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**PROPOSED RESIDENTIAL DEVELOPMENT  
HAVANT ROAD, EMSWORTH**

**NOISE IMPACT ASSESSMENT**

Technical Report: R7238-1 Rev 0

Date: 20th December 2017

For: Barratt David Wilson Homes Southampton  
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**24 Acoustics Document Control Sheet**

**Project Title:** Proposed Residential Development at Havant Road, Emsworth  
Noise Impact Assessment

**Report Ref:** R7283-1 Rev 0

**Date:** 19th December 2017

|                                       | <b>Name</b>                            | <b>Position</b>         | <b>Signature</b> | <b>Date</b> |
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| For and on behalf of 24 Acoustics Ltd |                                        |                         |                  |             |

**Document Status and Approval Schedule**

| <b>Revision</b> | <b>Description</b> | <b>Prepared By</b> | <b>Approved By</b> |
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| 0               | Approved for Issue | Reuben Peckham     | Stephen Gosling    |
|                 |                    |                    |                    |
|                 |                    |                    |                    |

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## **EXECUTIVE SUMMARY**

Barratt Southampton intends to apply for planning permission to develop the land off Havant Road, Emsworth for residential use.

The site is subject to ambient noise from road traffic using both Havant Road and the nearby A27.

The scheme has been specifically designed to mitigate noise from road traffic noise as far as reasonably practicable and the assessment has shown that noise levels in the majority of areas within the majority of private external amenity areas should be lower than 55 dB  $L_{Aeq, 16 \text{ hour}}$  during the day.

Acoustic specifications for glazing and alternative means of background ventilation have been provided and, on this basis, it is considered that internal noise levels will be acceptable throughout the development when windows are closed with alternative means of background ventilation provided.

On the above basis it is considered that an appropriate acoustic environment can be provided to the proposed residential properties, both externally and internally. There should therefore be no harm on the grounds of noise to the future residents of this proposed development.

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## **1.0 INTRODUCTION & SCOPE OF ASSESSMENT**

- 1.1 24 Acoustics Ltd has been retained by Barratt Southampton to undertake an updated noise impact assessment at the land off Havant Road, Emsworth, Hampshire. It is intended to apply for planning permission to redevelop the site for residential use.
- 1.2 This report has assessed the impact of noise from road traffic adjacent to the site. The report has been updated based upon the latest proposed site layout and is based upon new noise survey data, obtained in surveys undertaken on the site in December 2017.
- 1.3 All noise levels in this report are quoted in dB relative to 20  $\mu$ Pa.

## **2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT**

- 2.1 The site is located on the western side of Emsworth and is situated between the A27, Havant Road (the A259) and Selangor Avenue. In addition, the Warblington to Emsworth railway line is located on the north-eastern boundary of the site. The site is approximately 15 acres in size and is currently used as grazing fields for livestock.
- 2.2 The A27 runs along the north-west boundary of the site and is the dominant noise source across the northern portion of the site. The A27 is a dual carriageway, elevated by approximately 6 metres above the level of the site. A fence has been installed along the top of the embankment for the A27 and this is effective in attenuating traffic noise across the site.
- 2.3 Havant Road runs along the southern boundary of the site. This is a main road connecting Warblington and Emsworth. Havant Road is level with the site and controls noise levels across the southern portion of the site.
- 2.4 Barratt Southampton proposes to redevelop the site for residential use. A total of 147 private and affordable houses and flats are proposed. A plan showing the proposed development scheme is shown in Figure 1.

### 3.0 STANDARDS AND GUIDANCE

#### NPPF

3.1 The National Planning Policy Framework (NPPF) [Reference 1] was published by the Department for Communities and Local Government in March 2012. For noise, the NPPF policy states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions, while recognising that many developments will create some noise.

3.2 The NPPF refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:

*"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

- 3.4 In 2014 the Planning Practice Guidance (PPG) was finalised [Reference 3]. This is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The PPG states that noise can override other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.
- 3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system. Table 1 is reproduced from the NPPG and summarises the noise exposure hierarchy, based on the likely average response.

