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# Former MSD Facility, Breakspear Road South, Ickenham

## Noise and vibration impact assessment

September 2022

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# 1 Introduction

## 1.1 Overview

Keltbray Developments Limited, part of the Keltbray Group, proposes to construct and operate a vehicle and equipment storage yard on an existing developed site on the outskirts of Ickenham in the London Borough of Hillingdon (the Proposed Development). Keltbray Developments Limited has engaged Mott MacDonald to provide transportation and environmental consultancy services at the planning stage of the Proposed Development.

The Keltbray Group are a leading UK subcontractor and the yard is intended to support future construction projects in West and Central London for which the Keltbray Group will be a key member of the construction supply chain. The site would be focused on supporting Keltbray's wider activities to service and facilitate these future construction projects. The proposals are not going to be utilised as a commercial builder's merchant which would generate activity from both trade contractors or members of the public. The facility is intended to replace existing individual sites leased by Keltbray in Ashford, London Borough (LB) of Hounslow and another on the edge of the LB of Hillingdon, both of which are scheduled for redevelopment away from industrial use. In addition, it is expected that some staff may transfer at some point in the future from Keltbray's facility in Egham, Surrey, again due to proposed redevelopment.

## 1.2 Project description

The Proposed Development site lies within the LB of Hillingdon, in Ickenham, Uxbridge. The site is located approximately 5km east of the M25 and is adjacent to an active construction compound for the HS2 project. The site is located within the London Greenbelt and on the eastern edge of the Colne Valley Regional Park. Breakspear Road South, from which the site is accessed, provides routes towards Harefield and Ruislip Common in the North, and Ickenham in the South. The site is located on part of the former Merck Sharpe Dohme (MSD) Animal Health Site, to the west of Breakspear Road South near Ickenham in the LB of Hillingdon.

The proposed development encompasses a storage yard facility to support future Keltbray Group construction projects in West and Central London. There will be 4 new industrial storage warehouses and an office building, retained from the site's previous use, with associated car parking.

The site previously accommodated the MSD Animal Health Facility and contains a selection of small office and industrial buildings. The majority of these existing buildings will be demolished, with one being retained and refurbished for offices and the rest being new builds. An administration building will be provided, utilising an existing building on the site, with the remaining structures on the site to be demolished. Four independently operating storage facilities will be provided with associated yard space and access points onto an internal access road. Pedestrian facilities will be provided predominately along the northern side of the internal access road, with a crossing facility provided to connect to the proposed administration building. The Proposed Development will result in a 'working yard', along with significant additional landscaping and ecological enhancements. To facilitate the use of the occasional larger HGVs associated with such a storage yard, the access road and bell-mouth with the junction of Breakspear Road South will be widened.

It is anticipated that the Proposed Development will be operational during 2023.

## 1.3 Purpose of this report

This report presents an assessment of potential noise and vibration impacts that are expected to arise during the construction and operational phases of the Proposed Development. It is intended to support the application for planning consent for the Proposed Development made to the LB of Hillingdon.

## 1.4 Scope

The types of noise and vibration impacts that are expected to arise due to the Proposed Development with the potential to affect sensitive receptors are:

- Temporary airborne noise and ground-borne vibration impacts due to construction activities on the Proposed Development site
- Temporary changes in road traffic noise from Breakspear Road South due to vehicles accessing the site during construction
- Permanent changes in road traffic noise from Breakspear Road South due to vehicles accessing the site during operation
- Permanent airborne noise impacts due to the daily operations within the Project site (such as permanent fixed plant, movement of vehicles, movement of material)

Furthermore, airborne noise impacts due to the operation of HS2 may affect the proposed office building within the Proposed Development site

This report presents an assessment of these impacts.

The Proposed Development site is sufficiently remote from sensitive receptors such that activities or processes generating permanent ground-borne vibration impacts are not expected to result in adverse effects. These are not considered further.

## 1.5 Structure of the report

The report has been set out to describe the approach of the assessment and the relevant criteria, present a description of the baseline conditions, assess the potential impacts and identify any potential exceedance of relevant criteria and requirements for mitigation. Recommended mitigation measures are also described in outline.

The main aspects of the report are:

- Policies, standards and guidance
- Methodology
- Baseline conditions
- Assessment of temporary and permanent impacts
- Mitigation
- Conclusions and recommendations

# 2 Policies, standards and guidance

## 2.1 Overview

This section presents a description of the relevant policies, standards and guidance, which informs the methodology of assessment.

## 2.2 National policy

### 2.2.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF)[1] was adopted by the Government in July 2018 and was subsequently updated in February 2019 and July 2021. It sets out the Government's planning policies for England and how these are expected to be applied.

Paragraph 174 of the NPPF states that: "*Planning policies and decisions should contribute to and enhance the natural and local environment by: 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*".

Paragraph 185 of the NPPF states that planning policy and decisions should aim to: "*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*." and "*identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*".

Paragraph 187 reintroduces the 'Agent of Change' principle – "*Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed*."

### 2.2.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE)[2] sets out the following aims in line with the Government's long-term vision of promoting good health and quality of life through the management of noise. Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development is to:

- "*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*."

[1] Ministry of Housing, Communities and Local Government, The National Planning Policy Framework, 2021.

[2] Department for Environment Food and Rural Affairs, Noise Policy Statement for England, 2010.

### 2.2.3 Planning Practice Guidance

Planning Practice Guidance (PPG)[3] provides guidance on how the policy set out in NPPF may be interpreted in practice for a wide range of issues. There is a subsection of PPG relating specifically to noise: "*Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider*:

- *Whether or not a significant adverse effect is occurring or likely to occur.*
- *Whether or not an adverse effect is occurring or likely to occur.*
- *Whether or not a good standard of amenity can be achieved.*

*In line with the Explanatory Note of the NPSE, this would include identifying whether the overall effect of the noise exposure (including the impact during construction wherever applicable) is, or would be, above or below the significant observed adverse effect level*..."

## 2.3 Local policy

### 2.3.1 The London Plan

Policy D14 of The London Plan 2021[4] states:

"*A: In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:*

*1) avoiding significant adverse noise impacts on health and quality of life*

*2) reflecting the Agent of Change principle as set out in Policy D13 Agent of Change*

*3) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses*

*4) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)*

*5) separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation*

*6) where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles*

*7) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.*

*B: Boroughs, and others with relevant responsibilities, should identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations*."

[3] Ministry of Housing, Communities and Local Government, Planning Practice Guidance, 2019.

[4] Mayor of London, The London Plan, 2021.

### 2.3.2 Local plan

The London Borough of Hillingdon Local Plan Part 1[5] 'Strategic policies' include: Land, Water, Air and Noise - SO10: Improve and protect air and water quality, reduce adverse impacts from noise including the safeguarding of quiet areas and reduce the impacts of contaminated land.

Clause 8.138 states: "*Guidance has already been set out at the national level by the NPPF. This guidance sets out a clear rationale as to where sensitive development should be located in relation to existing noise/ pollution sources, and also provides guidance on where potentially noise polluting development should be located*."

The London Borough of Hillingdon Local Plan Part 2[6] 'Development management policies - Managing Transport Impacts' Clause 8.7 states: "*Transport Assessments/Statements will be required so that transport impacts of development proposals can be properly identified and addressed. Traffic modelling may be required to demonstrate that the proposed development does not have an impact on road safety and the flow of traffic. Impacts on the local and wider environment should be assessed including impacts on amenity, air quality and noise*." Clause 8.13 states: "*The Council will not support development which will unacceptably contribute to traffic movements, deleteriously impact on the highway network or road user safety (including to pedestrians) or, affect residential amenity including by noise, congestion or inadequate parking provision*."

Policy DMHB 11 part B states "*Development proposals should not adversely impact on the amenity…of adjacent properties and open space*."

Policy DMT 1 requires "*Development proposals will be required to meet the transport needs of the development and address its transport impacts in a sustainable manner. In order for developments to be acceptable they are required to: have no significant adverse transport or associated air quality and noise impacts on the local and wider environment, particularly on the strategic road network*."

### 2.3.3 Local authority advice

The London Borough of Hillingdon has published information and advice on the approach to dealing with noise nuisance associated with commercial, industrial and construction noise. With regards to construction noise, works are required to be limited to core hours as follows[7]:

"*Noise from building work which is audible at the site boundary is only permitted between the following times:*

- *Monday to Friday, from 8am to 6pm*
- *Saturday, from 8am to 1pm*

*Works audible at the site boundary are not permitted on Sunday, public or bank holidays*."

With regards to road works[8], the London Borough of Hillingdon require prior consent (at 28 days before works commence) under Section 61 of the Control of Pollution Act 1974.

[5] London Borough of Hillingdon, A Vision for 2026 Local Plan Part 1 Strategic Policies (adopted November 2012), 2012.

[6] London Borough of Hillingdon, Local Plan Part 2 Development Management Policies Adopted version 16 January 2020, 2020.

[7] https://www.hillingdon.gov.uk/article/5157/Commercial-industrial-and-construction-noise [Last accessed 23 June 2022]

[8] https://www.hillingdon.gov.uk/article/5159/Noise-from-transport [Last accessed 23 June 2022]

## 2.4 Consultation

### 2.4.1 Pre-application planning advice – June 2022

Pre-application planning advice for the Proposed Development issued by the London Borough of Hillingdon[9] considers noise within 'Amenity' as follows:

"*Policy DMHB 11 of the Hillingdon Local Plan: Development Management Policies and Policy BE1 of the Hillingdon Local Plan: Strategic Policies both seek to ensure that new development does not adversely impact on the residential amenity of neighbouring properties, including a reduction in access to daylight and sunlight, or a loss of privacy or outlook.*

*As a result of the application site's location, approximately 100 metres away from the nearest residential property, it is considered that the proposed development would have no adverse impact on residential amenity, in terms of a loss of outlook, light or privacy. There is the potential for additional noise and disturbance being created as a result of the more intensive use of the site, however the direct impacts of this to neighbours are likely to be relatively low*."

