

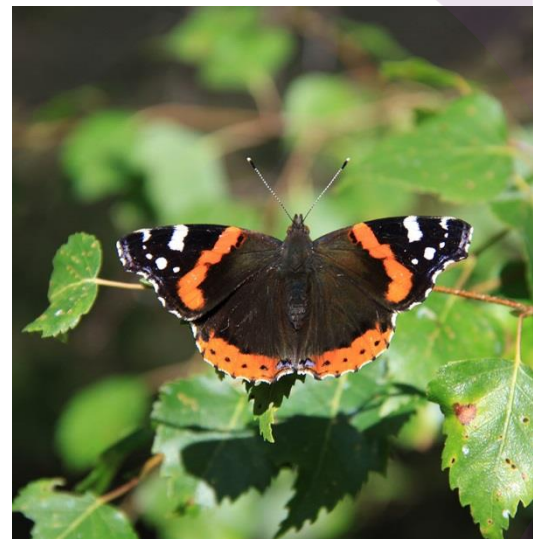


Homes England

## Werrington

### Noise Impact Assessment

Draft Report



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## Document revisions

| No. | Details                                         | Date       |
|-----|-------------------------------------------------|------------|
| 1   | Draft report                                    | 22/10/2020 |
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# Executive summary

## Purpose of this report

This report has been produced for the purpose of providing a sound assessment suitable for submission with a future planning application for a proposed residential development on land off Ash Bank Road, Werrington (the Site).

## Assessment

Sound surveys were completed in and around the Site between 25<sup>th</sup> and 26<sup>th</sup> September 2018 to identify key noise sources and obtain data to represent the Site noise exposure during both the daytime and night-time periods. This information was used to assess the potential constraints to the proposed Site as well as to identify where potential mitigation might be required to reduce noise impacts on future residents on the Site.

This assessment has been completed with reference to relevant UK guidance and legislation including ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise*' (2017) and with due regard to the requirements of Staffordshire County Council.

## Outcomes

The assessment demonstrates that good acoustic design is capable of overcoming the medium acoustic risks of the Site and that with appropriate planning conditions, residential amenity can be protected in terms of the noise environment.

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# 1. Introduction

## 1.1 Background

Wood Group UK Limited (Wood) has been commissioned by Homes England to undertake an assessment of land off Ash Bank Road, Werrington for residential development. The land on which this development is proposed is referred to throughout this document as 'the Site' or 'the proposed development'.

The assessment has been completed with reference to relevant UK guidance and legislation relating to the assessment of sound affecting the Site and nearest noise sensitive receptors (NSRs).

## 1.2 Proposed Site and Development Overview

### Site Location

The Site is located in Werrington, bounded by the A52 (Ash Bank Road) to the north, Salters Lane to the west, HMYOI Werrington to the south and east and fields to the south. The Site is currently split into three parcels, separated by Salters Close and HMYOI Werrington.

The larger central parcel of some 3ha comprises three fields. It is enclosed on all sides by existing development (including HMYOI Werrington to the east) apart from the southern edge which is open. The site slopes down from the road with some vegetation on the southern boundary.

The smaller eastern parcel is 1ha in size and is a single field enclosed with a hedgerow on the eastern boundary and existing development on the other sides including the HMYOI Werrington to the south.

The western parcel is bounded by Salters Close and Salters Lane with a hedgerow on the southern boundary. It is noted that this parcel is not developable and therefore not surveyed or included in this assessment.

A figure showing the Site location can be seen in **Appendix A**.

### Existing Acoustic Environment

Wood has undertaken analysis of the local area with respect to pertinent sources of sound that may require assessment for both ingress and egress in relation to the proposed development.

The A52 is situated on the north of the Site boundary to both parcels of land and is considered to be the largest contributor to the acoustic environment.

HMYOI Werrington currently divides the site and lies on the southern boundary of one parcel and the eastern boundary of the other. Whilst there are intermittent sounds from the institute, it is not deemed to be a large contributor to the acoustic environment.

## 2. Terminology

Throughout this report the term 'noise' is used to describe an 'unwanted sound' and is generally applied when describing assessment methodologies or the prediction of levels at receptors for the purpose of assessment. In keeping with relevant policy, Standards and guidance, calculated or measured levels associated with the existing acoustic environment and not associated with road or rail traffic will be described as 'sound'.

Whilst it is recognised that road or rail traffic noise is not always considered 'unwanted', the term 'noise' will be applied when describing the contribution to the existing acoustic environment or the predicted development impacts.

The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Due to this wide range, a scale based on logarithms is used in noise level measurement. The scale used is the decibel (dB) scale which extends from 0 to 140 dB, corresponding to the intensity of the sound pressure level.

The ear has the ability to recognise a particular sound depending on the pitch or frequencies found at the source. Microphones cannot differentiate noise in the same way as the ear; and to counter this weakness the noise measuring instrument applies a correction to correspond more closely to the frequency response of the ear. The correction factor is called 'A-weighting' and the resulting measurements are written as dB (A). 'A-weighting' refers to the sound level that represents the human ear's response to sound.

The dB (A) unit is internationally accepted and has been found to correspond well with people's subjective reaction to sound. Typical dB (A) sound levels for familiar sounds are given in Table 2.1.

Table 2.1 Typical Sound Levels<sup>1</sup>

| Approximate Noise Levels dB(A) | Example                                                                                              |
|--------------------------------|------------------------------------------------------------------------------------------------------|
| 0                              | Threshold of hearing for normal young people.                                                        |
| 20                             | Recording studio, ambient level.                                                                     |
| 40                             | Quiet residential neighbourhood, ambient level.                                                      |
| 60                             | Department store, restaurant, speech levels.                                                         |
| 80                             | Next to busy highway, shouting                                                                       |
| 100                            | Textile mill; press room with presses running; punch press and wood planers, at operator's position. |
| 120                            | Ship's engine room; rock concert, in front and close to speakers.                                    |
| 140                            | Moon launch at 100m; artillery fire, gunner's position.                                              |

The sound levels given in Table 2.1 are sound pressure levels ( $L_p$ ) and describe the sound level at a point in space. Sound power levels ( $L_w$ ) are used to describe the sound output of a sound source. Sound levels vary over time depending on sound generating activities. The following indices are used to take account of these variations:

<sup>1</sup> Bies, D. A., Hansen, C. H., 2009. Engineering Noise Control: Theory & Practice. 4<sup>th</sup> Edition. Abingdon: Spon Press.

- $L_{Aeq, T}$  is the equivalent continuous sound level and is the sound level of a steady sound having the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time.  $L_{Aeq, T}$  is considered the best general purpose index for environmental sound;
- $L_{A90, T}$  index represents the sound level exceeded for 90% of the measurement period and is used to indicate quieter times during the measurement period. It is usually referred to as the background sound level;
- $L_{A10, T}$  refers to the level exceeded for 10% of the measurement period.  $L_{A10, T}$  is widely used as a descriptor of road traffic noise; and
- $L_{Amax, F}$  is maximum fast weighting recorded noise level during the measurement period.

In addition, the following definitions may be helpful when reading this report:

- Ambient Sound: Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far;
- Background sound: (See  $L_{A90, T}$ ) The A-weighted sound pressure level of the residual sound at the assessment position that is exceeded for 90% of a given time interval,  $T$ , measured using the fast time weighting;
- Fast Time Weighting: A sound pressure level measurement using a 125ms moving average time weighting period is said to have been determined using 'fast weighting';
- Free Field: Signifies that a sound measurement has been undertaken in 'free field' conditions i.e. away from any reflecting facades other than the ground e.g. building facades, close boarded fence work etc.;
- Façade level: Addition of 3 dB (A) façade correction to free field levels to reach a sound level at the façade of a building (1 m or less) as advised in BS 4142:2014 and BS 5228:2009+A1:2014;
- Specific Sound Level,  $L_{Aeq, Tr}$ : The equivalent continuous A-weighted sound pressure level at the assessment position produced by an industrial sound source over a given reference time interval,  $T$ ; and
- Rating Sound Level,  $L_{Ar, Tr}$ : The specific sound level plus any adjustment for the characteristic features of the sound.

## 3. Relevant Policy and Guidance

### 3.1 National Planning Policy

#### National Planning Policy Framework

Noise can be a material consideration in planning. Noise is considered by the National Planning Policy Framework (NPPF, February 2019).

