Feasibility Stage Noise Risk Assessment

Bold Forest Garden Village

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Basis of Report

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1.0 Introduction

Avison Young (UK) Ltd has appointed SLR Consulting Limited (SLR) to undertake a preliminary noise risk and impact assessment to support a future residential use at Bold Forest Garden Village, St Helens (The Site).

Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature. To assist the reader, a glossary of terminology has been included in Appendix A.

A statement of the competence of the engineers associated with this assessment constituting an SQA (Suitability Qualified Acoustician) is enclosed in Section 0.

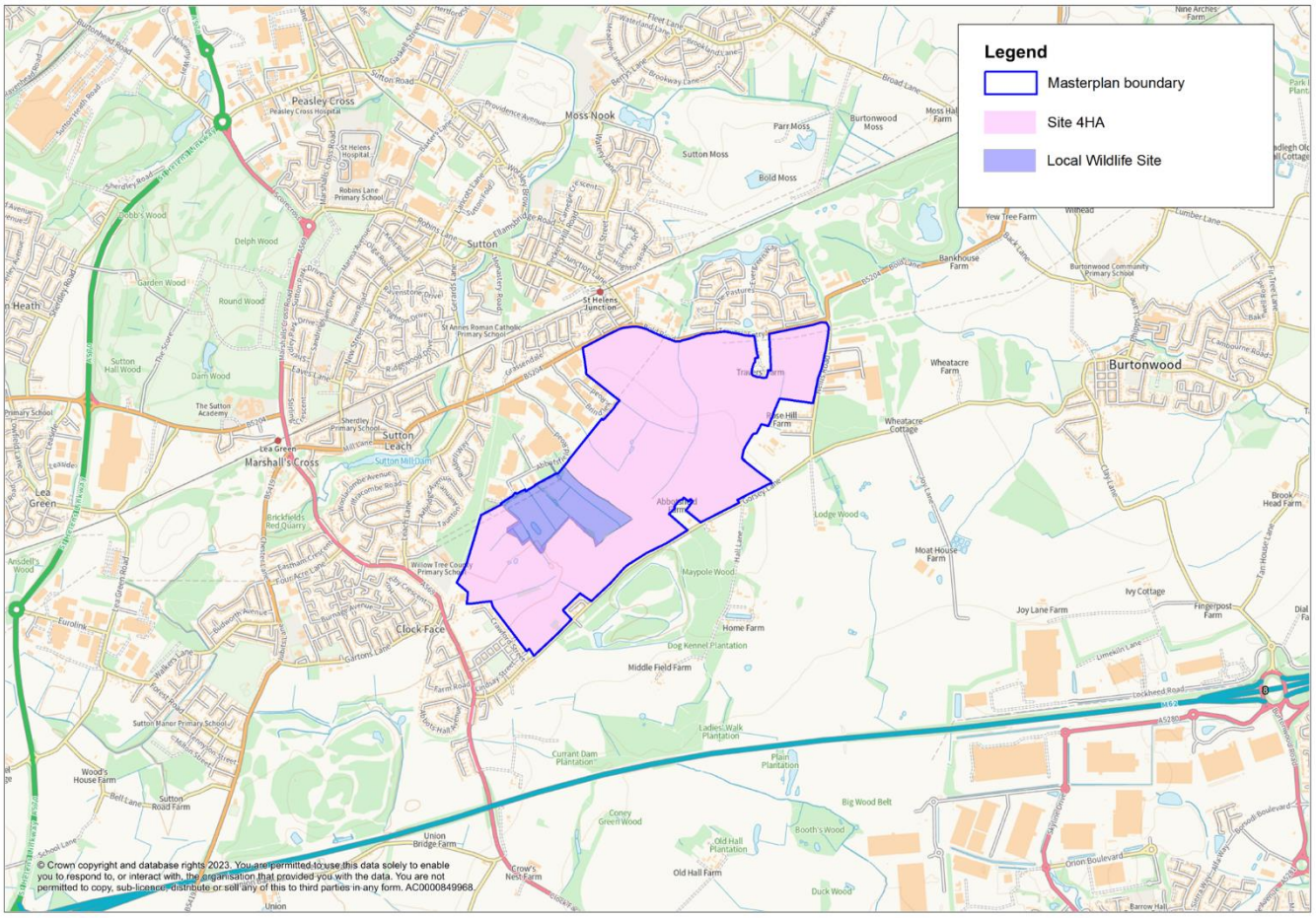
2.0 Site Description

Bold Forest Garden Village is envisaged to be a new residential area set within the northern areas of Bold Forest Park which is located on the southern edge of the town of St Helens.

2.1 Proposed Development

Figure A below details the indicative site masterplan boundary.

Figure A: Site Boundary and Context



3.0 Planning and Noise Guidance

3.1 Noise Policy Statement for England (NPSE)

Inter alia, the NPSE *"seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise".* The aims and this statement apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise. These noise types are qualified from the NPSE as follows:

- "Environmental noise" includes noise from transportation sources.
- "Neighbour noise" includes noise from inside and outside people's homes; and
- "Neighbourhood noise" which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street.

The Statement sets out the long-term vision of the Government's noise policy, which is to *"promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development."*

It is recognised that the statement expresses the long-term desired policy outcome, whereby using the words of "promote" and "good" recognises that it is not possible to have a single objective noise-based measure that is either mandatory or applicable to all sources of noise in all situations.

The concept of the "effective management of noise" applies to all types of noise and that the solution could be more than simply minimising the noise.

The NPSE provides definitions of health and quality of life as follows:

> *"2.12 The World Health Organisation defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, and recognises the enjoyment of the highest attainable standard of health as one of the fundamental rights of every human being.*
>
> *2.13 It can be argued that quality of life contributes to our standard of health. However, in the NPSE it has been decided to make a distinction between "quality of life" which is a subjective measure that refers to people's emotional, social and physical wellbeing and "health" which refers to physical and mental wellbeing.*
>
> *2.14 It is recognised that noise exposure can cause annoyance and sleep disturbance both of which impact on quality of life. It is also agreed by many experts that annoyance and sleep disturbance can give rise to adverse health effects. The distinction that has been made between 'quality of life' effects and 'health' effects recognises that there is emerging evidence that long term exposure to some types of transport noise can additionally cause an increased risk of direct health effects. The Government intends to keep research on the health effects of long-term exposure to noise under review in accordance with the principles of the NPSE."*

The policy promotes the effective management and control of noise, within the context of Government policy on sustainable development and includes three aims to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvements of health and quality of life.

This Statement adopts established concepts from toxicology that are currently being applied to noise impacts. This concept details effect levels, at which an exposure may be classified into a specific category. The classification categories as detailed within the NPSE are as follows:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

The second aim of the NPSE to *"mitigate and minimise adverse impacts on health and quality of life"* refers to the situation where noise impact lies somewhere between the LOAEL and SOAEL. This requires that all reasonable steps are taken to mitigate adverse effects on health and quality of life while accounting for the guiding principles of sustainable development. The NPSE states *"this does not mean that such adverse effects cannot occur".*

In defining the upper limit of SOAEL the NPSE states that *"it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all source of noise in all situations. Consequently, the SOAEL is likely to be different for difference noise sources, for different receptor and at different times…"*. Consequently, values of SOAEL will differ between sources and situations.

3.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was introduced by The Department for Communities and Local Government in March 2012, with the latest revision dated December 2023.

The NPPF defines the Government's planning policies for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. The Government's stated purpose in producing the NPPF was to streamline policy, so the planning process is less restrictive, to give a more easily understood framework for delivering sustainable development.

Under the heading of Section 15 conserving and enhancing the natural environment, the NPPF states the requirement to prevent unacceptable environmental impacts including noise:

> *"180. Planning policies and decisions should contribute to and enhance the natural and local environment by: …*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability…"*

Paragraph 191 of the NPPF further provides commentary on noise as follows:

> *"191. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*[69]
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…"*
>
> *Foot Note 69 - See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).*

The NPPF acknowledges that there is a host of existing sources of national and international guidance which can be used, in conjunction with the Framework, to inform the production of Local Plans and decision making.

3.2.1 Agent of Change Principle

The Agent of Change principle has been defined in recent revisions of the NPPF to explain that new development should not result in unreasonable restrictions being placed on existing and established businesses. The onus for mitigation for any new development has been required to lie with the developer, rather than the business.

Paragraph 193 of the NPPF has been noted to state:

> *"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

This principle has been deemed necessary to follow for the proposed residential development near to existing commercial sources. The guidance has provided that residential development should be suitably mitigated against commercial uses, to support the coexistence of noise-sensitive and noise-generating uses.

3.3 Planning Practice Guidance – Noise (PPGN)

PPGN provides guidance on how planning can manage potential noise impacts in new development, with interpretation and implementation of planning policy contained in the NPPF and NPSE. This was introduced in 2014 with the most recent version issued in July 2019.

The PPGN noise exposure hierarchy table introduces a new threshold of the NOAEL no observed adverse effect level, being between the NOEL and LOAEL and where the noise has no adverse effect where exposure to it does not cause any change in behaviour, attitude or other physiological response.

The PPGN clearly established whether noise is likely to be a concern, following policy statements and requirements of the NPSE and NPPF with additional categorisation and guidance as follows:

> *"At the lowest extreme, when noise is not perceived to be present, there is by definition no effect. As the noise exposure increases, it will cross the 'no observed effect' level. However, the noise has no adverse effect so long as the exposure does not cause any change in behaviour, attitude or other physiological responses of those affected by it. The noise may slightly affect the acoustic character of an area but not to the extent there is a change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.*
>
> *As the exposure increases further, it crosses the 'lowest observed adverse effect' level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).*
>
> *Increasing noise exposure will at some point cause the 'significant observed adverse effect' level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during*

periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided."

It is qualified further to the above statements that the word "level" does not necessarily refer to a single value of noise exposure and that several factors may need to be considered to determine what noise would amount to an adverse or significant adverse effect. Specifically stating:

"Although the word 'level' is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs."

PPGN also provides additional guidance in what is required from the agent of change following circumstances described by Paragraph 187 of the NPPF. It states that the agent of change must "define clearly the mitigation being proposed to address any potential significant adverse effects that are identified".

The guidance also provides there are four broad types of mitigation including:

- *"engineering: reducing the noise generated at source and/or containing the noise generated;*
- *layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose built barriers, or other buildings;*
- *using planning conditions/obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise levels differentiating as appropriate between different times of day, such as evenings and late at night, and;*
- *mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building."*

Use of toxicology thresholds of NOEL, LOAEL and SOAEL for the assessment of noise impacts is reinforced within PPGN, which includes a noise exposure hierarchy table to define human perception at these effect levels, as titled *"when noise could be a concern"* and shown below in **Table A**.

