

# 13. Noise and Vibration

## Introduction

- 13.1 This Chapter of the ES assesses the likely significant effects of the Proposed Development with respect to noise. This Chapter also describes the methods used to assess the effects; the baseline conditions currently existing at the Site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant negative effects; and the likely residual effects after these measures have been adopted.
- 13.2 Vibration has been scoped out this assessment, as the development is not associated with activities that have the potential to cause ground borne vibration at local receptors during its operation or construction.

## Policy context, legislation, standards and other guidance

- 13.3 There is relevant primary and secondary legislation that makes provisions in respect to noise that are relevant to the Proposed Development throughout its life cycle. A summary of relevant legislation is provided in **Table 13.1** below.

**Table 13.1: Summary of Relevant Primary and Secondary legislation**

Primary Legislation	Relevant Statutory Instruments	Relevance
Environmental Protection Act 1990	Statutory Nuisance (Appeals) Regulations 1990	Management of statutory nuisance, including noise, is set out in Part III of the Environmental Protection Act 1990. The act places a duty on a local authority to investigate complaints of statutory nuisance from people living within its area.
Control of Pollution Act 1974	The Control of Noise (Appeals) Regulations 1975	The Control of Pollution Act 1974 (CoPA) grants powers to local authorities to deal with noise nuisances. Section 60 allows a local authority to serve a notice of its requirements for the control of construction site noise, and Section 61 concerns the procedures adopted when a contractor or developer approaches the local authority prior to construction taking place, with the intention of agreeing noise and vibration limits in advance.
	The Control of Noise (Codes of Practice for Construction and Open Sites) (England) Order 2002	This order approves parts of BS 5228 as being suitable for giving guidance on appropriate methods of minimising noise from certain activities, which include construction and piling operations.

## National Planning Policy

### *National Planning Policy Framework (2012)*

- 13.4 The National Planning Policy Framework (NPPF), March 2012 sets out the Government's planning policies for England and how these are expected to be applied. The NPPF sets out the Government's requirements for the planning system, and is a material consideration in planning decisions. In respect to noise, the NPPF states that planning policies and decisions should aim to:
- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
  - mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
  - recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
  - identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
- 13.5 For what constitutes a significant adverse impact, the NPPF refers to the Noise Policy Statement for England.
- 13.6 The Noise Policy Statement for England (NPSE), 2010 provides explanation of the term 'significant adverse impact' from the NPPF. The document also defines the meanings of the terms No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL).
- 13.7 National Planning Practice Guidance (PPG) sets out how planning can manage potential noise impacts in new development. It advises that planning authorities' 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; and
  - whether or not a good standard of amenity can be achieved.
- 13.8 PPG states that these potential effects should be evaluated by comparison with the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. To illustrate these thresholds and help identify where noise could be a concern, PPG provides an example table of noise exposure hierarchy which is repeated as **Table 13.2** for convenience:

**Table 13.2: Noise exposure hierarchy, based on the likely average response**

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect Level (NOAEL)	No specific measures required
		Lowest Observed Adverse Effect Level (LOAEL)	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level (SOAEL)	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

## Local Planning Policy

### *Staffordshire Moorlands Core Strategy (March 2014)*

- 13.9 The Staffordshire Moorlands Development Plan is a District wide development plan which replaces the Staffordshire Moorlands Local Plan to provide a framework for delivering development to 2026. The Core Strategy, the key LDF document, is a

strategic District wide plan which influences how and where the Staffordshire Moorlands will develop and contains all of the policies required to control development. The policies with relevance to noise are as follows.

13.10 Policy SD4 'Pollution and Flood Risk' states the following:

*"The Council will ensure that the effects of pollution (air, land, noise, water, light) are avoided or mitigated by refusing schemes which are deemed to be (individually or cumulatively) environmentally unacceptable and by avoiding unacceptable amenity impacts by refusing schemes which are pollution-sensitive adjacent to polluting developments, or polluting schemes adjacent to pollution sensitive areas, in accordance with national guidance."*

13.11 Policy R1 – 'Rural Diversification' states the following:

*"All development in the rural areas outside the development boundaries of the towns and villages will be assessed according to the extent to which it enhances the character, appearance and biodiversity of the countryside, promotes the sustainable diversification of the rural economy, facilitates economic activity, meets a rural community need and sustains the historic environment. Appropriate development should not harm the rural character and environmental quality of the area or any sites designated for their nature conservation, or historical interest by virtue of the scale, nature and level of activity involved and the type and amount of traffic generated or by other effects such as noise and pollution."*

### **Standards**

13.12 There is a range of British and international standards relating to the quantification, prediction and management of noise. The ES will consider those standards set out below:

- British Standard 7445-2:1991 '*Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use*' describes methods to be used for measuring and describing environmental noise levels at a site in a consistent manner. This standard shall be followed for all environmental noise measurements undertaken to support the assessment.
- British Standard 5228-1:2009+A1:2013 '*Noise and vibration control on construction and open sites*' provides noise source levels for typical construction equipment and calculation methods to determine construction noise levels at distance. It shall be used for all construction noise calculation and assessment.
- British Standard 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' provides recommendations for the control of noise in and around new or refurbished buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate. The standard provides appropriate design criteria for dwellings and offices.

- British Standard 4142:1997 '*Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas*' shall be used for assessing potential noise from the recently consented technology park and the employment uses associated with the Proposed Development, at residential land uses. There is potential for a new version of this standard to be published soon, as consultation has recently closed on a new draft; if this occurs prior to undertaking the baseline noise surveys, its successor will be adopted for use.
- International Standard: ISO 9613-2: 1996(E) '*Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation*' defines algorithms for the prediction of noise levels in the community from sources of known sound emission. It shall be used in the calculation of noise from sources not related to transport infrastructure.