The NPPF advises that significant adverse impacts on health and the quality of life as a result of noise from new development should be avoided. It also advises that other adverse impacts on health and quality of life arising from noise from new development should be reduced to a minimum.

The NPPF is taken into account by Local Authorities when preparing their local and neighbourhood plans which form the basis for noise (including vibration) policies within an area.

Paragraph 170 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst other considerations):

*“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.”*

The NPPF goes on to state in Paragraph 180 that:

*“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 of 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; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”*

Paragraph 182 of the NPPF states:

*“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.”*

The NPPF document does not refer to any other documents regarding noise other than the Noise Policy Statement for England (NPSE, 2010).

## 3.2 British Standards and Other Guidance

The documents summarised in **Table 3.1** provide threshold values for noise both inside and outside dwellings and will be used within the noise assessment to ensure suitable conditions for residential use. Pertinent criteria adopted within this report have been highlighted in bold.

Table 3.1 British Standards and Noise Guidance Documents

| Guidance document                                                                                  | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Calculation of Road Traffic Noise (CRTN) (1988)</b>                                             | Presents a noise prediction methodology for road traffic noise. Using detailed information on two-way traffic flows, % of HGV movements, road gradient, vehicle speed, ground conditions and screening, the methodology calculates the propagation of noise from roads. Although CRTN is predominantly a prediction methodology it also provides advice on measurements including a "shortened measurement procedure" whereby a continuous measurement taken for 3 hours between 10:00 and 17:00 can be converted to the $L_{10, 18h}$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'</b>               | <p>Presents design criteria for noise within habitable rooms in new residential development to avoid adverse impacts on sustainable use. In summary, these include:</p> <p><b>Resting in Living Rooms: 35 dB <math>L_{Aeq, 16h}</math> (daytime)</b><br/> Dining in Dining Rooms / Areas: 40 dB <math>L_{Aeq, 16h}</math> (daytime)<br/> <b>Sleeping or resting in Bedrooms: 35 dB <math>L_{Aeq, 16h}</math> (daytime) / 30 dB <math>L_{Aeq, 8h}</math> (night-time).</b></p> <p>It is stated within the guidance that where development is considered necessary or desirable, a relaxation of up to 5 dB of these levels may be available, and reasonable conditions still achieved. Consideration of regular, individual noise events (e.g. scheduled aircraft or passing trains) is also required, as these can lead to sleep disturbance. The specification of noise limits, in terms of <math>L_{Amax, F}</math> should be based upon the character and number of events per night.</p> <p>It is advised that noise limits should only be considered for large balconies that will be used for relaxation and that noise limits should not be necessary for small balconies.</p> <p>Design criteria for non-domestic buildings include:<br/> Cafeteria, canteen, kitchen: 50-55 dB <math>L_{Aeq, T}</math><br/> Open plan office: 45-50 dB <math>L_{Aeq, T}</math><br/> Meeting room, training room: 35-45 dB <math>L_{Aeq, T}</math><br/> Place of worship: 30-35 dB <math>L_{Aeq, T}</math></p> |
| <b>World Health Organisation 'Guidelines for community noise' (1999)</b>                           | <p>Presents guideline noise levels for community noise in specific residential environments e.g. in outdoor living areas.</p> <p>In order to avoid significant annoyance in outdoor living areas, a threshold of <b>55 dB <math>L_{Aeq, T}</math></b> is specified. In order to avoid moderate annoyance, a threshold of 50 dB <math>L_{Aeq, T}</math> is given. This document has since been partially superseded by 'Environmental Noise Guidelines for the European Region' (2018) but is still referred to in current versions of other standards and guidance documents.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>World Health Organisation 'Environmental Noise Guidelines for the European Region' (2018)</b>   | Partially supersedes the WHO 'Guidelines for Community Noise' (1999) and presents the latest guideline noise levels for community noise in specific residential environments e.g. in outdoor living areas. The document provides recommended target noise levels for road, railway, aviation wind turbine noise and leisure noise. In order to avoid adverse health effects due to rail noise it is recommended that levels are reduced to 54 dB $L_{den}$ for day-evening-night and 44 dB $L_{night}$ for night time rail noise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ProPG: Planning &amp; Noise 'Professional Practice Guidance on Planning &amp; Noise' (2017)</b> | <p>ProPG provides practitioners with guidance on a recommended approach to the management of noise for new residential development within the planning system in England. The guidance encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise.</p> <p>ProPG recommends a 2-stage approach; an initial risk assessment of the proposed development site, and where the results indicate that noise requires further consideration, a full assessment in the form of an Acoustic Design Statement (ADS).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>TRL and Casella Stanger 'Method for Converting the UK Road Traffic</b>                          | Presents an empirical formula for the conversion of $L_{A10, 18h}$ to $L_{Aeq, 16h}$ and $L_{Aeq, 8h}$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Guidance document                                                                                           | Summary |
|-------------------------------------------------------------------------------------------------------------|---------|
| <b>Noise Index <math>L_{A10, 18h}</math> to the EU Noise Indices for Road Noise Mapping'</b><br>(TRL, 2002) |         |

### 3.3 Local Planning Policy

Table 3.2 Local Planning Policy

| Guidance document                                                | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Staffordshire Moorlands Local Plan Adopted September 2020</b> | <p><b>Policy SD 4</b><br/><b>Pollution and Water Quality</b><br/> <i>"The Council will protect people and the environment from unsafe, unhealthy and polluted environments by ensuring proposals avoid potential adverse effects; and only permitting proposals that are deemed (individually or cumulatively) to result in pollution (including air/water/noise/vibration/light/ground contamination) if after mitigation, potential adverse effects are deemed acceptable."</i></p> <p><b>Policy DC 1</b><br/><b>Design Considerations</b><br/> <i>"All development shall be well designed and reinforce local distinctiveness by positively contributing to and complementing the special character and heritage of the area in line with the Council's Design Guide SPD. In particular, new development should: ...</i><br/> <i>5. protect the amenity of the area, including creation of healthy active environments and residential amenity, in terms of satisfactory daylight, visual impact, sunlight, outlook, privacy, soft landscaping as well as noise, odour and light pollution."</i></p> <p><b>Policy DSR 3</b><br/><b>Land off Ash Bank Road Werrington (WE003 &amp; WE052)</b><br/> <i>"Land comprising two sites is allocated for residential development.... Development will be subject to compliance with other relevant Local Plan policies and;</i> <ul style="list-style-type: none"> <li><i>A Noise impact assessment to consider the impact of the HM Young Offenders Institute. Where appropriate the assessment shall provide details of measures to mitigate the impact of noise on residential development."</i></li> </ul> </p> |

## 4. Data Gathering Methodology

### 4.1 Baseline Sound Survey

Wood completed a series of sound monitoring surveys around the Site between 25<sup>th</sup> and 26<sup>th</sup> September 2018. The purpose of the survey was to quantify the acoustic environment at the Site during daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods to inform the design and calibration of a computer noise model intended to assist in the assessment of site suitability for the proposed development.

The survey methodology is summarised in the following:

- Sound level monitoring was undertaken at two ambient monitoring locations. The measurements equate to a minimum of 1 hour during 4 time periods; morning (07:00 – 12:30), afternoon (12:30 – 19:00), evening (19:00 – 23:00) and night (23:00 – 07:00). Observations were made by a surveyor during each measurement at the Site. Sound monitoring locations are presented in **Appendix C**;
- Sound level monitoring was undertaken at a location along the A52 in accordance with the shortened measurement procedure presented in the Calculation of Road Traffic Noise (CRTN). An additional hour was also recorded during the night-time period (23:00 – 07:00);
- The sound level meters (SLMs) were calibrated before each measurement along with a post monitoring level check with no significant drift in calibration recorded. Windshields were fitted to the microphones to minimise the effects of any wind induced sound; and
- Details of the monitoring instrumentation (model/serial numbers etc.) are presented in **Appendix B**. All measurements were conducted, where possible, in accordance with BS 7445-1:2003 *Description and measurement of environmental noise. Guide to quantities and procedures*.

BS 7445-1:2003 details standardised guidance for the measurement of environmental noise. The pertinent details of BS 7445-1:2003 adopted in this assessment are as follows:

- Instrumentation to measure equivalent continuous A-weighted sound pressure level conforming to type 1 as given in BS EN 61672-1:2013 *Electroacoustics. Sound level meters. Specifications*;
- All equipment calibrated, and the calibration shall follow manufacturer's instructions. All Wood sound monitoring equipment is calibrated at an accredited laboratory at a minimum interval of 24 months; and
- Minimise the influence of reflections by, whenever possible, undertaking measurements at least 3.5m from any reflective surface other than the ground. Preferred measurement height is 1.2 – 1.5m above the ground.

