SHARPS REDMORE

ACOUSTIC CONSULTANTS

Report

Former Foulstone School site, Nanny Marr Road, Darfield

Noise assessment of a proposed residential and retail development

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1.0 Introduction

1.1 Sharps Redmore (SR) was instructed to undertake an environmental noise assessment of a proposed residential and retail development at the former Foulstone School site at Nanny Marr Road, Darfield. The proposal is for housing on the northern half of the site, with six retail units and associated service area and car parking at the southern end of the site. A site location plan is attached as Appendix A.

1.2 The site is located in a predominantly residential area; the site is bordered by Nanny Marr Road to the west, by Coronation Street to the north, by Queen Street and Victoria Street to the east and by Barnsley Road to the south.

1.3 This assessment is based on the following Smith Smalley Architects drawings:

- Proposed site plan drawing 5364 P02;
- Indicative elevations drawing 5364 P03;

1.4 The objective of the assessment is to determine how noise that may be generated as a result of the proposal would affect residential amenity of both existing and future residences.

1.5 Section 2 of this report contains a discussion of the available methods of assessment and assessment criteria.

1.6 Section 3 of this report presents details of the environmental noise survey undertaken at the site.

1.7 An assessment of the proposed residential element of the development is presented in Section 4. The different components of retail noise are considered in sections 5 to 8; the assessment conclusions are contained in section 9.

1.8 A guide to the acoustic terminology used in this report is shown in Appendix D.

2.0 Assessment methodology and criteria

2.1 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 123 of the NPPF states the following:

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts[27] on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts[27] on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing business wanting to develop in continuance of their business should not have unreasonable restrictions put on them because changes in nearby land uses since they were established;[28] and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

2.2 It can be seen that the NPPF reinforces the March 2010 DEFRA publication, "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."

[27] See Explanatory note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs).

[28] Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.

2.3 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"… all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

2.4 It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:

i) The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:2014 and World Health Organisation (WHO) "*Guidelines for Community Noise"* contain such guidelines.

ii) Alternatively, the impact may be determined by considering the change in noise level that would result from the proposal, in an appropriate noise index for the characteristic of the noise in question. There are various criteria linking change in noise level to effect. This is the method that is suited to, for example, the assessment of noise from road traffic because it is capable of displaying impact to all properties adjacent to a road link irrespective of their distance from the road.

iii) Another method is to compare the resultant noise level against the background noise level (L_{A90}) of the area. This is the method employed by BS 4142:1997 to determine the likelihood of complaint from noise of an industrial nature. It is best suited to the assessment of steady or pseudo-steady noise.

Guideline noise values

2.5 There are a number of guidance documents that contain recommended guideline noise values. These are discussed below.

2.6 British Standard 8233:2014 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.

2.7 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 effect.

2.8 The World Health Organisation/BS 8233 guideline noise values are summarised in the following table:

TABLE 1: WHO/BS 8233 guideline noise values

Document	Level	Guidance
World Health Organisation "Community Noise 2000"	L_{AeqT} = 55 dB	Serious annoyance, daytime and evening. (Continuous noise, outdoor living areas)
	L_{AeqT} = 50 dB	Moderate annoyance, daytime and evening. (Continuous noise, outdoor living areas).
	L_{AeqT} = 35 dB	Moderate annoyance, daytime and evening. (Continuous noise, dwellings, indoors)
	L_{AeqT} = 30 dB	Sleep disturbance, night-time (indoors)
	L_{AMAX} = 60 dB	Sleep disturbance, windows open at night. (Noise peaks outside bedrooms, external level).
	L_{AMAX} = 45 dB	Sleep disturbance at night (Noise peaks inside bedrooms, internal level)
BS 8233:2014 "Sound Insulation and noise reduction for buildings"	L_{AeqT} = 55 dB	Upper limit for external steady noise. (gardens and patios).
	L_{AeqT} = 50 dB	Desirable limit for external steady noise. (gardens and patios).
	$L_{Aeq\ 16\ hours}$ = 35 dB	Resting, living room day. (Internal – steady noise)
	$L_{Aeq\ 16\ hours}$ = 40 dB	Dining, dining room day. (Internal – steady noise)
	$L_{Aeq\ 16\ hour}$ = 35 dB	Sleeping, bedroom day (Internal – steady noise)
	$L_{Aeq\ 8\ hours}$ = 30 dB	Sleeping, bedroom night (Internal – steady noise)

2.9 For L_{AeqT} 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, our calculations are carried out to a 1 hour time base, which is a more stringent assessment than is given in the guidance documents.

Changes in noise level

2.10 Changes in noise levels of less than 3 dBA are not perceptible under normal conditions and changes of 10 dBA are equivalent to a doubling of loudness. This guidance has been accepted by inspectors, at inquiry, to encompass changes in noise levels in the index L_{AeqT}.

2.11 The following table shows the response to changes in noise (known as a semantic scale):

TABLE 2: Change in noise level

Change in noise level L_{AeqT} dB	Response	Impact
<3	Imperceptible	None
3 – 5	Perceptible	Slight/moderate
6 – 10	Up to a doubling	Moderate/significant
11 – 15	More than a doubling	Substantial
>15	-	Severe

Assessment of fixed plant BS 4142:1997

2.12 As explained, this British Standard enables the likelihood of complaint to be determined according to the following summary process:

i) Determine the background noise levels, in terms of the index L_{A90}, at the receptor locations of interest.

ii) Determine the specific noise level of the source being assessed, in terms of its L_{AeqT} level (T = 1 hour for day or 5 minutes for night), at the receptor location of interest.

iii) Correct (penalise) the rating level, if the source noise is of tonal or intermittent nature so as to attract attention. The correction factor is 5 dB. The resultant level is termed the rating noise level.

iv) Compare the rating noise level with the background noise level; the greater the difference between the two, the higher the likelihood of noise complaint.

v) Differences (rating – background) of around +10 dB indicate that complaints are likely; a difference of +5 dB is of marginal significance; a difference of –10 dB is a positive indication that complaints are unlikely.

vi) The general intent of the planning system is to ensure that a development does not result in "significant adverse impacts on health and quality of life." The avoidance of this is, in our judgement, equivalent to the BS 4142 marginal significance criterion of +5 dB, although common for a planning condition to require a rating level not to exceed the background noise level, subject to a minimum requirement (see below), of 35 dB

vii) It should be noted that the scope and methodology of the standard do not apply where background noise levels are low (i.e. less than 30 dB L_{A90}) or for rating levels which are lower than 35 dB. It is our view, therefore, that in order to pass the "reasonableness" test (NPPF, paragraph 206, Government Circular 11/95) no planning condition should require a rating of less than "very low".

Methodologies Selected

2.13 With all of the above comments in mind, the components of noise have been assessed as follows:

i)	mechanical services plant	- BS 4142:1997;
ii)	delivery activity	- guideline values;
iii)	car parking activity	- guideline values;
iv)	road traffic	- change in noise level.

3.0 Noise survey details

3.1 A noise survey was undertaken between Wednesday 23rd July and Thursday 24th July 2014 at two measurement locations representative of the noise climate at the properties in Nanny Marr Road to the west (location A) and Barnsley Road to the south (location B) of the site (see Appendix A).

3.2 Noise measurements were taken using two Norsonic 118 sound level meters fitted with environmental microphone kits. The sound level meters were calibrated at the start and end of the measurements and no variation in levels noted.

3.3 Weather conditions during the survey were dry, partly cloudy (50% cover) and warm (25°C) with light and variable winds (<5 m/s).

3.4 Noise measurements were made every 5 minutes during the survey. The sound level meter microphones were located in free field conditions at a height of approximately 2 metres above ground level at both measurement locations.

3.5 The purpose of the noise survey was twofold; firstly to establish the typical minimum daytime and night time background and ambient noise levels, primarily for use in establishing fixed plant noise level limits in accordance with the guidance in BS 4142:1997; and secondly, to establish the noise climate to which the proposed houses would be exposed.

