V2	0.12	Below threshold of planning permission refusal	0.08	Below threshold of planning permission refusal
V3	0.04	Below threshold of planning permission refusal	0.02	Below threshold of planning permission refusal

5.3.2. It can be seen from Table 5.4 that the VDV is considerably higher inside the DHO building than at the two external locations. However, caution must be taken when using these results to predict VDVs within the proposed dwellings as the vibration depends on many factors, for example, foundations of the building, building materials, support of the internal floors.

5.3.3. It can also be seen by comparing **Table 2.3** and **Table 5.4** that the calculated day and evening and night-time VDVs in all locations are below the threshold above which "planning permission will not be granted".

5.3.4. Whilst the measured vibration levels are below the thresholds set in the planning policy it would be reasonable to ensure that vibration from the passage of trains is not transmitted into the new buildings. This could be achieved by incorporation of appropriate interfaces between the foundations and the superstructure. The performance specification for this can be developed in consultation with the structural engineers at detailed design stage.

6 Mitigation

6.1 Construction and Demolition

6.1.1. Further assessment of construction noise mitigation should be undertaken when a contractor has been appointed and detailed method statements, the construction programme and descriptions of the proposed plant are available. Until these are known, further assessment is not possible due to the variety of construction methods available.

6.1.2. The following advice is based on the guidance provided in BS 5228-1 and should be applied to minimise the noise breakout from the construction activities affecting noise sensitive receptors:

- Ensuring the use of quiet working methods, the most suitable plant and reasonable hours of working for noisy operations, where reasonably practicable,
- Locating noisy plant and equipment as far away from houses as reasonably possible, and where practical, carry out loading and unloading in these areas,
- Screening plant to reduce noise which cannot be reduced by increasing the distance between the source and the receiver (i.e. by installing noisy plant and equipment behind large site buildings),
- Shutting down any machines that work intermittently or throttling them back to a minimum,
- Orientating plant that is known to emit noise strongly in one direction so that the noise is directed away from houses, where possible,
- Closing acoustic covers to engines when they are in use or idling and
- Lowering material slowly, wherever practicable, and not dropping it.

6.1.3. Vibration can be more difficult to control than noise and there are few generalisations which can be made about its control. Where reasonably practicable, plant and/or methods of working causing significant levels of vibration at sensitive premises should be replaced by other less intrusive plant or working methods.

6.1.4. The main sources of vibration typically associated with the construction process are piling, in particular intermittent vibration derived from conventional driven piling.

6.1.5. It is anticipated that the appointed contractor would adopt an appropriate Code of Construction Practice (CoCP) which will be agreed prior to commencement of construction. This could form part of the agreed working methods with the Local Authorities under Section 61 of the Control of Pollution Act 1974.

6.1.6. The aim of the CoCP will be to minimise vibration as far as practicable having regard to the human discomfort criteria, which will minimise impacts on ecological species and provide protection against cosmetic or structural damage to buildings.

6.2 Internal Noise Levels

6.2.1. A mitigation strategy has been developed to comply with the internal noise level in BS 8233:1999. To meet the internal noise levels specific glazing has been recommended below.

6.2.2. Mitigation measures are indicated in **Tables 6.1** for the facades of proposed sensitive receptors within the development. The mitigation is based on the façade noise levels (free-field) presented in **Tables 4.1** and **4.2**.

6.2.3. **Tables 6.1** presents the Weighted Sound Reduction Index (R_w) dB required for the glazing units and the resulting internal noise levels

6.2.4. The current façade design of the north façade indicates that the external wall would provide a sound reduction in excess of R_w 80dB.

6.2.5. The window areas for the north façade of Block D will include a double glazing system separated by 100mm. It is anticipated that the combined glazing system will provide a total sound reduction of approximately R_w 51dB. As an example, this could be achieved with a system including a single glazing pane (10mm), 100mm air cavity and double glazing unit comprising of 10mm and 6mm panes. This indicates the potential performance which can be achieved on the façade with the most significant noise levels. Other reductions represent typical performance requirements of acoustic glazing. The actual requirements for each block will be refined at the detailed design stage

Table 6.1: Acoustic performance of glazing required for development

Receiver Reference	Habitable Room	Acoustic performance of Glazing Required to meet Internal Noise Level R_w ,dB	Internal Noise Level $L_{Aeq,16hr}$ dB	Internal Noise Level $L_{Aeq,8hr}$ dB	Internal Noise Level L_{Amax} dB
DHO East 1	Living Room	35	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
DHO East 2					
	Living Room	35	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
DHO East (North façade)	Living Room	51	<30dB	-	-
	Bedroom	51	-	<30dB	<30dB
DHO North 1	Living Room	51	<30dB	-	-
	Bedroom	51	-	<30dB	<30dB
DHO North 3	Living Room	51	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
DHO South East (North façade)	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
DHO South	Living Room	31	<30dB	-	-

Receiver Reference	Habitable Room	Acoustic performance of Glazing Required to meet Internal Noise Level R_w ,dB	Internal Noise Level $L_{Aeq,16hr}$ dB	Internal Noise Level $L_{Aeq,8hr}$ dB	Internal Noise Level L_{Amax} dB
West	Bedroom	31	-	<30dB	<30dB
DHO South West (East façade)	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 2) East	Living Room	37	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 2) South (North façade)	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 2) South West	Living Room	37	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 2) West (East façade)	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 3) North West	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 3) South East	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 3) South (North façade)	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB
BLR (Phase 3) West	Living Room	31	<30dB	-	-
	Bedroom	31	-	<30dB	<30dB

7 Summary and Conclusion

7.1 Summary

7.1.1. A Noise and Vibration Assessment of the proposed Bacton Low Rise redevelopment has been undertaken to determine the suitability of the sites for residential development.

7.1.2. A noise model, validated with noise survey results, has been used to establish the noise levels across the sites for comparison with LBC policy DP28 and to set demolition and construction noise limits.

7.1.3. Noise survey data has also been used to set noise limits for the proposed CHP.

7.1.4. A vibration survey undertaken on site has been used to establish the vibration levels at three locations close to the railway line for comparison with LBC policy DP28.

