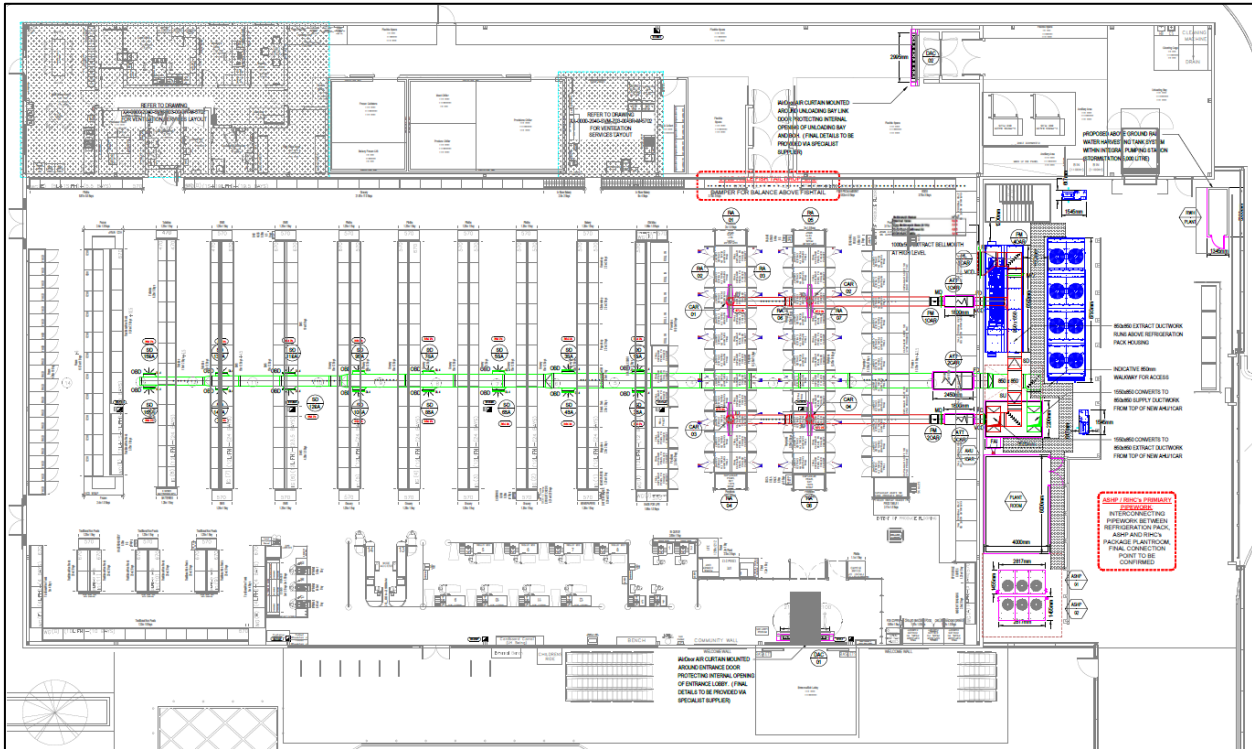


784-B055089



Noise Assessment

Sainsbury's Supermarket Limited

November 2024



Tetra Tech Limited. Registered in England number: 01959704

Registered Office: 3 Sovereign Square, Sovereign Street, Leeds, United Kingdom, LS1 4ER

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Appendix A – Acoustic Terminology

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Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
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

Executive Summary

A noise assessment has been undertaken in support of a non-material amendment to the approved a planning application for the relocation of a substation at a retail food store at Arborfield, Nine Mile Ride Extension, Reading, RG2 9GB.

Due to the low measured background levels, the assessment against BS4142 criteria was not considered an appropriate test for the proposed development. The combined operational noise levels (including the relocation of the substation, HGV activities for the daytime and building services plant for both daytime and night-time) from all proposed noise sources associated with the Site were assessed against WHO/BS 8233 criteria.

By incorporating the previously agreed mitigation strategy (an acoustic barrier and gate) designed in the previous iteration of this report which has been approved within the decision notice for the planning application (application number: 232927), the daytime and night-time internal noise criteria set out in WHO/BS 8233 is achieved. Therefore, during the daytime and night-time, noise levels at all receptors are predicted to result in a Lowest Observed Adverse Effect (LOAEL) and therefore result in a low impact in relation to noise.

It is considered there is no material change between the already approved scheme and the new scheme and that the effect of moving the sub-station has no material impact on the nearest sensitive receptors.

1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment to support a non-material amendment to relocate the substation for a proposed retail food store at Arborfield, Nine Mile Ride Extension, Reading, RG2 9GB.

The outline planning for the site application under Wokingham Borough Council planning ref (O/2014/2280) was approved on 02/04/2014.

This report considers the effect of relocating the proposed substation to the southern boundary of the site and the cumulative impact of the proposed site activities on the nearest residential receptors.

A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise. The noise levels from the proposed commercial activities have been predicted at existing sensitive receptors using CadnaA noise modelling software which incorporates ISO 9613-2 methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A.

1.2 Legislative Context

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published in December 2023. With regard to noise and planning, the NPPF contains the following statement at Paragraph 191:

“191. 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 [...]

“193. 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.

“194. 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 below in Table 1.1.

Table 1.1: NPPG 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 (LOAEL)			
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 (SOAEL)			
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 difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
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, NPSE and PPG 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 'BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings' (2014) and 'BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound' (2014) have been used. Section 2.0 presents the noise level criteria used as a basis of this assessment.

The PPG 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.

