

SHARPS REDMORE

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Report

Environmental Noise Assessment

Meadway, Tilehurst, Reading

Prepared by

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Project No 1818299

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This report has been prepared with all reasonable skill, care and diligence commensurate with an acoustic consultancy practice under the terms and brief agreed with our client at that time. Sharps Redmore provides no duty or responsibility whatsoever to any third party who relies upon its content, recommendations or conclusions.

1.0 Introduction

- 1.1 Sharps Redmore (SR) has been instructed to carry out an environmental noise assessment for the redevelopment of the Meadway Shopping Parade in Tilehurst, Reading. The site location is shown in Figure 1 below:

FIGURE 1: Site Location



- 1.2 The site is located fronting Honey End Lane, immediately to the south of Tilehurst Road and to the west of Prospect Park. The site forms part of the Meadway District Centre which consists of two halves. The northern part of the centre, the application site, is a purpose-built precinct opened in 1967, containing retail, takeaway and community uses and 27 flats above the shops. The precinct is surrounded by car parking. The site is bounded by Honey End Lane to the east, flats in Victory Close to the north, the rear gardens of the houses in Stoneham Close to the west, with the Asda superstore to the south.
- 1.3 Sharps Redmore has previously prepared a noise assessment for the redevelopment of the retail elements of the site, including partial demolition and refurbishment of the existing retail units and an extension to the existing precinct to create new retail units. Planning permission¹ was granted for the redevelopment subject to planning conditions, including the following in relation to potential noise impact.

Condition 33 – Noise generated by new plant associated with the development hereby approved shall not exceed a level of 10dB below the existing background noise levels of 48 dB LA90,15mins between 07:00 and 19:00 hrs, 40 dB LA90,15mins between 19:00 and 23:00 hrs and 38 dB LA,15min between 23:00 and 07:00 hours at the nearest noise sensitive receptor, as measured in accordance with BS 4142:2014.

¹ Planning Permission Reference 150945 – Redevelopment of Meadway Precinct including partial demolition, refurbishment of existing retail units including creation of additional floor space through extending existing premises, new shop fronts to extended units, extension to existing precinct to create new retail units within use classes A1, A2, A3, A4, and A5, laying out of new car park, new servicing arrangements, bins stores, engineering operations including re-profiling of rear of the site and landscaping, relocation of public toilets to within precinct.

Condition 34 – No deliveries to, collections from, or any other associated vehicle movements shall take place within the site between the hours of 2200 and 0800 Monday to Saturday and 1800 to 1000 hrs on Sundays and Bank Holidays.

Condition 35 – No uses hereby permitted within Classes A3, A4 or A5 shall be used outside the hours of 0800 to 2300 at any time.

- 1.4 Outline planning permission is now being sought to create a district centre, with ancillary and support uses complimenting the previously consented retail centre with a new residential community.
- 1.5 The purpose of this report is therefore to determine the impact of noise on the proposed residential units and impact of noise from the proposed development on the existing and new residential properties. This report takes into account national and local policy aims and has regard to relevant noise guidance.
- 1.6 Section 2.0 of this report contains a discussion of the available methods of assessment and assessment criteria.
- 1.7 Section 3.0 of this report presents details of existing baseline conditions. An assessment of the impact of noise on the proposed residential properties is presented in section 4. The impact of noise from the proposed development is considered in section 5.
- 1.8 A guide to the acoustic terminology used in this report is shown in Appendix B.

2.0 Assessment Methodology and Criteria

National Policy

- 2.1 The National Planning Policy Framework (NPPF), February 2019, sets out the Government's planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 180 of the NPPF states the following:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation".*

- 2.2 Guidance on the interpretation of the policy aims contained within the NPPF is contained within National Planning Practice Guidance (NPPG). The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

TABLE 1: Noise Exposure Hierarchy

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

- 2.3 The NPPF and NPPG reinforce 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.”*

- 2.4 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.”

Local Policy

- 2.5 With regard to the local policy regard is had Policy CS34 of the Reading Borough LDF Core Strategy 2008 (Altered 2015) and Policy DM 4 of the Sites and Detailed Policies Document 2012 (altered 2015). In the terms of the noise the policies state the following:

Policy CS34

“Development will only be permitted where it would not be damaging to the environment through air, land, noise or light pollution.”

“Proposals for development that are sensitive to the effects of air, noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.”

Policy DM4

“Development will not cause significant detrimental impact to the living environment of existing or new residential properties, in terms of:

noise and disturbance;”

- 2.6 It is clear from both the national and local policy aims that the fact a noise can be heard is not reason to refuse planning permission. Regard should be made to level of impact and the mitigation measures available to reduce noise.

