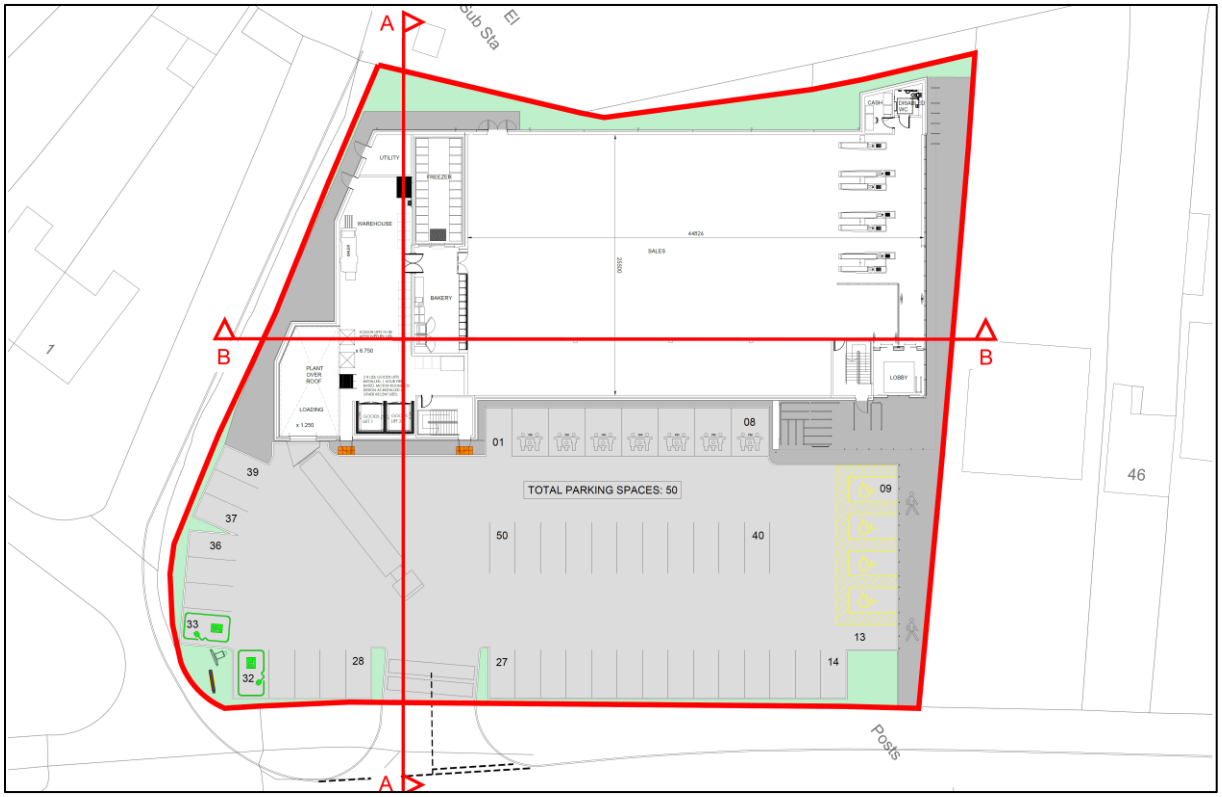
Proposed Supermarket, Mumbles Road, Swansea, SA3 5AT

Noise Assessment

784-B027946



Prepared on Behalf of Lidl Great Britain Ltd.

September 2021

Tetra Tech Limited. Registered in England number: 01959704
Registered Office: 3 Sovereign Square, Sovereign Street, Leeds, United Kingdom, LS1 4ER

Document control

Document:	**Noise Assessment**
Project:	Mumbles Road, Swansea
Client:	Lidl Great Britain Ltd.
Job Number:	784-B027946
File Origin:	O:\Acoustics Air Quality and Noise\Fee Earning Projects\784-B027946

Revision:	**1**	**Status:**	**First Issue**
Date:	9th September 2021		
Prepared by: David Fink Environmental Technician	**Checked by:** Graham Davis Principal Consultant	**Approved By:** Nigel Mann Director	
Description of revision:			

Revision:	**2**	**Status:**	**Second Issue**
Date:	15th September 2021		
Prepared by: David Fink Environmental Technician	**Checked by:** Graham Davis Principal Consultant	**Approved By:** Nigel Mann Director	
Description of revision: Minor updates and revised site plans			

Revision:		**Status:**	
Date:			
Prepared by:	**Checked by:**	**Approved By:**	
Description of revision:			

CONTENTS

1.0 INTRODUCTION

1.0 Purpose of this Report

This report presents the findings of a noise impact assessment undertaken for a proposed Lidl store at Mumbles Road, Swansea. This report considers the potential noise impact of the following noise sources:

- Building Services Plant
- HGV movements
- HGV unloading/loading
- Customer Car parking
- Customer Noise

A description of the existing noise environment in and around the site is provided. The noise levels from the facility have been predicted at local representative receptors using CADNA noise modelling software which incorporates ISO 9613 methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and Report Conditions are presented in Appendix B.

1.1 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. Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. They are supplemented by a series of Technical Advice Notes (TANs), Technical Advice Note 11 which relates to Noise, Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. The primary objective of PPW is 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, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.

Paragraph 6.7.5 says *"In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that*

solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable."

Paragraphs 6.7.6 and 6.7.7 say *"In proposing new development, planning authorities and developers must, therefore:*

address any implication arising as a result of its association with, or location within, air quality, noise action planning priority areas or areas where there are sensitive receptors;

• not create areas of poor air quality or inappropriate soundscape; and

• seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

Paragraph. 6.7.24 says *"The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport-related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided, and assessment undertaken."*

TAN 11 provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.

1.1.1 Swansea City Local Development Plan (LDP)

Swansea City LPD Policy RP 2 new A presents the following policy with regard to noise:

"*Where development could lead to exposure to a source of noise pollution it must be demonstrated that appropriate mitigation measures will be implemented and incorporated into the design of the development to minimise the effects on existing and future occupants.*

Noise sensitive developments will not be permitted unless effective/appropriate mitigation is carried out to prevent exposure to existing noise generating uses Development which would cause or result in a significant increase in levels of environmental noise in an identified Noise Action Planning Priority Area, or would have unacceptable impacts on an identified Quiet Area or the characteristics of tranquillity that led to the designation of a Quiet Area, will not be permitted".