Furthermore, the PPG: Noise identifies at Paragraph: 011 Reference ID: 30-011-20190722 the requirement for developments proposals to incorporate measures to mitigating the impact of noise on residential developments. In particular:

“Noise impacts may be partially offset if residents have access to one or more of:

- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;*
- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;*
- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).*

1.3 Local & Regional Policy Context

The Wokingham Borough Local Development Framework contains policies which are related, however do not provide specific criteria to aim for. The policies have been reproduced below for clarity:

“Policy CP1: Sustainable Development

Planning permission will be granted for development proposal that:

8) Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers.

Policy CP3:

Planning permission will be granted for proposals that:

a) Are of an appropriate scale of activity, mass, layout, built form, height, materials and character to the area together with a high quality of design without detriment to the amenities of adjoining land users including open spaces or occupiers and their quality of life.”

1.4 Acoustic Consultants' Qualifications and Professional Memberships

The lead project Acoustic Consultant is Travis Smith. The report has been checked by Joe Nott and verified by Dawit Abraham. Relevant qualifications, membership and experience are summarised in Table 1.2.

Table 1.2: Acoustic Consultants' Qualifications & Experience

Name	Education	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)
Travis Smith	BSc 2022	Jul 2022	-	-
Joe Nott	BSc 2016	Aug 2016	Aug 2017	-
Dawit Abraham	BSc 2008 MSc 2010	Oct 2010	Jan 2011	Jan 2015

2.0 Assessment Criteria

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

- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings – Code of practice'
- BS4142:2014 'Method for rating industrial and commercial sound'
- World Health Organisations (1999) 'Guidelines for Community Noise'

A full bibliography of documents referenced within this report is provided within Appendix B.

Table 2.1: Noise Level Criteria and Actions

Noise Sources	Noise Level Criteria	Justification for Effect Level- Action Required
No Observed Adverse Effect Level (NOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background level $L_{A90,T}$ dB is less than or equal to 0dB	Justification for Effect Level: Below low impact threshold in BS4142:2014 Action Required: None
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are below: Living Rooms: - 35 dBL _{Aeq,16hours} Kitchens, Dining Rooms, and Studies: - 40 dBL _{Aeq,16hours} Bedrooms: - 35 dBL _{Aeq,16hours} - 30dB L _{Aeq,8hr} - L _{AFmax,2min} noise levels do not exceed: 45dB L _{AFmax} based on 10 th highest L _{AFmax,2min} sample)	Justification for Effect Level: Less than threshold values in Table 4 in BS8233:2014 and Table 1 in World Health Organisation (1999) Guidelines on Community Noise Action Required: None
Absolute external noise criteria for the following noise sources: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are below 50dBL _{Aeq,16hours}	Justification for Effect Level: Less than 'desirable' values in BS8233:2014 Paragraph 7.7.3.2. Action Required: None
Lowest Observed Adverse Effect Level (LOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level ($L_{Ar,T}$) dB and existing background sound level $L_{A90,T}$ dB is between 1-4dB.	Justification for Effect Level: Within less likely for adverse or significant adverse impact to occur low impact threshold in BS4142:2014 Action Required: Mitigate and reduce to a minimum the exceedance over 0dB above background threshold
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are between: Living Rooms: - 35-40 dBL _{Aeq,16hours} Kitchens, Dining Rooms, and Studies: - 40-45 dBL _{Aeq,16hours} Bedrooms: - 35-40 dBL _{Aeq,16hours} - 30-35dB L _{Aeq,8hr} - L _{AFmax,2min} noise levels do not exceed 45dB L _{AFmax} based on 10 th highest L _{AFmax,2min} sample)	Justification for Effect Level: Exceed threshold guidelines in Table 4 of BS8233:2014 and World Health Organisation (1999) Guidelines on Community Noise by no greater than 5dB to achieve <u>reasonable internal conditions</u> as defined by Note 7 to Table 1 in BS8233:2014 Action Required: Mitigate and reduce to a minimum the exceedance over the threshold

Noise Assessment

Absolute external noise criteria for the following noise sources: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are between 50-55 dBL_{Aeq,16hours}	Justification for Effect Level: Exceed 'desirable' threshold guidelines but within upper threshold guidelines in Paragraph 7.7.3.2 of BS8233:2014
Significant Observed Adverse Effect Level (SOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level (L_{Ar,T}) dB and existing background sound level L_{A90,T} dB is between 5-9dB.	Justification for Effect Level: Within adverse impact threshold in BS4142:2014. Action Required Additional mitigation required to achieve effect of LOAEL or less.
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are between: Living Rooms: 40-45 dBL_{Aeq,16hours} Kitchens, Dining Rooms, and Studies: 45-50 dBL_{Aeq,16hours} Bedrooms: 40-45 dBL_{Aeq,16hours} 35-40dB L_{Aeq,8hr} 45-55dB L_{AFmax,2min} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Exceeds BS8233:2014 L_{Aeq,T} reasonable criteria by 5dB or exceeds L_{AFmax,2min} (10th highest sample) Action Required: Additional mitigation required to achieve effect of LOAEL or less.
Absolute external noise criteria for the following noise sources: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels exceed 55 dBL_{Aeq,16hours}	Justification for Effect Level: Exceeds BS8233:2014 L_{Aeq,16hours} upper criteria. Action Required: Additional mitigation required to achieve effect of LOAEL or less.
Unacceptable Observed Adverse Effect Level (UOAEL)		
Fixed plant and equipment located externally or internally with louvered ventilation grilles	Difference between Rating Level (L_{Ar,T}) dB and existing background sound level L_{A90,T} dB is equal to or greater than 10dB	Justification for Effect Level: Within significant adverse impact threshold in BS4142:2014 Action Required: Additional mitigation required to achieve effect of LOAEL or less.
Absolute internal noise criteria for the following noise sources with windows closed: - Road traffic noise - Goods vehicle deliveries and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels exceed: Living Rooms: 45 dBL_{Aeq,16hours} Kitchens, Dining Rooms, and Studies: 50 dBL_{Aeq,16hours} Bedrooms: 45 dBL_{Aeq,16hours} 40dB L_{Aeq,8hr} - L_{AFmax,2min} noise levels exceeds 55dB L_{AFmax} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Exceeds BS8233:2014 L_{Aeq,T} reasonable criteria by 10dB or exceeds L_{AFmax,2min} (10th highest sample) by 10dB or more. Action Required: Additional mitigation required to achieve effect of LOAEL or less.

