2	48.4	52.1	Plant noise from industrial premises within the vicinity of the monitoring location were dominant, with HGV movements, and vehicle movements audible during the measurement.
1100-1200	49.8	46.5	62.4	47.8	51.0	
1200-1300	51.0	45.9	70.2	47.7	53.4	
1300-1400	49.6	45.7	65.8	47.2	51.4	
1400-1500	50.9	46.2	61.6	48.1	52.9	
1500-1600	51.6	47.7	71.8	49.3	53.2	
1600-1700	51.1	49.1	62.0	49.9	51.8	
1700-1800	50.7	48.4	65.3	49.6	51.4	
1800-1900	51.4	49.5	66.4	50.4	51.9	
1900-2000	51.5	49.7	54.6	50.3	52.4	
2000-2100	52.2	50.5	55.5	51.2	53.0	
2100-2200	50.4	48.2	55.8	49.1	51.6	
2200-2300	50.3	47.8	54.5	49.0	51.4	
15/09/2021 – 16/09/2021 - Night-time						
2300-2315	50.2	48.3	53.3	49.1	51.0	Plant from industrial premises within the vicinity of the monitoring location were dominant, with HGV movements, and vehicle movements audible during the measurement. Birdsong was occasionally audible.
2315-2330	50.2	48.5	52.8	49.1	51.0	
2330-2345	50.5	48.7	53.0	49.6	51.1	
2345-0000	50.2	47.9	54.3	48.6	51.3	
0000-0015	48.4	47.2	50.8	47.6	49.0	
0015-0030	48.7	47.6	50.9	48.1	49.1	
0030-0045	48.7	47.3	51.1	48.0	49.2	
0045-0100	49.5	47.5	52.2	48.6	50.1	
0100-0115	49.3	46.9	52.1	48.0	50.0	
0115-0130	48.3	47.0	50.5	47.5	48.9	
0130-0145	48.9	46.9	51.9	47.9	49.7	
0145-0200	48.7	47.2	51.1	47.9	49.3	
0200-0215	48.8	47.1	50.7	48.1	49.3	
0215-0230	48.7	47.4	51.4	47.9	49.2	
0230-0245	48.8	47.3	51.1	48.1	49.3	
0245-0300	49.2	47.5	51.6	48.4	49.8	
0300-0315	49.0	47.5	51.4	48.2	49.7	
0315-0330	48.7	47.0	52.2	47.8	49.3	
0330-0345	48.3	47.0	50.4	47.5	48.8	
0345-0400	47.5	46.3	49.7	46.8	48.0	
0400-0415	47.2	46.2	49.2	46.6	47.6	
0415-0430	47.2	46.0	53.7	46.6	47.7	
0430-0445	48.0	46.8	50.0	47.2	48.5	
0445-0500	48.3	46.9	50.4	47.6	48.8	
0500-0515	48.3	46.9	50.9	47.5	48.9	
0515-0530	49.3	47.0	59.5	47.7	49.7	
0530-0545	48.9	47.3	51.2	48.0	49.7	
0545-0600	49.1	47.4	56.3	48.1	49.9	
0600-0615	49.3	47.5	62.8	48.1	50.2	
0615-0630	49.0	47.2	56.5	48.0	49.5	

Monitoring Location 1 – To the North of Unit 1, Representative of Noise Levels at Nearby Receptors						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
0630-0645	49.4	47.8	56.0	48.5	49.9	
0645-0700	49.2	47.8	54.0	48.4	49.9	
16/09/2021 – Daytime						
0700-0800	50.7	48.2	57.9	49.0	52.0	Plant noise from industrial premises within the vicinity of the monitoring location were dominant, with HGV movements, and vehicle movements audible during the measurement.
0800-0900	51.2	48.2	61.0	49.1	52.5	
0900-1000	52.6	51.0	62.6	51.6	53.1	

MLs 2 & 3 Daytime Results 16/09/2021						
Monitoring Locations	Period Start	L _{Aeq} (dB)	L _{A max} (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
Office North (ML2)	12:22:01	58.1	73.8	43.9	62.4	Road Traffic noise from Clywedog Road South dominated including frequent HGV movements. A high powered jet wash from the adjacent industrial unit could be heard intermittently at ML1.
Office South (ML3)	12:41:45	56	71.4	40.7	60.6	
Office North (ML2)	13:02:15	56.3	70	43.8	60.9	
Office South (ML3)	13:05:58	54.2	69	41.5	58.4	