Table A: Planning Practice Guidance Noise Exposure Hierarchy Table

Response	Example of Outcomes	Increasing Effect Level	Action
NOEL – No observed effect level			
Not present	No effect	NOEL	No specific measures required
No observed adverse effect level			
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
LOAEL – Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for sleep disturbance. Affects acoustic character of the area and creates a perceived change in quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL – Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

3.4 ProPG Planning and Noise (2017)

ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise, New Residential Development was developed by a working group consisting of representatives from the Association of Noise Consultants (ANC), Institute of Acoustics (IOA), Chartered Institute of Environmental Health (CIEH) and practitioners from a planning and local authority background.

This guidance was made effective in May 2017 to provide a recommended approach to the management of noise within the planning system in England. It has drawn upon legislation, guidance and standards available at the time of publication to reflect the Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG-Noise) and other authoritative sources of guidance.

ProPG has been noted to advocate two sequential stages covering an 'initial noise risk assessment' at Stage 1 then a 'full assessment' at Stage 2 considering four key elements.

- Element 1 – Good acoustic design process.
- Element 2 – Internal noise level guidelines.
- Element 3 – External amenity area noise assessment.
- Element 4 – Assessment of other relevant issues.

ProPG has provided a summary of internal noise level guidelines as part of Stage 2 assessment requirements. These guidelines values have been derived from British Standard BS 8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings* (BS 8233) and *The World Health Organisation Guidelines for Community Noise* (1999).

Table B: ProPG Internal Ambient Noise Levels, dB

Activity	Location	07:00 to 23:00 dB $L_{Aeq,16h}$	23:00 to 07:00 dB
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30 $L_{Aeq,8h}$ 45 dB $L_{Amax(F)}$*
*Not normally exceeded more than 10 times per night.			

British Standard BS 8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings* (BS 8233)

Similarly BS8233:2014 '*Guidance on Sound Insulation and Noise Reduction for Buildings'* (BS8233) is the provision of recommendations for the control of noise in and around buildings.

It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate. The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table C

Table C: BS8233:2014 Suitable Internal Noise Levels, dB

Activity	Location	07:00 to 23:00 $L_{Aeq,16hr}$	23:00 to 07:00 $L_{Aeq,8hr}$
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

BS8233 states that the recommended limits can be relaxed by up to 5dB *"where development is considered necessary or desirable"*.

Whilst it may be considered desirable to achieve the BS8233 recommended internal noise levels with windows open, it is stated that where the limit cannot be met with an open window *"there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level"*.

It is therefore not essential that the recommended internal noise levels are achievable with open windows if suitable alternative means of ventilation can be provided.

With regard to external noise, Section 7.7.3.2 of BS8233 states that:

"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.

However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted.

In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

3.5 BS 4142:2014 +A1:2019

The British Standard BS 4142:2014 +A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound* (BS 4142) notably describes methods for rating and assessing sound of an industrial or commercial nature. It has been referenced where required in policy and guidance documents to assess the potential impact of sound of an industrial and/or commercial nature, at existing and proposed noise-sensitive receptor locations within the context of the existing sound environment.

Certain acoustic features can increase the significance of impact from a comparison of the specific sound level to the background sound level where these features are likely to affect perception and response. Where such features are present at the assessment location, a character correction (or penalty) to the specific sound level is made to obtain the rating level. This can be approached from subjective, objective and reference methods.

- Tonality: A correction of 0 dB to + 6 dB for sound ranging from not tonal to prominently tonal.
- Impulsivity: A correction of up to + 9 dB can be applied for sound that is impulsive.

- Intermittency: A penalty of + 3 dB can be applied if on/off conditions are readily distinctive within the reference time interval over the period of the greatest amount of on-time.
- Other characteristics: A penalty of + 3 dB can be applied in the absence of all other defined characteristics, where the specific sound contains a distinctive feature in the residual acoustic environment.

The rating sound level is equal to the specific sound level if there are no acoustic features present or expected to be present.

The significance of sound depends upon both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. An initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level.

- Typically, the greater the difference, the greater the magnitude of the impact;
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- 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 level, this is an indication that the specific sound source will have a low impact, depending on the context.

BS 4142 has stipulated that context is important when assessing the impact of sound of a commercial and/or industrial nature. Amongst a range of advocated considerations, this can include mitigation, residual sound levels, location and absolute sound levels in the consideration of context.

The scope of BS 4142 recognises that human response to sound can be subjective as affected by many factors, both acoustic and non-acoustic. The significance of its impact can depend on various factors such as the exceedance to the background level, its absolute level, time of day and change in environment, as well as local attitudes to the source of sound and character of the neighbourhood.

3.5.1 Application for Commercial Sources

The scope of ProPG considers new residential development that will be predominantly exposed to airborne noise from transportation sources. In cases where the Site is exposed to noise of an industrial and/or commercial nature, this shall be considered at Stage 1 of the ProPG approach.

ProPG guidance has advocated the methodology of BS 4142[1] in establishing the impact of industrial and/or commercial sound. If rated as lower than adverse subject to context following BS 4142, its contribution may be included in the degree of risk established for the Site. If considered to be dominant, such as being rated at least adverse subject to context following BS 4142, then the ProPG risk assessment should not be applied to the industrial or commercial noise component. In low-risk cases a subjective judgement of dominance has been advocated as sufficient, based on the audibility of the industrial and/or commercial sound.

The assessment method of ProPG has been applied to the residential development to understand the risks and design requirements to mitigate the proposal from environmental noise sources. Where commercial impacts have been viewed satisfied by the design of the scheme and remain less than

[1] British Standard BS 4142:2014 +A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound.

adverse including context, then the ProPG Stage 1 risk assessment allows that any commercial impacts may be included within its assessment.

> *"In the special case where industrial and/or commercial noise is present on the Site but is "not dominant" (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk in Stage 1 and may also be included in the consideration of Stage 2 Element 2 Internal Noise Level Guidelines (and if included, this should be clearly stated)."*

3.5.2 Acoustics Ventilation and Overheating Guide (2020)

The AVO Guide has been published for application by practitioners when following Stage 2 Element 1 of good acoustic design within ProPG. This extended guidance document has aimed to assist designers to adopt an integrated approach to the acoustic design within the context of the ventilation and thermal comfort requirements.

It has been acknowledged from the AVO guide that there is a need to address how the ventilation strategy and overheating mitigation impacts of the impacts on the acoustic conditions and whether a more-informed strategy is required in the mitigation of overheating.

3.6 Approved Document O

Approved Document (ADO) was published on the 15th December 2021. Part O addresses overheating in residential buildings and came into force in June 2022. Overheating has not previously been addressed in the Building Regulations.

The simple way to comply with Part O is to provide adequate window openings such that comfortable internal temperatures can be maintained during the hottest times of the year. However, the document precludes the use of open windows for overheating control at night if this would result in internal noise levels above 40 dB L_{Aeq} or 55 dB L_{Amax}.

Unlike the AVO Guide, ADO does not appear to offer any flexibility with respect to how often windows might be required to be opened. Therefore, the noise limits are absolute. I.e., if they will be exceeded with windows open then the only option would be to install mechanical cooling even if windows would only need to be opened on a few nights of the year.

Note: Part O is a now legal requirement and component of the Building Regulations in the UK applicable to all residential buildings in the UK (noting the above exceptions) and therefore these criteria do not need to be further considered by the Local Planning Authority or imposed by way of a planning condition.

3.7 BS 6472-1:2008

The British Standard 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings – Part 1 vibration sources other than blasting (BS 6472-1), offers guidance on vibration criteria within buildings. Vibrations may cause reactions ranging from 'just perceptible', through 'concern' to 'alarm' and 'discomfort'. The subjective response varies widely and is a function of situation, information, time of day and duration.

BS 6472-1 provides guidance using the metric of Vibration Dose Values (VDVs), correlating human exposure to where complaints are probable. VDVs may be used to assess the severity of impulsive and intermittent vibration, such as experienced from blasting at quarries or from rail traffic, and steady vibration such as from a busy road or fixed plant. The adoption of the VDV parameter is based on social studies undertaken in the 1980s and early 1990s into human response to vibration. BS 6472 requires that the VDV is determined for 16-hour daytime (07:00 – 23:00) and 8-hour night-time (23:00 – 07:00) periods.

VDV is measured in each of the three whole-body orthogonal axes and the maximum from the three axes is used. Where the vibration conditions are constant or regularly repeated throughout the day and assessment is based on measured data, only one representative period need be measured, and the 16-hour daytime (or 8-hour night-time) overall VDV level may be calculated from the shortened measurement using appropriate formulae.

For the assessment of building vibration with respect to human response, the predicted or measured VDV are compared to thresholds within Section 6 of BS 6472-1. When the appropriately weighted vibration measurements or predictions have been used to derive the VDV for day or night at the relevant places of interest, their significance in terms of human response for people in those places can be derived; against the probability that the VDV might result in adverse comment by those who experience it.

Table D: Various Probabilities of Adverse Comment within Residential Buildings

Place and Time	Low Probability of Adverse Comment, VDV $ms^{-1.75}$	Adverse Comment Possible, VDV $ms^{-1.75}$	Adverse Comment Probable, VDV $ms^{-1.75}$
Residential Buildings 16 h day	0.2 – 0.4 [a]	0.4 – 0.8	0.8 – 1.6 [b]
Residential Buildings 8 h night	0.1 – 0.2 [a]	0.2 – 0.4	0.4 – 0.8 [b]

[a] Adverse comment is not expected below this range.
[b] Adverse comment is very likely above this range.

For measurements in accordance with BS 6472-1, considering internal excitation, the measurement position should be made at or near to where most adverse comment would be generated. This measurement position is generally comparable to an equivalent entry point into the proposed receiver space, where the distance from the proposed source and the proposed foundation structure is similar.

It can therefore interpreted as per the guidance that a “low probability of adverse comment” can be considered the LOAEL, and conversely the SOAEL is interpreted as an “adverse comment probable”.

3.8 Local Planning Policy

The St Helens Borough Council (SHBC) is the planning authority for Bold Forest Garden Village (BFGV):

The below policies will likely bear further consideration in respect to noise, vibration and acoustics.