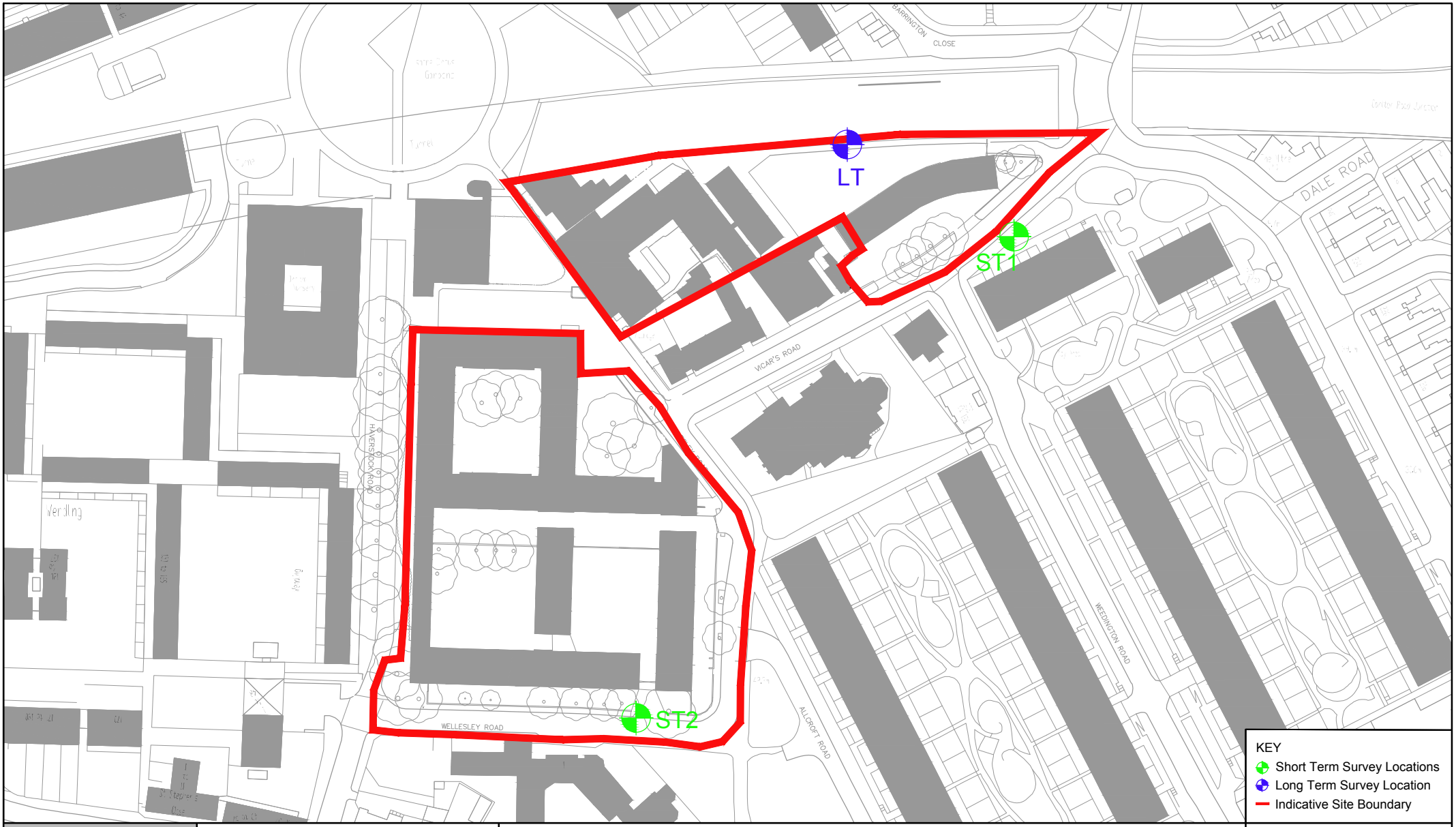
7.2 Conclusion

7.2.1. Mitigation is required for the majority of the proposed development. Specific glazing and building façade measures have been outlined to meet the 'good' internal noise levels from BS 8233:1999. The glazing performance will be refined at the detailed design stage to ensure these requirements are met.

7.2.2. Outdoor garden noise levels will meet the BS 8233:1999 criteria.

7.2.3. The vibration levels fall within the acceptable criteria defined by LBC although they could be further mitigated in the detailed design stage through considering an appropriate interface between the foundations and superstructure should this be considered of benefit.

Figures



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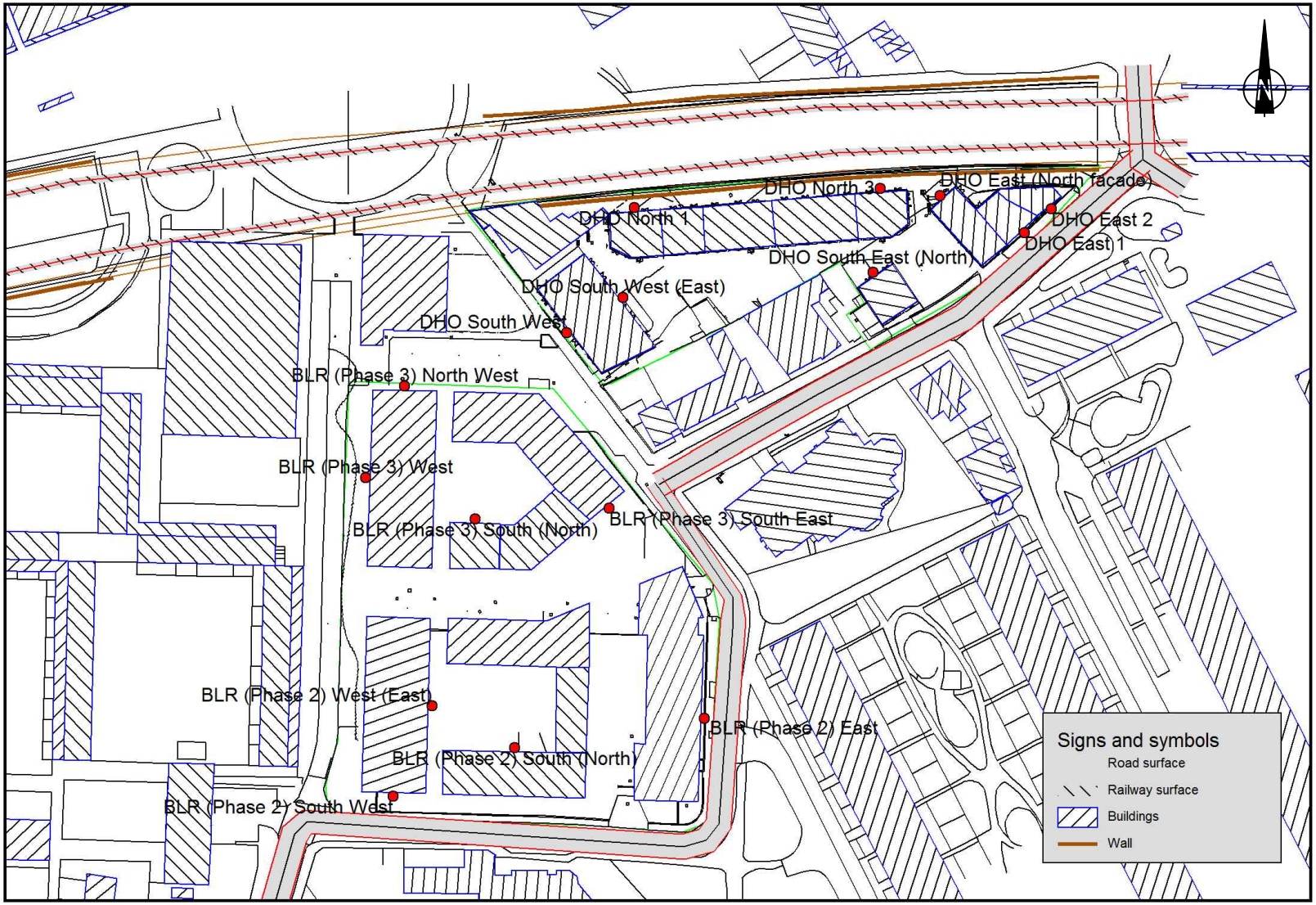
BACTON ESTATE