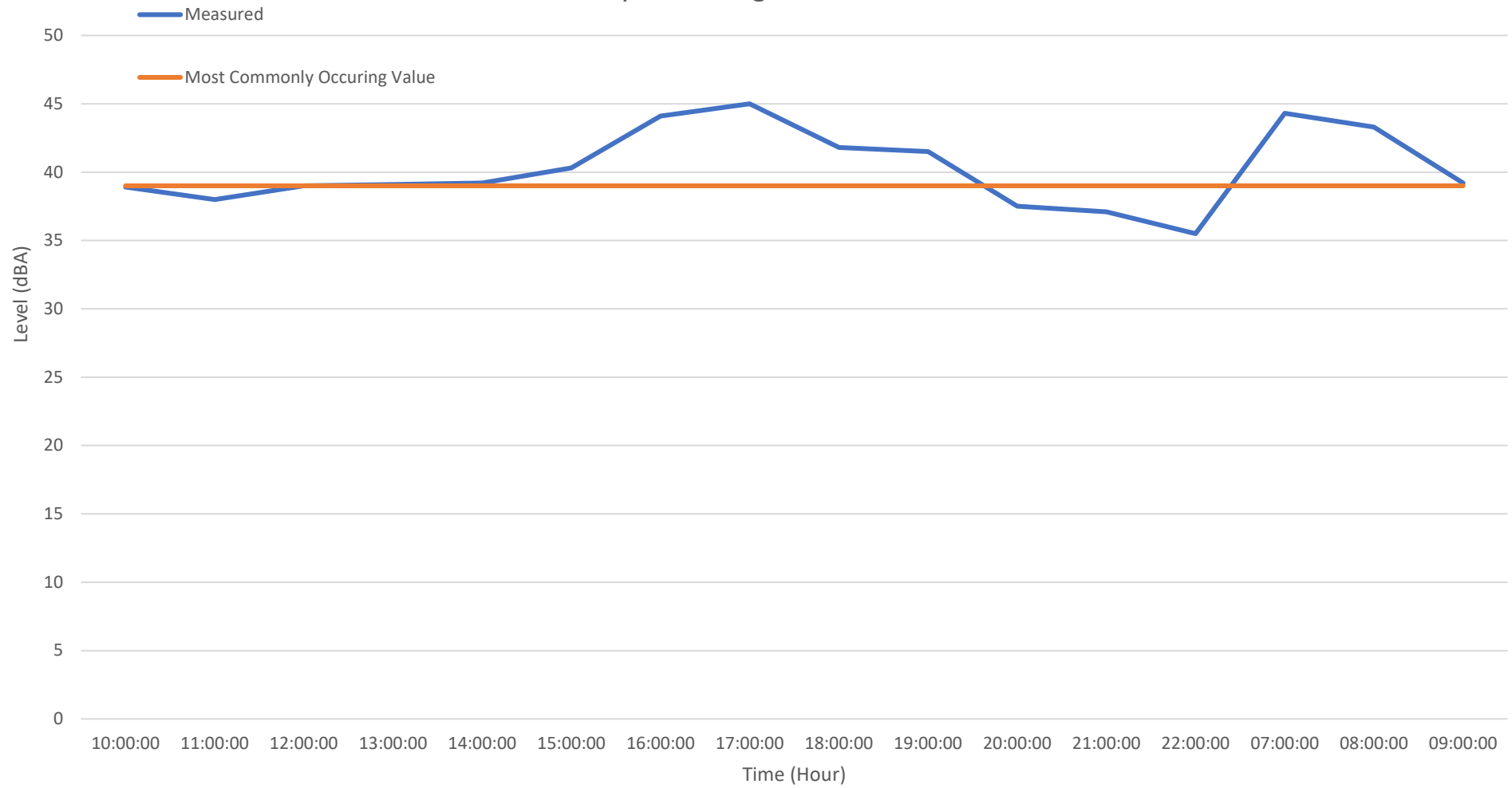
Appendix C

Assessment of Background Sound Levels

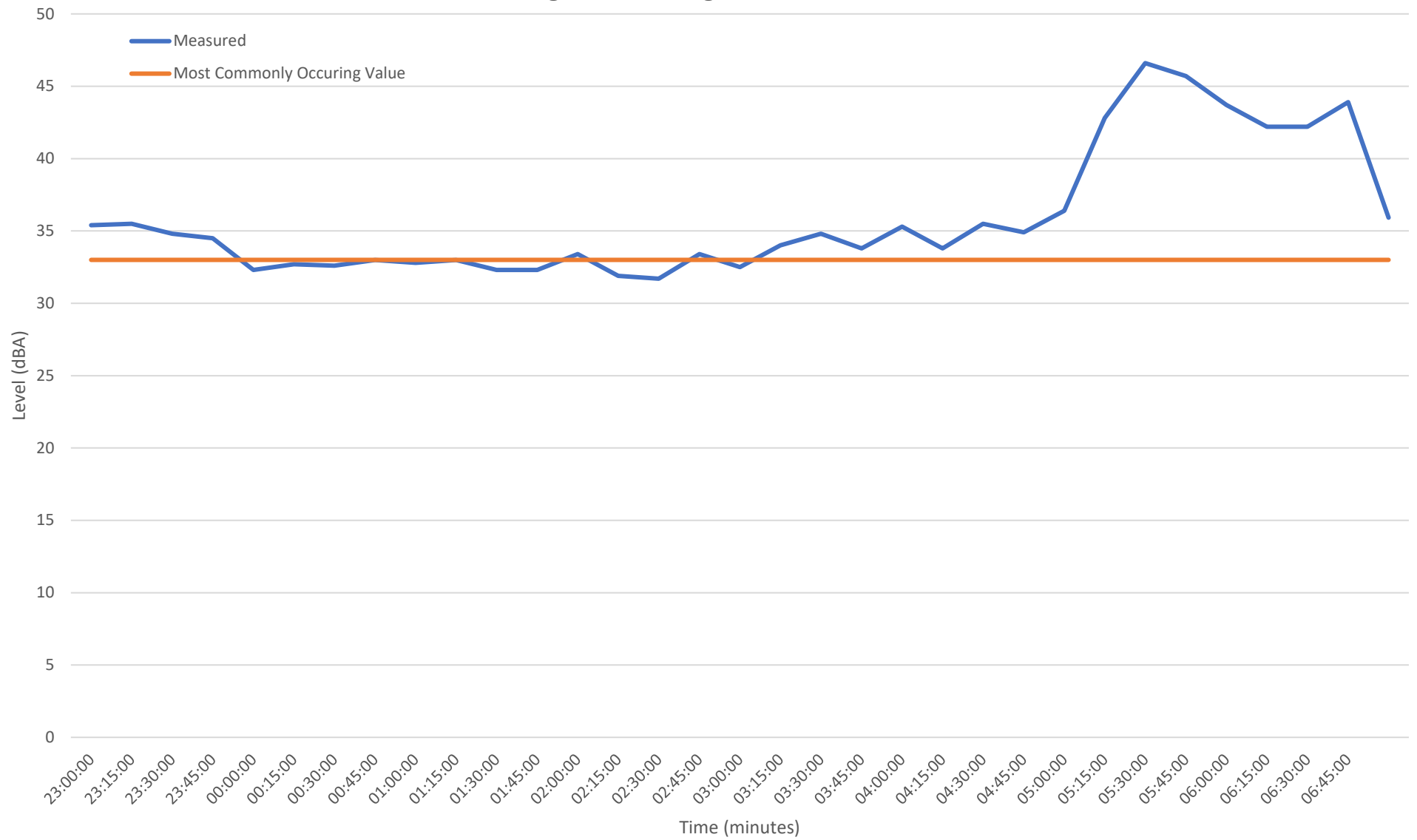
APPENDIX C

Background Noise Assessment

ML1: Daytime Background Determination



