

Noise Impact Assessment

**Solent Retail Park
Selbourne Road
Havant
P09 1ND**

**REC Report: 90113
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**Prepared for:
Hargreaves Properties Limited**

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QUALITY ASSURANCE

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EXECUTIVE SUMMARY

Baseline & Source Noise Surveys

A Baseline Noise Survey has been conducted on the Site boundary at a location considered to be representative of the noise climate experienced at the closest residential dwellings to the Site.

REC has recently completed a number of source noise measurements for a Heavy Goods Vehicle and a passenger car in order to inform this Noise Impact Assessment

Noise Impact Assessment

The Noise Impact Assessment has been completed with due regard to the requirements of Havant Borough Council's Environmental Health Department.

Plant noise emission limits have been set, for all proposed mechanical and electrical plant, which should not be exceeded when measured or determined by calculation at the closest residential receptor.

It has been shown that predicted noise levels from the Site's Service Yard and operation of the customer car park gives rise to negligible noise impacts at the closest residential dwellings.

It has been shown that the change in local road traffic movements gives rise to negligible noise impacts along the surrounding roads.

Given the favourable outcome of this assessment it is not considered that noise should be a constraint in granting planning permission.

TABLE OF CONTENTS

QUALITY ASSURANCE	I
EXECUTIVE SUMMARY	2
Baseline & Source Noise Surveys	2
Noise Impact Assessment	2
TABLE OF CONTENTS	3
1.0 INTRODUCTION	4
2.0 SITE DESCRIPTION	5
3.0 ASSESSMENT CRITERIA	6
4.0 NOISE SURVEYS	10
5.0 NOISE IMPACT ASSESSMENT	14
6.0 CONCLUSION	20

APPENDICES

Appendix I	Limitations
Appendix II	Glossary of acoustic terminology
Appendix III	Figures
Appendix IV	Full Tabulated survey results

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd have been commissioned by Hargreaves Properties Limited to undertake a Noise Impact Assessment for a proposed Retail Unit with associated car parking and service yard area on land located off Selbourne Road in Havant P09, to be referred to hereafter as 'the Site'.

This study has been undertaken to determine the likely impact of the proposed development upon local noise sensitive residential receptors in the vicinity of the Site.

At the outset of this project, consultation has been undertaken with Les Glass of Havant Borough Council (HBC). This consultation was undertaken to establish HBC's requirements for the noise survey and subsequent assessment.

Accordingly, this assessment has been completed with due regard to mechanical and electrical plant noise emission limit criteria stipulated by HBC. It has also been agreed that any noise impact from the service yard and customer car parking area shall be compared to the existing ambient noise level at the closest residential receptors. Comparisons have been made against the widely adopted 'subjective response to changes in noise level' criteria table. These guidelines assess the significance of impact resulting from the change in ambient noise level.

An assessment of the change in road traffic noise levels generated by an increase in development-generated traffic flows has been completed and It has been shown that negligible noise impacts prevail along the surrounding roads.

This assessment is based upon the results of a baseline noise survey undertaken at the site, a service yard source noise survey and a passenger vehicle source noise survey.

1.2 Limitations

The limitations of this report are presented in Appendix I.

1.3 Confidentiality

REC has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2.0 SITE DESCRIPTION

2.1 Site location

The site is located approximately 800m south west of Havant town centre on Selbourne Road. The Site is bound by Brockhampton Lane to the north, Selbourne Road to the east and Solent Road to the south. The closest residential dwellings to the Site lie on Brockhampton Lane to the north west of the Site.

The key source of noise impacting upon the Site is from road traffic on the A27 dual carriageway which lies approximately 120m to the south. Intermittent noise from vehicles using Brockhampton Lane is also audible.

All acronyms used within this report are defined in the glossary presented in Appendix II.

2.2 Proposed development

The proposal is for the construction of a new retail unit. To the north of the retail unit is a proposed service yard area accessed from Brockhampton Lane. Vehicles using the customer car parking area, which lies to the south and west of the retail unit can enter and exit the car park from Selbourne Lane, with exit only permitted onto Brockhampton Lane. Accordingly, this assessment has been undertaken with due regard to the supplied fixed master plan as shown on the following drawings:

- Proposed Site Plan (Drg No. 1209-PL12), dated July 2012.

The proposed Site Plan is detailed in Figure 1 of Appendix III.

3.0 ASSESSMENT CRITERIA

3.1 Fixed Plant Noise

3.1.1 Local Authority Guidance and Criteria – Havant Borough Council Environmental Health Department

REC has contacted Les Glass, Environmental Health Team Leader at HBC and the following noise assessment criteria have been agreed:

- The noise rating level of any fixed mechanical and electrical plant shall not exceed 5dB below the existing background noise level when measured or calculated outside the closest residential receptor.

3.2 Guideline Noise Values

There are a number of guidance documents that contain recommended guideline noise values. BS8233:1999 '*Sound insulation and noise reduction for buildings*' is principally intended to assist in the design of new dwellings; however, the Standard does state that it may be used in the assessment of noise from new sources being brought to existing dwellings.

BS8233 was based on the advice contained in a draft of World Health Organisation (WHO) document "Guidelines for community noise". The WHO guideline values are appropriate to what are termed "critical health effects". This means that the limits are at the lowest noise level that would result in any psychological or physiological health effect.