Design Guidance

- 2.7 Neither national nor local policy contains any technical advice on acceptable noise levels. However 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, these are discussed below:

Proposed Residential Units

- 2.8 The current nationally recommended internal noise levels for dwellings are given in BS 8233:2014 'Guidance on Sound Insulation & Noise Reduction for Buildings'. BS 8233 recommends the following internal noise standards:

TABLE 2

BS 8233:2014 Table 4 – Indoor ambient noise levels for dwellings			
Activity	Location	0700 to 2300	2300 to 0700
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

- 2.9 There is no longer a L_{AMAX} standard for bedrooms in BS 8233. However, footnote 4 to Table 4 states that *“Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.”* In this case, it is proposed that the previous BS 8233 internal standard (also referenced in World Health Organisation Guidelines for Community Noise) is applied. This is 45 dB L_{AMAX} , inside bedrooms.

External Areas (Garden and Balconies)

- 2.10 For outdoor areas (i.e. balconies), BS 8233:2014 recommends that “it is desirable that the external noise level does not exceed 50 dB L_{AeqT} , with an upper guideline value of 55 dB L_{AeqT} ” However, the document recognises that these guideline values are not achievable in all circumstances and in higher noise areas, a compromise might be warranted. In such circumstances, development should be designed to achieve the lowest practicable levels in these external amenity spaces.
- 2.11 The Planning Practice Guidance on Noise, published on planningportal.gov.uk, gives further consideration relating to mitigating the impact of noise on residential developments and considers that noise may be partially off-set if residents of the dwellings have access to:
- A relatively quiet façade (containing windows to habitable rooms as part of their dwelling;
 - A relatively quiet external amenity space for their sole use such as a balcony which is generally considered as desirable.
 - A relatively quiet nearby external space for use by a number of residents as part of the amenity of their dwellings, and/or;
 - A relatively quiet external, publicly accessible amenity space that is nearby (e.g. within a 5 minute walk).

ProPG: Planning and Noise – New Residential Development

- 2.12 The ProPG professional practice guidance on planning and noise has been produced by the Chartered Institute of Environmental Health (CIEH), Institute of Acoustic (IOA) and Association of Noise Consultants (ANC).

2.13 The ProPG recommends a 2 stage approach; an initial assessment which identifies the risk of noise on the proposed planning application, and where the results indicate that noise requires further consideration a full assessment in the form of an Acoustic Design Statement (ADS) which would include four key elements as follows:

- Element 1 – demonstrating a “Good Acoustic Design Process”;
- Element 2 – observing internal “Noise Level Guidelines.”
- Element 3 – Undertaking an “External Amenity Area Noise Assessment”
- Element 4 – Consideration of “Other Relevant Issues.”

2.14 The advice contained within ProPG is based on the policy objectives contained within the NPPF and the objective noise guidelines within BS 8233:2014. However the ProPG does not constitute an official government code of practice.

Impact of commercial/retail units

2.15 With regard to the proposed retail/commercial units regard will be had to the World Health Organisation Community Noise Guideline Values and BS 4142:2014+A1:2019.

WHO Community Noise Guideline Values

2.16 The WHO advice is the most useful, comprehensive, and pertinent advice in this case, because it is not specific to the circumstances of the assessment. Instead, it provides guidance on acceptable limits in, for example, schools, dwellings and offices.

2.17 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, physiological or sociological effect. They are, as defined by NPSE, set at the Lowest Observed Adverse Effect Level (LOAEL), but do not define the level above which effects may be considered significant (SOAEL). Compliance with the LOAEL should, therefore, be seen as a robust aim.

2.18 The WHO LOAEL guideline values are summarised in the following table.

TABLE 3: WHO Guidelines

Value	Guidance	Location
$L_{AeqT} = 55 \text{ dB}$	Few seriously annoyed, Daytime and evening	Continuous noise, outdoor living areas
$L_{AeqT} = 50 \text{ dB}$	Few moderately annoyed, Daytime and evening	Continuous noise, outdoor living areas
$L_{AeqT} = 35 \text{ dB}$	Acceptable level to avoid speech disturbance interference, daytime and evening	Continuous noise, dwellings, indoors
$L_{AeqT} = 45 \text{ dB}$	To avoid sleep disturbance, window open at night	Continuous noise, outside bedrooms, outdoor values
$L_{AeqT} = 30 \text{ dB}$	To avoid sleep disturbance	Continuous noise, bedrooms, indoors
$L_{Amax} = 60 \text{ dB}$	To avoid sleep disturbance, window open at night	Noise peaks, outside bedrooms, outdoor values
$L_{Amax} = 45 \text{ dB}$	To avoid sleep disturbance at night	Noise peaks, bedrooms, indoors

2.19 For L_{AeqT} criteria the time base (T) given in the document is 16 hours for daytime limits and 8 hours for night time limits. When assessing impact from commercial developments, 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 but is reflective of the actual duration of the delivery process.

