
MILLER GOODALL
ACOUSTICS AND AIR QUALITY

# NOISE ASSESSMENT

**on behalf of**

## CAMPBELL REITH LLP

**for the site at**

## FRIAR PARK ROAD, SANDWELL

## REPORT DATE: 24 MAY 2022

## REPORT NUMBER: 102640-3

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# Summary

A noise assessment was undertaken to predict the potential impact of environmental noise sources at a proposed residential development at the Land off Friar Park Road, Sandwell.

This assessment report presents the results of an environmental noise and vibration survey, computer modelling, noise impact assessment and outline mitigation to limit impact from environmental noise.

With the implementation of the mitigation outlined the impact from environmental noise and vibration is not expected to be significant and residential development will be acceptable.

**Record of changes**

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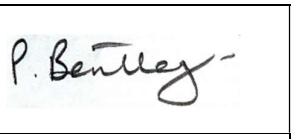
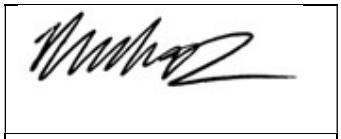
| Signed |  | Signed |  |
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# 1 Introduction

1.1 Miller Goodall Ltd has, on behalf of Campbell Reith LLP, undertaken an environmental noise impact assessment for a proposed residential development on land off Friar Park Road, Sandwell.

1.2 The aim of this assessment is to provide high-level design advice to ensure the site is suitable for residential development. We understand that future planning applications for the site will be brought forward by other third parties.

# 2 Site Description

2.1 The site is located off Friar Park Road, Sandwell. The site location is shown outlined in red in Appendix 1.

2.2 The site lies to the north of the urban area of Sandwell, and is to the south of the M6 motorway and Bescot Sidings. The site consists of a number of large open fields which are currently used as stabling for horses and for recreational use by dog walkers.

2.3 The main sources of environmental noise and vibration are the M6 motorway, Bescot Sidings and commuter railway to the North. Local road traffic noise is dominant on Friar Park Road along with a background hum from the M6 motorway.

2.4 Pulse Wednesbury is located to the southwest of the development site. This site benefits from planning approval with mitigation in the form of an acoustic barrier protecting existing residential properties to the west and proposed future residential properties to the north.

2.5 There is a small element of industrial and commercial activity around the AG Barr factory off Friar Park Road. No noise was ever evident from these areas during any of our surveys and any contribution of noise from these activities is therefore assumed to be insignificant.

# 3 Proposed Development

3.1 The proposal is to develop the site for residential development. Road access to the development site is gained off Friar Park. At this stage no layouts are known.

# 4 Policy Context

## 4.1 Noise Policy Statement for England

4.1.1 The Noise Policy Statement for England (NPSE[1]), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are:

[1] Noise Policy Statement for England, Defra, March 2010

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

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

4.1.2 The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and the quality of life occur.

4.1.3 The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the Statement). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case:

"…all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development".

4.1.4 Importantly, the NPSE goes on to state:

"This does not mean that such adverse effects cannot occur".

4.1.5 The Statement does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that:

"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available"

4.1.6 It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

## 4.2 National Planning Policy Framework

4.2.1 The National Planning Policy Framework (NPPF[2]) initially published in March 2012, was updated in July 2018. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise"[3].

[2] National Planning Policy Framework, Ministry of Housing, Communities and Local Government, July 2018

[3] Planning Policy Guidance 24: Planning and Noise, DCLG, September 1994

4.2.2 The revised NPgrePF advises that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives). One of these is an environmental objective which is described in par. 8 (c):

*"to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

4.2.3 At par. 170 we are advised that:

*"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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.*

4.2.4 Par. 180 goes on to state:

*"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

*a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*

*b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

## 4.3 Planning Practice Guidance – Noise

4.3.1 As of March 2014, a Planning Practice Guidance[4] for noise was issued which provides additional guidance and elaboration on the NPPF. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

4.3.2 In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

[4] Planning Practice Guidance – Noise, http://planningguidance.planningportal.gov.uk/blog/guidance/noise/, 06 March 2014

"…the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation".

4.3.3 Examples of these factors include:

- The source and absolute noise level of the source along with the time of day that it occurs;
- Where the noise is non-continuous, the number of noise events and pattern of occurrence;
- The frequency content and acoustic characteristics of the noise;
- The effect of noise on wildlife;
- The acoustic environment of external amenity areas provided as an intrinsic part of the overall design;
- The impact of noise from certain commercial developments such as night clubs and pubs where activities are often at their peak during the evening and night.