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

**Table 1:** PPG Noise Exposure Hierarchy

- 3.6 In general terms it is considered that a noise impact with an effects level which is lower than SOAEL is acceptable (providing the effect is mitigated to a minimum). There is currently, however, a major discontinuity between the above guidance and objective technical criteria for use in planning noise impact assessments. For this site it is considered that the appropriate (technical and objective) standard for use in assessing the noise impact for traffic noise impact is British Standard 8233: 2014 [Reference 4] and the World Health Organisation Community Noise [Reference 5]. These standards and guidance are described below.

#### BS 8233 and World Health Organisation

- 3.7 BS 8233:2014 provides design guidance for dwelling houses, flats and rooms in residential use and recommends that internal noise levels in dwellings do not exceed 35 dB  $L_{Aeq,16\text{ hour}}$  in living rooms and bedrooms during the day, 40 dB  $L_{Aeq,16\text{ hour}}$  in dining rooms during the day and 30 dB  $L_{Aeq,8\text{ hour}}$  in bedrooms at night.
- 3.8 BS 8233 also notes that *"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or  $L_{Amax,F}$ , depending on the character and number of events per night."*
- 3.9 The World Health Organisation (WHO) provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO 2000 guidelines suggest internal noise levels not exceeding 30 dB  $L_{Aeq,8hr}$  or regularly exceeding 45 dB  $L_{Amax,f}$  for 'a good night's sleep'.
- 3.10 The World Health Organisation also provides guidance on the relationship between annoyance and noise levels in external amenity areas (gardens, terraces, balconies, etc.). It defines that noise levels in the order of 55 dB  $L_{Aeq,16\text{ hour}}$  (between 07:00 and 23:00) is the onset of significant community annoyance from continuous noise sources.
- 3.11 In relation to external noise, BS 8233: 2014 proposes the upper guideline value 55 dB  $L_{Aeq,T}$  but acknowledges that there will be circumstances where these guideline values are not achievable where development is desirable.

- 3.12 The Planning Inspectorate, from recent planning appeal history, has considered noise levels within Noise Exposure Category B of the former PPG24 (i.e. 55 – 63 dB  $L_{Aeq, 16hr}$  during the daytime, 45 – 57 dB  $L_{Aeq, 8\text{ hour}}$  during the night) to be acceptable for external amenity areas (Appeal References: APP/LI765/A/10/2126522 and APP/X1735/A/11/2160369).
- 3.13 With respect to the above guidance, levels up to 63 dB  $L_{Aeq, 16\text{ hour}}$  in the daytime and 57 dB  $L_{Aeq, 8\text{ hour}}$  in the night-time are considered acceptable in external amenity areas, although lower levels are desirable wherever practicable.

Professional Practice Guidance on Planning & Noise (ProPG)

- 3.14 The Professional Practice Guidance on Planning and Noise (ProPG) [Reference 6] was published jointly by the Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health in May 2017. The guidance relates to the consideration of existing sources of transportation noise upon proposed new residential development and strives to:
- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
  - Encourage the process of good acoustic design in and around new residential developments;
  - Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
  - Improve understanding of how to determine the extent of potential noise impact and effect; and
  - Assist the delivery of sustainable development.
- 3.15 The guidance describes a recommended approach for new residential development, which includes four key elements of the assessment process, identified below:
- Good acoustic design process;
  - Internal noise level guidelines;
  - External amenity area noise assessment;
  - Assessment of other relevant issues.

- 3.16 It is important to note that the guidance in ProPG does not constitute an official government code of practice and neither replaces nor provides an authoritative interpretation of the law or government policy. It is provided for guidance only and has no formal place within planning legislation.

#### Summary

- 3.17 Based upon the review of standards described above, noise has been assessed in accordance with the following approach:
- BS 8233 for interior noise levels (of 35 dB  $L_{Aeq,16hr}$  in living rooms and 30 dB  $L_{Aeq,8hr}$  in bedrooms, and not to exceed and 45 dB  $L_{Amax,f}$  in bedrooms at night for regular events only);
  - World Health Organisation Criteria for the external amenity areas outside of the buildings of 55 dB  $L_{Aeq,16hr}$  where feasible.