Noise Assessment

Absolute external noise criteria for the following noise sources: • Road traffic noise • Goods vehicle deliveries and unloading of vehicles. • Service yard noise including forklift truck movements. • Car Parks	Noise levels exceed 60 dBL_{Aeq,16hours}	Justification for Effect Level: Exceeds BS8233:2014 L_{Aeq,16hours} upper criteria by 5dB or more. Action Required: Additional mitigation required to achieve effect of LOAEL or less.
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3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict noise levels at a number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613-2 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 and model settings as given in Table 3.1 below have been used.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	DEFRA	LIDAR 1m DTM
Building heights – around site	Tetra Tech Observations	4.0m height for one-storey properties 8.0 m height for two storey properties 3.0m per additional storey
Receptor positions	Tetra Tech	1.5 m for ground floor properties 4.0m height for first-floor properties 10.0m for receivers with additional floor
Modelling Parameters	Tetra Tech	- Ground Absorption: 0.5 (Surrounding site boundary) - Ground Absorption: 0.0 (within site boundary) - Order of Reflections: 2 - Receiver Spacing: 5.0
Proposed Plans	Hadfield Cawkwell Davidson	Drawing Title: Proposed Service Yard, Plan, Section & 3D View Drawing No: SK-A-9105
	RAC Engineering Servies Ltd	Drawing Title: Refrigeration Plant Layout Drawing No: SDG3-0000-2040
	SVM building Services Design	Drawing Title: Mechanical Services, Ground Floor, Services Layout Drawing No: DR-M-0570

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.2 Model Input Data

Information regarding noise emissions from the proposed plant and operation activity (HGVs & car park) has been determined using provided noise emissions & data from the Tetra Tech Library.

Data contained within Tables 3.2 & 3.3 presents noise information for all plant and operational noise while Table 3.4 contains the sound reduction indices of the attenuator which has been applied to the AHU sources within the model.

Table 3.2: Summary of Noise Input Data (Sound Pressure Levels)

Noise Source	Type	Sound Pressure Level (dB(A))	Distance (m)	Source
HGV Unloading	Average	73.8	3	Tetra Tech Library
HGV Movement	Average	73.0	3	Tetra Tech Library
Car Park	Average	54.0	1.5	Tetra Tech Library
Refrigeration Pack	Average	41.1	10	Manufacturer Data
Gas Cooler	Average	38.0	10	Manufacturer Data
LT Condensing Unit	Average	41.0	10	Manufacturer Data
IT Condensing Unit	Average	41.0	10	Manufacturer Data
ASHP	Average	42.3	10	Manufacturer Data

Table 3.3: Summary of Noise Input Data (Sound Power Levels)

Noise Source	Type	Octave Band Sound Power Level ($L_w(A)$)								Sound Power Level ($L_w(A)$)	Source
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
Air Handling Unit (AHU)	Average	76.0	80.0	76.0	74.0	71.0	67.0	65.0	65.0	76.6	Previous Tetra Tech Work
Substation	Average	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	53.0	Calculated Noise Limit

It is understood that the substation housing will be comprised of brick with no. 2 louvers on the west facing façade. It is considered the material of the substation housing will significantly mitigate the potential noise emissions. Therefore, the substation has been modelled as no. 2 area sources representing the louvres.

Table 3.4: Sound Reduction Indices

Noise Source	Octave Band Sound Power Level ($L_w(A)$)								Rw	Source
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
Attenuator	5.0	11.0	19.0	29.0	36.0	37.0	29.0	18.0	30.0	Previous Tetra Tech Work

3.3 Modelling Inputs & Rating Corrections

Table 3.5 presents the model input information and BS4142 rating penalty corrections applied to noise data presented within Tables 3.2 & 3.3. Rating corrections have been applied as +3dB for intermittent/tonal/impulsive noise sources as per guidance within BS4142 Section 9.2.

Table 3.5: Modelling Inputs & Rating Corrections

Noise Source	Source Type	BS4142 Rating Penalty
Refrigeration Pack	Area / Vertical Area	+3
Gas Cooler	Area / Vertical Area	+3
LT Condensing Unit	Point	+3
IT Condensing Unit	Point	+3
False Load Evaporator	Area / Vertical Area	+3
Air Handling Unit (AHU)	Area / Vertical Area	+3
Substation	Vertical Area	+3