Table 4.1 Sound Monitoring Locations

| Position Reference | Description                                                                                       | British Grid Reference | Type of Monitoring                                                                                                                        |
|--------------------|---------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>M1</b>          | Located in the smaller parcel of the Site on the southern boundary adjacent to HMYOI Werrington.  | X: 394234<br>Y: 347378 | 5 minute logging between the following time periods:<br>11:25 – 12:25<br>10:45 – 11:45<br>15:45 – 16:45<br>18:45 – 19:45<br>01:10 – 02:30 |
| <b>M2</b>          | Located in the larger parcel of the Site on the eastern boundary adjacent to HMYOI Werrington.    | X: 394074<br>Y: 347294 | 5 minute logging between the following time periods:<br>10:30 – 11:30<br>12:50 – 13:50<br>15:30 – 16:30<br>19:00 – 20:00<br>00:15 – 01:15 |
| <b>CRTN</b>        | Located in the larger parcel on the Site on the northern boundary adjacent to A52 (Ash Bank Road) | X: 394029<br>Y: 347423 | 1 hour logging between the following time periods:<br>11:00 – 14:00<br>01:30 – 02:30                                                      |

**Appendix C** shows the monitoring locations listed above.

The surveyor conducting the work was fully competent, being an Associate Member of the Institute of Acoustics and holding the Certificate of Competence in Environmental Noise Measurement.

### Survey Meteorological Conditions

Weather conditions during the measurements were noted to be appropriate for noise monitoring, with 0 – 20% cloud coverage, an average wind speed less than  $5 \text{ ms}^{-1}$ , a temperature between 6 and  $18^\circ \text{C}$ , dry road conditions with no precipitation and good visibility.

Based on the above, no data has been excluded from the analysis due to rainfall or unsuitable wind speeds. Therefore, 128 no. 5-minute logging periods and 4 no. 1-hour logging periods were considered suitable for use in the data analysis process to represent the Site.

## 4.2 Assessment Criteria

### External Sound Levels

Criteria for noise levels in external amenity areas is provided in the guidance in terms of the 16 hour average daytime sound level,  $\text{dB L}_{\text{Aeq},16\text{h}}$ . The criteria indicates a threshold of  $50 \text{ dB L}_{\text{Aeq},16\text{h}}$ , which is desirable not to be exceeded, above which adverse effects may occur, with a desirable upper limit of  $55 \text{ dB L}_{\text{Aeq},16\text{h}}$ .

It is considered that if external sound levels due to HMYOI Werrington do not exceed a shorter duration (one hour) sound level of  $50 \text{ dB L}_{\text{Aeq},1\text{h}}$ , then adverse effects are unlikely from this noise source.

### Internal Sound Levels

Assuming a partially open window provides 15 dB attenuation, criteria for external sound levels which should not be exceeded, in order to achieve acceptable internal conditions, are provided in **Table 4.2** below, also assuming reasonably basic window and ventilation specifications.

Table 4.2 Internal Sound Level Limits

| Criteria & Transmission Loss                                                                        | Daytime | Night-time |
|-----------------------------------------------------------------------------------------------------|---------|------------|
| <b>BS 8233:2014 limit for good internal conditions, daytime, dB <math>L_{Aeq,T}</math></b>          | 35      | 30         |
| <b>Attenuation provided by partially open window</b>                                                | 15      | 15         |
| <b>Façade transmission loss (Basic Spec Façade)</b>                                                 | 25      | 25         |
| <b>Acceptable external sound level assuming a partially open window, dB <math>L_{Aeq,1h}</math></b> | 50      | 45         |
| <b>Acceptable external sound level assuming a closed window, dB <math>L_{Aeq,1h}</math></b>         | 60      | 55         |

Activity in HMYOI Werrington will generally be limited to daytime and evening hours. The criteria for good internal conditions during the daytime is an internal sound level not exceeding 35 dB  $L_{Aeq,16h}$ . By applying the same longer duration ( $L_{Aeq,16h}$ ) criteria to a shorter duration of one hour ( $L_{Aeq,1h}$ ), as outlined above for external sound levels, it is considered that adverse effects to internal receptors will be avoided.

This is on the basis that, whilst activities may occur over durations of longer than an hour, if the criterion to be met over the whole daytime period is not exceeded in any one hour, then adverse effects due to the sound of activities are most unlikely.

The assessment of residential suitability has been undertaken in accordance with the guidance and criteria provided within ProPG. The ProPG criteria for continuous daytime and night-time noise levels due to transport sources is reproduced in **Table 4.3** below, with additional categories between the negligible, medium and low categories as provided in the guidance:

Table 4.3 Criteria for Residential Suitability

| Risk Category           | Daytime Sound Levels     | Night-time Sound Levels |
|-------------------------|--------------------------|-------------------------|
| <b>High</b>             | >70 dB $L_{Aeq,16h}$     | >60 dB $L_{Aeq,8h}$     |
| <b>Medium</b>           | 65 - 70 dB $L_{Aeq,16h}$ | 55 - 60 dB $L_{Aeq,8h}$ |
| <b>Medium - Low</b>     | 60 - 65 dB $L_{Aeq,16h}$ | 50 - 55 dB $L_{Aeq,8h}$ |
| <b>Low</b>              | 55 - 60 dB $L_{Aeq,16h}$ | 45 - 50 dB $L_{Aeq,8h}$ |
| <b>Low - Negligible</b> | 50 - 55 dB $L_{Aeq,16h}$ | 40 - 45 dB $L_{Aeq,8h}$ |
| <b>Negligible</b>       | <50 dB $L_{Aeq,16h}$     | <40 dB $L_{Aeq,8h}$     |

On the basis of the noise risk categories above, requirements for whole façade attenuation are provided in **Table 4.4** below.

Table 4.4 Minimum Apparent Façade Sound Reductions Required for Different Noise Risk Categories

| Risk Category           | Apparent Façade Sound Reduction Required, dB |            |
|-------------------------|----------------------------------------------|------------|
|                         | Daytime                                      | Night-time |
| <b>High</b>             | > 35                                         | > 30       |
| <b>Medium</b>           | 30 - 35                                      | 25 - 30    |
| <b>Medium - Low</b>     | 25 - 30                                      | 20 - 25    |
| <b>Low</b>              | 20 - 25                                      | 15 - 20    |
| <b>Low - Negligible</b> | 15 - 20                                      | 10 - 15    |
| <b>Negligible</b>       | ≤ 15                                         | ≤ 10       |

With regard to short duration events during the night-time, instantaneous maximum noise levels within bedrooms should not normally exceed 45 dB  $L_{AFmax}$  more than ten times per night.

## 5. Sound Monitoring and Modelling Results

### 5.1 Sound Survey Results

A summary of the environmental sound monitoring results is shown in **Table 5.1** and **Table 5.2**.

Table 5.1 Ambient Sound Monitoring Results

| Monitoring Location | Period                     | Time (hh:mm)                                                     | dB $L_{Aeq, T}$ | dB $L_{Amax, T}$ | dB $L_{A90, T}$ (mean) | dB $L_{A90, T}$ (mode) |
|---------------------|----------------------------|------------------------------------------------------------------|-----------------|------------------|------------------------|------------------------|
| M1                  | Daytime (07:00 – 23:00)    | 10:45 – 11:45<br>11:25 – 12:25<br>15:45 – 16:45<br>18:45 – 19:45 | 46              | 78               | 41                     | 41                     |
|                     | Night-time (23:00 – 07:00) | 01:10 – 02:30                                                    | 34              | 51               | 32                     | 33                     |
| M2                  | Daytime (07:00 – 23:00)    | 10:30 – 11:30<br>12:50 – 13:50<br>15:30 – 16:30<br>19:00 – 20:00 | 46              | 75               | 42                     | 42                     |
|                     | Night-time (23:00 – 07:00) | 00:15 – 01:15                                                    | 36              | 54               | 34                     | 34                     |

Table 5.2 CRTN Sound Monitoring Results

| Monitoring Location | Period                     | Time (hh:mm)  | dB $L_{Aeq, T}$ | dB $L_{A10, T}$ | dB $L_{Amax, T}$ | dB $L_{A90, T}$ (mean) |
|---------------------|----------------------------|---------------|-----------------|-----------------|------------------|------------------------|
| CRTN                | Daytime (07:00 – 23:00)    | 11:00 – 14:00 | 68              | 72              | 89               | 50                     |
|                     | Night-time (23:00 – 07:00) | 01:30 – 02:30 | 51              | 40              | 78               | 33                     |

The acoustic environment at the measurement locations was observed as detailed in **Table 5.3**.