3.6 The noise levels measured during the survey were dominated by local road traffic sources.

3.7 The results of the noise survey are summarised below and presented in full in Appendix B.

TABLE 3: Summary of measured noise levels

Location	Measured noise levels dB				
	Daytime (0700 – 2300)		Night time (2300 – 0700)		
	L_{A90}	L_{AeqT}	L_{A90}	L_{AeqT}	L_{Amax}
A	33.6-54.6	47.8-65.1	28.9-47.2	32.2-63.0	40.5-86.2
B	35.3-48.4	43.3-66.9	29.7-50.0	33.6-61.1	41.5-78.2

Location B: Lowest daytime $L_{A90\ 1\ hour}$ = 39 dB (2200-2300 hours)

4.0 Proposed residential development

4.1 The proposed residential development comprises three rows of houses parallel to Nanny Marr Road at the northern end of the site. It is recognised that the only realistic means of providing a suitable internal noise climate within the proposed residential units will be to have windows closed and an alternative means of providing ventilation.

4.2 It is proposed that the building envelope and glazing should be specified such that the internal noise levels within the new residential units meet the criteria presented in BS 8233:2014.

TABLE 4: BS 8233 internal noise levels

Room/conditions	Noise level dB
Resting, living room day. (Internal – steady noise)	$L_{Aeq\ 16\ hours}$ = 35 dB
Dining, dining room day. (Internal – steady noise)	$L_{Aeq\ 16\ hours}$ = 40 dB
Sleeping, bedroom day (Internal – steady noise)	$L_{Aeq\ 16\ hour}$ = 35 dB
Sleeping, bedroom night (Internal – steady noise)	$L_{Aeq\ 8\ hours}$ = 30 dB

4.3 Since the internal layout of the proposed houses have yet to be established it is not possible to undertake detailed calculations to establish the sound insulation requirements for individual room uses.

4.4 The calculations presented below are based on the reasonable assumption that the external wall construction provides a sound reduction index at least 10 dB higher than the most onerous glazing performance.

4.5 The noise survey results at Location A can be used to assess the noise climate at the first row of proposed houses adjacent to Nanny Marr Road. From the measured noise levels at location A the daytime ambient noise level is 61 dB $L_{Aeq\ 16\ hours}$ and the night time level is 54 dB $L_{Aeq\ 8\ hours}$.

4.6 Comparison with the criteria outlined in Table 4 above suggests that in order to reduce internal noise levels to 35 dB during the daytime (living rooms and bedroom), this would require an inside to outside overall reduction of 26 dB. For night time, in order to achieve a level of 30 dB inside bedrooms a reduction of 24 dB would be required, based on the measured night time ambient level of 54 dB $L_{Aeq\ 8\ hours}$.

4.7 Glazing is often specified using an RW value which would typically be around 6 dB [1] higher than the noise level reductions quoted. For the closest residential blocks with façades facing Nanny Marr Road, the glazing requirements will be in the region of R_W=32 dB for daytime and R_W= 30 dB for night-time.

4.8 Typically these glazing requirements may be achieved using a 6mm outer pane, 12mm air gap, and a 6mm inner pane glazed system or similar. In order to achieve the reductions stated windows will need to be closed and therefore an alternative means of background ventilation will be necessary to satisfy the requirements of Building Regulations.

4.9 For the residential units set back further from Nanny Marr Road, lower noise levels could be expected and less onerous glazing/ventilation requirements may result, although these should be reviewed in light of potential noise from adjacent retail operations. Noise from retail operations could be mitigated to the new residential units through appropriate façade (glazing) design.

4.10 It is recommended that detailed sound insulation calculations are undertaken at the appropriate time (once internal layouts are determined) to ensure internal noise levels comply with the internal noise levels contained in BS 8233:2014. This work can be secured by imposition of suitably worded planning condition.

[1] This is a typical value; detailed calculations will take into account room and glazed area dimensions. This report must not be used for detailed design or procurement purposes.

5.0 Noise from mechanical services plant

5.1 The precise details of the mechanical services and refrigeration equipment (type and noise signature) are not known at this stage; however the proposed elevations drawing indicates that fixed plant will be located to the rear of the retail units in the service area.

5.2 The closest existing residential properties to the likely plant areas will be those in Barnsley Road and Church Street to the south of the site. It is suggested that plant noise emissions to existing residential properties be controlled through a combination of mitigation measures; these may include screening and the selection of intrinsically quiet plant.

5.3 With regard to the assessment of industrial noise sources in commercial premises (i.e. fixed mechanical plant associated with a retail development), British Standard 4142:1997 *'Method for Rating industrial noise affecting mixed residential and industrial areas'* enables the resultant noise level from new equipment to be compared against the existing background noise level (L_{A90}) of an area to assess the likelihood of complaints.

5.4 In determining suitable plant noise criteria SR have considered measured background noise levels taken during the noise survey. To ensure that the amenity of existing local residents would not be affected, the "rating noise level" (the predicted noise level plus any penalty for character), should not exceed the lowest measured background noise level (unless this would result in a rating level of less than 35 dB, whereby the lower limit shall be 35 dB).

5.5 The lowest measured background noise levels at measurement location B were 39 dB $L_{A90\ 1\ hour}$ during the daytime and 30 dB $L_{A90\ 5\ minutes}$ at night.

5.6 It is proposed to adopt the following plant noise criteria at the nearest existing residences in Barnsley Road/Church Street to the south:

TABLE 5: Proposed plant rating noise limits

Time period	Proposed rating noise level
Daytime	39 dB
Night time	35 dB

5.7 The following planning condition is recommended to secure the above criteria:

"*No fixed plant and/or machinery shall come into operation until details of the fixed plant and machinery serving the development hereby permitted, and any mitigation measures to achieve this condition, are submitted to and approved in writing by the local planning authority. The rating level of the noise emitted from the site shall not exceed 39 dBA between 0700 and 2300 hours and 35 dBA at all other times. The noise levels shall be determined by measurement or calculation at the nearest noise sensitive premises. The measurements and assessment shall be made according to BS 4142:1997.*"

6.0 Noise from delivery events

6.1 The proposed site plan drawing 5364 P02 shows that the largest retail unit is located at the southern end of the site; it is the service yard to this retail unit that would be closest to the existing properties in Snape Hill Road and Church Street to the south. The rear of 4 Snape Hill Road is approximately 35 metres from the loading area of this retail unit, and 50 metres from a vehicle manoeuvring upon arrival and departure. 4 Church Street would be approximately 70 metres from a vehicle manoeuvring upon arrival and departure and approximately 55 metres from the loading area.

6.2 The noise levels of the different components of delivery event activity have been measured at a large number of retail stores, and the following maximum noise levels and typical event durations have been used extensively in the planning and design of similar stores:

TABLE 6: Delivery activity - baseline source noise levels (free field)

Event Noise Level (at 10 metres)						Overall L_{Amax} dB
Arrival		Unloading		Departure		
Duration (mins)	$L_{Aeq\,T}$ (dB)	Duration (mins)	$L_{Aeq\,T}$ (dB)	Duration (mins)	$L_{Aeq\,T}$ (dB)	
2	69	30	66	0.5	67	75-79

6.3 All these sound levels are representative at 10 metres and are measured with the microphone in free field, away from any reflecting surfaces. The levels stated are realistic worst case noise levels from a large collection of sample measurements and include all service yard activity noise including refrigeration units, cage movements, vehicle manoeuvres and reversing alarms.

6.4 The following table shows the predicted noise level from a delivery event at 4 Snape Hill Road (receptor identified at Appendix A).