### 2.4.2 Pre-application planning advice – August 2022

On the 5 August 2022, a pre-application planning advice meeting took place between the Hillingdon Environmental Health Officer (EHO), the Mott MacDonald Acoustics team, the Client, Gerald Eve LLP Planning Consultant and Campbell Architects. The outcome of the meeting and EHO advice are summarised below.

#### Construction

- Client confirmed that no piling will be undertaken and therefore demolition is anticipated to be the noisiest activity (however, in the event that piling is found to be required, the potential impacts are assessed here)
- Noise during demolition is unlikely to be significant due to the distance between the works and the closest building to be demolished (closest receptor is approx. 245m).
- Reference to threshold values given in BS 5228 Part 1 shall be made and not to baseline (meaning 'Example method 1 – The ABC method' will be used)

#### Operation

- Additional baseline measurements are not required
- Noise from fixed plant shall be controlled in accordance with the BS 4142 methodology such that the rating level does not exceed the level 5 dB below the typical background sound level ($L_{A90}$)
- Operational noise assessment should consider the impact from HS2 trains on the site offices

## 2.5 Legislation

### 2.5.1 The Control of Pollution Act 1974

Whilst receptors may be affected by nearby construction activities and accept that there would be some temporary disturbance caused, the Control of Pollution Act 1974 offers further protection.

[9] London Borough of Hillingdon. RE: Construction of new buildings for storage and light industrial use (Use Class B8 & E) with associated highway and landscaping improvements. SITE: Merck Sharpe Dohme (MSD) Site Off Breakspear Road South Harefield. Reference 72870/PRC/2021/258 dated 16 June 2022.

Section 60 of the Act enables a Local Authority to serve a notice specifying its noise control requirements covering plant or machinery (which is or is not being used), hours of working, and levels of noise that can be emitted.

Section 61 relates to prior consent in which the contractor consults with the Local Authority and provides an application prior to construction works commencing to obtain approval for the methods to be used and the steps proposed to minimise noise resulting from the works.

## 2.6 British Standards

### 2.6.1 British Standard 5228 Code of Practice for noise and vibration control on construction and open sites Part 1 – Noise

British Standard 5228 Part 1[10] (BS 5228-1) presents an approach to the prediction and assessment of noise due to construction activity for the purpose of determining potential significance. Annex E 'Example Method 1 – The ABC method' is based on the comparison of received site noise levels with threshold values that are assigned with respect to pre-construction ambient noise levels for the residential receptor. The identification of a potentially significant effect allows for account to be taken of factors such as the duration of exposure, character of the impact and the number of receptors that are affected. The method is summarised in Table 2.1.

**Table 2.1: BS 5228 Example method 1 – The ABC method for potential significant effect at dwellings**

| **Assessment category and threshold value period** | **Threshold value in decibels (dB) ($L_{Aeq,T}$)** | | |
|---|---|---|---|
| | Category A [A)] | Category B [B)] | Category C [C)] |
| Night-time (23:00 – 07:00) | 45 | 50 | 55 |
| Evenings and weekends [D)] | 55 | 60 | 65 |
| Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00) | 65 | 70 | 75 |
| Note 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the (pre-construction) ambient noise level.<br>Note 2: If the (pre-construction) ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.<br>Note 3: Applied to residential receptors | | | |
| [A)] Category A: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are less than these values<br>[B)] Category B: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values<br>[C)] Category C: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are higher than the Category A values<br>[D)] 19:00-23:00 weekdays, 13:00-23:00 Saturdays and 07:00-23:00 Sundays | | | |

Source: BS 5228 Part 1: 2009+A1:2014

BS 5228 also describes methods for the control of noise from a range of construction activities.

[10] British Standard Institution BS 5228 Code of Practice for noise and vibration control on construction and open sites - Part 1: Noise, 2009+A1:2014.

### 2.6.2 British Standard 5228 Code of Practice for noise and vibration control on construction and open sites Part 2 –Vibration

BS 5228 Part 2[11] explains that even when it is of a very low magnitude, vibration can be perceptible to people living or working close by. Nuisance associated with vibration is frequently associated with the assumption that, if vibrations can be felt the damage is inevitable. However, considerably greater levels of vibration over the perceptible threshold are required before damage to buildings at either a cosmetic or structural level will occur. Table 2.2 gives guidance levels about vibration levels received at residential properties. Vibration levels are quantified in terms of peak particle velocity (PPV) defined as the instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position and is expressed in millimetres per second (mm/s).

**Table 2.2: Guidance on effects of vibration in terms of the response of building occupants**

| Vibration level | Effect |
|---|---|
| 0.14 mm/s | Vibration may just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies people are less sensitive to vibration. |
| 0.3 mm/s | Vibration might just be perceptible in residential environments. |
| 1.0 mm/s | It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents. |
| 10 mm/s | Vibration is likely to be intolerable for any more than a brief exposure to this level in most building environments. |

Source: BS 5228 Part 2 Table B.1

### 2.6.3 British Standard 4142 Method for rating and assessing industrial and commercial sound

British Standard 4142 'Method for rating and assessing industrial and commercial sound' (2014 amended 2019)[12] provides a methodology for assessing the impact of industrial noise sources on residential receptors as a process to assess sound from sources of an industrial nature.

The level of sound from an industrial source, the 'rating level', is expressed in terms of $L_{Aeq,T}$, and compared to the existing background sound level, expressed in terms of $L_{A90,T}$. If the source is impulsive, intermittent or tonal in nature, then the 'rating level' includes a penalty, to account for the character of the sound.

The following conclusions may be drawn based upon the difference between the rating level and background sound level:

"*Typically, the greater this difference, the greater the magnitude of the 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; and;*
- *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*

[11] British Standard Institution BS 5228 Code of Practice for noise and vibration control on construction and open sites - Part 2: Vibration, 2009+A1:2014

[12] British Standards Institution BS 4142 Method for rating and assessing industrial and commercial sound, 2014+A1: 2019.

*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*."

### 2.6.4 British Standard 8233 Guidance on sound insulation and noise reduction for buildings

BS 8233[13] provides guidance on the control of noise within internal spaces in terms of design aspects limiting the ingress of noise from external and internal sources. It provides design ranges for noise levels within internal spaces considered satisfactory for various uses.

The guidance states that for an unoccupied open plan office, the indoor ambient noise level should not exceed 50 dB $L_{Aeq,T,}$ in this way acoustic privacy in shared spaces can also be maintained. As offices generally operate during daytime, this level is only applicable during daytime.

## 2.7 Guidance

### 2.7.1 Design Manual for Roads and Bridges LA 111 Noise and vibration

Design Manual for Roads and Bridges LA 111 Noise and Vibration (2020)[14] (referred to as DMRB LA 111) describes a methodology for assessing the impacts of road traffic noise in terms of the noise descriptors conventionally used for assessing the impact of road traffic in the UK.

### 2.7.2 Calculation of Road Traffic Noise

The Calculation of Road Traffic Noise (CRTN)[15] describes the procedures for calculating noise from annual average weekday road traffic between 06:00 and 24:00 using the $L_{A10,18\text{-hour}}$ descriptor. These calculations procedures are used to assess the impact of changes in road traffic noise undertaken in accordance with the DMRB LA 111 methodology.

[13] BSI, BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings', 2014

[14] Highways England et al (2020) LA 111 Noise and vibration Revision 2.

[15] Department of Transport and Welsh Office (1988) Calculation of Road Traffic Noise. HMSO.

# 3 Methodology

## 3.1 Overview

This section provides the methodology for the following assessments:

- Construction noise
- Construction vibration
- Construction road traffic noise
- Operational fixed plant noise
- Operational road traffic noise
- Operational HS2 rail traffic noise (on proposed offices)

Table 3.1 below summarises the noise and vibration impacts that have been scoped out of the assessment.

**Table 3.1: Impacts scoped out of the assessment**

| Potential Impact | Justification |
|---|---|
| Operational vibration | There are no significant sources of vibration associated with the Project |

All assumptions and limitations within the assessment are also presented.

## 3.2 Construction noise

The assessment of construction noise is undertaken in accordance with guidance provided by BS 5228-1 Example Method 1 – The ABC Method.

The assessment also considers the duration of the construction works. Table E.2 within the standard provides examples of time periods, averaging times and noise levels associated with the determination of eligibility for noise insulation. It specifics that exceedance of the threshold levels for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months indicates a need for temporary rehousing (or the reasonable costs thereof). This is important because the frequency of occurrence (for example, the number of days) and pattern of occurrence (an event occurring one day per month for twelve months versus twelve events occurring sporadically over a one-month period) affects the likelihood of disturbance.

Noise levels for relevant construction plant have been extracted from BS 5228-1 Annex C, which includes a database of equivalent continuous noise levels ($L_{Aeq}$ dB) generated by a range of fixed and mobile plant used for typical construction activities.

In terms of defining the significance of effect, the following criteria are used to identify the potential for a significant adverse effect to occur:

- Predicted construction noise exceeds the threshold category level for significant adverse effect for the relevant period (daytime, evening, night-time etc)
- The duration of noise generating works is expected to be 10 or more days in any 15 consecutive days or a total number of days exceeding 40 in any six consecutive months

## 3.3 Construction vibration

The assessment of vibration due to activities during construction, principally piling, are assessed with respect to the threshold values given in Table 2.2 above. Where the predicted vibration

levels (ppv) exceed the threshold value of 1 mm/s at any receptor positions, BS 5228 Part 2 indicates a likelihood of complaint. Therefore, measures are required to avoid potential disturbance to building occupants.