3.8.1 Local Plan 2022-2037

3.8.1.1 Policy LPA06: Transport and Travel

“The Council’s strategic priorities for the transport network are to facilitate economic growth, enable good levels of accessibility between homes, jobs and services, improve air quality and minimise carbon emissions. To achieve these priorities, it will seek to…

*….4. To minimise air and **noise pollution** and carbon emissions, non-residential forms of development that would generate a significant amount of transport movement by employees or visitors must be supported by suitably formulated Travel Plans. Conditions and/or legal agreements will be used to ensure that Travel Plans submitted in such cases are fully implemented and monitored.”*

3.8.1.2 Policy LPA11: Bold Forest Garden Suburb

"The Bold Forest Garden Suburb site (identified as site 4HA in Policy LPA04) is allocated for housing development, with an indicative site capacity of 2,988 dwellings, of which a minimum of 510 dwellings will be delivered during the plan period. The site boundaries are set out in the appendix 5 site 4HA profile and on the Policies Map. 1. Development of the site should deliver the following requirements….

Design and Layout d) The development of this site should be consistent with the vision, aims, objectives and policies of the Bold Forest Park Area Action Plan (2017); e) The layout must avoid causing ***excessive noise or disturbance to occupiers*** *of existing dwellings and businesses within or around the site and for users of walking and cycling routes and open spaces;"*

3.8.1.3 Policy LPC10: Trees and Woodland

*The successful retention of healthy trees and planting of new trees as part of a new development can have numerous benefits for the community. In particular, trees can….****reduce noise*** *by acting as a sound barrier;"*

4.0 Baseline Environment

In the absence of a baseline environmental noise survey at the present project stage a desktop assessment has been undertaken. This is to inform the assessment of the existing noise climate based on available public domain information.

Public and project related data sources which have been used to inform the assessment are discussed in the following section.

4.1 Extrium

In 2017, the Department for Environment Food and Rural Affairs (DEFRA) produced strategic noise maps for main roads running through England. These were most recently updated in 2019. The strategic road noise maps are available to view via the Extrium online viewer tool[2].

The Extrium mapper details major road link noise levels, and reports in the form of:

- $L_{Aeq,\ 16\ hour}$ daytime average ambient between 07:00-23:00;
- and L_{Night} equivalent to the $L_{Aeq,8\ hour}$ night time average ambient noise level.

The map provides outputs separately for major road and rail links. These maps are reproduced below directly from the public platform[3].

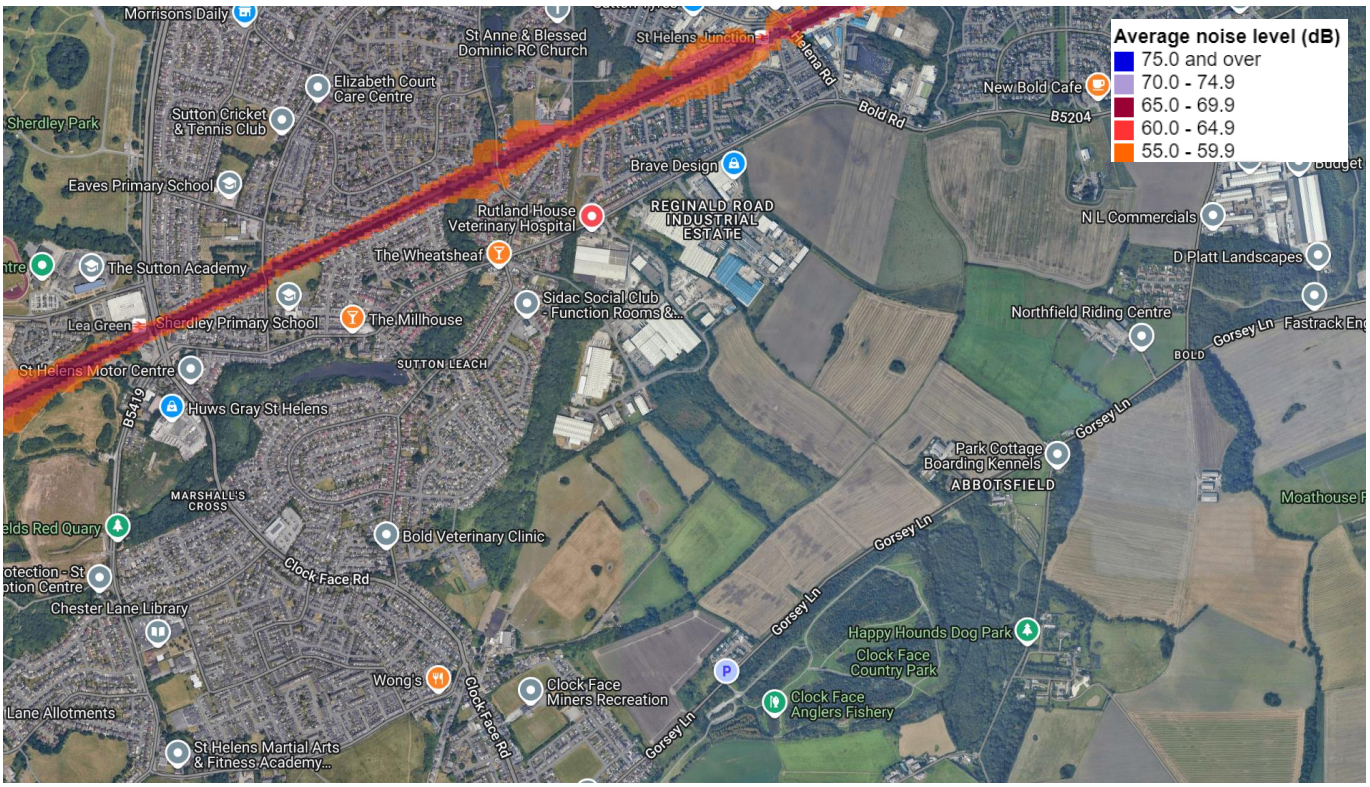
The below maps in Figure B and Figure C outlines the daytime $L_{Aeq\ 16\ hour,}$ road and rail noise contributions from main links, respectively.

Figure B: $L_{Aeq,\ 16\ hour}$ Road Traffic Noise – Major Links

[2] Extrium > England Noise and Air Quality Viewer

[3] Extrium > England Noise and Air Quality Viewer

Figure C: $L_{Aeq\ 16\ hour}$ Rail Traffic Noise



The below maps in Figure D and Figure E outline the daytime $L_{Aeq\ 8\ hour,}$ road and rail noise contributions from main links.

Figure D: $L_{Aeq\ 8\ hour}$/ L_{Night} Road Traffic Noise- Major Links

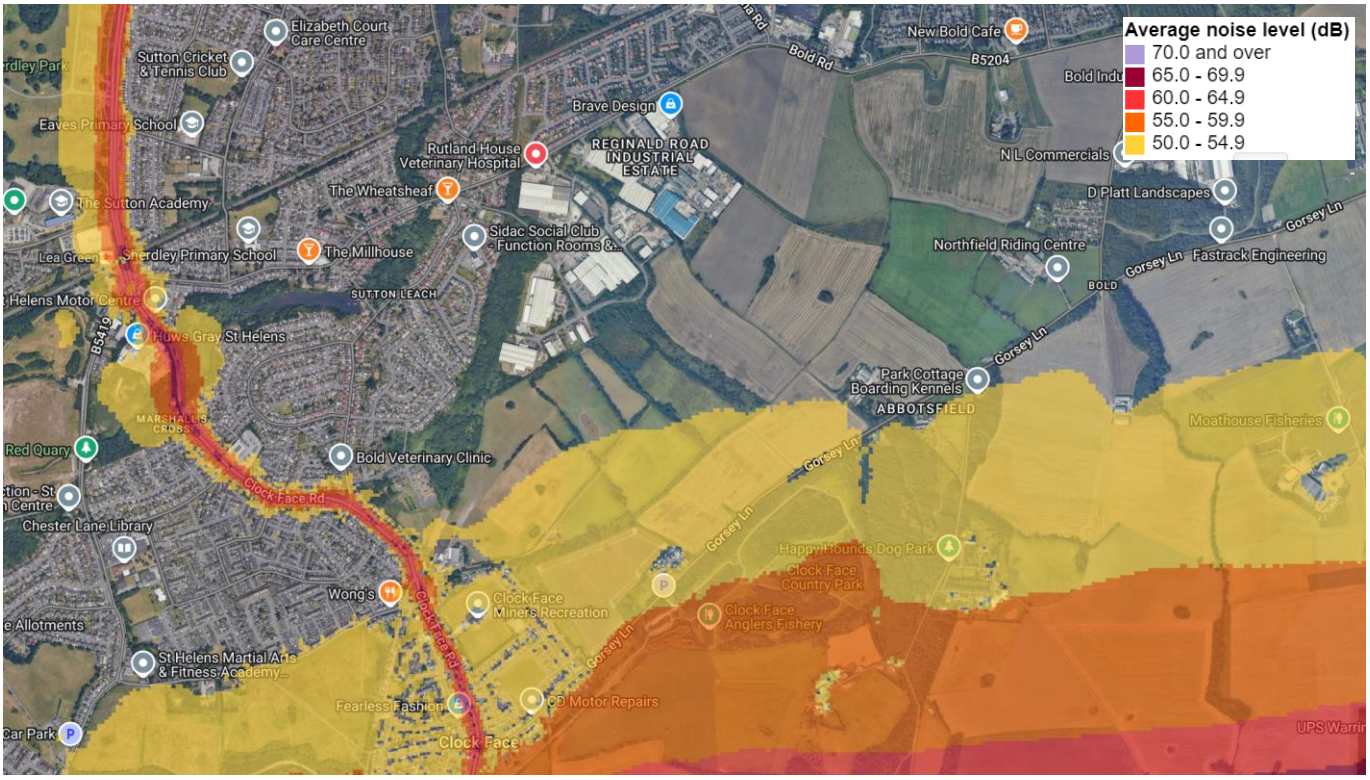


Figure E: $L_{Aeq\ 8\ hour}$/ L_{Night} Rail Traffic Noise

The public noise mapping does not consider small, localised road links, and thus further sources of data have been sought to better inform preliminary noise modelling exercises undertaken herein.