BS 4142:2011+A1:2019

2.20 This method describes a method for rating and assessing sound of industrial and/or commercial nature. It is clear from the scope of the standard that it should not be used for the assessment of recreational activities and people. Therefore in terms of the application its use is limited to the assessment of any new mechanical services plant using the following summary process:

- i) Determine the background sound levels, in terms of L_{A90} , at the receptor locations of interest.
- ii) Determine the specific sound level of the source being assessed, in terms of L_{AeqT} level (T = 1 hour for day or 15 minutes at night), at the receptor locations.
- iii) Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent or other characteristic which attract attention.
- iv) Compare the rating sound level against the background noise level; the greater the difference between the two, the higher the likelihood of complaints of the noise.

- v) Differences (rating – background) of around +10 dB is likely to be an indication of significant adverse impact (SOAEL) depending on context; a difference of +5 dB is likely to be an indication of adverse impact, depending on context. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon context.

- 2.21 It is therefore entirely possible that whilst the numerical outcome of a BS 4142 assessment is indicative of adverse or even significant adverse impact, when the proposal is considered in context the significance of the impact is reduced to an acceptable level.
- 2.22 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' (NPPF para 123). BS 4142:2014 considers that the threshold of 'significant adverse impact' is likely to be around 10 dB or more... depending on upon the context. However it is clear from condition 33 of the extant planning consent that Reading Borough Council recommends that noise levels from new plant should be at least 10 dB below the existing background level.

3.0 Survey Details

- 3.1 Sharps Redmore has previously carried out a survey of existing noise levels at the site in 2015 in relation to the extant planning consent. To update this survey to take into account the proposed residential development a further survey was carried out between the 30th April and 1st May 2019. Measurements were carried out at three locations as shown in Figure 2 and described in Table 4 below:

FIGURE 2: Monitoring Locations



TABLE 4: Noise Monitoring Locations

Reference	Description	Equipment Used
NL 1	Unattended measurements carried out at the edge of the existing car park. Microphone positioned on a tri-pod approx. 1.5m above ground in free field conditions. SLM set up to record noise levels at 15 min intervals between 1615 hrs and 1030 hours	Norsonic type 118 sound level meter Norsonic Calibrator 1251 Norsonic Microphone 40AF
NL 2	Located on the northern boundary of the site adjacent to residential apartments in Victoria Road. Microphone fixed on a pole approx. 3m above ground level in free-field conditions. SLM set up to record noise levels at 15 min intervals between 1600 hrs and 1000 hrs.	Norsonic type 140 sound level meter Norsonic Calibrator 1251 Norsonic Microphone 40AF
NL3	Attended measurements recorded over a 3 hour period in accordance with the shortened measurement procedure in CRTN ²	Norsonic type 140 sound level meter Norsonic Calibrator 1251 Norsonic Microphone 40AF

² Calculation of Road Traffic Noise 1988

- 3.2 Measurements at NL 3 were specifically over a 3 hour period allowing for an assessment of the $L_{A10,18hr}$ level, in accordance with the “shortened measurement” procedure incorporated in “Calculation of Road Traffic Noise (CRTN),”

The $L_{A10,18hr}$ noise level is calculated as:

$$L_{A10,18hr} = \text{Average } L_{A10(3\text{hours})} - 1 \text{ dB}$$

- 3.3 This can be converted to a $L_{Aeq,18hr}$ level by subtracting 3 dB, and then into a $L_{Aeq,16hr}$ as per the guidance in BS 8233:2014 by adding 1 dB.

$$L_{Aeq16hr(\text{free field})} = L_{A10,18hr} - 3 \text{ dB} + 1 \text{ dB.}$$

- 3.4 Full details of the survey are shown in the Appendix A to this report however based on survey results the measured noise levels at the front and rear of the site has been determined as shown in Table 5 below:

