9 NOISE

9.1 INTRODUCTION

9.1.1 This chapter has been prepared by Arup and considers the effects of changes in noise and vibration associated with the proposed development on the surrounding area. Initial impacts would arise from demolition and construction work, although these effects would be temporary. Permanent changes to the noise climate could arise from the operation of the development. The suitability of the noise climate for occupation of the site is also discussed.

9.2 REVIEW OF DEVELOPMENT PROPOSALS

9.2.1 For the purposes of this Chapter, the existing characteristics of the area and the proposed development will be described in relation to the noise climate.

9.2.2 Noise effects associated with the proposed development are difficult to predict at this early stage. The study area has therefore been concentrated immediately around the development at noise sensitive locations on the west, north, east, and south of the site. Beyond these areas, noise impacts would be less significant due to distance from the development.

9.2.3 Four noise sensitive receivers were selected immediately around the development site to represent noise at sensitive locations around the perimeter. In addition to the identified receivers around the site noise measurements have also been conducted on the existing site perimeter to assess the current noise climate. This will provide baseline data for future development plans to be assessed against. Details of the noise monitoring survey are provided in section 9.7.

Site Location

9.2.4 The current site is situated east of the village of Upper Heyford. The site is a mix of residential dwellings, and small industrial units. A main road (Camp Road) passes through the centre of the site separating the industrial units to the north and the residential dwellings to the south. The existing buildings on the site are a combination of former USAF buildings and RAF buildings.

9.2.5 The buildings (barracks and other facilities) on the south-east corner are currently empty and surrounded by fencing, the dwellings on the south-west are occupied.

9.2.6 During the site survey it was noted that some of the industrial units were in constant use. Further beyond the main site to the north are the original runway and various taxi-ways, these are currently used in part as a car park (car staging area) for a car leasing company.

9.3 METHODOLOGY

9.3.1 Potential noise issues relating to the proposed development have been set out in section 9.2 above. The assessment of noise effects has focussed on the closest noise sensitive receivers surrounding the proposed

development as described above. A methodology has been adopted to compare the predicted noise levels for each potential source with the expected noise levels if the new noise source were not introduced. The assessment is then made according to the predicted change in noise level, in relation to an appropriate assessment criterion, as defined by local or national policy, or by established practice. Specific noise requirements and assessment criteria are described in the section on Policies and Guidance (Section 9.9). Suitability of the site for residential occupation has been assessed based on existing measured noise levels, in accordance with Planning Policy Guidance 24 (PPG24), described in section 9.9.10.

9.4 APPROACH

9.4.1 The various methodologies to predict noise effects are described below:

9.4.2 Construction activities have been identified as a potential, if temporary, source of noise and vibration. Although there is an established methodology for predicting construction noise and vibration levels, there is insufficient information on the construction methodology at this stage of the development planning to attempt a meaningful prediction of noise levels at nearby sensitive receivers. The assessment of this potential impact will be qualitative based on the types of operation anticipated and best practicable means controls normally applied.

9.4.3 For traffic noise effects, prescribed prediction methodologies have been used to predict the likely noise changes based on forecast vehicle movements. The noise exposure arising from new or altered roads associated with the proposed development can be calculated using the Calculation of Road Traffic (CRTN) method [Department Of Transport Welsh Office, 1988]. The method creates a spatial model of the area between the road and the noise sensitive receiver. The noise source levels generated by the road are based on the volume, average speed and composition of the traffic. For the purposes of this assessment, traffic noise predictions have been undertaken for a constant distance from the road that is representative of the closest approximate distance that a property may be located to a road. Given that there are no new roads proposed on the approach to the development site this assessment methodology will accurately reflect the change in traffic noise levels associated with the development and provide a basis for assessment. For the purpose of this study, the changes in traffic noise resulting from the proposed development were forecast using the CRTN methodology to relate traffic noise change to forecast changes in traffic flow provided by the transport consultant and described in a separate chapter of this environmental impact assessment. (Chapter 6)
For plant machinery associated with buildings, or noise from entertainment venues it is very difficult to predict noise levels given the uncertainty as to the exact locations of the sources or the intensity of operation. However, for these sources, it is possible to establish target noise criteria or operational constraints to ensure these sources do not have an adverse impact as described in BS 4142.