The WHO and BS8233 guideline values are summarised in Table 3.1.

Table 3.1: Summary of guideline noise values contained in BS8233 and WHO Guidelines for Community Noise

Document	Noise Level	Guidance
World Health Organisation 'Community Noise 2000'	$L_{Aeq,T} = 55\text{dB}$	Serious Annoyance, daytime and evening (Continuous noise, outdoor living areas)
	$L_{Aeq,T} = 50\text{dB}$	Moderate Annoyance, daytime and evening (Continuous noise, outdoor living areas)
	$L_{Aeq,T} = 35\text{dB}$	Moderate Annoyance, daytime and evening (Continuous noise, dwellings indoors)
	$L_{Aeq,T} = 30\text{dB}$	Sleep disturbance, night-time (indoors)
	$L_{Amax} = 60\text{dB}$	Sleep disturbance, windows open at night (Noise peaks outside bedrooms, external level)
	$L_{Amax} = 45\text{dB}$	Sleep disturbance, windows open at night (Noise peaks inside bedrooms, internal level)
BS8233:1999	$L_{Aeq,T} = 55\text{dB}$	Upper limit for external steady noise (Gardens and balconies)
	$L_{Aeq,T} = 50\text{dB}$	Desirable limit for external steady noise (Gardens and balconies)

	$L_{Aeq,T} = 40\text{dB}$	Reasonable resting conditions for living rooms during day (Internal – steady noise)
	$L_{Aeq,T} = 35\text{dB}$	Reasonable sleeping conditions for bedrooms, night time (Internal – steady noise)
	$L_{Aeq,T} = 30\text{dB}$	Good sleeping conditions for bedrooms, night time (Internal – steady noise)
	$L_{Amax} = 45\text{dB}$	Limit for individual noise events for a reasonable standard in bedrooms at night

For $L_{Aeq,T}$ criteria, the time base (T) given in the documents is 16 hours for daytime limits and 8 hours for night time limits. When assessing impact, this has the tendency to smooth out the hourly variations in noise level. As such, the calculations in this assessment are carried out to a 1-hour time base, which is a more stringent assessment than is given in the guidance documents.

Within the Glossary of the now revoked Planning Policy Guidance (PPG) Note 24 it states that:

'A change of 3dB(A) is the minimum perceptible under normal circumstances, and a change of 10dB(A) corresponds roughly to halving or doubling the loudness of the sound.'

PPG 24 was replaced by the National Planning Policy Framework (NPPF) in March 2012. However, the NPPF does not provide specific guidance in terms of noise and so PPG 24 is still considered applicable for reference in the absence of any other suitable guidance.

Where the existing ambient noise level is already above the criteria developed from the various guidance documents, it may be considered unreasonable to adopt such criteria. It would be reasonable, however, given the above statement from PPG 24 to consider criteria which do not exceed the existing noise climate, thus giving rise to an overall 3dB increase i.e. the minimum perceptible. If it is less than the minimum perceptible it cannot effectively be described as disturbing or to affect the amenity of residents.

3.3 Change in Ambient Noise Levels

Table 3.2 provides an example of how changes in the ambient noise level can be categorised by significance.

Table 3.2: Subjective Response to Changes in Noise Level

Noise Level Change (dB)	Response	Impact
<3.0	Imperceptible	Negligible
3.0 – 5.0	Perceptible	Slight / Marginal
6.0 – 10.0	Up to a doubling of loudness	Significant
11.0 – 15.0	Over a doubling of loudness	Substantial
>15.0	-	Severe

3.4 Design Manual for Roads & Bridges Volume 11

The Highways Agency's document Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 7 (HA213/08) '*Noise and Vibration*' (2008) provides a method for evaluating both the immediate and long term noise effects on receptors of changes in traffic flows on public highways, assessed using 18 hour traffic flow (06:00 – 24:00) data.

The DMRB requires that an assessment is undertaken where an increase in a road traffic flow of 25% or greater, or a decrease of 20% or greater, is predicted, this being approximately equivalent to an increase or decrease in road traffic noise of approximately 1dB. The guidance states that where significant changes occur in the short-term, such as the opening of a new road, changes of 1dB or more might be perceived by local residents. However, where changes are long-term, as might occur with gradual increases in traffic over a period of years, changes of less than 3dB are unlikely to be perceived.

The DMRB recommends the use of the Department for Transport guidance '*Calculation of Road Traffic Noise*' (CRTN) for quantitative assessment of noise level changes. CRTN provides a method for calculating the noise from freely-flowing traffic down to speeds of 20km/h based on the calculation of the basic noise level (BNL) at a distance from the near-side edge of the carriageway. The guidance provides correction factors to take account of variations in topography, relative heights of the road and receiver, ground type, road type, speed and traffic composition (% Heavy Goods Vehicle). The assessment uses the 18-hour 10th percentile noise level which is the average of each of the hourly 10th percentile noise levels between 06:00 – 00:00, based on average annual weekday (AAWT) traffic flows.

The DMRB provides the guidance shown in Tables 3.3 and 3.4 on the classification of magnitude of change in 18 hour road traffic noise levels.