TABLE 7: Predicted delivery event noise at 4 Snape Hill Road

Activity	Resultant noise level (dB)
Arrival	
Baseline level	$L_{Aeq,2\ mins}$ = 69
Distance attenuation to 50 metres = 20 log $^{10}/_{50}$ = -14	$L_{Aeq,2\ mins}$ = 54
Screening loss = -12 dB (see Appendix C1)[1]	$L_{Aeq,2\ mins}$ = 43
Convert to 1 hour = 10 log $^{2}/_{60}$ = -15	**$L_{Aeq,1\ hour}$ = 28**
Unloading	
Baseline level	$L_{Aeq,30\ mins}$ = 66
Distance attenuation to 35 metres = -20 log $^{10}/_{35}$ = -11	$L_{Aeq,30\ mins}$ = 55
Screening loss = -15 dB (see Appendix C2) [1]	$L_{Aeq,30\ mins}$ = 40
Convert to 1 hour = 10 log $^{30}/_{60}$ = -3	**$L_{Aeq,1\ hour}$ = 37**
Departure	
Baseline level	$L_{Aeq,0.5\ mins}$ = 67
Distance attenuation to 50 metres = 20 log $^{10}/_{50}$ = -14	$L_{Aeq,0.5\ mins}$ = 53
Screening loss = -12 dB (see Appendix C1) [1]	$L_{Aeq,0.5\ mins}$ = 41
Convert to 1 hour = 10 log $^{0.5}/_{60}$ = -21	**$L_{Aeq,1\ hour}$ = 20**
Overall (28+37+20)	**$L_{Aeq,1\ hour}$ = 38**
WHO DAYTIME CRITERION ($L_{Aeq,16hr}$)	**55 dB**
WHO NIGHT TIME CRITERION ($L_{Aeq,8hr}$)	**45 dB**
Existing ambient daytime noise climate (location B)	**$L_{Aeq\ T}$ = 43-67 dB**
Existing ambient night time noise climate (location B)	**$L_{Aeq\ T}$ = 34-61 dB**
Peak noise – arrival and departure	
Baseline level	L_{Amax} = 75
Distance attenuation to 50 metres = 20 log $^{10}/_{50}$ = -14	L_{Amax} = 61
Screening loss = -12 dB (see Appendix C1)	**L_{Amax} = 49**
Peak noise – unloading	
Baseline level	L_{Amax} = 79
Distance attenuation to 35 metres = -20 log $^{10}/_{35}$ = -11	L_{Amax} = 68
Screening loss = -15 dB (see Appendix C2)	**L_{Amax} = 53**
Guideline night time criterion (L_{Amax})	L_{Amax} = 60
Existing peak night time noise climate	L_{Amax} = 42-78

[1] Screening provided by rear of store building

6.5 The following table shows the predicted noise level from a delivery event at 4 Church Street (receptor identified at Appendix A).

TABLE 8: Predicted delivery event noise at 4 Church Street

Activity	Resultant noise level (dB)
Arrival	
Baseline level	$L_{Aeq,2\ mins}$ = 69
Distance attenuation to 70 metres = 20 log $^{10}/_{70}$ = -17	$L_{Aeq,2\ mins}$ = 52
Screening loss = -6 dB (see Appendix C3)[2]	$L_{Aeq,2\ mins}$ = 46
Convert to 1 hour = 10 log $^{2}/_{60}$ = -15	**$L_{Aeq,1\ hour}$ = 31**
Unloading	
Baseline level	$L_{Aeq,30\ mins}$ = 66
Distance attenuation to 55 metres = -20 log $^{10}/_{55}$ = -15	$L_{Aeq,30\ mins}$ = 51
Screening loss = -7 dB (see Appendix C4) [2]	$L_{Aeq,30\ mins}$ = 44
Convert to 1 hour = 10 log $^{30}/_{60}$ = -3	**$L_{Aeq,1\ hour}$ = 41**
Departure	
Baseline level	$L_{Aeq,0.5\ mins}$ = 67
Distance attenuation to 70 metres = 20 log $^{10}/_{70}$ = -17	$L_{Aeq,0.5\ mins}$ = 50
Screening loss = -6 dB (see Appendix C3) [2]	$L_{Aeq,0.5\ mins}$ = 34
Convert to 1 hour = 10 log $^{0.5}/_{60}$ = -21	**$L_{Aeq,1\ hour}$ = 23**
Overall (31+41+23)	**$L_{Aeq,1\ hour}$ = 41**
WHO DAYTIME CRITERION ($L_{Aeq,16hr}$)	**55 dB**
WHO NIGHT TIME CRITERION ($L_{Aeq,8hr}$)	**45 dB**
Existing ambient daytime noise climate (location B)	**$L_{Aeq\ T}$ = 43-67 dB**
Existing ambient night time noise climate (location B)	**$L_{Aeq\ T}$ = 34-61 dB**
Peak noise – arrival and departure	
Baseline level	L_{Amax} = 75
Distance attenuation to 70 metres = 20 log $^{10}/_{70}$ = -17	L_{Amax} = 58
Screening loss = -6 dB (see Appendix C3)	**L_{Amax} = 52**
Peak noise – unloading	
Baseline level	L_{Amax} = 79
Distance attenuation to 55 metres = -20 log $^{10}/_{55}$ = -15	L_{Amax} = 64
Screening loss = -7 dB (see Appendix C4)	**L_{Amax} = 57**
Guideline night time criterion (L_{Amax})	L_{Amax} = 60
Existing peak night time noise climate	L_{Amax} = 42-78

[2]Screening provided by a 3 metre high acoustic grade service yard boundary fence.

6.6 The predicted delivery event noise levels is Tables 7 and 8 are below the WHO/BS8233 daytime and night time guideline noise values. Predicted peak noise levels are generally a little higher that the existing typical peak noise levels during the night time period.

6.7 With due regard to the location of the service yard and the existing noise climate it is considered that deliveries could be made from 0600 to 2200 hours without associated noise giving rise to significant adverse impact. In order to contain noise within the service area a 3 metre high acoustic grade screen (relative to service yard finished floor level) should be erected around the boundary of the service yard.

7.0 Noise from car parking activity

7.1 The closest residential properties to the car park are those on the opposite side of Nanny Marr Road, approximately 30 metres from the nearest parking spaces.

7.2 SR has previously undertaken extensive noise monitoring of retail car parks; at 10 metres from the boundary of a busy car park measured noise levels are 48 dB $L_{Aeq,1hr}$ (free field) have been found.

7.3 At 30 metres, this noise level would be attenuated by 9 dBA. The resultant predicted car park activity noise level would therefore be 39 dB $L_{Aeq,1hr}$ (48-9 dB).

7.4 Peak noise levels in car parks have been attributed to car door slam events. SR have measured noise from a considerable number of car door slam events and peak noise levels can be up to 66 dB L_{Amax} (free field) at 10 metres from the vehicle.

7.5 At 30 metres predicted peak noise levels from car door slams at 1 metre from the façade would be 57 dB L_{Amax} (66-9).

7.6 Observations of retail car park activity indicate that customers have a strong preference to park as close as possible to the store entrances. During off peak periods, when the availability of spaces is greatest, this would have the effect of increasing the distance separation between the properties in Nanny Marr Road and areas of car parking activity as customers are likely to park as close as possible to the store entrances. Therefore the predicted car parking activity noise level presented in paragraphs 7.3 and 7.5 can be considered worst case.

7.7 Both the predicted ambient and peak noise levels associated with customer car parking are below both the daytime and night time guideline noise values, and below the existing daytime ambient noise climate.

8.0 Noise from road traffic

8.1 The increase in road traffic noise as a result of the development can be determined by comparing the 2020 baseline traffic flows, with the 2020 baseline plus development flows, provided to SR by EJS Associates Consulting Engineers, by means of the formula found in "Calculation of Road Traffic Noise":

Increase in noise level = 10 $\log_{10}$ (future total traffic flow ÷ existing traffic flow) dB

8.2 To increase the noise level by 3 dBA, the minimum perceptible, the future traffic flow would need to be at least twice the existing traffic flow.

8.3 This assessment of road traffic noise has been undertaken for two way Friday PM, and Saturday peak hour flows with and without the development for the following road segments:

- Segment 1: Nanny Marr Road, north of retail access
- Segment 2: Nanny Marr Road, south of retail access

TABLE 9: Changes in road traffic noise – Friday peak hour flows

Road segment	background flow	with development flow	Change in noise level (dB)	Impact
1	607	681	+0.5	Negligible
2	607	800	+1.2	Negligible

TABLE 10: Changes in road traffic noise – Saturday peak hour flows

Road segment	background flow	with development flow	Change in noise level (dB)	Impact
1	492	604	+0.9	Negligible
2	492	789	+2.0	Negligible

8.4 In relation to the closest noise sensitive receptors to the site the changes in road traffic, as a result of the proposal would result in a negligible noise impact.

9.0 Assessment conclusions

9.1 Having undertaken this assessment against objective criteria, it is concluded that the development could proceed without the likelihood of noise from subsequent operations harming the amenity of local residents, on the basis of the following operating hours:

Store trading:	24 hours unrestricted;
Store servicing:	0600 to 2200 hours;

9.2 Mechanical services and refrigeration plant can be designed such that the suggested criteria, daytime 39 dBA and night time 35 dBA are achieved at the nearest existing noise sensitive properties; these noise limits could be secured by the following planning condition.