As noted in BS 5228 Part 2, vibration levels corresponding with the onset of potential cosmetic or structural damage are considerably higher than those used to indicate potential disturbance. Therefore, the use of the disturbance threshold provides the more stringent indicator for the requirement to mitigate.

## 3.4 Construction traffic

Assessment of noise from construction traffic using the current road network follows the methodology and guidance from DMRB LA111. The method compares basic noise levels (BNL) for baseline traffic conditions and those during construction phases. Noise levels from construction traffic using the existing road network are determined in accordance with CRTN methodology. This comparative assessment indicates the relative changes in noise level due to changes in traffic flow during construction at a reference distance of 10m from the closest carriageway edge.

Table 3.2 below presents the criteria for determining the magnitude of impact due to construction traffic noise.

**Table 3.2: Magnitude of Impact for Traffic Noise**

| Impact | Increase in BNL due to construction traffic (dB $L_{A10,18hr}$) |
|---|---|
| Negligible | Less than 1.0 |
| Minor | Greater than or equal to 1.0 and less than 3.0 |
| Moderate | Greater than or equal to 3.0 and less than 5.0 |
| Major | Greater than or equal to 5.0 |

For reference, noise changes due to road traffic of 1 dB are equivalent to an increase traffic flow of 25% or a decrease in traffic flow of 20%.

Guidance indicates that an increase in noise level due to construction traffic of 1 dB or more has the potential to result in adverse effects, and 3 dB or more (moderate or major impact) has the potential to result in significant adverse effects at noise sensitive receptors. This is only relevant however where the road traffic noise source subject to increases is the dominant source of ambient noise at the receptor position. The duration of increases in traffic flow due to construction traffic also contributes to the extent of any adverse effects.

Accordingly, the following criteria are used to identify the potential for a significant adverse effect to occur:

- A moderate or major impact when road traffic noise increases by 3 dB or more due to construction traffic for a period of 10 or more days in 15 days or for 40 days in any consecutive six months.

Professional judgement is applied for effects which are potentially significant. Factors that are applied to determine the final significance of effect include the resultant level of noise at the nearest receptors, the prevailing ambient noise levels and the character of noise in the surrounding area.

## 3.5 Operational site noise

Noise from the daily operations of the Proposed Development site (such as stationary building services plant, vehicle movements within the site, and moving, loading, and unloading materials) has been assessed using methodology from BS 4142, which provides a means of

assessing likely adverse impacts from the introduction of a new industrial sound source. The method compares the rating level[16] at the receiver with the representative background sound level ($L_{A90}$). The existing background sound levels has been used to define the maximum rating level at the closest noise sensitive receptors to the Proposed Development.

The BS 4142 methodology states that the lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. The following are considered:

- Where the rating level is at least 10 dB below background sound level, this is an indication of the specific sound source having a low impact and is considered negligible and not significant
- An adverse noise effect for operational noise arises due to a minor impact which relates to a difference of more than 10 dB below background but less than 5 dB above background sound level
- A potential significant adverse effect arises due to a moderate or major impact. This occurs when the rating level exceeds the background sound level by 5 dB or more.

Additional factors relating to the context are reviewed to determine the final significance of noise effects. Professional judgement is used to apply these factors which may include the following:

- The resultant level of sound at the receptor location
- Comparison of the character and level of residual sound in the existing and proposed scenarios
- The specific sensitivity of receptor (for example, façade insulation treatment, ventilation and/or cooling systems and the need for openable windows, acoustic screening)

## 3.6 Operational road traffic noise

Noise from changes in vehicle movements as a result of the Project is assessed using a proportionate approach following methodology and guidance of DMRB LA 111.

The assessment considered representative noise sensitive receptors adjacent to routes used by operational road traffic associated with the Project. DMRB LA 111 assessment requires the comparison of noise levels with (Do-Something) and without (Do-Minimum) the Project in the opening year to determine the magnitude of impact.

The criteria for determining the magnitude of impact due to operational road traffic noise is the same criteria as construction traffic noise and can be found in Table 3.2 above.

The following criterion is used to identify the potential for a significant adverse effect to occur:

- A moderate or major impact may arise when road traffic noise increases by 3 dB or more due to operational traffic associated with the Proposed Development

Additional factors are used to determine the final level of significance including consideration of the sources of noise, the causes of the change in noise levels, and the magnitude of the impact. Assessment of the final significance for each effect is based upon professional judgement.

[16] The equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location plus any adjustment for characteristic features of the sound.

## 3.7 Limitations and assumptions

### 3.7.1 Baseline noise levels

The Proposed Development is immediately adjacent to an active HS2 construction compound. Noise from site activities affects the local noise climate. The site also generates vehicle movements and any vehicles leaving the site uses temporary traffic lights to join Breakspear Road South. These interrupt the free flow of road traffic along Breakspear Road South and result in temporarily halting southbound traffic past the site entrance.

In addition to the results of the baseline noise measurements conducted by Mott MacDonald in May/June 2022, data published by HS2 has been used to supplement survey data.

### 3.7.2 Construction noise

The construction noise assessment has been undertaken using outline construction activities and assumed plant using experience from similar construction sites and professional judgement. Construction activities are assumed to include:

- Demolition and site clearance
- Levelling the site
- Pavement works, drainage, and utilities
- Construction of buildings
- Piling
- Fit out
- Site compound

Construction plant type and utilisation assumptions for each activity are described in Table 3.3 below as well as the combined noise level for each phase (the sum as $L_{Aeq,T}$ dB at 10m). These assumptions have been developed based on the anticipated works and used to calculate noise levels from construction activities at the representative receptor locations using BS 5228-1 methodology.

**Table 3.3: Plant and equipment assumed to be used during the construction phase**

| Phase | Activity | Equipment | BS 5228-1 ref. | $L_{Aeq,T}$ dB at 10m | Quantity | % on-time |
|---|---|---|---|---|---|---|
| **Demolition and site clearance** | Breaking up brick foundations | Breaker mounted on excavator | C.1.9 | 90 | 1 | 50 |
| | Clearing site | Tracked excavator | C.2.3 | 78 | 2 | 50 |
| | Clearing site | Wheeled backhoe loader | C.2.8 | 68 | 2 | 50 |
| | Loading lorries | Wheeled loader | C.2.27 | 80 | 2 | 50 |
| | Distribution of material | Articulated dump truck | C.2.33 | 81 | 2 | 50 |
| | Breaking road surface | Backhoe mounted hydraulic breaker | C.5.1 | 88 | 1 | 50 |
| | | | **SUM** | **90** | | |
| | | | | | | |
| **Levelling the site** | Ground excavation/ earthworks | Dozer | C.2.10 | 80 | 2 | 50 |

| Phase | Activity | Equipment | BS 5228-1 ref. | $L_{Aeq,T}$ dB at 10m | Quantity | % on-time |
|---|---|---|---|---|---|---|
| | Ground excavation/ earthworks | Tracked excavator | C.2.14 | 79 | 2 | 50 |
| | Distribution of material | Dump truck | C.2.31 | 87 | 2 | 25 |
| | Rolling and compaction | Dozer towing roller | C.2.36 | 81 | 1 | 50 |
| | Rolling and compaction | Vibratory roller | C.2.39 | 74 | 1 | 25 |
| | Distribution of material | Articulated dump truck | C.2.33 | 81 | 2 | 25 |
| | Spreading chipping/fill | Dozer | C.5.13 | 82 | 1 | 25 |
| | | | **SUM** | **88** | | |
| | | | | | | |
| **Pavement works, drainage and utilities** | Mixing concrete | Cement mixer truck | C.4.20 | 80 | 1 | 75 |
| | Lifting | Wheeled mobile crane | C.4.43 | 70 | 1 | 50 |
| | Trenching | Wheeled excavator | C.4.10 | 66 | 2 | 50 |
| | Paving | Asphalt paver and tipper lorry | C.5.31 | 77 | 1 | 25 |
| | Rolling and compaction | Vibratory roller | C.5.26 | 77 | 2 | 25 |
| | | | **SUM** | **81** | | |
| | | | | | | |
| **Construction of buildings** | Lifting | Wheeled mobile crane | C.4.43 | 70 | 1 | 50 |
| | Lifting | Telescopic handler | C.4.54 | 79 | 1 | 50 |
| | Mixing concrete | Cement mixer truck | C.4.20 | 80 | 1 | 25 |
| | Core drilling concrete | Core drill (electric) | C.4.69 | 85 | 1 | 25 |
| | Miscellaneous | Handheld cordless nail gun | C.4.95 | 73 | 1 | 25 |
| | | | **SUM** | **82** | | |
| | | | | | | |
| **Piling** | Driven cast in situ piling | Drop hammer | C.12.5 | 101 | 1 | 25 |
| | Lifting | Wheeled mobile crane | C.4.43 | 70 | 1 | 25 |
| | | | **SUM** | **95** | | |
| | | | | | | |
| **Fit-out** | Lifting | Diesel scissor lift | C.4.59 | 78 | 1 | 50 |
| | Lifting | Wheeled mobile crane | C.4.43 | 70 | 1 | 50 |
| | | | **SUM** | **76** | | |
| | | | | | | |
| **Compound** | Power | Generator | C.4.79 | 64 | 1 | 90 |
| | | | **SUM** | **64** | | |

### 3.7.3 Construction traffic

It is assumed that construction traffic (including Heavy Goods Vehicles (HGV), deliveries, and collections and the attendance of site staff using light vehicles) will access the site via Breakspear Road South.