Table 3.3: Classification of Magnitude of Noise Impacts in the Short Term

Noise Level Change, $L_{A10,18hr}$ (dB)	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
5.0+	Major

Table 3.4: Classification of Magnitude of Noise Impacts in the Long Term

Noise Level Change, $L_{A10,18hr}$ (dB)	Magnitude of Impact
0	No Change
0.1 – 2.9	Negligible
3.0 – 4.9	Minor

5.0 – 9.9	Moderate
10.0+	Major

4.0 NOISE SURVEYS

4.1 Baseline Noise Survey

A Baseline Noise Survey has been undertaken by REC at the Site. This survey was carried out to establish the existing prevailing baseline noise climate at a location considered to be representative of the closest noise-sensitive residential dwellings to the Site. The Baseline Noise Survey was conducted over the following period:

- 13:00 Friday 20th July 2012 – 12:00 Monday 23 July 2012.

The following noise measurement positions were chosen for the survey:

- Noise measurement position 1 (NMP1): - Located at the first floor window of the existing commercial unit known as Unit 25D on the north western boundary of the Site. The microphone of the sound level meter was located at a height of approximately 4.5m above ground level and 1m from the façade of the unit which constituted a façade measurement. This measurement was adopted as it was considered to be representative of the existing baseline noise climate at the front of the residential dwellings which lie on Brockhampton Lane. Noise sources at this location consisted primarily of distant road traffic borne from the A27. To a lesser extent noise was also audible from vehicles using Solent Road and Brockhampton Lane.

4.2 Service Yard Source Noise Survey

REC has previously measured the noise levels associated with the activity of a HGV operating in a service yard on a separate site for arrival, unloading and departure scenarios. This noise survey was conducted in September 2011. As such the measured noise levels are considered up-to-date. The noise survey measured a HGV performing the following activities:

- Scenario 1: HGV drives into service yard and reverse manoeuvres up to Dock Loader within Service Yard;
- Scenario 2: HGV unloads; and,
- Scenario 3: HGV departs.

4.3 Passenger Vehicle Source Noise Survey & Noise Generated by a Shopping Trolley

REC has previously measured noise levels associated with a passenger vehicle operating in a commercial car park for a number of operating scenarios in August 2011.

One measurement for each of the following operating scenarios has been used in this assessment:

- Scenario 1: Vehicle drives up to the microphone of the sound level meter at a distance of 1m, engine is turned off followed by 1 car door slam; and,
- Scenario 2: Vehicle boot is opened and closed, 1 car door slam, engine is started and the vehicle pulls away.

To supplement the passenger vehicle noise assessment, the noise level measured from a shopping trolley being wheeled up to a passenger vehicle, before being wheeled away has also been measured in August 2011, accounting for the following scenarios:

- Scenario 1: Shopping trolley pushed up to sound level meter at 1m over a distance of 15m ; and,
- Scenario 2: Shopping trolley pushed away from sound level meter over a distance of 15m.

The Baseline Noise Survey and all Source Noise Surveys were completed using the specification noise measurement equipment shown in Table 4.1.

Table 4.1: Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
All positions	Sound level meter	01dB-Metravib Black Solo	65211	2 May 2013
	Pre-amplifier	01dB-Metravib PRE21S	15667	
	Microphone	Microtech Gefell GmbH MCE212	103328	
	Calibrator	01dB-Metravib Cal 21	34113643	23 March 2013

The sound level meter had been calibrated to the manufacturer's traceable standard in May 2011.

The weather conditions during the noise surveys were conducive towards the measurement of environmental noise, being fine and dry with wind speeds consistently below 5.0m/s.

A summary of the lowest measured 1-hour daytime and night-time sound pressure levels from the Baseline Noise Survey are presented in Table 4.2, with the full tabulated measurement data presented in Appendix IV.

The daytime and night-time periods as suggested in PPG24 have been adopted for this assessment which is 07:00 – 23:00 for daytime and 23:00 – 07:00 for night-time.

Table 4.2: Summary of Lowest Measured 1 Hour Noise Levels at NMP1 – Façade

Measurement position	Time period		Measured Sound Pressure Level (dB), facade			
	Day	Period	L _{Aeq,T}	L _{Amax,fast}	L _{A90,T}	L _{A10,T}
NMP1	Friday 20 th July	13:00 – 23:00	51.5	63.7	47.3	51.6
		Night-time (23:00 – 07:00)	44.2	55.8	42.6	45.3
	Saturday 21 st July	Daytime (07:00 – 23:00)	51.1	65.5	47.1	52.7
		Night-time (23:00 – 07:00)	46.9	54.1	43.8	49.0

	Sunday 22 nd July	Daytime (07:00 – 23:00)	48.2	58.9	45.7	49.6
		Night-time (23:00 – 07:00)	45.9	54.1	43.4	47.7
	Monday 23 rd July	07:00 – 12:00	55.6	63.5	53.7	56.9

As the measured noise levels presented in Table 4.2 are 'façade' noise levels, Table 4.3 displays the corrected free-field noise levels following the deduction of 3dB.