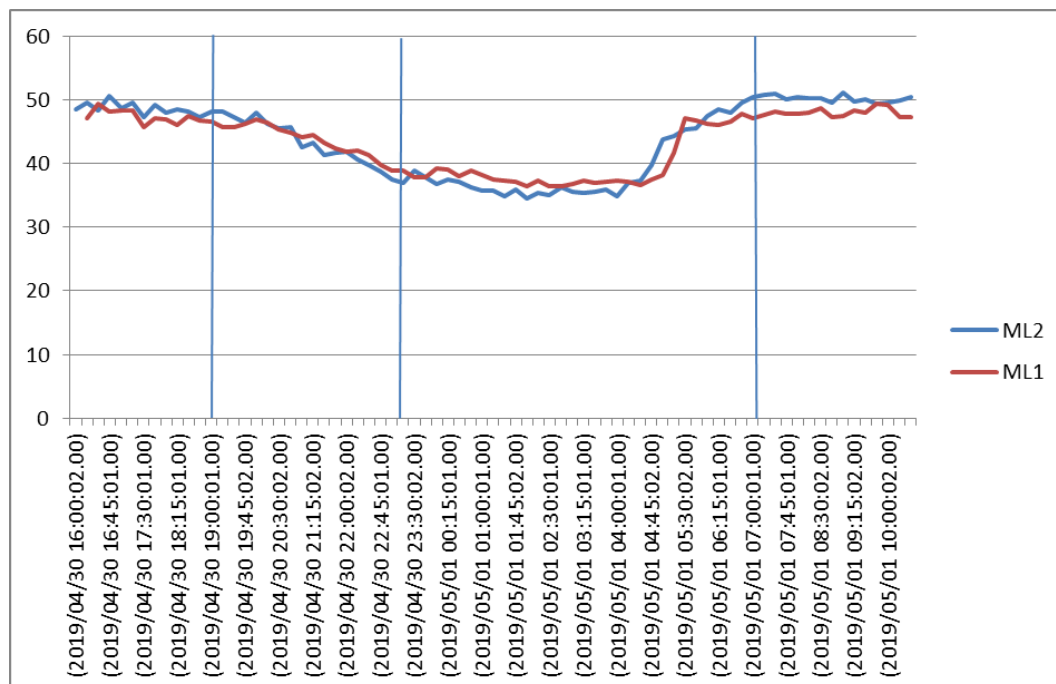
TABLE 5: Calculated Noise Levels (dB)

	Location	
	Front of site	Rear of site
Day time $L_{Aeq16hr}$	60 dB	52 dB
Night time $L_{Aeq16hr}$	54 dB	49 dB
Night time L_{Amax}	65 – 72 dB	62 dB

Background Noise levels

- 3.5 Measured background noise levels at each location are shown in Figure 3 below:

FIGURE 3: Measured Background $L_{A90,15min}$ noise levels

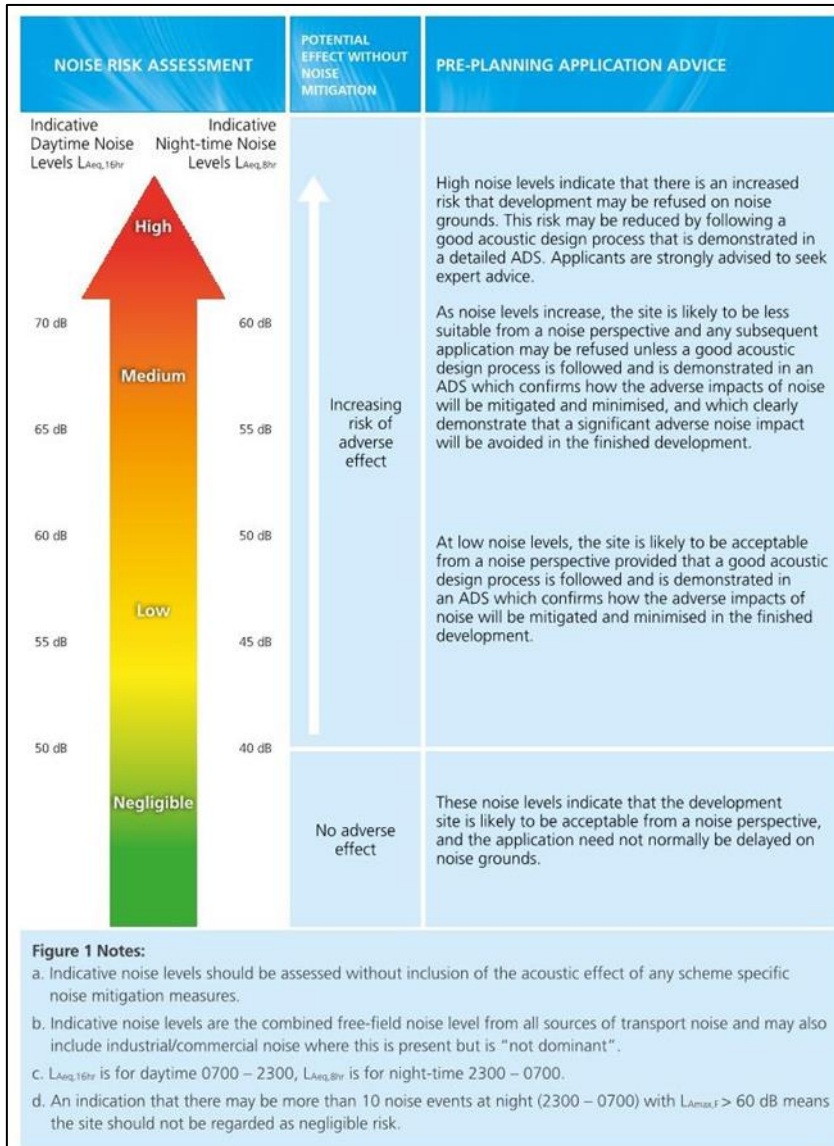


- 3.6 Measured background noise levels are consistent with those measured in 2015 as referred to in Condition 33 of the extant planning consent.