Table 5.3 Survey Observations

| Monitoring Location | Observations                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>M1 Morning</b>   | Distant road traffic noise is the dominant source from A52. Birdsong and wind rustling trees is audible. A high pitched sound is heard from HMYOI Werrington on occasion, along with dog barking from inside the YOI and intermittent noise from the YOI car park. There was a brief period of aircraft noise from a small aircraft flying overhead and noise from farm machinery in the distance audible intermittently.                                                                |
| <b>M1 Afternoon</b> | Road traffic noise from A52 is continuous and the main source of sound when no other source is present. Aircraft noise was present and audible approximately every 20 minutes. Children at a nearby bus stop were audible, along with wind rustling trees and birdsong. There was some distant banging noise audible, where it was not possible to identify the source. From HMYOI Werrington, there was intermittent voices/shouting, lasting up to 30 seconds at a time, at a maximum. |

| Monitoring Location | Observations                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>M1 Evening</b>   | Distant road traffic noise from A52 dominant and continuous. On the occasions aircraft noise is present, this became the more dominant sound source. Wind rustling trees and birdsong was audible throughout measurement. Distant shouting heard from within HMYOI Werrington and some dog barking in the distance was audible.                                                                               |
| <b>M1 Night</b>     | The ambient sound environment is dominated by wind rustling in the trees. An occasional car pass by dominates the acoustic environment when occurring. During the measurement, no noise from HMYOI Werrington was audible.                                                                                                                                                                                    |
| <b>M2 Morning</b>   | Road traffic noise from A52 is the dominant sound source, with wind in trees and birdsong also audible. Some distant noise from a lawnmower is audible along with some shouting from HMYOI Werrington and dog barking intermittently.                                                                                                                                                                         |
| <b>M2 Afternoon</b> | Road traffic noise from A52 is the dominant sound source with intermittent aircraft noise audible in the distance. Birdsong and wind in trees was audible throughout the measurement. From HMYOI Werrington there was occasional noise, including dog barking, people playing football and occasional banging.                                                                                                |
| <b>M2 Evening</b>   | Birdsong and wind rustling in trees are the dominant source of sound. On the occasion an aircraft passes overhead, this becomes the dominant source. Road traffic noise from A52 is intermittent and only dominates the acoustic environment when a HGV passes by. Shouting from HMYOI Werrington is intermittent, however louder and more frequent than earlier in the day, along with intermittent banging. |
| <b>M2 Night</b>     | Noise from wind rustling in trees is the main source of sound. There is intermittent road traffic noise from A52. There was one occasion of dog barking heard during the measurement. Some shouting is audible from HMYOI Werrington, but at a low level which would not influence the measurement.                                                                                                           |
| <b>CRTN Daytime</b> | Road traffic noise from A52 is the dominant sound source. Farm plant equipment in the distance can be heard when no road traffic is passing by. Pedestrians talking can be heard when walking past the measurement location. Aircraft noise from a small aircraft is audible whilst it passes overhead.                                                                                                       |
| <b>CRTN Night</b>   | The wind rustling in trees is the dominant sound source for most of the measurement. When a vehicle passes by on A52, that becomes the main sound source.                                                                                                                                                                                                                                                     |

Observations during the survey conclude that the A52 is the most continuous dominant contributor to the Site's acoustic environment, however noise from HMYOI Werrington is intermittent.

## 5.2 Noise Predictions

In order to determine the suitability of the Site for its proposed residential-led uses, noise predictions due to the road have been calculated using a noise model, which was developed using the Stapelfeldt LimA computational sound modelling suite. Meanwhile, the noise monitoring described in Section 5.1 has been used to assess the noise due to HMYOI Werrington.

Modelling has been undertaken based on the road sound source, which is the dominant feature in the acoustic environment.

The noise model has been used to produce noise contour plots for daytime (1.5m above ground) and night-time (4m above ground) scenarios as shown in **Appendix D**.

It should be noted that the noise model assumes an open site and therefore does not include any screening benefits to be provided by any proposed buildings. Noise levels would therefore be expected to be less than those currently predicted for areas situated behind the first row of dwellings facing on to the A52.

## 6. Assessment

### 6.1 Stage 1: Initial Site Noise Risk Assessment

An initial risk assessment of the Site (following the guidance of ProPG) has been conducted to provide an indication of the likely risk of adverse effects in the event that no subsequent mitigation which may be used to control noise levels within habitable rooms (such as glazing and ventilation systems) and in external amenity areas (such as acoustic barriers and layout design to maximise screening by building envelopes) is to be included as part of the development proposals. This is informed by Figure 1 of the ProPG which is shown in **Appendix E** of this report for reference.

This risk assessment is based on a combination of measurement and prediction techniques with reference to the results shown in **Section 5** of this report. ProPG is restricted to sites that are exposed predominantly to noise from transportation sources which applies to the majority of this Site where road traffic noise is the dominant source. Plots closest to HMYOI Werrington may, at times, be dominated by sound from HMYOI Werrington. The outline assessment of noise from HMYOI Werrington provided above indicates acceptable internal and external environments will be achieved without the need for mitigation.

#### Transport Sources

With reference to **Figure D.1** of **Appendix D**, during the daytime, the predicted noise levels are below 60 dB  $L_{Aeq, 16hr}$  for the majority of the Site. Noise levels closer to Ash Bank Road along the northern Site boundary are higher, in the region of 60 – 70 dB  $L_{Aeq, 16hr}$ . This indicates that the Site is considered to have low to medium risk of adverse effect.

With reference to **Figure D.2** of **Appendix D**, during the night-time, the predicted noise levels are below 50 dB  $L_{Aeq, 8hr}$  for the majority of the Site. Noise levels closer to Ash Bank Road along the northern Site boundary are higher, in the region of 50 – 60 dB  $L_{Aeq, 8hr}$ . This indicates that the Site is considered to have low to medium risk of adverse effect.

With reference to ProPG, as the measured external  $L_{AFmax}$  does not exceed 60 dB, no consideration of the individual noise events during the night-time period has been made.

#### HMYOI Werrington

The measured external sound levels at the nearest boundaries to HMYOI Werrington in both parcels of land, provided in **Table 5.1**, are 46 dB(A) during the daytime and 34 – 36 dB(A) at night. These levels are below the threshold for adverse effects described in **Section 4.2**, and are therefore acceptable.

Sound levels measured at the nearest boundaries to HMYOI Werrington in both parcels of land are 46 dB(A) during the daytime and 34 – 36 dB(A) at night. The  $L_{Amax}$  was recorded as 51 dB at M1 and 54 dB at M2. With reference to **Table 4.2**, all areas of the Site will achieve acceptable internal ambient noise conditions with the windows open and closed during a 24 hour period.

#### Summary

The results shown in **Figure D.1** and **D.2** indicate that any housing proposed lining Ash Bank Road falls within a medium risk of adverse effect to transport noise, whilst the rest of the Site falls within a negligible to low risk of adverse effect to transport noise (as supported by Figure 1 of ProPG, as shown in **Appendix E**).

Based on the information above, the Site is considered to be at a negligible risk of adverse effect to HMYOI Werrington.

The Site is therefore likely to be acceptable from a noise perspective provided that a good acoustic design process is followed, and appropriate measures are taken to mitigate and minimise noise in the finished development. Further details are provided in the following sections with reference to ProPG Stage 2.

## 6.2 Stage 2: Element 1 – Good Acoustic Design

It is recommended that primary external amenity areas for dwellings along Ash Bank Road are positioned facing away from the road, behind dwellings which would screen external amenity areas from road traffic noise. It is also desirable for dwellings in these areas to be terraced, as this will provide screening for other dwellings beyond this first row from road traffic noise.

