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9 NOISE & VIBRATION

9.1 Introduction

9.1.1 This chapter of the Environmental Statement (ES) addresses the potential effects of the Proposed Development near Eggborough, North Yorkshire on noise and vibration.

9.1.2 Impacts during the construction, operation and decommissioning phases of the Proposed Development are assessed. In particular, the chapter considers potential impacts on identified receptors in terms of:

- predicted noise and vibration levels during the site clearance and construction works associated with the Proposed Development;
- predicted changes in road traffic noise levels on the local road network during the construction and operational phases; and
- predicted noise and vibration resulting from operation of the Proposed Development.

9.1.3 This chapter is supported by the Figure 9.1 provided in ES Volume II and Appendices 9A and 9B in ES Volume III.

9.2 Legislation and Planning Policy Context

Legislative Background

Environmental Protection Act 1990

9.2.1 The Environmental Protection Act 1990 (EPA) Part 3 prescribes noise (and vibration) emitted from premises (including land) so as to be prejudicial to health or a nuisance as a statutory nuisance.

9.2.2 Local Authorities are required to investigate any public complaints of noise and if they are satisfied that a statutory nuisance exists, or is likely to occur or recur, they may serve a noise abatement notice. A notice is served on the person responsible for the nuisance. It requires either simply the abatement of the nuisance or works to abate the nuisance to be carried out, or it prohibits or restricts the activity. Contravention of a notice without reasonable excuse is an offence. Right of appeal to the Magistrates Court exists within 21 days of the service of a noise abatement notice.

9.2.3 In determining if a noise complaint amounts to a statutory nuisance the Local Authority can take account of various guidance documents and existing case law; no statutory noise limits exist. Demonstrating the use of 'Best Practicable Means' (BPM) to minimise noise levels is an accepted defence against a noise abatement notice.

Control of Pollution Act 1974

9.2.4 Sections 60 and 61 of the Control of Pollution Act 1974 (CoPA) provide the main legislation regarding demolition and construction site noise and vibration. If noise complaints are received, a Section 60 notice may be issued by the local planning authority with instructions to cease work until specific conditions to reduce noise have been adopted.

- 9.2.5 Section 61 of the CoPA provides a means for applying for prior consent to carry out noise generating activities during construction. Once prior consent has been agreed under Section 61, a Section 60 notice cannot be served provided the agreed conditions are maintained on-site.
- 9.2.6 CoPA requires that BPM (as defined in Section 72 of CoPA) be adopted for construction noise on any given site. CoPA makes reference to British Standard (BS) 5228 (British Standards Institute (BSI), 2014a and b) as BPM.

Environmental Permitting Regulations 2010

- 9.2.7 The Environmental Permitting Regulations 2010 require the application of Best Available Techniques (BAT) to activities performed within installations regulated by the legislation in order to manage the impact of these operations on the surrounding environment. This therefore just applies to the operational period, not construction.
- 9.2.8 In terms of noise specifically, the selection of BAT will have to be considered and balanced with releases to different environmental media (air, land and water) and to give due consideration to issues such as usage of energy and raw materials. Noise, therefore, cannot be considered in isolation from other impacts on the environment.
- 9.2.9 The definition of pollution includes *“emissions which may be harmful to human health or the quality of the environment, cause offence to human senses or impair or interfere with amenities and other legitimate uses of the environment”*. BAT is therefore likely to be similar, in practice, to the requirements of the Statutory Nuisance legislation which requires the use of BPM to prevent or minimise noise nuisance. In the case of noise, *“offence of any human senses”* may be judged by the likelihood of complaints. However, the lack of complaint should not necessarily imply the absence of a noise problem. In some cases it may be possible, and desirable, to reduce noise emissions still further at reasonable costs and this may therefore be BAT for noise emissions. Consequently, the aim of BAT should be to ensure that there is no reasonable cause for annoyance to persons beyond the installation boundary.
- 9.2.10 Guidance regarding Environmental Permitting and noise is available in the Environment Agency’s Integrated Pollution Prevention and Control (IPPC) H3 document ‘Horizontal Guidance for Noise Part 2 - Noise assessment and Control’ (Environment Agency, 2002a). However, ‘Horizontal Guidance for Noise Part 1 – Regulation and Permitting’ (Environment Agency, 2002b), which provided useful guidance relating to noise limits from industrial installations in terms of absolute rating levels and rating levels relative to background noise levels (as defined in BS 4142:1997 (now superseded)) was withdrawn in February 2016. Therefore industry wide noise limits no longer apply.