## **4.0 NOISE MEASUREMENTS**

### Methodology

- 4.1 Environmental noise surveys have been undertaken on the undeveloped site between 11th and 15th December 2017 in order to establish existing ambient noise levels across the site. The noise measurement locations are shown in Figure 2.
- 4.2 Ambient noise levels were measured using the following equipment:
- |                                                     |           |
|-----------------------------------------------------|-----------|
| 2* Rion (Type 1) precision grade sound level meter: | Type NL52 |
| Brüel and Kjær acoustic calibrator:                 | Type 4231 |
- 4.3 The instrumentation was configured to measure and store overall A-weighted statistical parameters such as  $L_{Aeq}$ ,  $L_{Amax}$  and  $L_{A90}$  (all measured on fast response).
- 4.4 The instrumentation at each location was equipped with an environmental microphone. Measurements were made at approximately 1.5 metres above ground level. The calibration of the instrumentation was checked before and after the tests and no signal variation occurred. Calibration of 24 Acoustics' equipment is traceable to National Standards.

### Noise Survey Results

- 4.5 The noise survey results are shown graphically in Figures 3 and 4 summarised in Tables 2 and 3 below.

|                      | Day                        | Night                   |                      |
|----------------------|----------------------------|-------------------------|----------------------|
|                      | L <sub>Aeq</sub> , 16 hour | L <sub>Aeq</sub> 8 hour | L <sub>Amax</sub> ,f |
| Monday 11/12/2017    | 62                         | 54                      | 64                   |
| Tuesday 12/12/2017   | 60                         | 56                      | 67                   |
| Wednesday 13/12/2017 | 63                         | 58                      | 70                   |
| Thursday 14/12/2017  | 62                         | 55                      | 66                   |
| Friday 15/12/2017    | 64                         |                         |                      |

**Table 2:** Summary of Noise Survey Results, Location 1, Boundary adjacent to A27

|                      | Day                        | Night                   |                      |
|----------------------|----------------------------|-------------------------|----------------------|
|                      | L <sub>Aeq</sub> , 16 hour | L <sub>Aeq</sub> 8 hour | L <sub>Amax</sub> ,f |
| Monday 11/12/2017    | 71                         | 64                      | 80                   |
| Tuesday 12/12/2017   | 72                         | 64                      | 80                   |
| Wednesday 13/12/2017 | 73                         | 65                      | 80                   |
| Thursday 14/12/2017  | 72                         | 64                      | 80                   |
| Friday 15/12/2017    | 73                         |                         |                      |

**Table 3:** Summary of Noise Survey Results, Location 2, Boundary adjacent to Havant Road

- 4.6 Train noise was recorded during previous surveys at the north of the site. It was established that the ambient noise on the site was dominated by road traffic and not affected by the noise from a passing train. The impact of train noise has therefore not been considered further.

## **5.0 ACOUSTIC MODELLING**

- 5.1 Detailed noise maps showing noise levels across the site have been calculated using IMMI v2017 software. The model has been developed following the method of Calculation in Road Traffic Noise [Reference 7].
- 5.2 The model was calibrated using the ambient noise measurements taken on site in December 2017.

- 5.3 The acoustic model has been used to provide a finer resolution of noise levels across the site as well as to predict noise levels across the site with the develop present.
- 5.4 The results of the acoustic modelling, showing the noise levels across the proposed development site, are shown in Figures 5 and 6.

## 6.0 ASSESSMENT

- 6.1 Both existing ambient noise levels and noise levels once the development has been constructed have been considered across the site as part of this assessment.
- 6.2 The scheme has been designed to mitigate the noise impact of road traffic noise as far as practicable by fronting the housing towards the A27 and Havant Road and using the new properties as an acoustic barrier. The assessment indicates that with the screening provided by the properties, noise levels in the majority of areas of the majority of private external amenity areas throughout the site will be lower than 55 dB  $L_{Aeq, 16 \text{ hour}}$  during the day and hence commensurate with the guidance from BS 8233:2014 and the World Health Organisation.
- 6.3 Incident levels along the row of properties closest to the A27 are predicted to be between 59 and 63 dB  $L_{Aeq, 16 \text{ hour}}$  during the daytime and between 57 and 59 dB  $L_{Aeq, 8 \text{ hour}}$  at night. Noise levels at the proposed properties closest to Havant Road are predicted to be between 63 and 66 dB  $L_{Aeq, 16 \text{ hour}}$  during the day and between 55 and 58 dB  $L_{Aeq, 8 \text{ hour}}$  during the night. Typical night-time  $L_{Amax,f}$  values will be 69- 71 dB and 70- 73 dB at properties closest to the A27 and to Havant Road respectively.
- 6.4 When windows are open the internal ambient noise levels which can be expected inside most of the properties will be greater than those recommended by BS 8233. Calculations have been undertaken to determine glazing and ventilation requirements for the proposed properties throughout. These indicate that standard thermal double glazing (4 mm glass, 16 mm air gap, 4 mm glass) capable of achieving a minimum performance of 31 dB  $R_w$  and trickle vents capable of achieving a minimum performance of 36 dB  $D_{n,e,w}$  should be acceptable in all properties (with the exception of those fronting Havant Road) and will ensure an adequate acoustic environment as defined in BS 8233 in all habitable rooms.