3.4 Sensitive Receptors

3.4.1 Sensitive Receptor Locations

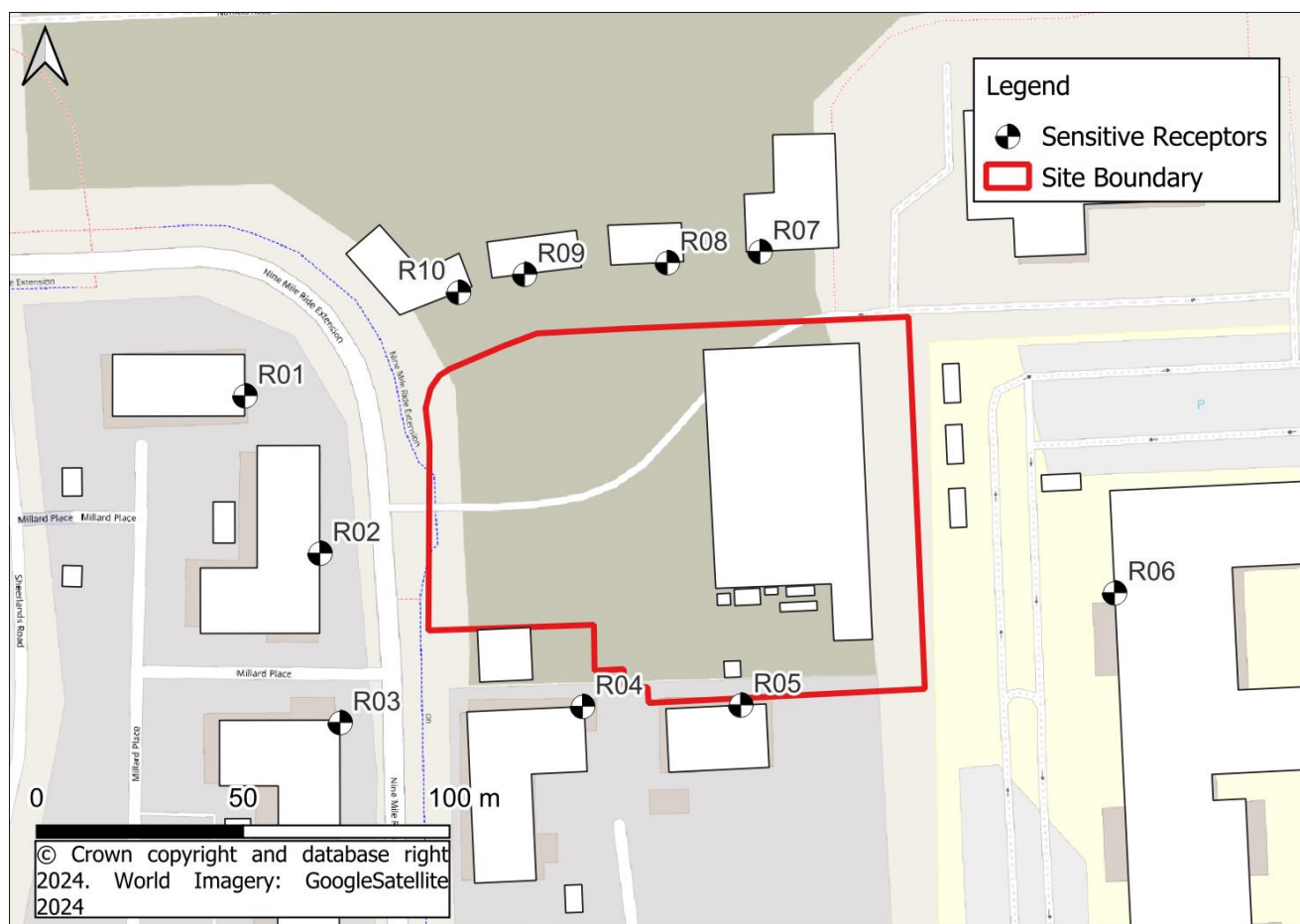
Table 3.6 summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are presented within Figure 3.1.

Table 3.6: Sensitive Receptor Locations

Ref.	Description	Type of Use	Height (m) Daytime / Night-time
R01	Bridle House	Residential	1.5, 4.0, 7.0 and 10.0
R02	Kirkpatrick House	Residential	1.5, 4.0, 7.0 and 10.0
R03	Carriage House	Residential	1.5, 4.0, 7.0 and 10.0
R04	Acre House	Residential	1.5, 4.0, 7.0 and 10.0
R05	Meadow House	Residential	1.5, 4.0, 7.0 and 10.0
R06*	Bohunt Wokingham Secondary School	Educational	1.5 and 4.0
R07	Future Residential Receptor	Residential	1.5 and 4.0
R08	Future Residential Receptor	Residential	1.5 and 4.0
R09	Future Residential Receptor	Residential	1.5 and 4.0
R10	Future Residential Receptor	Residential	1.5 and 4.0

* Daytime receptor only

Figure 3.1: Sensitive Receptor Locations



4.0 Noise Survey

4.1 Noise Survey Details

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background noise levels.

Equipment used during the survey included:

Rion NL52	Environmental Noise Analyser	s/n	00732146
Rion NL52	Environmental Noise Analyser	s/n	01221576
Rion NL52	Environmental Noise Analyser	s/n	01021257
Rion NC75	Sound Calibrator	s/n	34580543

