

Technical Note: Throckmorton Wider Site

Project	Throckmorton Wider Site		
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NOISE AND VIBRATION – CONSTRAINTS STUDY

Executive Summary

Main Points for consideration	Findings	Further Details
Is noise a significant constraint?	No	N/A
Is vibration a significant constraint?	No	N/A
Are there masterplan considerations?	Yes	N/A
Is mitigation likely to be required?	Yes	Localised acoustic fencing and uprated ventilation
Is further work required at feasibility stage?	No	N/A
Is further work required to accompany the planning submission?	Yes	Full Noise Impact Assessment

1 Introduction

- 1.1 This statement provides a preliminary noise assessment for a proposed mixed-use development in Throckmorton. Its purpose is to support the promotion of the site through the local plan and to inform the preparation of a masterplan, through identifying noise constraints and opportunities on the site, and the overall site suitability for the proposed uses from a noise perspective.
- 1.2 The following is based on a walkover of the site, undertaken in January 2020, which included short-term noise monitoring of the surrounding roads.

Site Setting

- 1.3 The proposed site is located around Throckmorton Airfield and comprises a number of parcels of land. The wider site currently comprises a mixture of open land, existing commercial/industrial uses and existing residential dwellings. The redline boundary is shown below in **Figure 1.1**.

Figure 1.1: Proposed site location

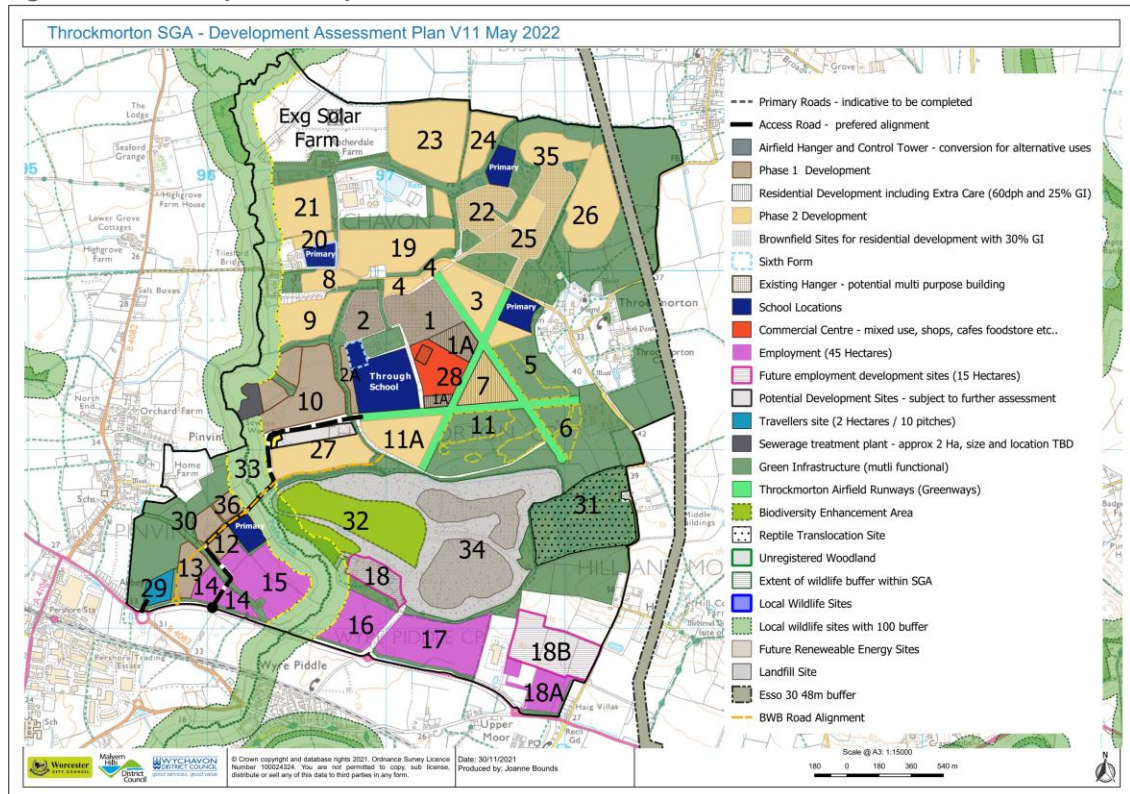


- 1.4 To the north of the airfield lies Long Lane with an existing poultry farm, transport business, and industrial uses beyond. To the east of the airfield, there is Throckmorton Road, an aggregate supplier and Throckmorton shooting ground. To the south of the airfield, there is Pershore Recycling Centre, Sandfield Farms with the A44 beyond. To the southwest of the airfield, lies SMH Fleet Services, UK Plant Services and the premises of a supercar

driving experience. To the west of the airfield, there is an existing poultry farm. There are also a number of existing commercial/industrial uses associated with the existing airfield.

