ACOUSTIC CONSULTANTS LTD

Noise Impact Assessment

Residential Development
Ewenny Road, Maesteg

Reference: 11071/CW

Client:

CASTELL GROUP
Property Development Specialists

Document Control

Version:	Revision Description:	Date:	Author:	Reviewed by:	Approved by:
1.0	First Issue	08/11/2024	Cameron Wheaton	James Abbass	James Abbass
2.0	Updated site layout	14/04/2025	Blake Lucas	Blake Lucas	Blake Lucas
3.0	Updated site layout	14/07/2025	James Abbass	Blake Lucas	Blake Lucas

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 Acoustics Consultants Limited to undertake a noise impact assessment for the proposed residential development at the former M E T Fabrications Limited metal supplier, on Ewenny Road, Maesteg, CF34 9TP.

This report provides the results of a noise survey conducted on the site and an assessment of external sources of noise on the sensitive elements of the development. The main and determining factor in terms of noise source has been determined as rail traffic. An attended vibration survey was also undertaken.

Initial comments from the Local Authority were received on 21st May 2025 which stated:

"However, the LAmax levels to bedrooms on the L-shaped facades with the current proposed layout (apart from apartment layout A) are expected to be exposed to LAmax levels of 65 and 67 dBA respectively. Whilst a closed window with trickle vents is proposed, it means that the occupants would have to have their windows kept in the closed position most of the time or be disturbed by noise. The layout of the flats should be carefully considered so that bedrooms that are exposed to these noise levels are avoided and either non- habitable rooms or kitchen/living rooms should be located on those facades."

The presented revision addresses these concerns through glazing placement and locations.

This noise impact assessment has been undertaken in accordance with Planning Policy Wales (PPW), Technical Advice Note Wales 11 (TAN11), British Standard 8233:2014 (BS8233), and British Standard 6472-1:2008 (BS6472).

2. The Site

The site is located at the currently operating M E T Fabrications Limited metal supplier on Ewenny Road in Maesteg, Bridgend. The proposals are the demolish the existing building and construct two three-storey units comprising 18 flats.

The proposed residential apartments are located within a predominantly residential area.

The site is immediately west of Ewenny Road Train Station, and the associated track. Trains run northwards and southwards and almost all trains stop at Maesteg Station. Trains stop at the station approximately 30 times per day between the hours of 06:00-00:00 on weekdays and Saturdays, and 09:00-21:00 on Sundays. This information was gathered from realtimetrains.co.uk. From our research, Ewenny Road station is predominantly served by local train vehicles only, i.e., no sprinter or main line trains.

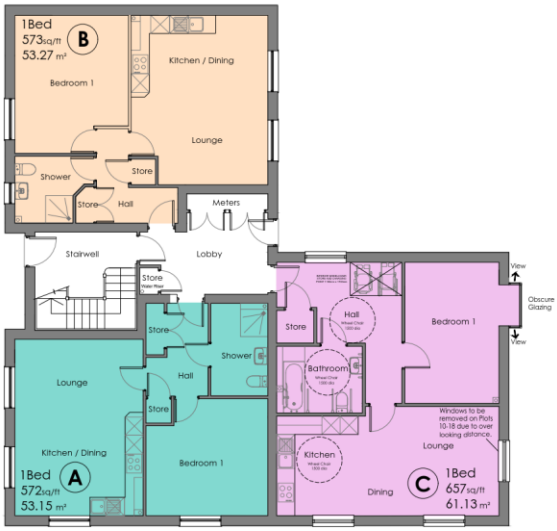
The site is also flanked by Bethania Street to the west, however, is mostly shielded from direct line of sight to the traffic on this road.

The site location plan can be found in the figure below.

Figure 1: Site Location (marked in red)

The proposed floorplans are provided below.

Figure 2: Proposed Floorplans & Glazing Layouts



Ground Floor

First/Second Floor

The glazing to the bedrooms takes into consideration comments received from the Local Authority in regard to night-time maximum noise levels from passing trains. The locations of said glazing have ensured that the bedroom windows are not affected by maximum night-time noise levels of between 65- and 67 dB L_{AFmax}. This is addressed in the modelling and assessment below.

3. Planning & Noise

3.1. Planning Policy Wales

Planning Policy Wales (PPW) Edition 12 dated February 2024 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 TANs, MTANs 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.

6.7.8 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.

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.

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 10 dated December 2018 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**			
Road Traffic	**A**	**B**	**C**	**D**
07.00 - 23.00 hrs	<55	55 – 63	63 – 72	>72
23.00 - 07.00 hrs	<45	45 – 57	57 – 66	>66
Rail Traffic	**A**	**B**	**C**	**D**
07.00 - 23.00 hrs	<55	55 – 66	66 – 74	>74
23.00 - 07.00 hrs	<45	45 – 59	59 – 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 (23.000 - 07.00): sites where individual noise events regularly exceed 82 dB L_{Amax} (S 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)."*

Where the Noise Exposure Category for a site falls into NEC B, C or D mitigation is necessary to control external noise.

4. Assessment Criteria

By meeting the below criteria, the residential amenity should not be adversely affected.

