Land South of Allington Lane
Eastleigh

Noise Assessment

Hallam Land Management, The Davies Family
& Bovis Homes Ltd

Brookbanks

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1 Introduction

1.1 Brookbanks Consulting Ltd is appointed by Hallam Land Management, The Davies Family and Bovis Homes Ltd to assess the noise environment in support of a potential development on land south of Allington Lane, Eastleigh.

1.2 In particular, this report has regard to the generated noise from vehicular traffic adjacent to the Site. This noise assessment will be used to determine what measures, if any are required to achieve a suitable noise environment for the Proposed Development.

1.3 Human subjects, under laboratory conditions, are generally only capable of noticing changes in steady noise levels of no less than 3 dB(A). Additionally, environmental noise rarely reaches the sound pressure levels associated with hearing impairment. However, noise can cause annoyance and therefore the potential impact needs to be assessed.

1.4 The following sections of this report will consider the Site conditions and assess the appropriateness of the Site for the Proposed Development in accordance with national noise guidance.

1.5 The site location is indicated below.

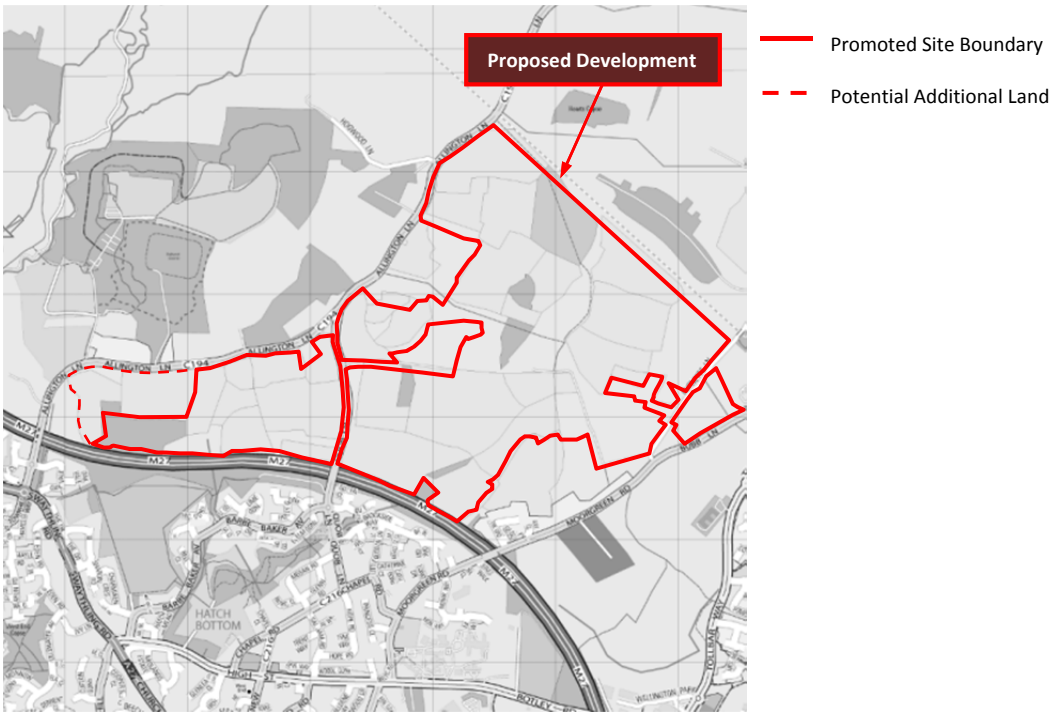


Figure 1a: Overall Strategic Site Location

2 Legislation and Planning Context

Assessment approach

2.1 Methods of assessment have been employed that are consistent with current guidance and best practice in planning policy and British Standards documents to ensure that the findings of this assessment are accurate and robust.

The Control of Pollution Act 1974

2.2 The Control of Pollution Act 1974 section 62 and 63 contains powers for local authorities to deal with noise and vibration from construction and demolition sites.

The Planning and Compulsory Purchase Act 2004

2.3 The Planning and Compulsory Purchase Act 2004 requires local authorities to draw up local Development plans. Setting the broad framework for acceptable Development in their area and reconciling the conflicts inherent in Development.

2.4 Under the Town and Country Planning Act 1990, local planning authorities may include planning conditions to Planning Consents which could include controls on the emission of noise. Advice on the use of these powers is given to English authorities in the light of the Government's Noise Policy Statement for England in the National Planning Policy Framework.

Noise Policy Statement for England

2.5 The Noise Policy Statement for England of March 2010 (Defra 2010) provides a more overarching policy statement on the approach to noise in England.

2.6 This Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy, 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.'

2.7 The NPSE indicates that noise should not be considered in isolation of the wider benefits of a proposed. The intention is to minimise noise impacts as far as is reasonably practicable.

2.8 The explanatory note of NPSE defines the following terms:

"There are two established concepts from toxicology that are currently being applied to noise impacts. They are:

- ***NOEL:** No Observed Effect Level: This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
- ***LOAEL:** Lowest Observed Adverse Effect Level: This is the level above which adverse effects on health and quality of life can be detected.*
- ***SOAEL:** Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur."*

2.9 The NPSE does not provide a numerical value for the SOAEL, stating at paragraph 2.22:

"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."