It is recommended that, where possible, noise levels should be met with windows open, instead of the use of trickle vents. In order to achieve this, a detailed design stage should consider having habitable rooms (living/dining areas and bedrooms) facing away from the adjacent A52 and HMYOI Werrington in order to minimise internal noise levels. This should avoid the potential significant adverse effects of individual noise events ( $L_{AFmax, F}$ ) on sleep i.e. behavioural awakenings and physiological impacts. Conversely, rooms which are less sensitive (kitchens, bathrooms, storage rooms, corridors etc.) should be placed on the noisy side of the building. The design implications of this recommendation would take into account the shielding of intervening buildings, such that it would likely only apply to the nearest houses to the A52. An additional way of minimising the intrusion of noise is to minimise the number of doors and windows on the noisy side of the dwellings.

Whilst not strictly considered as a feature of good acoustic design, uprated façade design could be implemented on dwellings which are proposed to be subject to the higher noise levels when facing the road and where the features above cannot be met for justifiable reasons.

### Element 2 – Internal Noise Level Guidelines

For the purposes of this assessment, the ‘building envelope’ refers to the façade, windows, roof, roof lights, ventilation openings and any other external element of the buildings. Contour plots of transport noise have been devised by Wood to detail potential sound insulation classes suitable for this application and can be seen in **Figure D.3** and **D.4** of **Appendix D**. It should be noted that these contours are indicative only and that further work should be completed at the detailed design stage to ensure all elements of the building envelope are suitably rated acoustically.

Wood has applied a class system when determining the likely sound insulation requirements for proposed dwellings. The sound insulation classes are defined as follows:

- Class A: Properties which meet the standard or relaxed/reasonable internal noise levels of BS 8233:2014 with open windows (based on a minimum 10 dB(A) of attenuation provided by an open window);
- Class B: Properties which meet the standard internal noise levels of BS 8233:2014 when fitted with closed, standard double glazing (6/12/6mm) and appropriate acoustic ventilation alternative to an open window; and
- Class C: Properties which would require up-rated glazing and ventilation elements to meet the standard or relaxed/reasonable internal noise levels of BS 8233:2014.

It can be seen from **Figure D.3** and **D.4** that Class B would be required for the majority of the Site, in order for habitable rooms to achieve the required internal noise criteria level of 35 dB  $L_{Aeq, 16hr}$  during the daytime and 30 dB  $L_{Aeq, 8hr}$  during the night-time. However, it should be noted that this assessment assumes an open site. It is likely that Class A will be suitable for dwellings further away from the A52 and for facades facing away from the road due to noise attenuation afforded by screening from the proposed buildings.

Furthermore, during the day-time, the northern parts of the Site show the potential for dwellings to fall into Class C depending on their proximity to the road. Where this is found to be the case during a detailed design assessment, mitigation measures including that of uprated glazing may be required in order to achieve standard internal noise levels.

### Element 3 – External Amenity Area Noise Assessment

WHO guidelines and BS 8233:2014 state that in order to avoid significant annoyance in outdoor living areas, a threshold of 55 dB  $L_{Aeq,T}$  should not be exceeded. There is potential for noise levels to exceed 55 dB  $L_{Aeq,T}$  in close proximity to the A52, however this is based upon predicted levels assuming an open site. It is considered reasonable to assume that screening from dwellings could reduce noise levels by up to 10 dB(A). It is therefore recommended that primary external amenity areas are positioned facing away from noise sources, particularly the A52 which has been identified as the dominant source across the Site.

## 7. Recommendations

This report presents a noise assessment to support an outline planning application for a proposed residential development on land off Ash Bank Road, Werrington.

The assessment has been undertaken in accordance with relevant policy and guidance documents including ProPG.

An initial site noise risk assessment has demonstrated that the Site has a low to medium risk of adverse effect depending on the location of the proposed dwellings to the road, and is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed, and appropriate measures are taken to mitigate and minimise noise in the finished development. It has also been shown that the Site is not likely to be adversely affected by HMYOI Werrington.

The positioning of dwellings on the perimeter of the Site (effectively acting as barrier blocks) will attenuate noise levels throughout the rest of the Site, meaning that it is likely that adequate internal noise levels in habitable rooms (living areas and bedrooms) can be achieved with natural ventilation for most facades, and that external noise levels will be acceptable for primary external amenity areas. Primary external amenity areas of the first row of dwellings should be located facing away from the A52 in order to achieve this.

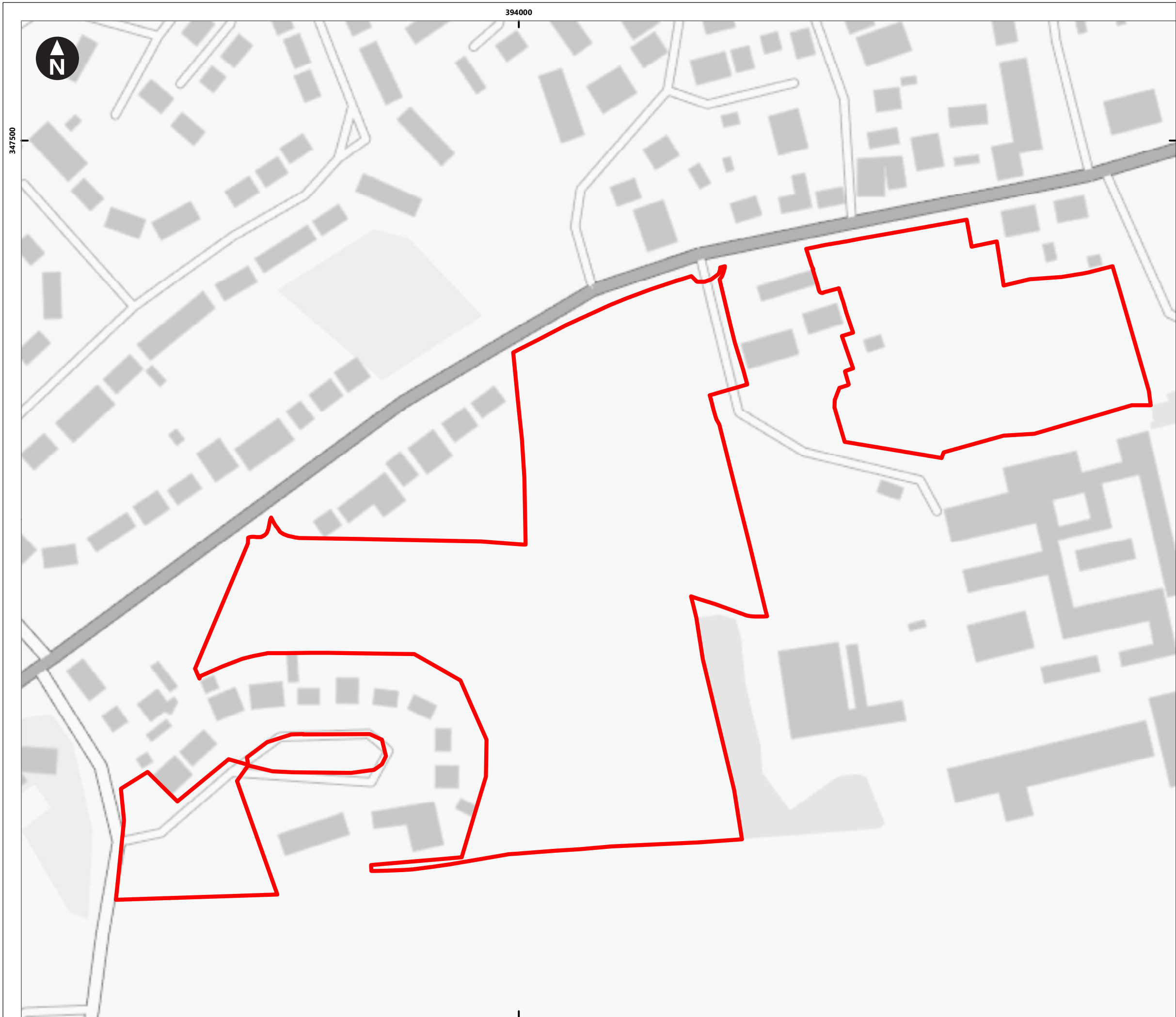
Proposed dwellings to the very north of the Site are likely to meet the standard internal noise levels of BS 8233:2014 when fitted with closed, standard double glazing and appropriate acoustic ventilation as an alternative to open windows. Dwellings situated behind the first row (and facades on the first row facing away from the road) are likely to achieve the relaxed/reasonable internal noise levels with open windows.

The assessment has therefore demonstrated that good acoustic design is capable of overcoming the acoustic challenges of the Site.