4.1. Indoor Noise Levels

Where sites fall into NEC, B, C or D the criteria of BS8233:2014 would apply. 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 4 of the British Standard and this is 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 $L_{Aeq,16\ hour}$	-
Dining	Dining Room/area	40 dB $L_{Aeq,16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\ hour}$	30 dB $L_{Aeq,8\ hour}$

British Standard 8233:2014 Section 7.7.2 Note 7 states:

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

It should be noted that where internal noise levels exceed the criteria in Table 1, it does not necessarily mean there will be unacceptable conditions within the habitable rooms. 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".*

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)".*

4.2. Amenity Spaces

Section 7.7.3.2, Table 4 of the British Standard provides the following for external noise levels:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments."

4.3. Overheating - Approved Document O

Approved Document O has been in force in Wales since November 2022.

There are no relevant noise requirements or criteria provided within the document. Section 2.2 of the Approved Document states:

> *"External noise is a material consideration considered when applying for Planning permission and mitigating measures may be required in the design in order to obtain Planning permission and controlled through a condition imposed on the consent".*

> *"2.3 noise levels in bedrooms should be kept to a minimum during the sleeping hours of 23:00 – 07:00. Building control bodies may accept as evidence that this requirement is satisfied: a. documentation to demonstrate that the local planning authority did not consider external noise to be an issue at the site at the planning stage or; b. if the local planning authority did consider external noise to be an issue that should be controlled through a condition at planning stage, then documentation to demonstrate that the proposals for heat removal (during the sleeping hours of 23.00 – 07.00) are accommodated within or do not conflict with documentation provided to the local planning authority to satisfy any related planning permission condition(s). (For example any expectation that windows on one or more façade, or in certain rooms, will need to be kept closed during noise-sensitive periods.)"*

Approved Document O Wales therefore relies upon criteria to be set at Planning stage if the Local Authority deems night-time noise to be an issue that conflicts with overheating.

Approved Document O, England:

The Approved Document within England does provide defined criteria. The relevant noise requirements under overheating conditions in Approved Document O, England are as follows:

> *"Noise*
>
> *3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*

*a. **40dB $L_{Aeq,T}$**, averaged over 8 hours (between 11pm and 7am).*

*b. **55dB L_{AFmax}**, more than 10 times a night (between 11pm and 7am).*

3.4 Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use. NOTE: Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020)."

4.4. Vibration

As there is a railway line located close to the proposed residential development, the impact due to vibrations from the railway line and the effects on the people within the dwellings needs to be considered.

The most relevant document is British Standard 6472-1:2008 *"Guide to evaluation of human exposure to vibration in buildings".* The standard provides ranges of vibration for different classes of building (e.g., houses, offices, etc.) for acceptable magnitudes of vibration for daytime and night-time periods.

The British Standard also provides an interpretation for residential buildings of the probability of adverse comment for different levels of exposure to vibration.

The measurement scale used for impulsive vibration is one that effectively accumulates the vibration energy received over the daytime or night-time period, the Vibration Dose Value (VDV). The criteria for evaluating the likelihood of adverse comment are set out in Table 3 below.

Table 3: Vibration Dose Values ($m/s^{-1.75}$) of which various degrees of adverse comment may be expected.

Place and time	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential Buildings 16-hour day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential Buildings 8-hour night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Where feasible, the aim is to keep the Vibration Dose Value (VDV) within the low probability of adverse comment range or lower.

5. Noise & Vibration Survey

Attended noise and vibration surveys were undertaken on the 11th of October 2024, to determine the impact of existing noise levels and vibration from transportation sources on the proposed site.

An unattended noise survey was undertaken from the hours of 13:30, 11th of October 2024 until 11:20, 14th of October 2024 to obtain road traffic noise data.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

Vibration Dose Values were measured using a tri-axial vibration meter configured to enable Vibration Dose Value (VDV) measurements, PPV and Acceleration across the three axes. The equipment is checked using a Quality System to ensure it conforms with the requirements set out in British Standard 6472:1992, British Standard 7385-1:1990 and British Standard 7385-2:1993. All the recorded parameters were weighted as stated in the British Standard 6472 – 1:2008.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 4: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-13617-E0	16/11/2023	UK-23-131
Pre-Amp, NTI, MA220	7162	16/11/2023	UK-23-131
Microphone, NTI, MC230A	A14714	16/11/2023	UK-23-131
Calibrator, Larson Davis, CAL200	12605	24/07/2024	1509121-1
SLM, Svantek, 959	14784	05/04/2024	1508264-1
Pre-Amplifier, Svantek, SV12L	18685	05/04/2024	1508264-1
Microphone, GRAS, 40AE	183810	05/04/2024	1508264-1
Calibrator, Larson Davis CAL200	18293	05/04/2024	1508264-2

The measurement system was checked before and after use with the noted calibrator and no significant drift was detected.

5.2. Weather Conditions

Table 5: Weather conditions throughout duration of assessment

Date/ Time	Temperature	Wind Speeds (m/s)	Wind Direction	Humidity	Precipitation (Y/N)
11th Oct 12:00 - 00:00	9°C	2.5	ESE	57%	No
12th Oct 00:00 - 12:00	9°C	2.5	ENE	92%	No
12th Oct 12:00 - 00:00	14°C	6.7	W	70%	No
13th Oct 00:00 - 12:00	6°C	3.3	WNW	87%	No
13th Oct 12:00 - 00:00	9°C	3.4	ESE	72%	No
14th Oct 00:00 - 12:00	9°C	5.8	E	97%	Yes (00:00 - 5:30)

5.3. Monitoring Procedure

Fully attended noise and vibration monitoring were carried out at the location marked in the figure below. The main noise sources during the monitoring exercise were train pass-bys and station stop events, along with road traffic from Bethania Street.