1.2 Acoustic Consultants' Qualifications, Professional Memberships

The lead project Acoustic Consultant is David Fink. The report has been checked by Graham Davis and verified by Nigel Mann. Relevant qualifications, membership and experience are summarised below.

Table 1.2 Acoustic Consultants' Qualifications & Experience

Name	Education	Institute of Acoustics Post Graduate Diploma in Acoustic and Noise Control (Pass Date)	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
David Fink	BEng 2016	-	March 2017	June 2017	-
Graham Davis	BA 2008	Nov 2013	Sep 2011	Jan 2014	-
Nigel Mann	BSc 1997 MSc 1999	Nov 2001	Nov 1998	Nov 2001	Jul 2005

2.0 ASSESSMENT CRITERIA

2.1 BS 4142 Assessment Criteria

A comparison of noise from the proposed development with existing background noise levels has been undertaken with reference given to the guidance provided within BS 4142:2014+A1:2019, '*Methods for rating and assessing industrial and commercial sound'.* This standard sets down the following guidelines for assessing the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes, based upon difference between the measured background noise level and the rating level of the source under consideration. In particular, the standard states:

"a) Typically, the greater the difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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."

In addition to noise levels the significance of the impact depends on the individuals affected and to the acoustic features present which may be assessed subjectively or objectively as appropriate. Section 9 of BS 4142:2014+A1:2019 recommends that correction factors be applied to the specific noise level if the noise contains certain acoustic features such as:

- tonality
- impulsivity
- other sound characteristics which are readily distinctive
- intermittency

It should be noted that the significance of an industrial sound source depends upon both the margin by which the rating level exceeds the background sound level and the overall context in which the sound occurs.

2.2 Noise Intrusion Assessment Criteria

The criteria in BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' has been chosen as a suitable method for determining an adequate level of noise control to ensure that noise levels within existing properties and proposed office spaces of the development meet the following recommended noise level targets; these targets are:

Living rooms	L_{Aeq} =	35	
Bedrooms	L_{Aeq} =	30	L_{Amax}, night-time = 45 dB*
Offices	L_{Aeq} =	50	

*Derived from World Health Organisation Guidelines for Community Noise, 1999

Typical façades, regardless of construction, will offer around 15 dB sound insulation when windows are open. For the purposes of this assessment, the maximum external noise level from the source under consideration will be 50 dB(A) during the daytime, and 45 dB(A) during the night-time to ensure a maximum daytime L_{Aeq} of 35 dB, and a maximum night-time L_{Aeq} of 30 dB within habitable rooms are achieved.

These levels are also comparable to the World Health Organisation Recommendations in their 'Guidelines for Community Noise' (1999) publication which states that outdoor levels of 45 dB $L_{Aeq,T}$ for open windows at night or internal levels of 30 dB $L_{Aeq,T}$ are guideline values to prevent sleep disturbance. Similarly, outdoor levels of 60 dB L_{Amax} for open windows at night or internal levels of 45 dB L_{Amax} are also maximum guideline values to prevent sleep disturbance.

3.0 ASSESSMENT METHODOLOGY

3.1 Noise Modelling Methodology

The development has been assessed using three-dimensional noise modelling of source noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically.

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

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Building heights – around site	Tt Observations	8 m height for two storey residential properties, with 3 m per additional storey and 4 m for Bungalows.
Barrier heights	Tt Observations	Existing garden fences at a height of 1.8m have been included within the modelling, which are based on available drawings and site observations.
Receptor positions	Tt	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties. 4.0 m height for model grid.
Proposed Plans	One Design Architectural Services	Drawing No: 19211-AD-050-Rev B Dated: Sep 2021

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

3.2 Model Input Data

Building Services Plant (BSP)

Point sources have been used in the model to represent potential plant associated with the Development. The point sources have been located as outlined in the Proposed Site Plan. The maximum sound pressure levels of the point sources at 1 and 3 metres were estimated in the model as a conditional maximum level that the proposed noise levels at nearby receptors were predicted to meet the BS 4142 assessment criteria. Noise emission limits have been specified to ensure that plant noise rating levels (including a + 2 dB correction for potential tonal aspects of the noise source) are at or below existing daytime and night-time background noise levels.

Delivery Noise Data

Noise of a delivery event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 5m distance even with the same vehicle type. Similarly, individual events using the same vehicle and at the same location have been recorded to vary by as much as 14 dB.

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

HGV Unloading Event Noise Data

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

Daytime $L_{Aeq\ (1hour)} = 10\log(1/60)(2\ mins \times 10^{0.1x67.5dB} + 30\ mins \times 10^{0.1x76.8dB} + 1mins \times 10^{0.1x67.5dB})$

= 73.8 dB at 3 m distance

15 minutes at L_p 76.8 dB at 3 m distance (vehicle unloading)

Night-time $L_{Aeq\ (15mins)} = 10\log(1/15)(15\ mins \times 10^{0.1x76.8dB})$

= 76.8 dB at 3 m distance

Maximum Noise Level

L_{Amax} = 89.4 dB at 3m distance

HGV Movement Noise Data

Worst-case noise-levels have been calculated using this data to represent a worst-case in any 1-hour daytime (07:00 – 23:00) period and 15-minute period during the night-time (23:00 – 07:00). Contributions from an HGV manoeuvring within the site has been represented as a point source in the model.

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

Daytime $L_{Aeq\ (1hour)} = 10\log(1/60)(20\ seconds \times 10^{0.1x67.5dB})$

= 44.9 dB at 3 m distance

Night-time $L_{Aeq\ (15mins)} = 10\log(1/15)(20\ seconds \times 10^{0.1x67.5dB})$

= 51.0 dB at 3 m distance

Maximum Noise Level

L_{Amax} = 73.0 dB at 3m distance

Car Park Noise Data

Noise levels from proposed car parking areas have been determined based upon observations within a similarly sized store unit during a busy week-day period. L_{Aeq} noise levels, as follows, are modelled as an area source for the car parking area.