"*No fixed plant and/or machinery shall come into operation until details of the fixed plant and machinery serving the development hereby permitted, and any mitigation measures to achieve this condition, are submitted to and approved in writing by the local planning authority. The rating level of the noise emitted from the site shall not exceed 39 dBA between 0700 and 2300 hours and 35 dBA at all other times. The noise levels shall be determined by measurement or calculation at the nearest noise sensitive premises. The measurements and assessment shall be made according to BS 4142:1997.*"

9.3 With regard to the proposed residential units, it is recommended that detailed sound insulation calculations are undertaken once internal layouts are determined to ensure internal noise levels comply with the internal noise levels contained in BS 8233:2014. This work can be secured by imposition of suitably worded planning condition.

9.4 In summary, based on a thorough assessment against objective standards the proposed retail and residential development would not give rise to significant adverse impact by reason of noise, and as such complies with the requirements of the NPPF.

APPENDIX A

SITE LOCATION PLAN

Appendix A: **Site location plan showing noise measurement locations and receptors**



APPENDIX B

NOISE SURVEY RESULTS

Appendix B1	Title: Noise survey results

Measurement location A - Adjacent to 50 Nanny Marr Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
23.7.14	13:50:00	65.5	48.4	61.0	69.9	44.0
	13:55:00	67.2	48.0	62.6	74.5	43.4
	14:00:00	65.5	48.8	61.0	72.8	45.9
	14:05:00	66.8	49.1	62.3	74.6	46.1
	14:10:00	66.8	51.4	62.6	73.2	46.5
	14:15:00	65.3	48.6	61.4	73.5	45.1
	14:20:00	67.6	51.8	64.0	76.1	46.7
	14:25:00	65.2	47.7	60.5	74.0	46.3
	14:30:00	66.5	50.3	62.2	75.6	46.0
	14:35:00	66.8	50.0	62.5	74.0	45.7
	14:40:00	65.9	48.1	61.0	70.6	45.5
	14:45:00	67.0	47.2	62.2	71.9	44.4
	14:50:00	66.8	50.0	62.9	76.4	46.1
	14:55:00	65.6	49.6	61.4	71.6	45.9
	15:00:00	66.2	50.0	62.5	76.2	47.5
	15:05:00	67.0	48.9	63.4	77.3	46.0
	15:10:00	66.5	48.4	61.9	71.1	44.3
	15:15:00	66.8	48.4	63.4	78.8	44.7
	15:20:00	66.8	48.5	62.5	71.2	46.1
	15:25:00	66.6	49.1	61.8	73.4	46.5
	15:30:00	67.0	51.7	63.3	75.1	47.9
	15:35:00	66.8	49.2	63.1	75.6	45.6
	15:40:00	66.5	48.1	63.8	79.7	45.7
	15:45:00	65.7	48.6	61.1	71.1	45.5
	15:50:00	66.4	49.6	62.3	76.4	46.2
	15:55:00	66.5	49.7	62.1	74.1	46.3
	16:00:00	65.5	49.6	61.4	75.1	44.1
	16:05:00	66.9	51.2	63.1	75.0	43.7
	16:10:00	65.0	49.2	60.6	69.6	46.4
	16:15:00	66.7	49.5	62.0	73.3	46.9
	16:20:00	66.7	51.1	63.1	76.6	48.5
	16:25:00	67.5	49.6	63.3	75.8	47.3
	16:30:00	65.7	51.8	61.7	73.7	48.2
	16:35:00	67.5	48.7	63.5	73.6	46.2
	16:40:00	66.6	51.0	62.6	74.1	48.3
	16:45:00	67.8	51.1	63.7	75.5	48.1
	16:50:00	66.6	50.5	62.5	71.2	45.5
	16:55:00	66.7	48.3	62.7	73.1	45.3
	17:00:00	67.5	49.0	62.8	70.9	45.1
	17:05:00	66.7	51.3	62.8	71.8	48.6
	17:10:00	67.3	48.5	62.8	71.9	45.6
	17:15:00	67.4	51.7	63.4	74.8	47.2
	17:20:00	67.5	50.3	63.4	72.1	45.1
	17:25:00	67.5	51.4	64.2	85.4	44.8
	17:30:00	67.9	49.6	63.8	76.2	44.7
	17:35:00	67.5	52.0	63.3	71.3	46.4
	17:40:00	65.7	47.8	62.1	77.8	44.7
	17:45:00	66.8	49.2	63.7	79.0	45.7

Appendix B2	Title: Noise survey results

Measurement location A - Adjacent to 50 Nanny Marr Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
23.7.14	17:50:00	67.1	46.8	62.8	72.8	44.7
	17:55:00	66.7	48.9	62.0	72.1	45.3
	18:00:00	68.3	50.9	64.3	77.4	43.6
	18:05:00	66.8	49.3	63.1	82.1	45.2
	18:10:00	66.1	48.7	61.5	69.4	46.3
	18:15:00	66.5	47.1	61.9	73.2	43.2
	18:20:00	67.1	47.4	62.6	72.1	43.1
	18:25:00	66.4	47.2	61.9	72.2	43.2
	18:30:00	66.9	50.6	65.1	81.7	46.8
	18:35:00	65.9	46.0	61.3	71.7	43.4
	18:40:00	65.2	47.1	60.2	72.5	43.5
	18:45:00	65.9	46.7	61.3	72.5	43.9
	18:50:00	65.9	46.9	62.1	74.6	42.9
	18:55:00	66.4	46.7	62.3	76.0	43.4
	19:00:00	65.9	48.2	61.4	71.1	45.2
	19:05:00	67.0	45.8	62.4	81.2	41.7
	19:10:00	65.6	46.0	62.7	83.0	42.2
	19:15:00	66.4	48.6	62.3	73.6	45.1
	19:20:00	64.6	46.1	59.6	71.3	42.4
	19:25:00	64.9	45.3	60.3	73.2	42.0
	19:30:00	65.9	46.8	61.3	72.0	41.5
	19:35:00	65.1	44.4	60.0	71.2	40.5
	19:40:00	64.2	44.2	59.3	71.0	40.9
	19:45:00	64.5	45.1	60.2	73.8	42.8
	19:50:00	64.8	42.3	59.8	74.6	40.8
	19:55:00	64.3	45.7	60.3	75.9	41.5
	20:00:00	64.1	44.4	59.8	71.5	42.5
	20:05:00	64.4	43.3	59.5	69.7	40.1
	20:10:00	64.1	45.9	59.5	72.6	42.0
	20:15:00	63.8	43.3	59.5	75.3	39.9
	20:20:00	63.7	42.9	58.6	71.6	40.1
	20:25:00	65.7	44.7	61.3	77.0	41.4
	20:30:00	64.9	44.1	59.9	72.8	41.5
	20:35:00	65.9	41.4	61.4	75.2	39.0
	20:40:00	64.6	42.6	61.0	77.3	38.7
	20:45:00	64.4	43.5	60.3	76.5	39.5
	20:50:00	65.2	41.3	59.5	72.5	39.4
	20:55:00	65.1	43.7	59.9	71.7	41.1
	21:00:00	63.9	43.1	59.3	73.9	40.5
	21:05:00	65.0	45.4	61.3	77.2	41.9
	21:10:00	65.7	49.0	61.2	75.9	47.8
	21:15:00	65.3	43.6	60.5	70.0	40.8
	21:20:00	63.4	41.5	59.5	77.9	39.9
	21:25:00	63.2	40.2	58.4	71.9	38.3
	21:30:00	62.7	40.4	57.3	69.4	38.2
	21:35:00	65.3	44.4	60.4	74.9	40.4
	21:40:00	64.9	41.6	61.1	75.7	38.7
	21:45:00	61.5	41.7	57.2	69.2	39.5