9.5 DIRECT / INDIRECT EFFECTS

9.5.1 For the purposes of the noise and vibration assessment, direct effects are considered to be those arising from construction or operation within 300m of the proposed development. Indirect effects are considered to be those arising at greater distance. Any such effects are likely to be as a result of changes in traffic flow on roads around the proposed development.

9.6 LIMITATIONS, CONSTRAINTS AND ASSUMPTIONS

9.6.1 The only limitation in relation to this assessment is the detail of information available for the construction methods. The assessment of construction noise effects has been based on a qualitative evaluation of the processes and durations likely to take place from the information available. The relevant measures to control disturbance are considered and the likely residual impact identified.

9.7 BASELINE

Study Area

9.7.1 Any noise or vibration effects associated with the proposed development are likely to be greatest at positions immediately surrounding the site perimeter. The study area has therefore been concentrated inside and around the development at noise sensitive locations identified below. Beyond these areas noise impacts would be less significant due to distance from the development, the masking effect of other noise sources and screening by buildings.

9.7.2 Three measurement locations were selected to be representative of the nearest noise sensitive properties to the site. In order to assess the suitability of the site for residential purposes, five locations on the site were selected to be representative of the noise environment over the development area.

Monitoring Survey

9.7.3 A site visit was conducted around the application site during the day and night of Tuesday 13th and Wednesday 14th March 2007. The purpose of the visit was to measure existing noise levels, identify existing noise sources and provide an impression of the overall noise climate in each area of the site. Weather conditions were favourable for the duration of the survey, with no precipitation and light winds.
The measurement period was considered to cover typical noise levels during the daytime, evening and night-time periods as well the highest noise levels during the evening rush hour period and the quietest period in the early hours of the morning.

9.7.4 Full details of the measurement periods and results are provided in the Appendices. The general noise methodology followed was that described in BS 4142:1997 [British Standards Institution, 1997].
Immediately before and after each series of measurements was carried out, the sound level meter calibration was checked using a sound pressure level calibrator. No significant variation was recorded during the survey periods.

9.7.5 Noise measurements were taken at approximately 1.2 metres above ground level and well away from any building facades and are considered representative of freefield measurements. A windshield was placed over the microphones at all times during the survey period to reduce any potential effect of wind-induced noise. Corresponding statistical analysis of the measured noise was then carried out, and the following parameters recorded: L_{Aeq}, L_{Amax} and percentiles L_{a90} to L_{A10}.

9.7.6 All noise measurement instrumentation owned and used by Arup Acoustics is checked for correct calibration to traceable national and international standards on an annual basis. Routine 'in-house' spot checks are also carried out at regular intervals as part of Arup Acoustics Quality Assurance policy, to provide additional confidence in measured noise data.

Survey Instrumentation

9.7.7 Noise Equipment:

- Brüel & Kjær 2260 Type 1 precision integrating Sound level Analyser;
- Brüel & Kjær Type 1 4231 SPL Calibrator;
- Kestral Anemometer.

9.7.8 Personnel:

Philip Mudge & Caroline McKelvey, Arup Acoustics.

9.7.9 Measurement Location Description

The measurement locations are described below and are identified in Figure N1 and Figure N2.