- 6.5 Habitable rooms to the front façade of the proposed properties fronting Havant Road (Plots 1-7 and 140- 147) will require an acoustically rated background vent in order to achieve acceptable internal noise levels. Calculations indicate that this vent should have a minimum sound insulation performance of 39 dB  $D_{n,e,w}$ . Rytons 125mm Acoustic AirCore<sup>®</sup> with Hit & Miss Ventilator - AAC5HM is capable of complying with this specification.
- 6.6 On this basis it is considered that internal noise levels will be acceptable throughout the development when windows are closed with alternative means of background ventilation provided.

## **7.0 CONCLUSIONS**

- 7.1 Barratt Southampton intends to apply for planning permission to develop the land off Havant Road, Emsworth for residential use.
- 7.2 The site is subject to ambient noise from road traffic using both Havant Road and the nearby A27.
- 7.3 The scheme has been specifically designed to mitigate noise from road traffic noise as far as reasonably practicable and the assessment has shown that noise levels in the majority of areas within the majority of private external amenity areas should be lower than 55 dB  $L_{Aeq, 16 \text{ hour}}$  during the day.
- 7.4 Acoustic specifications for glazing and alternative means of background ventilation have been provided and, on this basis, it is considered that internal noise levels will be acceptable throughout the development when windows are closed with alternative means of background ventilation provided.
- 7.5 On the above basis it is considered that an appropriate acoustic environment can be provided to the proposed residential properties, both externally and internally. There should therefore be no harm on the grounds of noise to the future residents of this proposed development.

## REFERENCES

1. Department for Communities and Local Government. National Planning Policy Framework, 2012.
2. Department of the Environment. Planning Policy Guidance (PPG) 24, Planning and Noise, 1994.
3. DEFRA, Noise Policy Statement for England, 2010.
4. British Standards Institution. British Standard 8233: Sound Insulation and Noise Reduction for Buildings, 1999.
5. World Health Organisation. Guidelines for Community Noise, 2000.
6. Association of Noise Consultants, Institute of Acoustics, Chartered Institute of Environmental Health. Professional Practice Guidance on Planning and Noise, May 2017.
7. Department of Transport. Calculation of Road Traffic Noise.



**Project:**  
Land at Havant Road,  
Emsworth

**Description:**  
Proposed Site Plan

**DWG No:** Figure 1

**Scale:** N.T.S.

**Rev:** A

**Date:** December 2017

**Drawn By:** RP

**Job No:** 7238-3



|                                                     |                                              |                       |                                                                                                      |
|-----------------------------------------------------|----------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <b>Project:</b><br>Land at Havant Road,<br>Emsworth | <b>Description:</b><br>Site Survey Locations |                       | <br>24Acoustics |
| <b>DWG No:</b> Figure 2                             | <b>Scale:</b> N.T.S.                         | <b>Rev:</b> A         |                                                                                                      |
| <b>Date:</b> December 2017                          | <b>Drawn By:</b> RP                          | <b>Job No:</b> 7238-3 |                                                                                                      |

FIGURE 3: Location 1 Noise Survey Results, Site Boundary with A27, 11th - 15th December 2017

