



ACOUSTIC
CONSULTANTS LTD

Noise Impact Assessment

**Proposed Residential Development Site
Eagle house, Port Talbot**

Reference: 8972/LN

Client:	Acoustic Consultant:
 CASTELL GROUP Property Development Specialists	 ACOUSTIC CONSULTANTS LTD

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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise aspects as included in this report. We provide advice only in relation to noise and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Castell Group appointed Acoustic Consultants Limited to carry out a noise impact assessment and provide a noise impact assessment for the proposed residential development on the land currently occupied by an office building.

The assessment takes into consideration the impact of road traffic noise from the A48 Talbot Road to the south of the site.

The report assesses the suitability of the site with respect to TAN 11 and British Standard 8233:2014+A1:2019 / WHO (1999).

This report presents the basis and conclusions in relation to the noise from external noise sources.

The author of this report is an Associate Member of the Institute of Acoustics (AMIOA) with a recognised acoustic qualification and over two years' experience within the field. The report has been checked by a director of the company who is a Member of the Institute of Acoustics (MIOA) with over 13 years' experience in the field of acoustics.

2. The Site & Proposals

The site is situated opposite Port Talbot Parkway train station. To the east of the site is a residential area with the M4 located approximately 450m to the north east.

Proposals include a mixture of 20 1- and 2-bedroom flats, spread across 4 floors, with a retail unit on the ground floor.

The Google site location and site plan are provided below in Figure 1 and Figure 2. The Google maps image shows the proposed site boundary highlighted in red.

Figure 1: Existing Site Location – Google Maps

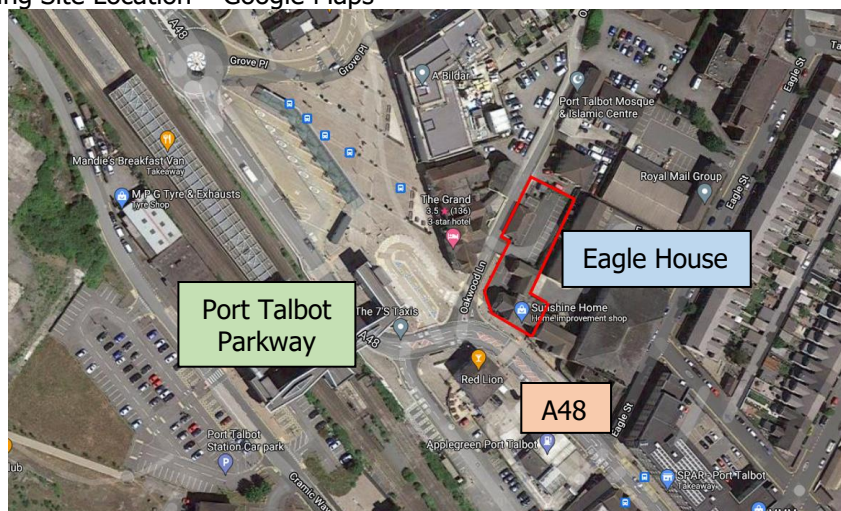


Figure 2: Proposed Site Plan



3. Planning Policy

3.1. Planning Policy Wales

Planning Policy Wales (PPW) Edition 11 dated February 2021 sets out the land use planning policies of the Welsh Government. Section 1 states:

"1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs¹, MTANs² and policy clarification letters comprise national planning policy. "

The most relevant statements for noise affecting a residential use are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 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.

6.7.6 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 management areas, 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.*

6.7.7 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.

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- traffic management and road safety;*
- ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- supporting low or zero emissions public transport;*
- providing active travel infrastructure; and*
- incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission. Location of Commercial, Industrial and other Potentially Polluting Development.

6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of

people to pollution will be unacceptable. Whilst some uses may be appropriate with the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications. Soundscapes and Compatibility of Uses

6.7.24 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."

PPW does not provide any quantifiable criteria and directs you to the Technical Advice Notes (TAN 11).

3.2. Technical Advice Note (Wales) - Noise

Planning Policy Wales (PPW) Edition 11 dated February 2021 sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes. The relevant planning criteria for proposed residential development is in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction states:

"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 or adding unduly to the costs and administrative burdens of business.

It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources”.

Table 1 provides Noise Exposure Categories, which relate to proposed residential developments near to a transportation noise source. Noise Exposure Categories, (NEC's) in relation to road traffic noise are addressed in ranges according to the free-field equivalent noise levels ($L_{Aeq, T}$) measured at the position of the proposed dwellings.