Figure N1: Site plan showing measurement locations for PPG24 Assessment

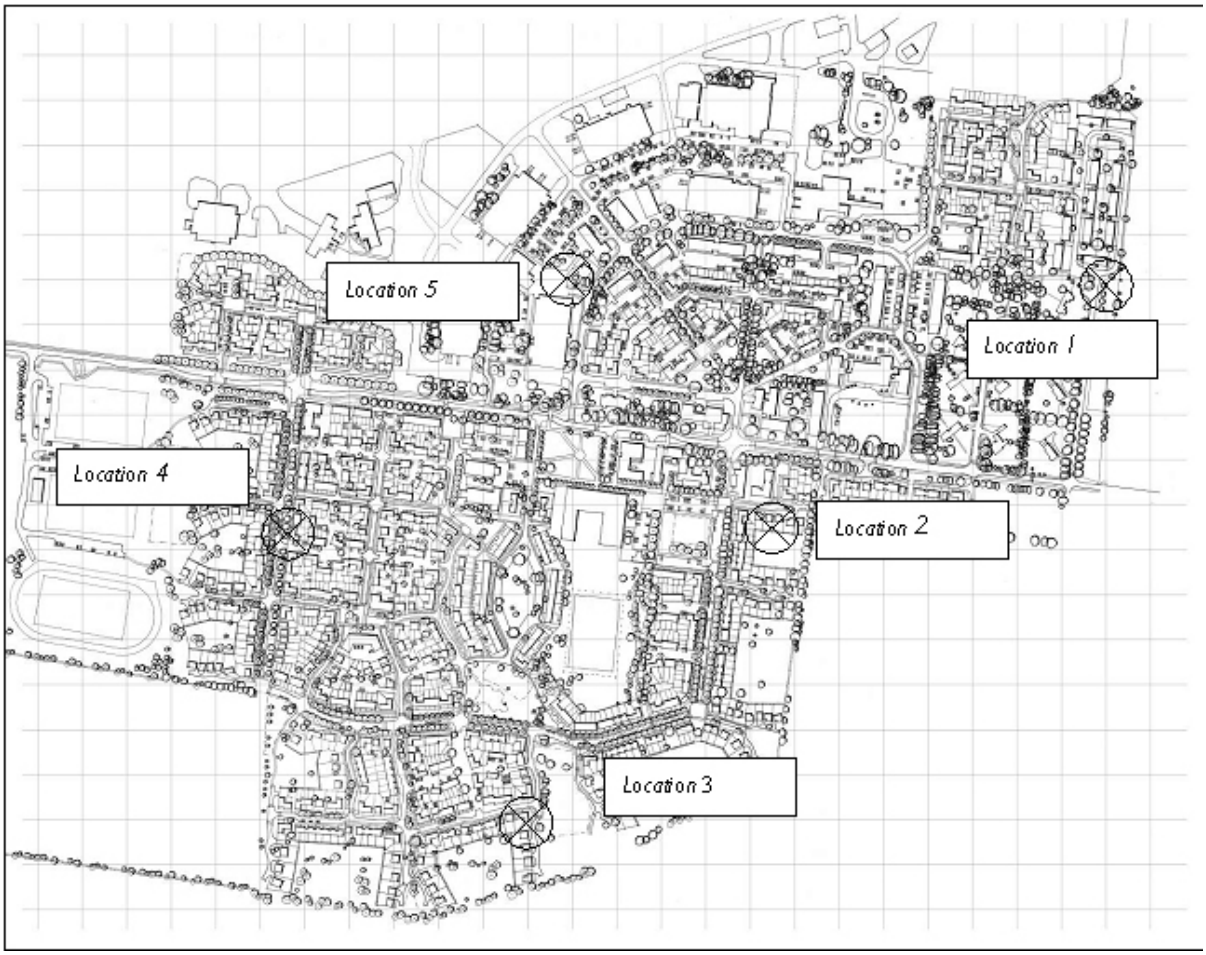

Figure N2: Site plan showing external measurement locations used for setting noise emissions. Blue areas indicate identified residences.

Location 1

9.7.10 On the east perimeter, north of Camp Road. This location was close to some existing light industrial units. Some were in operation, others appeared to be empty. To the north was the main car park for the vehicle leasing company.

9.7.11 Noise levels measured were dominated by some low level plant noise from one of the nearby commercial units. There was also influence from distant traffic noise, birdsong, vehicle movements on the runway and occasional jet aircraft movements overhead.

Location 2

9.7.12 Location 2 was on the eastern edge of the unused residential buildings previously occupied by military personnel. The area is currently ring fenced and not in use, therefore the noise climate is quiet and dominated by distant noise sources.

9.7.13 The noise levels measured were typically from distant traffic noise, vehicles on Camp Road were not clearly distinguished from the general traffic hum. Birdsong was a significant contributor to the noise climate, particularly at dusk.

Location 3

9.7.14 This location was on the southern edge of the site, again within the ring fenced area mentioned above. The housing here was very similar that of location 2 and also unoccupied.

9.7.15 Noise levels here were very similar to those of location 2, dominated by traffic noise and birdsong.

L***ocation 4***

9.7.16 Location 4 was situated opposite the rear of the occupied residential dwellings on Eday Road to the Western edge of the site, located at the edge of a disused car park on Dacey Drive.