Daytime $L_{Aeq(1hour)}$ Noise Level = 54.0 dB at 1.5m height

Customer Noise

Noise from pedestrians using a similarly sized retail store have been measured at the site during store opening hours. The noise level data and calculations below have been used in the model to assess noise from these sources at nearby noise sensitive properties.

Observations were made as to worst-case numbers of pedestrian movements associated with the store (including vocalisations and use of the use of a cash machine) on a busy Thursday morning 08:00 – 09:00. Based on these observations worst case assumptions of 82 customer pedestrian movements per hour have been made. Each movement was estimated to be a maximum duration of 5 seconds. The following calculations determine the $L_{Aeq,1hour}$ based on the above assumptions and noise measurements taken at the site.

82 x 5 seconds (410 secs) at L_p 42.0 dB at 3 m distance (pedestrian pass-by)

Daytime $L_{Aeq(1\ hour)} = 10\log(1/3600)(410\text{secs} \times 10^{0.1 \times 42.0\text{dB}})$

= 32.6 dB at 3 m distance

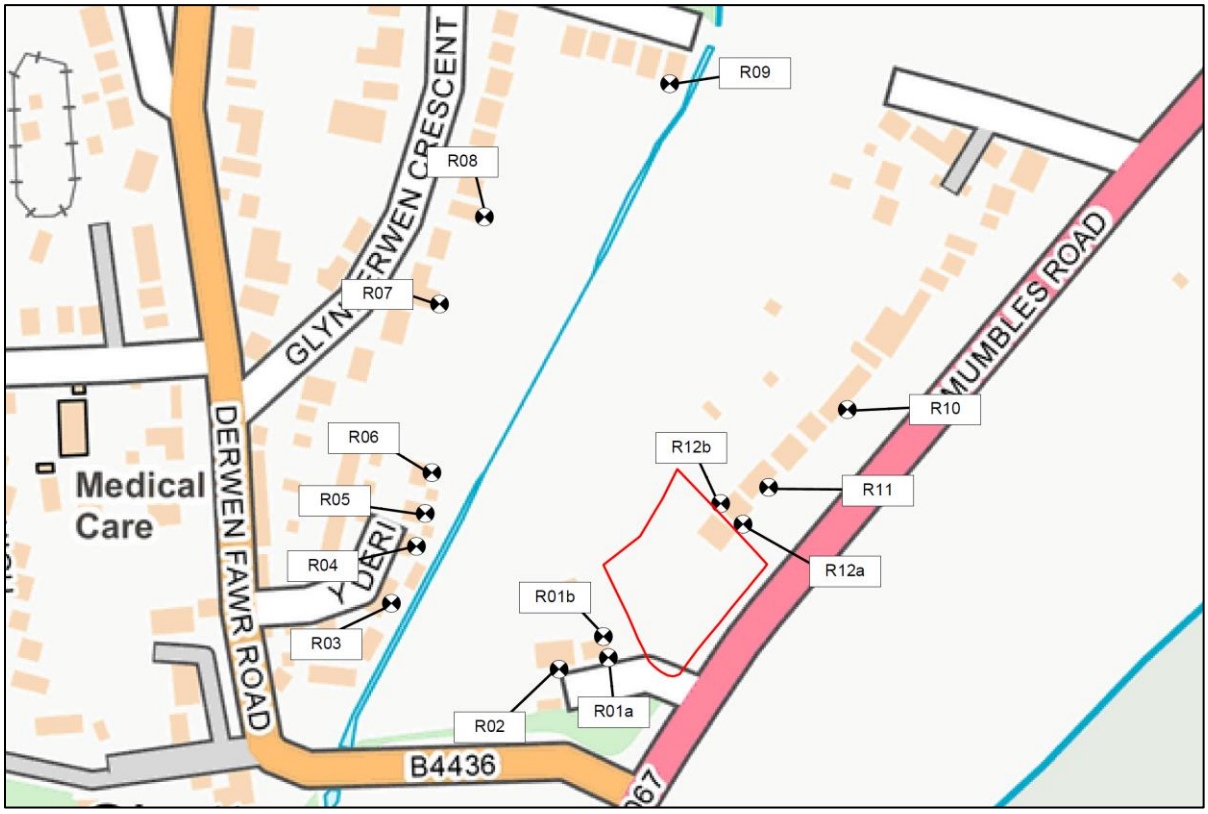
3.3 Sensitive Receptors

Table 3.2 below summarises receptor locations that have been selected to represent worst-case residential receptors with respect to direct noise from the site. The receptor positions are shown illustratively on Figure 3.1 below.

Table 3.2 Sensitive Receptor Locations

Ref.	Description	Use Classification	Height (m)
R01a/b	1 Glyn Crescent	Residential	1.5/4.0
R02	2 Glyn Crescent	Residential	1.5/4.0
R03	12 Y Deri	Residential	1.5/4.0
R04	18 Y Deri	Residential	1.5/4.0
R05	20 Y Deri	Residential	1.5/4.0
R06	22 Y Deri	Residential	1.5/4.0
R07	23 Glynderwen Crescent	Residential	1.5/4.0
R08	15 Glynderwen Crescent	Residential	1.5/4.0
R09	47 Ashleigh Road	Residential	1.5/4.0
R10	34 Mumbles Road	Residential	1.5/4.0
R11	44 Mumbles Road	Residential	1.5/4.0
R12	48 Mumbles Road	Residential	1.5/4.0

Figure 3.1 Sensitive Receptor Locations



Not to scale
OS Licence No. AL553611

4.0 NOISE SURVEY

4.1 Noise Survey Methodology

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

Rion NL-52	Environmental Noise Analyser	s/n	253702
Rion NL-52	Environmental Noise Analyser	s/n	264490
Rion NL-52	Environmental Noise Analyser	s/n	1276552
Rion NC-75	Sound Calibrator	s/n	35270131