National Planning Practice Guidance NPPG, 2014

2.10 In February 2014 National Planning Practice Guidance (NPPG) was published.

2.11 The main objective is to:

"Identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

2.12 A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the NPPG as indicated below.

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
Lowest Observed Adverse Effect Level			
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
Significant Observed Adverse Effect Level			
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	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Figure 2a: Noise Exposure Hierarchy

2.13 The guidance identifies that the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation. These factors include:

- The source and absolute level of the noise together with the time of day it occurs;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- The spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content) and the general character of the noise.

2.14 More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be taken into account;
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows;
- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed.

2.15 In relation to how noise can be mitigated, this is dependent on the type of development being considered and the character of the proposed location. In general, for noise making developments, there are four broad types of mitigation:

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

2.16 There are further considerations relating to mitigation of noise on residential developments. The noise impact may be partially off-set if the residents of those dwellings have access to:

- A relatively quiet facade (containing windows to habitable rooms) as part of their dwelling, and/or;
- A relatively quiet external amenity space for their sole use or a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings;
- A relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).

Application of the Noise Policy Statement for England (Defra)

2.17 For the purposes of this assessment, the recommended noise levels have been defined as follows:

External Noise (Daytime)

- NOEL: noise levels less than 50 dB;
- LOAEL: noise levels between the 50 dB and 55 dB;
- SOAEL: noise levels above the upper 55 dB.

Internal Noise (Night-time)

- NOEL: noise levels less than 30 dB;
- LOAEL: noise levels between the 30 dB and 35 dB;
- SOAEL: noise levels above the upper 35 dB.

British Standard 8233:2014: Sound Insulation and Noise Reduction for Buildings

2.18 BS8233:2014[1] gives recommendations for the control of noise in and around buildings and suggests appropriate criteria and internal noise limits for habitable rooms of residential dwellings. In accordance with the requirements of BS8233:2014, the following internal and daytime noise limits will need to be met within sensitive rooms of the residential dwellings:

- 35dB LAeq (16 hour) during the daytime in living rooms;
- 30dB LAeq (8 hour) during the night time in bedroom areas;
- 55 dB LAeq,T for noise in external amenity areas.

Calculation of Road Traffic Noise

2.19 The Calculation of Road Traffic Noise[2] is the standard UK procedure for defining measurement and calculation methods for assessing road traffic noise. The procedures assume typical traffic and noise propagation conditions which are consistent with moderately adverse wind speeds and direction during the specified periods.

2.20 All predicted noise levels are expressed in terms of $L_{A10\ (1\text{-hour})}$ or $L_{A10\ (18\text{-hour})}$ between 0600 and 2400. The $L_{A10\ (18\text{-hour})}$ is the arithmetic average of the values of L_{A10} hourly data for each of the eighteen 1-hour periods between 0600 and 2400.

British Standard 5228: Code of Practice for Noise and Vibration Control on Construction and Open Sites

2.21 BS5228: 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' (British Standards Institution 2009, as amended) sets out the methodology to predict construction noise and the control of noise and vibration. It provides guidance on methods of predicting and measuring noise and assessing its impact on those exposed to it, and also recommendations for basic methods of vibration control.

2.22 At this stage, the detailed means of construction, including matters such as the actual plant and equipment to be used, is not known. Such matters can be controlled through the use of appropriate conditions on any planning consent. The lack of detail at this stage means that the assessment of construction effects can only be qualitative, but nonetheless the detail available is sufficient to demonstrate that the construction phase can proceed without undue or significant adverse effects on the surrounding community.

2.23 Annex B in BS5228-2:2009 sets out guidance on effects of vibration levels of construction noise. Receptors to vibration have been identified as heritage sites such as nearby listed buildings and other noise sensitive receptors.

2.24 Human beings are very sensitive to vibration, BS5228-2:2009 suggesting that the threshold of perception typically being in the peak particle velocity (PPV) range of 0.14mm/s to 0.3mm/s. Vibration above these levels can disturb, startle, cause annoyance or interfere with work activities. Vibration nuisance is often associated with the assumption that if vibration can be felt then damage is inevitable. However, considerably greater levels of vibration are required to cause damage to buildings and structures.

[1] British Standard 8233:1999; Sound Insulation and Noise Reduction for Buildings
[2] Department of Transport (1988) The Calculation of Road Traffic Noise

2.25 The standard provides guidance for identifying the significance of noise and vibration levels from surface construction activity. Significance can be considered in relation to fixed limits for noise and vibration, or alternatively in considering the potential change in the ambient noise level with the addition of construction noise.

2.26 There are no national noise criteria for limiting noise from construction sites. BS 5228 Annex E gives guidance on the significance of noise effects from construction and recommends the ABC method to establish construction noise limits.

2.27 The ABC method involves rounding the existing ambient noise levels to the nearest 5 dB for the appropriate time period and then comparing these levels to the total noise level, including construction noise. If the total noise level exceeds the existing rounded value, then a significant effect is deemed to have occurred.

Significance Criteria

2.28 Methods of assessment have been employed that are consistent with current guidance and recommendations in the form of statutory documents and recognised publications to ensure that the findings represent a robust approach to the Assessment.

2.29 The DMRB Volume 11, Section 3, Part 7: Environmental Assessment Procedure is used for the assessment of operational noise impacts for road schemes and gives guidance on the magnitude of impact from noise changes upon the local environment. The significance of predicted increases in road traffic noise as a result of the Proposed Development has been assessed according to the criteria described below.