- 1.5 There are a number of existing residential receptors including isolated dwellings and small clusters of houses surrounding the site.
- 1.6 A conceptual masterplan detailing the proposed uses of the site is shown in **Figure 1.2**.

Figure 1.2: Concept Masterplan



2 Relevant Standards and Guidelines

National Planning Policy Framework (NPPF)

- 2.1 Published in 2012, and most recently revised in July 2021¹, this document sets out the Government's planning policies for England. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

"174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

¹ Department for Communities and Local Government (DCLG) (2012); 'The National Planning Policy Framework', TSO

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

2.2 It also makes the following references to noise in the Section entitled *Ground conditions and pollution*:

"185. 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 life⁶⁰;

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.

⁶⁰ See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

BS 8233:2014: Guidance On Sound Insulation and Noise Reduction for Buildings

2.3 This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

2.4 The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings for steady external noise sources. It is stated that it is desirable that the internal ambient noise level does not exceed the following criteria set out in **Table 2.1** overleaf:

Table 2.1: Summary of internal ambient noise levels to be achieved in habitable rooms

Activity	Location	Internal noise level criteria (L _{Aeq,T} , dB)	
		Daytime (07:00 - 23:00hrs)	Night-time (23:00 - 07:00hrs)
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30
Study and work requiring concentration	Executive Office	35 - 40 dB L _{Aeq,T}	N/A
	Staff/meeting room, training room	35 - 45 dB L _{Aeq,T}	
N/A	Open plan office	45 - 50 dB L _{Aeq,T}	

2.5 Whilst BS 8233:2014² recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise³ below.

2.6 With respect to external amenity space such as gardens and patios it is stated that it is desirable that the noise level does not exceed 50 dB L_{Aeq,T}, with an upper guideline value of 55 dB L_{Aeq,T} which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

2.7 The L_{AFmax} criterion in BS8233 is largely concordant with the World Health Organisation (WHO) guidance: 1999: Guidelines for community noise. This document draws upon guidance from Vallet and Vernay, which states:

“For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night”

² British Standards Institution (BSI) (2014); British Standard (BS) 8233 'Sound insulation and noise reduction for buildings', British Standards Institution (BSI)

³ World Health Organisation (WHO) (1999); 'Guidelines for Community Noise', WHO, Geneva

BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

- 2.8 The BS 4142⁴ Standard describes methods for rating and assessing the following:
- Sound from industrial and manufacturing processes;
 - Sound from fixed installations which comprise mechanical and electrical plant and equipment;
 - Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
 - Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.
- 2.9 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The Standard advises the purpose of the methodology includes the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.
- 2.10 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.
- 2.11 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.
- 2.12 Comparing the rating level with the background sound level, BS 4142 states:
- "Typically, the greater this difference, the greater the magnitude of impact.*
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. 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 on the context."*

⁴ BS4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound, BSI

3 Site Walkover

- 3.1 A site walkover has been undertaken to identify the noise sources surrounding the site. In addition, a short-term baseline noise survey has been undertaken to measure noise from road traffic, to allow road traffic noise to be predicted across the site.
- 3.2 There are a number of existing businesses associated with the airfield, in the northern area of the site. However, for the purposes of this assessment, it has been assumed that these would not be operating when the proposals come forward., therefore they have not been considered within the following observations or assessment work.