Appendix B3	Title: Noise survey results

Measurement location A - Adjacent to 50 Nanny Marr Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
23.7.14	21:50:00	63.9	40.4	58.7	70.2	38.4
	21:55:00	62.2	40.7	57.6	70.1	37.9
	22:00:00	63.7	40.6	58.0	68.6	38.6
	22:05:00	65.3	42.4	60.5	71.4	40.4
	22:10:00	62.8	39.2	56.7	68.4	37.1
	22:15:00	60.6	39.1	58.7	75.6	37.4
	22:20:00	62.2	39.2	57.3	72.4	36.7
	22:25:00	62.7	38.9	57.9	70.8	36.1
	22:30:00	62.3	38.6	57.8	71.1	35.6
	22:35:00	62.4	39.0	57.9	72.3	36.1
	22:40:00	56.3	38.7	56.2	75.4	35.0
	22:45:00	62.7	35.7	58.1	73.8	33.5
	22:50:00	44.4	33.6	47.8	65.2	31.9
	22:55:00	60.9	35.3	56.8	72.6	32.9
	23:00:00	61.1	35.7	57.0	71.2	31.8
	23:05:00	61.3	37.7	56.7	69.6	35.9
	23:10:00	55.5	38.8	54.2	69.7	36.4
	23:15:00	63.5	37.8	58.6	74.1	35.2
	23:20:00	47.2	36.9	51.6	68.6	35.6
	23:25:00	45.1	34.9	54.9	74.0	32.5
	23:30:00	54.9	34.9	52.6	67.6	32.0
	23:35:00	41.1	31.8	50.8	71.6	30.3
	23:40:00	50.4	34.2	50.2	67.0	30.9
	23:45:00	45.7	33.9	51.0	69.9	31.6
	23:50:00	55.2	36.0	53.7	69.5	33.2
	23:55:00	52.3	34.1	51.4	67.2	31.3
24.7.14	00:00:00	57.3	32.4	52.7	68.1	30.7
	00:05:00	53.5	35.9	53.6	68.2	32.7
	00:10:00	50.8	33.3	53.1	71.3	30.5
	00:15:00	40.5	34.0	40.8	54.6	31.5
	00:20:00	39.7	33.3	37.8	54.1	30.2
	00:25:00	49.5	32.0	48.7	63.9	30.2
	00:30:00	34.4	28.9	32.2	45.5	27.3
	00:35:00	46.3	32.1	48.9	67.3	30.0
	00:40:00	47.2	31.1	48.9	66.2	29.4
	00:45:00	38.9	32.3	36.4	45.8	29.9
	00:50:00	39.2	31.5	45.5	65.0	29.4
	00:55:00	38.2	30.5	34.9	47.0	28.5
	01:00:00	35.5	30.3	33.7	46.0	28.5
	01:05:00	38.8	30.6	35.8	48.3	29.2
	01:10:00	42.2	32.2	46.5	63.4	30.4
	01:15:00	51.5	31.2	50.3	66.9	29.7
	01:20:00	37.7	29.6	51.1	72.2	27.9
	01:25:00	38.3	30.5	48.2	67.1	28.7
	01:30:00	37.3	30.8	34.3	52.3	29.3
	01:35:00	35.6	30.8	33.5	40.7	29.2
	01:40:00	38.3	31.7	36.3	51.4	29.5
	01:45:00	35.5	30.1	48.6	69.1	27.8

Appendix B4	Title: Noise survey results

Measurement location A - Adjacent to 50 Nanny Marr Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
24.7.14	01:50:00	48.2	35.9	49.6	68.0	35.4
	01:55:00	51.4	36.2	51.9	69.4	35.4
	02:00:00	42.9	35.8	46.0	66.6	35.3
	02:05:00	46.6	36.0	47.6	64.8	35.6
	02:10:00	43.6	36.0	49.5	67.6	35.3
	02:15:00	36.9	35.8	44.5	65.8	35.1
	02:20:00	50.6	36.2	51.9	70.7	35.5
	02:25:00	42.2	36.2	40.0	43.5	35.6
	02:30:00	45.1	35.8	46.6	62.1	35.1
	02:35:00	45.8	35.9	41.8	54.8	35.4
	02:40:00	49.9	36.0	53.2	70.7	35.4
	02:45:00	37.6	35.8	38.8	53.9	35.4
	02:50:00	44.0	35.8	47.3	64.7	35.2
	02:55:00	43.4	36.0	54.2	76.1	35.5
	03:00:00	49.7	36.1	49.8	67.6	35.5
	03:05:00	36.5	35.8	36.1	40.5	35.3
	03:10:00	42.8	36.0	47.0	65.8	35.4
	03:15:00	46.6	36.5	54.3	75.9	35.7
	03:20:00	44.8	37.0	47.0	66.3	36.0
	03:25:00	46.9	39.5	45.5	60.5	36.2
	03:30:00	51.0	37.8	48.2	63.7	35.9
	03:35:00	49.0	38.5	49.3	66.2	35.8
	03:40:00	53.1	40.0	50.2	65.4	36.1
	03:45:00	56.3	39.3	54.6	73.8	36.1
	03:50:00	46.7	39.1	46.7	62.1	37.8
	03:55:00	48.5	38.1	50.7	68.5	36.6
	04:00:00	43.6	37.4	45.9	62.9	36.0
	04:05:00	50.3	38.6	50.3	67.6	36.6
	04:10:00	50.6	40.4	49.8	67.6	37.4
	04:15:00	51.1	40.8	49.9	65.1	37.2
	04:20:00	54.4	42.8	52.2	67.9	37.5
	04:25:00	44.4	39.0	42.4	53.8	37.2
	04:30:00	50.3	39.0	49.4	64.9	36.9
	04:35:00	46.6	39.2	47.5	64.2	36.8
	04:40:00	55.5	39.5	52.0	67.0	37.4
	04:45:00	58.0	40.0	53.9	70.2	37.3
	04:50:00	58.8	42.4	54.3	67.2	37.7
	04:55:00	56.9	40.0	52.8	66.1	36.6
	05:00:00	62.3	39.1	57.3	71.4	37.0
	05:05:00	62.4	39.3	57.7	71.6	37.3
	05:10:00	61.4	40.0	56.3	69.1	37.1
	05:15:00	61.4	41.8	56.4	70.0	36.6
	05:20:00	60.7	42.6	56.0	72.0	37.3
	05:25:00	61.6	42.1	56.4	69.2	37.8
	05:30:00	61.7	41.8	56.5	70.4	38.3
	05:35:00	56.4	39.3	52.3	67.7	36.8
	05:40:00	62.0	40.5	56.6	69.1	37.7
	05:45:00	61.5	42.7	57.2	72.9	38.7

Appendix B5	Title: Noise survey results

Measurement location A - Adjacent to 50 Nanny Marr Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
24.7.14	05:50:00	61.8	38.8	58.0	71.9	36.6
	05:55:00	60.7	38.6	57.9	73.1	35.6
	06:00:00	61.5	40.6	57.2	73.3	37.8
	06:05:00	65.0	40.7	60.4	75.6	38.7
	06:10:00	63.4	40.3	58.2	71.7	36.6
	06:15:00	62.6	42.4	58.1	73.6	39.3
	06:20:00	66.8	42.7	61.3	73.4	40.0
	06:25:00	64.2	41.6	58.5	70.7	39.3
	06:30:00	64.3	43.7	58.9	70.1	39.9
	06:35:00	65.3	47.2	60.6	70.6	42.6
	06:40:00	66.6	44.6	63.0	86.2	41.6
	06:45:00	64.0	41.4	58.6	71.0	39.5
	06:50:00	63.2	41.2	57.8	71.7	38.6
	06:55:00	63.9	42.0	59.0	70.8	38.1
	07:00:00	65.7	42.6	60.9	74.7	40.1
	07:05:00	63.7	41.0	58.2	70.3	39.5
	07:10:00	66.4	43.7	61.6	74.2	40.0
	07:15:00	66.8	44.1	61.5	73.1	40.8
	07:20:00	64.6	43.2	61.6	82.3	40.8
	07:25:00	66.1	43.6	61.7	75.8	39.0
	07:30:00	66.6	40.3	61.0	72.8	37.4
	07:35:00	66.2	43.7	62.8	78.5	41.0
	07:40:00	66.3	41.8	61.2	73.7	39.0
	07:45:00	65.9	44.8	61.0	72.7	41.2
	07:50:00	66.6	45.1	62.0	73.7	41.0
	07:55:00	67.4	44.0	61.9	70.9	40.3
	08:00:00	67.3	44.1	62.4	72.4	42.0
	08:05:00	65.8	43.9	61.1	72.7	38.5
	08:10:00	66.6	47.0	61.3	73.7	44.1
	08:15:00	67.2	45.0	62.8	77.9	42.8
	08:20:00	66.3	47.2	61.8	74.2	42.8
	08:25:00	65.7	43.9	61.4	72.7	40.1
	08:30:00	66.5	54.1	63.4	75.3	48.3
	08:35:00	66.6	50.9	61.9	72.7	48.4
	08:40:00	65.0	48.1	60.6	72.2	45.1
	08:45:00	65.7	46.1	62.1	76.7	41.7
	08:50:00	65.5	46.5	61.2	79.0	43.7
	08:55:00	67.9	44.3	63.9	77.8	40.8
	09:00:00	66.2	44.5	61.4	73.1	38.6
	09:05:00	65.5	43.7	60.4	72.2	40.8
	09:10:00	65.2	43.8	60.5	71.3	39.0
	09:15:00	64.7	45.5	59.9	68.7	40.5
	09:20:00	66.0	46.3	62.0	72.6	41.5
	09:25:00	67.2	50.6	63.5	77.7	42.3
	09:30:00	64.4	40.7	59.5	71.0	38.4
	09:35:00	66.0	43.5	61.3	73.2	39.5
	09:40:00	65.3	47.8	60.7	72.6	40.2
	09:45:00	64.7	46.2	59.7	69.7	43.8