Table 1: TAN 11 Noise Exposure Categories

NOISE SOURCE	NOISE EXPOSURE CATEGORY			
	A	B	C	D
Road Traffic				
07.00 - 23.00 hrs	<55	55 – 63	63 – 72	>72
23.00 - 07.00 hrs	<45	45 – 57	57 – 66	>66

The Technical Advice Note (Wales) 11 gives advice to Local Planning Authorities on assessing proposals for residential developments near a source of noise, depending upon which of the four Noise Exposure Categories the proposed site falls into:

- NEC A. *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.*
- NEC B. *Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection.*
- NEC C. *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.*
- NEC D. *Planning permission should normally be refused.*

In addition, it states: *"Night-time noise levels (23.00 - 07.00): sites where individual noise events regularly exceed 82 dB L_{Amax} (5 time weighting) 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)."*

3.3. British Standard 8233:2014

The below informative section is based on British Standard 8233:2014 and WHO 1999. By meeting the below criteria, the residential amenity should not be adversely affected. The below criteria would apply to all plots which fall into NEC B - D.

3.3.1. Internal Equivalent Noise Levels

Section 7.7.2 Table 4 of the British Standard 8233:2014 provides internal ambient noise levels for dwellings from noise sources 'without a specific character'.

The British Standard guideline states that noise levels should not exceed those as noted in Table 2 of the British Standard. These criteria are based on the guidance provided within WHO 1999 and are summarised below:

Table 2: British Standard 8233:2014 Internal Noise Criteria

Activity	Location	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Resting	Living Room	35 dB $L_{Aeq,16 \text{ hour}}$	-
Dining	Dining Room/area	40 dB $L_{Aeq,16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16 \text{ hour}}$	30 dB $L_{Aeq,8 \text{ hour}}$

3.3.2. Maximum Noise Levels

Section 7.7.2 Note 4 of the British Standard states "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".

British Standard BS8233 provides no definitive criteria for maximum noise levels from individual events ($L_{Amax,F}$). Section 3.4 of the "Guidelines for Community Noise" published by the World Health Organisation in 1999 (WHO 1999) states *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 L_{Amax} more than 10-15 times per night (Vallet & Verbey 1991)"*.

4. Noise Monitoring

A long-term noise monitoring exercise was undertaken at two locations in May 2021.

4.1. Monitoring Equipment

Sound Pressure Levels were measured using Class 1 sound level meters with a half-inch condenser microphone. The equipment is checked annually using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2005 and in accordance with British Standard EN 10012:2003 and traceable to the National Standards. This equipment was checked and calibrated as noted below and the certificates are available for inspection. Table 3 provides the equipment and calibration status.

Table 3: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-11053-E0	22/04/2020	34610
Pre-Amp, NTI, MA220	5871	22/04/2020	34610
Microphone, NTI, MC230A	9276	22/04/2020	34609
Calibrator, Nor-1251	35227	02/10/2020	35886

The measurement systems were checked before and after use with the calibrators and no significant drift was detected.

4.2. Weather Conditions

During the monitoring conditions were clear, mostly- dry, and calm. The weather conditions are not expected to have adversely affected the measured data.

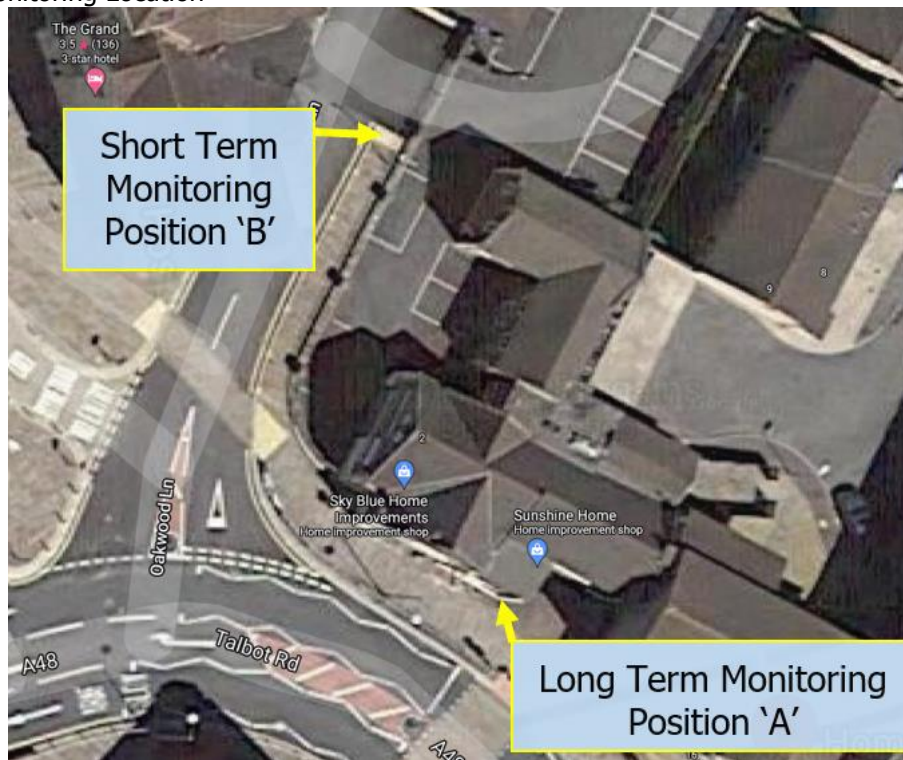
Table 4: Weather conditions during survey