9.7.17 Noise levels at this location were typical of a quiet residential location. Distant traffic noise and local traffic on Camp Road dominated the noise climate, there was also the occasional car movement on Dacey Drive. Other sources included birdsong, and overhead aircraft.

Location 5

9.7.18 Location 5 was situated closer to the taxiways south of the main runway and between 2 large industrial units. This was an area of considerable activity. There were various vehicles movements on the taxiway, including private cars and HGVs. There was the influence of distant traffic noise. The industrial units around the location were clearly occupied and active at all times of day. There was considerable sawing/grinding noises emanating from one of the units during the very early hours of the morning. There was also constant plant noise from many sources throughout the 24hour period. However, with all the activity the measured noise levels were still no higher then 55dBL_{Aeq} (48dBL_{A90}) during the daytime.

Location 6

9.7.19 Location 6 was located outside a house at the western corner of Camp Road where it meets Somerton Road. This location was chosen to assess current noise conditions at the village of Upper Heyford, identified as one of the closest noise sensitive receivers.

9.7.20 Noise levels were dominated by distant and local traffic noise, birdsong, and overhead aircraft. Noise from the activities on the development site was not subjectively audible at this location.

Location 7

9.7.21 This location was chosen to be representative of the village of Caulcott and some occupied farm buildings close to the B4030 east of Caulcott. The chosen location was on a bend of the B4030 approximately equidistant between the two identified receivers at the entrance to a field.

9.7.22 Noise levels were dominated by road traffic on the B4030, traffic flows were counted at 16 vehicles per minute during the rush-hour peak. Other sources were birdsong and activities associated with the nearby farms.

Location 8

9.7.23 Location 8 was just west of some residential and farm buildings on Somerton Road, north of the development site. This road was a typical quiet country lane with very few traffic movements. However, vehicles that use the road tended to travel quite fast. Other than the noise of vehicle pass-bys the only other noise sources identified were distant traffic noise and birdsong.

9.8 CONSULTATION

9.8.1 Consultation with Oxfordshire's environmental health department has confirmed that plant noise limits should be set at the site boundary in accordance with recommendations in BS4142 and based on measured background noise levels; the suitability of the site for residential purposes should be assessed in accordance with PPG24 and construction noise should be assessed in accordance with BS 5228.

9.9 POLICIES AND GUIDANCE

9.9.1 As part of the assessment procedure for an environmental statement, there is a requirement that significant effects should be described and measures to control any significant adverse effects identified. The relevant methods adopted for the assessment of each source of noise and vibration are summarised in the following sections. Some of these describe specific requirements or thresholds for amelioration.

Traffic Noise

9.9.2 An approach to assessing noise and vibration effects from roads is described in The Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment [Department of Transport, 1994]. The DMRB approach to assessing noise impact is to compare the noise levels for the Do Something scenario (with scheme) against noise levels for the Do Minimum scenario (without scheme).

9.9.3 The criterion for acceptability of road traffic noise exposure at residential properties is contained in the Noise Insulation Regulations [HMSO, 1988], which enact part of the provisions of the Land Compensation Act [HMSO, 1973]. This provides an entitlement for noise insulation measures if noise levels are equal to or exceed 68 dB $L_{A10,18h}$r at the building façade. The Land Compensation Act also provides a mechanism by which owners of homes affected by increased noise levels can claim compensation for any loss in value of the property on the open market that might occur.

Construction Noise

9.9.4 Construction noise and vibration is temporary and cannot be assessed in the same way as more permanent operational impacts. Potential noise and vibration impact from construction must also be weighed against other factors such as the benefits that the completed development (or road scheme) will bring to the local community. The national guidance and policy does not propose any specific criteria for the setting of noise limits or criteria for construction works as it is recognised that this must be judged against local needs and conditions. The impact of construction noise and vibration is usually assessed with reference to the following guidance and statutes:

BS 5228 Noise and Vibration Control on Construction and Open Sites [British Standards Institution, 1997]

9.9.5 BS 5228 provides guidance on the assessment and control of noise from construction operations. The Standard contains detailed information on noise reduction measures and promotes the 'best practicable means' approach to control noise and minimise the impact on local residents and construction workers.