4.3.4 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

"Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed".

4.3.5 The PPG was amended in December 2014 to clarify guidance on the potential effect of noise from existing businesses on proposed new residential accommodation. Even if existing noise levels are intermittent (for example, from a live music venue), noise will need to be carefully considered and appropriate mitigation measures employed to control noise at the proposed accommodation.

# 5 Acoustic Standards and Guidance

## 5.1 ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development – May 2017

5.1.1 ProPG: Planning and Noise is new guidance with the aim of delivering sustainable development and promoting good health and well-being through the effective management of noise which may impact on new residential developments. The guidance aims to complement the national planning policy and encourages the use of good acoustic design at the earliest phase of the planning process. It builds upon the recommendations of various other guidance documents including NPPF, NPSE and PPG-Noise, BS 8233 and WHO.

5.1.2 The guidance is applicable to new residential developments which would be exposed predominantly to noise from existing transport sources. The ProPG advocates a risk based approach to noise using a two-stage process:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements: –
  - Element 1 – demonstrating a 'Good Acoustic Design Process';
  - Element 2 – observing internal 'Noise Level Guidelines';

- Element 3 – undertaking an 'External Amenity Area Noise Assessment'; and
- Element 4 – consideration of 'Other Relevant Issues'.

5.1.3 Stage 1 assessments provide for a risk-based approach. This approach allows for site sot be risk assessed to determine a Stage 2 assessment is required. The bandings for the risk assessment are shown in Table 1 below.

**Table 1: ProPG Stage 1 Risk Assessment**

| Risk Assessment | Free-field External Daytime $L_{Aeq,T}$ Level | Free-field External Night-time $L_{Aeq,T}$ Level | Free-field External Night-time $L_{AFmax}$ Level |
|---|---|---|---|
| Negligible impact | <50dB | <40dB | <60dB |
| Low impact | 50-60dB | 40-50dB | >60dB for up to 10 individual events per night |
| Medium impact | 60-70dB | 50-60dB | |
| High impact | >70dB | >60dB | |

5.1.4 The ProPG approach is underpinned by the preparation and delivery of an 'Acoustic Design Statement' (ADS), whereby the higher the risk for noise at the site, the more detailed the ADS. The ADS should address the following issues:

- Present the initial site noise risk assessment, including the pre-development acoustic conditions prior to development;
- Describe the external noise levels that occur across the site both before and after any necessary mitigation measures have been incorporated. The external noise assessment with mitigation measures in place should use an informed judgement of typical worst-case conditions;
- Demonstrate how good acoustic design is integrated into the overall design and how the proposed acoustic design responds to specific circumstances of the site;
- Confirm how the internal noise level guidelines will be achieved, including full details of the design measures and building envelope specifications;
- A detailed assessment of the potential impact on occupants should be undertaken where individual noise events are expected to exceed 45 dB $L_{AF,max}$ more than 10 times a night inside bedrooms;

- Priority should be given to enable the use of openable windows where practical across the development. Where this is not practical to achieve the internal noise level guidelines with windows open, then full details of the proposed ventilation and thermal comfort arrangements must be provided;
- Present the findings of the external amenity area noise assessment;
- Present the findings of the assessment of other relevant issues;
- Confirm for a low-risk site how adverse impacts of noise will be mitigated and minimised;
- Confirm for a medium or high noise risk site how adverse impacts of noise will be mitigated and minimised and clearly demonstrate that a significant adverse noise impact has been avoided.

5.1.5 ProPG target noise levels are based on existing guidance from BS 8233 and WHO (see below). Table 2 below outlines the guidance noise levels for different room types during day and night times.

**Table 2: ProPG guideline indoor ambient noise levels for dwellings**

| Activity | Location | 07:00 to 23:00 | 23:00 to 07:00 |
|---|---|---|---|
| Resting | Living Room | 35 dB $L_{Aeq,16hr}$ | - |
| Dining | Dining room/area | 40 dB $L_{Aeq,16hr}$ | - |
| Sleeping (daytime resting) | Bedroom | 35 dB $L_{Aeq,16hr}$ | 30 dB $L_{Aeq,8hr}$<br>45 dB $L_{Amax,F}$ |

5.1.6 The footnotes to this table suggest that internal noise level limits can be relaxed by up to 5 dB where development is considered necessary or desirable, and still represent “reasonable” internal conditions. They also suggest that in such cases, external levels which exceed WHO guidance target levels (see WHO section below) may still be acceptable provided that reasonable internal noise levels are achieved. Although, where the acoustic environment of external amenity areas is intrinsic to the overall design, “noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$”. The wording of ProPG (and BS 8233:2014) is clear that exceedance of guideline noise levels in external areas should not prohibit the development of desirable developments in any event.