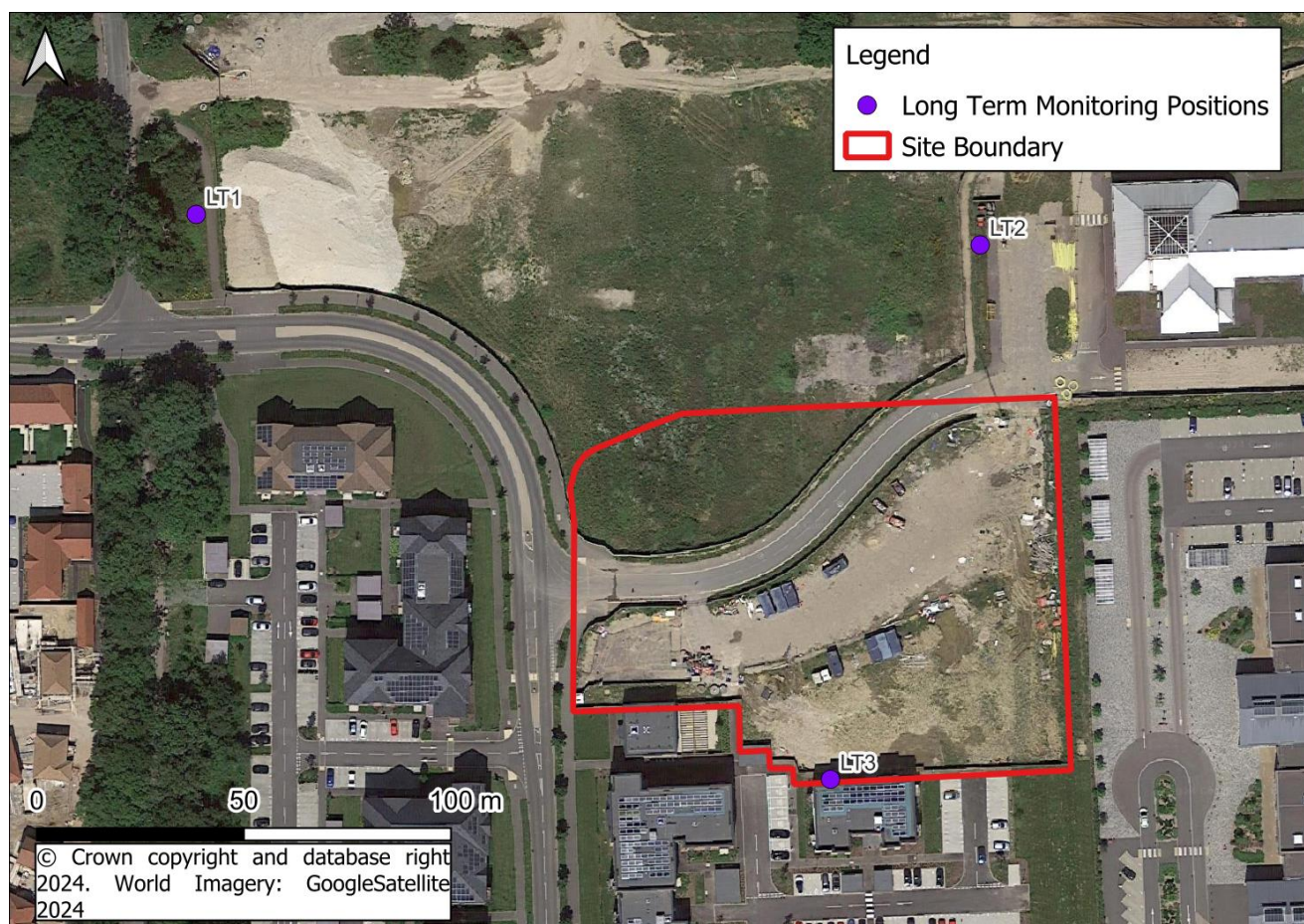
The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of +0.1 dB was observed on meters s/n 01021257 and 01221576, and a drift of +0.0 dB was observed on meter s/n 00732146. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

Baseline noise measurements were undertaken at three locations (as specified in Table 4.1 and shown in Figure 4.1 below) from Thursday 18th May 2023 to Tuesday 23rd May 2023. Three long-term (LT) locations were being measured unattended over a 120-hour period. The raw data collected from the long-term noise monitoring is available upon request.

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

Table 4.1: Noise Monitoring Locations

Ref	Description
LT1	North-west of the site, adjacent to access gate off Sheerlands Road.
LT2	North of the site, approximately 40m west of Arborfield Green Leisure Centre.
LT3	At the southern boundary of the site, north of Meadow House.

Figure 4.1: Noise Monitoring Locations

4.2 Noise Survey Results

The dominant noise sources found in the area include distant and nearby road traffic noise. Other contributions to the ambient noise climate consist of birdsong, aircraft passes, and daytime leisure centre activity.

Ambient and background noise levels are usually described using the LAeq index (a form of energy average) and the LA90 index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the LA10 index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented LAeq,T and LA10,T are average noise levels whilst the LA90 is the modal noise level of each 5-minute measurement over the stated survey period.

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in Table 4.2 below. All values are sound pressure levels in dB (re: 2×10^{-5} Pa).