### **Departmental Guidance**

13.13 A number of Government Departments have published procedures in relation to noise and vibration. The following are relevant to Proposed Development:

- Department for Transport '*Calculation of Road Traffic Noise*' (CRTN) (1988) shall be used for the calculation and measurement of road traffic noise.
- Highways Agency '*Design Manual for Roads and Bridges*' (DMRB) Part 7, Volume 11, Section 3 (HD 213/11 – Revision 1) Noise and Vibration shall be used to define boundaries for the likely effect of increases in traffic noise levels.
- Department for Education '*BB 93: Acoustic design of schools*' provides a regulatory framework for the acoustic design of schools, and gives supporting advice for the planning and design of schools.

### **Other relevant guidance**

13.14 A number of Non-Governmental Organisations (NGOs) have published procedures and guidelines in relation to noise and vibration. The following are relevant to Proposed Development:

- World Health Organisation '*Guidelines for Community Noise*' (1999) provides guidance on acceptable internal and external noise levels in buildings and outdoor living areas.
- World Health Organisation '*Night noise guidelines for Europe*' (2009) provide further information on the health effects of night noise, and derives health-based guideline values.

### **Assessment Methodology and Significance Criteria**

13.15 This section sets out the methodology for assessing the likely significant effects of the Proposed Development on noise and vibration. The need for an assessment of noise and vibration effects results from the potential for the effects set out in **Table 13.3** to occur.

**Table 13.3: Potential noise and vibration impacts**

Receptor(s)	Phase / Duration	Impact(s)	Potential Effect(s)
Existing nearby dwellings.	Construction / Temporary	Temporary demolition and construction noise impacts at off-site receptors	Temporary effects on human activity and health (e.g. annoyance, speech communication, sleep disturbance, hypertension, cardiovascular effects and heart disease).
Existing and proposed nearby dwellings.	Operational / Permanent	Permanent commercial noise impacts at receptors due to the commercial aspect of the Proposed Development	Permanent effects on human activity and health (e.g. annoyance, sleep disturbance, hypertension, cardiovascular effects and heart disease).
Existing and proposed nearby dwellings.	Operational / Permanent	Permanent daytime and night-time mechanical services noise impacts at receptors due to the commercial aspect of the Proposed Development	Permanent effects on human activity and health (e.g. annoyance, speech communication, sleep disturbance, hypertension, cardiovascular effects and heart disease).
Existing and proposed nearby dwellings.	Operational / Permanent	Permanent noise and due to road traffic on the local road network.	Permanent effects on human activity and health (e.g. annoyance, speech communication, sleep disturbance, hypertension, cardiovascular effects and heart disease).
Existing and proposed nearby dwellings.	Operational / Permanent	Permanent night-time noise impacts at receptors due to traffic including heavy vehicles accessing the commercial aspect of the Proposed Development	Permanent effects on human activity and health (e.g. annoyance, sleep disturbance, hypertension, cardiovascular effects and heart disease).

### Noise Sensitive Receptors

- 13.16 The effects of noise and vibration on human activities have been assessed at existing and proposed sensitive receptors. All locations for which proper use or enjoyment requires the absence of excessive noise or vibration are considered to be sensitive receptors, including dwellings, community amenity spaces and public rights of way.
- 13.17 The noise sensitive receptors considered in this assessment are set out in the sections below, and are summarised in paragraph 13.20.

### ***Proposed Development***

13.18 A full description of the proposed development is provided in Chapter 4. The noise generating uses associated with the Proposed Development are:

- Up to a maximum of 33,480 sq. metres of employment use (B1, B2 and B8 uses).
- A new vehicular access road, which will provide access to the site from Sandon Road on the western boundary.

13.19 The noise sensitive uses associated with the Proposed Development are:

- Up to 168 residential units.
- Community facilities including a community centre, village shop, green open space, and children's play area.

### ***Surrounding Area***

13.20 The noise sensitive receptors which are immediately adjacent to the Proposed Development are as follows:

- Dwellings in close proximity to the west of the proposed residential development on Sandon Road.
- Dwellings immediately to the southwest of the proposed development on Sandon Close and Rookery Crescent.
- Dwellings to the north of the proposed development along Cresswell Old Road, including Railway Cottages.
- Lower and Upper Newton Farm, to the east of the proposed industrial development.
- Outlying properties to the south of the proposed industrial development (The Shippons, Leese Houses Farm).
- Outlying properties to the south of the proposed residential development (Four Oaks, Country View).

## **Construction**

### ***Assessment Methodology***

13.21 The noise due to construction operations has been predicted in accordance with BS5228:2009+A1:2014: 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'. This Standard provides a method for calculating the A-weighted equivalent continuous noise levels over a period of interest at receptors, based on:

- The proposed hours of working, and the duration of breaks taken during the day.
- The proposed heavy plant types, numbers and percentage on-times for each activity.

- Typical noise emissions for heavy plant which are included in the Appendix of the Standard.
- Distances between the receptors and the heavy plant.
- The nature of the ground cover, and any obstacles that may provide acoustic screening between heavy plant and the calculation positions.

***Significance Criteria***

13.22 There are no definitive criteria for the assessment of construction noise. The Control of Pollution Act 1974, as amended by the Environmental Protection Act 1990 places the onus upon Local Authorities to recommend criteria appropriate to their area of jurisdiction.

13.23 However, BS 5228:2009+A1:2014 provides examples of how the significance of noise from surface construction activity may be determined for the purpose of environmental assessment. Examples are given both in relation to fixed (absolute) thresholds, and when considering the potential change in the ambient noise level with the construction noise.

13.24 For the purpose of assessing the significance of noise from demolition and construction activities arising from the Proposed Development, the threshold levels set out in table E.1 of BS5228-1: 2009+A1:2014 have been adopted as the SOAEL values (repeated below in **Table 13.4** for convenience).

**Table 13.4: Threshold Values from BS5228+A1:2014**

Assessment category and threshold value period	Threshold value, in decibels (dB) (LAeq,T)		
	Category A <sup>A)</sup>	Category B <sup>B)</sup>	Category C <sup>C)</sup>
Night-time (23.00-07.00)	45	50	55
Evenings and weekends <sup>D)</sup>	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 LAeq,T noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.*

*NOTE 2 If the 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 LAeq,T noise level for the period increases by more than 3 dB due to site noise*

*NOTE 3 Applied to residential receptors only*

<sup>A)</sup> Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

<sup>B)</sup> Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

<sup>C)</sup> Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

<sup>D)</sup> 19.00-23.00 weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays



13.25 As all local receptors fit into Category A, construction noise impact has been classified with reference to the categories defined in **Table 13.5**.