Table 4.3: Summary of Lowest Measured 1 Hour Noise Levels at NMP1 – Freefield

Measurement position	Time period		Measured Sound Pressure Level (dB), freefield			
	Day	Period	L _{Aeq,T}	L _{Amax,fast}	L _{A90,T}	L _{A10,T}
NMP1	Friday 20 th July	13:00 – 23:00	48.5	60.7	44.3	48.6
		Night-time (23:00 – 07:00)	41.2	52.8	39.6	42.3
	Saturday 21 st July	Daytime (07:00 – 23:00)	48.1	62.5	44.1	49.7
		Night-time (23:00 – 07:00)	43.9	51.1	40.8	46.0
	Sunday 22 nd July	Daytime (07:00 – 23:00)	45.2	55.9	42.7	46.6
		Night-time (23:00 – 07:00)	42.9	51.1	40.4	44.7
	Monday 23 rd July	07:00 – 12:00	52.6	60.5	50.7	53.9

For the service yard, measurements have been taken of three delivery activities comprising HGV drive-in and manoeuvre up to the dock leveller, unloading operations and departure respectively. The noise level from an operational HGV trailer-mounted chiller unit has also been included within the assessment, derived from REC library data, and is detailed below.

A summary of the measured sound pressure levels from the service yard noise survey, for a HGV driving into the service yard, unloading and departing, are presented in Table 4.4 below.

Table 4.4: Summary of Measured Noise Levels for Service Yard Noise Survey

Delivery activity	Duration (hh:mm:ss)	Measured sound pressure level, free field at 10m L _{Aeq,T} (dB)
Drive into service yard & Manoeuvre up to dock leveller	00:02:30	68.0
Unloading operations	00:30:00	63.0
Trailer Mounted Chiller Unit	00:30:00	55.0
Departure	00:00:30	67.0

A summary of the measured sound pressure levels from the passenger vehicle noise survey

are presented in Table 4.5, with the full tabulated measurement data presented in Appendix IV.

Table 4.5: Summary of Measured Noise Levels for Car Source Noise Survey

Scenario	Duration (seconds)	Measured sound pressure level at 1m $L_{Aeq,T}$ (dB)	Calculated sound event level at 1m $L_{Aeq,T}$ (dB)
1	30	49.9	64.7
2	34	56.5	71.8

A summary of the measured sound pressure levels of a shopping trolley being wheeled across a car park is presented in Table 4.6 with the full tabulated baseline measurement data presented in Appendix IV.

Table 4.6: Summary of Measured Noise Levels for Shopping Trolley Source Noise Survey

Scenario	Duration (seconds)	Measured sound pressure level at 1m $L_{Aeq,T}$ (dB)	Calculated Sound Event Level (dB)
1	10	71.5	81.5
2	14	68.9	80.4

Section 5.0 details the Noise Impact Assessments.

5.0 NOISE IMPACT ASSESSMENT

5.1 Plant Noise Emission Limits Assessment

At the time of producing this report, the proposed Mechanical and Electrical (M&E) plant items for the development had not been finalised. Accordingly, it is necessary to set plant noise emission limits for which any plant items shall not exceed, when determined at the closest residential receptor.

The noise emission limit criteria imposed by HBC is for the total noise rating level from mechanical and electrical plant not to exceed the existing measured background noise level by -5dB.

The proposed operating periods for M&E plant had not been finalised at the time of producing this assessment as such Table 5.1 details the derived plant noise emission limits for both daytime and night-time periods during the weekday and weekend periods based on the calculated noise levels presented in Table 4.3.

Table 5.1: Calculated Plant Noise Emission Limits

Period	Lowest Measured 1-Hour Background Noise Level, freefield L_{A90} (dB)	Criteria	Derived Plant Noise Emission Limit L_A (dB)
Weekday (07:00 – 23:00)	44.3	$L_{A90} - 5\text{dB}$	39.3
Weekday (23:00 – 07:00)	40.8		35.8
Weekend (07:00 – 23:00)	42.7		37.7
Weekend (23:00 – 07:00)	40.4		35.4

Table 5.1 indicates the total maximum permissible noise rating levels from M&E plant at the closest residential receptor for weekday and weekend daytime and night-time periods.

The final plant noise emission limit will need to be designated once the operating schedule for M&E plant has been decided.

5.2 Service Yard Noise Impact Assessment

REC have undertaken source noise measurements within the service yard area of a supermarket in Manchester which is considered to be of a representative size to that proposed as part of this development.

The delivery process has been divided into three elements. Firstly the HGV drives into the service yard and reverse manoeuvres up to the loading dock. Secondly unloading operations take place before, thirdly, the HGV departs.

The following agreed assumptions have been made for this assessment:

- The receiver height has been taken as being 1.8m high, accounting for a person stood in the front garden area of No.6 Brockhampton Lane; and,

- A partially open window will attenuate outdoor to indoor noise by 10 to 15dB.

This assessment has calculated the resulting sound pressure levels at the residential dwelling known as No.6 Brockhampton Lane which is the closest receptor to the proposed service yard. In determining the sound pressure level at the receptor, the following calculation methodology has been adhered to:

- 1 Distance correction, from where the proposed HGV will drive up to / unload within the new service yard to the closest residential receptor has been calculated using the following formula:

$$L_{eq,T} = 20 \times \log (D_2/D_1)$$

Where $D_1 = 10m$, the measurement distance; and

$D_2 =$ the distance from the location of the HGV trailer during drive in / unloading operations within the new service yard to the closest residential receptor.