## 5.2 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

5.2.1 This standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999) . These guideline noise levels are shown in Table 3 below.

**Table 3: BS 8233:2014 guideline indoor ambient noise levels for dwellings**

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

5.2.2 BS 8233:2014 advises that:

> *"regular individual noise events…can cause sleep disturbance. A guideline value may be set in terms of SEL[5] or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".*

5.2.3 BS 8233:2014 adopts guideline external noise values provided in WHO for external amenity areas such as gardens and patios. The standard states that it is "desirable" that the external noise does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ whilst recognising that development in higher noise areas such as urban areas or those close to the transport network may require a compromise between elevated noise levels and other factors that determine if development in such areas is warranted. In such circumstances, the development should be designed to achieve the lowest practicable noise levels in external amenity areas.

## 5.3 World Health Organisation (WHO) Guidelines for Community Noise 1999

5.3.1 The WHO Guidelines 1999 recommends that to avoid sleep disturbance, indoor night-time guideline noise values of 30 dB $L_{Aeq}$ for continuous noise and 45 dB $L_{AFmax}$ for individual noise events should be applicable. It is to be noted that the WHO Night Noise Guidelines for Europe 2009[6] makes reference to research that indicates sleep disturbance from noise events at indoor levels as low as 42 dB $L_{AFmax}$. The number of individual noise events should also be taken into account and the WHO guidelines suggest that indoor noise levels from such events should not exceed approximately 45 dB $L_{AFmax}$ more than 10 – 15 times per night.

[5] Sound exposure level or $L_{AE}$

[6] WHO Night Noise Guidelines for Europe 2009

5.3.2 The WHO document recommends that steady, continuous noise levels should not exceed 55 dB $L_{Aeq}$ on balconies, terraces and outdoor living areas. It goes on to state that to protect the majority of individuals from moderate annoyance, external noise levels should not exceed 50 dB $L_{Aeq}$.

## 5.4 BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings (Part 1: Vibration sources other than blasting)

5.4.1 BS 6472-1: 2008 *Guide to evaluation of human exposure to vibration in buildings – Part 1 Vibration sources other than blasting*, provides general guidance on human exposure to building vibration in the range of 0.5 Hz to 80 Hz. The standard sets out the measurement methodology procedure to be used, including suggested measurement positions, the evaluation methods and the reporting and information to be included in a report.

5.4.2 The standard presents the concepts of vibration dose value (VDV) and estimated vibration dose value (eVDV) as the appropriate measurement parameters. Where the vibration is continuous and does not vary in its magnitude over time, the eVDV may be used to approximate the VDV value. Where the vibration is time varying such as is the case with trains passing by a given location, this approach is not recommended.

5.4.3 The human response to vibration exposure varies depending upon the displacement, the frequency, how it varies over time, and the duration of exposure. The calculation of VDV incorporates these factors and includes a frequency weighting to give a better correlation with human response than say root mean squared (RMS) methods, where the vibration is of short duration and of high amplitude.

5.4.4 The units of measurement of VDV are metres per second raised to the power of minus 1.75 (or $ms^{-1.75}$).

5.4.5 The standard provides a table of recommended vibration dose values with which the estimated daytime 16 hour and night-time 8 hour dose values are to be assessed to establish the likelihood of adverse comment. These values are reproduced in **Error! Reference source not found.** below.

**Table 4: Likelihood of adverse comment to vibration in residential buildings**

| Location | Low Probability of Adverse Comment* | Adverse Comment Possible | Averse Comment Probable** |
|---|---|---|---|
| Residential Buildings (07:00 to 23:00hrs) | 0.2 to 0.4 $ms^{-1.75}$ | 0.4 to 0.8 $ms^{-1.75}$ | 0.8 to 1.6 $ms^{-1.75}$ |
| Residential Buildings (23:00 to 07:00hrs) | 0.1 to 0.2 $ms^{-1.75}$ | 0.2 to 0.4 $ms^{-1.75}$ | 0.4 to 0.8 $ms^{-1.75}$ |

* Below these ranges adverse comment is not expected

** Above these ranges adverse comment is very likely

The above values apply to both vertical and horizontal vibration using appropriate frequency weightings.

## 5.5 BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites Part 2: Vibration.

5.5.1 BS 5228:2009 Parts 2 (Vibration) provides guidance and recommendations on minimising potential vibration impacts through the adoption of Best Practicable Means (BPM).