Wind Speed (m/s)	Average Air Temperature (°C)	Precipitation (time/hrs)	Cloud Cover (%)
< 8	~ 3 to 13	0-2mm	~ 80-100%

4.3. Noise Monitoring Procedure

A partially attended noise monitoring exercise was carried out at two locations, a long term one between 14:00 hours on the 12th of May and 14:00 hours on the 14th of May 2021. A short term one was taken for one hour between 14:30 hours on the 12th of May and 15:30 hours on the 12th of May 2021. The measurements were carried out at positions noted as 'Monitoring Location A' and 'Monitoring Location B' below.

Figure 3: Monitoring Location



Monitoring position A was placed out of a window on the first floor. Monitoring position B was mounted on a tripod approximately 1.5 metres above the ground and in free-field positions. Both meters used during the monitoring exercise had their internal clock synchronised.

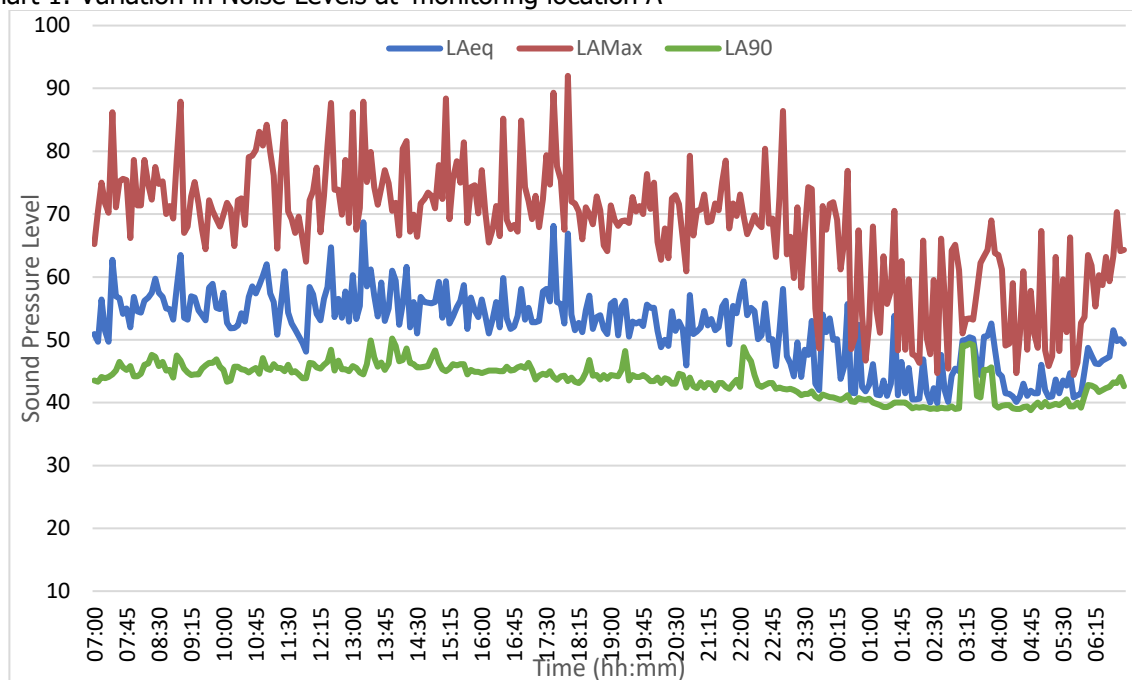
4.4. Measured Noise Levels & Observations

The main noise affecting the whole site was determined by the road traffic on the A48. Construction noise could clearly be heard for most of the duration of the site visit. Location B had louder construction noise due to the reflections off The Red Lion opposite whilst location A was shielded from this. Due to the weather, only the data from the initial 24 hour period was used.