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 0.0 dB was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

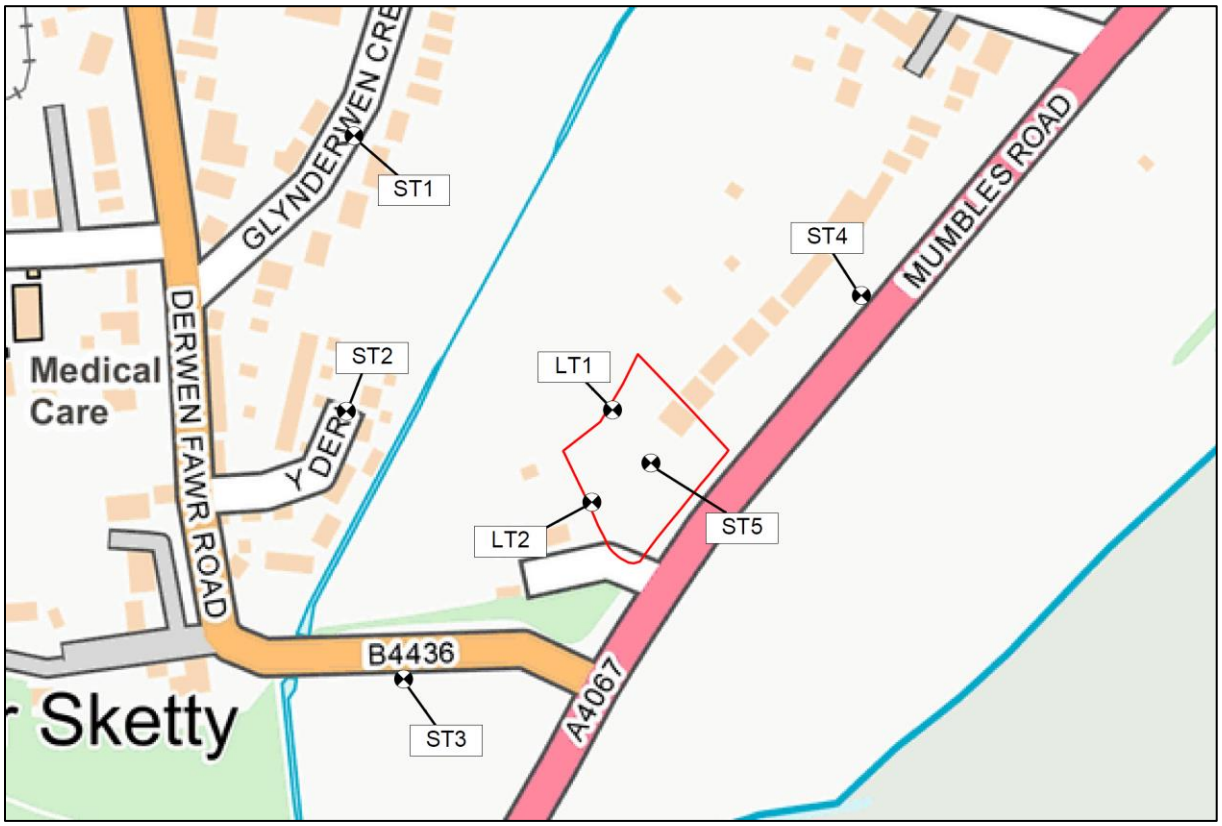
A baseline monitoring survey was undertaken at seven locations (as specified in the following table and Figure 4.1 below) from Thursday 15th July 2021 to Wednesday 21st July 2021. Attended short term measurements were undertaken at five locations during day, evening and night-time periods with two additional locations being measured unattended over a 142-hour period. The raw data collected from the long-term monitoring are 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} at all times during the survey, with a predominant variable wind direction during the survey.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	North-western boundary of the site
LT2	South-western boundary of the site
ST1	North-west of the site, 19 Glynderwen Crescent
ST2	West of the site, at north end of Y Deri
ST3	South-west of the site, Derwen Fawr Road, adjacent to Blackpill car park
ST4	North-east of the site, 30 Mumbles Road
ST5	In the centre of the site

Figure 4.1 Noise Monitoring Locations



Not to scale
OS Licence No. AL553611

4.2 Noise Survey Results

The dominant noise sources found in the area is: road traffic noise from Mumbles Road. Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	21/07/2021 09:53	23	0 – 1	SSE	1	Background road traffic noise
Day ST2	21/07/2021 10:12	23	0 – 1	SSE	1	Background road traffic noise, light aircraft above
Day ST3	21/07/2021 10:31	23	0 – 1	SSE	1	Road traffic noise Mumbles Road, and car park activity
Day ST4	21/07/2021 10:51	23	0 – 1	SSE	1	Road traffic noise Mumbles Road
Day ST5	21/07/2021 11:07	23	0 – 1	SSE	1	Road traffic noise Mumbles Road

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Evening ST1	20/07/2021 20:53	23	0 – 1	NW	1	Background road traffic noise
Evening ST2	20/07/2021 21:12	23	0 – 1	NW	1	Background road traffic noise
Evening ST3	20/07/2021 21;29	23	0 – 1	NW	1	Light road traffic noise Derwen Fawr Road
Evening ST4	20/07/2021 22:06	23	0 – 1	NW	1	Road traffic noise Mumbles Road
Evening ST5	20/07/2021 21:49	23	0 – 1	NW	1	Road traffic noise Mumbles Road
Night ST1	20/07/2021 23:00	20	0 – 1	N	1	Background road traffic noise
Night ST2	20/07/2021 23:17	20	0 – 1	N	1	Background road traffic noise
Night ST3	20/07/2021 23:34	20	0 – 1	N	1	Light road traffic noise Derwen Fawr Road
Night ST4	21/07/2021 00:10	20	0 – 1	N	1	Road traffic noise Mumbles Road
Night ST5	20/07/2021 23:52	20	0 – 1	N	1	Road traffic noise Mumbles Road