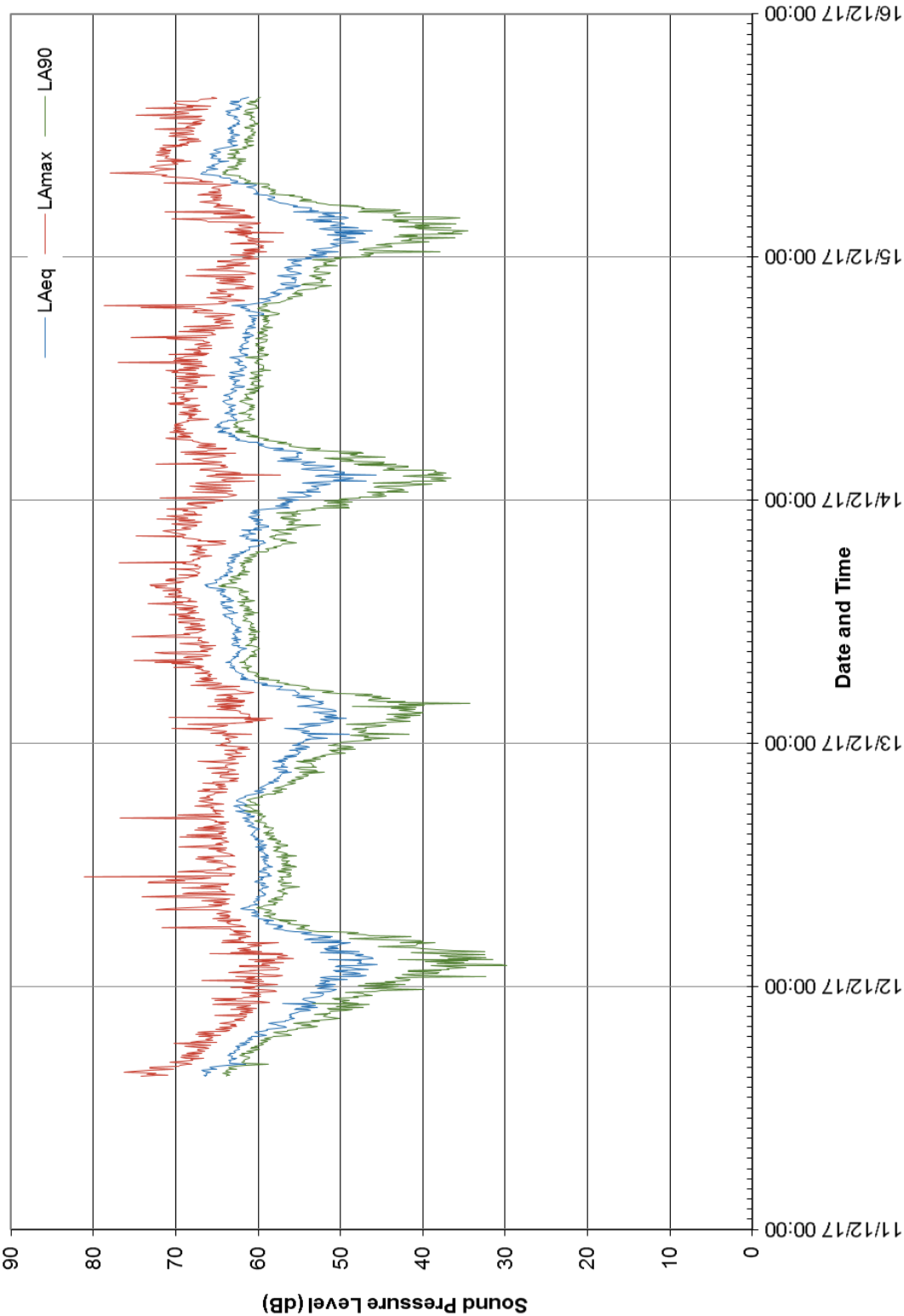
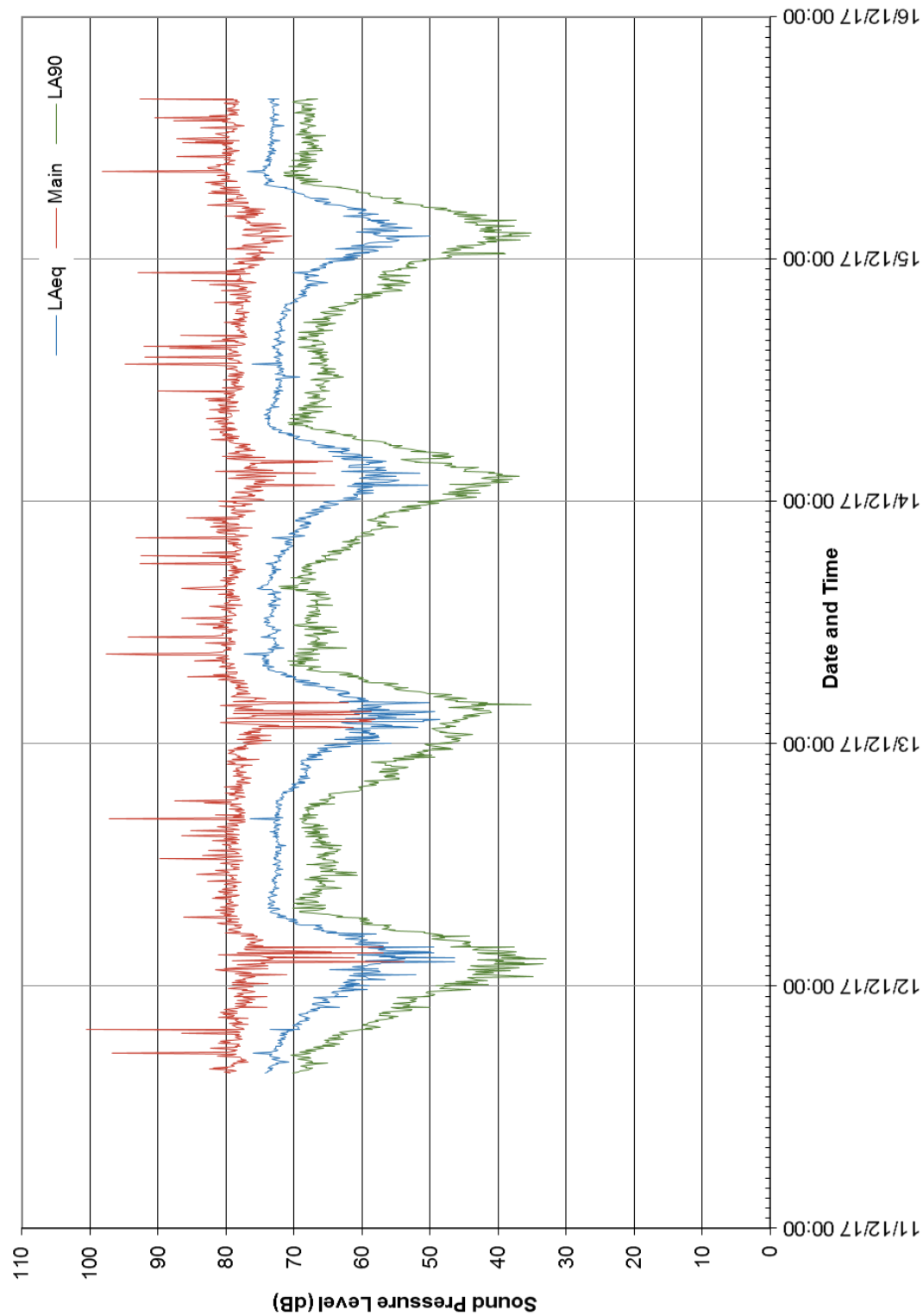