The sound level meter was mounted on a tripod extended to 1.8 metres above the ground overlooking the railway line, in a free-field position. The vibration monitoring position was located at ground level next to the sound level meter.

A baseline noise monitoring exercise was also undertaken from 11th October 2024 to 14th October 2024.

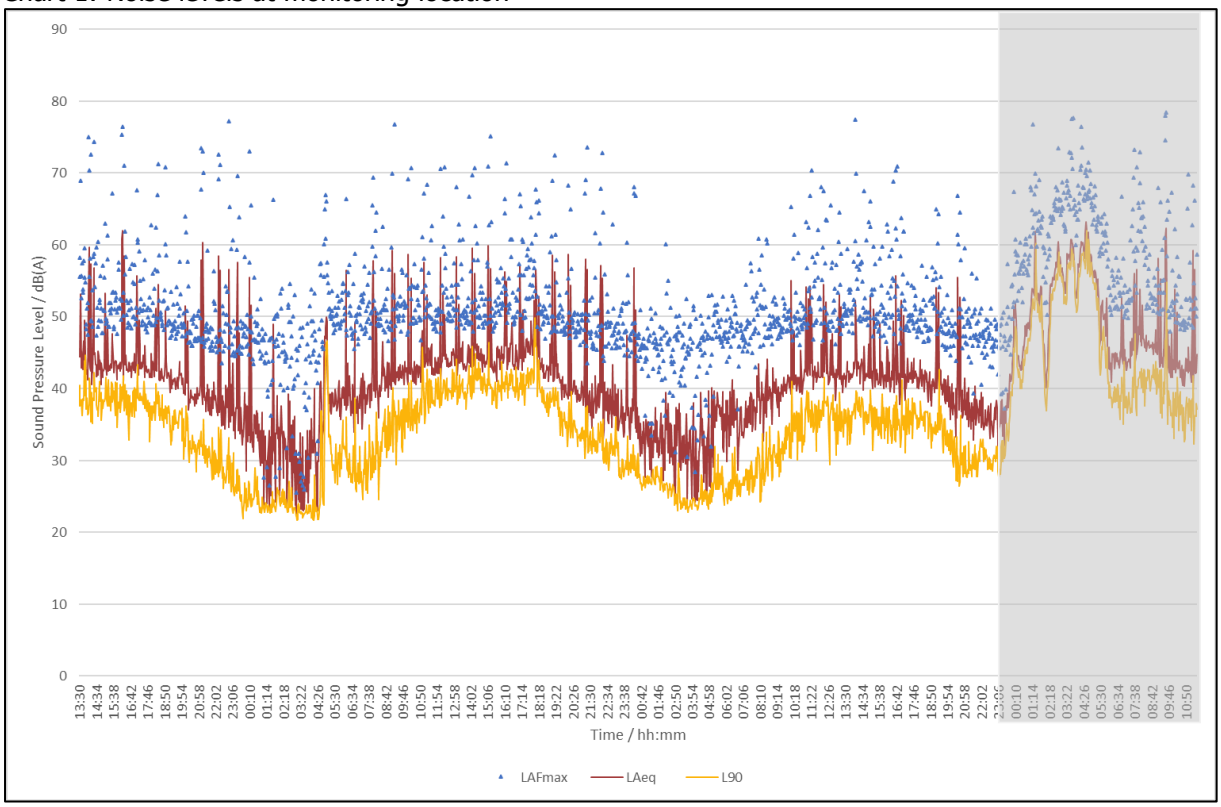
The monitoring location is shown in the figure below.

Figure 3: Monitoring Location

5.4. Measured Noise Levels

The chart below provides the measured equivalent, maximum, and background sound levels over the survey duration.

Chart 1: Noise levels at monitoring location



The greyed-out box over the data on the morning of 14th October indicate unsuitable weather conditions. This period is not used for the assessment dataset.

From our site survey, the dominant factor in terms of noise control is due to trains passing the site.

The table below summarises the data.