- 2 Time correction, from where the proposed HGV will drive up to / unload within the new service yard to the closest residential receptor has been calculated using the following formula:

$$L_{eq,T} = 10 \times \log (T_2/T_1)$$

Where $T_1 = 33m$; and

$T_2 =$ The duration of the individual measurement.

It is understood that a 2.6m high brick wall will be built along the perimeter of the Service Yard with two steel sliding gates providing a means of access and exit. Given the presence of the gates which will have no acoustic benefit, and following analysis of the scheme masterplan, this assessment has allowed for only partial line of sight removal from operations in the service yard from No.6 Brockhampton Lane. Partial line of sight removal has been taken as -5dB.

Table 5.2 details the assessment for the predicted noise impact from the proposed service yard at the front façade of the proposed apartments.

Table 5.2: Predicted Service Yard Noise Levels at No.6 Brockhampton Lane

Delivery Activity	Measured free-field sound pressure level (dB)	Distance from delivery activity to receptor (m)	Distance Correction (dB)	Time Correction (dB)	Screening reduction (dB)	Calculated 1-hour L_{Aeq} at receptor (dB)	Total Combined Calculated 1-hour Noise Level
Arrival	68.0	89	-19.0	-13.8	-5	30.2	36.0
Unloading	63.0	71	-23.0	-3.0	-5	31.9	
Chiller Unit On	55	71	-17.0	-3.0	-5	30.0	

Departure	67.0	57	-15.1	-20.8	-5	26.1	
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Table 5.3 compares the calculated ambient noise level with the existing lowest 1 hour measured ambient noise levels for the daytime weekday and weekend periods for No.6 Brockhampton Lane.

Table 5.3: Predicted Change in Ambient Noise Level at No.16 Brockhampton Lane

Period	Lowest Measured 1-hour Ambient Noise Level L_{Aeq} (dB)	Total Combined Calculated 1-hour Noise Level L_{Aeq} (dB)	Calculated Combined Noise Level L_{Aeq} (dB)	Difference +/- (dB)
Weekday (Daytime)	48.5	36.0	48.7	+0.2
Weekend (Daytime)	45.2		45.7	+0.5

Table 5.3 indicates that the greatest unmitigated change in ambient noise level will be +0.5dB during the weekend daytime period. Comparing this noise level change with the guidance contained in Table 3.2 results in a negligible impact and so consideration towards noise mitigation options is considered unwarranted.

5.3 Customer Car Park Passenger Vehicle Noise Impact Assessment

REC have conducted a series of passenger vehicle noise measurements which account for a vehicle manoeuvring into and out of a typical car parking space, detailed previously as scenario 1 and scenario 2. In addition to vehicle noise, the noise level produced by a shopping trolley being wheeled across a supermarket car park has also been measured. The two noise sources have been combined for this assessment.

The closest residential dwelling to the western car park is No.26 Brockhampton Lane.

In calculating the resulting noise level change at No.26 Brockhampton Lane, the following methodology has been adhered to:

1. The measured noise level, from both passenger vehicle Scenarios 1 and 2 and the shopping trolley Scenarios 1 and 2, have been converted to a Sound Exposure Level (SEL) (at 1m) before being combined to give an overall SEL for a complete car manoeuvre, by using the following formula:

$$SEL = L_{eq} + 10 \times \log T$$

Where: T = measurement duration in seconds.

From here the two SEL noise levels were combined using the following formula:

$$\text{Total SEL} = 10 \times \log (10^{(SEL_1/10)} + 10^{(SEL_2/10)})$$

2. It has been assumed that all of the car parking spaces on the western side of the retail unit will be full in the interests of informing a worst case assessment.

3. The equivalent 1 hour L_{eq} has been calculated using the following formula:

$$L_{eq,1hr} = \text{Total Adjusted SEL} - (10 \times \log 60 \times 60).$$

Where: 60×60 = total number of seconds in a 1 hour period.

4. Finally, the distance from the centre of the car park to the front of No.26 Brockhampton Lane is 56m. The centre of the car park has been used as an average source noise position, assuming all vehicles will be evenly distributed throughout the car park. Distance correction has used the following formula:

$$L_{eq} \text{ at receptor} = L_{eq} - (20 \times \log D)$$

Where $D = 56m$

It is understood that a 1.8m high close-boarded fence will be built along the perimeter of the customer car park with Brockhampton Lane. As the proposals do not include for an acoustic specification fence, this assessment has not allowed for any noise attenuation afforded by screening of the customer car park from No.26 Brockhampton Lane. This approach will also ensure that the outcome is worst-case.

Table 5.5 details the predicted 1 hour L_{Aeq} noise level at No.26 Brockhampton Lane as a result of passenger vehicles using the customer car park.

Table 5.5: Derivation of the 1-hour L_{Aeq} Noise Level

Total combined SEL at 1m (dB)	Total adjusted SEL for 77 car parking spaces (dB)	Calculated $L_{eq,1hr}$ at 1m (dB)	Distance to 26 Brockhampton Lane (m)	Calculated $L_{eq,1hr}$ at No.26 Brockhampton Lane (dB)
84.3	105.4	69.9	54	35.2

Table 5.6 below compares the calculated 1 hour L_{Aeq} noise level with the measured 1 hour L_{Aeq} noise level at the rear of No.26 Brockhampton Lane.