# Appendix A

## Site Location



Key

— Site Boundary

Scale at A3: 1:1,580  
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41103 Werrington  
Noise Assessment

**Figure A.1**  
**Site Boundary**

October 2020  
● ● ●

**wood.**

Figure A1 Site Boundary

## Appendix B

### Equipment Calibration Details

Table B.1 NL31 – 06 Calibration Details

| Manufacturer | Instrument        | Type     | Serial Number | Calibration Date |
|--------------|-------------------|----------|---------------|------------------|
| Rion         | Sound Level Meter | NL – 31  | 00541623      | 02/02/2018       |
| Rion         | Pre Amplifier     | NH – 21  | 11609         | 02/02/2018       |
| Rion         | Microphone        | UC – 53A | 318928        | 02/02/2018       |

Table B.2 NL52 – 95 Calibration Details

| Manufacturer | Instrument        | Type    | Serial Number | Calibration Date |
|--------------|-------------------|---------|---------------|------------------|
| Rion         | Sound Level Meter | NL – 52 | 01121395      | 13/02/2018       |
| Rion         | Pre Amplifier     | NH – 25 | 21439         | 13/02/2018       |
| Rion         | Microphone        | UC – 59 | 04412         | 13/02/2018       |

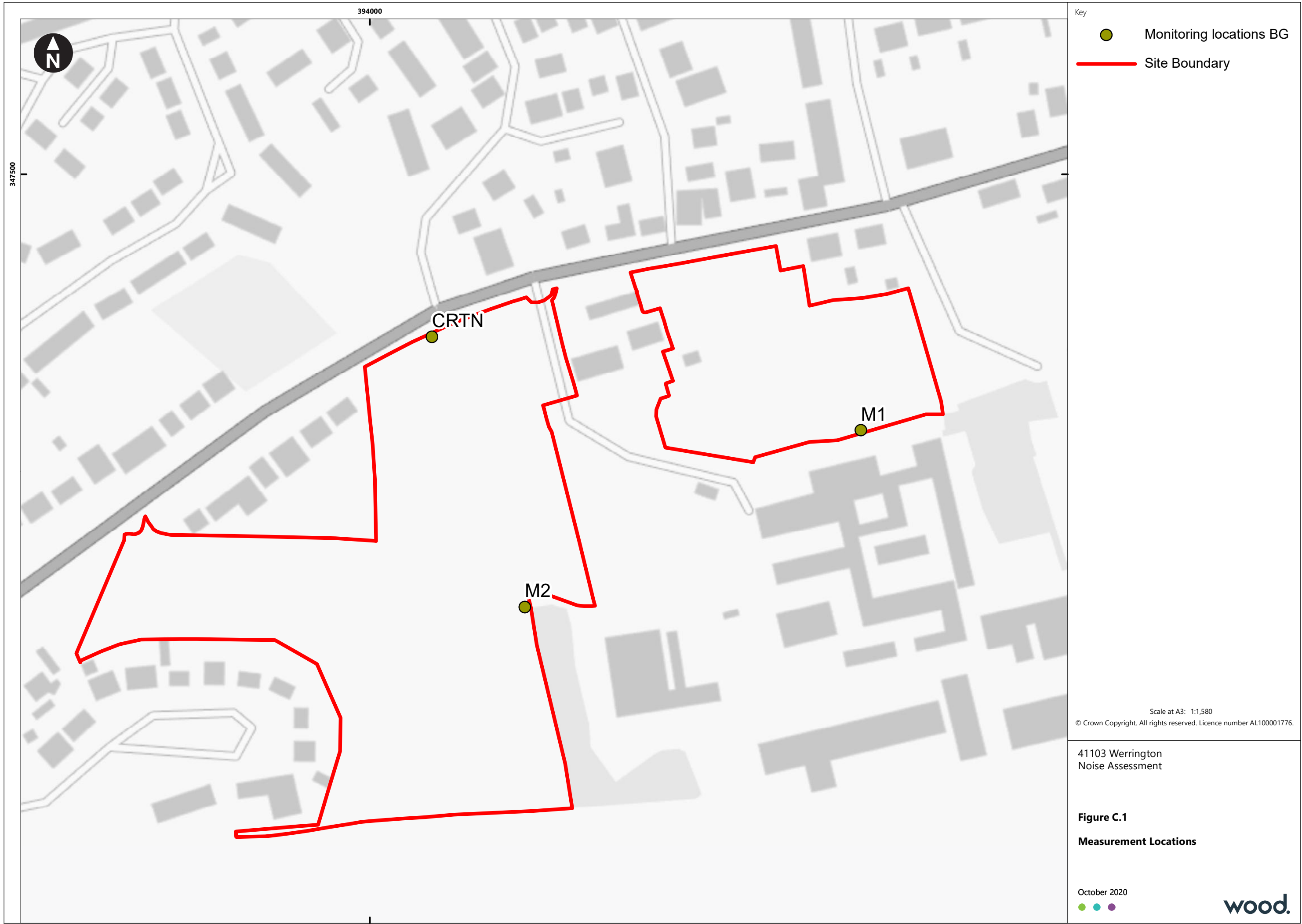
Table B.3 C1 Calibration Details

| Manufacturer | Instrument | Type    | Serial Number | Calibration Date |
|--------------|------------|---------|---------------|------------------|
| Rion         | Calibrator | NC – 74 | 34251550      | 23/05/2018       |