2.30 The tables below outline the criteria for determining the magnitude in relation to changes in traffic noise, with short term relating to the first occupation of the development with longer term relating to 10 years after opening.

Magnitude	Change in Traffic Noise (dB)
Major	10 +
Moderate	5 – 9.9
Minor	3 – 4.9
Negligible	0.1 – 2.9

Figure 2b: Magnitude of Effect in the Long Term

2.31 BS5228: 'Code of Practice for noise and vibration control on construction and open sites' is the methodology for the prediction of construction noise, and control of noise and vibration. Significance can be considered in relation to fixed limits for noise and vibration, or alternatively in considering the potential change in the ambient noise level with the addition of construction noise for the purposes of the proposed development. This significance can be assessed using the criteria below.

Magnitude	Change in Traffic Noise (dB)
Major	5 +
Minor	0.1 – 4.9

Figure 2c: Magnitude of Change

3 Potential Effects – Construction Stage

3.1 During the construction stage, it is envisaged that earthworks, installation of necessary services and building construction would form the main noise impacts upon existing residential properties in the environs of the site.

3.2 At the time of writing, it is considered that the impact of construction traffic would be negligible. The temporary increase in traffic due to construction is likely to be indiscernible from daily variations in traffic flow.

3.3 Although the final details of the construction activities cannot be finalised until construction contractors have been confirmed, construction noise levels have been predicted using the sound pressure levels for typical construction plant as described in BS 5228: 2009 Part 1. The sound pressure levels in BS 5228 have been presented as a LAeq at a distance of 10 m. A high percentage for the 'on-time' (the length of time that the equipment remains active on site) has been assumed so as to present a reasonable worst case.

3.4 The table below presents a list of generic construction plant that could potentially be used on site, together with an estimate on the length of time the construction plant is used.

Plant Description	BS5228 Reference	Sound level at 10m	On time %
Angle Grinder	Table C4 No. 93	80	40
Asphalt Paver	Table C5 No. 33	75	60
Circular Saw	Table C4 No. 72	79	40
Compressor	Table C5 No. 5	75	80
Concrete Pump and mixer truck discharging	Table C4 No. 28	79	80
Concrete Saw	Table C4 No. 71	85	10
Delivery Lorry	Table C2 No. 35	80	70
Diesel Generator	Table C4 No. 84	74	100
Dozer	Table C5 No. 12	77	60
Dumpers	Table C4 No. 9	77	60
Excavator	Table C5 No. 34	82	75
Percussion Drill	Table C4 No. 69	85	40
Pneumatic Breaker	Table D2 No.2	81	40
Poker Vibrator	Table C4 No. 33	78	80
Road Planer	Table C5 No. 7	82	70
Roller Compactor	Table C5 No. 29	76	60
Telescopic Handler	Table C4 No. 54	79	75
Tower Crane	Table C4 No. 49	77	60
Tracked Excavator	Table C5 No. 18	80	70
Tracked Excavator fitted with Breaker	Table D2 No. 5	91	70
Tracked Mobile Crane	Table C4 No. 52	75	60
Vibratory Roller (22t)	Table C5 No. 28	77	60
Water Pump	Table C2 No. 45	65	75
Welder	Table C3 No. 31	73	40

Figure 3a: List of Construction Plant and Associated Sound Levels

3.5 The above table identifies a list of plant that could be used across the site, to identify the likely construction noise; the likely construction process on site has been identified. This include:

- Site mobilisation
- Road Construction
- Site Clearance
- Building construction

3.6 Following this, the likely construction plant to be used during the identified construction processes has then been identified. The combined noise output has been calculated using the following methodology.

3.7 The on-time correction factor has been extracted from Figure F5 within BS5288.

3.8 The construction noise impacts have been calculated using the following formula as described in BS5228:

$$K_h = 20 \times LOG\frac{R}{r}$$

Where:

K_h = the correction for propagation across hard ground
R = the distance to the receptor location
r = the distance of 10 m at which the SPL has been measured

3.9 Where more than one piece of the same equipment is used in a construction activity, the following equation has been used to determine the total noise level generated:

Combined noise level = x + 10*log10(N)

Where:

x = noise level from a single piece
N = the number of items of equipment used

3.10 To calculate the combined noise level for a construction process the following equation has been used to combine the noise levels from the individual construction plant:

Combined event= $10*\log10\ (10^{(L_1/10)} + 10^{(L_2/10)} + 10^{(L_3/10)} + ... + 10^{(L_n/10)})$

Where:

L1 = individual noise event

3.11 A worst case scenario has been presented by considering propagation across hard ground and by not considering screening provided by topographical features, buildings or other structures.

3.12 The following tables present the total noise levels expected to be generated by the construction process occurring on site.