Northern Area

- 3.3 Noise levels in the northern part of the site, adjacent to the northern boundary of Throckmorton Industrial Park, were noted to be quieter than the southern and central parts of the site. Occasional gunshots associated with the shooting ground were perceived to be audible, together with occasional banging. There was underlying fixed plant noise, which it is assumed was associated with the industrial park or the operations at the waste management facility.
- 3.4 HGV movements were noted along Long Lane from the identified haulage and transportation premises.
- 3.5 During a site walkover in the area of the Poultry Farm, a delivery of animal feed was being undertaken in the vicinity of the sheds. This was a noisy process which was clearly audible against the residual environment.
- 3.6 Onsite observations indicate that there are forklift trucks operating within the premises of Marshall's Transport. These generally have associated alarms, such as reversing beepers, which can be tonal in nature and out of character with the existing noise climate. Furthermore, there will be vehicle movements associated with the premises, although these were not observed during the site walkover. Some form of mitigation is likely to be required to protect the future amenity of any proposed residential receptors in the vicinity of the premises.
- 3.7 Observations undertaken in the vicinity of the anaerobic digestion plant, indicates that it does not generate any significant noise. However, during the site walkover, HGV movements on Long Lane were significant, and therefore this masked any HGV/plant movements at the digestion plant site itself. Therefore, some form of mitigation is likely to be required to protect the future amenity of any proposed residential receptors in the vicinity of the site.

Central Area of the Site

- 3.8 In the centre of the site towards the Waste Management Facility, the noise environment was dominated by the movement of waste and use of heavy machinery at the Hill and

Moor Waste Management Facility. Some of the operations/machinery which were noted to generate high noise levels are labelled on **Figure 1.2**. Occasional bangs could also be heard which subjectively sounded like gunshots, which were presumed to be coming from Throckmorton Shooting Ground, which practices Clay Pigeon Shooting.

Figure 3-2: Operations at Hill and Moor Waste Management Facility



Southern Area of the Site

- 3.9 In the southern portion of the site, onsite observations indicate that the noise environment is dominated by road traffic noise from the A44, which was consistently busy throughout the survey period.
- 3.10 Noise levels generated by the Waste Management Facility were noted to vary considerably based on the operations being undertaken and the location of the equipment in relation to the large bunds on the site. The waste management facility is operated between;
- 08:00 and 18:00 Monday to Friday; and

- 09:00 and 13:30 on Sunday.

3.11 It is understood that operations take place in the western area of the landfill site.

Surrounding area

3.12 There are a number of small businesses surrounding the site, particularly farm buildings which have associated outbuildings, digestors and/or grain dryers. It is considered that localised mitigation, such as acoustic barriers, may be required to reduce noise levels to within acceptable levels. For existing businesses south of the A44, it is considered that noise from the road will dominate the noise levels during the daytime. Consideration will need to be given to any existing noise sources during the night-time. However, it is considered likely that noise from road traffic on the A44 will determine the extent of any mitigation in this area.

4 Baseline Noise Monitoring

4.1 The measurement locations adopted during the survey are labelled in **Figure 4.1** below. Details of monitoring undertaken at each location are provided overleaf.

Figure 4.1: Noise Measurement Locations



Measurement Location 1

- 4.2 Measurement Location 1 was adjacent to the southern site boundary and was adopted to determine noise levels from the A44 to the south of the site.
- 4.3 Monitoring at Measurement Location 1 was undertaken between 13:15 and 16:15 on 29th January 2020, to allow road traffic noise levels to be determined in accordance with the shortened measurement procedure from CRTN. The microphone was in free-field conditions at a height of circa. 3 m above local ground level, to raise the microphone to approximately 1.5 m above the level of the A44, which was raised above the surrounding ground. The horizontal distance from the microphone to the kerb edge was approximately 11 m.
- 4.4 The measurement location had a clear line of site to the A44 and the noise environment at Measurement Location 1 was dominated by road traffic noise from the A44.

Measurement Location 2

- 4.5 Measurement Location 2 was adjacent to the southern site boundary and was adopted to determine noise levels from the A44 to the south of the site.

- 4.6 Monitoring at Measurement Location 2 was undertaken between 13:12 and 16:12 on 31st January 2020, to allow road traffic noise levels to be determined in accordance with the shortened measurement procedure from CRTN. The microphone was in free-field conditions at a height of circa. 1.5 m above local ground level. The horizontal distance from the microphone to the kerb edge was approximately 7 m.
- 4.7 The measurement position had a clear line of site to the A44 and the noise environment at Measurement Location 2 was dominated by road traffic noise from the A44.