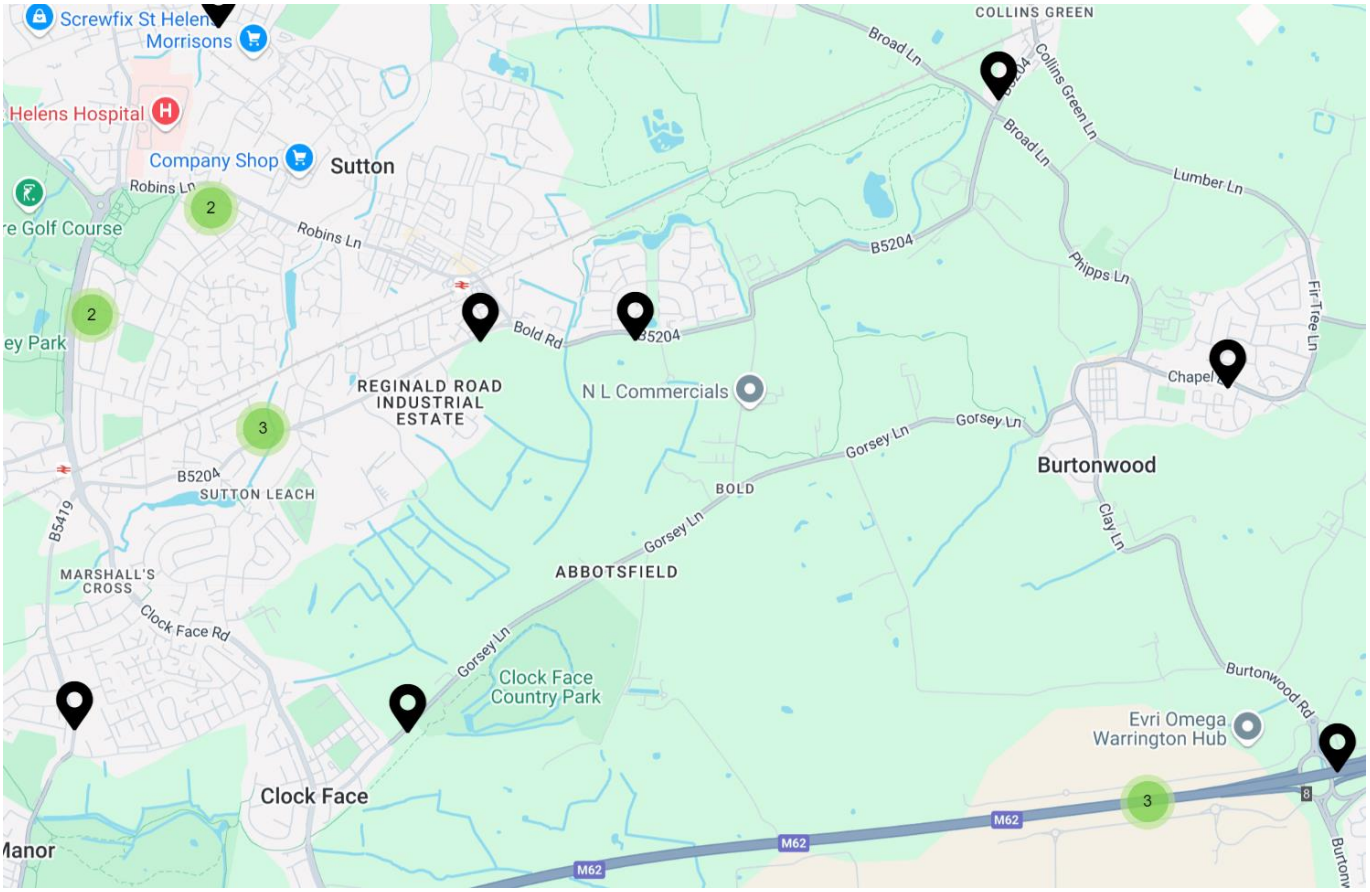
For small road links in the vicinity, SLR have sought traffic flow data from the Department for Transport (DfT).

Such data exists for many local road links in the vicinity of the proposed devleopment on the government web-based platform[4].

Traffic data is broadly presented in the format AADF (Average Annual Daily Flow). Broad equivalency has been drawn with AADT (average annual daily traffic), as is typically used for acoustic modelling purposes and is considered sufficient for the present project stage.

Numerous data points are reflected below about the site boundary for smaller road links in the vicinity, these data points are presented in Figure F below.

Figure F: DFT Traffic Data Points



[4] https://roadtraffic.dft.gov.uk/#6/55.250/-1.000/basemap-regions-countpoints

4.2 Bold Forest Area- Action Plan

The Bold Forest Area Action Plan discusses various environmental factors related to the area as a whole, as relevant to this assessment of feasibility are some baseline noise measurements undertaken to inform the action plan.

The Action Plan states:

"The high background noise level is a major environmental detractor for both residents around the area and potential visitors to the Forest Park.".

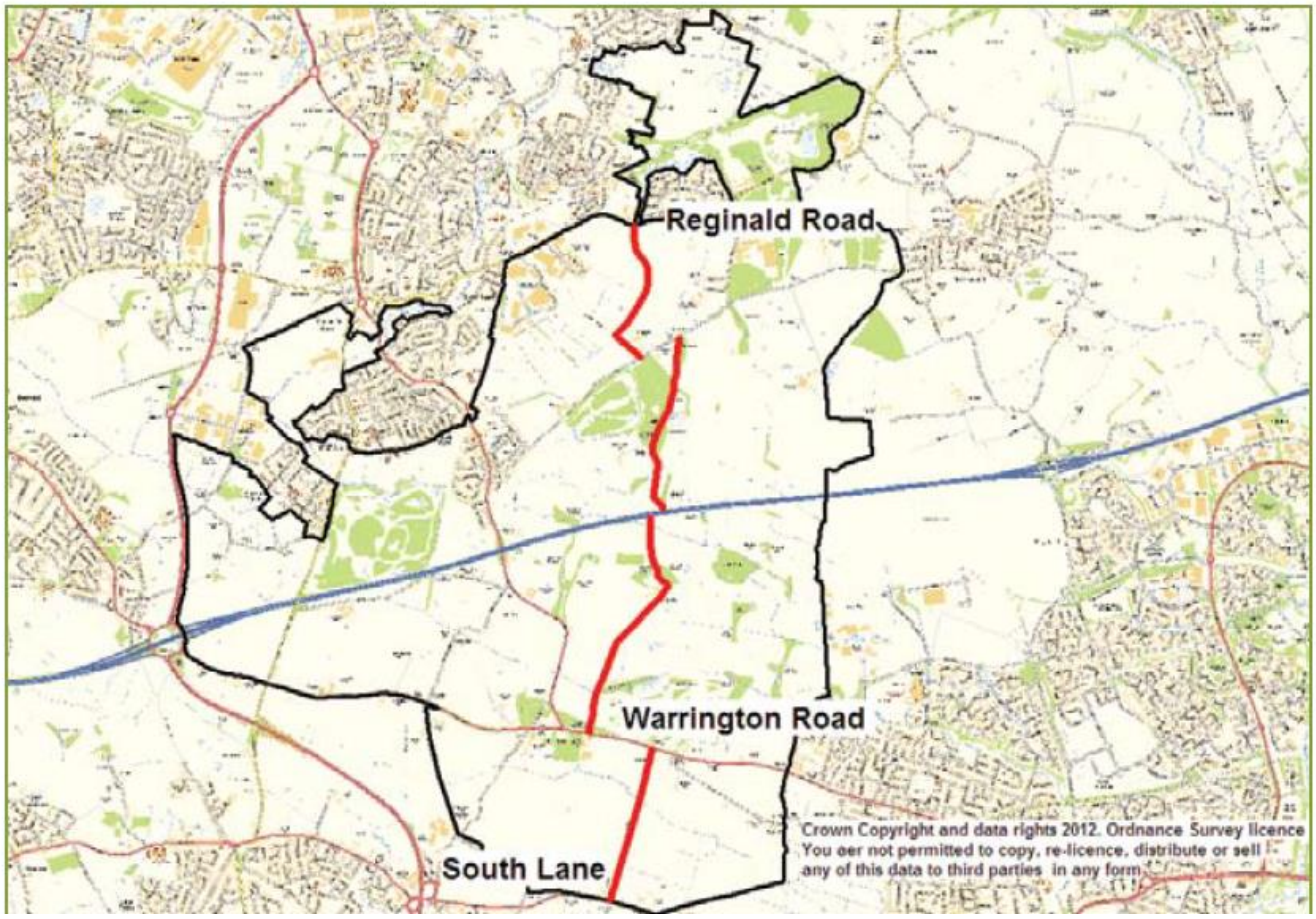
The Action Plan goes on to state:

"A transect survey with a 100m sampling frequency, undertaken along 5.5 km of the Forest Park from South Lane to Reginald Road, indicates that typical decibel levels are between 70 and 80 dB with clear peaks of over 90dB at the M62 motorway and main roads such as the A57 Warrington Road."

The above indicates that a relatively short sample measurement (presumed to be free field equivalent average sound level) has been captured at these locations.

The levels reported would be presumed to be at the locations shown below:

Figure G: Noise Transect Data Points



It should be considered that short term measurements (circa 1.5h) would not necessarily reflect long term 16hr (day) and 8 hr (night) average ambient noise levels. Particularly where the time-of-day measurements were undertaken is not reported (and thus relative intensity of anthropomorphic activity).

Nonetheless peak noise levels of 90dB (assumed maximum noise event level L_{AFMax}) in proximity to the M62 would not be unusual, and 70dBA (assumed L_{Aeq}, equivalent average noise level) at Reginal Road

(considering -3dB per doubling of distance for a line noise source from the M62, as well as localised traffic sources) is also not unexpected, and has been considered in calibration of the indicative baseline modelling enclosed in this risk assessment.

5.0 Agent of Change and Commercial and Industrial Activity Noise Considerations

The site lies in a predominantly brownfield area, with mixed existing development comprising predominantly residential uses, in the immediate vicinity, as well as some commercial and industrial activity in the surround about the boundary of the site.

5.1 The “Agent of Change” Principle

The 'agent of change’ principle encapsulates the position that a person, business or developer (i.e. the agent) introducing a new land use is responsible for managing the impact of that change.

The practical issue that has arisen on occasion is that in circumstances where residents move into an area where noise is emanating from a long-standing commercial operation, this may have resulted in the Local Planning Authority (LPA) imposing additional licensing restrictions on the established licensed and/or permitted business.

NPPF provides guidance on the implementation of an 'agent of change' principle to place the responsibility for noise management measures on the incoming 'agent of change' in this instance the developer for which this application is being made. Particularly impacts above adverse, should be shown to be mitigated by design for incoming development with the view to protecting operation of existing commercial and industrial businesses in the surround.

Key points about "agent of change adverse":

- **Responsibility lies with the new development:**

When a new development is proposed near an existing business or community facility, the developer (considered the "agent of change") is responsible for managing any negative impacts like noise, pollution, or disruption caused by the new development to the existing use.