4.0 Noise Assessment – Proposed Residential

Impact of road traffic noise

- 4.1 To determine the suitability of the site for residential use an initial assessment has been carried out in accordance with the Professional Practice Guidance (ProPG).
- 4.2 This initial assessment does not include the impact of any mitigation measures that have been incorporated into the design of the project but is intended to give an indication as to the extent of the acoustic issues that will be faced. Using the ProPG Figure 1 shown below based on survey results (as shown in Table 5) there will be low/medium risk to the residential properties closest to and facing Honey End Lane and a low risk for all remaining properties.



- 4.3 As the application is for outline consent only, it is not possible to carry out a detailed noise assessment at this stage. However the properties will be designed to achieve the internal noise levels within BS 8233:2014.

Internal Noise Levels

- 4.4 Glazing is often specified using an R_w value which would typically be around 6 dB³ higher than the outside to inside noise levels reductions quoted. Therefore the window (glazing, frame and seals) requirements will be in the region of $R_w = 23 - 31$ dB for all windows. This performance can be achieved through the use of standard thermal double glazing which would be fitted as standard in all properties.
- 4.5 Of primary concern at night are maximum noise levels from road traffic on Honey End Lane. Based on noise data measured at NL 3 the maximum noise level from vehicles passing is between 65 – 72 dB. To achieve the suggested internal criteria of 45 dB L_{Amax} may require the installation of acoustic windows to bedrooms facing Honey End Lane.
- 4.6 To achieve the internal noise levels it will be necessary to have windows closed, therefore alternative means of ventilation should be provided through the use of acoustic trickle vents or acoustic wall vents. The vents should be designed not to reduce the acoustic performance of the façade when considered as whole.
- 4.7 Details of the mitigation measures can be secured through a suitably worded planning condition.

External Amenity Areas

- 4.8 The concept design based on the previously agreed (retail) consent has two distinct courtyards, a public realm square fronting the reconfigures retail and an amenity courtyard over the parking serving the residents to the west.
- 4.9 Both these areas will be screened from road traffic noise by the buildings fronting onto Honey End Lane. This will significantly reduce noise in these areas resulting in noise levels below the recommended criteria in BS 8233:2014.
- 4.10 Taking into account the design of the development and the mitigation measures that can be included as part of the building envelope to control noise it is concluded that noise from road traffic will not cause an adverse impact to future residents in line with the policy aims of the NPPF.

Noise from proposed commercial/retail

- 4.11 The development includes residential units above and adjacent to commercial/retail premises. It is assumed that the conditions that were imposed by the local authority in relation to noise from delivery activity, new mechanical services plant will also apply to the new residential properties. This will ensure that noise from these sources will not cause significant impact to proposed residents.

³ 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.

- 4.12 In addition to the assessment of air-borne noise there also needs to be consideration of the flanking noise path commercial premises which share party walls or floor within any residential properties. Similar considerations will need to be given to noise from the residents car park.
- 4.13 The critical aspects of the recommended measures to control flanking noise are installation of elements of mass to the walls and columns (plasterboard) and separation of these elements of mass from the building structure (independent lining). This will depend on use of the retail units and layout of the residential apartments and cannot be carried out at the outline planning stage.
- 4.14 The impact of structure borne noise can be considered at the detailed design stage which can be secured through a suitably worded planning condition.