5.5.2 General measures include minimising plant on-times and revving engines, modification of plant, enclosures around noisy activities, installation of acoustic screening around plant, activities, or at the boundary of nearby dwellings.

5.5.3 The standard also provides threshold limits for vibration impact from peak particle velocity. These limits provide useful thresholds to assess vibration from train pass-by events. Table 5 presents these thresholds.

**Table 5: BS5228 PPV Thresholds**

| Vibration Level PPV $mms^{-1}$ | Effect |
|---|---|
| $0.14mms^{-1}$ | Vibration might be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration. |
| $0.3mms^{-1}$ | Vibration might just be perceptible in residential environments |
| $1.0mms^{-1}$ | It's likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents |
| $10mms^{-1}$ | Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments |

# 6 Noise & Vibration Survey

## 6.1 Noise Survey

6.1.1 A mix of attended and unattended noise surveys were carried out at the site to characterise the noise climate. Measurements were made at locations shown in Appendix 2. The summary noise survey results can be found in Table 6 below.

6.1.2 The noise climate was dominated at all positions by distant road traffic, with $L_{AFMax}$ sound levels at MP5 and MP6 driven by rail pass by events and train horn events at Bescot Sidings and on the commuter rail line.

**Table 6: Summary noise survey data**

| Survey Location | Date | Start Time | Elapsed Time (hh:mm:ss) | $L_{Aeq,T}$ (dB - range) | Overall $L_{AFmax}$ (dB) | $L_{AF10,T}$ (dB - range) | $L_{AF90,T}$ (dB - range) |
|---|---|---|---|---|---|---|---|
| MP1 | 14/10/21 | 14:30-17:00 | 00:45:00 | 52-58 | 57-64 | 52-58 | 49-55 |
| MP2 | 14/10/21 | 15:00-16:30 | 00:30:00 | 51-52 | 57-69 | 52-55 | 46-49 |
| | 15/10/21 | 10:55 | 00:15:00 | 52 | 60 | 53 | 50 |
| | 12/11/21 | 13:30 | 00:45:00 | 46-48 | 59-63 | 47-50 | 45-46 |
| MP3 | 15/10/21 | 12:00 | 00:45:00 | 57 | 66-74 | 52-54 | 54-55 |
| MP4 | 15/10/21 | 12:30 | 00:45:00 | 62-63 | 79-80 | 66-67 | 51-53 |
| | 12/11/21 | 13:00 | 00:45:00 | 61-62 | 72-77 | 65-67 | 51-52 |
| MP5 (unattended) | 10/11/21 | 15:45 | 07:15:00 | 52 | 76 | 54 | 50 |
| | 10/11/21 | 23:00 | 08:00:00 | 55 | 88 | 58 | 46 |
| | 11/11/21 | 07:00 | 16:00:00 | 53 | 84 | 56 | 47 |
| | 11/11/21 | 23:00 | 08:00:00 | 54 | 82 | 55 | 49 |
| | 12/11/21 | 07:00 | 05:30:00 | 53 | 76 | 54 | 51 |
| MP6 (unattended) | 10/11/21 | 15:45 | 7:45:00 | 57 | 83 | 57 | 51 |
| | 10/11/21 | 23:00 | 8:00:00 | 57 | 87 | 58 | 49 |
| | 11/11/21 | 07:00 | 16:00:00 | 57 | 90 | 58 | 50 |
| | 11/11/21 | 23:00 | 8:00:00 | 58 | 88 | 56 | 49 |
| | 12/11/21 | 07:00 | 8:49:59 | 56 | 86 | 56 | 51 |

## 6.2 Vibration Survey

6.2.1 Attended vibration surveys were carried out at the site to characterise the vibration levels at the site boundary, approximately 20m from the nearest track side location. Surveys were completed at three positions over individual 1hr periods for each position. Measurements were made at locations shown in Appendix 3. The summary vibration survey results can be found in Table 7 below.