3.13 The potential noise impacts during the construction stage are presented below.

Plant	Number	Noise level at 10m	Noise level at 20m	Noise level at 50m	Noise level at 100m	Noise level at 200m
Delivery Lorry	1	80	74	66	60	54
Tracked Mobile Crane	1	75	69	61	55	49
Telescopic Handler	1	79	73	65	59	53
Wheeled loader	1	78	72	64	58	52
Dozer	1	77	71	63	57	51
Dumpers	2	80	74	66	60	54
Diesel generator	1	74	68	60	54	48
Total		87	81	73	67	61

Figure 3b: Site Mobilisation Noise Levels

Plant	Number	Noise level at 10m	Noise level at 20m	Noise level at 50m	Noise level at 100m	Noise level at 200m
Road Planer	1	82	76	68	62	56
Tracked Excavator	1	80	74	66	60	54
Dozer (Spreading fill)	1	77	71	63	57	51
Dumpers	2	80	74	66	60	54
Vibratory Roller (22t)	1	77	71	63	57	51
Asphalt Paver	1	75	69	61	55	49
Diesel Generator	1	74	68	60	54	48
Total		87	81	73	67	61

Figure 3c: Road Construction Noise levels

Plant	Number	Noise level at 10m	Noise level at 20m	Noise level at 50m	Noise level at 100m	Noise level at 200m
Dumpers	2	80	74	66	60	54
Tracked Excavator	1	80	74	66	60	54
Lorry	1	79	73	65	59	53
Dozer	2	77	71	63	57	51
Compressor	1	75	69	61	55	49
Diesel Generator	1	74	68	60	54	48
Total		86	80	72	66	60

Figure 3d: Site Clearance Noise levels

Plant	Number	Noise level at 10m	Noise level at 20m	Noise level at 50m	Noise level at 100m	Noise level at 200m
Tracked Excavator	1	80	74	66	60	54
Diesel Generator	1	74	68	60	54	48
Dumpers	1	80	74	66	60	54
Telescopic Handler	1	79	73	65	59	53
Concrete Pump & Concrete mixer truck discharging	1	79	73	65	59	53
Poker Vibrator	2	78	72	64	58	52
Compressor	2	75	69	61	55	49
Total		87	81	73	67	61

Figure 3e: Building Construction Noise Levels

3.14 Construction activities can produce high noise levels, particularly close to source. Construction noise tends to fluctuate and is usually of fairly short duration related to particular activities. The construction noise impacts would depend on the proximity of construction activities to nearby receptor locations.

3.15 The construction noise impacts predicted above indicate that the impacts could be observed by sensitive receptors within 150m of the site. The predicted noise levels are based on a possible worst case scenario. Propagation across hard ground has been assumed and no screening from topographical features or other structures has been assumed.

3.16 The majority of existing residential dwellings lie over 150 m from the centre of the site (and therefore is not hard ground without screening for most residential properties), meaning the highest value identified for noise levels at 150m (maximum) would be 61 dB, which is below the Category A threshold (ABC method) of 65 dB. A Construction and Environmental Management Plan (CEMP) is recommended to be used to ensure minimal disruption to nearby residences during the construction process.

3.17 To the north east of the development Weston Turville Reservoir lies some 200m from the centre of the site to the waters edge. The natural screening already present takes the form of an earth bund and substantial planting, meaning the highest value identified for noise levels at 200m (maximum) would be potentially lower than 61 dB, which as described

above is below the Category A threshold (ABC method) of 65 dB. A Construction and Environmental Management Plan (CEMP) is recommended to be used to ensure minimal disruption to the reservoir during the construction process.

4 Potential Effects – Vibration

4.1 Ground-borne vibration is often a cause for concern to future residents, especially in relation to construction.

4.2 BS 6472 presents vibration levels that could induce the probability of human discomfort due to ground-borne vibration. These are more stringent than those recommended for structural damage. Compliance with BS 6472 criteria should ensure that building damage is unlikely.

4.3 Vibration transmitted from construction activities through the ground to the receiver cannot be reliably calculated at this stage. Factors affecting ground borne vibration such as rock/soil type, water content and solid damping will greatly influence the way in which vibration travels through the ground.

4.4 There is no reason to suggest that vibration impacts cannot be adequately controlled. This is based on the information provided by publicly available geological data and the type of construction work that would take place on a residential site.

5 Potential Effects – BS8233 External levels

5.1 BS8233 indicates that for traditional external areas that are used for amenity space, such as gardens and patios, an upper guideline value of 55 dB LAeq,T is acceptable. However, BS8233 also recognises that the guideline values are not achievable in all circumstances, such as city centres or urban areas adjoining the strategic transport network.

5.2 BS8233 identifies that in such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but external noise should not be prohibitive on development delivery.

5.3 A review of the noise environment across the site has indicated that the external noise largely does not exceed 55 dB within the residential area of the site. Acceptable noise levels would be achieved through the setback of residences which would act as a noise shield for the majority of the amenity space.

5.4 There are sections of the site adjacent to the M27 that could experience noise level higher than the 55dB. Therefore, it is proposed to introduce acoustic screening adjacent to the motorway. The height of the screening will be confirmed during the planning application process but based on the initial assessment, a height of **6m** should be sufficient. The screening is likely to compromise a solid earth earth bund together with a fence.

5.5 Traffic noise is the dominant noise source, however, there is the potential that rail noise could cause annoyance. The risk of this will depend on the distance between the housing and the rail line. Traffic noise that is more constant evokes a different response to rail noise that is more sporadic. As such, any rail noise mitigation is reflective of this. There is the potential that addition noise screening may be required to protect dwellings from rail noise, should this be required then additional fencing is all that is likely to be required, located to the south of the rail line.