**Table 13.5: Construction Noise Impact Categories**

Impact Category	Description
No Impact	Daytime noise levels less than the ambient $L_{Aeq}$ , or less than or equal to 65 dB $L_{Aeq}$ .
Negligible	Daytime noise levels between 65 and 70 dB $L_{Aeq}$ .
Minor Adverse	Daytime noise levels between 70 and 75 dB $L_{Aeq}$ .
Moderate Adverse	Daytime noise levels greater than 75 dB $L_{Aeq}$ .
Major Adverse	Daytime noise levels greater than 80dB $L_{Aeq}$ .

13.26 There are no LOAEL values set out in authoritative guidance for construction noise. In the absence of any guidance it is proposed to adopt the thresholds of 55 dB  $L_{Aeq}$  (façade incident) during the day, 50 dB  $L_{Aeq}$  (façade incident) during the evening, and 40 dB  $L_{night}$  (façade incident) during the night. The evening and night LOAEL values are consistent with the LOAEL values recommended by the WHO for the onset of annoyance or sleep disturbance.

## Commercial Operations

### *Assessment Methodology*

13.27 As part of the assessment of noise impact associated with the commercial part of the development, the following has been undertaken:

- The nearest existing and proposed noise receptors that could potentially be affected by the commercial aspects of the development have been identified.
- Background noise measurements have been undertaken at a selection of nearby noise sensitive receptors in accordance with the requirements of British Standard 4142:1997: "*Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas*".
- Appropriate noise limits for future fixed plant, equipment and operations associated with the proposed commercial operations have been determined at nearby existing and proposed noise sensitive receptors.
- The level of impact has been determined based on the ability for future commercial operators to comply with adopted significance criteria for operational noise.

### *Significance Criteria*

13.28 The significance of potential commercial noise will be described with reference to the BS4142 Assessment Levels as set out in **Table 13.6**.

**Table 13.6: Example threshold of potential significant effect at dwellings**

BS 4142 Assessment Level (Rating level relative to background level), dB(A)	BS 4142 Semantic (as described in BS 4142)
< - 10	'If the rating level is more than 10 dB below the measured background level then this is a positive indication that complaints are unlikely'
+ 5	'A difference of around +5 dB is of marginal significance'
+ 5 to + 10	No BS 4142 description but the more positive the difference, the greater the likelihood of complaints.
+ 10	'A difference of around 10 dB or more indicates that complaints are likely'
> + 10	No BS 4142 description but the more positive the difference, the greater the likelihood of complaints.

13.29 In terms of NPSE terminology, the LOAEL shall be defined as a Rating level that has parity with the Background level. When considering absolute noise levels, the LOAEL shall be equivalent to the 'good' standard recommended in BS8233, equivalent to the guideline value recommended by the WHO.

## Road Traffic Noise

### *Assessment Methodology*

13.30 As part of the assessment of noise impact of off-site traffic increases caused by the development, the following has been undertaken:

- The proposed number of traffic movements associated with the redevelopment has been estimated based on best available information.
- The percentage increase in traffic flow on the local road network caused by the redevelopment has been calculated, based on the traffic assessment undertaken to support the development.
- The associated increase in traffic noise on the local road network has been calculated and compared to the significance criteria for road traffic noise increases (see **Table 13.7**).

### *Significance Criteria*

13.31 Table 3.1 of the DMRB noise document (HD312/11) presents the classification of magnitude of impacts for short term traffic impacts (short term in this context relates to the time at which a change in traffic conditions occurs). The semantics in the table will be used to describe the significance of the traffic impacts of this scheme, and are presented in **Table 13.7**.

**Table 13.7: Road Traffic Noise Impact Categories**

Change in Noise Level	Impact Category (as described in DMRB)	Equivalent NPSE description of effect
0 dB(A)	No change	No Observed Effect Level
0.1 – 0.9 dB(A)	Negligible	No Observed Adverse Effect
1.0 dB(A)		Lowest Observed Adverse Effect Level
1.0 - 2.9 dB(A)	Minor	Observed Adverse Effect
3.0 dB(A)		Significant Observed Adverse Effect Level
3 – 4.9 dB (A)	Moderate	Significant Observed Adverse Effect
5 dB(A) or more	Major	Significant Observed Adverse Effect

### Consultation

13.32 During the assessment, Denis Colgan, Pollution Control Officer in the Environmental Health department at Staffordshire Moorlands District Council was consulted on various occasions. Advice was sought in relation to the following:

- Prior to the noise survey taking place, noise survey locations and survey methodology were discussed and agreed.
- The potential of night time vehicular access impacting local residents was discussed, and an appropriate assessment methodology was agreed.

### Baseline Conditions

13.33 Several noise surveys have been undertaken to support this assessment, as follows:

- Background noise survey (see measurement points BNML1 and BNML2). The background noise levels measured at these locations have been used to inform a BS4142 assessment of potential industrial noise caused by the proposed development at existing receptors.
- Industrial noise survey (see measurement point INML). The noise levels measured at this location have been used to inform an assessment of existing industrial noise at new residential receptors at the proposed development.
- Road noise survey (see measurement point RNML). The noise levels measured at this location have been used to validate a road noise model that has in turn been used to inform an assessment of road noise changes at new and existing residential receptors.

13.34 These noise surveys are described in detail below, and the measurement locations for all of the surveys are shown on **Figure 13.1**.