4.4.1. Long Term 'Monitoring Location A'

A chart of the variation in equivalent and maximum noise levels with time is provided below:

Chart 1: Variation in Noise Levels at 'monitoring location A'



From the measured road traffic noise data propagating from the A48, we have determined the following free-field octave band design 'daytime' and 'night-time' equivalent noise levels, and maximum noise levels at the monitoring location:

Table 5: Measured Octave Band Design Noise Levels at 'Monitoring Location A' (façade Level)

Parameter	63	125	250	500	1000	2000	4000	8000	dB(A)
Day $L_{eq, (16hr)}$	73	67	62	62	68	66	61	54	71
Night $L_{eq, (8hr)}$	66	61	56	56	59	59	56	49	64
Night $L_{max(F)}$	90	77	72	72	75	75	71	66	80

4.4.2. Short Term 'Monitoring Location B'

The short-term noise measurements were considerably higher than the long term L_{eq} data. The noise climate consisted on mainly construction noise. This position measured an L_{90} of 72 dBA, which is closer to the L_{eq} from measurement position A.

Table 6: Measured Octave Band Noise Levels at 'Monitoring Location B'

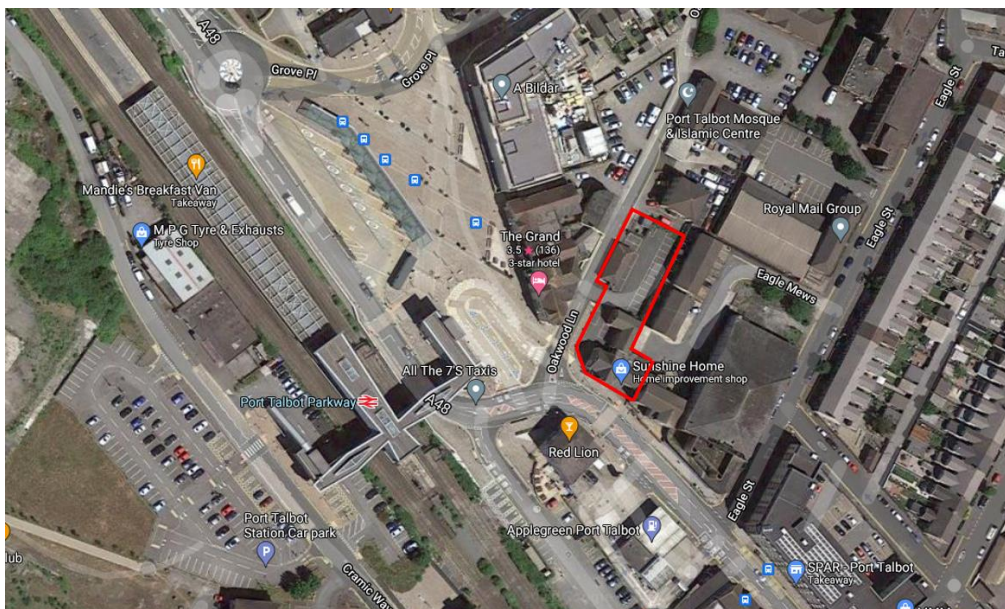
Parameter	63	125	250	500	1000	2000	4000	8000	dB(A)
L_{Aeq}	88	82	78	75	74	71	66	61	79
$L_{max(F)}$	112	110	105	103	97	103	99	96	108

5. Noise Modelling

5.1. Noise Modelling Parameters

To determine noise levels across the site, noise modelling has been undertaken using computer modelling package Cadna:A by DataKustik and the measured data noted above.

The software predicts road traffic noise propagation using the method of 'The Calculation of Road Traffic Noise 1988' (CRTN'88). A verification model has been created for the road and rail noise separately to ensure the measured and predicted levels are comparable.



The site layout is based on Google Maps imagery and the provided plans. The modelled noise levels of road traffic on the A48 were calibrated to a receiver positioned at the monitoring location. Building heights are based on the supplied elevation drawings. All buildings and ground are reflective. The site layout follows the drawings provided in Figure 2 of this report. The building evaluations for all the residential buildings are predicted at the worst-case residential receiver height, that being the typical height of a person in a bedroom.

5.2. Noise Modelling Calculations

Predicted noise emission maps for equivalent noise levels during the daytime ($L_{Aeq,16hour}$) and night-time ($L_{Aeq,8hour}$) are provided below in the figures below.

Figure 4: Predicted $L_{Aeq, 16 \text{ hour}}$ dB (façade level)