At this stage the amount of construction traffic is unknown. However, a conservative worst-case calculation of 200 light vehicle and 400 heavy vehicle movements per day (meaning 300 vehicles arriving and leaving the Project site) has been assumed for works. The latest Transport Statement[17] in section 5.2 states that:

"*Following discussions with Keltbray, it is estimated that there could be an absolute maximum requirement for 40 HGVs to access the site on a single day. This is a potential but unlikely worst-case scenario and typically the average HGV numbers per day over the course of the construction project will be significantly lower than this.*"

This corresponds with 80 movements per day.

### 3.7.4 Operational noise

At this stage, the following specifications of permanent and/or daily operations within the Proposed Development site are currently unknown:

- Fixed building services plant to be installed
- Vehicle movement/on-site traffic
- Moving, loading, and unloading of material

Typical background sound levels (expressed as $L_{A90,T}$) which are representative of the nearest noise sensitive receptors have been measured. In the absence of definitive plant and operations within the Proposed Development site and using guidance from consultation with the Local Authority, a proposed rating level limit on operational noise emissions has been defined at 5 dB below prevailing background.

Building services plant installations will be designed to ensure that resultant sound levels fall within this limit. Compliance with this shall be demonstrated during the design stage.

In the case of the other operational activities listed above, an estimate of the noise emission from typical operations (e.g. loading gravel into lorry, use of telehandler to load/unload material) that might occur in Yard 3, the closest yard to the receptors, has been calculated. Operational plant type and utilisation assumptions are described in Table 3.4. These assumptions have been developed based on experience from similar sites and professional judgement and have been used to calculate noise levels from operational activities at the representative receptor locations which may be compared to the prevailing background sound level in accordance with BS 4142 methodology.

Core activity is identified to be between 06:00 and 18:00 mainly from Monday to Friday, with minimal movements outside this period[18].

[17] Mott MacDonald (2022). Former MSD Facility, Breakspear Road, Ickenham - Transport Statement (doc ref: 108003-MMD-00-XX-DC-T-0001)

[18] Mott MacDonald (2022). Former MSD Facility, Breakspear Road, Ickenham - Transport Statement (doc ref: 108003-MMD-00-XX-DC-T-0001)

**Table 3.4: Plant and equipment assumed to be used during the operational phase**

| Phase | Activity | Equipment | BS 5228-1 ref. | $L_{Aeq,T}$ dB at 10m | Quantity | % on-time |
|---|---|---|---|---|---|---|
| **Loading and unloading of material** | Loading lorries | Loading gravel to lorry | C.10.10 | 85 | 1 | 20 |
| | Lifting | Telescopic handler | C.2.35 | 71 | 2 | 25 |
| | | | **SUM** | **78** | | |

In addition, the Proposed Development has the potential to result in changes in traffic noise conditions at surrounding noise sensitive receptors; the associated impacts can be beneficial or adverse. Factors which have the potential to affect road traffic noise include, among others: overall traffic volume, proportion of heavy vehicles, traffic speed, road alignment (vertical and horizontal alignment), the type of carriageway surfacing material and change to the noise character of the existing area or non-acoustic factors (e.g. vegetation removal).

# 4 Baseline conditions

## 4.1 Overview

This section presents a description of the baseline noise climate based on three main sources of information:

- Baseline noise surveys conducted by Mott MacDonald in May/June 2022
- Baseline data presented within the HS2 Environmental Statement 2013
- HS2 monitoring data collected during the construction phase

## 4.2 Measurement procedure and locations

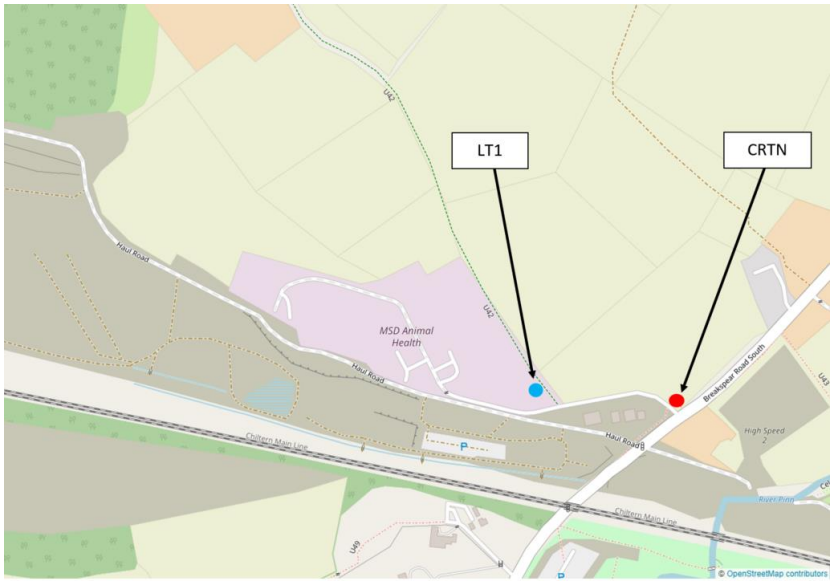
A noise survey was undertaken by Mott MacDonald and comprised:

- an unattended, continuous measurement on the site from Wednesday 25 May 2022 to Wednesday 1 June 2022 (position 'LT1'); and
- an attended measurement adjacent to Breakspear Road South close to the site entrance on Wednesday 25 May 2022 and in accordance with the shortened measurement procedure described in CRTN (position 'CRTN').

Measurement locations are detailed in Figure 4.1 below and photographs of the sound level meters (SLMs) in their positions are shown in Figure 4.2 and Figure 4.3.

The position 'LT1' was selected to be representative of the noise levels at the nearest receptors. The position 'CRTN' was situated 4m away from the nearest edge of the Breakspear Road South carriageway.

**Figure 4.1: Noise measurement positions**




Source: OpenStreetMap Contributors, marked up by Mott MacDonald

**Figure 4.2: Photograph of the LT1 measurement position**

**Figure 4.3: Photograph of the CRTN measurement**

It was intended that the attended CRTN measurement would follow the shortened measurement procedure within the guidance, where measurements of $L_{10}$ are made over three consecutive hours (between 10:00 and 17:00). However, due to unsuitable weather conditions and moisture on the carriageway of Breakspear Road South, the measurement was terminated after two hours.

## 4.3 Equipment

All equipment used for baseline noise measurements complies with Class 1 requirements given in BS EN 61672[19]. The SLMs were fitted with a microphone and windshield suitable for the outdoor environment. Measurements were taken at a height of between 1.2m and 1.5m above local grade level.

[19] BS EN 61672-1:2013 'Electroacoustics-Sound level meters Part 1: Specifications.'

All measurement locations were chosen to be 'free field' (at least 3.5m from an acoustically reflective façade). Measurements were completed by a Mott MacDonald acoustician competent in environmental noise monitoring and completed in accordance with the principles of BS 7445[20].

The calibration levels of all SLMs were checked before and after the measurement periods and no significant changes were noted in drift or offset from the reference levels.

A full inventory of this equipment is shown in Table 4.1 below.

**Table 4.1: Details of sound measurement equipment used**

| Item | Make/model | Serial number | Calibrated until |
|---|---|---|---|
| SLM (for CRTN measurement) | Rion NL-52 | 1265461 | 17/01/2024 |
| SLM (for LT measurement) | Rion NL-52 | 1265460 | 07/07/2023 |
| Calibrator | Rion NC75 | 34913591 | 21/02/2023 |

As a minimum, the SLMs recorded noise levels in decibels to include the following descriptors:

- $L_{Amax}$ – the highest value of the A-weighted sound pressure level with a specified time weighting that occurs during a given event.
- $L_{Aeq,T}$ – also referred to as the continuous equivalent noise level, it is the A-weighted sound pressure level that is the same amount of sound energy as the time varying noise over the same period of time (T).
- $L_{A10,T}$ – the A-weighted sound pressure level that is exceed for 10% of a given time interval (T).
- $L_{A90,T}$ – also referred to as the background noise level, it is the A-weighted sound pressure level that is exceeded for 90% of a given time interval (T).

All equipment was configured to measure A-weighted values using the fast time weighting.

For the purposes of the assessment, only the $L_{Aeq}$ and $L_{A90}$ parameters are presented as the results of the measurement at position LT1. The $L_{A90}$ values measured in contiguous 15-minute intervals have been analysed to determine the modal value for the background sound levels during the day and night-time periods in accordance with guidance provided by BS 4142.

The results of the measurement at position CRTN are presented as one-hour values using the $L_{A10}$ parameter, which is appropriate with regards to road traffic noise.

## 4.4 Weather conditions

Historic meteorological data published by the Met Office © Crown copyright 2018, at https://wow.metoffice.gov.uk/ is obtained for the Frithwood Weather observation site. Actual wind speeds at the site would be expected to be less than those recorded at the meteorological station as the microphone was located closer to the ground. Table 4.2 below summarises the recorded weather conditions.