### Attended Background Noise Survey

- 13.35 An attended background noise survey was undertaken between 4<sup>th</sup> and 5<sup>th</sup> March 2014 at the following measurement positions near to the proposed industrial development:
- BNML1 (OSGB Coordinates 398612, 339114) was selected to be representative of the background noise climate at Lower and Upper Newton Farm, to the east of the proposed industrial development.
  - BNML2 (OSGB Coordinates 397723, 338585) was selected to be representative of the background noise climate at outlying properties to the south of the proposed industrial development (i.e. The Shippons and Leese Houses Farm).
- 13.36 These measurement locations represent the residential properties close to the development that are also furthest away from transportation noise sources. The measured noise levels therefore represent the lowest background noise climate for properties potentially impacted by the proposed industrial development.
- 13.37 The measurements consisted of 15-minute measurements during the day and 5-minute measurement during the night, and was generally conducted in accordance with the relevant guidance contained in BS4142:1997 “*Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas*” and BS7445-2:1991 “*Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use*”.
- 13.38 The noise environment in the local area was influenced by constant traffic movements on the A50 between Stoke-on-Trent and Uttoxeter, less frequent movements on Sandon Road and Cresswell Old Lane, occasional farm vehicles, occasional train movements on the railway, and occasional aircraft movements. At BNML2, noise was faintly audible from Blythe Business Park to the north-west, believed to be from Johnson Mattheys Colour Technologies. However, this was only faintly audible, was not considered to significantly affect the measured values, and was not considered to be at a level that could cause annoyance.
- 13.39 The full details of the measurements, including equipment calibration details, are presented on noise monitoring forms in **Appendix 13.2**. A summary of averaged results is presented in **Table 13.8**.

**Table 13.8: Summary of Averaged Background Noise Measurement Results**

Location	Day (0700 - 2300)		Night (2300 - 0700)	
	L <sub>Aeq,T</sub>	L <sub>A90,T</sub>	L <sub>Aeq,T</sub>	L <sub>A90,T</sub>
BNML1	59.7	54.5	51.3	44.0
BNML2	49.8	41.5	45.5	40.4

### Industrial Noise Survey

- 13.40 A survey of noise from the existing Blythe Business Park was undertaken at INMP (OSGB Coordinates 397608, 338989) in order to quantify any industrial noise sources that could potentially cause a noise impact at the proposed residential area. It was

identified that operations at the site currently occupied by Johnson Matthey Colour Technologies, a ceramic colours and coatings specialist, was the main building with a potential to give rise to significant industrial noise impacts at proposed residential areas.

- 13.41 A graph showing the time history of the results of the industrial noise survey is presented in **Appendix 13.3**.

**Table 13.9: Summary of Industrial Noise Measurement Results**

Location	Day (0700 - 2300)		Night (2300 - 0700)	
	$L_{Aeq,T}$	$L_{A90,T}$	$L_{Aeq,T}$	$L_{A90,T}$
INML	47.4	44.7	47.0	43.2

### Road Noise Survey

- 13.42 A road noise survey was undertaken in order to determine the noise level associated with traffic on Sandon Road in accordance with the principles set on in CRTN. Measurements were undertaken over 24 hours at a location 10m from the edge of the closest carriageway of Sandon Road at RNML (OSGB Coordinates 397418, 339132). The road traffic noise values obtained from the measurements are summarised as follows:

**Table 13.10: Summary of Road Noise Measurement Results**

Location	$L_{A10,18h}$ Day (0600 - 0000)	$L_{A10,6h}$ Night (0000 - 0600)
RNML	63.5	49.7

- 13.43 A graph showing the time history of the results of the road noise survey is presented on **Appendix 13.3**.

## Predicted Significant Effects

### Construction

#### *Construction Site Noise Assessment*

- 13.44 In order to evaluate the noise during the development's construction phase it is necessary to define the various activities that will be undertaken. Construction contractors may use different working methods and plant to achieve the same ends, so an accurate construction noise and vibration impact assessment is not normally possible until appointment of the approved contractor. Consequently, at this stage of a project it is normally only possible to undertake a generic construction noise and vibration impact assessment based on possible methods of working gained from experience with previous similar developments.
- 13.45 A selection of the closest residential noise receptors surrounding the development has been identified, and these are shown in **Table 13.12**. The distance of these noise sensitive receptors (NSRs) from the proposed new development will vary considerably throughout the construction programme. Predictions of construction noise levels have

been based on the likely range of distances for each construction activity to each receptor.

13.46 It is expected that the construction stage will comprise the following phases:

- demolition of existing structures;
- preparation of site, including earthworks;
- piling operations;
- construction of foundations;
- erection of steel frames;
- external works including creation of hard standing, and
- creation of new roads.

13.47 For the purposes of this assessment, it is assumed that heavy plant construction activities will take place during normal construction hours, namely Monday to Friday, between 08:00 and 17:30 and on Saturdays between 08:00 and 13:00. The calculations have not taken any screening into account, nor any ground absorption, and are therefore likely to represent the 'worst-case' noise levels during each phase of work.