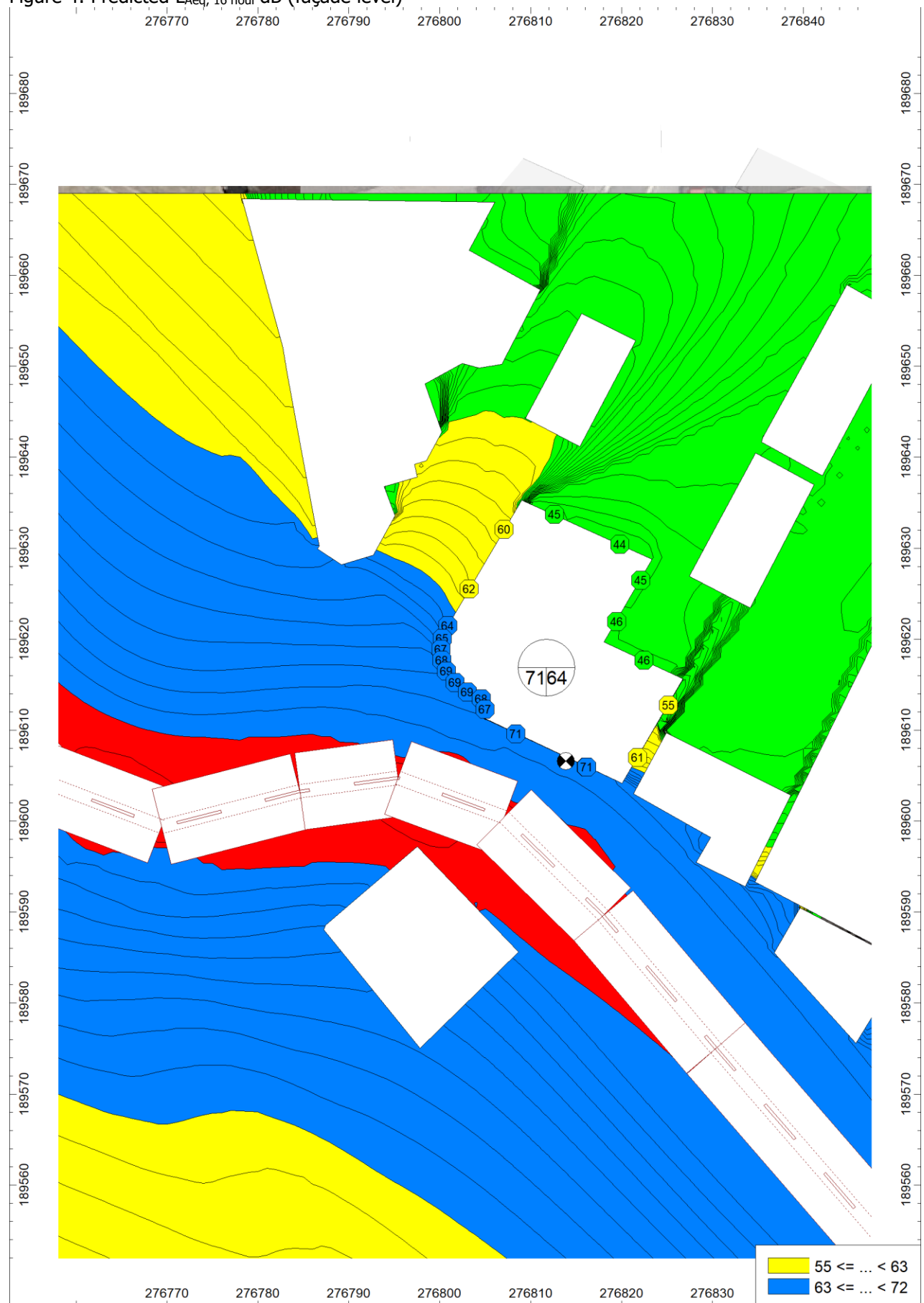


Figure 5: Predicted L_{Aeq} 8 hour dB (façade level)