Planning Policy Context

National Planning Policy

National Policy Statements for Energy

- 9.2.11 Section 5.11 of the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a) refers to the Government’s policy on noise within the Noise Policy Statement for England (discussed further below) and sets out

requirements for noise and vibration assessment for Nationally Significant Infrastructure Projects such as the Proposed Development.

- 9.2.12 At paragraph 5.11.8, with regards decision making, NPS EN-1 states *“The project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission.”* Section 9.5 describes the impact avoidance measures identified relevant to the Proposed Development.
- 9.2.13 The NPS for Fossil Fuel Electricity Generating Infrastructure (EN-2) (DECC, 2011b) sets out policy specific to fossil fuel power stations. At paragraph 2.7.1, specific sources of noise identified that are relevant to the Proposed Development include *“the gas and steam turbines that operate continuously during normal operation”*. It reiterates at paragraph 2.7.5 the point made in NPS EN-1 that *“the primary mitigation for noise from fossil fuel generating stations is through good design, including enclosure of plant and machinery in noise-reducing buildings wherever possible and to minimise the potential for operations to create noise”* and goes on to state that *“Noise from gas turbines should be mitigated by attenuation of exhausts to reduce any risk of low-frequency noise transmission.”*
- 9.2.14 The NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (DECC, 2011c) states at paragraph 2.20.4 that *“A new gas pipeline may require an above ground installation such as a gas compression station on the route of the pipeline to boost transmission line pressure... These may be located in quiet rural areas, and therefore the control of noise from these facilities is likely to be an important consideration.”* The Above Ground Installation (AGI) at the northern end of the Proposed Gas Connection, which is located in a rural setting, will comprise valves and Pipeline Inline Gauging equipment (which are not significant sources of noise) and the compression equipment will be located within the Proposed Power Plant Site.

National Planning Policy Framework

- 9.2.15 The National Planning Policy Framework (NPPF) was introduced in March 2012 (Department for Communities and Local Government (DCLG), 2012). The document sets out the Government’s planning policies for England and how these are expected to be applied. The Framework supersedes the previous guidance document PPG 24 ‘Planning and Noise’ (Office of the Deputy Prime Minister (ODPM), 1994).
- 9.2.16 The NPPF is a matter which the Secretary of State is likely to consider "relevant and important" in determining an application for a development consent order (DCO).
- 9.2.17 The planning system is required to contribute to and enhance the natural and local environment. Consequently, the aim is to prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.
- 9.2.18 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 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 [subject to the provisions of the Environmental Protection Act 1990 and other relevant law]; 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."*

9.2.19 With regards to 'adverse effects' and 'significant adverse effects' the NPPF refers to the noise Policy Statement for England Explanatory Note (NPSE) (Department for Environment, Food and Rural Affairs (Defra), 2010), which is described below.

Noise Policy Statement for England

9.2.20 The NPSE (Defra, 2010) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The NPSE applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

9.2.21 The statement sets out the long term vision of the government's noise policy, which is to:

"promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development".

9.2.22 This long term vision is supported by three aims:

- *"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 improvements of health and quality of life."*

9.2.23 The long term policy vision and aims are designed to enable decisions to be made regarding what is an acceptable noise burden to place on society.

9.2.24 The 'Explanatory Note' within the NPSE provides further guidance on defining 'significant adverse effects' and 'adverse effects' using the concepts:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

9.2.25 The three aims can therefore be interpreted as follows:

- the first aim is to avoid noise levels above the SOAEL;
- the second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur; and
- the third aim seeks, where possible, to positively improve the health and quality of life through the pro-active management of noise whilst also taking account of the guiding

principles of sustainable development. It is considered that the protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

9.2.26 The NPSE recognises that it is not possible to have single objective noise-based measures that define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

Planning Practice Guidance

9.2.27 In March 2014, DCLG released its Planning Practice Guidance (PPG) web-based resource to support the NPPF (DCLG, 2014). The guidance advises that local planning authorities’ should 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.