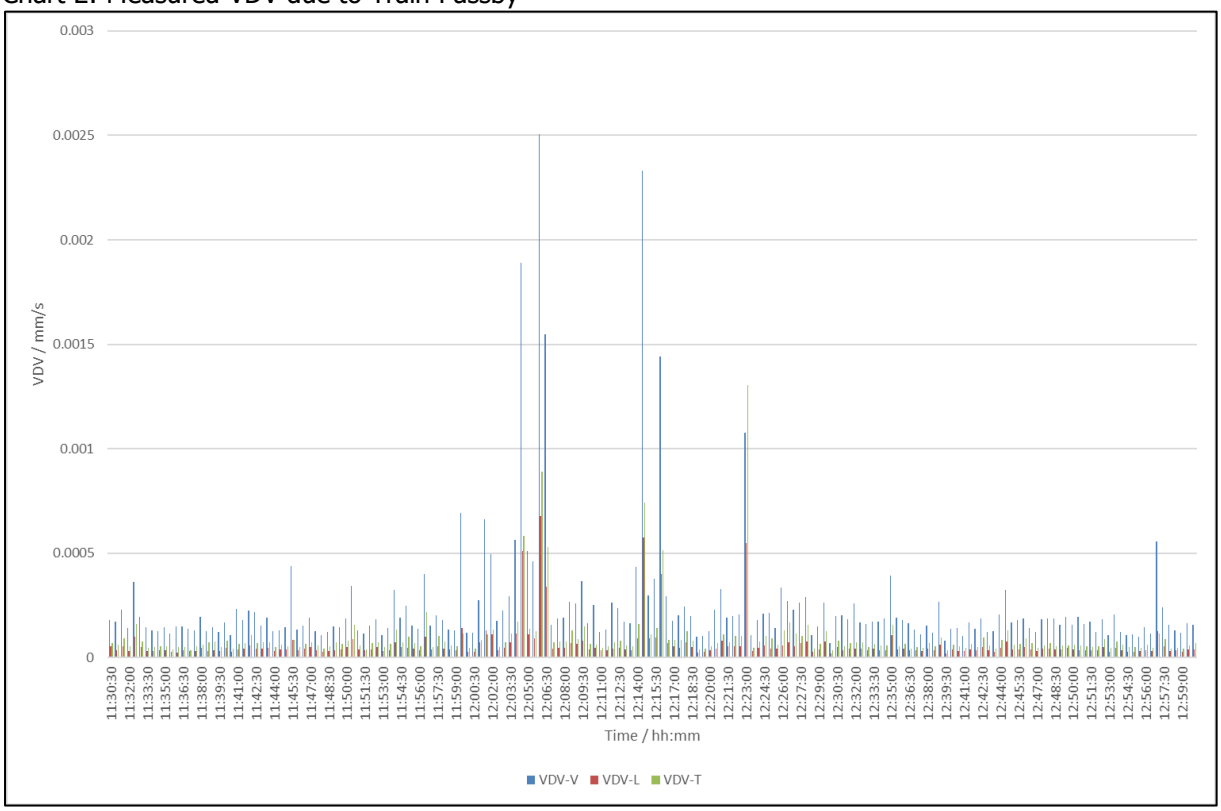
Table 6: Design Noise Levels

Parameter	Sound Pressure Level per Octave Band / dB								dB(A)
	63	125	250	500	1000	2000	4000	8000	
L_{eq16hr}	56	49	43	42	43	39	34	29	47
L_{eq8hr}	49	43	37	37	38	35	28	23	41
L_{Fmax} (1)	59	57	49	56	56	55	52	45	61

5.5. Rail Traffic Vibration

The following chart provides the measured VDV across the three axes during the attended measurement exercise.

Chart 2: Measured VDV due to Train Passby



6. Noise Modelling

6.1. 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 road traffic and rail traffic noted above.

The software predicts road traffic noise propagation using the method of 'The Calculation of Road Traffic Noise 1988' and 'The Calculation of Rail Noise', and a verification model has been created to ensure the measured and predicted levels are comparable.

The noise predictions have been undertaken using supplied plans of the proposed site and the following general modelling parameters:

- The site layout is based on Google Maps imagery and the provided plans.
- The noise sources considered in the modelling are rail traffic. The noise sources were calibrated to the measured levels at receivers positioned at the monitoring locations shown above.
- Building heights are based on Google Street View observations for the surrounding buildings and measured on the elevations for the proposed dwellings.
- The ground is considered hard and reflective.
- Third order reflections have been calculated.
- The noise maps below show noise levels across the site from the noted noise sources at a height of 4.5 metres above the ground (first floor height). The residential dwellings are located at first floor height and above.
- Building evaluation levels are reported as the worst-case level per façade.

Noise maps have been generated to determine the required Noise Exposure Category across the site for 'mixed noise' sources. The noise maps are colour-coded to show the Noise Exposure Categories and equivalent noise level.

The NEC noise maps are provided in Figures 4-6. The colour key is as follows:

Table 7: NEC noise map colour coding key

NEC A	Daytime equivalent noise levels up to 55 dB $L_{Aeq\ (16\ hour)}$, night-time equivalent noise levels up to 45 dB $L_{Aeq\ (8\ hour)}$.
NEC B	Daytime equivalent noise levels of between 55-63 dB $L_{Aeq\ (16\ hour)}$, night-time equivalent noise levels of between 45-57 dB $L_{Aeq\ (8\ hour)}$.
NEC C	Daytime equivalent noise levels of between 63-72 dB $L_{Aeq(16\ hour)}$, night-time equivalent noise levels of between 57-66 dB $L_{Aeq(8\ hour)}$. Night-time maximum noise levels in excess of 82 dB $L_{Amax\ (slow)}$. No part of the site falls into this category.
NEC D	Daytime equivalent noise levels in excess of 72 dB and night-time equivalent noise levels in excess of 66 dB.

6.2. Noise Modelling Results

The following figures provide the day, night, and night-time maximum noise modelling predictions across the site.

Figure 4: Daytime dB $L_{Aeq(16hr)}$ noise affecting the development.