Environmental Protection Act [HMSO, 1990]

9.9.6 The Environmental Protection Act describes the duty of the Local Authority to take steps to abate any noise impact, including that from a construction site, deemed to be causing a statutory nuisance.

Control of Pollution Act [HMSO, 1974]

9.9.7 The Control of Pollution Act gives the Local Authority powers to serve a notice to the developer requiring the control of site noise under Section 60 of the Act. This may include specific controls to restrict certain activities identified as causing particular problems. Conditions regarding hours of operation will generally be specified and noise and vibration limits at certain locations may be applied in some cases. All requirements must adhere to established guidance and be consistent with best practicable means to control noise only as far as is necessary to prevent undue disturbance.

Building Services Plant Noise

9.9.8 To ensure that the proposed development does not have an unacceptable impact on the surrounding area, appropriate noise targets would be specified based on the existing noise climate. BS 4142:1997 Rating industrial noise affecting mixed residential and industrial areas [British Standards Institution, 1997] (the 'Standard') gives a method for determining the likelihood of complaint from a new industrial development. Although the title of the Standard implies a limited application to just industrial situations, the assessment methods it recommends are often used to assess noise from building services plant from commercial premises. Fixed plant of this nature is included within the scope of the Standard.

9.9.9 The Standard specifies a survey method to measure 'the specific noise level' (the introduced noise) in terms of $L_{Aeq,Tr}$, and 'the background noise level' (the noise existing in the absence of the specific noise level at the receiver location) expressed in terms of $L_{A90,T}$. Corrections are then made if the specific noise has a distinctive

character, i.e. tonality or impulsivity. The corrected specific noise level is described as 'the rating level' ($L_{Ar,T}$). To assess the likelihood of complaints the background level is subtracted from the rating level and the following criteria applied:

- if the difference is around +10 dB or more then complaints are likely;
- if the difference is around +5 dB then this is of marginal significance;
- if the rating level is more than 10 dB below the measured background level then this is a positive indication that complaints are unlikely.

Suitability of Site for Residential Development

9.9.10 The highest level noise guidance document from which most other relevant documents stem is Planning Policy Guidance: Planning and Noise (PPG 24) [Department of the Environment, 1994]. This document offers guidance on the development of residential areas near to new or existing noise sources. It also defines noise exposure categories (NECs) for day and night-time to assess whether or not it is appropriate to allow the development of residential properties for a given noise climate. The categories relate to different noise bands depending on the source of noise, i.e. road, rail, air, or mixed noise sources. The noise exposure categories given in the PPG 24 for road traffic are reproduced in Table N1. The associated advice provided in PPG 24 relating to the granting of planning permission for residential use is shown in Table N2.

Table N1: Noise Exposure Categories for new dwellings near existing traffic and mixed noise sources

Noise Levels[0] Corresponding to the Noise Exposure Categories for New Dwellings $L_{Aeq,T}$ dB				
	Noise Exposure Category (NEC)			
Noise source	**A**	**B**	**C**	**D**
Road traffic				
0700-2300	< 55	55-63	63-72	>72
2300-0700	< 45	45-57	57-66	>66
Mixed Source[1]				
0700-2300	< 55	55-63	63-72	>72
2300-0700	< 45	45-57	57-66	>66

[0]Noise Levels: the noise level(s) ($L_{Aeq,T}$) used when deciding the NEC of a site should be representative of typical conditions.

[1]Mixed sources: this refers to any combination of road, rail, air and industrial noise sources. The 'mixed source' values are based on the lowest numerical values of the single source limits in the table. The 'mixed source' NECs should only be used where no individual noise source is dominant.

Table N2: Definitions of Noise Exposure Categories for new dwellings near existing noise sources	
NEC A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
NEC B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
NEC C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
NEC D	Planning permission should normally be refused

9.10 ASSESSMENT

9.10.1 The following sections describe the approach used to estimate changes in noise level for each type of noise source associated with the development. Where appropriate, the changes in noise levels have been predicted at the closest noise sensitive facades surrounding the proposed development.