Table 4.2: Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	L _{Aeq,T} (dB)	L _{Amax,T} (dB)	L _{Amin,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)
Weekday Daytime 07:00 - 23:00	42 hours	18/05/2023 – 23/05/2023 07:00 – 23:00	LT1	52.1	89.1	23.3	52.3	43.0
Weekday Night-time 23:00 – 07:00	22 hours	18/05/2023 – 23/05/2023 23:00 – 07:00		45.3	75.9	19.3	39.2	27.0
Weekend Daytime 07:00 - 23:00	32 hours	20/05/2023 – 21/05/2023 07:00 – 23:00		50.3	78.8	26.6	50.9	40.0
Weekend Night-time 23:00 – 07:00	16 hours	20/05/2023 – 21/05/2023 23:00 – 07:00		47.2	77.8	22.8	41.8	26.0
Weekday Daytime 07:00 - 23:00	48 hours	18/05/2023 – 23/05/2023 07:00 – 23:00	LT2	49.0	89.2	23.5	48.7	42.0
Weekday Night-time 23:00 – 07:00	24 hours	18/05/2023 – 23/05/2023 23:00 – 07:00		42.1	83.6	19.3	37.0	28.0
Weekend Daytime 07:00 - 23:00	32 hours	20/05/2023 – 21/05/2023 07:00 – 23:00		47.8	87.3	27.6	47.9	40.0
Weekend Night-time 23:00 – 07:00	16 hours	20/05/2023 – 21/05/2023 23:00 – 07:00		41.6	71.7	22.8	38.3	27.0
Weekday Daytime 07:00 - 23:00	48 hours	18/05/2023 – 23/05/2023 07:00 – 23:00	LT3	48.1	83.9	25.9	48.8	42.0
Weekday Night-time 23:00 – 07:00	24 hours	18/05/2023 – 23/05/2023 23:00 – 07:00		41.3	77.1	21.0	36.9	30.0
Weekend Daytime 07:00 - 23:00	32 hours	20/05/2023 – 21/05/2023 07:00 – 23:00		47.8	88.7	29.3	48.5	40.0
Weekend Night-time 23:00 – 07:00	16 hours	20/05/2023 – 21/05/2023 23:00 – 07:00		40.5	64.3	25.1	38.6	28.0

4.3 Representative Background Noise Levels

Using the data collected during the baseline survey, representative background noise levels have been derived for all receptor locations presented in Figure 3.1. Table 4.3 presents the representative background noise levels considered appropriate for the existing sensitive receptors within the area (the lower of the respective daytime and evening measurements have been used to represent daytime noise levels, where appropriate).

Table 4.3: Representative Background Noise Levels (All Receptors)

Receptors	Monitoring Location	Time Period	Representative Background Noise Level ($L_{A90,T}$ dB)*
R01 and R02 and R10	LT1	Daytime (07:00 – 23:00)	40
		Night-time (23:00 – 07:00)	26
R03, R04, R05 and R06	LT3	Daytime (07:00 – 23:00)	40
		Night-time (23:00 – 07:00)	27
R07, R08 and R09	LT2	Daytime (07:00 – 23:00)	40
		Night-time (23:00 – 07:00)	28
*Lowest $L_{A90,T}$ value selected from either Weekday or Weekend.			

The representative noise levels presented in Table 4.3 have been used to inform the assessment presented in Section 5.0.