Noise from Asda Superstore

- 4.15 The existing Asda superstore trades from 0600 – 2300 hours (Monday to Saturday) and 1000 – 1600 (Sundays). Deliveries to the store are received by a partially enclosed service area which accessed off Honey End Lane. In terms of potential noise to the new residential units the main impact will be from car parking activity.
- 4.16 The nearest noise sensitive properties to the car park at the town houses and residential apartments which will be constructed in the south west corner of the site. These properties are approx. 5m from the nearest spaces.
- 4.17 Surveys of noise levels at the boundaries of retail store car parks have shown that levels range from $L_{Aeq,1hr} = 43$ dB to 48 dB at a distance of 10 metres. The baseline noise value of $L_{Aeq\ 1\ hour} = 48$ dB is considered a robust (worse case) baseline maxima to apply to peak trading hours, whilst the lower value of 43 dB $L_{Aeq\ 1\ hour}$ is appropriate to use to assess off peak trading conditions.
- 4.18 This baseline noise source data is considered to be robust for use in assessing car parking noise as it includes all sources of noise including cars pulling into the car park, manoeuvring into parking spaces, customer activity in the car park, loading of shopping, door slams and vehicle departures.
- 4.19 Taking into account the distance attenuation the predicted noise levels from car parking activity at the nearest residential properties will be 54 dB L_{Aeq1hr} during peak hours and 49 dB L_{Aeq1hr} during off-peak times.
- 4.20 Predicted noise levels will be below the daytime guideline values. Whilst the night time guideline values will be exceeded this is based on cars parking in the closest spaces to the residential units, which are furthest away from the store entrance. During off-peak periods people tend to park as close as possible to the store entrance and therefore in practice noise levels from car park activity during the period 0600 – 0700 hours will be less than that predicted.
- 4.21 As discussed above all residential properties will be fitted with thermal double glazing as standard and alternative ventilation to enable windows to be kept closed to control noise. These same measures will also protect future residents against noise from car parking activity at the Asda Store.

- 4.22 It is therefore concluded that noise from the existing and proposed commercial/retail premises will not cause significant adverse impact to future residents. Furthermore the proposed residential development will not result in unreasonable restrictions on the operation of any existing commercial premises in the area.

5.0 Noise Assessment – Proposed Retail Centre on Existing Residential Properties

- 5.1 The impact of noise from the redevelopment of the commercial elements of the scheme on the existing residential properties in Stoneham Close and Victoria Close was carried out as part of the noise assessment which accompanied the application for the extant planning consent discussed in section 1.0 of this report.
- 5.2 Based on this assessment planning conditions were imposed by Reading Borough Council setting criteria for any new fixed plant (Condition 33), delivery times (Condition 34) and the hours of operation of any A3, A4, A5 use (Condition 35).
- 5.3 The noise survey carried out showed that there has been no significant changes to the existing noise climate since the extant permission was granted in 2017, it is therefore assumed that the similar conditions would apply to the proposed scheme to control noise from the proposed commercial/retail development.
- 5.4 These conditions will ensure that noise from the proposed commercial/retail units does not cause adverse impact to existing residents in line with the policy aims of the NPPF.

6.0 Summary and Conclusions

- 6.1 Planning permission is being sought for the redevelopment of the Meadway District Centre, Tilehurst, Reading to create a district centre, with ancillary and support uses complimenting the previously consented retail centre with a new residential community.
- 6.2 A noise assessment has been carried out to determine the impact of existing noise (road traffic and commercial noise) on the proposed residential properties and the impact of the proposed retail centre on existing noise sensitive properties.
- 6.3 Based on a survey of existing noise levels and the extant planning consent for the site granted by Reading Borough Council in 2017 the following has been concluded:
- Subject to mitigation measures including the installation of acoustic windows to bedrooms fronting Honey End Lane, and alternative means of ventilation, such as acoustic trickle vents to all rooms, internal noise levels will be within the criteria for residential properties as set in BS 8233:2014.
 - The development has been designed with the amenity spaces screened from road traffic noise as a result noise levels in these areas will be below the criteria for external amenity as set in BS 8233:2014.
 - Noise from adjacent commercial premises will be controlled by planning conditions restricting the operating activities and through the design of the development to control any potential structure borne sound.
 - Noise from car park activity at the adjacent Asda store will not cause significant adverse impact to future residents and as result the development will not result in any unreasonable restrictions on the continued operation of the store.
 - The impact of noise from the proposed retail centre on existing noise sensitive properties will be controlled through the use of planning conditions similar to those imposed on the extant planning consent.
- 6.4 It is therefore concluded that the development will not compromise the Governments' noise policy vision, as stated in the Noise Policy Statement for England and National Planning Policy Framework.