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

Table 4.3 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	62 Hours	15/07/2021 - 21/07/2021 13:34 – 11:29	LT1	52.2	89.1	33.1	53.7	46
Weekday Night-time 23:00 – 07:00	32 hours	15/07/2021 - 21/07/2021 23:00 - 07:00		45.8	79.8	21.9	45.6	30
Weekend Daytime 07:00 - 23:00	32 Hours	17/07/2021 - 18/07/2021 07:00 - 23:00		52.1	88.4	32.6	53.5	45
Weekend Night-time 23:00 – 07:00	16 hours	17/07/2021 - 18/07/2021 23:00 - 07:00		46.3	83.0	26.3	47.7	36
Weekday Daytime 07:00 - 23:00	63 Hours	15/07/2021 - 21/07/2021 13:19 - 23:00	LT2	53.8	90.5	34.0	55.2	48
Weekday Night-time 23:00 – 07:00	32 hours	15/07/2021 - 21/07/2021 23:00 - 07:00		47.1	83.7	24.9	47.3	32
Weekend Daytime 07:00 - 23:00	32 Hours	17/07/2021 - 18/07/2021 07:00 - 23:00		54.6	95.2	34.1	54.9	46
Weekend Night-time 23:00 – 07:00	16 hours	17/07/2021 - 18/07/2021 23:00 - 07:00		47.5	83.4	30.0	48.9	38
Daytime 07:00 - 19:00	15 Mins	21/07/2021 09:53	ST1	42.3	63.0	34.5	43.6	36.7
	15 Mins	21/07/2021 10:12	ST2	41.3	60.9	31.4	44.0	34.8
	15 Mins	21/07/2021 10:31	ST3	63.7	86.3	44.6	65.6	49.9
	15 Mins	21/07/2021 10:51	ST4	67.1	88.7	46.6	70.4	56.2
	15 Mins	21/07/2021 11:07	ST5	54.8	70.6	40.8	57.6	48.6
Evening 19:00 - 23:00	15 Mins	20/07/2021 20:53	ST1	38.9	56.8	33.2	39.4	34.8

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)
	15 Mins	20/07/2021 21:12	ST2	37.4	54.4	33.3	39.2	35.2
	15 Mins	20/07/2021 21;29	ST3	50.4	68.4	36.1	53.4	41.5
	15 Mins	20/07/2021 22:06	ST4	65.6	78.4	42.6	70.8	50.7
	15 Mins	20/07/2021 21:49	ST5	55.7	73.6	39.3	57.9	45.8
Night-time 23:00 - 07:00	15 Mins	20/07/2021 23:00	ST1	43.6	66.4	33.3	41.8	37.0
	15 Mins	20/07/2021 23:17	ST2	37.9	53.0	30.7	39.9	34.7
	15 Mins	20/07/2021 23:34	ST3	47.6	75.8	33.0	46.1	37.3
	15 Mins	21/07/2021 00:10	ST4	62.5	88.0	35.3	64.5	39.4
	15 Mins	20/07/2021 23:52	ST5	50.4	64.9	35.8	54.2	39.5

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

5.0 ASSESSMENT OF EFFECTS

5.1 Proposed Building Service Plant Noise Assessment

This assessment has been undertaken in order to establish the maximum external noise levels from the proposed building services plant (BSP). The assessment compares the predicted worst-case breakout noise levels from proposed plant with the existing measured average background noise L_{A90} at the closest proposed and existing residential receptors. In accordance with BS 4142 section 9.2, a + 2 dB correction has been added to create the Plant 'Rating Level at Receptor' to account for any tonality and intermittency associated with the proposed plant.

A series of predictions were made by defining different sound power levels at point sources. When the sound pressure levels are set as shown in Table 5.1 (which are considered to be achievable), the noise rating levels at all the existing receptors are predicted to be at or below existing background levels when the plant is cumulatively operating during the daytime and night-time as shown in Table 5.2. All predicted rating noise levels fall within the limits outlined within pre-application advice for the site.

The indicative locations of the plant are shown in figure 5.1 below.