Survey Locations

Date	26.10.2012
A4 Scale	N.T.S.
Drawn by	ZB
Checked by	AL

Figure Number

1



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Facade Locations

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A4 Scale	N.T.S.
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Figure Number	2

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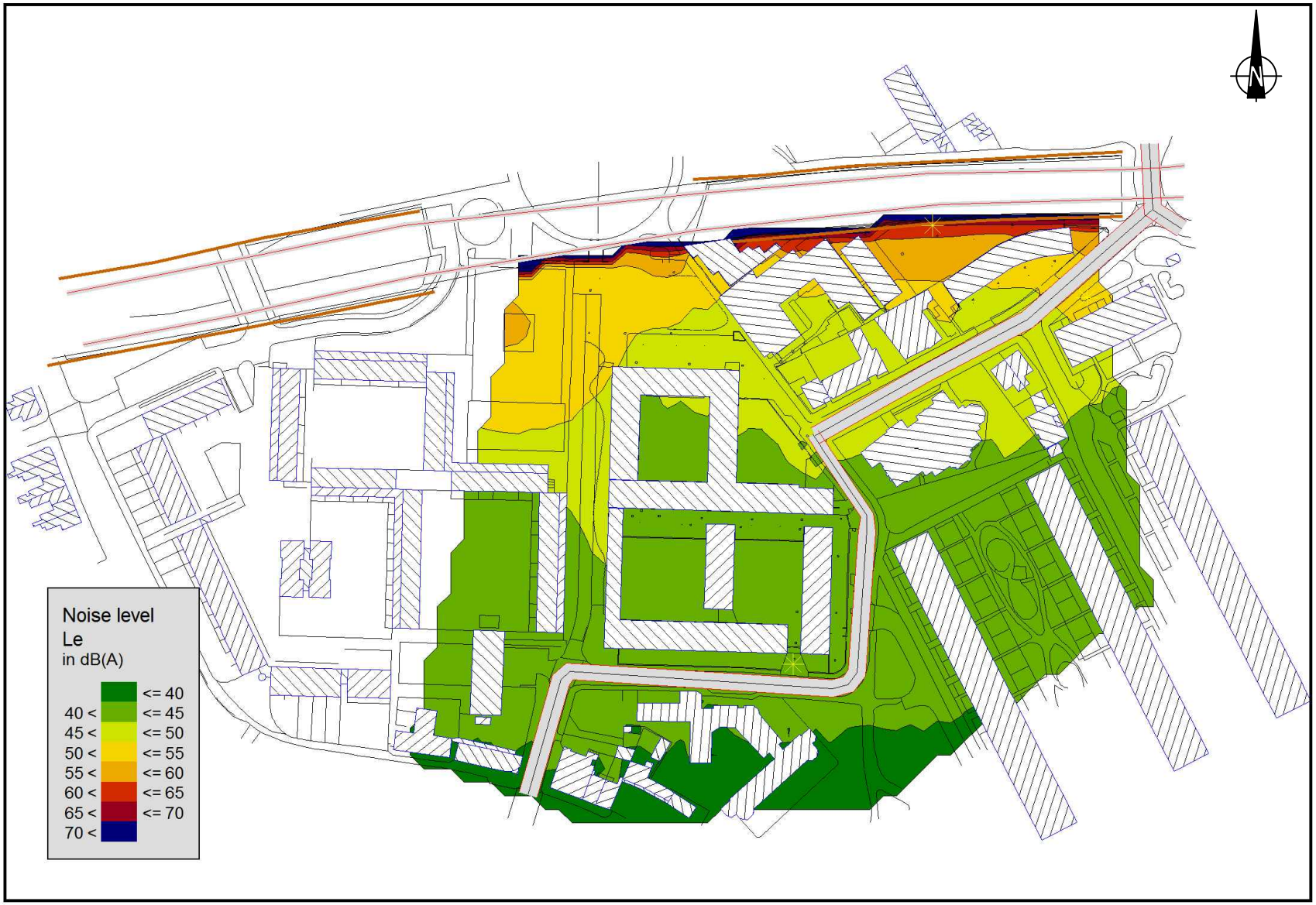
BACTON ESTATE

Railway Noise Contours
Daytime at Ground Floor Level

Date	26.10.2012
A4 Scale	N.T.S.
Drawn by	ZB
Checked by	AL
Figure Number	3



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Railway Noise Contours
Evening at Ground Floor Level