[20] British Standards Institution BS 7445 Description and measurement of environmental noise. Part 1: Guide to quantities and procedures, 2003,

**Table 4.2: Record of weather conditions during the noise survey**

| Date | Conditions | Wind speed range (m/s) | Temperature range (°C) |
|---|---|---|---|
| Wednesday 25 May 2022 | Mix of sunny and cloudy, rain in afternoon | 0.5-3.6 | 8.3-18.6 |
| Thursday 26 May 2022 | Mix of sunny and cloudy | 0.5-3.6 | 9.9-20.1 |
| Friday 27 May 2022 | Mix of sunny and cloudy | 0.5-3.6 | 11.4-19.1 |
| Saturday 28 May 2022 | Mix of sunny and cloudy | 0.5 - 2.2 | 8.3 - 17.4 |
| Sunday 29 May 2022 | Mix of sunny and cloudy | 0.5 - 3.1 | 5.9 – 16.0 |
| Monday 30 May 2022 | Mix of sunny and cloudy, intermittent rain through afternoon and evening | 0.5 -1.8 | 5.4 - 14.1 |
| Tuesday 31 May 2022 | Mix of sunny and cloudy, rain roughly between midnight and 02:00, and intermittent rain through afternoon and evening | 0.5 - 2.2 | 8.1 - 15.8 |
| Wednesday 1 June 2022 | Mix of sunny and cloudy | 0.5 - 1.3 | 6.8 - 17.8 |

Source: https://wow.metoffice.gov.uk/ (Met Office © Crown copyright 2019)

## 4.5 Limitations

Inevitably there is a degree of variation in measured noise levels. Contributory factors to this variation include meteorological conditions, the inherent difference in the acoustic environment during the course of a day (eg variations in traffic flows) and tolerances in instrumentation readings. Any acoustic measurement is a snapshot of the conditions at the time of the measurement. Every effort has been made to limit variation in the measurements reported. Measures taken to limit variation include:

- Undertaking surveys with appropriately qualified and trained acoustic engineers
- Conducting measurements over multiple days to ensure the variations in noise climate are captured
- Use of measurement equipment that is calibrated to appropriate standards by accredited bodies and checking reference levels on site using a field calibrator
- Following best practice methodology for environmental noise measurement set out in BS 7445
- Measuring under appropriate meteorological conditions and disregarding measurements where conditions were unsuitable (for example, during rainfall or where average wind speeds exceed 5m/s)
- Measuring at times and locations that are representative of the noise climate affecting the sensitive receptors considered relevant to the exposure to the noise impact considered.

## 4.6 Results

### 4.6.1 Long-term measurements

The results of the long-term measurements have been analysed to determine the following parameters:

- Representative modal daytime $L_{A90,1hour}$ and night-time $L_{A90,15min}$ background sound levels derived from the measured 15-minute values in accordance with the procedures described in BS 4142
- $L_{Aeq,T}$ daytime (12-hour), evening (4-hour) and night-time (8-hour) ambient noise levels in accordance with BS 5228-1

All levels have been rounded to the nearest whole number and are presented in Table 4.3.

**Table 4.3: Summary of results of the measurement at position LT1**

| Date | $L_{Aeq, T}$ dB | | | Modal $L_{A90, 15min}$ dB | | Notes |
|---|---|---|---|---|---|---|
| | Day (07:00-19:00) | Evening (19:00-23:00) | Night (23:00-07:00) | Day (07:00-23:00) | Night (23:00-07:00) | |
| Wednesday 25 May 2022 | 55* | 52 | 48 | 47* | 37 | |
| Thursday 26 May 2022 | 56 | 51 | 47 | 47 | 35 | |
| Friday 27 May 2022 | 54 | 50 | 44 | 44 | 30 | |
| Saturday 28 May 2022 | 50 | 47 | 46 | 40 | 34 | |
| Sunday 29 May 2022 | 48 | 50 | 50 | 38 | 37 | |
| Monday 30 May 2022 | 56 | 53 | 49 | 47 | 44 | School half term<br>$L_{Aeq}$ daytime and evening data and $L_{A90}$ daytime data may not be representative of typical conditions |
| Tuesday 31 May 2022 | 54 | 51 | 48 | 43 | 38 | |
| Wednesday 1 June 2022 | 53* | --- | --- | 43* | --- | |
| * Denotes a partial time period due to installation and collection of SLM | | | | | | |

### 4.6.2 Short-term measurement

Results of the measurement at position CRTN are summarised in Table 4.4 below. As stated above, measurement in accordance with the CRTN shortened measurement procedure was terminated after two hours due to rainfall and moisture on the carriageway of Breakspear Road South.

**Table 4.4: Summary of the results of the measurement at position CRTN**

| Time | $L_{A10,1hr}$ dB | Notes and observations |
|---|---|---|
| 13:15 - 14:15 | 72 | Dominant noise source RTN from Breakspear Rd S |
| 14:15 - 15:15 | 73 | Temporary traffic lights in close proximity to SLM (used for HS2 site personnel to cross the road) resulting in occasional traffic queues, engines revving when lights turn green, idling<br>Intermittent railway noise in distance<br>Construction noise from adjacent HS2 compound |
| 15:15 - 16:15 | N/A | Measurement terminated due to rain and subsequent wet roads |

Considering typical traffic conditions, it is assumed that the $L_{A10,1hr}$ value for the 15:15 to 16:15 interval to be at least equal to the previous two hours due to higher traffic flows during the evening rush hour period. Therefore, the arithmetic mean of the three hours is calculated as 73 dB $L_{A10,3hr}$ corresponding with the daytime value of 72 dB $L_{A10,18hr}$.

## 4.7 HS2 published data

Reference is made to the HS2 London-West Midlands Environmental Statement, Volume 5: Appendix SV-002-006 (Community Forum Area 6 [CFA6] South Ruislip to Ickenham)[21].

Table 4.5 below summarises the baseline noise levels from the report that are closest to the Proposed Development area (prior to the set-up of the current site compound) and Figure 4.4 shows the approximate location of the positions.

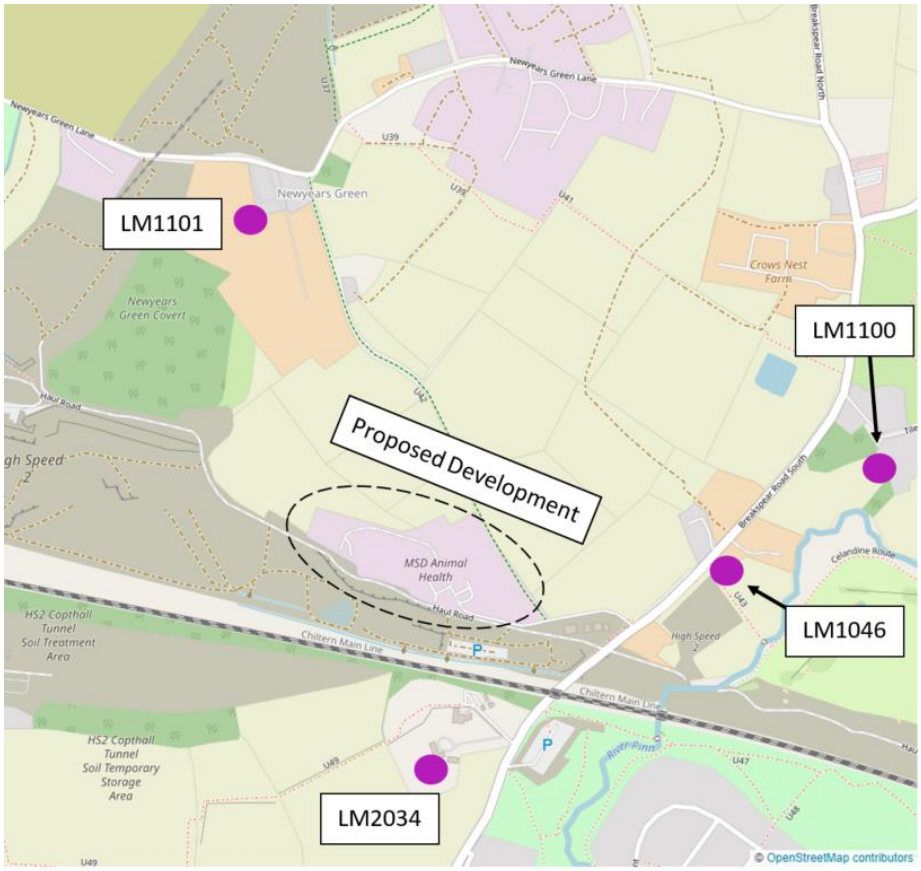
**Table 4.5: Summary of HS2 baseline noise data relevant to the study area**

| Position reference | Brief description | Daytime $L_{Aeq}$ dB | Evening/ weekend $L_{Aeq}$ dB | Night-time $L_{Aeq}$ dB |
|---|---|---|---|---|
| LM1046 | Dwellings north of the Chiltern main line railway off Breakspear Road South, Harefield | 57.5 | 55.4 | 48.6 |
| LM2034 | Dwellings south of the Chiltern main line railway off Breakspear Road South, Harefield | 50.1 | 48.2 | 48.3 |
| LM1100 | Dwellings off Tile Kiln Lane, Harefield | 51.9 | 50.3 | 46.5 |
| LM1101 | New Years Green Lane, Harefield | 50.3 | 47.2 | 45.1 |

Source: Information from London-West Midlands Environmental Statement, Volume 5: Appendix SV-002-006 CFA6 South Ruislip to Ickenham

[21] HS2 Limited from the London-West Midlands Environmental Statement, Volume 5: Appendix SV-002-006 (Community Forum Area 6 [CFA6] South Ruislip to Ickenham), [available online https://webarchive.nationalarchives.gov.uk/ukgwa/20140810181503/http://assets.dft.gov.uk/hs2-environmental-statement/volume-5/sound/Vol5_CFA6_Sound_noise_and_vibration_Baseline_report_SV-002-006.pdf]

**Figure 4.4: HS2 measurement positions**




Source: OpenStreetMap Contributors, marked up by Mott MacDonald

### 4.7.1 Comparison of baseline data

HS2 baseline measurement positions LM1046 and LM2034 and similar to position LT1 used for the May/June 2022 survey conducted by Mott MacDonald.

LM1046 is located approximately 145m away from position LT1 off of Breakspear Road South. Daytime and evening levels measured on site in May/June 2022 are lower than the HS2 baseline noise levels. This may be because LM1046 is in closer proximity of Breakspear Road South compared with position LT1. The night-time noise levels are similar despite position LT1 being more remote from the road.