- **Mitigation measures:**

If the new development could significantly affect existing uses, the developer must implement suitable mitigation measures, like suitable acoustic design measures for dwellings and gardens, to minimize the adverse effects.

- **Planning applications:**

This principle is often considered during planning applications, where developers need to demonstrate how they will address potential "agent of change" issues with nearby properties.

Example scenario:

- A developer wants to build a new apartment complex near a steel works.
- The steel works business is already long established in the area and generates noise as part of its operations.
- Under the "agent of change" principle, the developer would need to incorporate acoustic design mitigation measures into the dwelling design development proposals to minimize noise impact on future residents once in situ.

Key business and commercial areas that might be noise generating and will warrant detailed baseline noise assessment and analysis of potential impact will be as below:

Businesses off Abbotsfield Road Including (but not exclusive of others which may warrant consideration):

- Kirkby Steel Tubes
- Pyramid Distribution
- Northern Connectors
- West Lancashire Steel
- IPS St Helens
- 151 Products
- X-Met Metals Ltd
- .M Utley Offshore
- Stone and Porcelain

Businesses off Brindley Road including (but not exclusive of others which may also warrant consideration):

- Go Green pelleting Services
- Royal Valeting Services
- Pyroplanet Fireworks
- PK Autos
- The Mini Restoration Company
- Adapa UK

Businesses to the North of Bold Road, And:

Businesses off Nellis Road at and about Bold Industrial Park including (but not exclusive of others which may warrant consideration):

- NL Commercials
- Elusive Recording Studios
- Rosehill Diner
- Pentre Engineering
- Bold Skip Hire
- Bold Tyre Centre

In summary, it is advised that an assessment should be undertaken to identify any additional acoustic mitigation needs for the site on the basis of commercial and industrial noise ingress into the site is undertaken from the key potential sources identified above, undertaken in accordance with BS4142:2014+A1:2019 *"Methods for rating and assessing industrial and commercial sound"* (BS4142).

However, in order to undertake an assessment in accordance with BS4142, a baseline environmental sound survey is necessary to be undertaken.

6.0 ProPG Assessment

6.1 Stage 1 – Initial Risk Assessment

The assessment method of ProPG has been applied to the development to understand the risks and design requirements to mitigate future proposals from environmental transportation noise sources. The assessment has been undertaken based on desktop transportation data modelling only, and it is advised this is validated via site surveys in due course before design decisions are made for potential development.

6.2 Noise Model

The sound predictions for the assessment have been undertaken using a proprietary software-based noise model, CadnaA®, which implements the full range of UK calculation methods. The calculation algorithms set out in ISO 9613-2:2024 have been used and the model assumes:

- A ground absorption factor of 0.5 (mixed ground conditions).
- Relative humidity of 70%.
- Air temperature of 10°C.
- Contour Data to include OS terrain data.
- A reflection factor of 2.
- The day and night noise maps have been presented at a grid height of circa 1.5 m above the railway to reflect noise levels incident at relative ground floor level for apartment living rooms, and bedroom, and in amenity areas across the current site, accounting for topography and expected footing elevation of the proposed development above the adjacent railway.

The effects of the existing noise climate impacting the proposed new scheme site location have been considered for this assessment, as stated modelling outputs are based on desktop traffic data and modelling in the public domain and should be reviewed and validated with baseline site noise surveying before any detialed design work is undertaken.

The scale has been set to be directly comparable with the negligible, low, medium and high risk of adverse effects categories set out within ProPG and has been used to provide a hierarchy of noise mitigation measures required to protect residences from road traffic noise.

It should also be noted that ProPG does not define specific threshold boundaries for negligible, low, medium, and high noise risk. However, SLR have defined 10dB delineations with reference to the scale provided in ProPG[5], as presented below in Figure H.

The ProPG transportation noise maps have been presented in for the daytime and night-time period, in Figure I and Figure J respectively.

It should be noted that the noise maps have been modelled at 1.5 m height above ground during the daytime to represent the height of a ground floor living room window or garden, and 1.5 m above the ground during the night to represent the height of a ground floor apartment window.

[5] Page 09 ProPG Stage 1 Figure 1 Initial Site Noise Risk Assessment

Figure H:ProPG Noise Risk Hierarchy

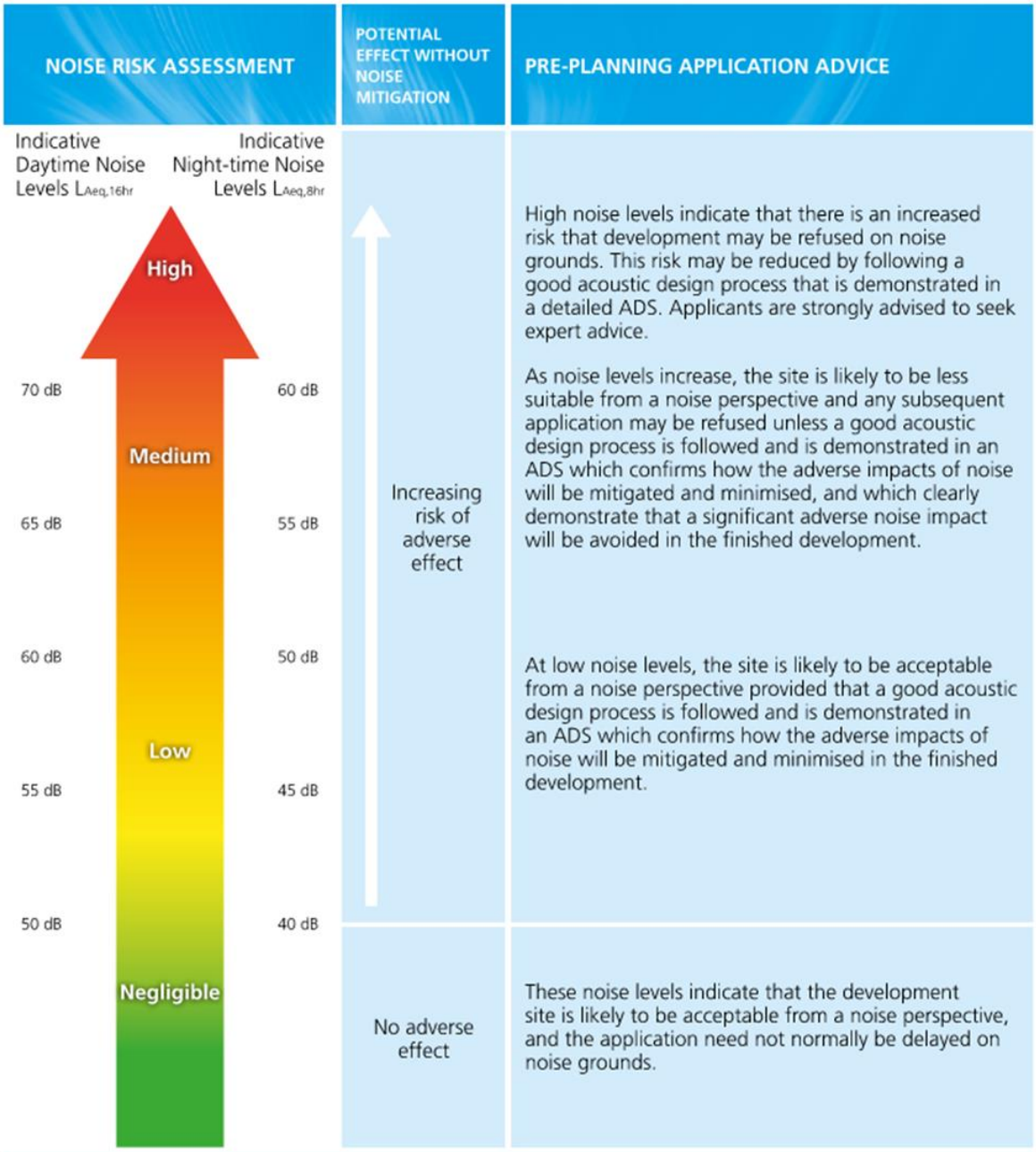


Figure 1 Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".

c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.

d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as negligible risk.