5.6 The affected area and mitigation for traffic noise is shown below.

Figure 5a: Location of motorway noise screening

6 Potential Effects – BS8233 Internal Assessment

3D SoundPLAN Noise Model

6.1 In order to predict the future noise environment across the site, a 3D noise model has been generated through the SoundPLAN computer software package. This was established through the following steps:

- Production of a 3D ground profile
- Confirming location of existing highways
- Confirming future traffic levels
- Confirming location of development

6.2 Therefore, it is concluded that the 3D SoundPLAN model is appropriate to assess and predict the future noise levels.

BS8233:2014 Assessment of Day Time Noise Levels in Living Rooms

6.3 BS8233 indicates a desirable daytime noise level of 35dB L_{Aeq}. The calculated noise levels have been used to determine likely noise levels in the Proposed Development, and therefore the extent of noise attenuation required. The maximum recorded values (L_{Aeq}) according to the model are shown below in comparison to the modelling outputs recorded in the survey.

Housing Location	Future Year with Development
House fronting M27	59.8
House fronting Allington Lane south	66.9
House fronting Allington Lane north	61.6
House fronting Quob Lane	57.9

Housing Location	Future Year with Development
House fronting Burnetts Lane	57.2

Table 6a: Daytime Façade Modelled Noise Levels (dB)

6.4 Typical noise reductions for a dwelling façade with windows set in a brick/block wall will provide a façade sound insulation performance of 33 dB (A). An open window will reduce façade noise levels by 15 dB.

6.5 As indicated, façade noise levels will be attenuated through window glazing. The internal noise levels are identified below.

Housing Location	Future Year with Development
House fronting M27	26.8
House fronting Allington Lane south	33.9
House fronting Allington Lane north	28.6
House fronting Quob Lane	24.9
House fronting Burnetts Lane	24.2

Table 6b: Daytime Internal Modelled Noise Levels (dB)

6.6 This demonstrates that the BS8233 daytime noise standards will be achieved.

BS8233:2014 Assessment of Night Time Noise Levels in Bedrooms

6.7 BS8233 indicates that a night time noise level of 30 dB L_{Aeq} represents an acceptable standard in bedrooms. The calculated noise levels have been used to determine likely noise levels and the extent of attenuation required. The maximum recorded values (L_{Aeq}) according to the model are shown below.

Housing Location	Future Year with Development
House fronting M27	59.2
House fronting Allington Lane south	65.0
House fronting Allington Lane north	59.0
House fronting Quob Lane	57.4
House fronting Burnetts Lane	53.4

Table 6c: Night-time Façade Modelled Noise Levels (dB)

6.8 As indicated, façade noise levels will be attenuated through window glazing. The internal noise levels are identified below.

Housing Location	Future Year with Development
House fronting M27	26.2
House fronting Allington Lane south	32.0
House fronting Allington Lane north	26.0
House fronting Quob Lane	24.4

Housing Location	Future Year with Development
House fronting Burnetts Lane	23.4

Table 6d: Night-time Internal Modelled Noise Levels (dB)

6.9 This demonstrates that the BS8233 night-time noise standards will be achieved across the majority of the site. The predicted noise levels indicate that houses fronting Allington Lane south may require enhances window glazing. Standard glazing is 6mm glazing separated by a 12mm gap, to achieve the necessary noise attenuation, 8mm glazing will be necessary.

Potential Mitigation

6.10 The above assessment clearly demonstrates that with closed windows the BS8233 internal noise levels will be met. However, opening windows for ventilation purposes will increase noise levels. Therefore, alternative means of ventilation for those properties fronting the highway may be necessary.

6.11 It is considered appropriate to consider the use of air brick ventilation and / or trickle vents on the properties fronting the public highway. This will provide adequate ventilation when the windows are closed.