LM2034 is located approximately 360m away from position LT1 off of Breakspear Road South within the grounds of Brackenbury House. Daytime and evening levels measured on site in May/June 2022 are higher than the baseline noise levels at LM2034 published by HS2. This position is further from the road than position LM1046, but closer to the Chiltern main line railway. As noted above, the night-time noise levels are similar despite position LT1 being more remote from the road.

### 4.7.2 HS2 monitoring data

HS2 construction monitoring noise data measured during May 2022 (concurrent with the Mott MacDonald survey) at location ID N065 on Breakspear Road South, Harefield, Uxbridge

(507425E 187376N)[22] are summarised in Table 4.6. This location is in proximity of HS2 baseline position LM1046 (for details refer to section 4.7).

The HS2 site, adjacent to the proposed development, is known to be active during weekdays (excluding bank holidays) from 08:00 to 18:00 and Saturdays from 08:00 to 13:00, in line with the core working hours detailed into HS2 Phase 1-D4: Working Hours, v1.4, February 2017.

**Table 4.6: Summary of HS2 construction monitoring noise data relevant to the study area**

| Date | Average $L_{Aeq,T}$ dB | | | | Modal $L_{A90,T}$ dB | |
|---|---|---|---|---|---|---|
| | Weekday Daytime (07:00-19:00) | Saturday Daytime (07:00-13:00) | Weekday Evening (19:00-23:00) | Night (23:00-07:00) | Daytime (07:00-23:00) | Night-time (23:00-07:00) |
| w/c 3 May 2022* | 65 | 66 | 63 | 59 | 50 | 40 |
| w/c 9 May 2022 | 66 | 64 | 63 | 59 | 53 | 41 |
| w/c 16 May 2022 | 65 | 65 | 63 | 59 | 52 | 41 |
| w/c 23 May 2022 | 65 | --- | 64 | 59 | 50 | 39 |

* Bank holiday of 2 May is excluded

Position N065 is located approximately 290m from position LT1. These monitoring levels throughout the month of May are higher than the baseline noise levels at LT1 for every time period. This is most likely because N065 is in closer proximity of Breakspear Road South compared with position LT1.

[22] https://www.data.gov.uk/dataset/24542ae7-dd44-444f-b259-871c4cc43b5e/environmental-monitoring-data; "May 2022 monthly monitoring data"; "hs2_noise_data_areasouth_hillingdon_may_2022" location ID N065

# 5 Assessment

## 5.1 Noise sensitive receptors

Five representative receptor locations have been selected for the assessment of noise impacts. These receptors represent the closest properties surrounding the Proposed Development and have the potential to be affected by the construction works. These receptors are described in Table 5.1 below and shown in Figure 5.1.

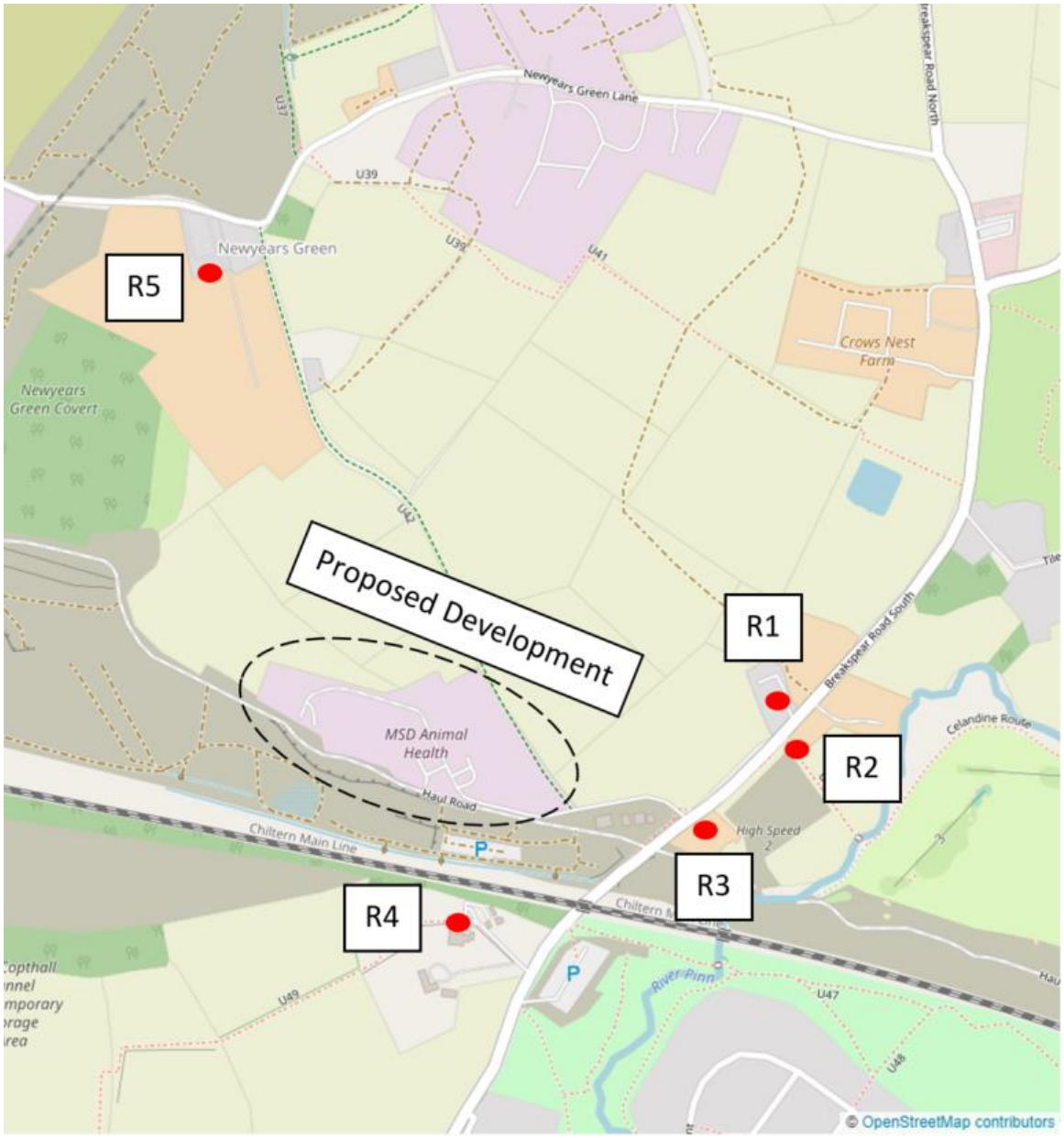
**Table 5.1: Summary of noise sensitive receptors**

| ID | X, Y (BNG) | Description of receptor | Baseline reference | Representative ambient noise level, dB $L_{Aeq, T}$ | | Background sound level, dB $L_{A90, T}$ | |
|---|---|---|---|---|---|---|---|
| | | | | Weekday daytime (08:00 – 19:00) | Saturday morning (08:00 – 13:00) | Daytime (07:00 – 23:00) | Night-time (23:00 – 07:00) |
| R1 | 507402, 187433 | Grays Cottages, residential property off Breakspear Rd S | LT1, LM1046, N065 | 57 | 52 | 50 | 40 |
| R2 | 507434, 187390 | Residential property on the south side of Breakspear Rd S | LT1, LM1046, N065 | 57 | 52 | 50 | 40 |
| R3 | 507336, 187272 | Residential property adjacent to site entrance on Breakspear Rd S | LT1, LM1046, N065 | 57 | 52 | 50 | 40 |
| R4 | 507047, 187173 | Brackenbury House, residential property between Breakspear Rd S and Chiltern main line railway | LM2034, N065 | 50 | 48 | 50 | 40 |
| R5 | 506752, 187927 | Residential property off New Years Green Ln | LM1101 | 50 | 47 | -- | -- |

On a precautionary basis, the representative ambient noise levels for daytime have been derived from the daytime HS2 data at the nearest position. The background sound levels for the daytime and night-time are selected as typical modal values after analysing both the survey data measured by Mott MacDonald in May/June 2022 and the HS2 monitoring data from the month of May.

The representative ambient noise levels for Saturday mornings for R1, R2, and R3 have been derived from the results of the measurement at position LT1 between the hours of 08:00 and 13:00. The representative ambient noise levels for Saturday mornings for R4 and R5 have been derived from the evening/weekend HS2 data at the nearest position. Since position LT1 is not an equivalent position for R4 and R5 the HS2 evening/weekend data is considered representative of Saturday noise levels.

**Figure 5.1: Receptor locations**




Source: OpenStreetMap Contributors, marked up by Mott MacDonald

## 5.2 Construction noise

Calculations have been completed at the identified representative receptor locations based on the stated assumptions in section 3.1.

As per the LB of Hillingdon core working hours set out in section 2.3.3, assessments have been completed for the daytime and Saturday morning time periods using ‘Example method – the ABC method' described in BS 5228-1. The representative baseline ambient noise levels indicate that all five receptors fall within Category A.

Calculations indicate that the phases including demolition, site clearance and levelling the site are predicted to be the noisiest and the received levels are presented in Table 5.2. The magnitude of impact due to other construction activities are predicted to be lower. The predictions assume no specific mitigation. The values for receptor R4 assume the benefit of

partial screening (5 dB attenuation) provided by the existing railway embankment. All levels are presented as free-field values.