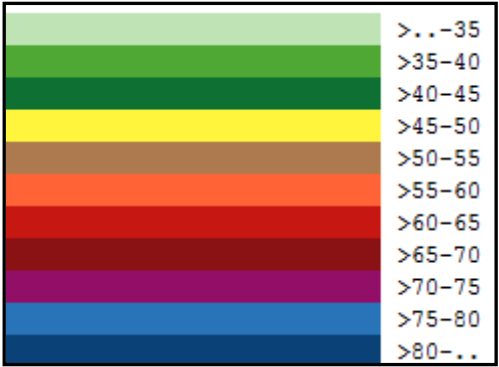
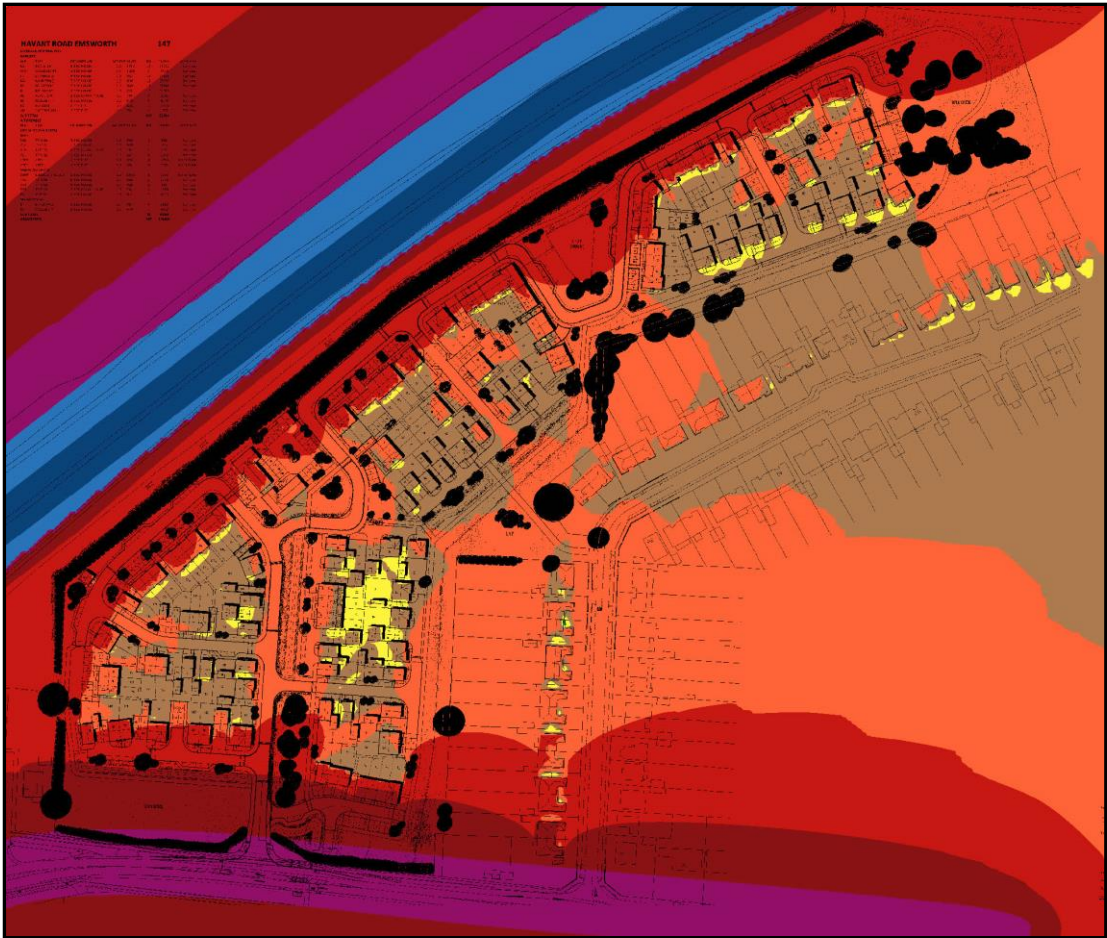