6.12 The affected properties are highlighted below.

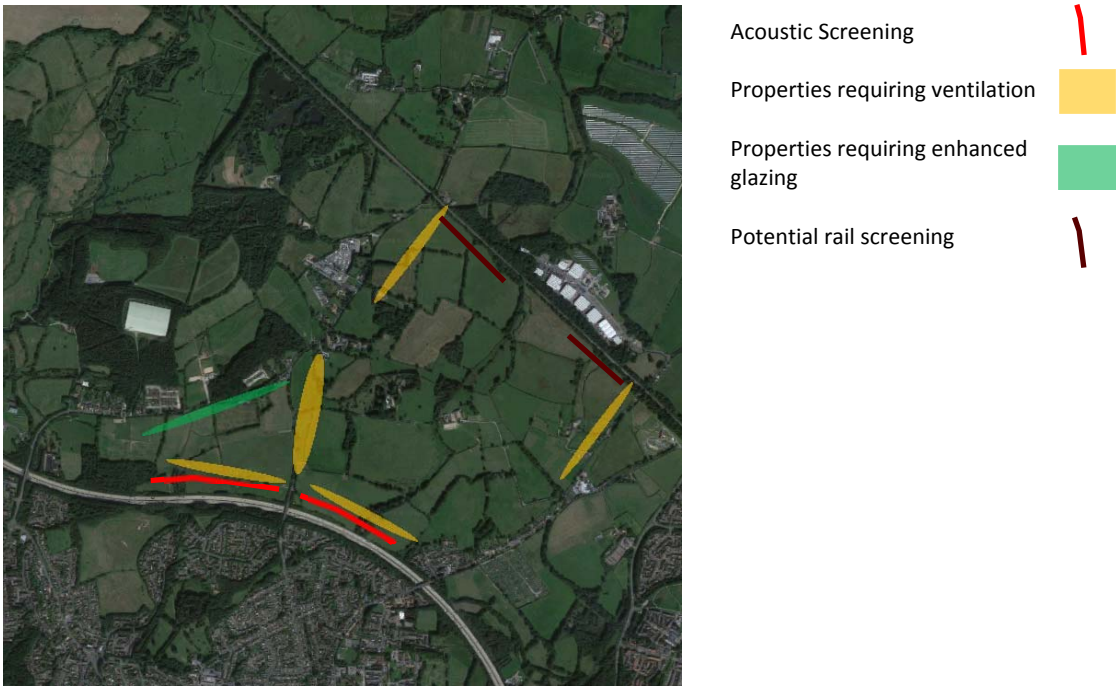


Figure 6a: Location of noise screening

7 Off Site Sensitive Receptors

7.1 Traffic noise predictions have been made using the CRTN prediction methodology. The methodology has been used to predict the magnitude of any change in noise level resulting from the development proposals at the roadside of the local network.

7.2 The predicted changes in noise level, identified with respect to the road traffic noise impact assessment criteria, are identified in the map and presented in the table below.

Figure 7a: Link Count Locations

Link	Noise level (dB) without Development	Noise level (dB) with Development	Noise Impact (dB)	Long Term Effect
B3037 west of Allington Lane	72.5	73.0	0.5	Negligible
B3037 west of Riverside	72.7	73.2	0.5	Negligible
A335 east of M3	73.5	73.6	0.2	Negligible
A335 north M27	75.4	75.6	0.2	Negligible
A335 north of A3035	71.8	72.3	0.5	Negligible
A27 north of A334	73.4	73.6	0.3	Negligible
A27 south of A334	72.3	72.3	0.0	Negligible
A334 east of A27	72.5	72.7	0.2	Negligible
A334 west of A27	73.0	73.1	0.1	Negligible
A27 east of Allington Lane	70.3	70.8	0.5	Negligible
A27 west of Allington Lane	72.5	73.8	1.2	Negligible
Charles Watts Way east of Tollbar Way	73.8	73.8	0.0	Negligible
Charles Watts Way west of Tollbar Way	76.0	76.1	0.2	Negligible
Tollbar Way north of Charles Watts Way	71.7	72.1	0.4	Negligible

Figure 7b: Predicted Noise Levels within Local Road Network

7.3 This demonstrates that the majority of the receptors will experience a negligible increase with minor increases reported adjacent to the development. It is considered that an increase of less than 3db is not discernible and therefore it is concluded that the development will have a negligible impact.

8 Conclusion

8.1 Traffic noise from has been identified as the most significant noise source. Internal noise levels inside the proposed dwellings can be provided within acceptable limits through the following mitigation measures.

- Passive ventilation systems and double glazing for those residential properties closest to M27, Quob Lane, Burnetts Lane and Allington Lane
- Enhanced double glazing specification along Allington Lane
- Internal layout of properties to consider the location of lounge and bedroom areas for properties fronting onto M27, Quob Lane, Burnetts Lane and Allington Lane
- Site layout to consider the orientation of residential buildings to reduce sight lines onto Aylesbury Road, World's End Lane and Halton Lane.
- External space adjacent to the M27 protected by acoustic noise screening.

8.2 This Noise Assessment demonstrates that the Proposed Development will not be significantly affected by the noise levels in the immediate vicinity. It is also anticipated from this that noise impacts arising out of the proposed development are negligible.

8.3 It is therefore concluded the Proposed Development is consistent with relevant planning policy guidance and its location on the Site should be supported from a noise perspective.

9 Limitations

9.1 The conclusions and recommendations highlighted above are limited to the general availability of background information and the Proposed Development of the Site.

9.2 Third party information has been used in the preparation of this report, which Brookbanks Consulting Ltd, by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks Consulting Ltd accepts no liability for same.

9.3 The benefits of this report are provided to Hallam Land Management, The Davies Family and Bovis Homes Ltd for the potential development on land south of Allington Lane, Eastleigh.

9.4 Brookbanks Consulting Ltd excludes third party rights for the information contained in the report.

Appendix A – Noise Terminology

The scale used to identify noise sources is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound pressure level. The ear recognises sound, based on pitch and frequencies. Microphones cannot record noise in the same way; to counter this, 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). Typical dB(A) noise levels for familiar noise are indicated below.