9.2.28 This guidance introduced the additional concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). Full details of the PPG on effects are provided in Table 9.1.

9.2.29 Factors to be considered in determining if noise is a concern are identified including the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, character of the noise and cumulative impacts.

9.2.30 With particular regard to mitigating noise impacts on residential development the guidance highlights that impacts may be partially off-set if residents have access to a relatively quiet façade as part of their dwelling or a relatively quiet amenity space (private, shared or public).

Table 9.1: Planning Practice Guidance

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	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television;	Observed Adverse Effect	Mitigate and reduce to a minimum

Perception	Examples of outcomes	Increasing effect level	Action
	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.		
Significant Observed Adverse Effect Level			
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
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Local Planning Policy

9.2.31 As described in Chapter 7: Legislative Context and Planning Policy Framework, policy is provided by a range of local documents; the Core Strategy (Selby District Council, 2013) is the local plan which is to cover the period from 2011 to 2027, and is a key part of the development plan.

9.2.32 In the Core Strategy (2013), Section 3.5 - Objectives, Objective 16 States the that:

“[The protection] against pollution, improving the quality of air, land and water resources, and avoiding over-exploitation of water resources, and preventing noise/light/soil pollution and protecting development from noise/light/soil pollution.”

9.2.33 In Policy SP19 – Design Quality within the Core Strategy it goes on to state that:

“Proposals for all new development will be expected to contribute to enhancing community cohesion by achieving high quality design and have regard to the local character, identity and context of its surroundings including historic townscapes, settlement patterns and the open countryside... Both residential and non-residential development should meet the following key requirements:

- *Preventing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water, light or noise pollution or land instability.”*

Other Guidance

British Standard 7445-1:2003 and 7445-2:1991

9.2.34 BS 7445 ‘Description and measurement of environmental noise’ (BSI, 1991 and 2003) defines parameters, procedures and instrumentation required for noise measurement and analysis.

British Standard 5228:2009+A1:2014

9.2.35 BS 5228-1 ‘Code of practice for noise and vibration control on construction and open sites. Noise’ (BSI, 2014a) provides a ‘best practice’ guide for noise control, and includes Sound Power Level (Lw) data for individual plant as well as a calculation method for noise from construction activities. BS 5228-2 ‘Code of practice for noise and vibration control on construction and open sites. Vibration’ (BSI, 2014b) provides comparable ‘best practice’ for vibration control, including guidance on the human response to vibration.

British Standard 6472:2008

9.2.36 BS 6472-1 ‘Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting’ (BSI, 2008) presents recommended frequency weighted vibration spectra (for continuous vibration) and vibration dose values (VDV) (for intermittent vibration) above which adverse comment is likely to occur in residential properties.

British Standard 7385:1993

9.2.37 BS 7385-2 ‘Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration’ (BSI, 1993) presents guide values for transient and continuous vibration, above which there is a likelihood of cosmetic damage. The standard establishes the basic principles for carrying out vibration measurements and processing the data, with regard to evaluating vibration effects on buildings.

British Standard 4142:2014

9.2.38 BS 4142 ‘Methods for rating and assessing industrial and commercial sound’ (BSI, 2014c) can be used for assessing the effect of noise of an industrial nature, including mechanical services plant noise. The method compares the difference between ‘rating level’ of the industrial noise, with the ‘background level’ at the receptor position.

World Health Organisation

- 9.2.39 The World Health Organisation's (WHO) 'Guidelines for Community Noise' (WHO, 1999) recommend external daytime and evening environmental noise limits, and internal night-time limits to avoid sleep disturbance.
- 9.2.40 The WHO 'Night Noise Guidelines for Europe' (WHO, 2009) recommend updated guidelines on night-time noise limits to avoid sleep disturbance.

Calculation of Road Traffic Noise

- 9.2.41 Department of Transport (DfT)/ Welsh Office Memorandum 'Calculation of Road Traffic Noise' (CRTN)' (DfT/ Welsh Office, 1998) describes procedures for traffic noise calculation, and is suitable for environmental assessments of schemes where road traffic noise may have an effect.