Figure 5.1 Indicative BSP Locations

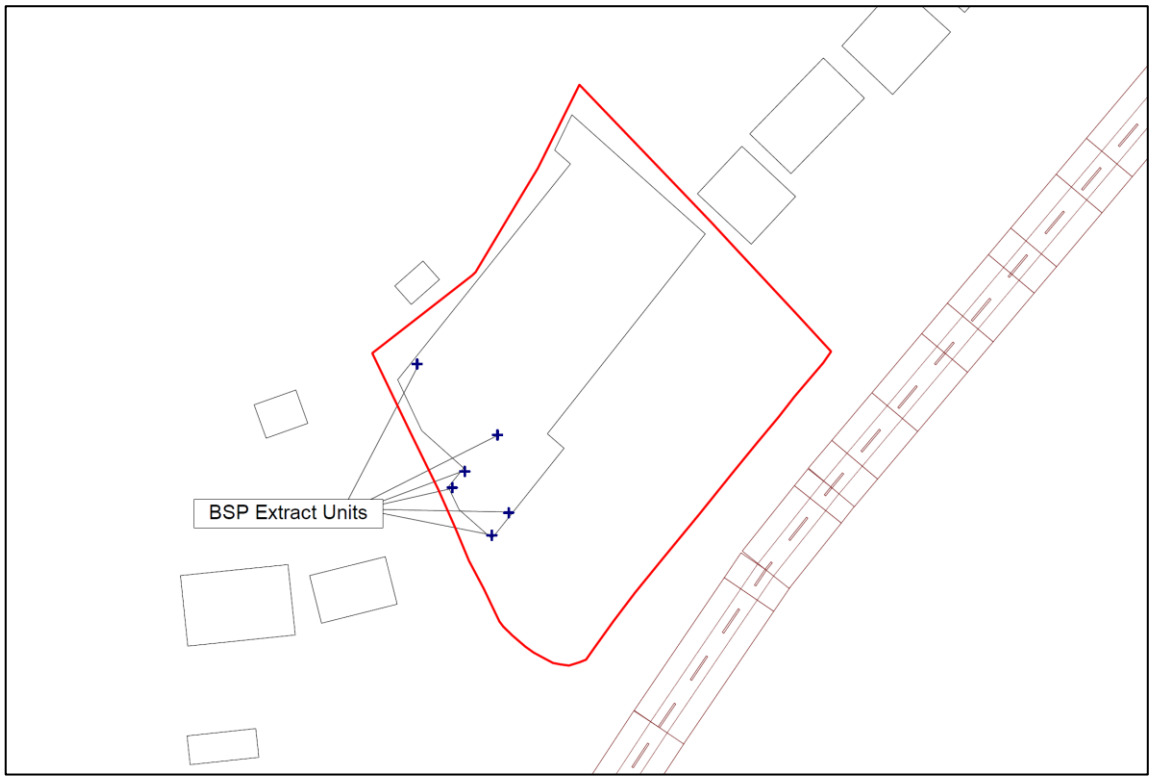


Table 5.1 Proposed Emission Limits for BSP as Modelled

BSP Location	Noise Emission Limit - Sound Pressure Level (Per Unit)	
	Daytime	Night-time
BSP x 6	64.5 dB(A) at 1m OR 54.9 dB(A) at 3m	49.5 dB(A) at 1m OR 39.9 dB(A) at 3m

Table 5.2 BS 4142 Assessment for Proposed Plant

Ref	Existing Measured Average Background L_{A90}		Noise rating level from plant (with +2 dB Correction)		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R01a	45	30	40	25	-5	-5
R01b	45	30	45	30	0	0
R02	45	30	30	15	-15	-15
R03	45	30	30	15	-15	-15
R04	45	30	31	16	-14	-14
R05	45	30	31	16	-14	-14
R06	45	30	30	15	-15	-15
R07	45	30	25	10	-20	-20
R08	45	30	23	8	-22	-22
R09	45	30	21	6	-24	-24
R10	45	30	25	10	-21	-21
R11	45	30	28	13	-17	-17
R12a	45	30	32	17	-13	-13
R12b	45	30	25	10	-20	-20

5.2 Operational Noise Intrusion Assessment

Internal noise levels, at nearby sensitive receptors from all sources of potential noise associated with the proposed development (including HGV movements, loading/unloading events, customer movements and car parking) have been assessed at existing properties with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of single glazing with a sound reduction of 30 dB has been used.

Table 5.3 Daytime Noise Intrusion Levels L_{Aeq}

Location	Description	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01a	1 Glyn Crescent	50.6	35.6	20.6	35
R01b	1 Glyn Crescent	48.6	33.6	18.6	35
R02	2 Glyn Crescent	38.5	23.5	8.5	35
R03	12 Y Deri	32.8	17.8	2.8	35
R04	18 Y Deri	31.4	16.4	1.4	35
R05	20 Y Deri	28.3	13.3	0.0	35
R06	22 Y Deri	26.0	11.0	0.0	35

Location	Description	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R07	23 Glynderwen Crescent	24.4	9.4	0.0	35
R08	15 Glynderwen Crescent	22.0	7.0	0.0	35
R09	47 Ashleigh Road	16.9	1.9	0.0	35
R10	34 Mumbles Road	34.2	19.2	4.2	35
R11	44 Mumbles Road	38.6	23.6	8.6	35
R12a	48 Mumbles Road	47.0	32.0	17.0	35
R12b	48 Mumbles Road	28.5	13.5	0.0	35

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

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

Location	Description	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01a	1 Glyn Crescent	57.5	42.5	27.5	30
R01b	1 Glyn Crescent	51.6	36.6	21.6	30
R02	2 Glyn Crescent	41.5	26.5	11.5	30
R03	12 Y Deri	34.9	19.9	4.9	30
R04	18 Y Deri	33.7	18.7	3.7	30
R05	20 Y Deri	30.9	15.9	0.9	30
R06	22 Y Deri	28.2	13.2	0.0	30
R07	23 Glynderwen Crescent	26.3	11.3	0.0	30
R08	15 Glynderwen Crescent	24.0	9.0	0.0	30
R09	47 Ashleigh Road	19.2	4.2	0.0	30
R10	34 Mumbles Road	42.2	27.2	12.2	30
R11	44 Mumbles Road	41.2	26.2	11.2	30
R12a	48 Mumbles Road	49.5	34.5	19.5	30
R12b	48 Mumbles Road	31.0	16.0	1.0	30