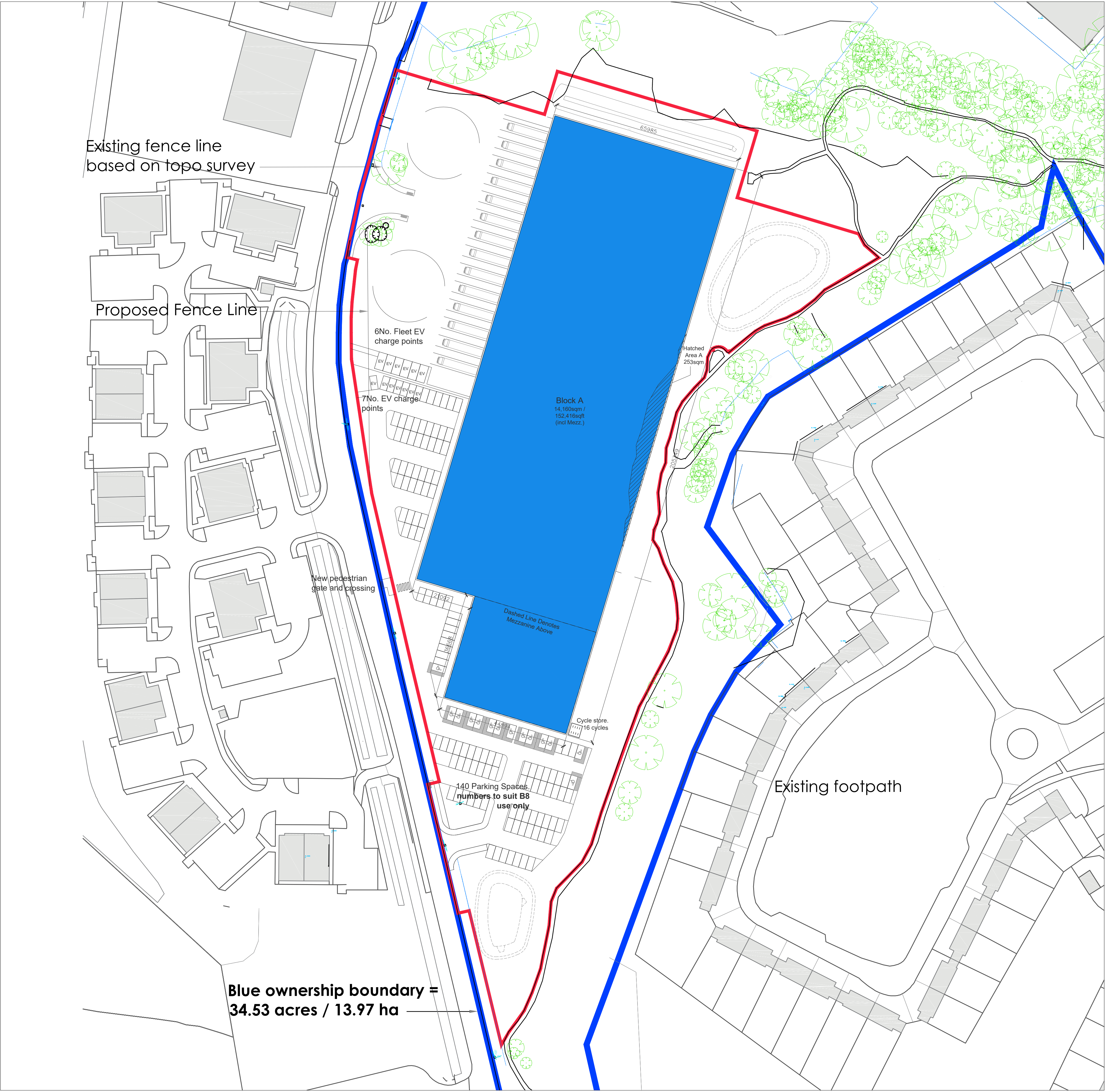
ML1: Night-time Background Determination



ML2: Determination of the Background Sound Levels Calculated Over 15 Minute Periods (16/09/2021)					
Period Start	L _{Aeq} (dBA)	L _{Amin} (dBA)	L _{Amax} (dBA)	L _{A90} (dBA)	L _{A10} (dBA)
12:22	58.1	40.6	70.2	44.0	62.3
13:00	56.3	39.7	68.1	43.7	60.8
Overall	57.8	39.7	70.2	43.9	61.6