Construction Noise and Vibration

9.10.2 A detailed study of construction methods is not possible at this stage of the project. As the project progresses, the 'Best Practicable Means' of carrying out the work will be identified in accordance with the procedures given in BS 5228 [British Standards Institution, 1997]. As each parcel of land approaches development it will be possible to establish more detailed construction method statements. Because these will be dependent on the particular construction used, it is not possible to establish these at present. Where these methods are considered likely to cause increased noise at the surrounding residential areas, best practicable means would be used to control noise and specific details will be discussed and agreed with the local planning authority and an appropriate construction code of practice will be developed. This code of practice would be included in the contract documents.

9.10.3 The site is likely to be phased in development and thus it is unlikely that construction activities will take place across the entire site simultaneously. Work on each building/group of buildings is likely to take place in five stages: Demolition and site preparation; Foundations; Superstructure construction; Fit-out; and, Landscaping. During all stages of construction it is likely that there will be a static generator and compressor running whenever the site is in operation. Forklift trucks will be used throughout construction to move materials.

Demolition

9.10.4 It is likely that during demolition pneumatic breakers, bulldozers, dumper trucks and tipper lorries will be used to demolish existing buildings and collect and remove material from site. Noise is likely to be greatest where demolition is taking place although this will move around the site and will thus be relatively short-lived. There will be a number of tipper lorries removing material from site. These movements should take place during normal working hours.

Foundations

9.10.5 It is expected that the majority of the buildings will require strip foundations, although it is possible that some piled foundations may be required. Where piling is required, the choice of piling method will affect the noise produced substantially. Use of concrete piles dug using a rotary auger is likely to be less intrusive than impact piling. However both methods will need materials delivered by HGV/cement lorry.

Superstructure construction

9.10.6 Noise from superstructure construction will depend on the method chosen e.g. brick, block, concrete or steel framed. Whichever construction is used; cranes (either fixed, wheeled or tracked), pneumatic hand tools and back hoe excavators may be used along with concrete pumps or mixers. The amount of concrete to be pumped will increase if the building is constructed using a concrete frame or floors.

Landscaping and fit-out

9.10.7 Landscaping, fit-out and infrastructure will take place as the site is progressively developed. Hand tools, back hoe excavators, bull-dozers and road rollers may be required at various times and depending on the amount of earth movement required; tippers or dumper trucks will be required.

9.10.8 Ground modelling activities, and any other particularly noisy construction methods, can be restricted to agreed hours of the day. Similarly, times for haulage on and off the site may also be restricted.

9.10.9 Experience has shown that problems associated with construction noise can be to a large extent, mitigated by conducting a sensitive public consultation exercise, which must start before the works on site commence. A named person who can be contacted in the event of query or concern is also beneficial. Continued public liaison throughout the works will alleviate many potential problems. Although it has not been possible to calculate noise levels from construction works, it is considered that effects are unlikely to be significant as a consequence of distance between the development and the nearest potentially occupied residences.

Road Traffic Noise

9.10.10 The proposed development at Heyford Park would attract additional traffic to the area. In most locations, the proportionate change in traffic is insufficient to cause any perceptible increase in noise level (i.e. typically less than 3dB(A)). The greatest increases in noise levels, which are expected to have a marginal to significant impact, are likely to occur in the following areas:

- Between North Aston Road and Water Street, toward the north-west corner of the site (marginal impact, with an increase in the noise level of 4-5dB(A) between 2006 and 2013),
- Along parts of Camp Road (marginal to significant impact, with some parts predicted to experience a noise level increase of 2-6dB(A), while the noise levels in other areas will decrease by 3-8dB(A) between 2006 and 2013), and
- Port Way, between Lower Heyford Road and Heyford Road (positive significant to marginal negative impact, with changes between -6 to +3dB(A) between 2006 and 2013).
- The traffic flow at one section of Ardley Road (B430), between Hereford Road and Heyford Road, is expected to have a significant proportionate decrease, result in approximately a halving of loudness (decrease of 7dB(A) between 2006 and 2013).

9.10.11 Detailed road traffic prediction results are shown in Figure N.A01 in the appendices

Plant / Machinery Noise

9.10.12 The proposed development may introduce items of plant and equipment associated with the various buildings and utilities. This could be plant associated with ventilation, heating or cooling requirements. The opportunity would be taken at the design stage to limit the noise output from such equipment to a level that would ensure that there would not be an adverse reaction from local residents surrounding the development.