Approx. noise level	Noise Example
10 dB	Normal breathing
20 dB	Rustling leaves, mosquito
30 dB	Whisper
40 dB	Stream, refrigerator humming
50 dB	Quiet office
60 dB	Normal conversation
70 dB	In car noise without radio
80 dB	Vacuum cleaner / washing machine
90 dB	Lawnmower
100 dB	Train
110 dB	Pneumatic Drill
120 dB	Thunder
130 dB	Plane taking off
140 dB	Threshold of pain

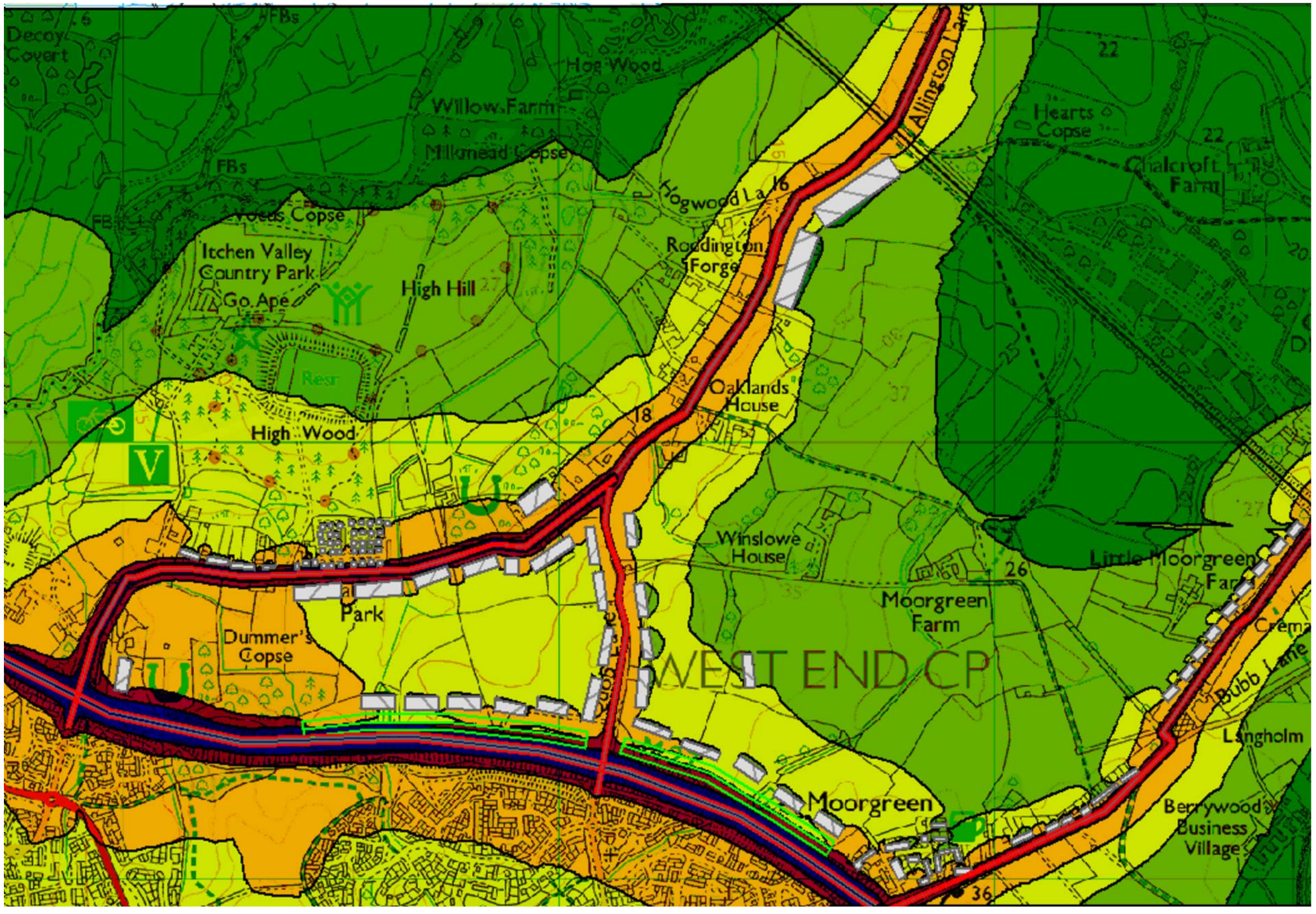
Table AP1: Noise Level Descriptions

The noise levels indicated above are sound pressure levels (SPL) and describe the noise level at a single point in space. Noise levels at a receptor vary over time depending on the occurring noise generating activities. The following indices are used to take into account noise level variation over time:

- LAeq T is the equivalent continuous sound level and is the sound level over the time period (T). It is possible to consider this level as the ambient noise encompassing all noise at a given time. LAeq T is considered the best general purpose index for environmental noise.
- LA90 T represents the noise 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 noise level.
- LA10 T refers to the level exceeded for 10% of the measurement period. LA10 T is widely used as a descriptor of traffic noise.
- LAmax is maximum recorded noise level during the measurement period.

Appendix B – Noise Mapping Results

Original Drawing Size A3



Construction Design and Management (CDM)
Key Residual Risks

Contractors entering the site should gain permission from the relevant land owners and/or principle contractor working on site at the time of entry. Contractors shall be responsible for carrying out their own risk assessments and for liaising with the relevant services companies and authorities. Listed below are Site Specific key risks associated with the project.

1) Overhead and underground services
2) Street Lighting Cables
3) Working adjacent to water courses and flood plain
4) Soft ground conditions
5) Working adjacent to live highways and railway line
6) Unchartered services
7) Existing buildings with potential asbestos hazards

NOTES:

1. Do not scale from this drawing
2. All dimensions are in metres unless otherwise stated.
3. Brookbanks Consulting Ltd has prepared this drawing for the sole use of the client. The drawing may not be relied upon by any other party without the express agreement of the client and Brookbanks Consulting Ltd. Where any data supplied by the client or from other sources has been used, it has been assumed that the information is correct. No responsibility can be accepted by Brookbanks Consulting Ltd for inaccuracies in the data supplied by any other party. The drawing has been produced based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.
4. No part of this drawing may be copied or duplicated without the express permission of Brookbanks Consulting.