**Table 7: Summary vibration survey data**

| Survey Location | Date | Start Time | Estimated VDV 16hr $mms^{-1.75}$ | | | Peak Particle Velocity ($mms^{-1}$) | | |
|---|---|---|---|---|---|---|---|---|
| | | | X axis | Y axis | Z axis | L axis | V axis | T axis |
| VM1 | 24/11/2021 | 12:20 | 0.006 | 0.006 | 0.003 | 0 - 0.1 | 0 - 0.075 | 0 - 0.075 |
| VM2 | 24/11/2021 | 13:35 | 0.019 | 0.008 | 0.008 | 0 - 0.1 | 0 - 0.1 | 0 - 0.05 |
| VM3 | 24/11/2021 | 15:17 | 0.006 | 0.006 | 0.003 | 0 - 0.075 | 0 - 0.075 | 0 - 0.05 |

# 7 Impact Assessment

## 7.1 Environmental Noise Impact Assessment

7.1.1 Predictions of road, rail and sports pitch noise levels across the site have been undertaken using the CadnaA noise modelling package. Specific model parameters were applied as follows:

- Propagation of noise using algorithms within ISO 9613: 1993 *Acoustics - Attenuation of sound during propagation outdoors*. Roads were modelled as line sources at a height of 0.5 m above ground level and calibrated using spectral data measured during the survey.
- Default ground absorption G = 0.5 (equivalent to mixed ground).
- Ground attenuation: spectral all sources
- No adverse meteorological effects
- Two orders of reflection
- DEFRA LIDAR dataset to import topographical land features.

7.1.2 The model has been calibrated for both daytime and night-time $L_{Aeq,T}$ sound levels including noise from the M6, Friar Park Road, the commuter railway line and the freight movement in Bescot Sidings.

7.1.3 The calibration of the M6, commuter rail and Bescot Sidings were made to MP6 logger position. MP4 has been used for the calibration of Friar Park Road. No night-time measurement is available at MP4 so the daytime data has been applied to the night-time scenario as a simple worst-case assumption.

7.1.4 Corrections of -14dB and -19dB have been applied to the commuter railway line to convert the cumulatively measured pass-by events into average $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ levels respectively.

7.1.5 Similarly, a -18dB correction has been applied to Bescot Sidings to allow for correction to $L_{Aeq,8hr}$. Bescot yard has been include in the night-time scenario only as the survey indicated the majority of freight movements took place during the night-time period. Any freight movements from the yard in the daytime were infrequent and did not affect the overall daytime sound level which is wholly dominated by the M6.

## 7.2 Predicted Internal Noise Levels Assessed to ProPG Guidance Levels

7.2.1 Based on ProPG guidance, it is proposed that noise from the development is controlled to 30dB $L_{Aeq}$ in bedrooms at night and 35dB $L_{Aeq}$ in habitable rooms during the day, and that noise from individual events does not regularly exceed an indoor level of 45dB $L_{AFmax.}$

7.2.2 The generally accepted rule of thumb is that a window left open for ventilation provides 10 - 15 dB attenuation from external noise sources with the WHO Guidelines for Community Noise suggesting 15dB. The DEFRA report NANR116: Open/Closed Window Research[7] suggests the figure to be between 12 and 18 dB for road and rail traffic. ProPG indicates that where external noise levels are more than 15dB higher than the internal noise targets, openable windows should not be relied upon as the sole means of ventilation and some form of acoustically attenuated ventilation may be required. This equates to an external noise level of 45dB $L_{Aeq}$ / 60dB $L_{Amax}$ during the night or 50dB $L_{Aeq}$ during the day.

7.2.3 Appendix 4 presents the impact assessment maps using the ProPG methodology (Figures A4.1 - A4.2).

7.2.4 During the daytime the impact from combined rail and road traffic and football pitches is expected to be low risk across the majority of the site.

7.2.5 During the night-time the impact from combined rail and road traffic is expected to be medium risk across the majority of the site.

7.2.6 Overall, the site is characterised as medium risk site and the advice in ProPG states that a Stage 2 Acoustic Design Statement will be needed. This statement should accompany any applications for residential development made on the site.

7.2.7 To demonstrate the suitability of the site, calculations have been undertaken for typical dwelling layouts and the recommended glazing and background ventilation specification has been provided as an initial indication. Figure A4.3 presents this outline glazing and background ventilation specification, which can be adopted across the site to achieve the internal $L_{Aeq,16hr}$ target level in living room and kitchen spaces.

7.2.8 Figure A4.4 presents the recommended glazing and background ventilation specifications based on the predicted $L_{Aeq,8hr}$ sound level. This should be read in conjunction with the commentary on the $L_{AFmax}$ sound levels in Paragraphs 7.2.9 to 7.2.11 regarding the recommended outline glazing and background ventilation performance specification.

7.2.9 The 10th highest measured $L_{AFmax,5min}$ sound level in the night-time at MP5 and MP6 which were on the site boundary with the railway line were 62dB and 75dB respectively. The difference in the $L_{AFmax}$ sound level between MP5 and MP6 was due to the proximity of MP6 to the live running line.