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

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

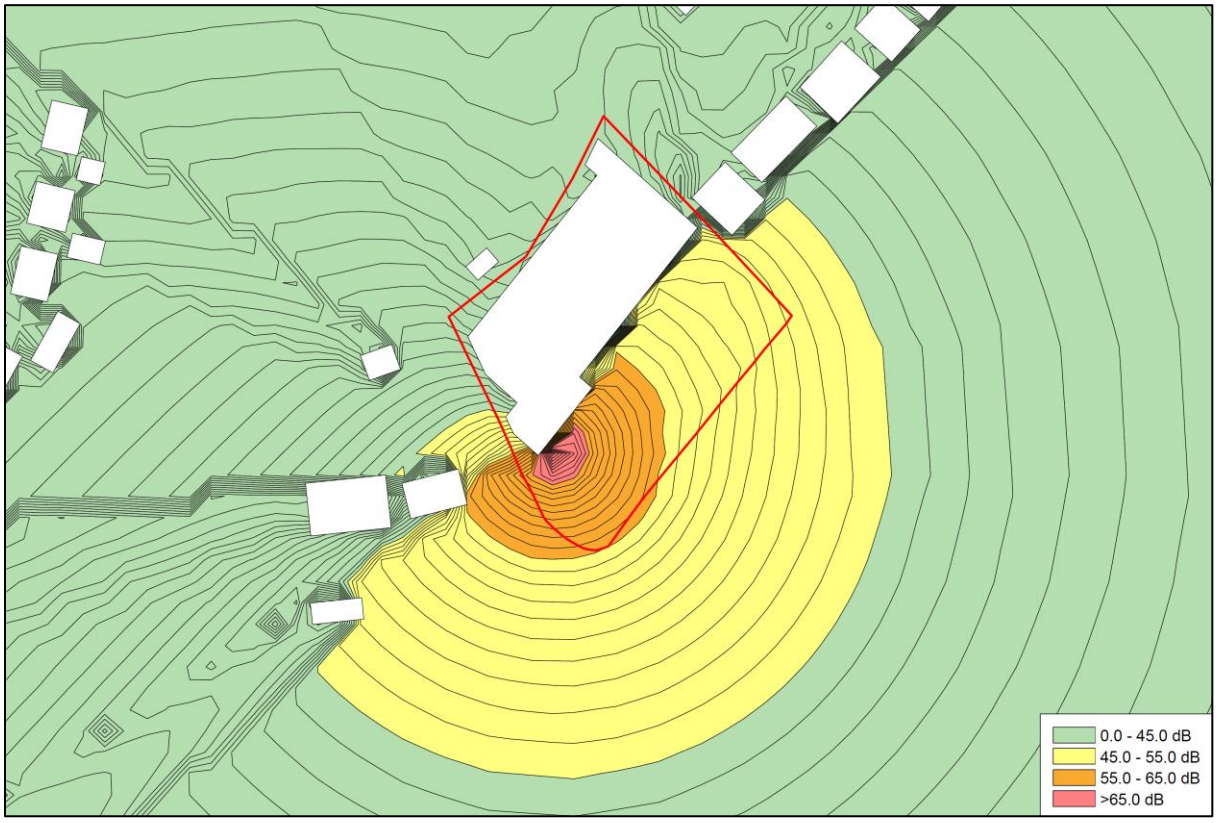
Location	Description	External L_{Amax} at 1m from facade	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria Internal L_{Amax}
R01a	1 Glyn Crescent	70.1	55.1	40.1	45
R01b	1 Glyn Crescent	64.1	49.1	34.1	45
R02	2 Glyn Crescent	53.9	38.9	23.9	45
R03	12 Y Deri	47.4	32.4	17.4	45
R04	18 Y Deri	46.1	31.1	16.1	45
R05	20 Y Deri	43.2	28.2	13.2	45
R06	22 Y Deri	40.6	25.6	10.6	45
R07	23 Glynderwen Crescent	39.0	24.0	9.0	45
R08	15 Glynderwen Crescent	36.5	21.5	6.5	45
R09	47 Ashleigh Road	31.4	16.4	1.4	45
R10	34 Mumbles Road	54.7	39.7	24.7	45
R11	44 Mumbles Road	53.1	38.1	23.1	45

Location	Description	External L_{Amax} at 1m from facade	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria Internal L_{Amax}
R12a	48 Mumbles Road	61.7	46.7	31.7	45
R12b	48 Mumbles Road	42.3	27.3	12.3	45

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

The assessment presented in the tables above demonstrate that internal L_{Aeq} and L_{Amax} noise levels within nearby dwellings from the proposed activities have the potential to exceed the target noise intrusion criteria at a number of existing receptors in a windows-open scenario, and therefore additional mitigation is outlined within Section 6.0.

Figure 5.1 Daytime Noise Contour Plot $L_{Aeq,1hour}$



Grid height 4m
Not to scale
OS Licence No. AL553611

6.0 MITIGATION

Following the assessments above, mitigation has been included to suitably reduce noise levels to below the target noise intrusion criteria at the closest sensitive receptors. Mitigation is provided in the form of a 4.0m and 2.5m acoustic barrier along the western boundary of the store car park, and a 2.0m acoustic barrier along the north-eastern boundary of the store car park. Tables 6.1 – 6.3 present the results of the Cumulative Noise Intrusion Assessment with the proposed mitigation in place.

Table 6.1 Daytime Noise Intrusion Levels L_{Aeq}

Location	Description	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01a	1 Glyn Crescent	42.5	27.5	12.5	35
R01b	1 Glyn Crescent	35.3	20.3	5.3	35
R02	2 Glyn Crescent	33.4	18.4	3.4	35
R03	12 Y Deri	22.7	7.7	0.0	35
R04	18 Y Deri	24.2	9.2	0.0	35
R05	20 Y Deri	23.2	8.2	0.0	35
R06	22 Y Deri	22.2	7.2	0.0	35
R07	23 Glynderwen Crescent	24.6	9.6	0.0	35
R08	15 Glynderwen Crescent	22.1	7.1	0.0	35
R09	47 Ashleigh Road	16.8	1.8	0.0	35
R10	34 Mumbles Road	32.2	17.2	2.2	35
R11	44 Mumbles Road	33.4	18.4	3.4	35
R12a	48 Mumbles Road	38.1	23.1	8.1	35
R12b	48 Mumbles Road	27.9	12.9	0.0	35

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

Table 6.2 Night-time Noise Intrusion Levels L_{Aeq}

Location	Description	External L_{Aeq} at 1m from facade	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria Internal L_{Aeq}
R01a	1 Glyn Crescent	44.1	29.1	14.1	30
R01b	1 Glyn Crescent	37.5	22.5	7.5	30
R02	2 Glyn Crescent	33.3	18.3	3.3	30
R03	12 Y Deri	23.7	8.7	0.0	30
R04	18 Y Deri	23.7	8.7	0.0	30
R05	20 Y Deri	24.2	9.2	0.0	30
R06	22 Y Deri	23.0	8.0	0.0	30
R07	23 Glynderwen Crescent	25.8	10.8	0.0	30
R08	15 Glynderwen Crescent	23.3	8.3	0.0	30
R09	47 Ashleigh Road	18.3	3.3	0.0	30
R10	34 Mumbles Road	33.8	18.8	3.8	30
R11	44 Mumbles Road	39.9	24.9	9.9	30
R12a	48 Mumbles Road	44.9	29.9	14.9	30
R12b	48 Mumbles Road	29.1	14.1	0.0	30