**Table 5.2: Assessment of construction noise impacts**

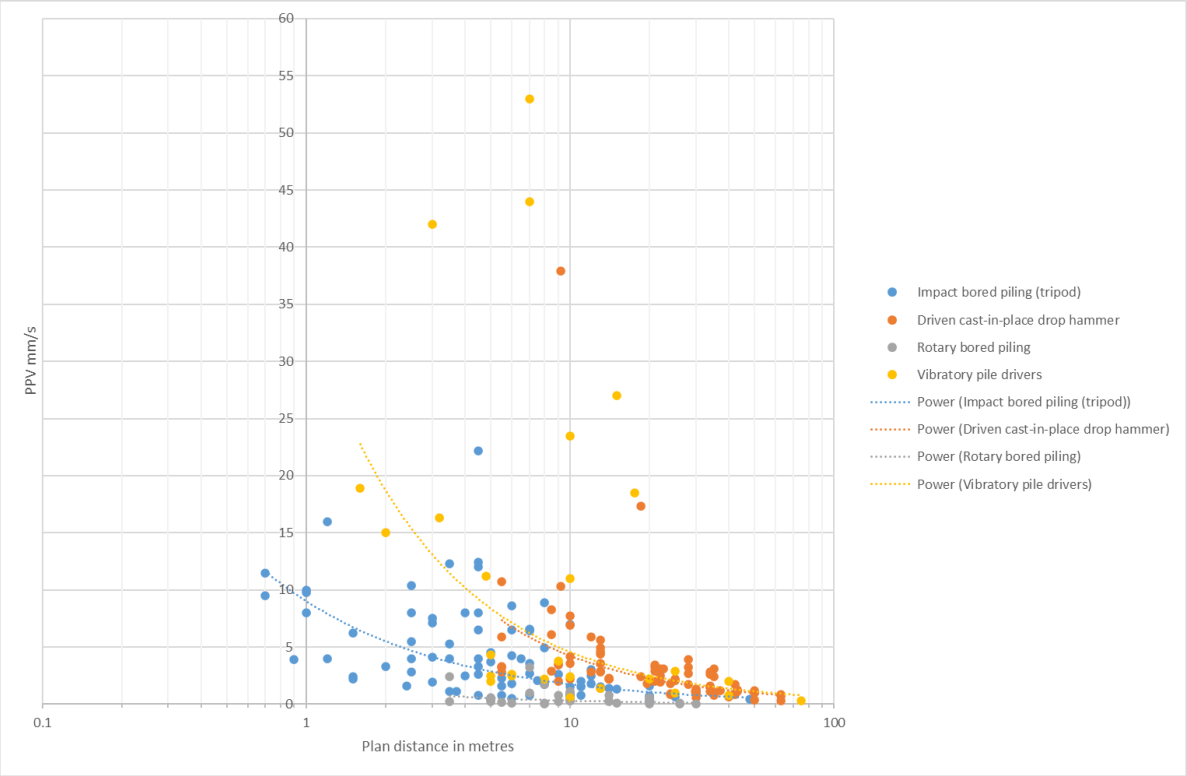
| Phase | R1 | R2 | R3 | R4 | R5 |
|---|---|---|---|---|---|
| **Category A Threshold (Daytime and Saturday morning) dB(A)** | **65** | **65** | **65** | **65** | **65** |
| Predicted noise impact due to demolition and site clearance $L_{Aeq}$ dB | 58 | 57 | 61 | 60 | 53 |
| Predicted noise impact due to site levelling $L_{Aeq}$ dB | 56 | 55 | 58 | 57 | 51 |
| Predicted noise impact due to drop hammer piling $L_{Aeq}$ dB | 63 | 62 | 64 | 67 | 57 |

Results indicate that predictions for the noisiest construction activities do not exceed the 65 dB(A) daytime threshold of Category A receptors except in the case that drop hammer piling is required where it is predicted to marginally exceed 65 dB(A). The noisiest method of piling has been considered as a worst case. However, the duration of work is not expected to a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months Therefore, no potential significant effect is identified due to activities on site during any stage of the construction phase.

## 5.3 Construction vibration

Figure 5.2 presents levels of ground-borne vibration for various types of piling methods as a function of distance. This shows that vibration from general activity is not expected to result in levels of vibration exceeding ~1 mm/s beyond 100m distance. It is expected that no sensitive receptors will lie within 100m of any piling activity therefore there is low risk that vibration due to piling will result in disturbance within neighbouring occupied buildings.

**Figure 5.2: Vibration levels for impact bored, driven cast rotary bored and vibratory piling methods**




Source: BS 5228 Part 2 Annex D

## 5.4 Construction traffic

The assessment has considered changes in road traffic on Breakspear Road South due to additional traffic movements during the construction phase. The baseline is described by traffic count data collected in 2022 and therefore includes the contribution of HS2-related traffic. As stated above, short-term changes in road traffic noise of 1 dB are considered to be smallest perceptible change. The predicted changes BNL values for the section of Breakspear Road South with the lowest baseline traffic volumes are shown in Table 5.3 below.

**Table 5.3: Construction traffic noise**

| Road | Construction Traffic Assumption | Existing Traffic BNL, dB(A) $L_{A10,\ 18hr}$ | Existing + Construction Traffic BNL, dB(A) $L_{A10,\ 18hr}$ | BNL Difference | Assessment |
|---|---|---|---|---|---|
| Breakspear Road South, link near R1 and R2 | 100 additional HGV movements<br>50 additional light vehicle movements | 68.9 | 69.1 | 0.3 | Negligible |
| | 200 additional HGV movements<br>100 additional light vehicle movements | 68.9 | 69.4 | 0.5 | Negligible |
| | 400 additional HGV movements<br>200 additional light vehicle movements | 68.9 | 69.9 | 1.0 | Minor |

An increase in road traffic of 400 additional HGV movements and 200 additional light vehicle movements per day would lead to a minor impact and would not be significant. This is however unlikely to occur for a construction site of this size and is a conservative approach.

The latest project information is that it is estimated that there could be an absolute maximum requirement for 30 HGVs to access the site on a single day. This is a potential but unlikely worst-case scenario and typically the average HGV numbers per day over the course of the construction project will be significantly lower than this[23].

This does not lead to a change in the outcome of the noise assessment of construction traffic.

## 5.5 Operational site noise

Noise level information is not available at this time to enable detailed assessment of operational noise from within the Proposed Development site. However, core activity is identified to be between 06:00 and 18:00 mainly from Monday to Friday, with minimal movements outside this period[24].

As per consultation with the Local Authority, the proposed rating level as defined in BS 4142 at the nearest noise sensitive receptors is not to exceed the level 5 dB below the representative background noise level.

Should noise from the daily operations within the site include a tonal, intermittent or impulsive noise character when assessed at receptor locations then appropriate penalty corrections should be applied to determine the rating level in accordance with BS 4142 guidance.

Based on the representative values presented in Table 5.1, the noise emissions of combined operational site noise (from fixed plant, on-site vehicle movements, and moving, loading, and unloading of material) should be controlled so that the rating levels at all receptor locations do not exceed:

- 45 dB $L_{Ar,Tr}$ during the daytime
- 35 dB $L_{Ar,Tr}$ during the night-time

Design of fixed mechanical services plant must include appropriate mitigation measures such as a barrier or plant enclosure.

An estimate of the typical operation of loading and unloading that might occur in Yard 3, the closest yard to the receptors, has been calculated and results (free-field) are presented in Table 5.4. Calculations have been completed at the identified representative receptor locations based on the stated assumptions in section 3.7.4. The values for receptor R4 assume the benefit of partial screening (5 dB attenuation) provided by the existing railway embankment. The remaining receptors assessed are assumed to have line of sight to Yard 3. Note that acoustic attenuation is not generally ascribed to vegetation screening receptors from sources of noise.

**Table 5.4: Assessment of likely operational noise impacts**

| Phase | R1 | R2 | R3 | R4 |
|---|---|---|---|---|
| Predicted noise level due to loading and unloading of material in Yard 3 $L_{Aeq}$ dB | 46 | 45 | 48 | 46 |

[23] Mott MacDonald (2022). Former MSD Facility, Breakspear Road, Ickenham - Transport Statement (doc ref: 108003-MMD-00-XX-DC-T-0001)

[24] Mott MacDonald (2022). Former MSD Facility, Breakspear Road, Ickenham - Transport Statement (doc ref: 108003-MMD-00-XX-DC-T-0001)

The predictions indicate that noise levels due to site operations are likely to fall below the prevailing background sound level, but are marginally above the rating level limit agreed with LBH. If it is considered essential that rating level from these activities falls 5 dB below prevailing background consideration should be given to the installation of a noise barrier (approximately 2.4-3m tall) around the south-east and north-east perimeter of Yard 3. The same typical operational activity being undertaken in Yard 4, Yard 2 and Yard 5 are likely to be lower due to greater distance and the presence of the hangar buildings that act as a screen.

## 5.6 Operational traffic

Operational traffic flows have been predicted for Breakspear Road South. Once operational, the access to the development would be mainly along Breakspear Road South to the site entrance approximately 160m north of the railway bridge (under the Chiltern Mainline).

The comparison of the BNL values for multiple road links on Breakspear Road South are shown in Table 5.5, which indicate that the predicted changes in road traffic noise om all sections is assessed to be no more than negligible.