[7] NANR116: 'Open/closed window research' Sound Insulation through ventilated open windows, Defra April 2007

7.2.10 Measurements at MP4 show the $L_{AFmax}$ sound level is between 72-80dB. The approximate distance to the centre of Friar Park Road to the monitoring position was 8m. The closest we would expect dwellings is around 17m, which would be the same standoff as the existing residential dwellings on Friar Park Road currently. $L_{AFmax}$ sound levels should reduce to around between 66-74dB.

7.2.11 Sound levels of between 62-75dB and 66-74dB can be readily mitigated with commercially available thermal double glazing and background ventilation arrangements. If the 75dB level is assumed across the site then a double-glazed unit and background window trickle ventilator of 40dB $R_w$ and 44dB $D_{ne,w}$ respectively can be used to limit the $L_{AFmax}$ sound level internally to be less than 45dB $L_{AFmax}$ for bedroom spaces.

7.2.12 We would however expect this level to be significantly reduced towards the centre of the site due to additional distance and self-screening of the development, so a reduction in façade sound insulation specification could be adopted.

7.2.13 The stage 2 acoustic design statement should determine the distribution of façade sound insulation measures across the site in relation to the expected reductions in both $L_{Aeq,T}$ and $L_{AFmax}$ sound levels.

7.2.14 External noise levels in amenity spaces are expected to achieve 55dB $L_{Aeq,T}$ or less with the inclusion of boundary treatment and suitable spatial planning to self-screen the gardens with the dwellings from significant sources of road traffic and railway noise.

7.2.15 We do not recommend facing back gardens directly onto the railway or M6 motorway. We would recommend a row of houses are used which are fronted onto the railway and M6 to provide an effective noise barrier. This design philosophy of shielding gardens should be implemented in any layout for the site.

7.2.16 It should be noted that the above impact maps are based on the undeveloped site and no account is made for self-screening from buildings within the site. The impact maps should therefore be regarded as absolute worst case.

7.2.17 Environmental noise would be considered to be at the No Observed Adverse Effect Level with the adoption of the mitigation measures proposed. Final mitigation will need to be developed once layouts are known and the recommendations in this report are indicative only to demonstrate that the site is not constrained due to noise and vibration.

## 7.3 Rail Vibration Impact Assessment

7.3.1 Measured vibration levels when compared to BS6472 are considered to achieves less than the low probability of adverse comment.

7.3.2 In terms of peak particle velocity, the measurements are well below the limit of 0.3mms$^{-1}$ quoted in BS5228:2009 which would be the limit at which vibration is just perceptible in residential environments.

7.3.3 Vibration from rail pass-by events is not considered significant and would be considered to be at the No Observed Effect Level or less.

# 8 Conclusions

8.1 A noise and vibration assessment were undertaken to predict the potential impact of environmental noise sources at a proposed residential development at the land off Friar Park, Sandwell.

8.2 Computer noise modelling was utilised in addition to baseline noise measurements and the potential impact on the proposed dwellings was determined using guidance provided in ProPG, BS 8233 and WHO 1999.

8.3 The assessment found that the highest predicted noise levels at the site would put the development in the low and medium risk category according to ProPG for daytime and night-time periods respectively. A stage 2 acoustic design statement should therefore be prepared and submitted with any future applications for residential development at the site.

8.4 Mitigation options have been indicated in the form of minimum glazing and ventilation specifications and are also indicated in Appendix 4 as well as .

8.5 External noise levels during the daytime are generally predicted to be ≤ 55dB and ≤ 50dB $L_{Aeq,16hr}$ towards the centre of the site. External noise in private gardens can be suitably controlled through local boundary fencing arrangements and good spatial planning practices.

8.6 Comparison of the measured vibration level from rail pass-by events with BS6472 and BS5228 shows that vibration levels are insignificant and are not a constraint to development.

8.7 With the implementation of the recommendations in terms of glazing and ventilation specifications, it is considered that a suitable and commensurate level of protection against noise will be provided to the occupants of the proposed accommodation. The site is therefore considered acceptable in terms of noise impact and final details of the mitigation will be produced when layouts are known.