Measurement Location 3

- 4.8 Measurement Location 3 was adjacent to Long Lane on the northern boundary of Throckmorton Industrial Park and was adopted to determine noise levels from Long Lane.
- 4.9 Monitoring at Measurement Location 3 was undertaken between 14:00 and † 17:00 on 29th January 2020, to allow road traffic noise levels to be determined in accordance with the shortened measurement procedure from CRTN. The microphone was in free-field conditions at a height of circa. 1.5 m above local ground level. The horizontal distance from the microphone to the kerb edge was approximately 5 m.
- 4.10 The measurement position had a clear line of site to Long Lane and the dominant noise source at Measurement Location 3 was the occasional passage of vehicles along Long Lane, with low level industrial/commercial noise and natural sounds dominant between passbys.

Measurement Equipment

- 4.11 The baseline noise survey was undertaken using the Class 1 specification noise measurement equipment detailed in **Table 4.1**. Equipment was calibrated using a portable calibrator immediately before and after the measurements with no significant drift in calibration observed. The sound level meters, pre-amplifiers and microphones were calibrated to traceable standards within the 24 months prior to the measurements. The portable calibrators were calibrated within the 12 months preceding the date of the survey.

Table 4.1: Noise Monitoring Equipment

Position	Equipment	Make & Model	Serial Number	Calibration Due Date
1 and 2	Sound Level Meter	Svantek 971	80342	March 2020
	Pre-Amplifier	Svantek SV18	59531	
	Microphone	ACO Pacific 7052E	71576	
3	Sound Level Meter	Svantek 971	60745	January 2021
	Pre-Amplifier	Svantek SV18	64535	
	Microphone	ACO Pacific 7052E	66815	
1 – 3	Calibrator	Svantek SV33A	90275	April 2020

Meteorological Conditions

- 4.12 Weather conditions during the survey were conducive for environmental noise monitoring; it being dry with low wind speeds.

Measurement Results

- 4.13 A summary of the measured noise levels at Measurement Locations 1 to 3 are presented in **Tables 4.2 to 4.7**.

Table 4.2 – Summary of measured sound pressure levels at Measurement Location 1

Start Date and Time	Sound Pressure Level		
	dB LAeq,1h	dB LA90,1h	dB LA10,1h
29/01/2020 13:15	67	56	69
29/01/2020 14:15	67	59	69
29/01/2020 15:15	67	58	69
13:15	-	-	69 LA10,3h ¹
06:00 – 00:00	-	-	68 LA10,18h ²
07:00 – 23:00	66 LAeq,16h ³	-	-
23:00 – 07:00	57 LAeq,8h ⁴	-	-

¹ Arithmetic average of three consecutive LA10,1hr measurements in accordance with CRTN.
² LA10,3hr – 1 dB based on guidance from CRTN.
³ LA10,18hr – 2 dB based on guidance from BS 8233.
⁴ 0.9 x LA10,18hr – 3.77 dB based on TRL guidance.

Table 4.3 – Summary of measured octave band sound pressure levels at Measurement Location 1

Period	Octave Band Sound Pressure Levels (Leq dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
13:15 – 16:15	68	66	65	63	65	59	50	45	67

Table 4.4 – Summary of measured sound pressure levels at Measurement Location 2

Start Date and Time	Sound Pressure Level		
	dB L _{Aeq,1h}	dB L _{A90,1h}	dB L _{A10,1h}
31/01/2020 13:12	68	51	71
31/01/2020 14:12	68	52	71
31/01/2020 15:12	68	52	72
13:12	-	-	71 L _{A10,3h} ¹
06:00 – 00:00	-	-	70 L _{A10,18h} ²
07:00 – 23:00	68 L _{Aeq,16h} ³	-	-
23:00 – 07:00	59 L _{Aeq,8h} ⁴	-	-

¹ Arithmetic average of three consecutive L_{A10,1hr} measurements in accordance with CRTN.
² L_{A10,3hr} – 1 dB based on guidance from CRTN.
³ L_{A10,18hr} – 2 dB based on guidance from BS 8233.
⁴ 0.9 x L_{A10,18hr} – 3.77 dB based on TRL guidance.