Date	26.10.2012
A4 Scale	N.T.S.
Drawn by	ZB
Checked by	AL
Figure Number	4

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BACTON ESTATE

Railway Noise Contours
Evening at First Floor Level

Date	26.10.2012
A4 Scale	N.T.S.
Drawn by	ZB
Checked by	AL
Figure Number	5

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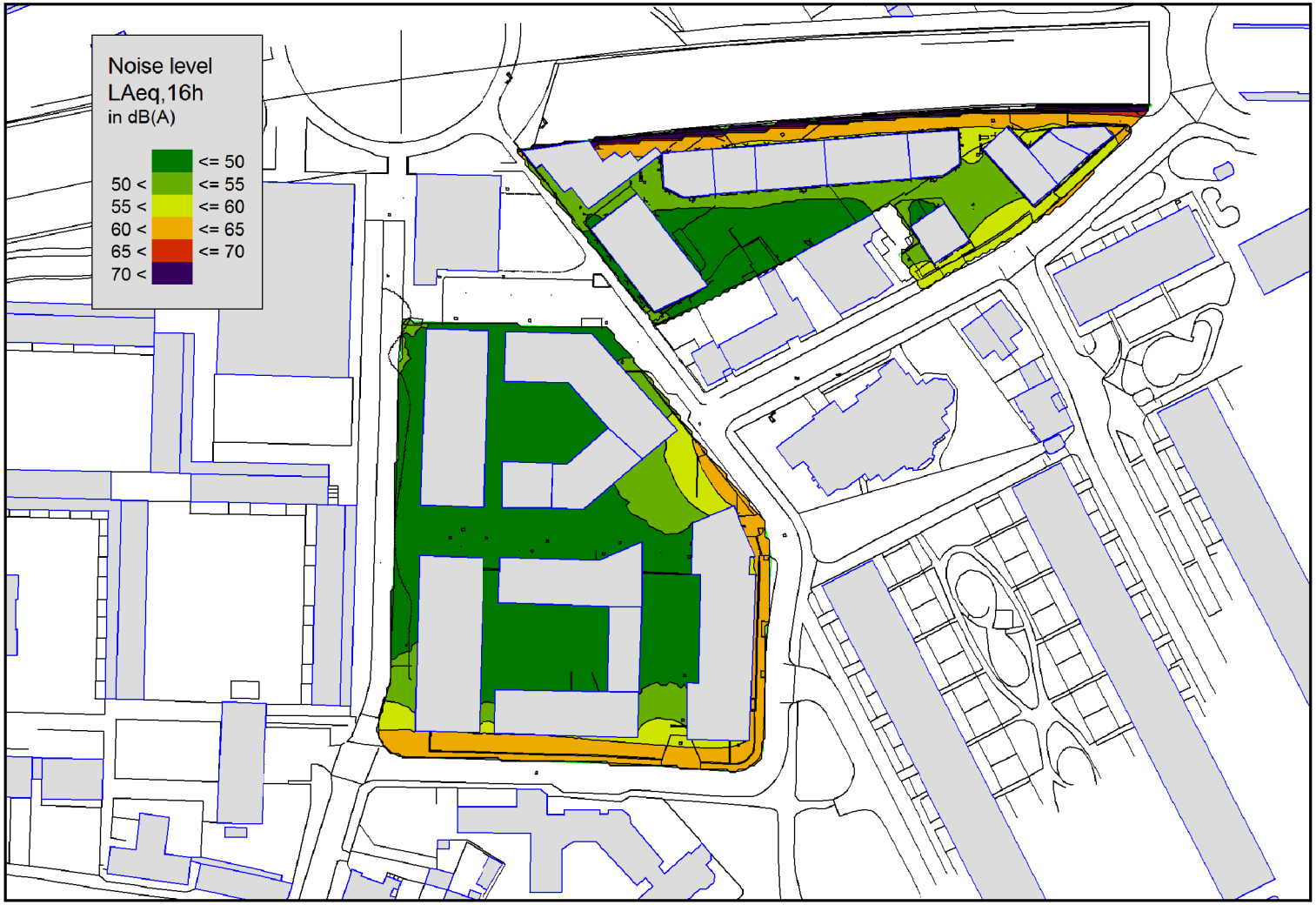
Railway Noise Contours
Night-time at First Floor Level

Date	26.10.2012
A4 Scale	N.T.S.
Drawn by	ZB
Checked by	AL
Figure Number	6



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BACTON ESTATE

Post Completion Road and Railway Noise Contours
Day-time at Ground Floor Level

Date	26.10.2012
A4 Scale	N.T.S.
Drawn by	ZB
Checked by	AL
Figure Number	7

Appendix A: Glossary of Acoustic Terms

The following glossary of terms has been produced from PPG 24 (HMSO, 1994), BS 8233:1999 and BS 4142:1997. They are explanations of the terms used within this document.

Ambient Noise	Total encompassing sound in a given situation at a given time, usually composed of sound from many sources far and near.
Background Noise	In BS 4142 this is defined as the A weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval, T ($L_{A90,T}$)
Daytime	Defined in PPG 24 as the period 07:00-23:00 hours.
Decibel (dB)	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure levels the reference quantity is 20 uPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
$L_{A10,T}$	The A weighted noise level exceeded for 10% of the measurement period, T. It gives an indication of the upper limit of fluctuating noise such as that from road traffic. $L_{A10,18h}$ is the arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{A90,T}$	The A weighted noise level exceeded for 90% of the measurement period, T. This is defined in BS 4142 as the background noise level.
L_{AE}	The sound exposure level – the level of a sound with a period of 1 second that has the same sound energy as the event considered.
$L_{Aeq,,T}$	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many noises and can be measured directly with an integrating sound level meter.
$L_{Amax,}$	The highest A weighted noise level recorded during a noise event. The time weighting (slow or fast) should be stated.
Night-time	Defined in PPG 24 as the period 23:00-07:00 hours.
Rating Level, $L_{Ar,Tr}$	The noise level of an industrial noise source which includes an adjustment for the character of the noise. Used in BS 4142:1997.

Residual Level	The ambient $L_{Aeq,T}$ remaining when the specific noise source is not present or is suppressed to a degree such that it does not contribute to the ambient noise.
Specific Noise Level, $L_{Aeq,Tr}$	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval
Specific Noise Source	The noise source under investigation for assessing the likelihood of complaints

Appendix B: TN ESP N1 ‘Noise Survey and Assessment Methodology’

Bacton Low Rise Redevelopment

Noise and Vibration Assessment

TECHNICAL NOTES

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Job Name: Bacton Estate

Job No.: 26572-001

Note No.: TN ESP N1

Date: 23 August 2012

Subject: Noise Survey and Assessment Methodology

Prepared By: Angela Lamacraft (PBA) for Mario Houska (London Borough of Camden)

Item	Subject
1.	**Introduction** Peter Brett Associates LLP (PBA) has been commissioned to undertake a noise assessment of the regeneration of Bacton Estate, Camden. This technical note sets out the appropriate planning policy and proposed noise assessment methodology for discussion with the Environmental Health Department at the London Borough of Camden (LBC). The assessment will support a full planning application for residential development. We would be grateful if for confirmation of acceptance of the proposed methodology or for any comments or queries.
2.	**Policy** Consultation with the Environmental Health Officer (EHO)[1] at LBC was undertaken on 16th August 2012. **Local Planning Policy** **Camden Development Policies 2010-2025, Local Development Framework** The EHO advised that Development Policy 28 (DP 28) 'Noise and vibration' applies to this development. DP 28 states that: "*The council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:* *a) Development likely to generate noise pollution; or* *b) Development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.* *Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted.* *The Council will only grant permission for the plant or machinery if it can be operated without cause [sic] harm to amenity and does not exceed our noise thresholds.*

[1] Mario Houska

The Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. Where these phases are likely to cause harm, conditions and planning obligations may be used to minimise the impact."