**Table 5.5: Operational traffic noise**

| Road link | BNL for 2022 baseline (dB) | BNL for consented development (dB) | BNL for proposed development (peak) (dB) | BNL for proposed development (average) (dB) | Max BNL difference (dB) | Assessment |
|---|---|---|---|---|---|---|
| BRS, link near R1 and R2 | 67.5 | 67.6 | 67.5 | 67.5 | 0.1 | Negligible |
| BRS link near R4 | 67.6 | 67.7 | 67.6 | 67.6 | 0.1 | Negligible |
| BRS, link north of B467 | 67.7 | 67.8 | 67.7 | 67.8 | 0.1 | Negligible |
| BRS, link south of B467 | 70.3 | 70.4 | 70.4 | 70.4 | 0.1 | Negligible |
| BRS, link north of A40 | 71.3 | 71.3 | 71.3 | 71.3 | No difference | Negligible |

BRS: Breakspear Road South
Note: Data used are AAWT for both way at each link

## 5.7 HS2 operational noise affecting proposed office spaces

Predicted noise levels due to the operation HS2 in the area of the Project are presented in the HS2 London-West Midlands Environmental Statement, Volume 5: Appendix SV-004-006 (Community Forum Area 6 [CFA6] South Ruislip to Ickenham). Location ID 709519 is considered to be representative of proposed office space on the basis that it is at a similar distance from the HS2 track alignment as the proposed office building. The estimated distance between the proposed office and the HS2 railway is approximately 35m. Predicted noise levels are reproduced in Table 5.6.

With reference to BS 8233[25] guidance, for acoustic privacy in an open plan office the ambient noise levels should be designed to be in the range 45 to 50 dB $L_{Aeq,T}$ excluding any noise produced by the occupants and their activities. More stringent guideline values apply to rooms

[25] British Standards Institution (2014) Guidance on sound insulation and noise reduction for buildings

requiring study and work requiring concentration (35 to 45 dB(A) for a staff/meeting room and 35 to 40 dB(A) for an executive office). BS 8233 also states "*If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB*".

The predicted 'Do Something' daytime noise level due to HS2 train traffic is 68 dB $L_{pAeq,07:00-23:00}$ (outdoor free field value). The corresponding internal level is estimated to be 53 dB $L_{pAeq,07:00-23:00}$, which exceeds the 45 to 50 dB design range for an open plan office given by BS 8233. Therefore, consideration should be given to the façade insulation and ventilation strategy. Given that the HS2 noise levels exceeds the design range by a relatively small margin, this could be achieved by providing a passive attenuated ventilation path and appropriate specification of glazing.

**Table 5.6: Extract of HS2 published data for daytime operational noise at receptor ID 709159**

| **Assessment location ID** | **Proposed scheme only (year 15 traffic)** $L_{pAeq}$,07:00-23:00 | **Do nothing (opening year baseline)** $L_{pAeq}$,07:00-23:00 | **Do something (opening year baseline + year 15 traffic)** $L_{pAeq}$,07:00-23:00 |
|---|---|---|---|
| 709519 | 68 | 57 | 68* |

Source: HS2 Limited from the London-West Midlands Environmental Statement, Volume 5: Appendix SV-004-006 (Community Forum Area 6 [CFA6] South Ruislip to Ickenham)
* Correction of the published value of 57 dB $L_{pAeq,07:00-23:00}$

# 6 Mitigation

## 6.1 Best practicable means

Keltbray and their contractors will, as far as reasonably practicable, seek to control noise and vibration levels so that nearby sensitive receptors are protected from excessive or prolonged noise and vibration associated with construction activities at the site, as identified in this application. Best Practicable Means (BPM) are defined under Section 72 of the Control of Pollution Act 1974 as those measures which are *"reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications*". Keltbray and their contractors will apply BPM to all activities to minimise the effects of noise and vibration and comply with the requirements of LB of Hillingdon.

The Site Management Team shall employ best practice and consider the timing, duration and phasing of construction activities to reduce to a minimum any disturbance to sensitive receptors where reasonably practicable.

## 6.2 General Measures

Where practicable, the control measures set out in BS 5228:2009+A1:2014 Part 1 and 2, Sections 8 will be implemented. Measures to be employed as a matter of course include:

- Employing only modern, quiet and well-maintained equipment (all equipment will comply with EC Directive 2000/14/EC, UK Statutory Instrument 2001/1701 and BS 5228); any plant, equipment, or items fitted with noise control equipment found to be defective will not be operated until repaired
- Careful planning of the sequence of work in order to minimise the transfer of noise/vibration to neighbours
- Where reasonably practicable, fixed items of construction plant will be electrically powered from the mains supply in preference to being diesel or petrol driven
- Use of screws and drills rather than nails for fixing hoardings
- Careful handling of materials and waste such as lowering rather than dropping items
- Loading / unloading material into vehicles within designated areas only
- Taking care when erecting or striking scaffolds to avoid impact noise from banging steel
- Avoidance of unnecessary noise (such as engines idling between operations, shouting, loud radios or excessive revving of engines) by effective site management
- Vehicles and mechanical plant utilised on the work sites for any activity associated with the construction works will be fitted with effective exhaust silencers and shall be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable
- All staff will receive a site induction and toolbox talks on the effects of noise and vibration as a nuisance and way to minimise noise and vibration at the source
- Sub-contractors and suppliers will be made aware of the environmental constraints of the site and made to follow the necessary procedures to minimise noise and vibration levels
- Staff will be supervised to prevent any unnecessary noise such as shouting or banging at all times
- Signs will be displayed within the site to raise awareness and to stress the importance of noise and vibration control and its impact on the local residence

## 6.3 Reversing Alarms / Moving Plant Safety Alarms

As far as reasonably practicable, noise from reversing/warning alarms will be controlled and limited. This will be managed through the following hierarchy of techniques:

- The layout of the work site will be designed to limit and where reasonably practicable, avoid the need for the reversing of vehicles. Keltbray and their contractors will ensure that drivers are familiar with the layouts of the work sites
- Alarms incorporating one or more of the features listed below or any other comparable system will be used where reasonably practicable:
  - use of broadband (non-tonal) signals
  - self-adjusting output sounders
  - flashing warning lights;
- Alarms are set to the minimum output noise level required for safety compliance.

## 6.4 Site Specific Measures

The following measures will be applied:

- Proposed plant to be located away from nearby sensitive receptors where reasonably practicable
- Limit the use of noisy plant or vehicles and switch off vehicle engines when not in use
- Lighting towers will be battery or electrical mains powered to eliminate the requirement for additional generator noise sources within work areas
- Ongoing local stakeholder consultation to effectively disseminate information regarding works and construction activities
- BPM will be reviewed and updated throughout the works in response to any complaints received.
- All operatives on site will be trained to ensure that noise minimisation and BPM are implemented at all times. Works will be checked regularly by site engineers to ensure that all works carried out are employing BPM at all times and, where necessary, corrective actions implemented.
- Employees must show consideration to the sensitive receptors, including residential neighbours, and must not generate unnecessary noise when walking to and from the site, or when leaving and arriving at work. This will be communicated through the Site Induction, Start of Shift Briefings and Toolbox Talks with supervision on site at all times.

# 7 Conclusions and recommendations

## 7.1 Construction

Detailed information relating to the proposed construction methods and types of machinery to be utilised are not known at this stage. Therefore, the construction noise assessment has been undertaken using outline construction activities and assumed plant based on experience of similar construction site (details are in section 3.7).

An assessment construction noise in accordance with the BS 5228-1 'Example method 1 – The ABC Method' indicates that predicted levels of noise during demolition and construction activities in all phases are below the 65 dB threshold value applicable to category A receptors. Noise during piling may marginally exceed the threshold value if a drop hammer piling method is used. However, the duration of this impact is not expected to exceed 10 consecutive days out of 15. Therefore, no potential significant effect is expected to occur at any nearby receptors. Details are presented in Section 5.2.

An assessment of changes in road traffic noise due to additional vehicles during construction has been undertaken considering changes in daytime vehicle movements on Breakspear Road South. This has found that with a maximum additional vehicle movements of 200 lights and 400 heavy vehicles (latest Transport Statement info estimated a maximum of 80 HGV movements a day) the impact is assessed as negligible impact and therefore not significant (details are presented in section 5.3).

Piling may be required in the construction of new buildings although the method to be used is not known at this stage. Typical levels of ground-borne vibration arising during piling by methods that generate the highest levels of vibration (drop hammer, impact and vibratory)have been used to estimate the distances at which the disturbance threshold value is exceeded. This indicates that there are no sensitive receptors that are expected to be exposed to vibration levels above the threshold value of 1 mm/s.

Best practicable means for the management of noise and vibration during construction is required and measures are described above and with the Project CEMP (details are presented in Section 6).

## 7.2 Operation

Detailed information and specifications of noise-emitting fixed plant to be installed on site are not available at this stage. Rating noise level criteria applicable to the combined levels due to all sources at the receptor position is required by the LB of Hillingdon to not exceed 5 dB below background sound level ($L_{A90}$) at any receptors when assessed in accordance with BS 4142 guidance for representative receptor locations.

The predictions for site operations (materials handling and vehicle movements) indicate that noise levels are likely to fall below the prevailing background sound level at the nearest noise sensitive receptors, but are marginally above the rating level limit agreed with LB of Hillingdon. If it is considered essential that rating level from these activities falls 5 dB below the prevailing background consideration should be given to the installation of an acoustic barrier (approximately 2.4-3m tall) around the south-east and north-east perimeter of Yard 3.cThe barrier should have a minimum density of 10kg/$m^2$ and be free of gaps between and below panels.

Increases in road traffic noise due to additional operational road traffic Breakspear Road South are assessed as negligible (details are presented in section 5.6).

Noise due to the operation of HS2 trains is expected to break into the internal area of a building in the western area of the site that is allocated as office space (details are presented in section 5.7). The predicted noise level inside the building exceeds the guideline design range for an open office by 3 dB. This assumes windows are opened for ventilation purposes. If the spaces are allocated to more sensitive office type uses then the design range is predicted to be exceeded by a larger margin. It is recommended in the development of the building design, consideration is given to the acoustic insulation and ventilation strategy of façades facing the railway to ensure satisfactory conditions. This may require an appropriate specification of glazing combined with attenuated passive ventilation such as trickle vents.