Table 4.5 – Summary of measured octave band sound pressure levels at Measurement Location 2

Period	Octave Band Sound Pressure Levels (L _{eq} dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
13:12 – 16:12	70	63	61	62	65	61	52	46	68

Table 4.6 – Summary of measured sound pressure levels at Measurement Location 3

Start Date and Time	Sound Pressure Level		
	dB L _{Aeq,1h}	dB L _{A90,1h}	dB L _{A10,1h}
29/01/2020 14:00	59	39	62
29/01/2020 15:00	60	40	63
29/01/2020 16:00	61	41	65
14:00	-	-	63 L _{A10,3h} ¹
06:00 – 00:00	-	-	62 L _{A10,18h} ²
07:00 – 23:00	60 L _{Aeq,16h} ³	-	-
23:00 – 07:00	52 L _{Aeq,8h} ⁴	-	-

¹ Arithmetic average of three consecutive L_{A10,1hr} measurements in accordance with CRTN.
² L_{A10,3hr} – 1 dB based on guidance from CRTN.
³ L_{A10,18hr} – 2 dB based on guidance from BS 8233.
⁴ 0.9 x L_{A10,18hr} – 3.77 dB based on TRL guidance.

Table 4.7 – Summary of measured octave band sound pressure levels at Measurement Location 3

Period	Octave Band Sound Pressure Levels (Leq dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
14:00 – 17:00	64	60	58	54	57	53	45	41	60

5 Potential Constraints to Development, Likely Mitigation and Further Assessment Works

Future Baseline

- 5.1 It is considered that due to the size of the proposed development, there is likely to be an increase in road traffic on the local road network due to road traffic associated with the proposed development. Therefore, it is considered that an assessment of development generated road traffic should be undertaken to support the planning application for the scheme.

Construction Phase

- 5.2 The noise and vibration levels generated during the construction phase may cause an impact at nearby sensitive receptors. However, this is likely to be a short-term, temporary impact, and can be controlled through a suitably worded CEMP.

Operational Phase

- 5.3 During the site walkover it was observed that the processes associated with the existing poultry farm and Marshall's Transport to the north of the airfield were audible over the residual environment, however the previous redline boundary did not include the land surrounding these premises and therefore noise associated with the poultry farm and Marshall's Transport was not considered as part of the constraints assessment.
- 5.4 Given the change in the proposed redline, it is now considered that there may be an impact from noise associated with the poultry farm and Marshall's Transport at proposed sensitive receptors associated with the proposed development. Therefore, further baseline noise monitoring and assessment should be undertaken to support the planning application for the scheme.

Road Noise - Residential Receptors

- 5.5 **Table 5.1** shows the predicted noise levels at a proxy dwelling on the Site, assuming a 10m standoff from the A44 and Long Lane.
- 5.6 Noise monitoring did not cover the night-time period. However, given the dominant source of noise at the monitoring locations is transportation noise, it is considered that

the $L_{AF,max}$ levels measured during the daytime will be similar to the $L_{AF,max}$ levels during the night-time.

- 5.7 The highest max level at ML1 was 92dB $L_{AF,max}$. From a review of the measured data, the majority of the measured levels were between 73dB $L_{AF,max}$ and 80dB $L_{AF,max}$. Therefore, it is considered that a max level of 92dB is not representative of the majority of the measured levels. Therefore, the highest maximum level measured at ML2 has been used to determine the requirements for dwellings located at 10m from the A44.

Table 5.1: Summary of assessment for example dwellings for northern and southern areas of the Site closest to road traffic noise sources, dB

Example dwelling location	Time period	Parameter	Scenario	External levels	Criteria	Reduction needed to meet criterion
Adjacent to the A44 – ML1	Daytime 16-hour (07:00 – 23:00)	$L_{Aeq,16h}$	Internal habitable rooms	66	35	31
			Gardens	66	50-55	11 – 16
	Night-time 8-hour (23:00 – 07:00)	$L_{Aeq,8h}$	Bedrooms	57	30	27
				$L_{AF,max}$	87 ²	45
Adjacent to the A44 – ML2	Daytime 16-hour (07:00 – 23:00)	$L_{Aeq,16h}$	Internal habitable rooms	67	35	32
			Gardens	67	50-55	12 – 17
	Night-time 8-hour (23:00 – 07:00)	$L_{Aeq,8h}$	Bedrooms	58	30	28
				$L_{AF,max}$	87 ²	45
Long Lane – ML3	Daytime 16-hour (07:00 – 23:00)	$L_{Aeq,16h}$	Internal habitable rooms	58	35	23
			Gardens	58	50-55	3 – 8
	Night-time 8-hour (23:00 – 07:00)	$L_{Aeq,8h}$	Bedrooms	50	30	20
				$L_{AF,max}$	79 ³	45
¹ Calculated using the methodology found within CRTN. ² Highest measured daytime max at ML2						