Figure I: Prediction of Road and Rail Noise Levels – Day $L_{Aeq,16h}$

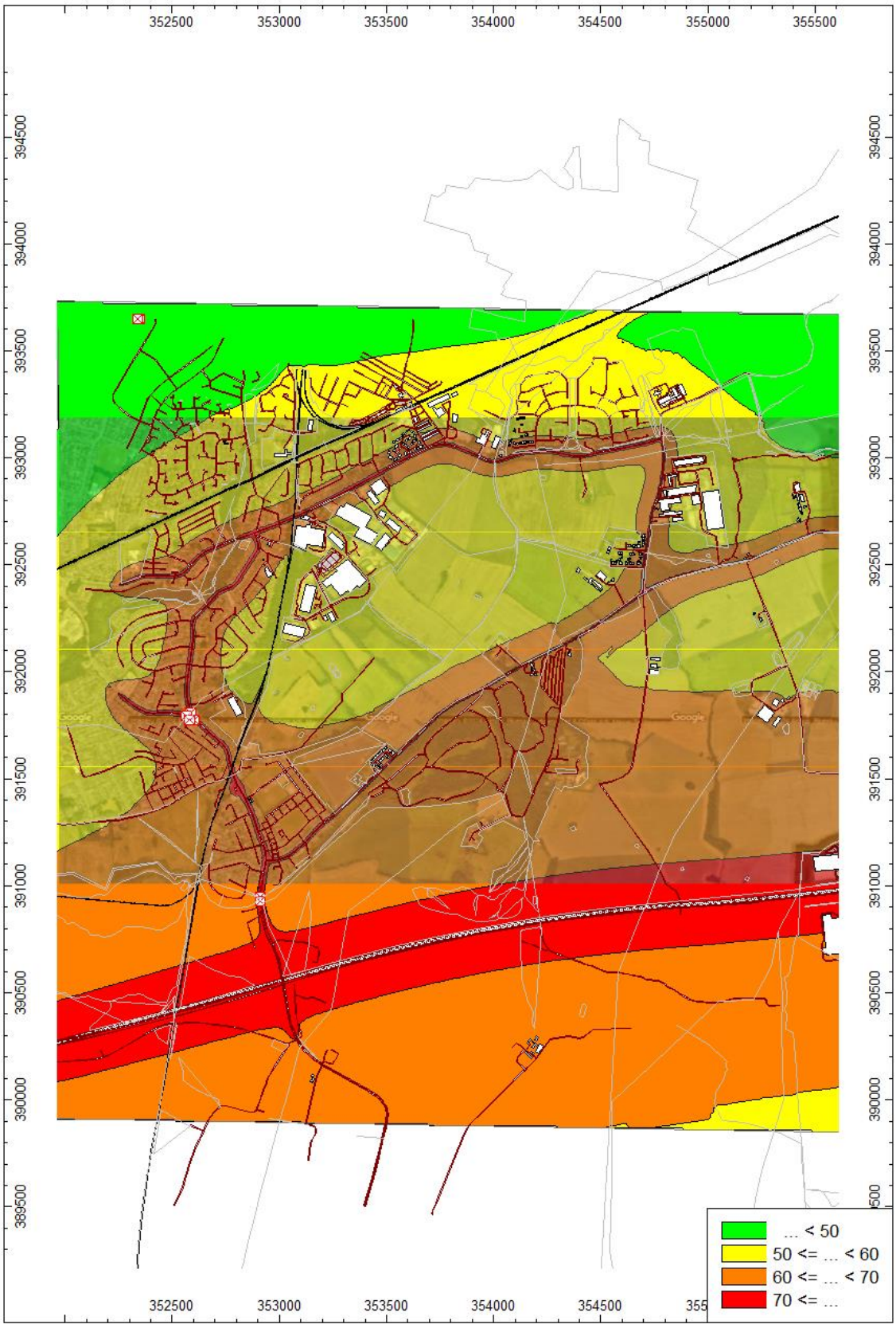
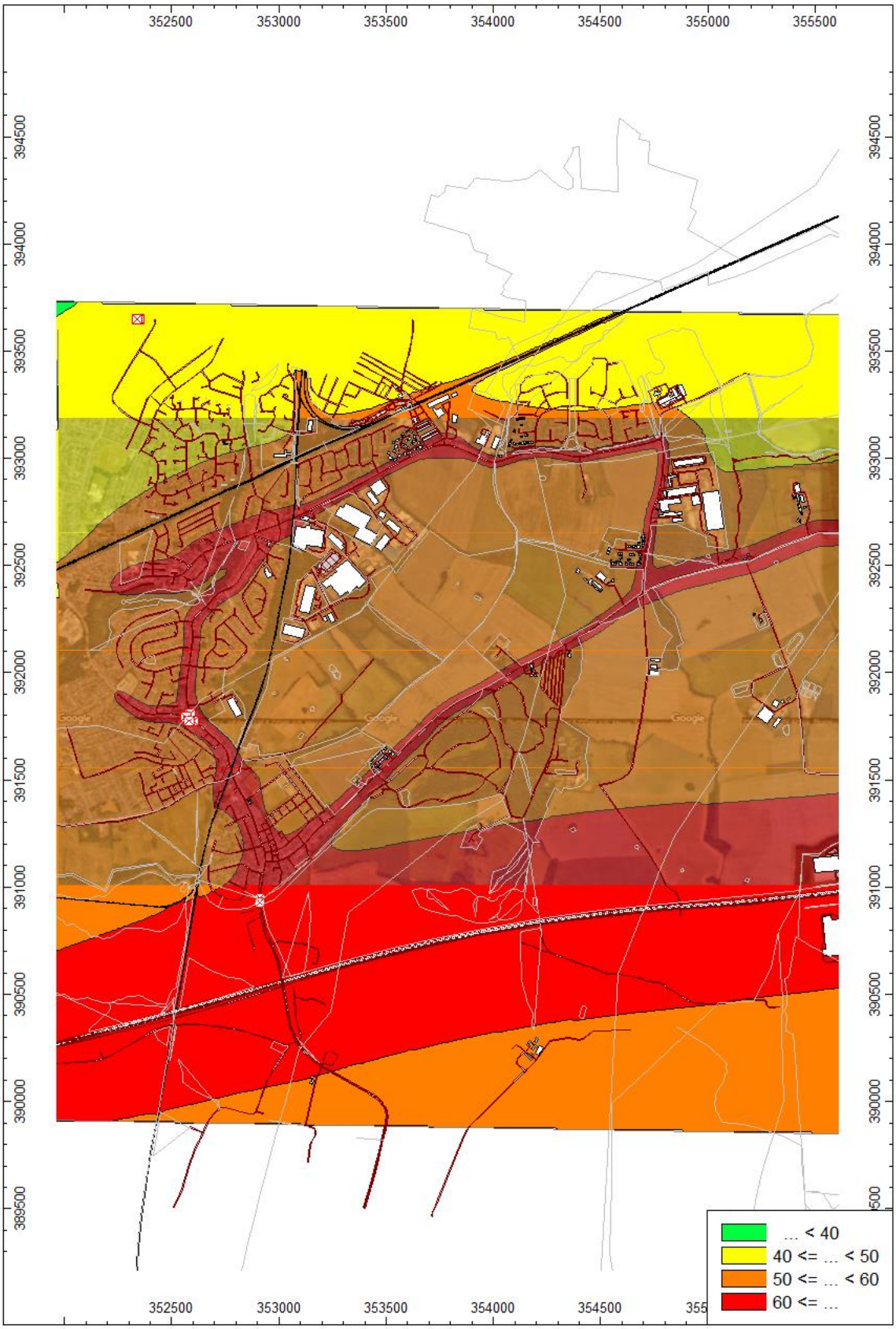


Figure J: Prediction of Road and Rail Traffic Noise Levels – Night $L_{Aeq,8h}$



The initial site noise risk assessment (in respect to transport noise sources as modelled from available public domain data) has been categorised as below.

The most prevalent environmental noise source across the site appears to emanate from transportation sources, particularly road traffic during the daytime and night as a result of the M62 running broadly parallel with the south site boundary. Some minor road traffic noise is also shown from minor “A” and “B” roads on the site periphery.

The initial Site noise risk assessment has been categorised quantitively:

In an unmitigated configuration for daytime the site boundary and outer areas falls into medium noise risk, for medium noise risk levels ProPG States:

> *“As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.”*

In an unmitigated configuration for daytime the site interior falls into low noise risk, for low noise risk levels ProPG States:

> *“At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.”*

In an unmitigated configuration for night time the site boundary and outer areas falls into high noise risk, for high noise levels ProPG States:

> *“High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.”*

In an unmitigated configuration for night time the site interior falls into medium noise risk, for Medium noise levels ProPG States:

> *“As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.”*

It is thus clear that generally this preliminary assessment of transportation noise levels across the site generally supports production of a further detailed ADS (Acoustic Design Statement), maximum noise levels potentially incident have not been assessment presently, and this should factor (in particular) into nighttime noise risk and design mitigation assessments also.

Generally, a scheme of fully considered detailed acoustic design is required in the context.

Whilst some further recommendations are made below, it should be recognised that the remainder of this document does not constitute a complete ADS statement until such time as baseline surveying is undertaken to validate indicative noise modelling of transportation sources, and to fully quantify commercial and industrial noise sources towards the site boundary.

Any such document should be produced by an SQA (suitably qualified acoustician).

6.3 Stage 2 – Full Assessment

Once the industrial noise contribution to the site soundscape has been considered in detail and transport noise modelling assumptions validated by measurement, the masterplan devleopment process should include the below considerations to optimise the site master planning exercises in accordance with ProPG Stage 2 within a formal ADS.

6.3.1 Good Acoustic Design Process

ProPG has stated it is imperative for acoustic design to be considered at an early stage of the development control process, as to avoid unreasonable acoustic conditions and prevent those which are unacceptable.

The main requirements for Good Acoustic Design have been explained relative to transport sources incident on the site. However, some indicative measures may also be particularly relevant and useful to control of industrial and commercial noise source ingress into the site if later found to be a significant contribution to the existing noise climate.

6.3.1.1 Barriers Bunds, Terrace Barrier Blocks

Multi storey “barrier” apartment blocks or terrace town housing may afford opportunities to screen dwellings within the interior of the site, with sensitive rooms also orientated toward the site interior protecting ocupants when resting or sleeping via screening.

6.3.1.2 Standoff distances

There are viewed to be opportunities for creating substantial standoff of distance value for acoustic mitigation purposes in those areas identified as having a noise climate more influenced by commercial industrial or road traffic noise sources.

SUDs, other drainage features, and communal amenity space (which is less sensitive acoustically) could be afforded to those areas deemed less acoustically suitable for dwellings towards key noise sources in the vicinity.

6.3.1.3 Topography

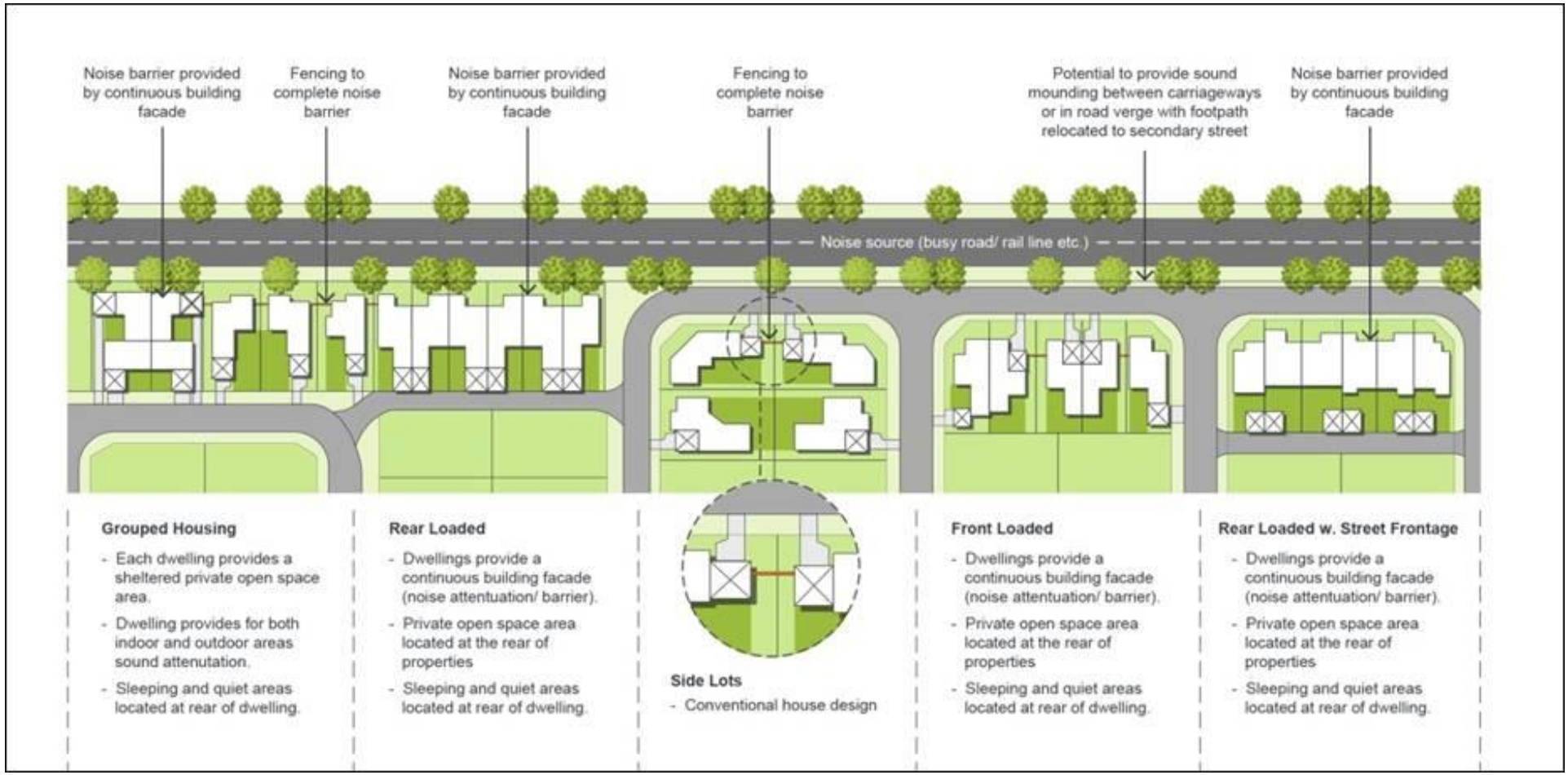
There are not any specific topographical benefits presently.