# APPENDICES

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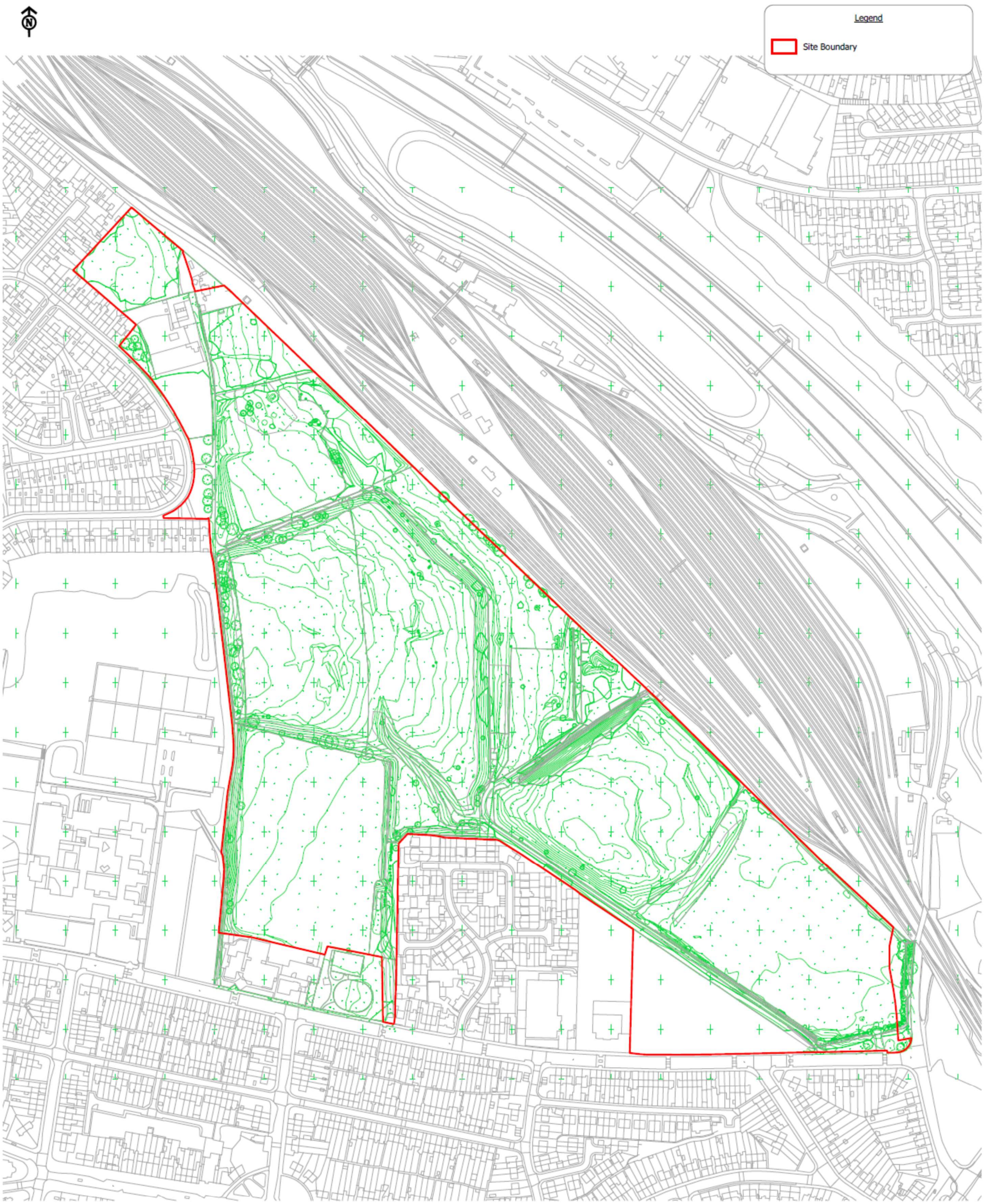
# Appendix 1: Site Location Plan




Friar Park, Wednesbury

Client: West Midlands Combined Authority

Figure 2:
Site Layout

Scale: 1:139029991@A3
CampbellReith OS Copyright: © Crown copyright. All rights reserved. Licence number 100020027
Contains Ordnance Survey data © Crown copyright and database right 2020.
Job Number: 13569
Drawn by - Checked by: RLF - PK
Drg No - Status/Revision: 13569-CRH-XX-XX-FG-G-7001 - P1
File location: N:\13500 - 13749\13569 L - Friar Park, Wednesbury - Remediation\Project_Workspaces (pdf in Outputs)
Date (Revision History): 08/12/2020 (P1, First Issue, 08/12/20, RLF)

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# Appendix 2: Noise Monitoring Positions

# Appendix 3: Vibration Monitoring Positions

# Appendix 4: CadnaA Predictions


Figure A4.1 - ProPG Risk Assessment (Daytime)