- 5.8 **Table 5.1** shows that, during the daytime and night-time for future dwellings adjacent to the A44, the building façade overlooking the road would need to provide up to 42 dB of attenuation to external noise levels.

- 5.9 For future dwellings located in the northern part of the site, the building façade would need to provide up to 34dB of attenuation.

- 5.10 A partially opened window typically provides between 10-15 dB of attenuation from external free-field levels to internal levels, therefore it is considered that dwellings at these locations would need windows to be closed and an alternative source of ventilation to be provided.
- 5.11 For gardens closest to the A44 facing directly onto the noise source(s), a sound reduction of 17 dB would be required to achieve the 55 dB upper guideline value in accordance with BS8233:2014. For gardens located closest to Long Lane, a sound reduction of 8dB would be required.

Road Noise - Office Receptors

- 5.12 **Table 5.2** shows the predicted noise levels at example office receptors on the Site, assuming a 10m standoff from the A44 and Long Lane.

Table 5.2: Summary of assessment for example office receptors for northern and southern areas of the Site closest to road traffic noise sources, dB

Example dwelling location	Time period	Parameter	Scenario	External levels	Criteria	Reduction needed to meet criterion
Adjacent to the A44 – ML1	Daytime 16-hour (07:00 – 23:00)	L _{Aeq,16h}	Internal office	66	35 – 40	31 – 26
Adjacent to the A44 – ML2				67	35 – 40	32 – 27
Long Lane – ML3				58	35 - 40	23 – 18
¹ Calculated using the methodology found within CRTN.						

- 5.13 **Table 5.2** shows that, during the daytime for future office receptors adjacent to the A44, the building façade overlooking the road would need to provide up to 32 dB of attenuation to external noise levels.
- 5.14 For future office receptors located in the northern part of the site closest to Long Lane, the building façade would need to provide up to 23dB of attenuation.
- 5.15 Based on a partially opened window providing between 10-15 dB of attenuation from external free-field levels to internal levels, it is considered that proposed offices at these locations would need windows to be closed and an alternative source of ventilation to be provided.

Mitigation

Road Traffic – Residential Receptors

External Noise Levels

- 5.16 The upper target noise levels for outdoor living areas in BS8233:2014 is 55 dB $L_{Aeq,16h}$. The predicted noise level at 10 metres from the A44 and Long Lane exceeds the criteria.
- 5.17 To reduce the noise impact in the nearest proposed gardens to within acceptable limits the following options are available:
- Design the development site such that the buildings provide a noise barrier to the garden areas;
 - Incorporate a standoff between the road and proposed dwellings;
 - Provide noise barriers around the perimeters of the gardens; and/or
 - Install an acoustic barrier along the perimeter of the development site.
- 5.18 Adopting one of the above design approaches should result in suitable daytime noise levels in gardens being achieved, provided the approaches are implemented effectively.

Internal Noise Levels

- 5.19 The recommended internal noise levels for living areas is 35dB $L_{Aeq,16h}$ during the daytime and 30dB $L_{Aeq,8h}$ and 45dB $L_{AF,max}$ during the night-time, as stated in BS8233:2014.
- 5.20 **Table 5.3** provides an indication of the likely glazing and ventilation requirements for dwellings at 10m from the A44 and Long Lane, for all internal criteria to be met, assuming that habitable rooms would be on the facades facing the road. The requirements are driven by the criterion which requires the largest sound reduction.

Table 5.3: Indication of typical glazing and ventilation requirements for proposed dwellings (no acoustic fencing)

Source	Indicative glazing requirement (pane/airgap/pane, mm)	$R_w + C_{tr}$	Typical ventilation requirement	$D_{n,e,w} + C_{tr}$
A44	10mm/16mm argon/9.1mm	39	Greenwood MA3051	52
Long Lane	9mm/12mm/12mm	38	Passive attenuated in-wall ventilator	44

- 5.21 It is likely that, with the presence of buildings on site, the sound insulation requirements for dwellings further into the site would be considerably reduced due to screening from the development itself, and that for large sections of the development, standard double glazing (4mm pane/12mm airgap/4mm pane) and open windows would be sufficient.