Appendix B6	Title: Noise survey results

Measurement location A - Adjacent to 50 Nanny Marr Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
24.7.14	09:50:00	66.9	49.0	62.3	71.7	40.8
	09:55:00	65.6	46.2	60.6	70.9	43.6
	10:00:00	64.7	43.1	59.6	71.1	41.0
	10:05:00	63.6	42.8	58.7	71.7	40.9
	10:10:00	65.0	44.2	60.1	69.7	40.0
	10:15:00	65.1	42.3	60.3	72.1	39.7
	10:20:00	65.7	45.0	60.4	70.3	41.8
	10:25:00	65.8	46.1	62.2	78.0	42.7
	10:30:00	64.8	43.5	60.9	76.2	41.3
	10:35:00	64.6	43.6	60.0	72.1	41.4
	10:40:00	65.1	47.7	60.6	72.5	42.7
	10:45:00	66.1	43.3	60.9	71.9	41.3
	10:50:00	65.3	43.6	62.5	80.5	40.5
	10:55:00	64.9	41.0	59.9	69.8	38.6
	11:00:00	65.1	45.3	60.5	69.6	41.7
	11:05:00	64.9	43.1	60.0	73.5	40.2
	11:10:00	65.6	45.5	61.3	71.5	41.7
	11:15:00	65.2	44.6	61.1	73.5	41.9
	11:20:00	65.4	45.5	61.0	71.2	41.6
	11:25:00	64.9	44.1	60.0	70.7	41.2
	11:30:00	63.8	54.6	61.3	66.8	52.7

Appendix B7	Title: Noise survey results

Measurement location B - Barnsley Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
23.7.14	17:00:00	58.4	48.0	56.8	75.3	44.9
	17:05:00	57.2	47.6	55.8	76.5	45.7
	17:10:00	52.3	46.0	51.2	66.9	44.1
	17:15:00	55.4	48.1	53.9	68.9	44.9
	17:20:00	55.3	48.3	53.8	71.9	45.6
	17:25:00	54.2	47.0	53.2	67.9	45.0
	17:30:00	58.9	47.3	58.6	74.9	44.4
	17:35:00	56.0	47.4	54.8	72.9	43.4
	17:40:00	54.6	45.8	52.9	68.6	42.9
	17:45:00	57.5	47.5	56.1	72.2	45.8
	17:50:00	56.4	47.2	53.7	66.5	43.7
	17:55:00	56.2	47.3	55.9	76.2	44.0
	18:00:00	56.0	47.2	53.9	68.1	44.1
	18:05:00	54.5	47.2	53.5	67.7	44.5
	18:10:00	53.6	46.7	51.6	65.6	43.1
	18:15:00	55.5	45.2	56.6	74.3	42.4
	18:20:00	55.3	47.0	52.8	67.5	44.6
	18:25:00	58.8	46.5	57.6	74.3	43.7
	18:30:00	68.0	46.2	66.9	82.1	43.5
	18:35:00	52.2	45.0	50.6	65.0	43.3
	18:40:00	54.3	45.4	53.6	70.9	43.4
	18:45:00	54.3	47.1	52.1	65.6	43.9
	18:50:00	51.0	45.4	50.8	71.2	43.5
	18:55:00	53.5	44.7	54.2	74.0	41.9
	19:00:00	54.6	45.3	52.9	70.1	41.8
	19:05:00	55.6	46.0	57.1	75.9	43.9
	19:10:00	51.9	44.2	50.6	66.5	41.4
	19:15:00	51.3	44.4	51.1	67.8	43.0
	19:20:00	50.8	44.1	49.0	65.2	42.0
	19:25:00	51.7	43.5	50.2	67.8	40.9
	19:30:00	54.2	43.9	52.2	67.7	41.3
	19:35:00	54.2	43.6	52.6	67.7	41.0
	19:40:00	50.9	43.6	49.6	67.6	40.5
	19:45:00	50.1	44.1	51.1	71.1	41.6
	19:50:00	50.6	43.3	51.3	71.0	41.2
	19:55:00	52.1	43.8	51.5	72.1	42.2
	20:00:00	58.3	44.9	56.9	76.8	41.7
	20:05:00	49.9	42.2	52.0	75.2	39.8
	20:10:00	50.4	42.8	51.7	71.7	40.5
	20:15:00	49.7	42.0	47.8	63.3	40.2
	20:20:00	50.1	41.7	50.8	69.0	39.7
	20:25:00	53.2	43.4	51.3	70.8	40.6
	20:30:00	51.8	42.0	51.2	71.3	39.5
	20:35:00	50.9	41.3	47.6	58.7	39.6
	20:40:00	51.8	41.9	50.6	69.3	39.9
	20:45:00	51.7	42.6	50.9	69.1	40.9
	20:50:00	53.9	40.6	52.5	71.0	38.5
	20:55:00	52.8	41.8	50.2	68.1	40.1

Appendix B8	Title: Noise survey results

Measurement location B - Barnsley Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
23.7.14	21:00:00	53.7	42.5	52.7	71.2	40.0
	21:05:00	52.5	42.4	56.7	83.3	39.6
	21:10:00	52.7	42.9	51.9	69.2	40.4
	21:15:00	53.4	43.6	57.0	83.2	40.6
	21:20:00	54.3	41.3	53.5	72.8	38.1
	21:25:00	49.5	40.3	47.8	66.0	38.1
	21:30:00	51.2	41.2	50.5	71.1	38.1
	21:35:00	53.7	42.3	54.0	75.0	39.5
	21:40:00	53.5	41.4	52.6	71.8	39.1
	21:45:00	49.0	40.9	49.6	69.5	39.1
	21:50:00	50.9	41.7	50.4	66.9	38.4
	21:55:00	47.6	40.5	50.0	71.4	38.6
	22:00:00	50.6	39.5	51.9	71.0	36.8
	22:05:00	52.4	41.6	52.1	72.2	39.5
	22:10:00	48.6	40.1	49.3	68.5	37.3
	22:15:00	47.7	38.8	44.3	57.7	37.0
	22:20:00	46.3	38.8	43.3	54.2	35.0
	22:25:00	49.6	39.0	50.0	68.8	36.6
	22:30:00	50.3	39.1	48.4	64.8	36.4
	22:35:00	51.3	38.5	51.1	71.9	34.9
	22:40:00	49.3	40.1	50.8	71.6	37.2
	22:45:00	50.9	37.0	50.0	67.6	34.2
	22:50:00	50.7	35.3	49.2	68.1	33.4
	22:55:00	49.2	36.4	47.3	64.7	32.6
	23:00:00	47.0	36.5	43.5	55.0	33.8
	23:05:00	47.1	40.1	44.1	56.2	38.2
	23:10:00	42.4	34.7	39.6	51.1	32.8
	23:15:00	46.6	36.5	44.7	61.6	34.5
	23:20:00	43.4	34.5	40.5	56.2	32.8
	23:25:00	42.2	34.2	38.5	45.2	32.2
	23:30:00	39.8	33.9	37.5	44.9	31.9
	23:35:00	41.3	32.8	38.1	49.7	30.5
	23:40:00	37.9	30.1	35.2	45.0	27.6
	23:45:00	43.5	32.0	42.8	62.8	28.5
	23:50:00	46.0	32.3	42.8	59.5	30.0
	23:55:00	40.3	33.4	37.7	46.2	31.6
24.7.14	00:00:00	39.3	34.1	37.3	55.0	31.1
	00:05:00	41.5	34.3	38.3	48.4	32.4
	00:10:00	41.9	32.0	39.6	59.2	30.4
	00:15:00	49.2	32.6	44.7	57.4	30.4
	00:20:00	40.0	33.0	37.1	49.6	31.4
	00:25:00	46.1	32.8	44.8	62.3	30.7
	00:30:00	41.4	31.9	38.2	52.4	30.0
	00:35:00	40.0	31.8	37.0	48.5	29.5
	00:40:00	40.8	32.1	39.0	55.5	30.1
	00:45:00	39.1	31.8	36.1	43.1	29.0
	00:50:00	40.1	33.3	37.6	46.9	31.3
	00:55:00	40.7	32.0	45.0	68.7	30.5