6.3.1.4 Plot Orientation

Orientation has been viewed primarily useful to afford best optimisation to sensitive rooms within apartments or houses which are generally on external elevations.

Examples of acoustically optimised master planning concepts, and dwelling optimisation are provided below, based on guidance from Camden Devleopment Control. This provides useful site layout insights in other contexts.

Figure K: Site Massing Optimisation



6.3.1.5 Internal layout

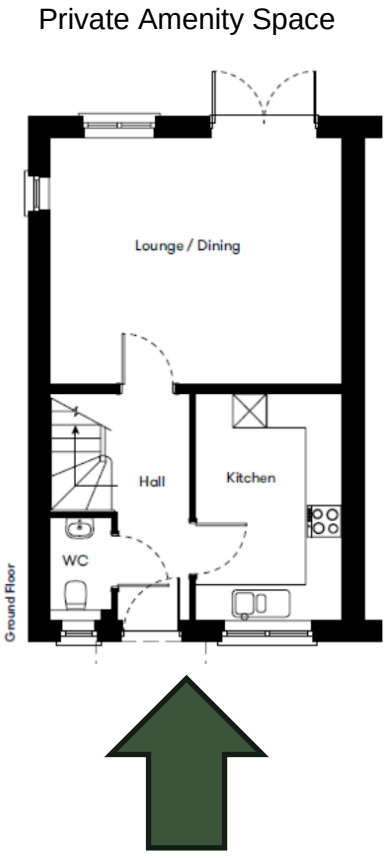
It has been acknowledged that ‘good acoustic design’ generally requires facing less-sensitive rooms (i.e., kitchens and bathrooms) towards the dominant incident noise sources. However, this is not always achievable.

Nonetheless in key apartments or dwelling houses adjacent or close to transport links it is preferred that bedrooms are not positioned to orientated on the highest noise exposed façade, and window areas along this façade should be reduced relative to other less noise exposed orientations.

Amenity spaces should also be orientated away from transportation noise sources

Consideration should next be given to acoustic design of building fabric, glazing and ventilation associated with apartments, as well as assessment of noise levels in any private amenity spaces associated with the development.

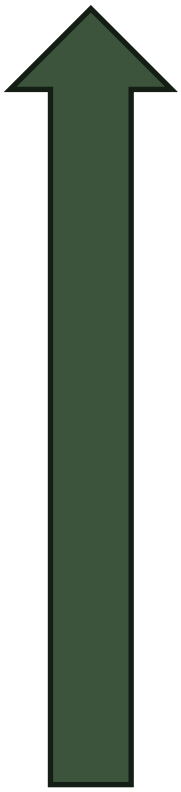
Figure L: Dwelling Internal Layout Optimization



6.3.1.6 Hierarchy of Mitigation

Table E below outlines a summary hierarchy of the order of implementation for acoustic mitigation measures in the context of residential master planning.

Table E: Summary of mitigation -Implementation Hierarchy

Order of Preference	Mitigating Measure	Summary Measure
Highest  Lowest	Investigate feasibility of reducing existing noise levels and relocating existing noise sources.	Reduce at source
	Maximise spatial separation between noise source(s) and receiver(s).	Attenuate through the propagation path
	Use existing structures and land topography to screen the proposed development from existing and significant source(s) of noise.	
	Incorporate new structures (such as noise barriers) into the scheme to cause a physical interruption between the significant noise source(s) and receiver(s). This also includes the placement of less-noise sensitive buildings closer to the noise source(s) where possible in the scheme.	
	Use the proposed layout of the scheme to reduce noise propagation across the site.	Mitigate at the receiver
	Use the orientation of noise-sensitive buildings to reduce the noise exposure of noise-sensitive rooms (e.g. bedrooms and living rooms) by facing them away from the significant source(s) of noise.	
	Use the acoustic design of the building to mitigate noise to acceptable levels inside, through façade design and insulation.	

6.3.2 Overheating Risk

The AVO Guide has been published for application by practitioners when following Stage 2 Element 1 of good acoustic design within ProPG. This extended guidance document has aimed to assist designers to adopt an integrated approach to the acoustic design within the context of the ventilation and thermal comfort requirements.

It has been acknowledged from the AVO guide that there is a need to address how the ventilation strategy and overheating impacts the acoustic conditions and whether a more-informed strategy is required in the mitigation of overheating.

The advice in this section has so far considered the internal ambient noise level with closed windows under Building Regulations ventilation conditions. The AVO guide has informed that acoustic assessments should also be formed for the overheating ventilation condition, which in the first instance has been considered with open windows.

Assessment should consider the Building Regulations Approved Document O: Overheating[6], noise limits provided at ≤ 40 dB $L_{Aeq,T}$ and 55 dB $L_{Amax(F)}$ at night (23:00 – 07:00) in all areas of the Site.

It has been considered that some areas of the future proposed development at The Site would be constrained by average ambient noise levels as a result of local and distant transportation sources, maximum noise level events will also need consideration, such that feasibility of achieving suitable IANL conditions with open windows (whether fully or partially open) can be assessed in detail.

As part of this, a full overheating assessment should be provided for all the Plot types with respect to their orientation within the scheme once design parameters are known.

Table B-5 of the AVO Guide has indicated that passive ventilation approaches could likely remain possible to adopt for the entire development, with passive attenuated ventilation commensurate for dwellings, if providing at least 23 dB attenuation from external to internal areas in the worst-case, while providing a suitable ventilation airflow rate.

Attenuated louvres, vents, or plenum windows have defined possible design solutions to overcome external noise ingress during an overheating condition in these instances.

A recent opinion paper[7] has highlighted successful applications of such passive attenuated approaches in residential design.

It should be generally understood that mechanical ventilation fans would also likely be used to provide overheating airflow rates where opening windows may not be feasible due to external noise ingress. In these instances, the noise from the mechanical system combined with the noise entering the building through supply and/or extract ducting must not compromise the IANL conditions of a bedroom beyond 40 dB $L_{Aeq,T}$ and 55 dB $L_{Amax(F)}$ at night (23:00 – 07:00).

The location for any mechanical apertures has been considered most suitable facing away from incident transport or commercial industrial noise sources as far as possible likely into the site interior given the opportunities presented by the current masterplan.

Further calculations may also be necessary in accordance with a suitable method (such as CIBSE).

[6] The Building Regulations 2010 Requirement O1: Overheating mitigation, 2021 Edition. As applicable to a building notice or full planning application submitted after 15th June 2022.

[7] Conlan, N and Harvie-Clark, J. Methods of controlling noise levels and overheating in residential buildings. Presented at 24th international congress on sound and vibration (ICSV24), July 2017.

It should be noted that Part O is a building regulation, and controlled outside of UK planning mechanisms, as such the above is considered sufficient evidence of a considered assessment at the present design stage.

Nonetheless It should be noted that many authorities expect to review a conceptual overheating mitigation plan including acoustic design requirements and recommendations at planning stage.

The table below summarises overheating control passive ventilation options where opening windows is later found to be acoustically unacceptable.

Table F: Alternative Passive Acoustically Controlled Venation and Overheating Control Air Path Mechanisms

Design Option	Description and Reference	Approximate Level Difference (External Free Field to Internal Reverberant)	Improvement Relative to Window.	
			Background Ventilation Condition	Overheating Cooling & Ventilation Condition.
Standard Opening Windows	Window(s) open sufficiently to provide an acoustic free area equivalent to 2% of the floor area. (Background ventilation)	Background Ventilation Condition 13 dB	Not Applicable.	
	Window(s) open sufficiently to provide a acoustic free area equivalent to 5% of the floor area. (Moderate overheating risk)	Overheating Control 9 dB (Moderate overheating risk).		
	Window(s) open sufficiently to provide an acoustic free area equivalent to 15% of the floor area. (High overheating risk)	Overheating Control 4 dB (High overheating risk)		
Open Windows with Sound Attenuation Balconies	Windows as above, Balconies may have a solid balustrade, or be enclosed to maintain a further degree (maintaining an open area for ventilation). Absorption may be provided to the soffit, and other surfaces.	17 – 23 dB	4 – 10 dB	
Attenuated or Plenum Windows.	Dual (Paired) Window Sets -typical spacing 200mm with staggered openings, and acoustically absorptive reveals.	17 – 24 dB	4 – 11 dB	
Attenuated Vents or Louvres.	Ventilation openings with integral means of acoustic attenuation. Typically, this could comprise acoustic louvres, or acoustically attenuated ducted grills to atmosphere.	17 – 29 dB	4 – 16 dB	
Attenuated windows or vents/ louvres with sound attenuating balconies	Combined use of balconies to provide screening and acoustically attenuated windows or vents. Refer to above for description of each element.	21 – 39 dB	8 – 26 dB	

7.0 External Amenity Noise Level Assessment

7.1 Amenity Overview

According to BS8233 and ProPG, private amenity spaces i.e. gardens, should have an area within them such that daytime noise levels are below the lower guideline value of ≤ 50 dB $L_{Aeq,16h}$ to provide a suitably protected, quiet and tranquil outdoor space, and not exceed an upper limit of 55 dB $L_{Aeq,16h}$.