ML3: Determination of the Background Sound Levels Calculated Over 15 Minute Periods (16/09/2021)					
Period Start	L _{Aeq} (dBA)	L _{Amin} (dBA)	L _{Amax} (dBA)	L _{A90} (dBA)	L _{A10} (dBA)
12:41	56.0	36.7	70.3	40.9	60.5
13:20	54.2	37.8	67.3	41.7	58.6
Overall	55.7	36.7	70.3	41.3	59.6

DRAWINGS



Rev	Description	By	Date
C	Initial Issue	MC	17.08.
D	Parking repositioned, Building size reduced	MC	31.08.
E	Existing walkway hatched	MC	04.10.
F	Fleet EV added, Pedestrian crossing added	MC	18.10.
G	Highways Updated	MC	02.12.
H	OS Map Included	MC	06.12.

Internal Areas
Ground Floor: 135K sqft
First Floor: 17K sqft

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FI REAL ESTATE MANAGEMENT

Project
Site 5
Wrexham

Description
Proposed Site plan

Status
For Information

Scale N.T.S	Drawn By PJ	Date MAY21
Job Number 1200	Drawing Number 02-001	Revision H

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KEY

Site Boundary

Noise Monitoring Locations

Existing Sensitive Receptors

Notes:

Boundaries are indicative.

Aerial imagery shown for context purposes only.

REVISION	DETAILS				DATE
CLIENT	FIRST INDUSTRIAL REAL ESTATE MANAGEMENT				
PROJECT	SITE 5 - WREXHAM INDUSTRIAL ESTATE				
DRAWING TITLE	FIGURE 1 - NOISE MONITORING AND EXISTING SENSITIVE RECEPTOR LOCATION PLAN				
DRG No.	GM11958-001		REV	A	
DRG SIZE	A3	SCALE	1:2,000		DATE
DRAWN BY	EF	CHECKED BY	JM	APPROVED BY	SU

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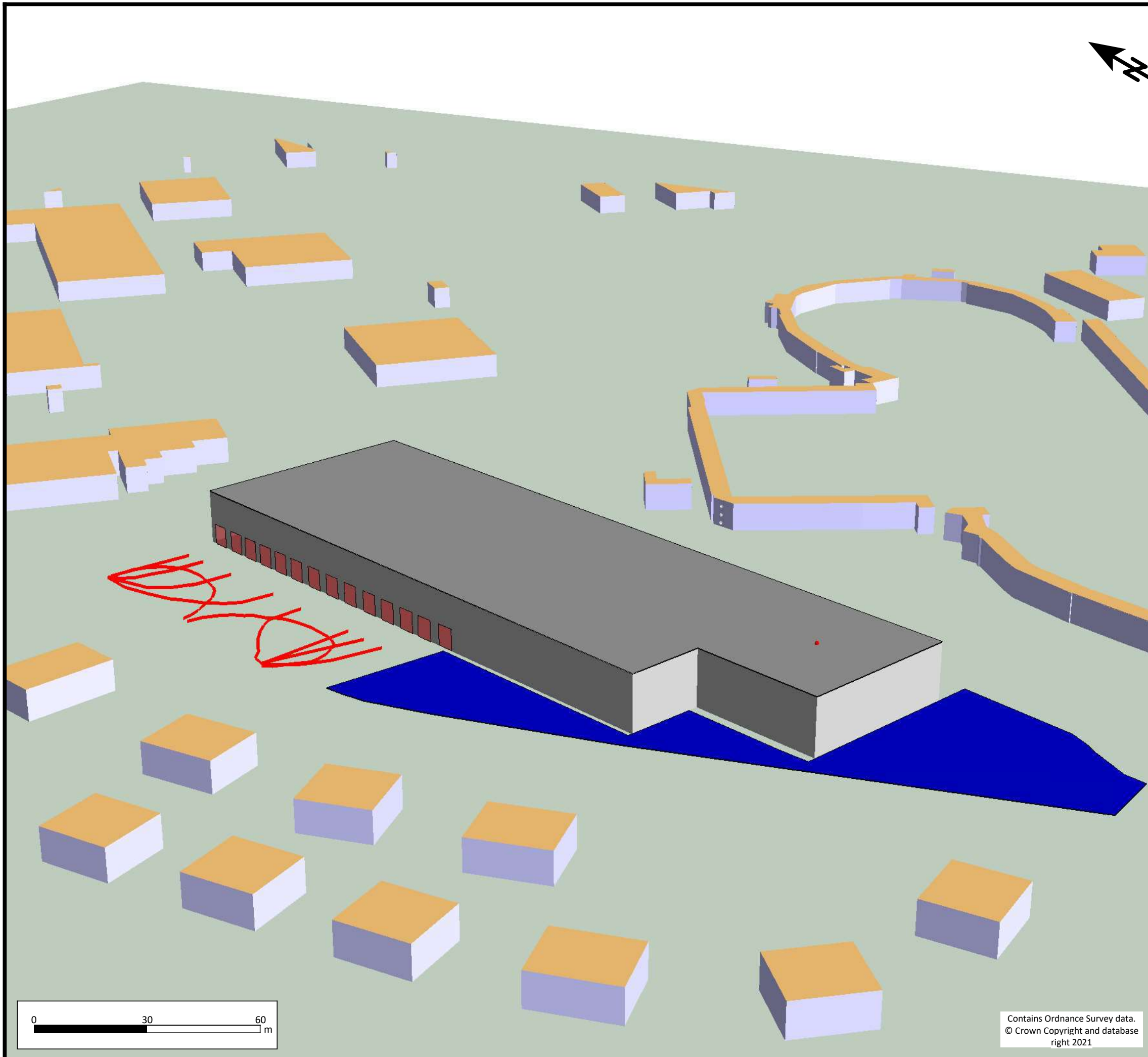
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Metres