APPENDIX A

SURVEY RESULTS

SURVEY RESULTS NL1 AND NL2

Date	NL1				NL2			
	L _{Aeq}	L _{AfMax}	L _{AfMin}	L _{Af,90}	L _{Aeq}	L _{AfMax}	L _{AFmin}	L _{AF,90}
(2019/04/30 16:15:45.00)	52.3	74.5	44.5	48.1	54.3	65.3	41.9	48.4
(2019/04/30 16:30:00.00)	51.3	65.2	45.6	48.3	55	72.3	42	49.6
(2019/04/30 16:45:00.00)	50.6	61.1	45.8	48.3	54	65.2	42.8	48.3
(2019/04/30 17:00:00.00)	48.5	66.4	41.8	45.6	54.3	62.8	43	50.5
(2019/04/30 17:15:00.00)	53.4	76.3	44.1	47.1	53.8	63	40.4	48.7
(2019/04/30 17:30:00.00)	51.6	69.2	42.6	46.9	54.5	65	42.8	49.5
(2019/04/30 17:45:00.00)	49.6	63.7	41.6	46	54.4	65.7	40.8	47.3
(2019/04/30 18:00:00.00)	50.6	63.4	44	47.4	54.4	70.9	41.5	49.2
(2019/04/30 18:15:00.00)	49.1	56.8	43.1	46.8	54.4	65.2	43.6	48
(2019/04/30 18:30:00.00)	49.8	63.8	44	46.6	54.5	67	44.1	48.5
(2019/04/30 18:44:59.00)	48.2	58.6	43.2	45.7	53.9	63.2	41.8	48.2
(2019/04/30 19:00:00.00)	49.9	68.1	42.1	45.7	53	59.5	42.5	47.3
(2019/04/30 19:15:00.00)	49.2	63.2	42.4	46.2	55.6	78.9	42.7	48.2
(2019/04/30 19:30:00.00)	51.1	64.2	43.2	46.9	53.1	61.3	43.3	48.1
(2019/04/30 19:45:00.00)	49.7	61.7	42.9	46.4	53.7	64	42.5	47.3
(2019/04/30 20:00:00.00)	48.9	60.1	42	45.4	53.4	63.8	41.9	46.4
(2019/04/30 20:15:00.00)	48.3	67.5	39.7	44.8	54.9	68.6	43	47.9
(2019/04/30 20:30:00.00)	47	58.3	41.1	44.1	52.9	71.9	43.3	46.2
(2019/04/30 20:45:00.00)	48.2	65.5	41.6	44.5	52.1	61.9	41.3	45.5
(2019/04/30 21:00:00.00)	46.4	56	39.9	43.2	52.4	67.3	39.6	45.7
(2019/04/30 21:15:00.00)	46.1	63.4	38.1	42.4	50.9	59	37.6	42.5
(2019/04/30 21:30:00.00)	45.9	60.4	38.1	41.9	50.3	60.4	37.8	43.3
(2019/04/30 21:45:00.00)	46.3	64.2	39.8	42.1	50.3	62.1	35.9	41.4
(2019/04/30 21:59:59.00)	45.3	59.8	38.5	41.3	52.4	72.2	38.8	41.6
(2019/04/30 22:15:00.00)	43.8	51.5	38	39.8	50.9	70.2	38.2	41.8
(2019/04/30 22:30:00.00)	43.1	53.4	37	38.8	49	60	37.9	40.7
(2019/04/30 22:45:00.00)	42.7	52.6	36.6	38.9	48.3	58.3	37.6	39.7
(2019/04/30 23:00:00.00)	43.1	62.3	35.4	37.9	48	61.6	36.4	38.7
(2019/04/30 23:15:00.00)	42.3	54.7	35.1	37.9	47.2	62.3	34.2	37.4
(2019/04/30 23:29:59.00)	42.2	49.8	36.7	39.3	47.4	62.1	33.8	37
(2019/04/30 23:44:59.00)	42.9	56	36.9	39.1	46.7	59.8	35.7	38.8
(2019/05/01 00:00:00.00)	41.1	47.5	36.6	38	45.4	57.4	35.6	37.9
(2019/05/01 00:15:00.00)	41.6	50.2	36.9	38.8	45.2	56.3	34.8	36.7
(2019/05/01 00:30:00.00)	40.6	52	36.2	38.1	45.1	59.8	35.2	37.5
(2019/05/01 00:45:00.00)	40	51.4	36.4	37.5	43.9	56.3	35.6	37.2
(2019/05/01 01:00:00.00)	41	52.9	35.8	37.3	40.6	52.4	34.8	36.3
(2019/05/01 01:15:00.00)	42	52.6	35	37.1	42.9	56.2	34	35.8
(2019/05/01 01:30:00.00)	40	54	34.9	36.5	44.5	58.4	33.7	35.7
(2019/05/01 01:45:00.00)	42.2	53.9	35.2	37.3	44.5	59.7	33.4	34.8
(2019/05/01 01:59:59.00)	42.9	57.1	35.5	36.5	44	59.5	33.7	35.9
(2019/05/01 02:15:00.00)	40.3	55.9	35.5	36.5	42.7	56.9	33.2	34.5
(2019/05/01 02:30:00.00)	37.9	45.3	35.4	36.7	40.9	59	34.1	35.4
(2019/05/01 02:45:00.00)	39.4	48.3	36.1	37.3	38.5	54.1	33.5	35.1