Table 5.6: Comparison of the 1-hour L_{Aeq} Noise Level with Existing 1-hour Noise Level

Period	Lowest Measured 1-hour Ambient Noise Level L_{Aeq} (dB)	Total Combined Calculated 1-hour Noise Level L_{Aeq} (dB)	Calculated Combined Noise Level L_{Aeq} (dB)	Difference +/- (dB)
Weekday (Daytime)	48.5	35.2	48.7	+0.2
Weekend (Daytime)	45.2		45.6	+0.4

Table 5.6 indicates that the greatest change in ambient noise level will be +0.4dB during the weekend daytime period. Comparing this noise level change with the guidance contained in Table 3.2 results in a negligible impact.

It should be noted that the proposed 1.8m close-boarded fence along the car park's perimeter with Brockhampton Lane will have a beneficial effect in reducing noise levels from the car parking noise, although the noise level reduction afforded by the fence is unquantified. Nevertheless, the actual change in noise levels will be lower than that

predicted in Table 5.6.

Given the predicted negligible noise impact from the customer car park, consideration towards noise mitigation options is considered unnecessary.

5.4 Change in Local Road Traffic Noise Levels

Upon completion of the proposed development, it is anticipated that local road traffic noise levels may change as a result of development-generated traffic. Therefore, it is appropriate to consider the magnitude of any impacts that might arise.

The results of the Traffic Assessment undertaken by David Tucker Associates have been used as the basis for the road traffic noise assessment. The assessment focuses on roads immediately surrounding the Site before development-generated traffic is dispersed across the wider network.

Road traffic noise calculations have been carried out in accordance with CRTN, being undertaken for a notional receptor location 10m from the edge of the carriageway of each road considered, and 1.5m above ground level. A notional receptor has been used because the change in traffic noise level adjacent to any given road will be the same at all locations where noise from this route is dominant.

The predicted changes in road traffic noise are shown in Table 5.7. This table shows the difference between the opening year without the development (2014), and the assumed opening year +15 (2029) with and without the development. Calculations have been undertaken assuming traffic speeds based on the current speed limits although these do not have a material influence over the resulting noise level change that is being assessed.

Table 5.7: Predicted Changes in Road Traffic Noise Levels Resulting from Operation of the Development, Free-field, dB

Road	Predicted Noise Level dB L _{Aeq,18hr}			Difference / Change in Basic Noise Level (dB)	
	Opening Year without Development (2014) (dB) 'A'	Opening Year without Development (2029) (dB) 'B'	Opening Year with Development (2029) (dB) 'C'	B-A	C-B
Park Road S (N)	69.1	68.5	70.1	-0.6	1
Park Road S (S)	69.7	69.0	70.6	-0.7	0.9
Solent Road (E)	67.6	68.5	68.7	0.9	1.1
Solent Road (W)	66.4	67.2	67.3	0.8	0.9
Brockhampton Lane	40.8	40.8	57.2	0	16.4
Selbourne Road (S)	62.9	63.8	64.5	0.9	1.6
Selbourne Road (N)	58.5	59.6	61.0	1.1	2.5

It can be seen from Table 5.7 that the most adversely affected location with regards to increase in road traffic noise levels is the northern part of Selborne Road with a 2.5dB increase in noise levels, of which 1.1dB is attributable to natural traffic increases. This increase is classed as a negligible impact. The remaining roads are also classed as a negligible impact.

The predicted noise level for Brockhampton Lane for 2029 'with development' is 57.2dB $L_{A10,18hr}$. This part of the Site is heavily influenced by road traffic noise from the A27 dual carriageway and Solent Road. Indeed the existing measured road traffic noise level ($L_{A10,18hr}$) is 59.5dB at NMP1. When the predicted 2029 'with development' noise level of 57.2dB $L_{A10,18hr}$ is added to the existing noise level, the total combined noise level is 61.5dB $L_{A10,18hr}$ which gives an increase of 2.0dB. This increase is classed as a negligible impact.

6.0 CONCLUSION

REC have been commissioned by Hargreaves Properties Limited to undertake a Noise Impact Assessment for a proposed Retail Unit with associated car parking and service yard area on land located off Selbourne Road in Havant P09.

This study has been undertaken to determine the likely impact of the proposed development upon local noise sensitive residential receptors in the vicinity of the Site. This study has been completed with due regard to the requirements of HBC's Environmental Health Department.

It has been agreed with HBC that any M&E plant items which may form part of the development will not exceed the existing measured background noise level by -5dB.

The results of the Service Yard and Customer Car Parking noise impact assessments have both indicated that the change in ambient noise level at the closest respective residential dwellings results in a 'negligible' impact. In determining these outcomes, no noise attenuation due to the intervening perimeter wall of the Service Yard or the close boarded fence between Brockhampton Lane and the car park has been allowed for. Accordingly, the predicted change in noise levels are considered worst-case and the actual change in noise level as a result of the development will be lower than that predicted.

The results of the change in road traffic noise levels have shown that all changes are classed as 'negligible' impact. As existing noise levels around the lower part of Brockhampton Lane are high, being influenced by road traffic noise from the A27 and Solent Road, the actual change in noise levels around the lower part of Brockhampton Lane is predicted to be negligible.

Given the favourable outcome of this assessment it is not considered that noise should be a constraint in granting planning permission.