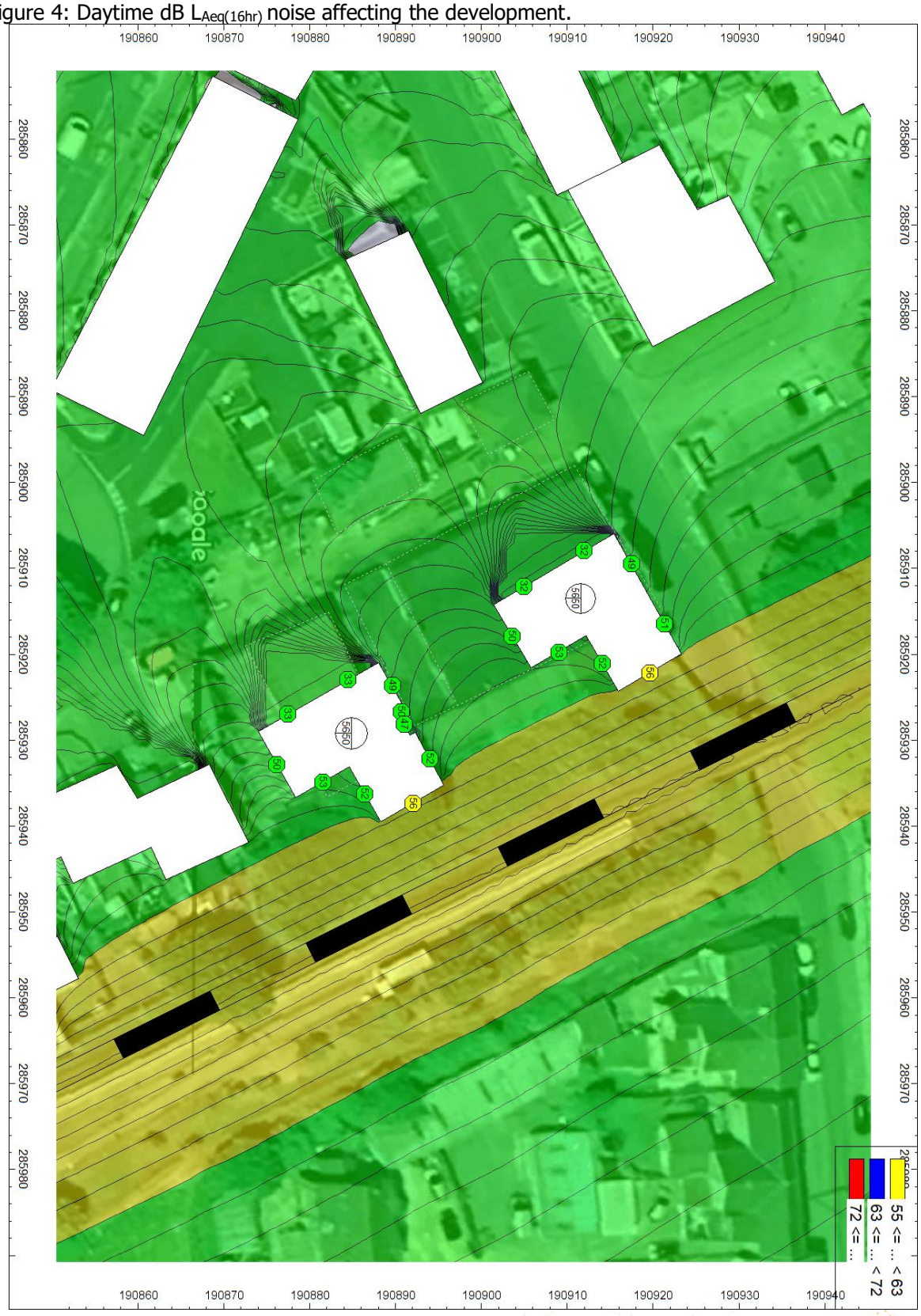


Figure 5: Night-time dB $L_{Aeq(8hr)}$ noise affecting the development.