The relevant threshold levels that are applicable to this development are contained within Tables A, B, C and E of DP28 and have been reproduced for reference.

Noise description and location of measurement	**Period**	**Time**	**Sites adjoining railways**	**Sites adjoining roads**
Noise at 1 metre external to a sensitive façade	Day	0700-1900	74 dB $L_{Aeq,12h}$	72 dB $L_{Aeq,12h}$
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	74 dB $L_{Aeq,4h}$	72 dB $L_{Aeq,4h}$
Noise at 1 metre external to a sensitive façade	Night	2300-0700	66 dB $L_{Aeq,8h}$	66 dB $L_{Aeq,8h}$

Table 1.1 (DP28 Table A): Noise levels on residential streets adjoining railways and roads at which planning permission will not be granted

Noise description and location of measurement	**Period**	**Time**	**Sites adjoining railways**	**Sites adjoining roads**
Noise at 1 metre external to a sensitive façade	Day	0700-1900	65 dB $L_{Aeq,12h}$	62 dB $L_{Aeq,12h}$
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	60 dB $L_{Aeq,4h}$	57 dB $L_{Aeq,4h}$
Noise at 1 metre external to a sensitive façade	Night	2300-0700	55 dB $L_{Aeq,1h}$	52 dB $L_{Aeq,1h}$
Individual noise events several times an hour	Night	2300-0700	>82 dB L_{ASmax}	>82 dB L_{ASmax}

Table 1.2 (DP28 Table B): Noise levels on residential streets adjoining railways and roads at and above which attenuation measures will be required

It can be seen that during the night-time that mitigation is required if the L_{Aeq} in each hour exceeds 55 dB for sites adjacent to railways and 52 dB for sites adjacent to roads.

Vibration description and location of measurement	Period	Time	Vibration Levels
Vibration inside critical areas such as hospital operating theatre	Day, evening and night	0000-2400	0.1 VDV $ms^{-1.75}$
Vibration inside dwellings	Day and evening	0700-2300	0.2 to 0.4 VDV $ms^{-1.75}$
Vibration inside dwellings	Night	2300-0700	0.13 VDV $ms^{-1.75}$
Vibration inside offices	Day, evening and night	0000-2400	0.4 VDV $ms^{-1.75}$
Vibration inside workshops	Day, evening and night	0000-2400	0.8 VDV $ms^{-1.75}$
N.B. Where dwellings may be affected by ground-borne regenerated noise internally from, for example, railways or underground trains within tunnels, noise levels within the rooms should not be greater than 35 dB(A)max			

Table 1.3 (DP28 Table C): Vibration levels on residential streets adjoining railways and roads at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise Level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5 dB(A) < L_{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10 dB(A) < L_{A90}
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10 dB(A) < L_{A90}
Noise at 1 metre external to a sensitive façade where L_{A90} > 60 dB	Day, evening and night	0000-2400	55 dB L_{Aeq}

Table 1.4 (DP28 Table E): Noise levels from plant and machinery at which planning permission will not be granted

National Planning Policy and Guidance

The National Planning Policy Framework (NPPF)

The EHO advised that the noise assessment should make use of the local planning policy which does not currently implement the NPPF.

Calculation of Road Traffic Noise (CRTN)

CRTN, Department of Transport (DoT), Welsh Office: 1988 describes the procedure for calculating noise from road traffic.

The CRTN shortened measurement procedure (paragraph 43) recognises the trends in traffic profiles and corrects the arithmetic mean of three 1-hour readings taken in consecutive hours between 10:00 -17:00 hours to provide a reliable estimate of the $L_{A10,18h}$ over the period 06:00 - 24:00 hrs.

Method for converting the UK Road Traffic Noise Index $L_{A10,18h}$ to the EU Indices for Road Noise Mapping

The method for converting the UK road traffic noise index to the EU indices for road noise mapping was published by Defra, TRL and Casella Stanger in 2006, because the noise index used in CRTN is different to those of the European Noise Directive (END). TRL developed an end correction to apply to the CRTN calculation to derive the relevant EU indices (such as $L_{Aeq,16h}$ and $L_{Aeq,8h}$) from calculated values of $L_{A10,18h}$.

Calculation of Railway Noise (CRN)

CRN, Department of Transport, 1995 describes the procedure for calculating the noise from moving railway vehicles at a given location.

Corrections can be used with a baseline sound exposure level (L_{AE}) to predict noise levels from the railway if the train vehicle types are known.

CRN advises that the period of measurement should be 06:00 to 24:00 hrs and/or 00:00 to 06:00 hrs.

Additional railway noise source terms for "Calculation of Railway Noise 1995"

This document provides additional corrections to those within CRN.

BS 4142:1997 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas'

Where building services plant is proposed noise should be assessed with regard to BS 4142:1997 'Method For Rating Industrial Noise Affecting Mixed Industrial and Residential Areas'. This standard sets out a method for determining the level of noise of an industrial nature, together with procedures for assessing whether the noise is likely to give rise to complaints from people living nearby.

The method subtracts the background level ($L_{A90,T}$) from the 'rating level', ($L_{Ar,Tr}$) which is calculated by adjusting the noise source for a character correction where the noise:

- Contains a distinguishable, discrete, continuous note;
- Contains distinct impulses; and
- Is irregular enough to attract attention

Table 2 presents the standard's assessment criteria in relation to the likelihood of complaints.

$L_{Ar,Tr} - L_{A90,T}$ (dB)	Advice
+ 10	Complaints likely

+ 5	Marginal significance
- 10	Complaints unlikely

Table 1.5: BS 4142 Assessment for the Likelihood of Complaints

The rating method in BS 4142 indicates that the higher the result of $L_{Ar,Tr}$ - $L_{A90,T}$ calculation, the greater the likelihood of complaints. The method of assessment is based on a reference time period of 1-hour during the daytime and 5-minutes during the night-time.