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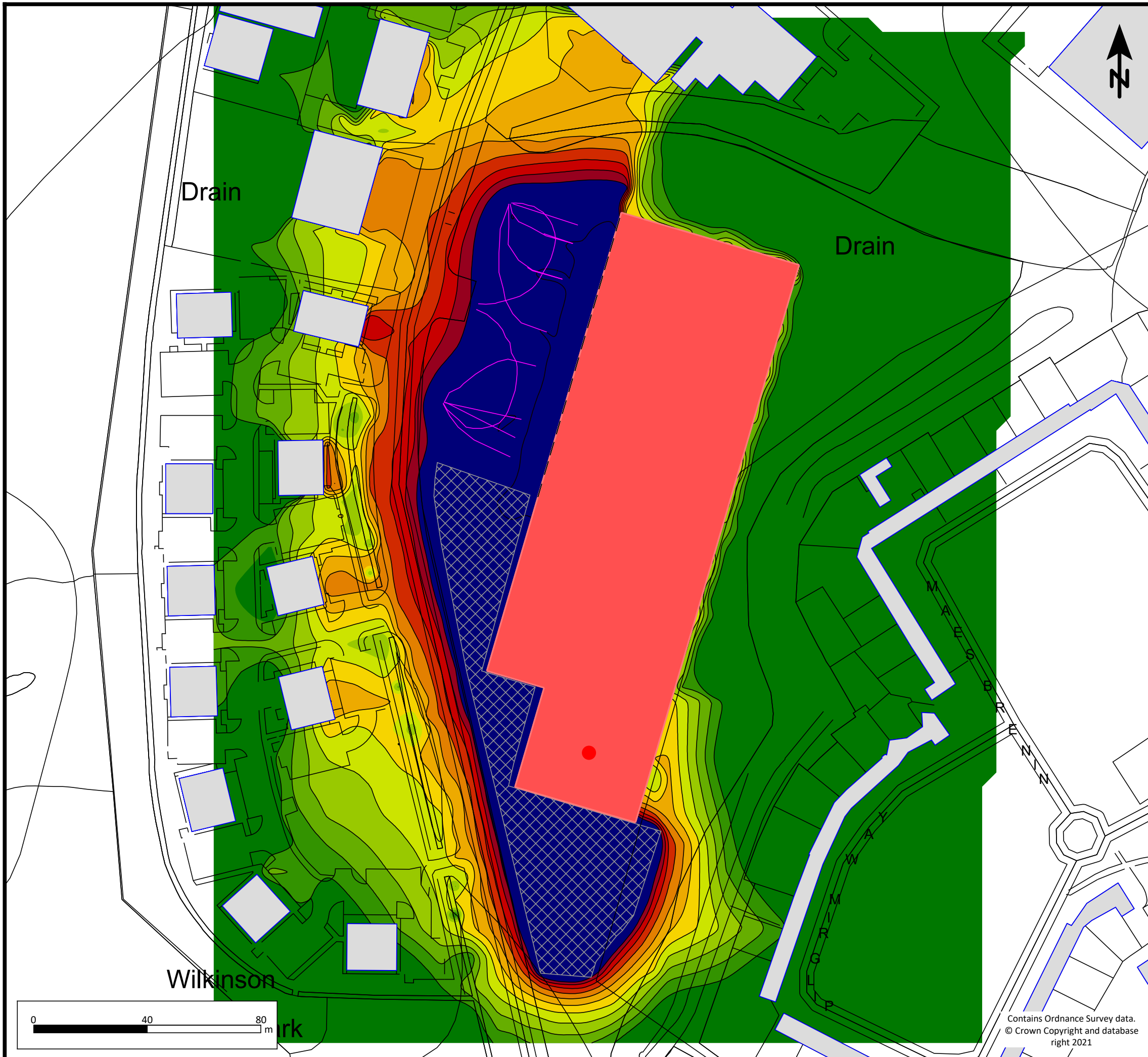
Key