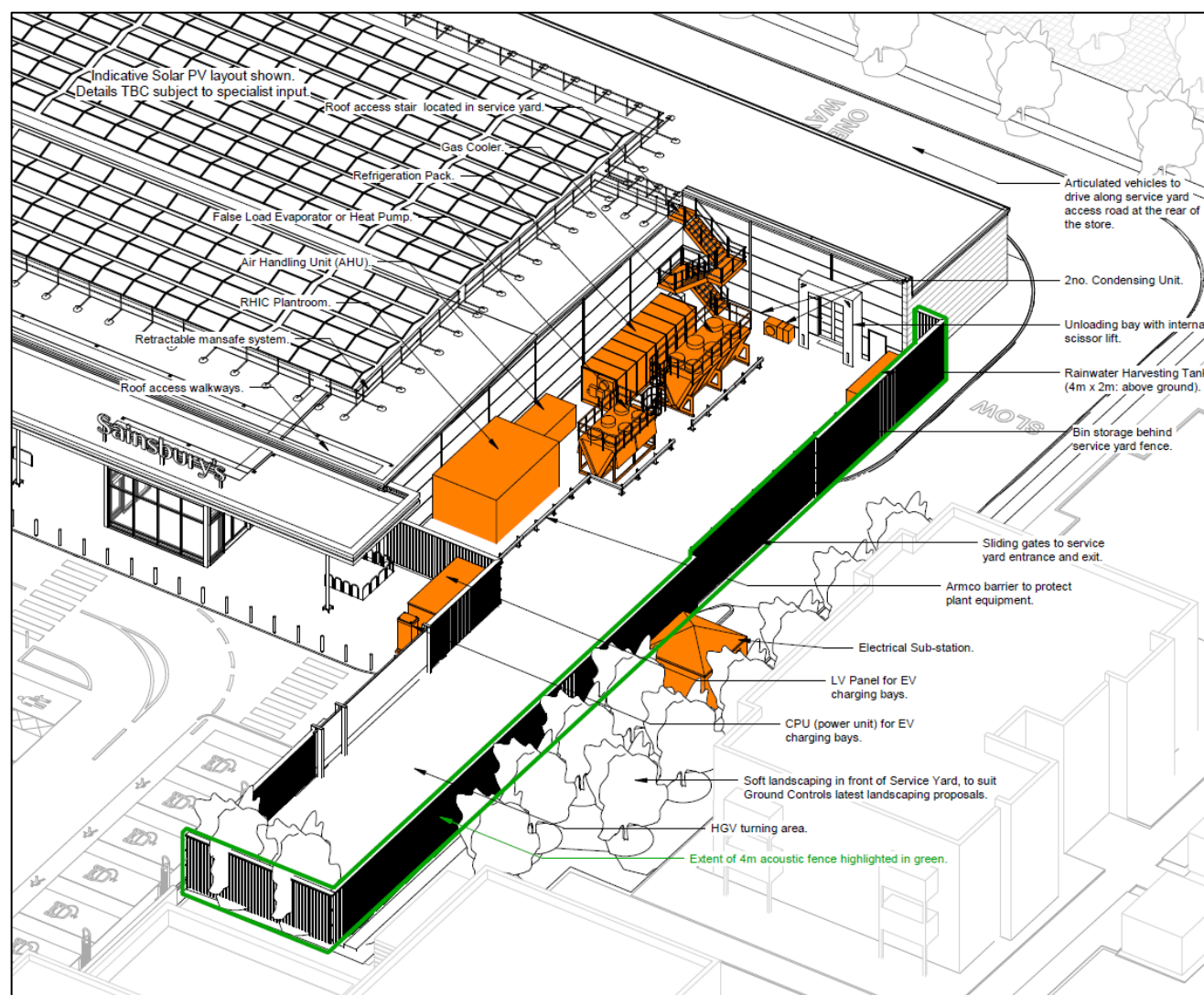
5.0 Assessment of Effects

5.1 Operational Phase

5.1.1 Embedded Mitigation

The proposed development is inclusive a 4.0m barrier and moveable gate along the southern boundary of the service yard with approximate length of ~70 m, as was designed in the previous iteration of this report, which was approved within the decision notice as part of planning application submitted to Wokingham Borough Council (application number: 232927). The specification of the barrier/gates will be robust with no gaps and a minimum density of 10 kg/m². Figure 5.1 shows the location of the barrier

Figure 5.1: Indicative Barrier Location



Not to scale

5.1.2 Building Services Plant Noise Assessment

This assessment has been undertaken to assess the noise impact from the proposed refrigeration plant and substation at the development. The assessment compares the worst-case levels associated with the relocating of the substation (which can be found in Figure 5.1.) and BSP and refrigeration plant with the existing measured average background noise level L_{A90} at the closest sensitive receptors. It is considered that the plant items will have identifiable on/off conditions, with many items operating at varying loads. Therefore, an intermittency correction penalty of +3 dB has been applied to all receptors (as shown in Table 3.5).

Table 5.1: BS4142 Assessment

Location	Existing Measured Background L_{A90}		Noise rating level from plant		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R01	40	26	13	13	-28	-14
R02	40	26	18	18	-22	-8
R03	40	28	19	19	-21	-9
R04	40	28	28	28	-12	+0
R05	40	28	34	34	-7	+6
R06*	40	N/A	10	N/A	-30	N/A
R07	40	27	6	6	-34	-21
R08	40	27	11	11	-29	-16
R09	40	27	12	12	-28	-15
R10	40	26	12	12	-28	-14

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

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

* R06 is a school and not typically occupied at night-time.

BS 4142 does not define 'low' in the context of background sound levels or rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30dB $L_{A90,T}$ and low rating levels as being less than about 35 dB $L_{Ar,T}$.

BS 4142 does not indicate how the initial estimate of impact should be adjusted when background and rating levels are low, only that the absolute levels may be more important than the difference between the two values. Where the background levels are low, the

absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values (existing and proposed noise rating levels).

As demonstrated within Table 5.1, the results of the assessment indicate that the BS4142 Noise Rating Levels at sensitive façades of the existing noise sensitive properties are at or below the background during the daytime, however during the night-time, the worst-case sensitive receptor is +6dB above the background. As such, daytime values fall within a No Observed Adverse Effect Level (NOAEL), with night-time exceedances predicted, this falls within a Significant Observed Adverse Effect Level (SOAEL). However, due to the low background levels during the night-time, it is considered that a combined noise intrusion assessment utilising BS8233 is considered more appropriate and has been undertaken below.

5.1.3 Combined Noise Intrusion Assessment

Internal noise levels at sensitive receptor locations, from all noise sources associated with the proposed development (including HGV movements, loading/unloading events, car parking and refrigeration plant), have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of double glazing with a sound reduction of 30 dB R_{w+Ctr} has been used. Results of the noise intrusion assessment for average daytime and night-time noise levels are presented within Tables 5.2 and 5.3 respectively, with daytime and night-time noise levels presented illustratively within Figures 5.1 & 5.2.

Table 5.2: Daytime Noise Intrusion Levels $L_{Aeq,1hour}$

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R01	39.0	24.0	9.0	35
R02	44.8	29.8	14.8	35
R03	40.6	25.6	10.6	35
R04	46.6	31.6	16.6	35
R05	50.5	35.5	20.5	35
R06	29.1	14.1	0.0	35
R07	37.3	22.3	7.3	35
R08	39.9	24.9	9.9	35
R09	42.2	27.2	12.2	35
R10	42.1	27.1	12.1	35

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

Table 5.3: Night-time Noise Intrusion Levels $L_{Aeq,15mins}$

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R01	36.7	21.7	6.7	30
R02	40.1	25.1	10.1	30
R03	37.0	22.0	7.0	30
R04	41.0	26.0	11.0	30
R05	36.5	21.5	6.5	30
R07	36.8	21.8	6.8	30
R08	39.6	24.6	9.6	30
R09	42.0	27.0	12.0	30
R10	41.8	26.8	11.8	30

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

As demonstrated within Tables 5.2 and 5.3 above, predicted noise levels are below the BS 8233 criteria at all receptors across both daytime and night-time apart from R05 during the daytime. An exceedance of 0.5dB is predicted to occur at R05, however, this is regarded as a minor exceedance when considering deliveries will occur for approximately 2-3 hours out of the assessed 16hour period. Therefore, it can be considered that all receptors will fall within the Lowest Observed Adverse Effect Level (LOAEL). These results are 2.2dB lower than those predicted in the previous reserved matters noise report, which was approved within the decision notice as part of planning application submitted to Wokingham Borough Council (application number: 232927). Suggesting the relocating of the substation has no material impact on the closest sensitive receptors.