Design Manual for Road and Bridges

- 9.2.42 The Highways England '*Design Manual for Road and Bridges Volume 11 Section 3 Part 7 HD213/11 (Revision 1) Traffic Noise and Vibration*' (DMRB) (Highways Agency, 2011) provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration effects arising from all road projects, including new construction, improvements and maintenance. The guidance can also be used for assessing changes in traffic noise levels as a result of non-road projects such as this.

9.3 Assessment Methodology and Significance Criteria

Determining Baseline Conditions and Noise Sensitive Receptors

Noise Monitoring Locations and Protocol

- 9.3.1 The location of potential noise sensitive receptors (NSRs) in proximity to the Site has been considered when assessing the effects associated with noise and vibration levels from the demolition, construction, operational and decommissioning phases of the Proposed Development.
- 9.3.2 Key NSR locations have been selected which are considered to be representative of the nearest and potentially most sensitive existing receptors to the Site. It is considered that if noise and vibration levels are suitably controlled at the key receptors identified, then noise and vibration levels will be suitably controlled at other sensitive receptors in the surrounding area.
- 9.3.3 In order to define existing noise conditions at NSRs, long-term ambient noise measurements have been undertaken at five representative residential NSR locations around the existing coal-fired power station site (within which the Proposed Power Plant Site, Proposed Construction Laydown area, Proposed Borehole and Electrical Connections and CCR Land are located), two at residential NSR locations along the Proposed Cooling Water and Gas Connection corridors to the north, and a further one at a residential NSR location closest to the Proposed AGI. Tranmore Farm house, located off Tranmore Lane to the west of the Proposed Development is vacant and under the control of Eggborough Power Limited so has not been considered as a NSR in this assessment. The noise monitoring locations and protocol were discussed in

advance and during the surveys with Selby District Council (SDC). The eight locations are shown in Table 9.2 and on Figure 9.1.

Table 9.2: Monitoring locations

Monitoring location	Address	Details
ML1	4 The Bungalows, Wand Lane, Gallows Hill	Located in the front garden of the residential property
ML2	Brimmond, Hazel Old Lane, Hensall	Located in the rear garden of the residential property
ML3	1 Roall Waterworks, Goole	Located in the rear garden of the residential property
ML4	Residential property at Eggborough Sports and Leisure Complex, adjacent to the existing coal-fired power station site	Approximately 30 m north of the leisure complex and east of the car park
ML5	Property on Millfield Road, Chapel Haddlesey	Located in the rear garden of the residential property
ML6	1 Manor Cottages, Chapel Haddlesey	Located in the field to the rear of the residential property
ML7	Burn Lodge Farm, off A19	Located in the garden to the north of the residential property
ML8	Gateforth Grange, West Lane	Located toward the front of the residential property, attached to a telegraph pole

9.3.4 Measurements were undertaken between Thursday 10th November and Thursday 17th November 2016 and between Thursday 24th November and Wednesday 7th December 2016.

9.3.5 Daytime relates to the period between 07:00 and 23:00 (with evening between 19:00 and 23:00), and night-time between 23:00 and 07:00.

9.3.6 All measurements were taken at approximately 1.2-1.5 m above ground level, and in accordance with the requirements of British Standard BS 7445 (BSI, 1991 and 2003). All monitoring locations were positioned at least 3.5 m from any reflecting surface, other than the ground (*i.e.* free-field). Details of ongoing activities and typical noise sources in the area were recorded during visits to the monitoring locations to set up and collect the measurement equipment.

Noise Survey Instrumentation

9.3.7 Details of the instrumentation (sound level meters (SLMs)) used during the surveys are presented in Table 9.3 below:

Table 9.3: Measurement equipment

Monitoring location	Manufacturer	SLM model	SLM serial number	Microphone model	Microphone serial number
ML1	Svantek	958	23420	Microtek	9759
ML2	B&K	2250	2827270	B&K 4189	2820205
ML3	B&K	2238	2201511	B&K 4188	2555151
ML4	Norsonic	Nor140	14003077	Nor1225	91924
ML5	Svantek	959	15606	GRAS 40AE	98114
ML6	Svantek	958	23420	Microtek	9759
ML7	Svantek	959	15606	GRAS 40AE	98114
ML8	B&K	2250	2827273	B&K 4189	2933689

- 9.3.8 All SLMs used were Class 1 precision instruments. Each was programmed to log a number of parameters including L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} values, in 15-minute contiguous intervals.
- 9.3.9 The calibration levels were checked prior to and following all measurements with a Brüel & Kjær 4231 field calibrator (serial number 2217877). No significant drift, more than 0.2 dB, occurred. Full calibration details are available upon request.