Appendix B9	Title: Noise survey results

Measurement location B - Barnsley Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
24.7.14	01:00:00	41.8	31.3	38.6	50.4	28.7
	01:05:00	37.1	32.0	35.0	42.7	28.8
	01:10:00	38.8	29.9	40.9	61.1	28.4
	01:15:00	38.5	31.1	37.3	51.4	29.5
	01:20:00	42.8	33.8	39.8	53.8	32.1
	01:25:00	38.4	31.2	36.1	54.4	29.7
	01:30:00	40.3	31.6	37.3	52.3	29.9
	01:35:00	35.8	29.7	33.9	45.9	28.2
	01:40:00	54.1	31.5	51.0	67.1	29.3
	01:45:00	36.6	31.2	34.0	45.6	29.6
	01:50:00	40.0	31.1	37.1	53.4	29.9
	01:55:00	38.3	32.2	35.9	42.8	30.6
	02:00:00	37.2	32.2	34.9	43.6	29.6
	02:05:00	44.5	33.3	39.9	52.0	31.8
	02:10:00	43.0	33.5	39.6	50.4	31.7
	02:15:00	37.4	32.6	35.5	44.4	30.4
	02:20:00	40.9	34.5	38.9	54.8	31.9
	02:25:00	36.1	30.6	33.6	41.5	28.7
	02:30:00	39.0	31.1	35.8	44.4	28.5
	02:35:00	46.6	34.9	42.3	54.3	31.2
	02:40:00	43.9	30.7	39.0	52.8	28.6
	02:45:00	38.3	30.0	35.2	44.3	28.7
	02:50:00	40.0	31.4	37.6	50.4	29.6
	02:55:00	42.3	34.3	38.9	49.1	31.7
	03:00:00	41.8	33.2	38.7	50.3	31.6
	03:05:00	40.8	31.0	38.0	52.8	28.9
	03:10:00	39.0	30.6	37.3	50.1	28.8
	03:15:00	40.1	30.6	36.2	47.3	28.9
	03:20:00	42.9	32.0	39.7	54.8	30.7
	03:25:00	41.6	31.1	38.6	52.2	29.3
	03:30:00	42.5	30.5	38.2	52.6	29.1
	03:35:00	41.6	32.6	39.0	51.9	30.7
	03:40:00	39.9	33.2	38.6	54.2	31.6
	03:45:00	43.7	34.6	41.1	54.6	32.1
	03:50:00	44.1	34.5	41.2	51.8	31.6
	03:55:00	38.7	32.9	36.7	53.0	31.4
	04:00:00	43.9	36.7	41.3	52.5	34.0
	04:05:00	47.2	36.7	44.1	58.0	34.3
	04:10:00	43.5	36.1	41.2	54.2	34.1
	04:15:00	43.1	36.5	41.5	56.5	33.7
	04:20:00	47.5	39.4	46.6	64.3	36.9
	04:25:00	49.4	38.0	47.7	66.2	34.7
	04:30:00	49.3	39.6	47.1	64.3	37.5
	04:35:00	49.6	39.0	47.2	65.5	36.0
	04:40:00	50.9	41.6	49.1	65.4	39.0
	04:45:00	47.3	40.5	45.0	56.8	37.8
	04:50:00	48.6	41.5	45.6	54.1	38.9
	04:55:00	50.2	41.1	46.7	55.5	37.7

Appendix B10	Title: Noise survey results

Measurement location B - Barnsley Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
24.7.14	05:00:00	48.2	39.4	44.9	56.4	36.8
	05:05:00	49.8	39.1	46.6	63.5	35.5
	05:10:00	48.3	41.5	45.3	54.9	39.0
	05:15:00	51.7	42.5	49.1	68.2	40.4
	05:20:00	49.7	41.1	47.8	66.7	39.0
	05:25:00	50.1	41.6	46.6	56.1	39.4
	05:30:00	57.8	42.8	53.4	70.3	40.6
	05:35:00	63.1	50.0	61.1	78.2	42.2
	05:40:00	51.8	43.8	50.8	67.0	41.4
	05:45:00	54.6	46.3	52.7	69.0	43.6
	05:50:00	49.4	42.3	48.0	65.1	40.0
	05:55:00	50.8	42.7	50.0	69.2	41.4
	06:00:00	50.6	41.2	50.1	69.7	39.9
	06:05:00	51.0	41.6	49.7	66.4	39.9
	06:10:00	51.3	42.1	51.3	69.5	40.3
	06:15:00	51.6	42.2	49.2	68.8	40.6
	06:20:00	53.1	44.3	51.9	69.8	42.6
	06:25:00	51.2	43.6	48.5	57.5	42.0
	06:30:00	49.2	42.5	46.7	52.2	39.9
	06:35:00	53.8	43.2	52.2	71.0	40.1
	06:40:00	51.9	42.8	51.7	72.3	40.6
	06:45:00	55.3	45.3	53.3	71.1	41.5
	06:50:00	53.1	43.4	52.6	72.4	39.9
	06:55:00	53.3	43.3	52.0	68.3	40.8
	07:00:00	53.1	43.3	51.3	66.4	40.8
	07:05:00	54.6	45.8	53.4	69.8	43.5
	07:10:00	54.4	44.2	53.0	70.8	40.5
	07:15:00	51.4	45.7	50.2	68.1	43.4
	07:20:00	57.5	47.4	57.1	73.9	43.5
	07:25:00	54.3	48.4	52.3	64.9	46.5
	07:30:00	53.9	48.0	53.1	69.9	45.8
	07:35:00	63.2	45.5	62.0	78.9	42.8
	07:40:00	56.5	47.7	54.9	70.9	44.6
	07:45:00	52.8	46.8	53.8	72.3	44.8
	07:50:00	55.7	46.5	54.1	69.9	44.0
	07:55:00	56.2	46.6	55.3	70.8	43.9
	08:00:00	56.6	47.3	54.0	68.3	44.1
	08:05:00	57.5	45.9	59.4	79.2	43.4
	08:10:00	57.4	43.7	56.5	74.1	41.1
	08:15:00	52.6	45.5	51.3	65.2	40.0
	08:20:00	54.9	43.7	52.0	70.0	41.5
	08:25:00	52.9	45.1	51.6	68.0	42.9
	08:30:00	52.2	44.6	50.8	64.4	43.3
	08:35:00	57.0	46.8	55.1	71.1	42.7
	08:40:00	54.0	44.2	52.3	68.1	41.7
	08:45:00	53.5	43.9	51.9	69.8	41.8
	08:50:00	52.3	42.3	50.9	68.1	38.9
	08:55:00	52.0	44.1	50.7	66.8	41.9

Appendix B11	Title: Noise survey results

Measurement location B - Barnsley Road

Date	Sample start time	Noise Parameter - dB				
		L_{A10}	L_{A90}	L_{Aeq}	L_{AFmax}	L_{AFmin}
24.7.14	09:00:00	54.5	44.4	52.0	66.5	40.8
	09:05:00	53.6	46.0	52.4	70.6	44.1
	09:10:00	58.0	45.4	54.4	69.8	43.8
	09:15:00	54.0	44.7	52.1	68.3	42.6
	09:20:00	57.3	44.9	53.8	68.1	42.2
	09:25:00	57.0	44.3	53.8	68.4	41.1
	09:30:00	54.3	43.8	51.6	66.5	41.6
	09:35:00	51.3	45.4	50.6	66.7	42.7
	09:40:00	54.4	46.5	51.6	64.2	42.9
	09:45:00	52.2	43.3	50.2	67.7	42.0
	09:50:00	55.8	45.4	52.6	68.5	43.2
	09:55:00	54.8	45.4	52.6	67.4	42.5
	10:00:00	52.1	44.3	49.9	64.8	42.0
	10:05:00	56.9	44.3	56.0	75.3	41.3
	10:10:00	56.9	44.4	57.6	82.0	42.2
	10:15:00	52.0	44.0	50.8	68.3	41.7
	10:20:00	53.3	44.8	50.9	67.7	41.8
	10:25:00	53.9	45.3	51.9	67.9	43.2
	10:30:00	54.3	45.5	52.2	67.3	43.7
	10:35:00	53.7	45.1	52.3	70.5	43.4
	10:40:00	56.0	42.4	52.8	67.0	40.3