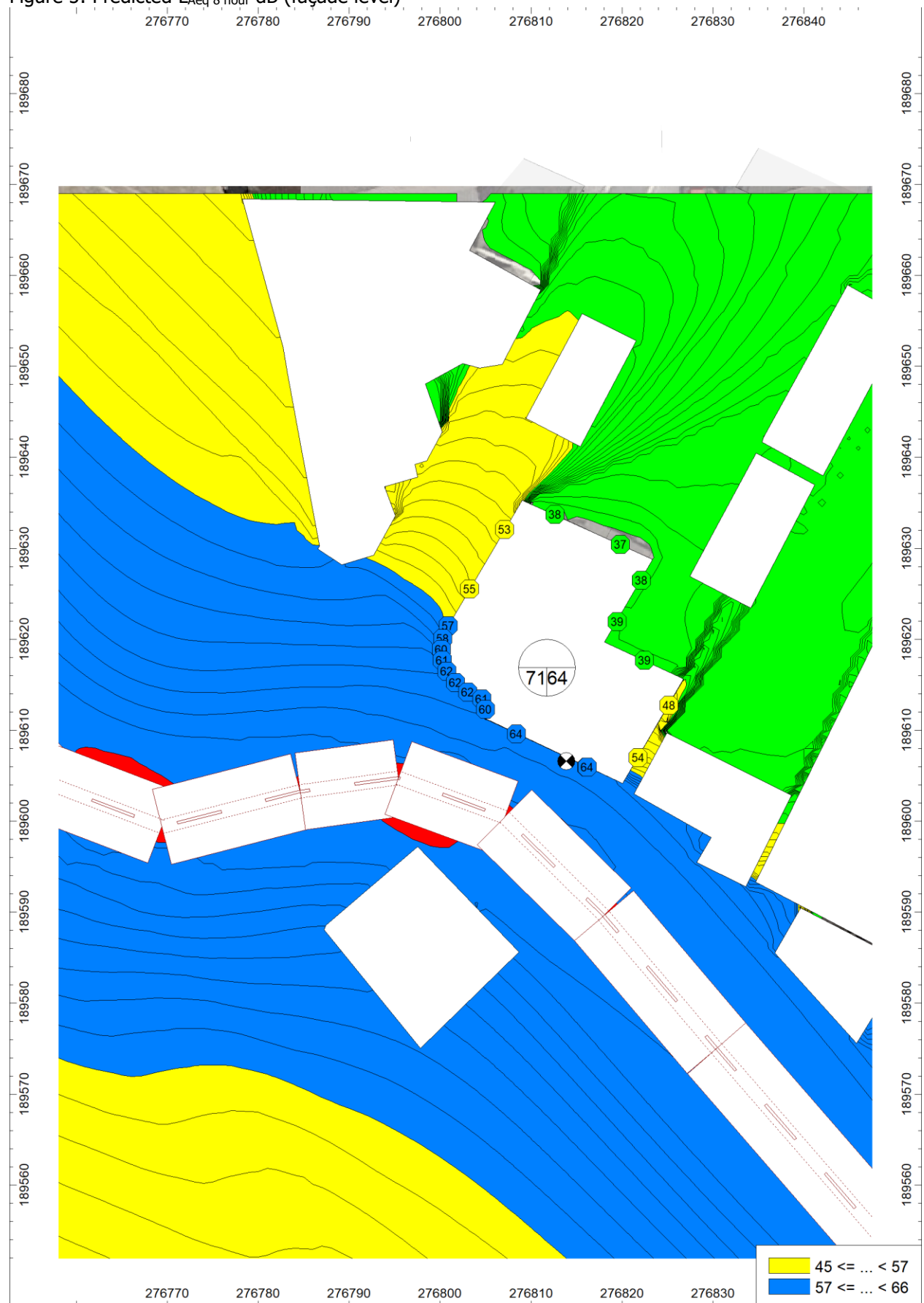
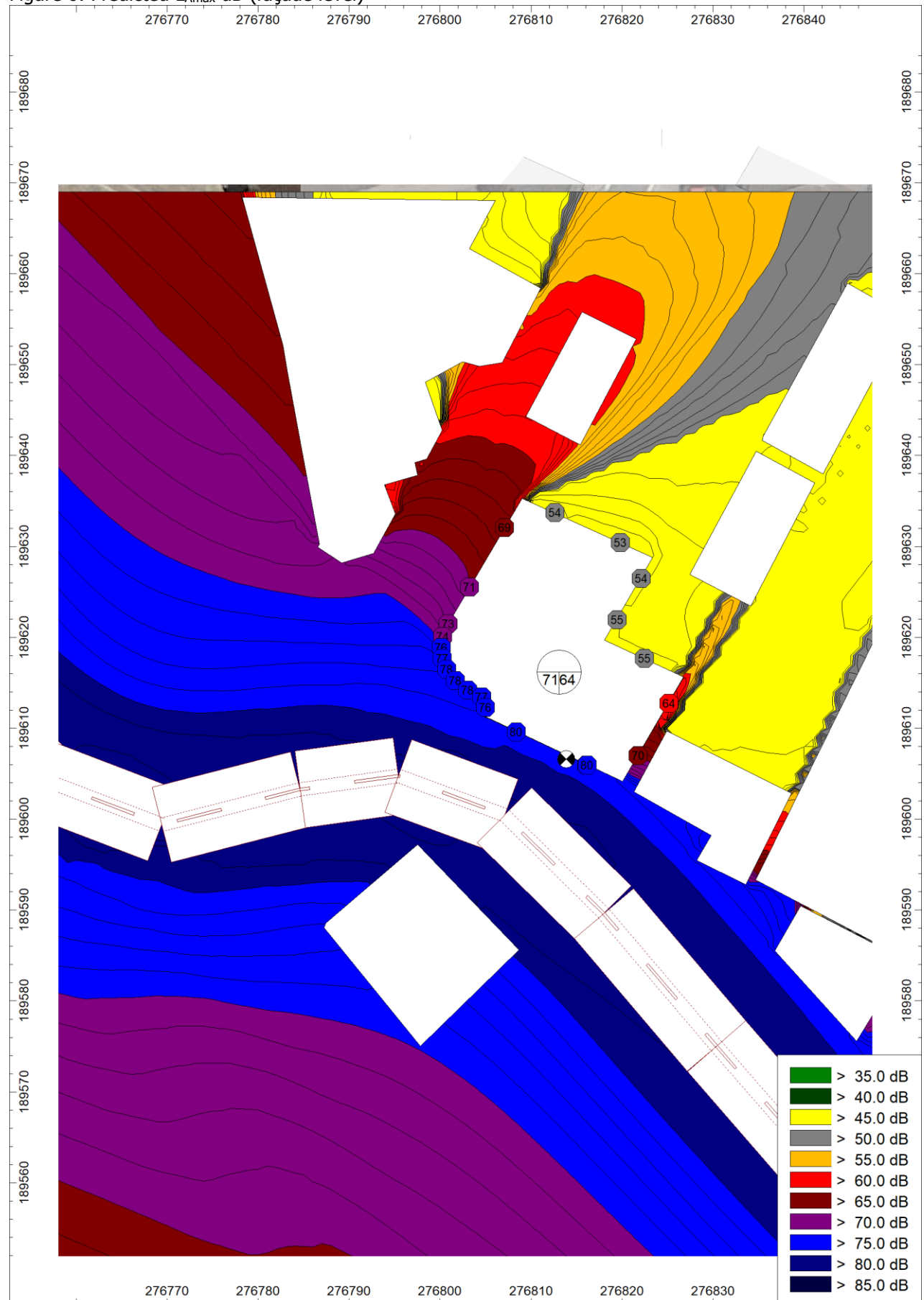