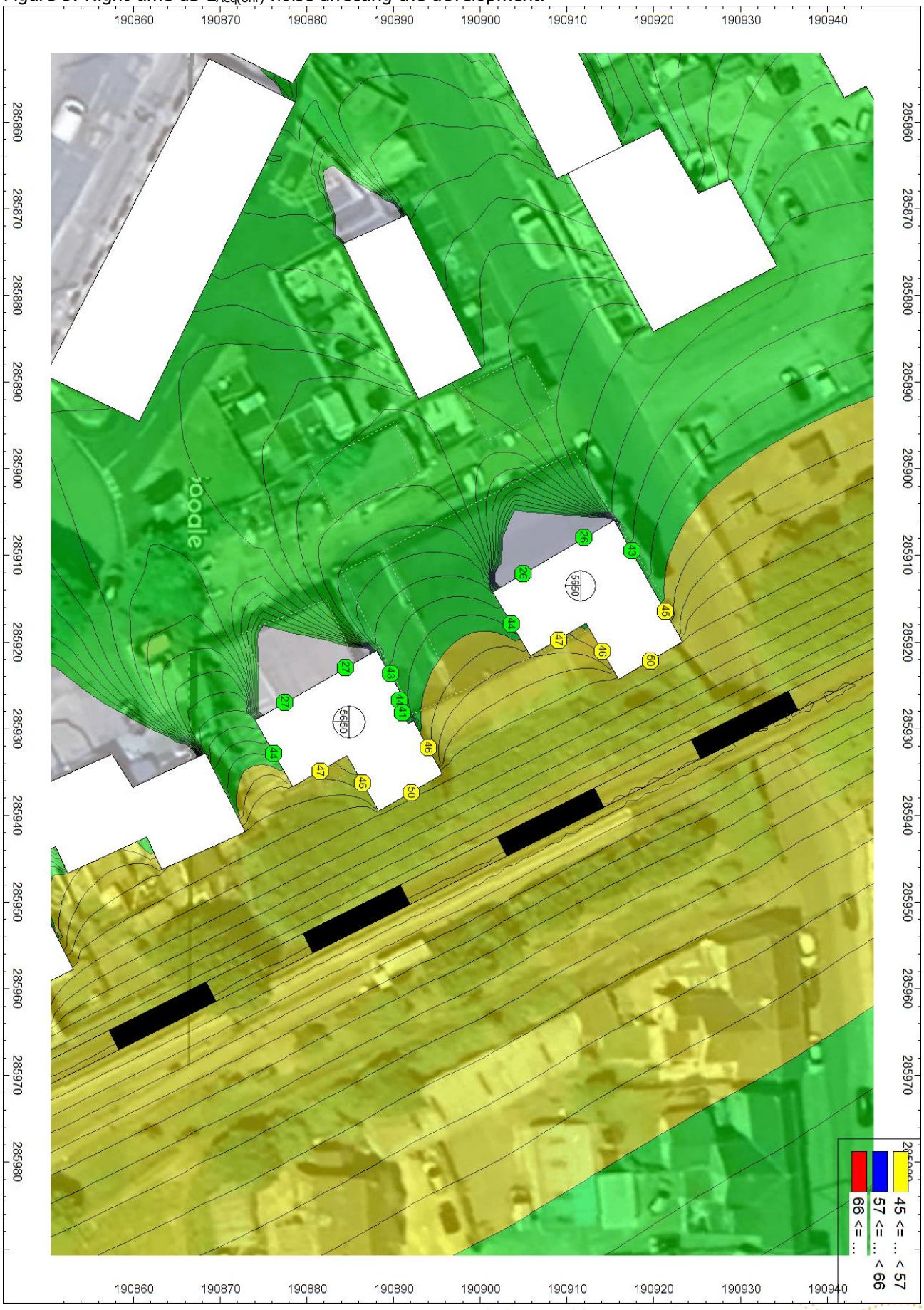
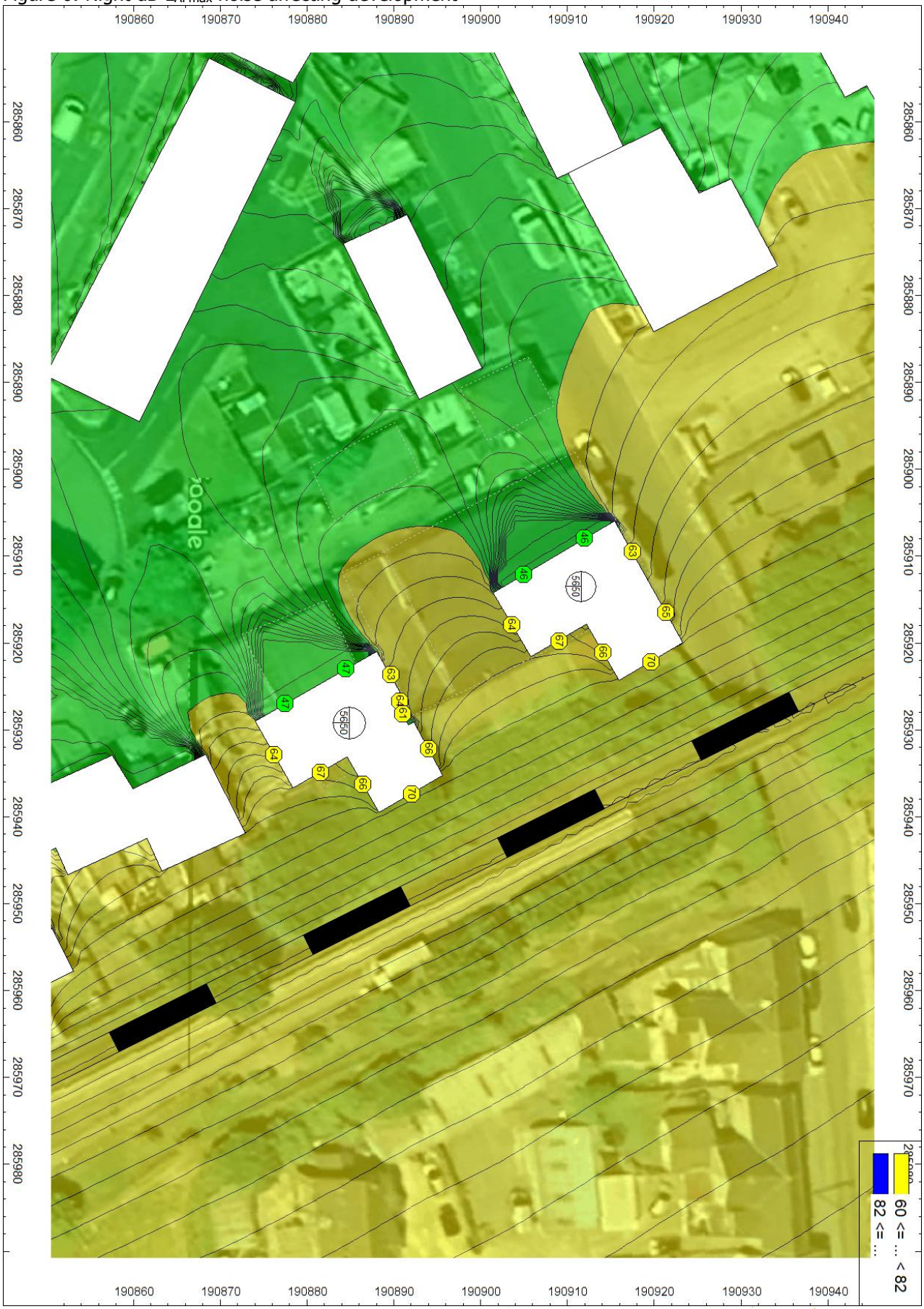