APPENDIX C

SCREENING CALCULATIONS

Appendix C: Screening calculations

Appendix C1

BASIC BARRIER ATTENUATION

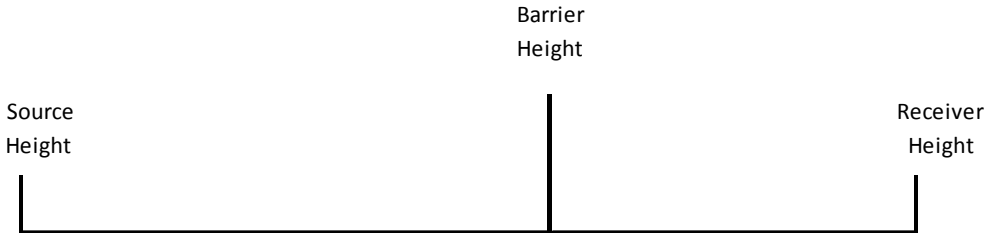
(based on Maekawa or CRTN)

Receptor: **4 Snape Hill Road**

Project: **All Saints Park, Nanny Marry Road, Darfield**

Source: **Delivery activity: arrival and departure**

Receiver: **4 Snape Hill Road**



Source-to-Barrier Distance	23.0 m
Receiver-to-Barrier Distance	27.0 m

Source Height	1.0 m
Receiver Height	4.5 m
Barrier Height	5.6 m

Path difference = 0.356 m

Frequency - Hz	63	125	250	500	1K	2K	4K	8K	CRTN
Attenuation - dB	**7.5**	**9.1**	**11.3**	**13.8**	**16.5**	**19.3**	**22.3**	**25.2**	**12.2 dBA**

Appendix C2

BASIC BARRIER ATTENUATION

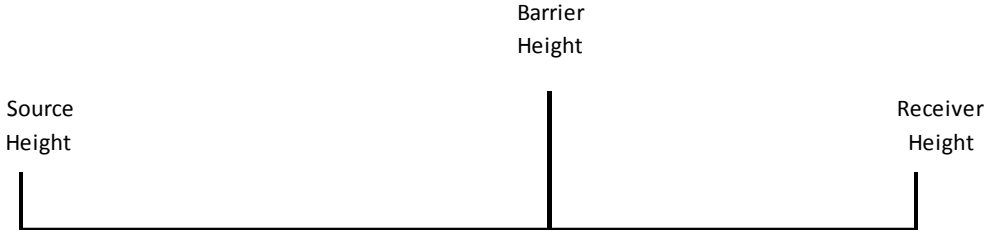
(based on Maekawa or CRTN)

Receptor: **4 Snape Hill Road**

Project: **All Saints Park, Nanny Marry Road, Darfield**

Source: **Delivery activity: unloading**

Receiver: **4 Snape Hill Road**



Source-to-Barrier Distance	7.0 m
Receiver-to-Barrier Distance	28.0 m

Source Height	1.5 m
Receiver Height	4.5 m
Barrier Height	5.6 m

Path difference = 1.006 m

Frequency - Hz	63	125	250	500	1K	2K	4K	8K	CRTN
Attenuation - dB	**10.2**	**12.5**	**15.1**	**17.9**	**20.8**	**23.8**	**26.7**	**29.7**	**15.4 dBA**

Appendix C: Screening calculations

Appendix C3

BASIC BARRIER ATTENUATION

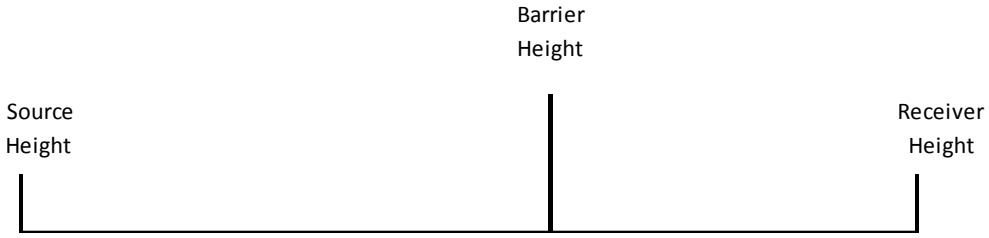
(based on Maekawa or CRTN)

Receptor: **4 Church Street**

Project: **All Saints Park, Nanny Marry Road, Darfield**

Source: **Delivery activity: arrival and departure**

Receiver: **4 Church Street**



Source-to-Barrier Distance	29.0 m
Receiver-to-Barrier Distance	41.0 m

Source Height	1.0 m
Receiver Height	4.5 m
Barrier Height	3.0 m

Path difference = 0.009 m

Frequency - Hz	63	125	250	500	1K	2K	4K	8K	CRTN
Attenuation - dB	**4.9**	**5.0**	**5.1**	**5.5**	**6.1**	**7.0**	**8.5**	**10.5**	**6.3 dBA**

Appendix C4

BASIC BARRIER ATTENUATION

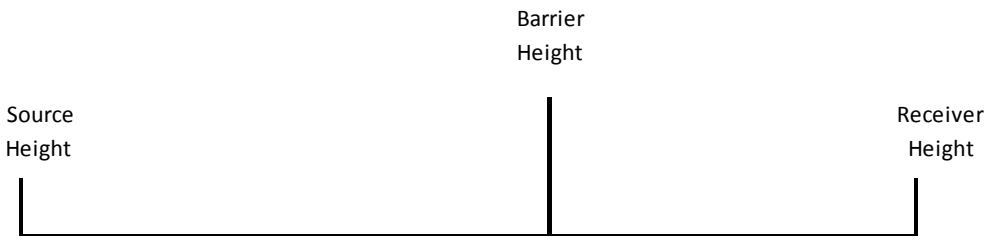
(based on Maekawa or CRTN)

Receptor: **4 Church Street**

Project: **All Saints Park, Nanny Marry Road, Darfield**

Source: **Delivery activity: unloading**

Receiver: **4 Church Street**



Source-to-Barrier Distance	14.0 m
Receiver-to-Barrier Distance	41.0 m

Source Height	1.5 m
Receiver Height	4.5 m
Barrier Height	3.0 m

Path difference = 0.026 m

Frequency - Hz	63	125	250	500	1K	2K	4K	8K	CRTN
Attenuation - dB	**5.0**	**5.3**	**5.7**	**6.5**	**7.8**	**9.6**	**11.8**	**14.3**	**7.4 dBA**

APPENDIX D

ACOUSTIC TERMINOLOGY

Appendix D: Acoustic Terminology

1. Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sound is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. 50 dB + 50 dB = 53 dB. A 10 dB increase in sound is perceived as a doubling of loudness.

2. Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz = 1 cycle/second. The range of frequencies audible to the human ear is around 20 Hz to 18000 Hz (or 18 kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.

3. To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability to automatically weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).

4. The second important characteristic of sound is amplitude or level. Two units are used to express level a) sound power level - Lw, and b) sound pressure level - Lp. Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity etc. The sound level that is measured on a meter is the sound pressure level, Lp.

5. External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to difference noises has been found to vary dependent on its temporal distribution (i.e. its variation with time). For this reason, a set of statistical indices have been developed.

6. There are four main statistical indices in use in the UK:

   L_{A90} The sound level (in dBA) exceeded for 90% of the time. This unit gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background noise level" of an area.

   L_{AeqT} The equivalent continuous sound level over a period of time, T. this unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the varying noise in question" (In other words, the energy average level). This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as road traffic, aircraft and trains.

   L_{A10} The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.

   L_{AMAX} The maximum level of sound, i.e. the peak level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.