Key:

Signs and symbols
- Berm embankment
- Berm top
- Calculation area
- Emission line
- Surface

Levels in dB(A)
- <= 45
- 45 - 50
- 50 - 55
- 55 - 65
- 65 - 65
- 65 - 70
- > 70

- First Issue		- - -	29.11.16
Status			Status Date
Preliminary			Nov 2016
Drawn	Checked		Date
MDM	AE		Nov 2016
Scale	Number		Rev
NTS	10440-NM-01		-

HLM, Bovis Homes and The Davies Family

Land at Allington Lane Eastleigh

With Development Day-time Noise Contours

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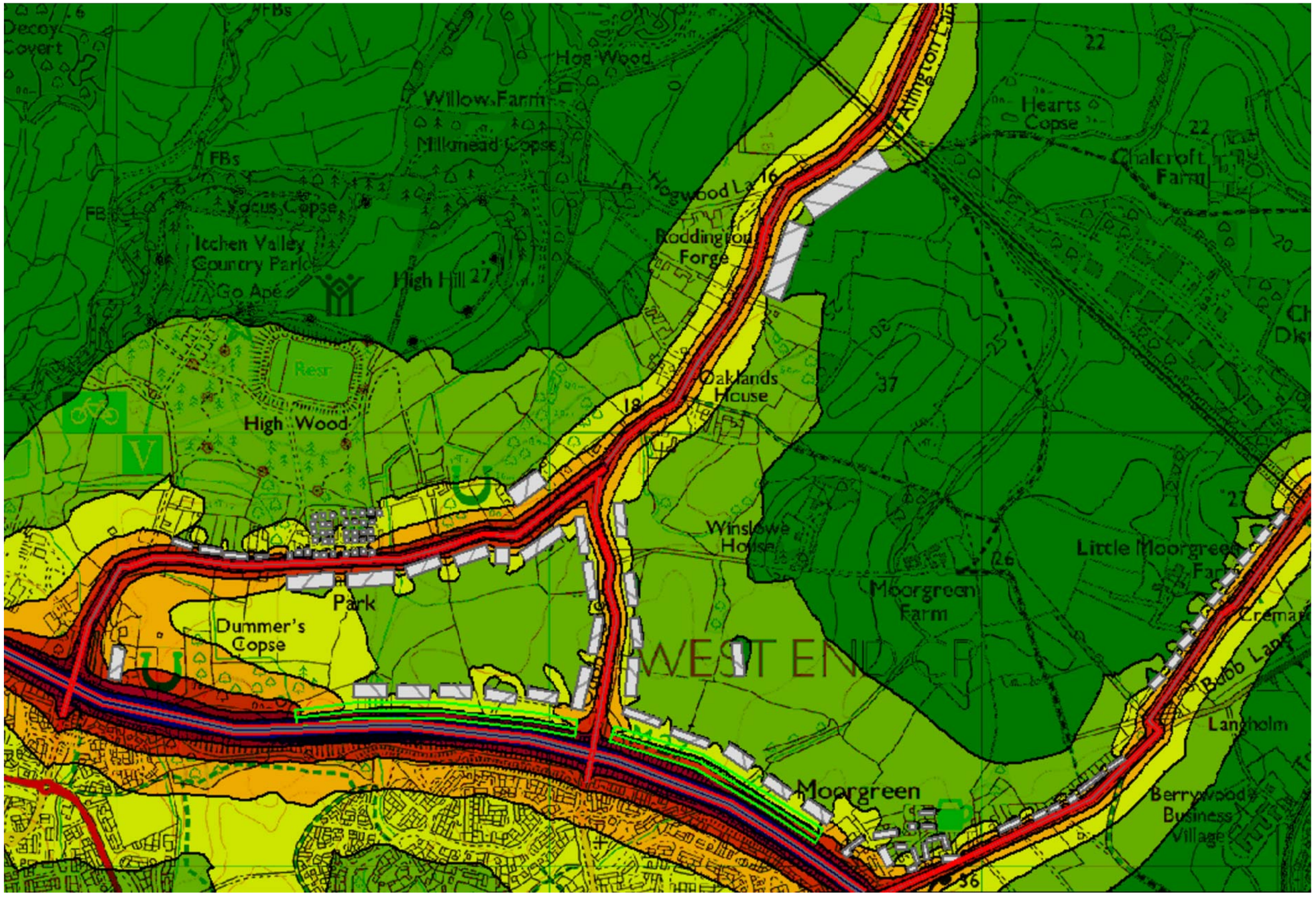
Original Drawing Size A3



Signs and symbols

- Berm embankment
- Berm top
- Calculation area
- Emission line
- Surface

Levels in dB(A)

<= 45
45 - 50
50 - 55
55 - 65
65 - 65
65 - 70
> 70

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Key:

- First Issue	-	-	29.11.16

Status		Status Date
Preliminary		Nov 2016
Drawn	Checked	Date
MDM	AE	Nov 2016
Scale	Number	Rev
NTS	10440-NM-02	-

HLM, Bovis Homes and The Davies Family

Land at Allington Lane Eastleigh

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