**Table 13.11: Construction Noise Source Calculations**

Activity	Equipment					Adjusted L <sub>Aeq</sub> @ 10m, dB	Activity L <sub>Aeq</sub> @ 10m
	BS522 8 Ref.	Plant Description	L <sub>Aeq</sub> @ 10m, dB	No.	% Use		
Demolition	C1.1	Breaker mounted on wheeled backhoe; 59kW; (7.4 t) 380 kg / 1700 mm tool / 74 mm dia. / 125 bar	92	2	75	93.8	94.9
	C1.14	Tracked crusher; 172kW; 47 t	82	2	75	83.8	
	C1.10	Tracked excavator (loading dump truck); 228kW; 44 t	85	2	75	86.8	
Earthworks / Site Preparation	C2.3	Tracked excavator; 102kW; 22 t	78	2	75	79.8	86.8
	C2.26	Wheeled loader; 209kW	79	2	75	80.8	
	C2.30	Dump truck (tipping fill); 306kW; 29 t	79	2	75	80.8	
	C2.10	Dozer; 239kW; 41 t	80	2	75	81.8	
Piling	C3.1	Hydraulic hammer rig Hydraulic hammer rig; 145kW; 16 m length / 5 t hammer / plywood dolly	89	2	30	86.8	86.9
	C3.7	Power pack; 147kW; 6 t	70	2	50	70.0	
	C3.28	Tracked mobile crane; 184kW; 110 t	67	2	75	68.8	
Foundations	C4.33	Poker vibrator	78	2	75	79.8	83.7
	C4.18	Cement mixer truck (discharging)	75	2	75	76.8	
	C4.32	Concrete mixer truck + truck mounted concrete pump + boom arm	78	2	75	79.8	
Building Erection	C4.38	Wheeled mobile telescopic crane; 610kW; 400 t	78	2	50	78.0	85.6
	C4.32	Concrete mixer truck + truck mounted concrete pump + boom arm	78	1	75	76.8	
	C4.73	Hand-held circular saw (cutting paving slabs); 1.5kW; 7.6 kg / 235 mm diameter	84	2	5	74.0	
	C4.93	Angle grinder (grinding steel); 2.3kW; 4.7 kg	80	2	25	77.0	
	C4.53	Lorry with lifting boom; 50kW; 6 t	77	2	75	78.8	
	C4.56	Wheeled excavator; 63kW; 14 t	83	1	50	80.0	
Creation of Hard Standing	C4.18	Cement mixer truck (discharging)	75	2	75	76.8	82.8
	C4.32	Concrete mixer truck + truck mounted concrete pump + boom arm	78	2	75	79.8	
	C4.18	Cement mixer truck (discharging)	75	2	75	76.8	
Creation of Roads	C5.18	Tracked excavator; 172kW; 35 t	80	2	75	81.8	83.9
	C5.20	Vibratory roller; 98kW; 8.9 t	75	2	75	76.8	
	C5.30	Asphalt paver (+ tipper lorry); 112kW; 12 t hopper	75	2	75	76.8	

13.48 The noise due to the construction processes involved with the will vary depending on the location of the construction activity and the location of the receiver. **Table 13.12** presents the predicted range of construction noise levels at each receptor.

**Table 13.12: Unmitigated Construction Noise Receiver Levels ( $L_{Aeq}$ , dB)**

Location	Earthworks / Site Preparation	Piling	Construction of Foundations	Building Erection	Creation of Hard Standing	Creation of Roads
16 Sandon Road	40 - 74	40 - 75	37 - 71	39 - 73	36 - 70	37 - 72
46 Sandon Road	40 - 75	40 - 75	37 - 72	38 - 74	36 - 71	37 - 72
11 Sandon Close	40 - 87	41 - 87	37 - 84	39 - 86	36 - 83	37 - 84
25 Rookery Crescent	41 - 88	41 - 88	38 - 85	40 - 87	37 - 84	38 - 85
Country View	42 - 62	42 - 62	39 - 59	40 - 60	38 - 58	39 - 59
The Shippons	41 - 51	41 - 51	38 - 48	40 - 50	37 - 47	38 - 48
Lower Newton Farm	36 - 47	36 - 47	32 - 44	34 - 45	31 - 43	33 - 44

13.49 From a comparison of these predicted  $L_{Aeq}$  values with the significance criteria presented in **Table 13.5**, the range of significance of construction noise for each location is presented in **Table 13.13**.

13.50 To account for potential cumulative impacts arising from simultaneous construction activities, 3 dB has been added to the maximum potential construction noise level, which represents a doubling of site activity compared to the situation with one type of construction activity occurring.

**Table 13.13: Construction Noise Significance (before mitigation)**

Location	Minimum Construction Noise Level, $L_{Aeq}$ , dB	Maximum Construction Noise Level, $L_{Aeq}$ , dB	Range of Significances during construction activities
16 Sandon Road	36	77	None - Moderate
46 Sandon Road	36	78	None - Moderate
11 Sandon Close	36	83	None - Major
25 Rookery Crescent	37	83	None - Major
Country View	38	65	None - Negligible
The Shippons	37	54	None - No Impact
Lower Newton Farm	31	50	None - No Impact



- 13.51 As the above table demonstrates, construction impacts could have a wide range of significance depending on location of construction activities and receptor locations. However, unless mitigation is implemented, major construction noise impacts could be experienced for limited duration at Sandon Road, Sandon Close and Rookery Crescent.

#### ***Construction Road Traffic Noise Assessment***

- 13.52 At the masterplanning stage no detailed traffic analysis of specific construction traffic routes or flows has been carried out. However, for the purpose of estimating the impact associated with construction traffic on the local roads, the volume of construction traffic required to cause a minor impact has been determined.
- 13.53 The most likely road to experience noise impacts as a result of construction traffic is Sandon Road. The number of construction heavy vehicles required to increase the Basic Noise Level (BNL) by 1 dB on Sandon Road is approximately 1000 per day.
- 13.54 This number significantly in excess of the construction traffic required for the development, which would be less than 100 movements per day. Therefore, increases in traffic noise levels associated with construction traffic are likely to be less than 1 dB and are therefore likely to be negligible.

### **Operation**

#### ***Noise from new fixed plant at industrial development***

- 13.55 There will be fixed plant or equipment associated with the proposed industrial development, which is expected to principally include ventilation and heating plant. Most of this plant will operate on demand (including overnight) or on a continual 24-hour basis. At this stage of the project, the location and full complement of all fixed plant is not available and would only normally be made available upon finalisation of the building's detailed specification.
- 13.56 Predicted noise levels from fixed plant can be calculated from standard acoustic formulae similar to those in the BS 5228 method used for stationary construction plant. The sound power level of the source (i.e. compressor, generator, pump house, refrigeration condensers, roof mounted fans etc.), distance to receiver, shielding effect of any barriers, and ground surface absorption are used to calculate the sound pressure level at the receptor. It is usual to predict noise from fixed plant as a 1-hour  $L_{Aeq}$  in the daytime level and a 5-minute  $L_{Aeq}$  at night as per the requirements of BS 4142.
- 13.57 Noise impact predictions undertaken at the detailed design stage will enable identification of any necessary noise mitigation measures, which are discussed further in the 'Mitigation' section below.
- 13.58 With appropriate consideration of mitigation, the significance of noise from fixed plant will be negligible.

#### ***Noise from existing industrial noise at proposed dwellings***

- 13.59 The survey undertaken at the Industrial Noise Measurement Position (INMP) identified that operations at the site currently occupied by Johnson Matthey Colour Technologies, a ceramic colours and coatings specialist, was the main existing industrial operation with

a potential to give rise to significant industrial noise impacts at proposed residential areas.