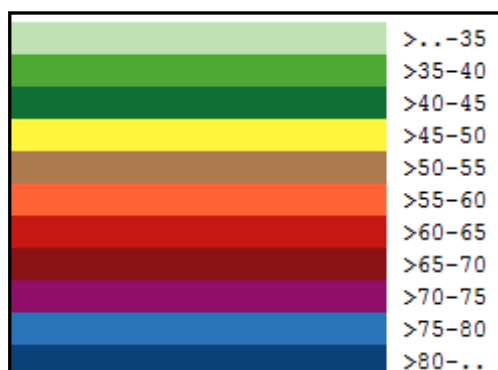
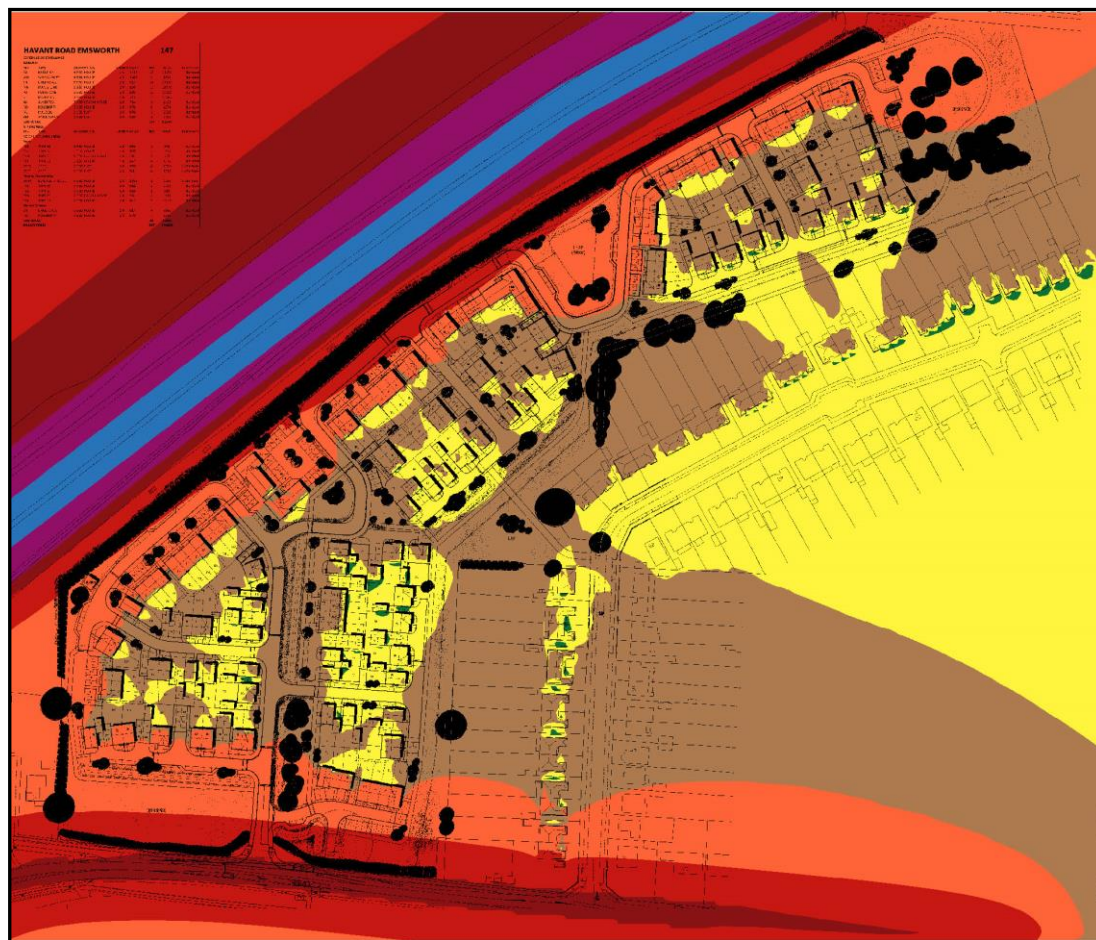