APPENDIX I LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between REC Ltd and the Client as indicated in Section 1.2.
2. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
3. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
4. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
5. REC can not be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by REC is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by REC in this connection without their explicit written agreement there to by REC.

APPENDIX II GLOSSARY OF ACOUSTICAL TERMINOLOGY

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc, according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

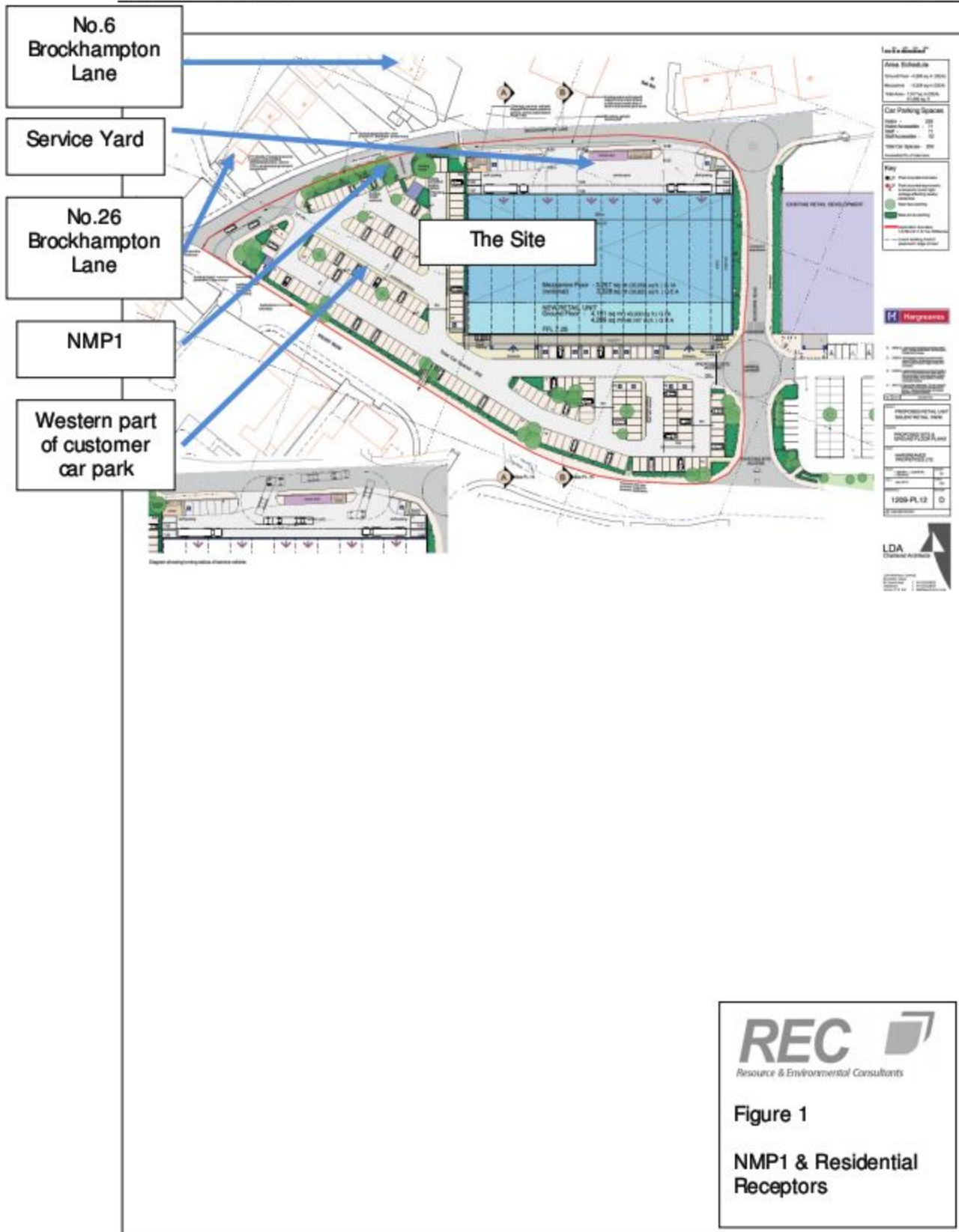
TYPICAL SOUND LEVELS FOUND IN THE ENVIRONMENT

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of pain

ACOUSTIC TERMINOLOGY

dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{Aeq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.
BS4142: 1997	This British Standard describes a method of determining the level of a noise of an industrial nature, together with procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity.

APPENDIX III FIGURES



REC
Resource & Environmental Consultants

Figure 1

NMP1 & Residential
Receptors

APPENDIX IV FULL TABULATED SURVEY RESULTS

Table 1: Noise Level Measurements at NMP1 (1 hour)