Figure 6: Predicted L_{Amax} dB (façade level)



6. Noise Exposure Category

From the measurements and predictions above this site falls into Noise Exposure Category C (NEC C) on the south façade which states the following:

"Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection."

The levels are taken as a worst case scenario for each façade with the receiver height at 4.5m which is the height of the first floor window.



7. Noise Control Measures

It will be necessary to design the building fabric of the residential properties to control road traffic noise levels internally.

7.1. Calculation Method

Calculations for the internal ambient noise levels due to road traffic noise have been undertaken using the calculation method provided in Annex G Section G.2 of British Standard 8233:2014, the building facade construction specified below and the octave band free-field design equivalent noise levels and maximum noise levels taken from the measured noise spectra noted above.

We advise that building elements, having the sound insulation performances noted below, be incorporated into the design of the façades including the windows, doors, floor, and the building roof.

Alternative constructions to those noted below could be used, however, they would need to be assessed to ensure they control external noise to within the BS 8233:2014.

7.2. External Wall Construction

The external walls to the development can be of a conventional construction comprising of either at least two skins of block (one of density 1850 Kg/m³, 100mm cavity, 100mm block (density of 400 Kg/m³). The inner skin of block would be plastered. The above construction is expected to achieve the following minimum sound reduction index:

Table 7: Required minimum sound insulation performance of the external wall

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	Rw
R (dB)	31	38	46	45	55	66	77	70	52

Any alternative constructions should achieve the above-noted performance.

7.3. Roof Construction

Within all zones, the dwellings could have a roof constructed using traditional techniques, such as a timber construction with concrete/slate tiles (minimum mass per unit area of 30 Kg/m²), with a 12mm plasterboard ceiling above the habitable rooms with thermal insulation.

The above construction is expected to achieve the following sound reduction indices:

Table 8: Required minimum sound insulation performance of the roof

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	Rw
R (dB)	17	22	37	42	50	57	57	57	44

Any alternative constructions should achieve the above-noted performance.

7.4. Window Construction

The windows should be constructed from sturdy good quality frames with airtight compression seals. The sound reduction indices required of the windows on all facades are as follows:

Table 9: Required Minimum Sound Insulation Performance of Windows

Location*	Required Windows Sound Reduction Index (dB) per Octave Band (Hz)								R _w (dB)	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
	16	21	20	31	39	37	47	46	33	6/12/6.4
	20	24	20	25	35	38	35	36	31	4/12/4
	20	24	20	25	35	38	35	36	31	4/12/4

* As per noise maps above (Figure 4 and Figure 5)

7.5. Ventilation Provision

There should be no un-attenuated vents or openings in the building façades. There will need to be suitably attenuated ventilation provisions in the habitable rooms where specific noise mitigation measures are required. The ventilation provisions should include the necessary sound attenuation so that the ingress of external noise is controlled to be compatible with the building fabric.

The minimum required performance for the vents is provided below. The supplier should provide test data confirming ventilation meets the below performance.