- Existing Buildings
- Industrial building; Room
- Transmissive area from Internal Operations
- Outdoor point source
- Indoor area source
- HGV Movements
- Carpark

CLIENT: First Investment Real Estate Management		
PROJECT: Site 5, Wrexham Industrial Estate		
TITLE: Figure 2 - Proposed Noise Sources		
DRG NO: GM11958/002	REV: A	
DRG SIZE: A3	SCALE: 1:1082	DATE: 16/12/2021
DRAWN BY JM	CHECKED BY SCU	APPROVED BY SCU

0 30 60 m

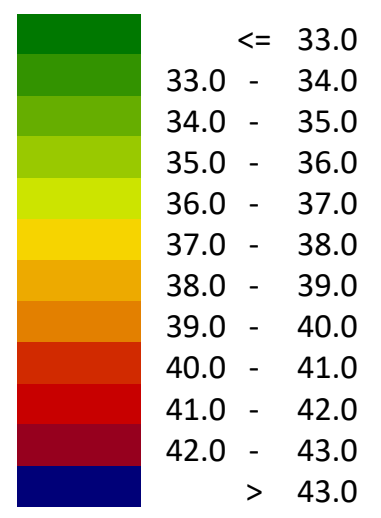
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Key

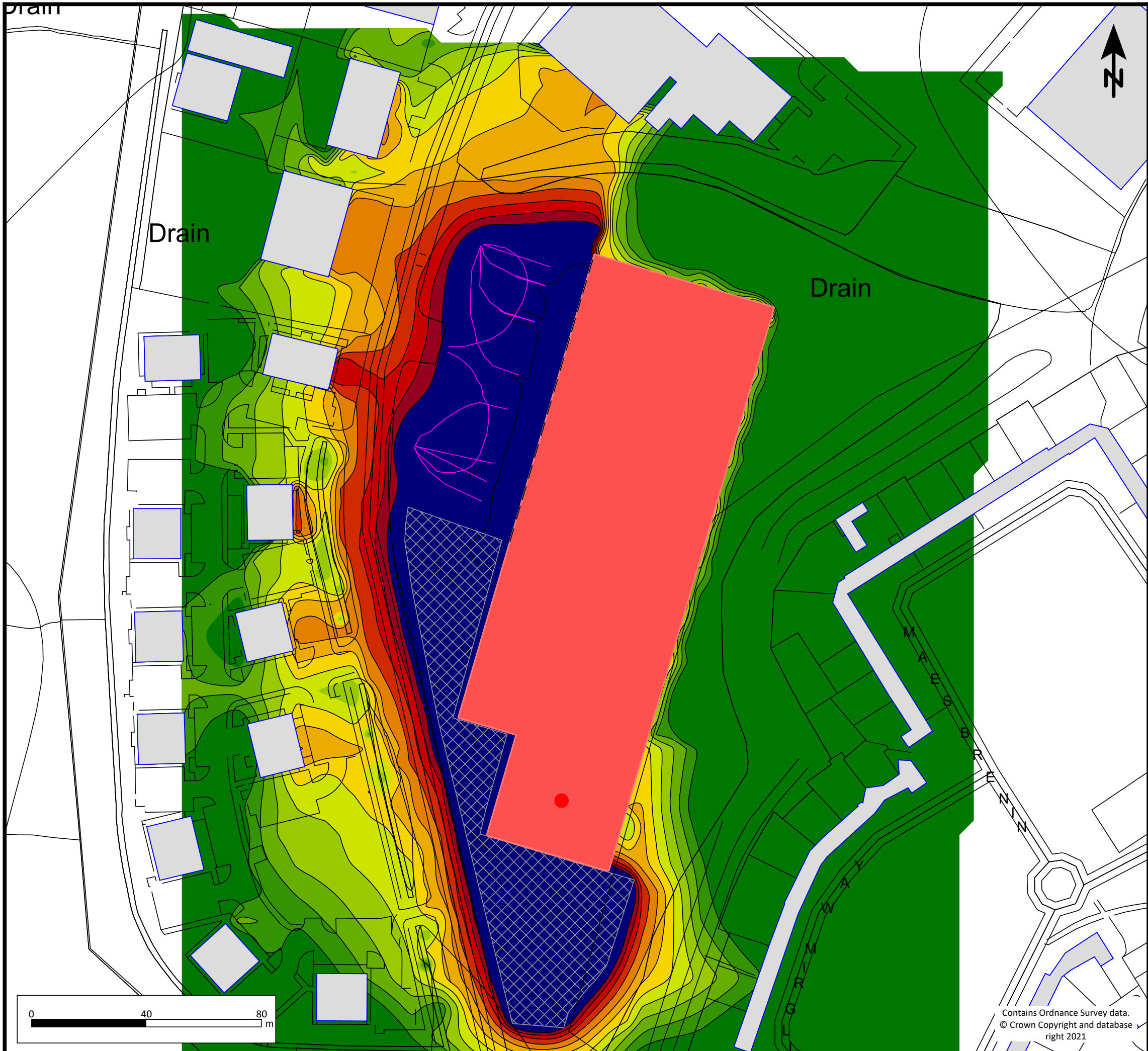
- Existing Buildings
- Roof as source
- Facade as source
- Rooftop Plant
- Indoor Forklift Movements
- HGV Movements

Daytime $L_{Aeq,1hour}$ dB



CLIENT: First Investment Real Estate Management		