- 13.60 Results of the survey indicate that the noise levels caused by this industrial operation are around 47 dB(A) during both the day and night at the INMP. The INMP is approximately representative of the location of the closest proposed residential buildings, and therefore a level of this magnitude could reasonably be expected at the closest of these proposed residential buildings.
- 13.61 The noise from Johnson Matthey Colour Technologies is considered to be a steady, and without elements that would attract a character penalty according to BS4142.
- 13.62 Therefore, when considered in accordance with BS4142, the rating noise level would be approximately 47 dB(A) for the most potentially affected properties. These rating levels are around 5 dB above the measured background levels at BNMP2 (the quietest survey location) of 42 dB(A) and 40 dB(A) respectively. Existing industrial noise would therefore be considered 'of marginal significance' according to BS4142, and corresponds to the Lowest Observed Adverse Effect Level for this assessment.
- 13.63 Based on the survey work undertaken, noise from the existing industrial facility within proposed bedrooms would be expected to be between 30 – 35 dB(A) with the windows partially open. However, with appropriate selection of glazing and ventilation solutions, industrial noise levels within new bedrooms could be readily attenuated to meet the 'good' standard recommended in BS8233, equivalent to the guideline value recommended by the WHO (and the adopted LOAEL).

#### *Operational Road Traffic Noise Assessment*

- 13.64 The proposed development is expected to generate additional vehicle movements, the full details of which are presented in the traffic assessment in Chapter 11. The results of the traffic assessment have been incorporated into Cadna/A v4.4, a three dimensional noise propagation modelling package that incorporates the noise propagation algorithms described in CRTN.
- 13.65 A preliminary road noise modelling exercise was undertaken to ensure that the Cadna/A model provided a good agreement with the results of the noise measurements. Traffic data for 2013 was used to predict noise at RNML (the road noise monitoring location). The modelling results for both day and night periods matched the measured values presented in **Table 13.9** to within 1 dB. This gives an indication that the road traffic noise model provides a sufficiently accurate representation of actual noise levels in the area.
- 13.66 The links used in the noise model are provided in **Table 13.14**.

**Table 13.14: Description of links used in traffic noise assessment**

Link Ref	Description of Link
A	New Site Access Road
B	Sandon Road (North of Site Access)
C	Sandon Road (South of Site Access)
D	Uttoxeter Road (East - towards Upper Tean)
E	Uttoxeter Road (West - towards Blythe and A50)
F	Uttoxeter Road (North - towards Blythe)
G	Stallington Road
H	Cheadle Road
I	Uttoxeter Road (North of Cheadle Road)
J	A50 (West)
K	A50 (South)

13.67 The Basic Noise Level (or BNL) is a term defined in CRTN used to refer to the traffic noise level at a reference distance of 10m from the nearside carriageway edge of a highway. The traffic speed, composition and associated BNL values for local roads with and without development flows in 2019 are presented in **Table 13.15** and **13.16** respectively.

**Table 13.15: 2019 'Without Development' Traffic Flows**

Link ID	Day Flows (0600 – 0000)			Night Flows (0000 – 0600)			BNL (L <sub>A10</sub> )	
	AAWT, 18h	Speed (km/h)	%HGV	AAWT,6h	Speed (km/h)	%HGV	Day	Night
A	-	-	-	-	-	-	-	-
B	4459	56	16	79	56	15	67.3	54.4
C	4459	56	16	79	56	15	67.3	54.4
D	15736	64	4	281	64	3	71.1	58.1
E	15910	64	4	284	64	4	71.1	58.4
F	4710	48	7	84	48	6	65.2	52.2
G	3565	48	4	64	48	4	63.1	50.4
H	10758	48	5	192	48	5	68.2	55.5
I	14025	48	5	250	48	4	69.4	56.3
J	61565	113	12	1092	113	11	82.5	69.7
K	49080	113	14	869	113	13	81.8	68.9

**Table 13.16: Development Traffic Flows**

Link ID	Day Flows (0600 – 0000)			Night Flows (0000 – 0600)		
	AAWT,18h	Speed (km/h)	%HGV	AAWT,6h	Speed (km/h)	%HGV
A	2177	48	16	39	48	31
B	1741	56	16	31	56	28
C	436	56	16	8	56	43
D	858	64	17	15	64	16
E	873	64	16	16	64	40
F	173	48	17	3	48	15
G	24	48	17	0	48	15
H	34	48	17	1	48	15
I	105	48	17	2	48	15
J	638	113	16	11	113	54
K	67	113	17	1	113	15

**Table 13.17: 2019 'With Development' Traffic Flows**

Link ID	Day Flows (0600 – 0000)			Night Flows (0000 – 0600)			BNL (LA10)	
	AAWT,18h	Speed (km/h)	%HGV	AAWT,6h	Speed (km/h)	%HGV	Day	Night
A	3371	48	13	117	48	11	65.1	53.6
B	6199	56	16	110	56	15	68.8	55.9
C	4895	56	16	87	56	15	67.7	54.8
D	16594	64	4	296	64	4	71.3	58.6
E	16783	64	5	300	64	4	71.6	58.6
F	4883	48	7	87	48	6	65.3	52.3
G	3589	48	4	64	48	4	63.1	50.4
H	10791	48	5	193	48	5	68.2	55.5
I	14131	48	5	252	48	4	69.4	56.4
J	62203	113	12	1104	113	11	82.6	69.7
K	49147	113	14	870	113	13	81.8	68.9

13.68 Contour plots showing the traffic noise levels for 2019 with and without the proposed development are presented in **Figures 13.2, 13.3, 13.5 and 13.6.**

**Table 13.18: Change in BNL associated with development in 2019**

Link ID	Increase in BNL with introduction of development in 2019	
	Day	Night
A	-	-
B	1.5	1.5
C	0.4	0.4
D	0.2	0.5
E	0.5	0.2
F	0.1	0.1
G	0	0
H	0	0
I	0	0.1
J	0.1	0
K	0	0