BS 6472:2008 Part 1 'Guide to Evaluation of Human Exposure to Vibration in Buildings. Vibration Sources other than Blasting'

BS 6472 - Part 1:2008 'Guide To Evaluation Of Human Exposure To Vibration In Buildings. Vibration Sources Other Than Blasting' is used to assess vibration levels experienced by people in buildings from a human comfort perspective.

Human exposure to vibration in buildings can be assessed in terms of Vibration Dose Value (VDV), velocity or weighted root mean square (RMS) acceleration (the square root of the average square of the waveform over a time period, calculated in this way to avoid positive and negative changes averaging to zero). BS 6472-1 indicates that VDVs can be used to assess the human exposure to vibration when the vibrations are of impulsive or intermittent type and can be used to assess vibration in both magnitude and duration.

BS 6472-1 outlines recommended VDV criteria for daytime (07:00-23:00hrs) and night time (23:00-07:00hrs) for residential properties. The criteria are presented in Table 1 below.

Place and time	Low probability of adverse comment $ms^{-1.75}$ [1]	Adverse comment possible $ms^{-1.75}$	Adverse comment probable $ms^{-1.75}$ [2]
Residential buildings[3] 16hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8hr night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

[1] Below these ranges adverse comment is not expected
[2] Above these ranges adverse comment is very likely
[3] For offices and workshops, multiply by factors of 2 and 4 respectively for a 16 hr day

Table 1.6: Daytime and Night-time VDV Criteria for Residential Properties

3. **Noise Survey Methodology**

The purpose of the road and rail traffic noise survey is to validate the noise model (see **Section 4**). The proposed approximate noise survey locations are shown on **Figure 1** attached at the end of this technical note. The exact measurement location may be amended slightly due to site constraints

We propose to set up an unattended 24-hour measurement in location **LT** (illustrated in **Figure 1** at the end of this technical note) provided that a secure location can be identified on site. The 24-hour measurement will record audio data as well as numerical data; the audio data of any events with unusually high noise levels or short term peaks will be listened to in order to determine if they are representative of the usual noise climate. From this data, the daytime $L_{Aeq,16h}$ and night time $L_{Aeq,8h}$ will be determined.

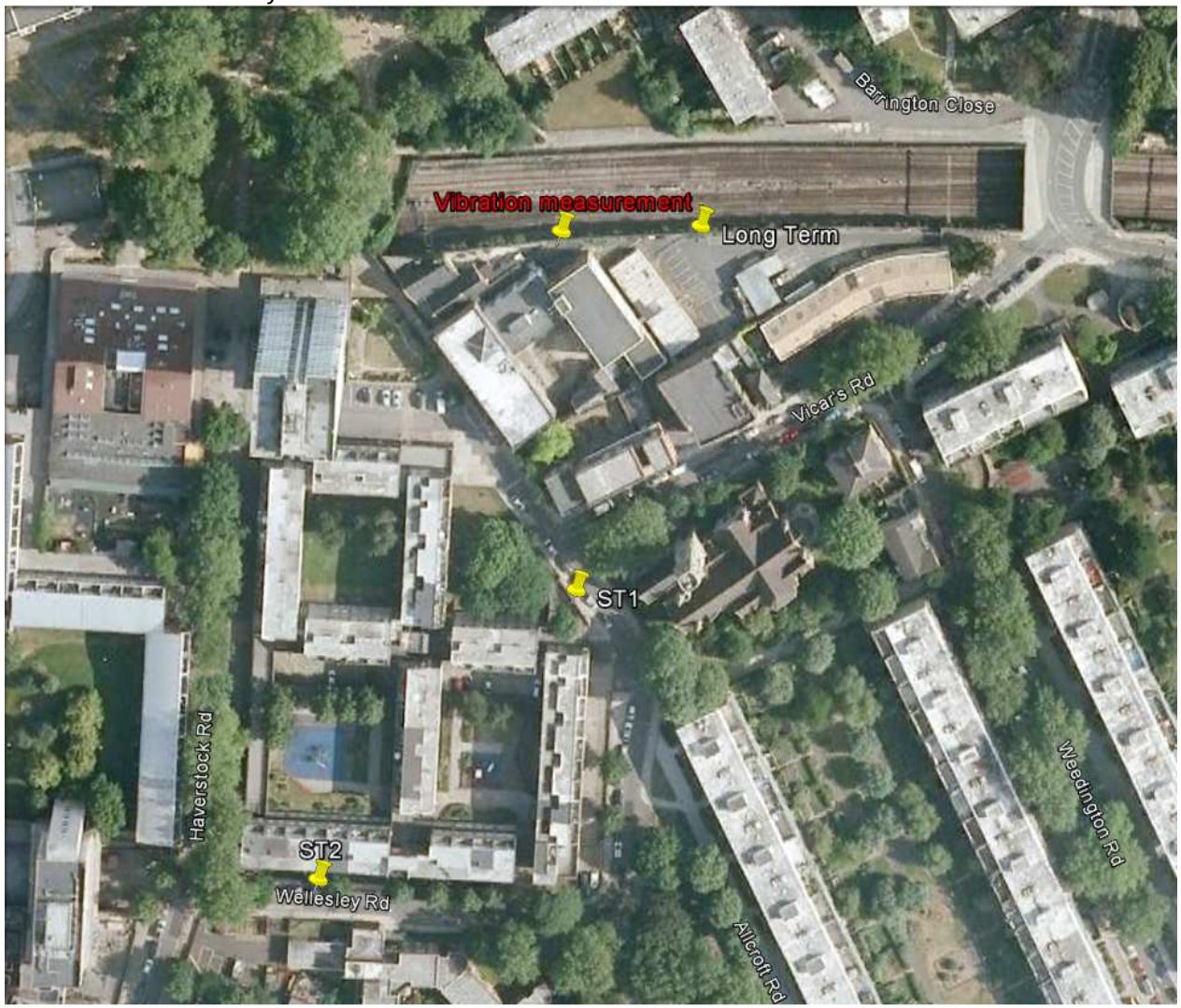
In addition, the following measurements will be taken at **ST1** and **ST2**:

- Three consecutive 1-hour attended measurements between 10:00 and 17:00 in

	accordance with the CRTN shortened measurement procedure, • Two non-consecutive 15-minute attended measurements starting from 23:00, and • Two non-consecutive 15-minute attended measurements finishing just before 07:00. (The above measurement times may be slightly different due to manoeuvring around the site but the measurement duration will be as described above.) From the daytime measurements the $L_{A10,18h}$, $L_{Aeq,16h}$ and $L_{Aeq,8h}$ can be calculated with the night-time measurements used for comparison.
4.	**Vibration Survey Methodology** A 2-hour vibration measurement will be undertaken close to the railway line to measure the existing vibration levels at the site. The proposed location is shown in **Figure 1** attached at the end of this technical note. The VDV will be measured during train passbys ensuring that at least one freight train is measured and the full daytime and night-time VDV calculated using guidance within BS 6472.
5.	**Noise Model** A noise model of the site will be prepared using SoundPLAN v7.1 which will include road traffic on Wellesley Road, Haverstock Road and Vicars Road as well as rail traffic data for the above-ground section of the London Underground Northern Line adjacent to the northern boundary of the site and the London overground railway line approximately 280 m to the east of the site. As requested by the EHO, the high speed railway line HS2, believed to be proposed approximately 800 m from the southern boundary of the site, will be included in the noise model unless it is shown that it will be located within a tunnel. The site topography is also included within the model and so corrections for this are included within the calculations. The model will be used to predict noise from road and rail traffic sources across the site using CRTN, CRN and ISO 9613-2. The results will be used to specify the mitigation required to achieve the criteria outlined in **Section 2**.
6.	**Assessment Methodology** The baseline noise model will be validated against the results of the noise survey and the model used as the basis of the noise assessment. If the noise survey results are higher than the model predicts (because of aircraft noise for example), a correction can be included in the noise model. The suitability of the existing noise climate for residential development will be assessed with regard to BS 4142 and Local Policy and outline mitigation advice will be provided with regard to BS 8233 and WHO 'Guidelines for Community Noise'. Mitigation advice, for example, glazing with alternative ventilation, will be specified where the criteria within DP28 is exceeded. The assessment will include the High Speed Railway unless it is shown to be located within a tunnel, in which case we consider that this, the distance to the site (over 800 m) and proximity to the site of existing noise sources (for example, traffic using the railway line adjacent to the site and local roads) will indicate that noise from the High Speed Railway will not be significant at the Bacton Estate site. The results of the vibration measurement will be compared to the guidance provided in BS 6472 and the Council Threshold levels specified in Table C of DP 28.

7.	**Conclusion** PBA will prepare a Noise and Vibration Assessment report to accompany the application for redevelopment of Bacton Estate, Camden based on the aforementioned methodology and would be grateful if you could confirm that you consider this approach to be acceptable.

Figure 1: Proposed Model Validation Noise Survey Locations



Appendix C: Traffic Data used in the Noise Model

C.1 Road Traffic Data

Table C.1: Traffic Counts during the Noise Survey

Time	Wellesley Road		Vicar's Road		Grafton Road	
	Total	HGV	Total	HGV	Total	HGV
	Start time: 12:58:23		Start time 10:55:17		Start time 10:55:17	
1st hour	93	7	56	8	80	7
2nd hour	103	9	59	3	89	3
3rd hour	167	2	62	9	87	10
Total	363	18	177	20	256	20
		5.0%		11.3%		7.8%
% of Wellesley Road	Not applicable		48.8%		70.5%	

Table C.2: Traffic Calculations

From ATC		Calculated			
Wellesley Road		Vicar's Road		Grafton Road	
Total	HGV	Total	HGV	Total	HGV
1085	20.1%	529	11.3%	765	7.8%

C.2 Rail Traffic Data

Table C.3: Rail Traffic Summary: Passenger Trains

Class	Number of trains		
	Night (24:00 - 06:00)	Day (06:00 - 24:00)	Total
319	25	327	352
222	3	122	125
375		48	48
HST		51	51

Table C.4: Rail Traffic Summary: Freight Trains

Class	Number of trains		
	Night (24:00 - 06:00)	Day (06:00 - 24:00)	Total
60	1	8	9
66	2	9	11

C.3 Reid Rail Report 'Vicars Road Development Site Rail Traffic on Adjacent Railway Routes' Dated September 2012

(Following page)

Reid Rail
The Transportation Consultants
13 Allan Park, Stirling, FK8 2QG Tel 01786 449997

Vicars Road Development Site

Rail Traffic on Adjacent Railway Routes

September 2012

Introduction

Peter Brett Associates is preparing an analysis of the noise around a development site in Vicars Road in the Borough of Camden London NW5 as part of an EIA for the planning application. Reid Rail was asked to prepare note of the trains using the railway in the vicinity for use in that analysis. The railway routes that were considered for analysis are as follows: -

1. Between Kentish Town and West Hampstead on the Midland Main Line out of St Pancras immediately North of the development site.
2. Between Gospel Oak and Hampstead Heath stations some 400m from the site
3. The line between Camden Road station and Hampstead Heath station which passes some 300m from the site

After consideration of the above options for consideration, it was decided that options 2 and 3 were sufficiently remote from the site (more than 300m) in a busy urban environment as to not merit further consideration.

Consideration was also given to London Underground services and to the proposed HS2 high speed route to Birmingham. The LU line closest to the site is the line between Chalk Farm and Belsize Park, some 800 metres away and in Tunnel. The HS2 route is some 900 metres away in the area of Adelaide Road and is not scheduled to open until around 2025. It was decided that there will be little benefit if any in studying these two railway sections.

Consultation and analysis of the working timetable for that section of the Railway between Kentish Town and West Hampstead produced the scheduled passenger trains operating on a daily basis past the development site with a split by night, defined as midnight to 06:00, and day, defined as 06:00 to midnight. The figures are analysed in the tables below.

Passenger Trains

The passenger trains generally run to a predetermined timetable for all in service trains and there is generally a pattern of out of service trains running to and from train cleaning and maintenance depots and returning as empty stock for service commencement in the morning as well as other empty trains.

For trains passing Vicars Road there is a variation in the timetable throughout the seasons but there is a total some 274 trains in the DOWN direction (away from London) and 303 in the UP direction (towards London) mainly local stopping services using the slow lines and with some mainline services using the fast lines. This makes a total of the order of 577 passenger trains per day passing the site. Some 29 of these are scheduled as night time trains, between midnight and 06:00 although there is a large seasonal variation in these night time trains. Perhaps the timetable has been further complicated by the Olympic Games this year. Some 548 are scheduled as day time trains, between 06:00 and midnight.

The passenger trains are of four mains types, class 319, class 375, class 222 and HST.