9.10.13 The mechanism for control would be by specifying the noise performance of such equipment when considering its suitability for use at this location, this may require incorporation of mitigation such as attenuators or noise screens for particularly noise devices. The proposed target cumulative noise limits for plant installed on the site would be that the rating level (as defined in BS 4142 [British Standards Institution, 1997]) would be 5dB(A) below the existing background noise level currently at the nearest noise sensitive locations. The background noise levels noise levels taken at the positions surrounding the site could be used to define the design noise levels to the values identified in Table N3 below. By implementing these cumulative noise limits the effects of plant noise associated with the proposed development are considered **not significant**.

Table N3: Cumulative plant noise limits

Location	Cumulative Plant Noise Limits	
	Daytime	Night time
Location 6	57	45
Location 7	55	30
Location 8	50	35

Suitability of Site for Residential Development

9.10.14 The suitability of the site for residential development has been assessed according to PPG24 described in Section 9.9.10. Locations 1 to 5 are considered representative of development areas. Table N4 below identifies the Noise Exposure Category associated with each location.

Table N4: Predicted Noise Exposure Categories from measured noise levels

Location	Daytime Noise level (0700-2300) $L_{Aeq,16h}$ dB	Night time Noise Level (2300-0700) $L_{Aeq,8h}$ dB	Noise Exposure Category
1	50	43	A
2	42	34	A
3	44	31	A
4	59	41	B
5	53	46	A

9.10.15 By comparison of the measured daytime and night time period noise levels identified in Table N4 above and the guidance identified in PPG 24 (see section 9.9.10) it can be seen that planning permission would normally be granted. In the vicinity of Location 4 the site is currently identified as NEC B in which noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise. It is considered that currently the noise levels in this area are predominantly created by traffic movement on Camp Road, traffic noise on Camp Road is expected to increase with the development by 3dB(A) which would not change the NEC rating for the area. Adequate protection against noise could be provided through mitigation measures such as provision of appropriately selected sound insulating building façade elements or noise screening.

9.11 MITIGATION

9.11.1 General principles of construction site noise control would be followed according to the guidance given in BS 5228: Part 1[British Standards Institution, 1997]. This requires that noise control measures would be adopted according to 'Best Practicable Means' (BPM) which includes measures such as specification of plant equipment, hours of operation and HGV access routes. Specific noise control practices could be agreed between the Contractor and the BCC if appropriate according to local requirements.

9.11.2 Hoarding will be erected around the perimeter of the site. In order to be effective at screening noise, this material will have a mass per unit of surface area in excess of 7 kg/m^2. Plywood sheets attached to a suitable scaffold frame are often used to create temporary screening for this purpose. If appropriate further screening will also be used to provide additional screening around long-term static plant (e.g. generators) at locations

where the boundary screening might not be effective such as areas of raised ground where there might be line of site between source and receiver.

9.11.3 Plant machinery such as generators or compressors should be positioned as far from noise sensitive locations as possible and ideally in naturally screened positions. All plant equipment should be adequately maintained to minimise noise emission. With these measures in place it is considered that the residual effects would be **not significant.**

9.11.4 Given that the traffic noise impacts associated with the new development are not considered to be significant in the majority of areas, traffic noise mitigation would be minimal. Appropriately designed earth bunding and/or noise barriers can provide adequate levels of noise mitigation. Alternatively, properties facing the roads identified below could be provided with an appropriately designed sound insulating façade elements. These mitigation measures should be considered in areas where the change is greater than 3dB(A), i.e.

- Between North Aston Road and Water Street (expected increase approximately 4-5dB(A));
- Along Camp Road, just east of Heyford Park (expected increase approximately 6dB(A)); and
- Along the unnamed road, south of Camp Road (expected increase approximately 4dB(A)).

(Refer to Figure N.A01 in Appendices)

9.11.5 Provided that the specification of any building plant and machinery results in target noise criteria specified above (9.10.12 & 9.10.13), there will be no requirement for additional mitigation from this range of sources.

Residual Effects

9.11.6 It is considered that there will be no residual noise and vibration effects provided the appropriate noise mitigation measures described above are put in place.