# Appendix C

## Monitoring Locations





# Appendix D

## Grid Noise Maps

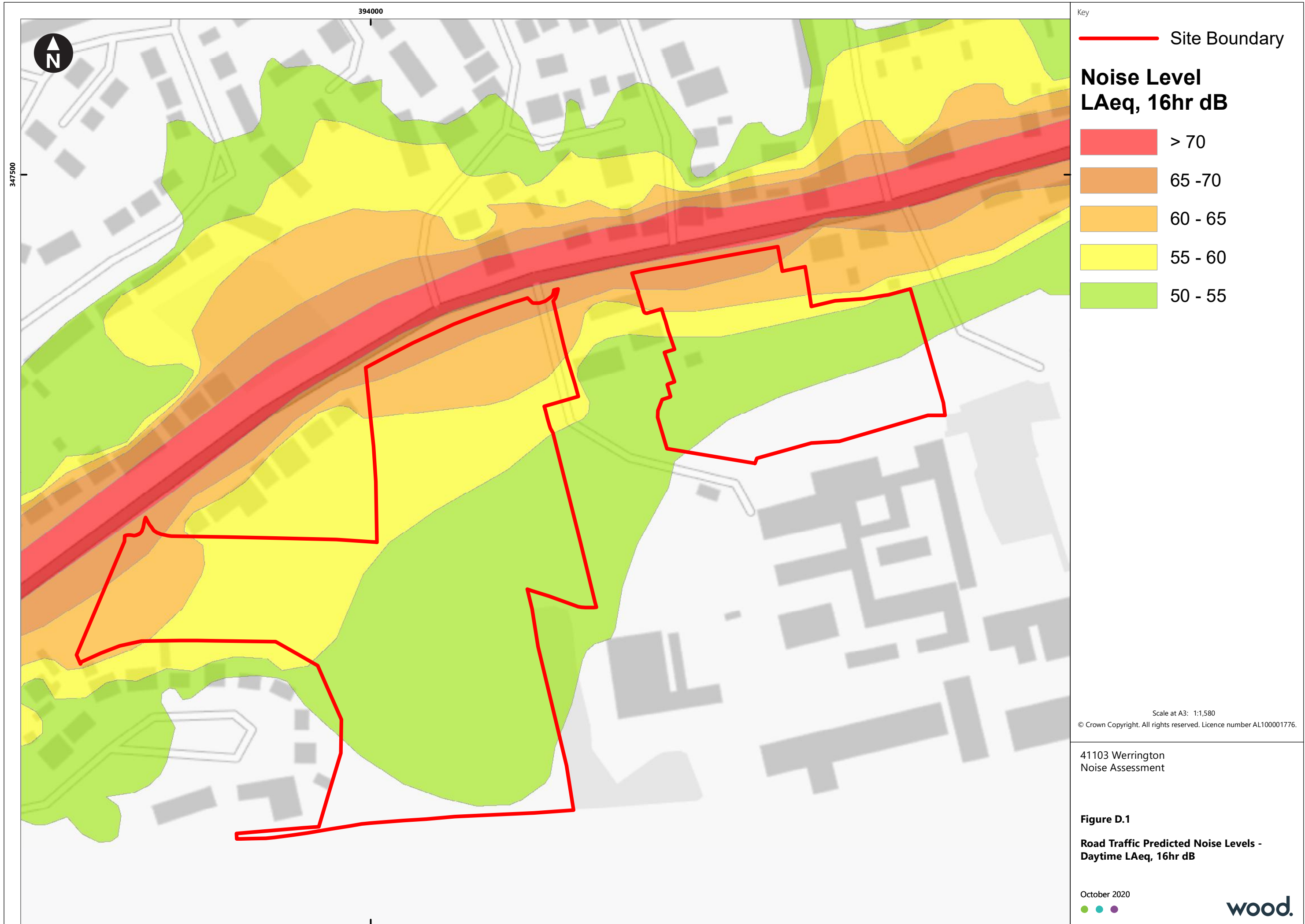
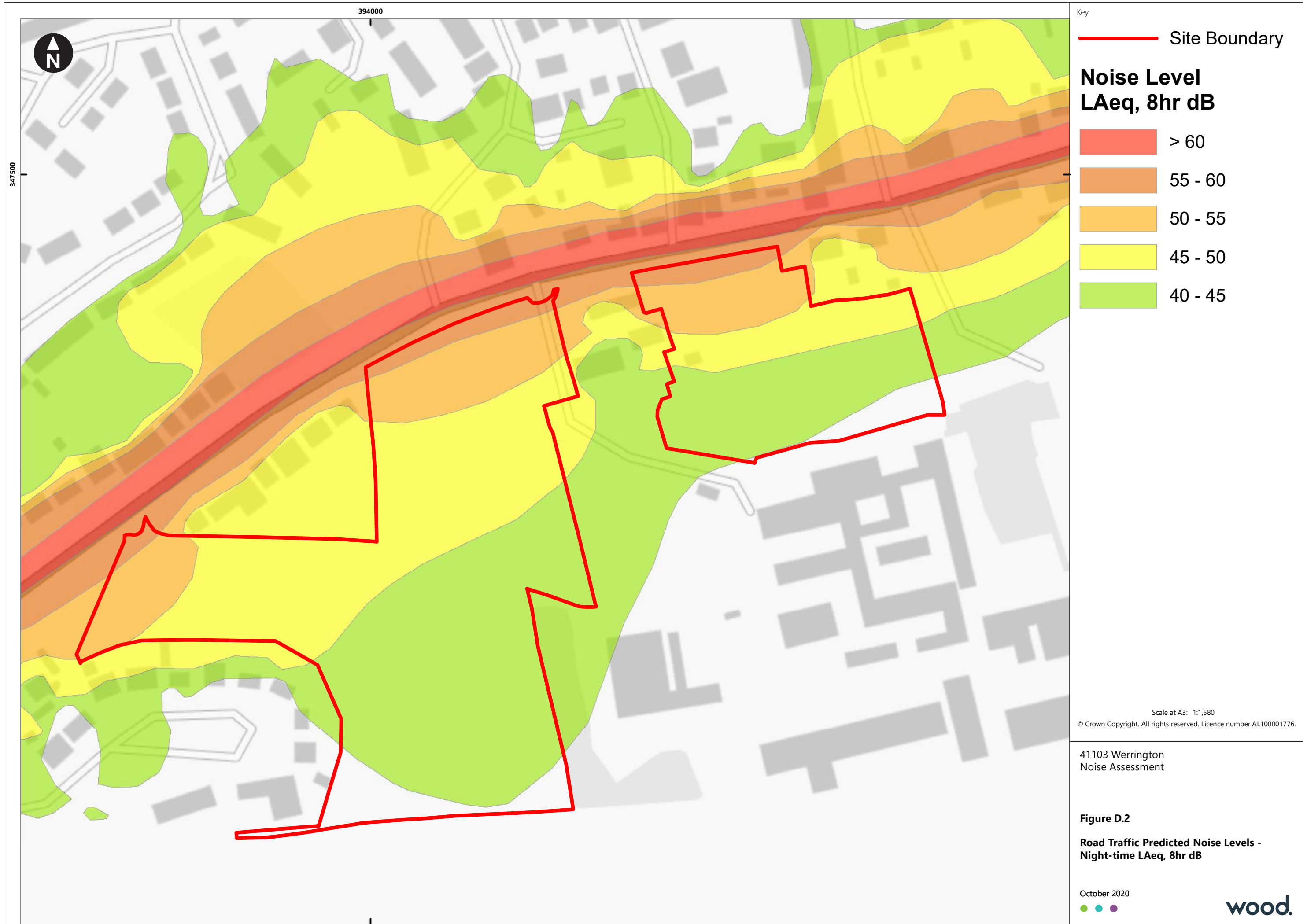
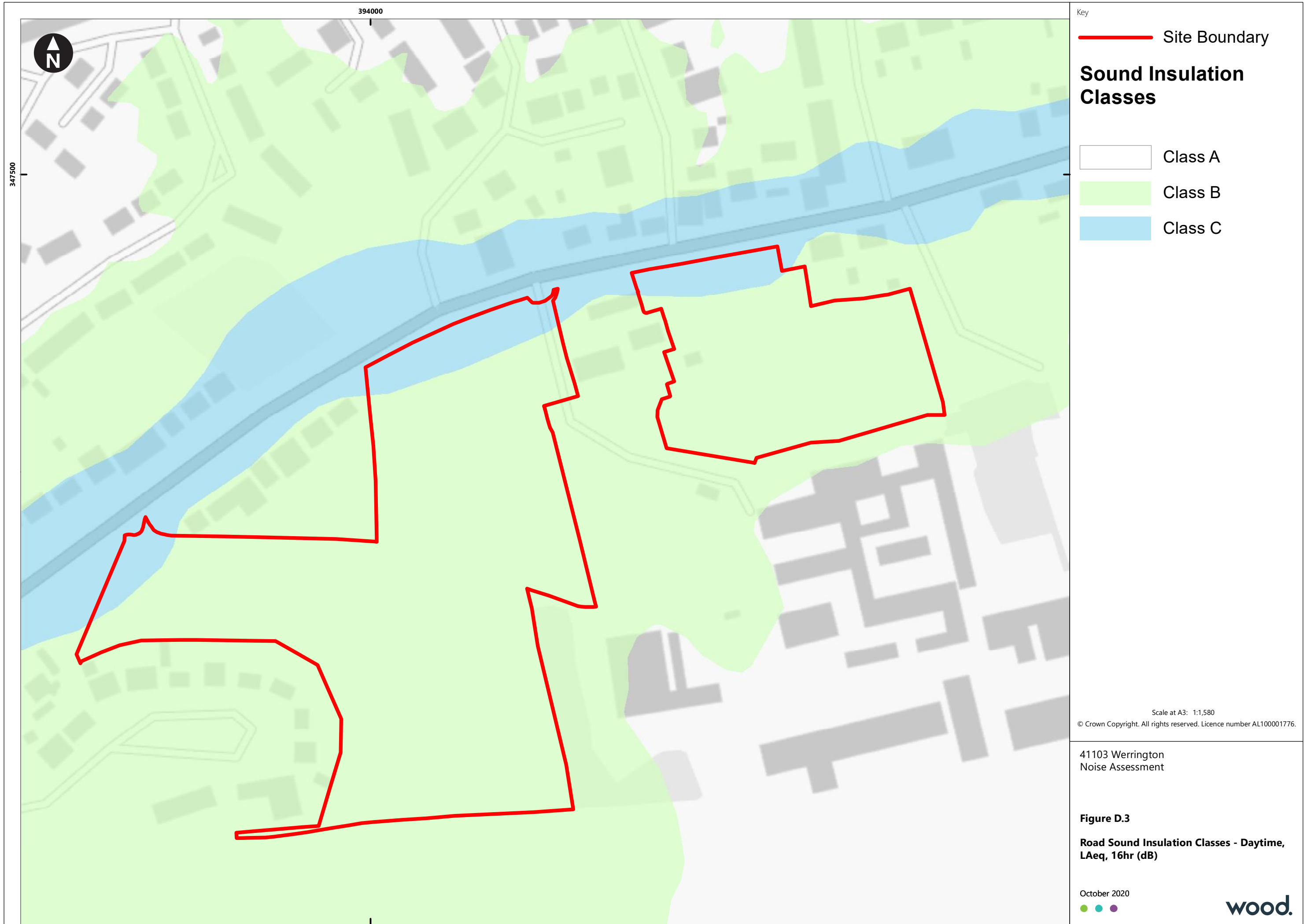