Table 10: Required Minimum Sound Insulation Performance of Vents

Location*	Required Ventilator Sound Insulation Performance, D _{n,e} per Octave Band (Hz)								D _{n,e,w} (dB)	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
	30	37	37	36	47	49	55	61	44	Titon – SF X V75 / SFSA C75
	30	35	35	36	34	29	33	34	32	Standard Trickle XS13 EA+XC13 412 Canopy
	30	35	35	36	34	29	33	34	32	Standard Trickle XS13 EA+XC13 412 Canopy

* As per noise maps above (Figure 4 and Figure 5)

7.6. Effect of Mitigation Measures

With the above noted noise control measures the BS8233 criteria can be met in all rooms. The calculation for the worst-case room is provided below:

Free Field Level at Façade									
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq}(15\text{ hour})$	70	64	59	59	65	63	58	51	68
Night $L_{eq}(8\text{ hour})$	63	58	53	53	56	56	53	46	61
Night-time $L_{max(dB)}$	87	74	69	69	72	72	68	63	77
Building Façade Construction									
External Element		63	125	250	500	1000	2000	4000	8000
SF X V75 / SFSA C75 (open) - 44 Dnew	D_{new}	30	37	37	36	47	49	55	61
	Number of	1							
		0.00083	0.00017	0.00017	0.00020	0.00002	0.00001	0.00000	0.00000
2x100mm block plastered/render both sides 100mm void, 1880 Kg/m ³ + 400 kg/m ³ - 52 Rw		31	38	46	45	55	66	77	70
	Area	10							
		0.00066	0.00013	0.00002	0.00003	0.00000	0.00000	0.00000	0.00000
Double Glazed: 6/12/6.4 - 33 Rw		16	21	20	31	39	37	47	46
	Area	2							
		0.00419	0.00132	0.00167	0.00013	0.00002	0.00003	0.00000	0.00000
Calculations to BS EN 12354									
	63	125	250	500	1000	2000	4000	8000	
Sum	0.005681751	0.001622227	0.001853871	0.000363299	4.06318E-05	4.34826E-05	5.85869E-06	4.88757E-06	
10log sum	-22.4551781	-27.89888459	-27.31920509	-34.39735284	-43.9113389	-43.61684834	-52.32199421	-53.1097076	
10log S/A	0.268721464	0.268721464	1.467074814	2.492345501	3.053948011	0.826695739	-0.38752589	-0.38752589	
correction factor +3	3	3	3	3	3	3	3	3	
	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq}(15\text{ hour})$	50.5	39.1	36.2	30.2	26.8	23.2	7.8	0.0	34
Night $L_{eq}(8\text{ hour})$	44.0	33.5	29.9	23.6	17.6	16.1	2.8	-4.2	27
Night-time $L_{max(dB)}$	68.3	49.7	45.8	40.0	34.2	32.5	18.4	12.3	45

8. Summary & Conclusions

Castell Group appointed Acoustic Consultants Limited to carry out a noise impact assessment and provide a suitability assessment and acoustic mitigation advice for the proposed residential development on the plot currently occupied by an office building.

The assessment takes into consideration the local authority requirements and considers the impact of road traffic noise from the A48 Talbot Road.

The report assesses the suitability of the site with respect to TAN 11 and British Standard 8233:2014+A1:2019 / WHO (1999).

The dominant noise source across the site is road traffic emanating from the A48. The worst-case façade of the site falls into NEC C, which is to the south of the site and the façades to the east and the west are situated in NEC B which therefore requires noise mitigation measures to the building façade construction, namely external walls, windows, and ventilation to habitable rooms, to ensure an adequate level of protection. The north façade of the building falls into NEC A.

With the noted building fabric construction, and suitable ventilation provisions as stated above in this report, the predicted internal noise levels within the proposed dwellings from both road traffic and rail noise are easily within the criteria of British Standard 8233:2014 of 35 dB L_{Aeq} (16 hour) in the daytime rooms, and 30 dB L_{Aeq} (8 hour) and 45 dB $L_{Amax(F)}$ in the night-time rooms.

As such, we would consider external noise to be suitably controlled within the habitable rooms of the proposed residential development and good internal conditions can be achieved.

In terms of environmental noise, we would consider that acceptable conditions can be achieved within the dwellings on the site as long as the noise control measures noted above are followed.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure p_A – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network

A-weighted sound pressure level, L_{pA} – quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$$L_{pA} = 10 \log_{10} (p_A/p_0)^2$$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
 p_0 is the reference sound pressure (20 μ Pa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10 \log_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2/p_0^2] dt \right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,T_r}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements

Rating level, L_{A,r,T_r} – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level, once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T_{20} (time taken for a 20 dB decay multiplied by three) and T_{30} (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, $eVDV$ – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).