PROJECT: Site 5 Wrexham		
TITLE: Figure 3 - Daytime Noise Contour Plots for Site 5		
DRG NO: GM11958/002	REV: A	
DRG SIZE: A3	SCALE: 1:1343	DATE: 16/12/2021
DRAWN BY JM	CHECKED BY SCU	APPROVED BY SCU

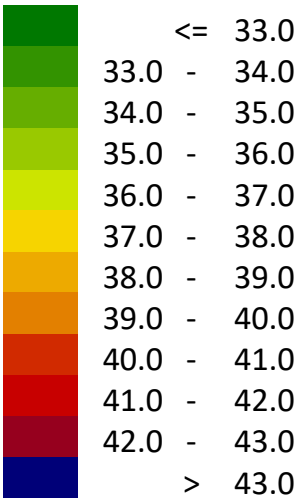
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Key

- Existing Buildings
- Roof as source
- Facade as source
- Rooftop Plant
- Indoor Forklift Movements
- HGV Movements
- Carpark

Night-time $L_{Aeq,15min}$ dB



CLIENT: First Investment Real Estate Management		
PROJECT: Site 5, Wrexham Industrial Estate		
TITLE: Figure 4 - Night-time Noise Contour Plots for Site 5		
DRG NO: GM11958/004	REV: A	
DRG SIZE: A3	SCALE: 1:1320	DATE: 16/12/2021
DRAWN BY JM	CHECKED BY SCU	APPROVED BY SCU

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