Date	NL1				NL2			
	L _{Aeq}	L _{AfMax}	L _{AfMin}	L _{Af,90}	L _{Aeq}	L _{AfMax}	L _{AFmin}	L _{AF,90}
(2019/05/01 03:00:00.00)	40	50.9	35.3	36.9	41.6	57.7	34.5	36.2
(2019/05/01 03:15:00.00)	38.7	49.8	35.8	37.1	43	59.8	33.5	35.6
(2019/05/01 03:30:00.00)	39.8	47.5	36.1	37.3	40	57.8	33.8	35.4
(2019/05/01 03:45:00.00)	40	48.4	36	37.2	42.5	56.5	33.8	35.5
(2019/05/01 04:00:00.00)	38.5	47.6	35.2	36.6	42.7	57.9	34.5	35.9
(2019/05/01 04:15:00.00)	40.2	47.5	35.7	37.4	42.3	58.6	33.2	34.8
(2019/05/01 04:30:00.00)	47.2	58.4	36.2	38.1	46	58.8	33.5	36.9
(2019/05/01 04:45:00.00)	49.7	66.4	37.5	41.7	46	60.4	33.8	37.3
(2019/05/01 05:00:00.00)	55.9	66.5	40.8	47.1	47.4	60.1	36.3	39.8
(2019/05/01 05:15:00.00)	55.5	72.4	43.1	46.8	55.5	73.6	39.1	43.8
(2019/05/01 05:30:00.00)	53.5	78.2	43.4	46.2	50.3	66.8	40.1	44.3
(2019/05/01 05:45:00.00)	51.6	73.4	43.2	46	51.2	65	41.8	45.4
(2019/05/01 05:59:59.00)	57.4	80.1	44.7	46.5	52.6	76.3	43	45.5
(2019/05/01 06:15:00.00)	52.7	68.6	45.1	47.8	52.2	68.6	45.6	47.5
(2019/05/01 06:30:00.00)	53.7	72.6	44.3	47	53.4	62.6	46.2	48.5
(2019/05/01 06:44:59.00)	51.1	72.3	44.7	47.6	54.2	67.6	45.4	47.9
(2019/05/01 07:00:00.00)	52.4	66.7	45	48.1	55.6	73.5	45.8	49.6
(2019/05/01 07:15:00.00)	51.8	75.2	43	47.8	55.7	66.3	46.4	50.4
(2019/05/01 07:30:00.00)	52.2	71.8	44.6	47.7	55.9	64.6	44.6	50.8
(2019/05/01 07:45:00.00)	50.8	62	45.1	48	54.9	65.2	45.9	51
(2019/05/01 08:00:00.00)	64.2	89.6	45.6	48.6	55.4	68.2	46.1	50.1
(2019/05/01 08:15:00.00)	50.1	62.3	44	47.2	57.2	77.5	44.2	50.4
(2019/05/01 08:30:00.00)	50.1	61.1	43.4	47.4	55	64.2	43.2	50.3
(2019/05/01 08:45:00.00)	52.3	68.5	45.2	48.3	55	66	44.3	50.3
(2019/05/01 09:00:00.00)	52.7	69.5	43.6	48	55.9	68.2	43.1	49.6
(2019/05/01 09:15:00.00)	54.1	70.2	47.1	49.4	56.5	75.2	43.3	51.1
(2019/05/01 09:30:00.00)	51.8	62	45.2	49.2	54.8	73.2	43.6	49.7
(2019/05/01 09:44:59.00)	50.7	63.7	41.9	47.3	55.8	69.8	45.2	50.1
(2019/05/01 10:00:00.00)	50.2	65.1	44.1	47.2	57.5	78.8	42.1	49.3
(2019/05/01 10:15:00.00)	51.7	67.4	44.9	47.8	56.2	72.2	43.4	49.6
(2019/05/01 10:30:00.00)	52.5	72.8	43.6	47.7	56.3	75.2	44.4	49.9
(2019/05/01 10:45:00.00)	64.1	97.3	43.8	48	61.7	89.5	43.4	50.4

SURVEY RESULTS NL3

Time Period	Noise Level dB			
	L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}
1300 – 1400 hrs	56	65	64	47
1400 – 1500 hrs	57	70	63	46
1500 – 1600 hrs	57	67	62	51

APPENDIX B

ACOUSTIC TERMINOLOGY

Acoustic Terminology

- B1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds 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. $50 \text{ dB} + 50 \text{ dB} = 53 \text{ dB}$. Increases in continuous sound are perceived in the following manner:

1 dB increase - barely perceptible

3 dB increase - just noticeable

10 dB increase - perceived as twice as loud

- B2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). 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.
- B3 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 automatically to 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).
- B4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - L_w and b) sound pressure level - L_p . 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, L_p .
- B5 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 different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.
- B6 The main noise indices in use in the UK are:

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

L_{Aeq} : The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". 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 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.

$L_{A\text{MAX}}$: The maximum 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.

- B7 In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = $20 \text{ Log} (\text{ratio of distances})$, e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \text{ Log } \frac{160}{10} = 60 - 24 = 36 \text{ dB.}$$