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E-mail: info@millergoodall.co.uk
www.millergoodall.co.uk

Drawing Notes:

- Includes contribution from road traffic on M6, rail traffic (commuter and freight in Bescot Yard), road traffic on Friar Park Road and Pulse Football
- Development Parcels outlined in purple

**ProPG Stage 1 Risk Assessment**

- <50dB Negligible Risk
- 50-60dB Low Risk
- 60-70dB Medium Risk
- >70dB High Risk

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Figure A4.2 - ProPG Risk Assessment (Night-time)

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Drawing Notes:

- Includes contribution from road traffic on M6, rail traffic (commuter and freight in Bescot Yard) and road traffic on Friar Park Road
- Development Parcels outlined in purple

**ProPG Stage 1 Risk Assessment**

- <40dB Negligible Risk
- 40-50dB Low Risk
- 50-60dB Medium Risk
- >60dB High Risk

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Figure A4.3 - Outline Glazing and Vent (Living Room & Kitchen Spaces)

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Drawing Notes:

- Includes contribution from road traffic on M6, rail traffic (commuter and freight in Bescot Yard), road traffic on Friar Park Road and Pulse Football
- Development Parcels outlined in purple

**Outline Glazing and Background Ventilation**

- 29dB Rw IGU, openable windows
- 29dB Rw IGU, 33dB Dnew vent
- 35dB Rw IGU, 33dB Dnew vent

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Figure A4.4 - Outline Glazing and Vent (Bedroom spaces)

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Drawing Notes:

- Includes contribution from road traffic on M6, rail traffic (commuter and freight in Bescot Yard), road traffic on Friar Park Road
- Development Parcels outlined in purple

**Outline Glazing and Background Ventilation**

- 29dB Rw IGU, openable windows
- 29dB Rw IGU, 33dB Dnew vent
- 35dB Rw IGU, 40dB Dnew Vent
- 40dB Rw IGU, 44dB Dnew vent
- 48dB Rw IGU, 55dB Dnew vent

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# Glossary of Terms

**Decibel (dB)** The unit used to quantify sound pressure levels; it is derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is usually only perceptible under controlled conditions.

**dB $L_A$** Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB $L_A$ broadly agree with an individual's assessment of loudness. A change of 3 dB $L_A$ is the minimum perceptible under normal conditions, and a change of 10 dB $L_A$ corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB $L_A$; normal conversation about 60 dB $L_A$ at 1 meter; heavy road traffic about 80 dB $L_A$ at 10 meters; the level near a pneumatic drill about 100 dB $L_A$.

**$L_{A90,T}$** The A weighted noise level exceeded for 90% of the specified measurement period ($T$). In BS 4142: 1997 it is used to define background noise level.

**$L_{Aeq,T}$** The equivalent continuous sound level. The sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period ($T$). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

**$L_{Amax}$** The highest A weighted noise level recorded during the time period. It is usually used to describe the highest noise level that occurred during the event.

**$L_{A10(18\ hour)}$** Often referred to as the UK road traffic noise index, this is the arithmetic average of the values of $L_{A10}$ hourly for each of the 18 one hour periods between 06:00 and 00:00.

**NOEL** No observed effect level: the level of noise exposure below which no effect at all on health or quality of life can be detected.

**LOAEL** Lowest observed adverse effect level: the level of noise exposure above which adverse effects on health or quality of life can be detected.

**SOAEL** Significant observed adverse effect level: the level of noise exposure above which significant adverse effects on health or quality of life can be detected.

**$R_w$** Single number rating used to describe the sound insulation of building elements and is defined in BS EN ISO 10140-2: 2010 (formerly BSEN ISO 140-3:1995). It is derived by measurement under laboratory conditions and does not take into account the effects of flanking transmissions.

**$D_{nT,w}$** The weighted standardized level difference is a single figure rating used to describe the sound insulation of a construction separating two rooms, for example a wall or floor, and is defined in BS EN ISO 16283-1:2014 (formerly BSEN ISO 140-4:1998). It is derived by measurement of an in-situ construction and therefore takes into account the effects of flanking transmissions, workmanship etc.

$D_{ne,w}$ The weighted element-normalized level difference is a single figure rating used to describe the sound insulation of small elements within a larger construction and is defined in BS EN ISO 10140-2:2010 (BSEN ISO 140-10:1991). It is most often used to rate the sound insulation performance of ventilator units e.g. trickle vents.

$C_{tr}$ A single-number spectrum adaptation term used to characterise the sound insulation rating with respect to urban traffic. It is defined in ISO 717-1:20-13.


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