Day	Period start	Measured Sound Pressure Level, façade			
		L _{Aeq,T}	L _{Amax,fast}	L _{A90,T}	L _{A10,T}
Friday	20/07/2012 13:00	58.7	66.1	54.2	61.7
Friday	20/07/2012 14:00	62.5	80.1	58.9	63.7
Friday	20/07/2012 15:00	63.1	74.6	61.0	64.5
Friday	20/07/2012 16:00	64.1	70.0	62.1	65.5
Friday	20/07/2012 17:00	64.4	69.7	62.4	65.9
Friday	20/07/2012 18:00	62.8	68.5	60.9	64.3
Friday	20/07/2012 19:00	61.4	67.7	58.4	63.2
Friday	20/07/2012 20:00	57.6	63.7	53.0	59.7
Friday	20/07/2012 21:00	51.8	69.2	47.8	53.0
Friday	20/07/2012 22:00	51.5	73.2	47.3	51.6
Friday	20/07/2012 23:00	51.2	79.2	45.7	49.7
Saturday	21/07/2012 00:00	46.4	64.0	43.9	47.5
Saturday	21/07/2012 01:00	48.2	76.0	43.0	46.7
Saturday	21/07/2012 02:00	44.9	55.8	42.7	46.4
Saturday	21/07/2012 03:00	44.2	55.8	42.6	45.3
Saturday	21/07/2012 04:00	47.6	64.8	42.9	48.7
Saturday	21/07/2012 05:00	50.0	69.5	44.4	51.5
Saturday	21/07/2012 06:00	50.7	67.9	45.9	52.7
Saturday	21/07/2012 07:00	51.6	65.5	47.1	53.3
Saturday	21/07/2012 08:00	54.5	73.6	48.9	56.9
Saturday	21/07/2012 09:00	53.2	66.2	49.9	54.7
Saturday	21/07/2012 10:00	55.1	66.2	51.9	56.5
Saturday	21/07/2012 11:00	55.5	67.7	52.6	57.0
Saturday	21/07/2012 12:00	57.2	72.2	53.9	58.8
Saturday	21/07/2012 13:00	58.2	69.4	54.8	60.1
Saturday	21/07/2012 14:00	58.8	65.7	55.8	60.4
Saturday	21/07/2012 15:00	58.5	80.4	55.3	59.9
Saturday	21/07/2012 16:00	57.4	66.5	54.8	58.9
Saturday	21/07/2012 17:00	58.5	72.0	56.6	59.7
Saturday	21/07/2012 18:00	57.4	65.6	54.9	59.0
Saturday	21/07/2012 19:00	54.2	72.0	51.4	55.5
Saturday	21/07/2012 20:00	53.3	70.5	49.8	54.8
Saturday	21/07/2012 21:00	52.0	67.4	49.0	53.3
Saturday	21/07/2012 22:00	51.1	66.4	48.5	52.7
Saturday	21/07/2012 23:00	49.4	60.9	47.3	50.7
Sunday	22/07/2012 00:00	49.7	60.5	47.5	51.1
Sunday	22/07/2012 01:00	50.7	69.8	46.4	51.1
Sunday	22/07/2012 02:00	48.9	59.4	46.3	50.6
Sunday	22/07/2012 03:00	46.9	54.1	44.1	49.0
Sunday	22/07/2012 04:00	48.2	63.0	43.8	50.0
Sunday	22/07/2012 05:00	53.1	76.8	45.9	55.2
Sunday	22/07/2012 06:00	51.3	68.5	46.3	53.3
Sunday	22/07/2012 07:00	50.1	72.5	45.9	51.3
Sunday	22/07/2012 08:00	52.9	66.9	48.4	54.3
Sunday	22/07/2012 09:00	56.1	71.4	52.3	57.3
Sunday	22/07/2012 10:00	57.5	71.2	54.5	58.8
Sunday	22/07/2012 11:00	58.3	71.0	56.5	59.6
Sunday	22/07/2012 12:00	58.8	69.3	56.7	60.1

Sunday	22/07/2012 13:00	57.5	65.1	55.6	59.0
Sunday	22/07/2012 14:00	58.3	74.1	56.1	59.6
Sunday	22/07/2012 15:00	58.0	72.8	56.1	59.3
Sunday	22/07/2012 16:00	57.9	67.5	55.7	59.4
Sunday	22/07/2012 17:00	57.7	71.3	55.5	59.1
Sunday	22/07/2012 18:00	56.8	65.2	54.9	58.1
Sunday	22/07/2012 19:00	55.5	64.7	53.1	57.0
Sunday	22/07/2012 20:00	54.7	73.4	51.8	56.2
Sunday	22/07/2012 21:00	50.9	65.3	47.7	52.8
Sunday	22/07/2012 22:00	48.2	58.9	45.7	49.6
Sunday	22/07/2012 23:00	49.9	73.1	46.2	49.6
Monday	23/07/2012 00:00	46.8	54.1	44.2	48.5
Monday	23/07/2012 01:00	45.9	57.0	43.4	47.7
Monday	23/07/2012 02:00	46.4	57.7	43.8	48.2
Monday	23/07/2012 03:00	47.0	59.3	43.8	48.9
Monday	23/07/2012 04:00	52.1	69.3	45.9	54.3
Monday	23/07/2012 05:00	55.5	68.1	51.9	57.2
Monday	23/07/2012 06:00	57.4	72.2	55.2	58.2
Monday	23/07/2012 07:00	58.2	75.6	54.8	59.8
Monday	23/07/2012 08:00	56.3	71.2	53.7	57.4
Monday	23/07/2012 09:00	55.6	63.5	53.7	56.9
Monday	23/07/2012 10:00	56.7	70.0	54.3	57.9
Monday	23/07/2012 11:00	57.0	71.9	54.1	58.5
Monday	23/07/2012 12:00	57.1	65.6	54.7	58.8