Figure 5.2: Daytime Noise Contour Plot (Grid Height: 1.5m)

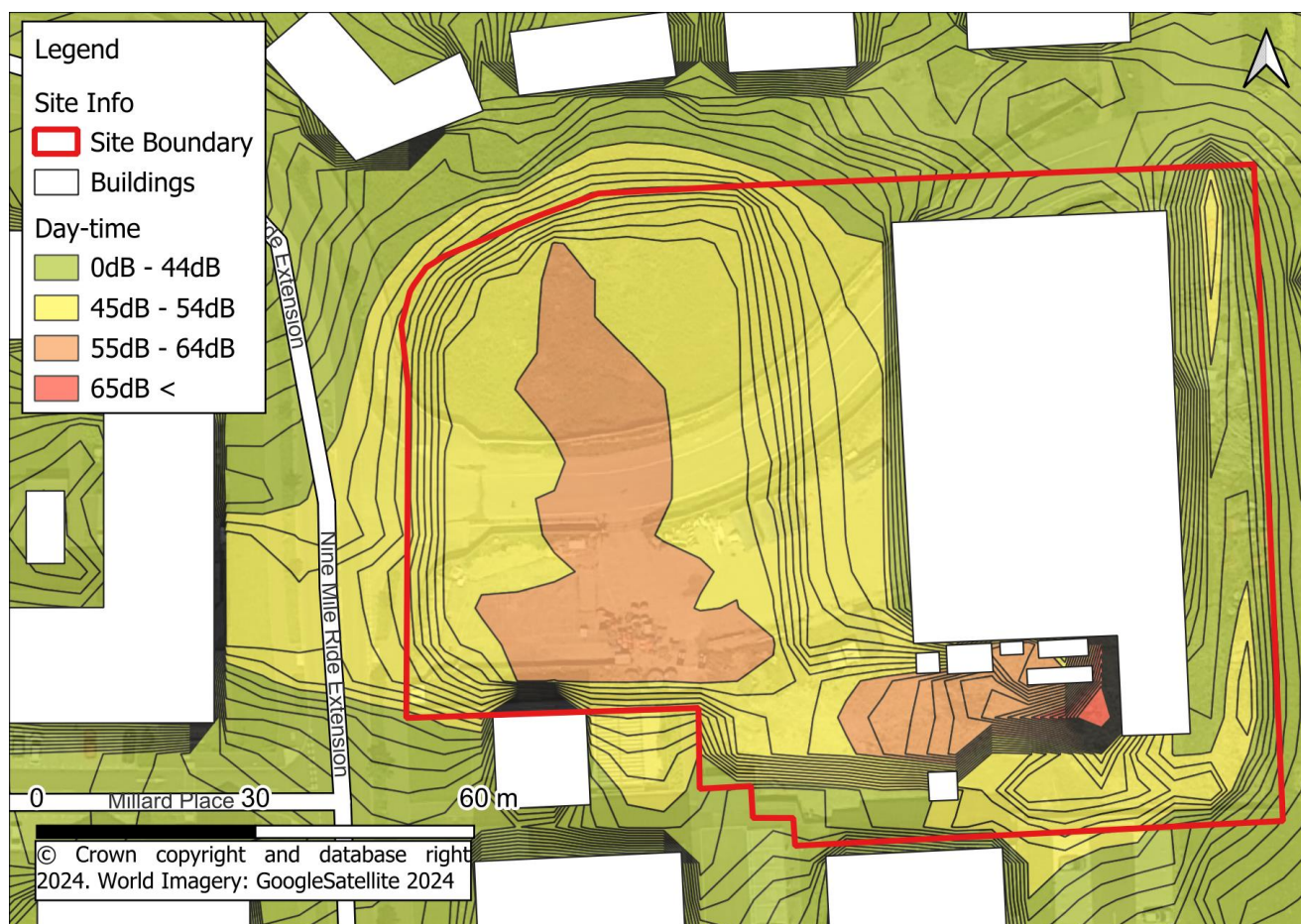


Figure 5.3: Night-time Noise Contour Plot (Grid Height: 4.0m)



6.0 Conclusion

This report presents the findings of a noise assessment to support a non-material amendment to relocate the substation for a proposed retail food store at Arborfield, Nine Mile Ride Extension, Reading, RG2 9GB.

This report considers the effect of relocating the proposed substation to the southern boundary of the site and the cumulative impact of the proposed site activities including plant noise and delivery activity on the nearest residential receptors.

Due to the low background levels ($L_{A90,T}$), the assessment against BS4142 criteria was not considered an appropriate test for the proposed development. The combined operational noise levels (including HGV activities for the daytime and building services and refrigeration plant, including the relocated substation, for both daytime and night-time) from all proposed noise sources associated with the Site were assessed against WHO/BS 8233 criteria.

With the embedded mitigation in place, the daytime and night-time internal noise criteria set out in WHO/BS 8233 is achieved. Therefore, during the daytime and night-time, noise levels at all receptors are predicted to result in a Lowest Observed Adverse Effect (LOAEL).

It is considered there is no material change between the already approved scheme and the new scheme and that the effect of moving the sub-station has no material impact on the nearest sensitive receptors.

The NPPF provides test points against which the proposed development has been assessed. Considering these points, the following conclusions can be drawn:

NPPF paragraphs 191 and 194

Based upon the assessments presented, it is considered that the development does not adversely affect or put sensitive receptors at risk from noise pollution, and no significant adverse effects are predicted to occur.

NPPF paragraph 193

Considering the existing use of the site and wider development 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 below the Lowest Observed Adverse Effect Level (LOAEL) and therefore the development will have a low impact in relation to noise.

Appendices

Appendix A – Acoustic Terminology

Acoustic Terminology

- 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 16-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.

Appendix B – References

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[illegible]