Figure D.1 Daytime Noise Levels





L:\LimAjobs\41103\2020\Figures\Figure D4 Night-time Glazing.mxd Originator: heatherisherwood

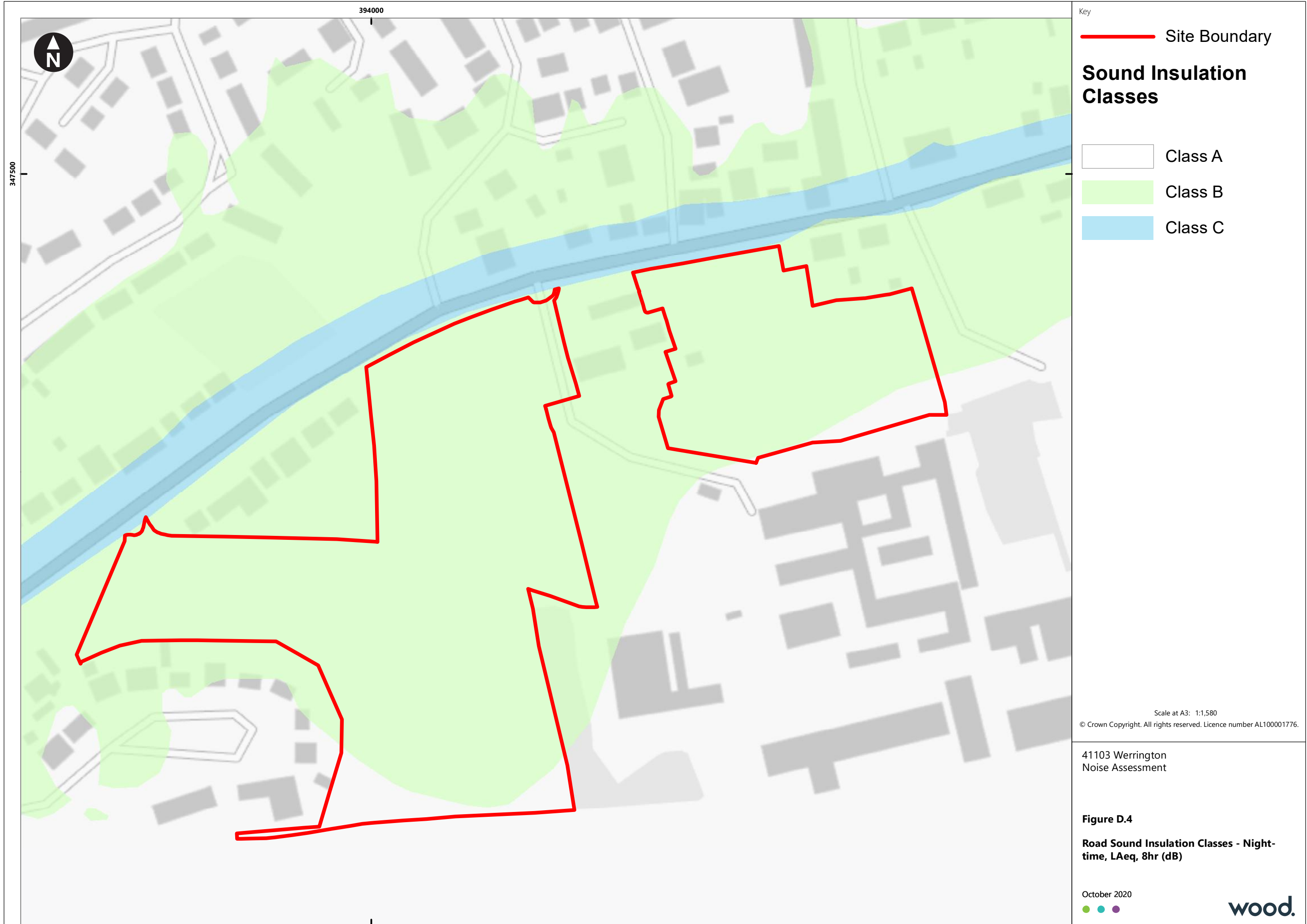
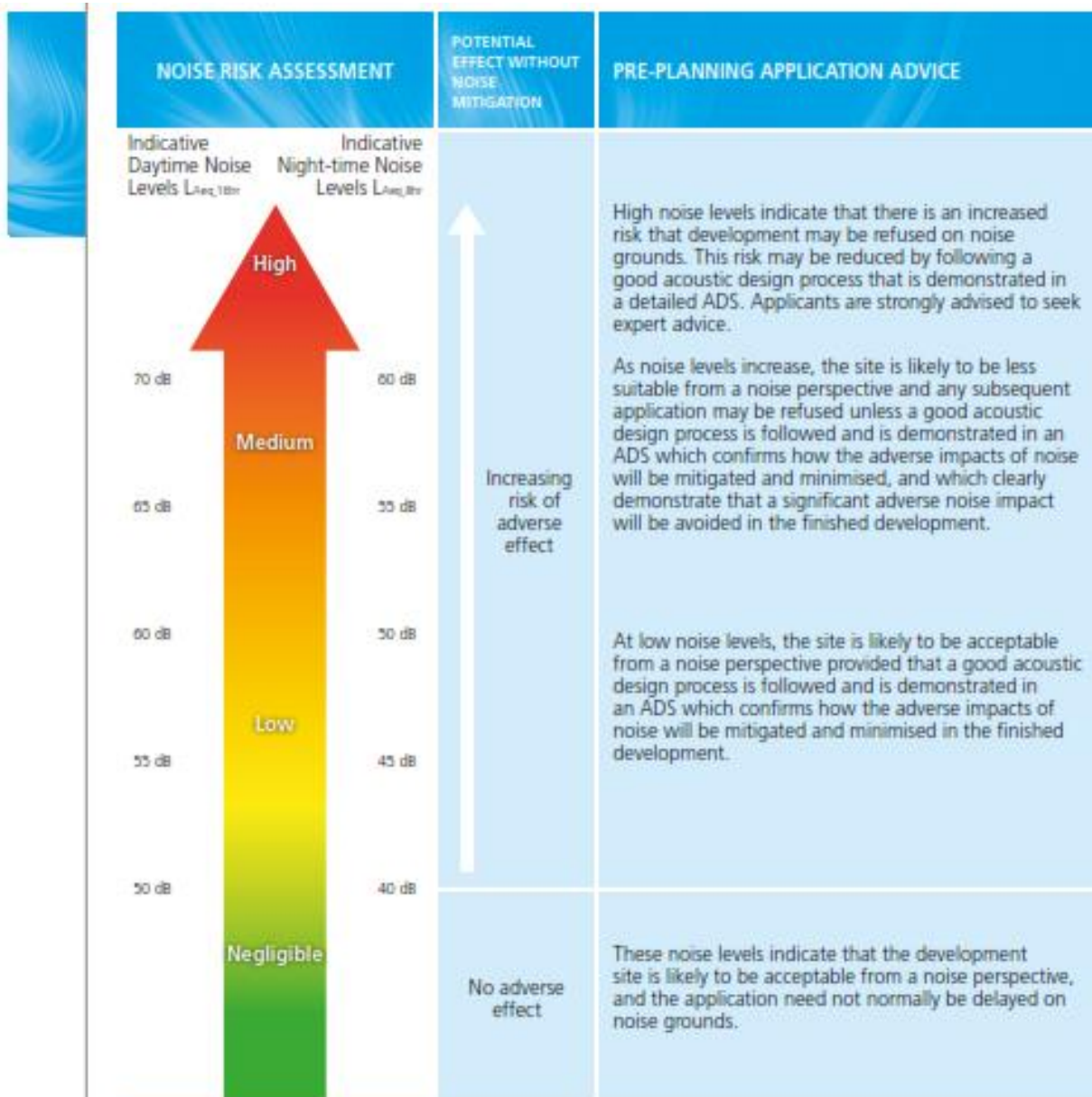


Figure D4 Night-time Glazing

## Appendix E

### ProPG – Figure 1



#### Figure 1 Notes:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- 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".
- $L_{Aeq,10hr}$  is for daytime 0700 – 2300,  $L_{Aeq,8hr}$  is for night-time 2300 – 0700.
- An indication that there may be more than 10 noise events at night (2300 – 0700) with  $L_{Amax,T} > 60$  dB means the site should not be regarded as negligible risk.

Figure 1. Stage 1– Initial Site Noise Risk Assessment