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

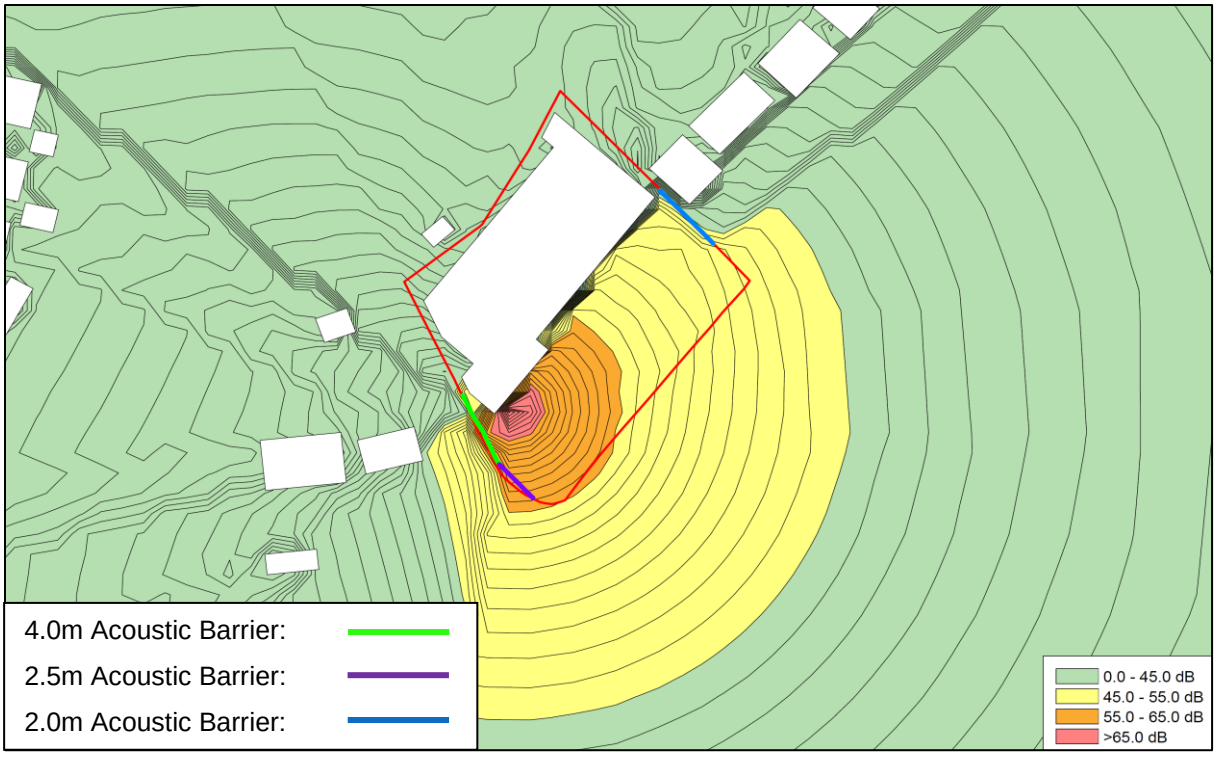
Table 6.3 Night-time Noise Intrusion Levels L_{Amax}

Location	Description	External L_{Amax} at 1m from facade	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria Internal L_{Amax}
R01a	1 Glyn Crescent	57.6	42.6	27.6	45
R01b	1 Glyn Crescent	50.7	35.7	20.7	45
R02	2 Glyn Crescent	46.5	31.5	16.5	45
R03	12 Y Deri	36.9	21.9	6.9	45
R04	18 Y Deri	36.9	21.9	6.9	45
R05	20 Y Deri	37.4	22.4	7.4	45
R06	22 Y Deri	36.2	21.2	6.2	45
R07	23 Glynderwen Crescent	39.0	24.0	9.0	45
R08	15 Glynderwen Crescent	36.5	21.5	6.5	45
R09	47 Ashleigh Road	31.4	16.4	1.4	45
R10	34 Mumbles Road	47.0	32.0	17.0	45
R11	44 Mumbles Road	53.1	38.1	23.1	45
R12a	48 Mumbles Road	58.1	43.1	28.1	45
R12b	48 Mumbles Road	42.3	27.3	12.3	45

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

As presented above, operational noise levels inclusive of mitigation fall below criteria during both the daytime and night-time assuming both a windows-open and windows closed-scenario. As such, operational noise levels are predicted to fall within the relevant WHO/BS:8233 criteria; therefore the proposed development is not expected to result in any significant adverse impacts at nearby dwellings.

Figure 6.1 Daytime Noise Contour Plot with Mitigation $L_{Aeq,1hour}$



Grid height 4m, Not to scale
OS Licence No. AL553611

7.0 CONCLUSIONS OF NOISE ASSESSMENT

This report presents the findings of a noise assessment undertaken in support of a planning application for a proposed Lidl store located at Mumbles Road, Swansea.

Baseline noise monitoring has been undertaken and the results of the baseline survey along with CadnaA noise propagation modelling have subsequently been used to establish maximum noise levels for proposed plant to meet the requirements of BS 4142.

Mitigation has been proposed in the form of a 2.0m noise barrier to the north-east of the site, and a hybrid 4.0m/2.5m noise barrier to the south of the site; the results of the assessment demonstrate that, inclusive of this mitigation, operational noise from the site is predicted to be below relevant WHO/BS:8233 noise intrusion criteria.

Therefore, the proposed development is not expected to have an adverse impact on health or quality of life and the requirements of Planning Policy Wales to incorporate measures to reduce noise levels are considered to be met.

APPENDICES

APPENDIX A – ACOUSTIC TERMINOLOGY AND ABBREVIATIONS

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

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

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

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

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

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

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

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

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

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

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

APPENDIX B – REPORT CONDITIONS

This Report has been prepared using reasonable skill and care for the sole benefit of Lidl Great Britain Limited ("the Client") for the proposed uses stated in the report by Tetra Tech Limited. Tetra Tech Limited exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

No liability is accepted or warranty given for; unconfirmed data, third party documents and information supplied to Tetra Tech Limited or for the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report. Tetra Tech Limited does not purport to provide specialist legal, tax or accounting advice.

The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech Limited accept no liability for issues with performance arising from such factors.