- 13.69 A comparison of the noise changes presented in **Table 13.18** with the criteria presented in **Table 13.6** reveals that all links experience a negligible increase, with the exception of Link B (Sandon Road north of site access), which experiences a minor increase. Noise contour plots showing the changes in traffic noise across the study area are presented as **Figure 13.4 and 13.7** for the day and night periods respectively.
- 13.70 As **Figures 13.2 to 13.7** show, in order to accommodate the new roundabout, some realignment of Sandon Road is necessary which will increase the distance to Sandon Road for the properties adjacent to the roundabout. This increased separation distance results in a net traffic noise decrease for these properties during both day and night periods, despite the minor increase in traffic flows along Sandon Road.
- 13.71 It can be seen from **Figures 13.4 and 13.7** that three properties are predicted to experience minor increases in traffic noise. These properties are Walton House, Isaak Walton Farm, and Izaak Walton Inn, which are all located close to the section of Sandon Road north of the site, but south of the A50.
- 13.72 All other properties will experience either no change or a negligible change.
- 13.73 These three properties represent 3% of the properties in the study area. Therefore, when considering the overall scale of the development, it is considered that a minor increase at 3% of properties in the study area can be considered a **negligible** adverse significant effect.

## Mitigation Measures

### Construction

13.74 Best practicable means to prevent noise from the site as defined in British Standard BS 5228-1: 2009 will be employed during the construction of the project. In particular, the contractor will be required to consider the following measures:

- Temporary screening or enclosures for static noisy plant to reduce noise emissions and plant shall be certified to meet the relevant EC Directive standards.
- Early and good public relations with the adjacent tenants and occupants of buildings will reduce the likelihood of complaints. It is recommended that local residents are informed and consulted regarding works and the name and contact details of the person on site that will be able to deal with queries provided;
- Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum;
- All vehicles and mechanical plant used for the purpose of the works should be fitted with effective exhaust silencers and should be maintained in good efficient working order;
- All major compressors should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools should be fitted with mufflers or silencers of the type recommended by the manufacturers;
- All ancillary plant such as generators, compressors and pumps should be positioned so as to cause minimum noise disturbance. If necessary, acoustic enclosures should be provided;
- If any piling works are required, the contractor shall adhere to the codes of practice for piling given in British Standard BS 5228:2009 and the guidance given therein;
- Outside of normal hours of working no construction works shall take place that are, 'audible' beyond the site boundary. Deliveries of materials shall be permitted outside of these hours provided and unloading operations are not audible outside the site boundary;
- In exceptional circumstances (for example in the case of traffic restrictions, in an emergency or where for technical reasons a process cannot be completed within the permitted hours) works outside the normal hours of working may be unavoidable and in such cases the person responsible shall consult Staffordshire Moorlands District Council Environmental Health department as far in advance as possible; and,
- In the event of emergency work the contractor shall notify Staffordshire Moorlands District Council Environmental Health department on the next working day.

## Operation

### Noise from new fixed plant at industrial development

- 13.75 As discussed previously, noise from fixed plant may be controlled at the design stage. For example, breakout noise from refrigeration plant contained within plant rooms can be silenced using acoustic louvres or splitter attenuators, fans can be contained within air handling units with silenced ducted intakes, exhausts can be silenced using in-duct attenuators and noise from boiler flue fans can be silenced by boiler flue attenuators.
- 13.76 However, noise from some types of mechanical service plant such as chiller units can be harder to attenuate, and therefore care during the selection and placement of such will be required to ensure that the 'good' standard recommended in BS8233, equivalent to the guideline value recommended by the WHO (and the adopted LOAEL), is met.

### Noise from existing industrial noise at proposed dwellings

- 13.77 As discussed previously, with appropriate selection of glazing and ventilation solutions, industrial noise levels within proposed dwellings could be readily attenuated to meet any standard noise conditions required by the local planning authority.
- 13.78 The details of these mitigation measures would be developed at the detailed design stage, when the façade constructions, precise locations of bedroom windows, room areas and room internal surface finishes are known. However, as a guide, 10mm double glazing with a 6mm air gap, in combination with a standard passive acoustic attenuator, would meet the requirements above.
- 13.79 With appropriate selection such will be required to ensure that the 'good' standard recommended in BS8233, equivalent to the guideline value recommended by the WHO (and the adopted LOAEL), is met.

### Operational Road Traffic Impacts for properties adjacent to proposed roundabout

- 13.80 It is identified in paragraph 13.70 and on **Figure 13.4 and 13.7** that the properties in the vicinity of the proposed roundabout will experience an overall decrease in road traffic due to the increased distance to Sandon Road associated with its proposed realignment. This decrease has been calculated in accordance with CRTN, based on the proposed changes in road alignment and the results of the traffic analysis.
- 13.81 During consultation with Staffordshire Moorlands District Council, the potential change in local night time noise character associated with HGVs using the new access road, and general road traffic using the roundabout during the night was discussed. This change in character would be due to the presence of the new roundabout causing changes in traffic speed in the vicinity of the roundabout compared to the existing situation. In particular the presence of HGVs accelerating away from the roundabout to cause sleep disturbance at local properties was identified as a potential impact.
- 13.82 In order to limit the potential night time noise impact associated with the new access road and roundabout, a limit on the number of night time HGV movements on the new site access road has been agreed.

- 13.83 It is therefore proposed to limit the number of HGV movements during the hours of 2200 – 0600 period to a total of 16 movements.
- 13.84 It should be noted that the traffic analysis on which the noise assessment is based has taken this restriction into account.