Figure 6: Night dB L_{AFmax} noise affecting development



7. Noise Exposure Category

From the noise measurements noted above, this site falls into Noise Exposure Category B, 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."

It should be noted there are many sites within Wales which fall within NEC B and planning permission is approved, subject to suitable noise control measures being employed.

8. Noise Control Measures

8.1. Calculation Method

Calculations for the internal ambient noise levels due to external noise have been undertaken using the calculation method provided in Annex G Section G.2 of British Standard 8233:2014.

The calculations have been undertaken using the building façade construction specified below and the octave band free-field design equivalent noise levels and maximum noise levels taken from the noise modelling results above. The room dimensions are based off standard room dimensions, as the current drawings do not state any specific room dimensions.

- Room size: Bedrooms have a floor area of 3x4m, with ceiling height of 2.4m.
- Room size: Living rooms have a floor area of 4x5m, with a ceiling height of 2.4m
- Assumed bedrooms have 2m^2 of windows, living rooms have 3m^2 of windows,
- Assumed bedrooms have 1 vent, and living rooms have 2 vents.

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.

8.2. Building Façade Constructions

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 recommended internal ambient noise level criteria.

8.2.1. External Wall Construction

Within all zones the external walls could comprise a masonry or light weight construction.

- The masonry construction could comprise of at least two skins of block (one of density 1880 kg/m^3, 100mm cavity, 100mm block (density of 400 kg/m^3). Room side of the block work would be plastered or have plaster on dabs.

- The lightweight construction could comprise a single frame construction with an external leaf of 100mm brick or block (density 1600 kg/m^3), 100mm timber stud with 50 millimetres of mineral wool insulation within the cavity and inner lining comprising two layers of dense plasterboard (minimum total surface mass 16 kg/m^2).

The constructions below are expected to achieve the following sound reduction indices:

Table 8: Required minimum sound insulation performance of external walls

Construction Type	Sound Reduction Index per Octave Band / dB								R_w
	63	125	250	500	1k	2k	4k	8k	
Masonry	31	38	46	45	55	66	77	70	52
Lightweight	25	40	45	46	53	60	65	60	52

Any alternative constructions must achieve the above noted performance.

8.2.2. Roof Construction

The roof could be constructed using traditional techniques, such as a timber construction with concrete tiles (minimum density 30 kg/m^2) with a loft space and a plasterboard ceiling above the habitable rooms.

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

Table 9: Required minimum sound insulation performance of roof

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	Rw
R (dB)	39	42	40	43	51	58	63	63	49

Any alternative constructions must achieve the above noted performance.

8.2.3. Window Construction

The windows on all elevations could be openable at occupier discretion with an alternative form of ventilation provided. The windows should be constructed housed in sturdy and good quality frames with airtight compression seals. The minimum sound reduction indices required of the windows are as follows:

Table 10: Required sound reduction of glazing

Room Type	Minimum Sound Reduction Index (dB) per Octave Band							R_w (dB)	Typical Construction
	63	125	250	500	1k	2k	4k		
Bedrooms	20	24	20	25	35	38	35	31	Double Glazing: 4/12/4
Living Rooms	20	24	20	25	35	38	35	31	Double Glazing: 4/12/4

8.3. Ventilation Provisions

There will be a need for suitable attenuated ventilation provisions to the habitable rooms across the development.

The vents are required to achieve the following element normalised level difference ($D_{n,e}$) in the open position. The supplier of any chosen ventilation product should provide test data confirming that the ventilation system meets the following performance data. There should be no unattended vents or openings in the façade.

Table 11: Required sound reduction of ventilation

Room Type	Required Element Normalised Level Difference (dB) per Octave Band (Hz)							$D_{n,e,w}$ (dB)	Typical Construction
	63	125	250	500	1k	2k	4k		
Bedrooms	30	35	35	36	34	29	33	32	Standard Trickle Vent
Living Rooms	30	35	35	36	34	29	33	32	Standard Trickle Vent

8.4. Overheating Conditions: Night-time Hours

It should be noted under overheating conditions the windows may need to be opened during the night. Where this is the case the requirements of Approved Document O will need to be met.

AD:O Wales does not define internal noise criteria within the document. It relies upon criteria to be set by local authorities at planning stages through documentation or conditions.

AD:O England does provide defined criteria for internal night-time noise levels under overheating conditions which is 10dB above BS8233 criteria. The following assessment is based on this method.