Passenger trains can operate on the fast lines line past the site at up to 70mph and on the slow lines, which is most of the trains at speeds up to 50mph. The

actual speed of the trains will vary and perhaps significantly depending on the operational constraints throughout the day, and is not known. It would be safe to assume for this site that most of the trains operate at between 30mph and 70 mph.

The number of carriages making up a train set is not known and will vary according to passenger demand and the need to return coaches to commence later services, but it is likely that they comprise 4 car and 8 car sets.

The track through the section concerned is standard Network Rail ballasted track.

The service is reduced at the weekend with around 220 services in each direction on Saturdays and 120 in each direction on Sundays

The breakdown of the passenger types by night and day is as of the order of:

CLASS OF TRAIN	NUMBER OF TRAINS (NIGHT AND DAY)		
	NIGHT 24:00 – 06:00	DAY 06:00 – 24:00	TOTAL
319	25	327	353
222	3	122	125
375	-	48	48
HST	-	51	51

Pictures of typical passenger train types using the route past the site.


Class 319 Diesel Multiple Unit


Class 222 Diesel Electric Multiple Unit


Class 375 Diesel Multiple Unit
back and front


HST 125 Diesel powered locomotives

Freight Trains

Freight trains generally run on booked freight train paths ensuring that there is a scheduled route available for each freight train. However the commercial nature of this type of service and the nature of the privatised railway means that some of these paths are not always used. The working timetable does not therefore provide an accurate picture of the likely noise from freight trains at any particular location.

The Freight Working Timetable for the section in question indicates that there are around 20 booked train paths per day with 3 of these scheduled to operate at night between midnight and 06:00. Generally the loads carried are aggregates from quarries with empty return trains.

The locomotives using the section are generally class 60 and class 66. Pictures of these two types are below.

Class 66 Diesel Locomotive Hauling Ballast Wagons

Class 60 Diesel Electric Locomotive

Appendix 1 – Sample of Passenger Train Times

Between Midnight and 09:00				13:00 to 15:00	
Time	Class	Time	Class	Time	Class
00:06:30	319	07:49:30	319	13:03:30	222
00:13:00	222	07:55:30	319	13:08:30	319
00:22:30	319	07:58:00	222	13:15:00	319
00:42:30	319	08:02:00	319	13:18:30	HST
01:06:30	319	08:03:00	222	13:22:30	319
01:12:30	319	08:08:30	319	13:25:00	319
01:37:00	319	08:15:00	319	13:28:30	319
04:29:00	319	08:18:30	HST	13:28:30	222
05:06:30	319	08:21:30	375	13:33:30	222
05:29:00	319	08:24:30	319	13:38:30	375
05:37:00	319	08:28:30	222	13:45:00	319
05:49:00	222	08:30:30	319	13:52:30	319
05:57:00	319	08:33:30	319	13:55:00	319
06:19:00	319	08:33:30	222	13:58:30	319
06:26:30	319	08:36:30	319	13:58:30	222
06:38:30	319	08:39:30	HST	14:03:30	222
06:40:30	222	08:42:30	319	14:08:30	375
06:45:00	319	08:49:30	319	14:15:00	319
06:48:00	375	08:52:30	375	14:18:30	HST
06:58:30	319	08:55:30	HST	14:19:30	222
07:03:00	319	08:58:30	222	14:22:30	319
07:03:30	HST			14:25:00	319
07:06:30	375			14:28:30	319
07:12:30	319			14:28:30	222
07:22:30	319			14:33:30	222
07:26:30	319			14:38:30	319
07:28:30	222			14:45:00	319
07:33:00	319			14:52:30	319
07:33:30	222			14:55:00	319
07:37:30	375			14:58:30	319
07:43:30	319			14:58:30	222

Appendix D: Noise Survey Results

Table D.1: Daytime Noise Survey Results

Location	Ref	Date (dd:mm:yy)	Start Time (hh:mm:ss)	Duration (hh:mm:ss)	$L_{Aeq,T}$ (dB)	$L_{AF90,T}$ (dB)	L_{AFmax} (dB)	L_{ASmax} (dB)
LT		06/09/2012	16:12:30	16:00:00	66.7	41.7	91.9	87.6
ST1	1st hour	07/09/2012	10:55:17	1:00:00	57.9	47.1	80.6	76.5
	2nd hour	07/09/2012	11:55:17	1:00:00	56.8	45.9	85.5	79.4
	3rd hour	07/09/2012	12:55:17	1:00:00	58.2	44.7	84.0	77.1
	Average			3:00:00	57.7	44.7	85.5	79.4
ST2	1st hour	06/09/2012	12:58:23	1:00:00	61.2	45.5	83.0	82.1
	2nd hour	06/09/2012	13:58:23	1:00:00	57.9	44.6	80.3	77.4
	3rd hour	06/09/2012	14:58:23	1:00:00	59.5	46.6	80.5	77.1
	Average			3:00:00	59.7	44.6	83.0	82.1

Table D.2: Night-Time Noise Survey Results

Location	Ref	Date (dd:mm:yy)	Start Time (hh:mm:ss)	Duration (hh:mm:ss)	$L_{Aeq,T}$ (dB)	$L_{AF90,T}$ (dB)	L_{AFmax} (dB)	L_{ASmax} (dB)
LT		06/09/2012	23:00:00	8:00:00	61.5	38.4	87.4	85.7
ST1	a	06/09/2012	23:04:18	0:15:00	50.2	41.5	68.8	65.7
	b	06/09/2012	23:51:17	0:15:00	48.5	40.7	65.2	63.6
	c	07/09/2012	05:01:14	0:15:00	48.7	39.3	65.8	64.6

Location	Ref	Date (dd:mm:yy)	Start Time (hh:mm:ss)	Duration (hh:mm:ss)	$L_{Aeq,T}$ (dB)	$L_{AF90,T}$ (dB)	L_{AFmax} (dB)	L_{ASmax} (dB)
	d	07/09/2012	05:42:36	0:15:00	47.5	39.9	65.1	63.8
	Average				48.8	39.3	68.8	65.7
ST2	a	06/09/2012	23:29:38	0:15:00	45.6	41.4	64.1	62.8
	b	07/09/2012	00:14:30	0:15:00	43.0	39.0	63.3	61.6
	c	07/09/2012	05:22:24	0:15:00	43.1	38.8	63.7	62.4
	d	07/09/2012	06:03:41	0:15:00	43.9	40.4	62.5	61.2
	Average				44.0	38.8	64.1	62.8