### **Operational Road Traffic Impacts for properties north of site on Sandon Road**

- 13.85 It is identified in paragraph 13.71 and on **Figure 13.4 and 13.7** that three properties are predicted to experience minor increases in traffic noise.
- 13.86 In terms of NPSE terminology, the road traffic impact for these properties lies between the LOAEL and the SOAEL. The NPSE therefore suggests that *“all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life for occupants of these properties while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”*
- 13.87 There is considered to be no reasonable mitigation measure available that could reduce the minor traffic noise impact for these properties, as any mitigation would involve the reduction of development traffic flows on the local road network, or physical works to infrastructure or property not owned by the developer. As vehicular access to the site is a fundamental requirement for the development, it would not be possible to further restrict the traffic flows whilst upholding the development objectives.
- 13.88 When considering the small number of properties (three) that could potentially experience a minor traffic noise impact, it is considered that the development meets the requirements of the NPSE without the need to further reduce operational road noise.
- 13.89 The degree of noise increase for the three properties north of site on Sandon Road is broadly equivalent to the reduction in noise for the properties adjacent to the realigned highway, and the overall noise changes can be viewed as neutral.

## **Residual Effects**

### **Construction**

#### ***Construction Site Noise Assessment***

- 13.90 It is considered likely that with the careful adoption of appropriate mitigation measures such as those described above, a reduction in the maximum construction noise levels of approximately 5 dB would be achievable, compared to the unmitigated levels presented in **Table 13.12**. For properties at Sandon Close and Rookery Crescent, it is considered that temporary screening through the construction of site hoarding would be particularly effective due to their proximity to the works, and that reductions of 10 dB would be achievable in these cases.
- 13.91 **Table 13.19** presents the range of significances at each receptor location, assuming that a reduction of 5 dB is achieved.



**Table 13.19: Construction Noise Significance (after mitigation)**

Location	Minimum Construction Noise Level, $L_{Aeq}$ , dB	Maximum Construction Noise Level, $L_{Aeq}$ , dB	Range of Significances during construction activities
16 Sandon Road	36	72	None - Minor
46 Sandon Road	36	73	None - Minor
11 Sandon Close	36	73	None – Minor
25 Rookery Crescent	37	73	None - Minor
Country View	38	60	None - No Impact
The Shippons	37	49	None - No Impact
Lower Newton Farm	31	45	None - No Impact

13.92 It is noted that even with mitigation, there will be limited periods during which minor impacts are predicted at Sandon Road, Sandon Close and Rookery Crescent. It is therefore suggested that particular attention is paid to reducing the potential noise impact at these properties.

13.93 The overall impact of construction noise after mitigation is considered to be minor.

***Construction Road Traffic Noise Assessment***

13.94 Increases in traffic noise levels associated with construction traffic are likely to be less than 1 dB and are therefore likely to be negligible.

**Operation**

***Noise from new fixed plant at industrial development***

13.95 With the mitigation outlined in the previous section, the overall impact would be negligible.

***Noise from existing industrial noise at proposed dwellings***

13.96 With the mitigation outlined in the previous section, the overall impact would be negligible.

***Operational Road Traffic Noise Assessment***

13.97 With the mitigation outlined in the previous section, the overall impact would be negligible.

**Cumulative Effects**

13.98 SMDC requested that the EIA consider one development for potential cumulative effects. The site is located at the former Indesit Work, Grindley Lane. Blythe Bridge (reference 09/11860/FUL) and the application, now permitted, was to alter conditions allowing the change of use on existing factory buildings. The reason for assessing for potential cumulative effects relates to highways and traffic flows. It is judged that there is

no potential for significant cumulative Noise effects given the physical separation between the sites.

## Summary

- 13.99 The potential noise effects due to the construction and operation of the proposed development have been assessed.
- 13.100 Potential operational noise effects associated with fixed plant are readily mitigated through careful design. With consideration of appropriate mitigation at the detailed design stage the significance of noise from new fixed plant associated with the industrial development is considered to be negligible.
- 13.101 The impact of increases in traffic associated with the development on local roads has been assessed, based on outputs of the traffic assessment. The overall impact as a result of increased traffic associated with the redevelopment on all local roads is classified as negligible.
- 13.102 The impact of potential construction traffic has been assessed. Although no detailed traffic analysis of specific construction traffic routes or flows has been carried out, the number of additional vehicle movements required on local roads in order to cause a minor increase has been calculated. As numbers of construction traffic movements are likely to be significantly less than these, the overall impact as a result of construction traffic on local roads is classified as negligible.
- 13.103 The impact of construction operations has been assessed, based on estimated types, numbers and locations of construction plant. The impact at any receptor will depend on its proximity to the construction activity. Temporary major adverse impacts are predicted at a number of receptors during some construction activities without mitigation. These temporary impacts would be reduced to minor, assuming that mitigation can achieve a modest reduction of noise. A summary of the effects is provided in **Table 13.20**.

**Table 13.20: Summary of Effects**

Description of Likely significant Effects	Significance of Impacts					Summary of Mitigation / Enhancement Measures	Significance of Residual Effects					Relevant Policy	Relevant Legislation
	(Major, Moderate, Minor Negligible)	Positive / Negative	(P/T)	(D/I)	ST/ MT/ LT)		(Major, Moderate, Minor, Negligible)	Positive / Negative	(P/T)	(D/I)	ST/ MT/ LT)		
<b>Demolition and Construction Phase</b>													
Construction Site Noise	Negligible - Major	Negative	T	D	MT	Noise screens and enclosures Early and good public relations Shutting down of machines being used intermittently Ancillary plant to be positioned so to cause minimum noise disturbance	Minor / Negligible	Negative	T	D	MT	-	Control of Pollution Act 1974
Construction Road Traffic Noise	Negligible	Negative	T	D	MT	Vehicles to be fitted with exhaust silencers	Minor / Negligible	Negative	T	D	MT	-	Control of Pollution Act 1974
<b>Operational Phase</b>													
Noise from new fixed plant at industrial development	-	Negative	P	D	LT	To be confirmed at outline stage	Negligible	Negative	P	D	LT	NPSE, NPPF, SMCS	Environmental Protection Act 1990
Noise from existing industrial noise at proposed dwellings	Marginal	Negative	P	D	LT	Glazing and ventilation solutions	Negligible	Negative	P	D	LT		
Operational Road Traffic Noise	Negligible	Negative	P	D	LT	Conditions limiting night time HGV movements	Negligible	Negative	P	D	LT		

P/T = Permanent or Temporary, D/I = Direct or Indirect, ST/MT/LT – short Term, Medium Term or Long Term, N/A = Not Applicable