However, it is not necessarily essential for an entire garden to achieve this, nor is it often practical in environments with relatively high prevailing noise levels to do so.

As such, it is normally considered reasonable to provide mitigation measures to protect external amenity where external noise levels would otherwise exceed 50-55 dB $L_{Aeq,16h}$ on the basis that part of the garden will achieve these levels.

Presently baseline information is not sufficient to undertake detialed modelling exercises, this should be undertaken once indicative site massing is understood.

Consideration for mitigation via building massing, and garden fence screening can then be accommodated into the master planning exercise.

8.0 Next Steps

After submission and review of this document by the design team. The below steps which are beyond the scope of this assessment are suggested to better quantify the existing baseline environment and allow specific design recommendations in respect to acoustic mitigation to be made:

- Undertake 5-7 day baseline noise survey capturing all key noise and sound modelling metrics.
- Assessment of commercial and industrial noise sources with respect to significance at proposed dwelling receptors, and potential conflict of interest with the “Agent of Change” principal under the NPPF.
- Validate and update noise modelling to actual measured data.
- Establish dwelling design requirements including:
    - Glazing,
    - Ventilation and;
    - Overheating mitigation (matters pertaining to acoustics)
- Establish design limits for any new mechanical service plant associated with the scheme.
- Establish external garden/amenity space design mitigation requirements in respect to the acoustic criteria enclosed in BS8233:2014 and ProPG.
- Assess potential noise impacts on the existing road traffic network as a result of flow increase and subsequent noise climate influence from devleopment traffic associated with the scheme.

9.0 Conclusions

This feasibility stage noise impact assessment provides review of the baseline information presently available in the public domain, and makes preliminary and indicative recommendations for further work to facilitate the acoustic design of any future residential schemes.

Commentary has been provided in respect to a Stage 1 assessment in accordance with ProPG. This has provided that the sound climate at the majority of the site is likely to be most significantly influenced by rail and road traffic noise.

Consideration has also been given to future assessment of commercial and industrial noise sources which will influence any acosutic design mitigation measures made.

The initial desktop site noise risk assessment has been categorised in the worst case as ‘high risk’ on the future occupants of the new noise sensitive development at night towards the site boundary.

However much of the site likely falls into significantly lower noise risk categories ranging from low to moderate from transport noise sources.

The above assessment should be validated with baseline survey data and an update to noise modelling exercises undertaken.

Stage 2 assessment in accordance with ProPG has not been undertaken in full at the present time.

SLR has outlined a typical good acoustic design process, considering optimised internal ambient noise levels, external amenity areas and other matters.

Commensurate design specifications should be established considering current industry guidance at the appropriate design stage.

Nonetheless It has been anticipated that provided such a detailed design process is undertaken, likely suitable internal and external amenity standards can be achieved by the scheme.

10.0 Closure

The assessment has required a suitable level of technical ability and has been undertaken by a Suitably Qualified Person (SQP). An individual with all the following credentials has been considered a SQP for this assessment:

- Has a minimum of three years' verifiable experience (within the last five years) of providing noise impact assessments in planning. Such experience has clearly demonstrated a practical understanding of factors affecting acoustics in relation to the proposed development use and in the built environment in general, including acting in an advisory capacity to provide recommendations and design advice in planning, and;
- Holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK is the Institute of Acoustics.

This assessment has been led and managed by a SQP as defined above.

Where some elements of the assessment (e.g. measurements) have been carried out by an acoustician who does not meet the requirements above, this has been undertaken with the direct guidance and supervision of a SQP who has reviewed, agreed and overseen the measurement methodology and any results obtained.

The SQP confirms that the relevant measurements and calculations:

- Represent good industry practice in accordance with available guidance.
- Are appropriate given the development being assessed and scope of works proposed.
- Avoid invalid, biased and exaggerated claims.

The checker and author of this document confirm that they both comply with the definition of a SQP defined in this Section.

Regards,

SLR Consulting Limited

Vince Taylor, BSc. (Hons) MSc MIOA
Technical Director-Acoustics

Aaron Tomlinson, BSC. (Hons) MIOA
Principal Acoustic Consultant

Appendix A Glossary of Terminology

Feasibility Stage Noise Risk Assessment

Bold Forest Garden Village

SLR Project No.: 410.066257.00001

29 April 2025

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A-1: Sound Levels Commonly Found in the Environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

Acoustic Terminology

dB (decibel) — The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (of 20 µPa).

dB(A) — A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

$L_{Aeq, T}$ — $L_{Aeq, T}$ is defined as the notional steady sound level which, over a stated period T, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

$L_{A10, T}$ & L_{A90} — If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L90 is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L10 index to describe traffic noise.

$L_{Amax(F)}$ — $L_{Amax(F)}$ is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

Appendix B Overheating Control Additional Guidance

Feasibility Stage Noise Risk Assessment

Bold Forest Garden Village

SLR Project No.: 410.066257.00001

29 April 2025

Acceptable Strategies for Reducing Overheating Risk

Limiting solar gains

Solar gains in summer should be limited by any of the following means.

Fixed shading devices, comprising any of the following

i. Shutters.

ii. External blinds.

iii. Overhangs.

iv. Awnings.

Glazing design, involving any of the following solutions.

i. Size.

ii. Orientation.

iii. g-value.

iv. Depth of the window reveal.

Building design

For example, the placement of balconies.

Shading provided by adjacent permanent buildings, structures or landscaping.

Although internal blinds and curtains provide some reduction in solar gains, they should not be taken into account when considering whether requirement O1 of ADO has been met.

Foliage, such as tree cover, can provide some reduction in solar gains.

However, it should not be taken into account when considering whether requirement O1 of ADO has been met.

NOTE: Examples of solar shading and their effectiveness are provided in the Building Research Establishment's BR 364 Solar Shading of Buildings

Removing Excess Heat

Excess heat should be removed from the residential building by any of the following means in order of hierarchy (likely controlled by noise risk)

a. Opening windows (the effectiveness of this method is improved by cross-ventilation).

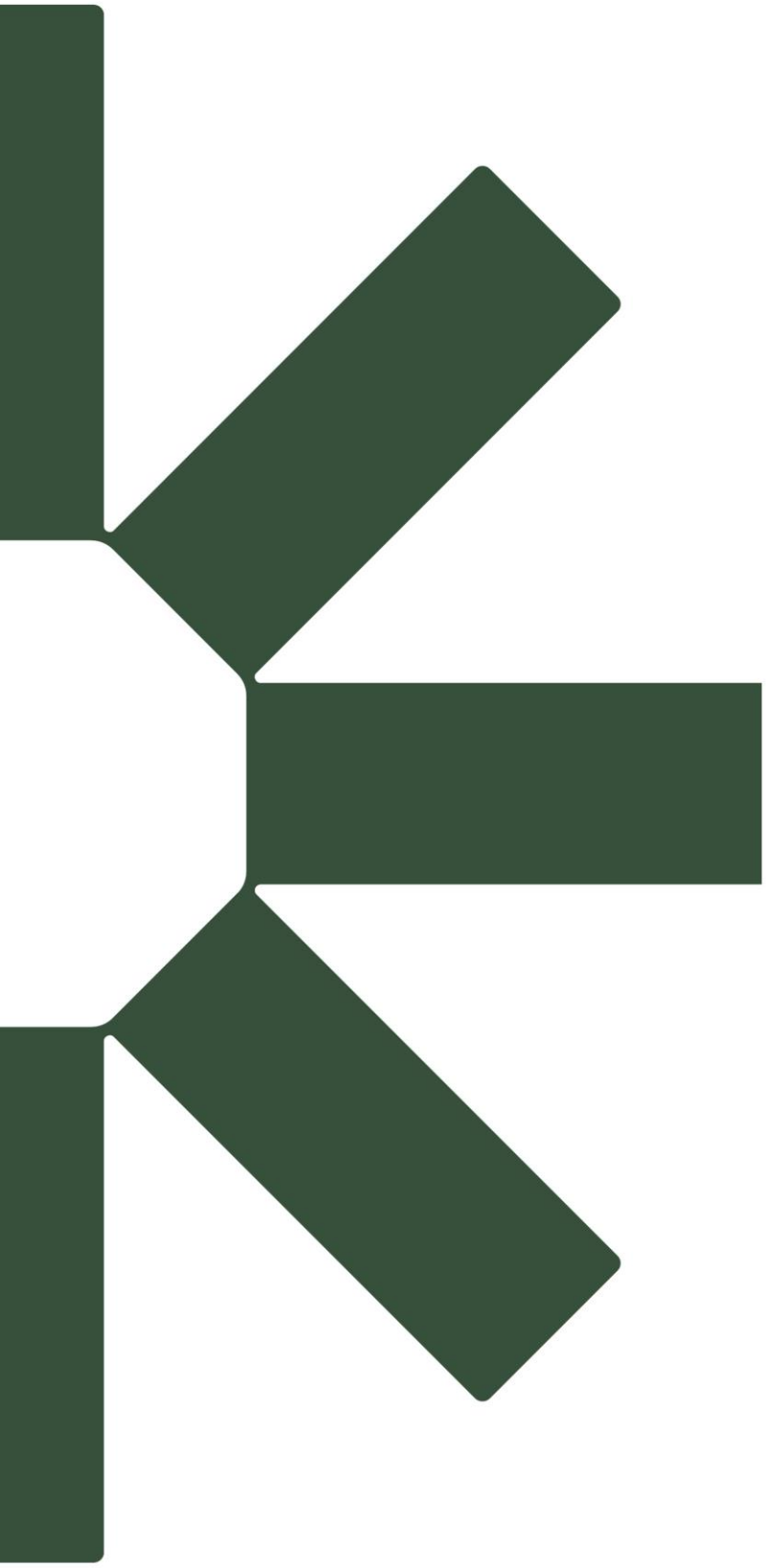
b. Ventilation louvres in external walls.

c. A mechanical ventilation system.

d. A mechanical cooling system

The building should be constructed to meet requirement O1 of ADO using passive means as far as reasonably practicable.

It should be demonstrated to the building control body that all practicable passive means of limiting unwanted solar gains and removing excess heat have been used first before adopting mechanical cooling.



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