With the measured noise levels considered, and on the basis that a partially open window achieves 13 dB attenuation, the predicted noise levels to all elevations and bedrooms are expected to fall within the AD:O criteria.

8.5. Effect of Mitigation Measures

With the mitigation measures installed to habitable rooms of the bedrooms in the areas noted above, the predicted internal noise levels are below the BS8233 criteria. The predictions for the worst-case night-time room are provided below.

Figure 7: Worst-case Room IANL Predictions for Bedrooms

Free Field Level at Façade

Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq,16hour}$	65	58	52	51	52	48	43	38	56
Night $L_{eq,8hour}$	57	51	45	45	46	43	36	31	50
Night-time $L_{max(fast)}$	68	66	58	65	65	64	61	54	70

Building Façade Construction

External Element		63	125	250	500	1000	2000	4000	8000
Standard Trickle - XS13 4400 EA+XC13 412 Canopy - 32 Dnew	D_{ne}	30	35	35	36	34	29	33	34
	Number of	1							
		0	0	0	0	0	0	0	0
2x100mm block plastered/render both sides 100mm void, 1880 Kg/m3 + 400 kg/m3 - 52 Rw		31	38	46	45	55	66	77	70
	Area	8							
		0	0	0	0	0	0	0	0
Double Glazed: 4/12/4 - 31 Rw		20	24	20	25	35	38	35	36
	Area	2							
		0	0	0	0	0	0	0	0
Pitched Roof - 56 Rw		25	39	47	53	58	56	60	55
	Area	12							
		0	0	0	0	0	0	0	0
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq,16hour}$	47	32	28	23	22	22	14	8	29
Night $L_{eq,8hour}$	39	25	21	17	16	17	7	1	23
Night-time $L_{max(fast)}$	50	40	34	37	35	38	32	24	42

In addition to the above, the locations of the bedroom windows address the concerns raised by the LPA in regard to night-time maximum noise levels due to passing trains.

The predicted levels at the bedroom glazing are 63- and 64 dB L_{AFmax}. This is below the level at which the LPA raised concerns.

9. Vibration Assessment

9.1. Calculated eVDV

At the measurement position the estimated vibration dose values over the daytime (07:00 to 23:00 hours) and night-time (23:00 to 07:00 hours) have been established from the short-term vibration levels and train timetables for this line.

From our research there are up to 30 daytime trains on the line, and up to 6 night-time trains on the line.

From our measured vibration data, we have determined the following day and night-time eVDV levels based on the typical VDV levels measured from the attended survey.

Table 12: Calculated eVDV (free-field level)

Time Period	eVDV X ($m.s^{-1.75}$)	eVDV Y ($m.s^{-1.75}$)	eVDV Z ($m.s^{-1.75}$)
Daytime (07:00-23:00)	0.0076	0.0019	0.0029
Night-time (23:00-07:00)	0.0015	0.0004	0.0006

9.2. Transfer Function

The following is an assessment of timber floors only. If the proposed floors are different to this, then the predictions will need reassessing. The measured level is a free-field level. Noise transfer from outside to inside the properties also need to be considered. Predictions are also shown below. The transfer is based on methodology followed by "Transfer Function (TRL HS2 Study, Brick Built, with wooden floors).

Table 13: Calculated internal eVDV per floor storey with Transfer Function (Timer Frame Construction)

Floor Level	Time Period	X ($m.s^{-1.75}$)	Y ($m.s^{-1.75}$)	Z ($m.s^{-1.75}$)	Assessment
Ground Floor (x2)	Daytime (07:00-23:00)	0.02	0.00	0.01	Low Probability
	Night-time (23:00-07:00)	0.00	0.00	0.00	Low Probability
Other Floors (x4)	Daytime (07:00-23:00)	0.03	0.01	0.01	Low Probability
	Night-time (23:00-07:00)	0.01	0.00	0.00	Low Probability

As can be seen above, the estimated vibration dose values for the daytime and night-time fall comfortably within the British Standard 6472 range of "low probability" and no further assessment or control is deemed required based on these levels.

10. Summary & Conclusions

Castell Group appointed Acoustics Consultants Limited to undertake a noise impact assessment for the proposed residential development at the former M E T Fabrications Limited metal supplier, on Ewenny Road, Maesteg, CF34 9TP.

This noise impact assessment has been undertaken in accordance with Planning Policy Wales (PPW), Technical Advice Note Wales 11 (TAN11), British Standard 8233:2014 (BS8233), and British Standard 6472-1:2008 (BS6472).

A site noise and vibration survey has been undertaken. Based upon the noise levels measured and noise modelling undertaken, the site falls into NEC B.

From the current drawings available, no external amenity space is available at the development. Therefore, no amenity space assessment is required.

In terms of overheating at night (ADO), our measured night-time noise data indicates that ADO criteria are expected to be comfortably achieved.

Our measured vibration data, and the subsequent eVDV assessment falls into the 'Low Probability' category of BS6472.

On the basis of the above, the proposals achieve the aims of TAN11 and PPW.

11. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – 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 µPa)

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:

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

where:

p_0 is the reference sound pressure (20 µPa); 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, $L_s = L_{Aeq,Tr}$ – 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, $L_{Ar,Tr}$ – 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 T20 (time taken for a 20 dB decay multiplied by three) and T30 (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).

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