Road Traffic – Office Receptors

- 5.22 The recommended internal noise levels for offices is between 35 and 40dB $L_{Aeq,T}$, stated in BS8233:2014.
- 5.23 **Table 5.4** provides an indication of the likely glazing requirements for offices located closest to the A44 and Long Lane, assuming a mechanical ventilation strategy, to ensure the recommended noise levels are achieved.

Table 5.4: Indication of typical glazing requirements for proposed offices located closest to the A44 and Long Lane

Road Source	Indicative glazing requirement (pane/airgap/pane, mm)	$R_w + C_{tr}$
A44	4mm/(6-16mm)/4mm	25
Long Lane	4mm/(6-16mm)/4mm	25

Existing Commercial Premises

Throckmorton Shooting Ground

- 5.24 As the noise impact from the shooting ground is likely to be difficult to mitigate, due to the nature of the noise, it is recommended that provision is made for a stand-off between the shooting ground and any proposed sensitive receptors.

Hill and Moor Waster Management Landfill

- 5.25 The landfill has the potential to give rise to significant noise levels, which were noted to vary significantly due to the operations being undertaken. It is understood that the majority of the operations are undertaken in the western area of the landfill site. It is understood that the landfill will be fully restored prior to the development being occupied. Should this not be the case, a standoff between the landfill will likely be required should any noise sensitive uses be proposed in this area.

Biomethane Plant

- 5.26 Although onsite observations indicate that the biomethane plant does not generate any significant noise, it is considered that noise associated with operations, such as HGV movements, loading/unloading operations have the potential to generate significant levels of noise. However, given the intervening distance between the plant and the

proposed development site, it is considered that noise from HGV's associated with the site are unlikely to result in an adverse impact.

Poultry Farm

- 5.27 Due to the potential for HGV deliveries to the poultry farm located to the north, boundary mitigation and/or uprated ventilation may be required to ensure that recommended external and internal noise levels are achieved.

Marshall's Transport

- 5.28 Due to the potential for HGV movements to and from the premises as well as noise from operations at the transport premises, it is recommended in the first instance that a setback distance from the noise source is introduced and that non-sensitive aspects of the development are located adjacent to any noise generating sources. Where this is not possible, boundary mitigation and/or uprated ventilation may be required to ensure that recommended external and internal noise levels are achieved.

Proposed Employment Uses

- 5.29 It is understood that employment uses form part of the proposals. At this stage, there is no information available regarding the proposed end use of the employment areas or where these are likely to be located. Any noise generating uses associated with the proposed commercial elements will need to be considered at proposed and existing noise sensitive uses. Where possible, noisy operations should be located away from existing and proposed sensitive uses. Careful consideration should be given to the orientation of any commercial buildings, with any noise generating uses placed on the screened side of the buildings. Commercial uses, such as offices, could also be utilised to provide screening from the existing commercial/industrial sources, to reduce noise levels at proposed noise sensitive uses.

Further Work

- 5.30 A noise impact assessment, including a long-term baseline noise survey is likely to be required to support any planning application for the scheme. The assessment would include consultation with the LPA to understand their specific criteria for an assessment and would allow more targeted advice to be provided with regard to specific mitigation measures and their effectiveness.

6 Summary

- 6.1 Due to the close proximity of the surrounding roads, careful consideration will need to be given to both the residential and proposed employment elements, which include the following;
- Design the development site such that the buildings provide a noise barrier to the external amenity areas;
 - Incorporate a standoff between the road and proposed sensitive receptors;

- Provide noise barriers around the perimeters of the gardens; and/or
- Install an acoustic barrier along the perimeter of the development site.

6.2 It is considered that with appropriate consideration to site design, mitigation measures and glazing/ventilation choices, noise could be adequately mitigated.

6.3 For proposed employment uses, it is recommended that any noise generating sources are located on the screened side of the buildings, away from proposed and existing sensitive receptors. It is likely that a more detailed noise survey and assessment will be required to support the planning application for the scheme.