FIGURE 4: Noise Survey Results, Location 2, Site Boundary with A27, 11th - 15th December 2017





|                                                     |                                                                                                     |                       |                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------|
| <b>Project:</b><br>Land at Havant Road,<br>Emsworth | <b>Title:</b><br>Daytime Predicted Noise Levels,1.5 m above<br>grade, dB L <sub>Aeq</sub> , 16 hour |                       |  |
| <b>DWG No:</b> Figure 5                             | <b>Scale:</b> N.T.S.                                                                                | <b>Rev:</b> A         |                                                                                       |
| <b>Date:</b> December 2017                          | <b>Drawn By:</b> RP                                                                                 | <b>Job No:</b> 7238-1 |                                                                                       |



|                                                     |                                                                                    |                       |                                                                                                      |
|-----------------------------------------------------|------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <b>Project:</b><br>Land at Havant Road,<br>Emsworth | <b>Title:</b><br>Night-time Predicted Noise Levels, 4 m height,<br>dB LAeq, 8 hour |                       | <br>24Acoustics |
| <b>DWG No:</b> Figure 6                             | <b>Scale:</b> N.T.S.                                                               | <b>Rev:</b> A         |                                                                                                      |
| <b>Date:</b> December 2017                          | <b>Drawn By:</b> JE                                                                | <b>Job No:</b> 7238-3 |                                                                                                      |

## APPENDIX A: NOISE UNITS

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB(A). The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB(A) corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The  $L_{Amax}$  noise level

This is the maximum noise level recorded over the measurement period.

ii) The  $L_{Aeq}$  noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.