Meteorological Conditions

- 9.3.10 Observations regarding weather conditions were made whilst attending the site. In addition, weather data have been obtained for the nearest weather station, located at Doncaster Sheffield Airport, approximately 25 km from the Site.
- 9.3.11 At the start of the first survey period (Thursday 10th November 2016), weather conditions on-site were observed to be dry with patchy cloud; wind blowing from a southerly direction with an average speed of approximately 2 m/s and the road surfaces were noted to be dry. At the end of the survey on Thursday 17th November 2016 weather conditions were noted to be dry with an average wind speed of approximately 2 m/s. The weather station data indicated that no unfavourable weather conditions occurred during this survey period with the exception of some precipitation throughout the day on Saturday 12th November 2016.
- 9.3.12 During the third site visit to set out more measurement equipment on Thursday 24th November 2016, weather conditions were noted to be dry with patchy cloud coverage, with average wind speeds of approximately 2 m/s from an easterly direction and road surfaces were noted to be dry. During the final site visit to collect the final survey equipment on Wednesday 7th December 2016 weather conditions were observed to be dry with patchy cloud coverage and with average wind speeds of approximately 4 m/s from a southerly direction. Road surfaces were noted to be dry. The weather station data indicated that no unfavourable weather conditions occurred during this survey period with the exception of some elevated average wind speeds between 8 – 9 m/s between 08:00 – 12:00 hours on Wednesday 7th December 2016.

- 9.3.13 For the time periods where slight unfavourable weather conditions were recorded on the long-term weather data, no anomalous sound level data were recorded with this time period and so it is considered that the rain and higher than desirable winds (*i.e.* windspeeds of >5 m/s) did not have a significant effect on the sound level measurements.
- 9.3.14 Overall the meteorological conditions were in general within the limits considered suitable by relevant standards for collecting noise measurements, and the measured levels are considered representative of a range of conditions prevailing at NSRs within the study area.
- 9.3.15 The results of the noise monitoring are presented in Section 9.4 (Baseline Conditions).

Impact Assessment and Significance Criteria

- 9.3.16 Effects are classified based on the magnitude of the impact and the sensitivity or value of the affected receptor. The criteria for assigning the magnitude of impacts are outlined below for the various potential impacts during demolition, construction and operation, and these are followed by a scale of receptor sensitivity in Table 9.11 and overall classification of effects matrix in Table 9.12.

Assessment of Demolition and Construction Noise Effects

- 9.3.17 The existing coal-fired power station is expected to cease operation before the end of 2019. The timing of subsequent decommissioning and demolition activities is currently uncertain, but as a worst case it is assumed that the demolition of the existing coal-fired power station could occur concurrently with the construction of the Proposed Development, although the demolition of the main power station is outside the scope of the DCO as only minor demolition works are required to enable the construction of the Proposed Development. In order to present a robust, 'worst case' assessment of effects on nearby receptors, the impacts and effects associated with the demolition of the existing coal-fired power station are included in the assessment of the construction noise and vibration effects of the Proposed Development.
- 9.3.18 The main coal-fired power station demolition works are likely to be divided into a number of demolition and ground preparation phases, potentially including the use of explosives to remove the cooling towers and stack. It is envisaged that the majority of demolition works will be undertaken during similar working hours to the construction of the Proposed Development, namely Monday to Friday 07:00 to 19:00 and Saturday 07:00 to 13:00, although it is likely that some construction activities will be required to be 24 hours during the peak periods.
- 9.3.19 Before the appointment of a construction contractor, site specific details on the construction activities, programme and number or type of construction plant are not yet available. Therefore, detailed construction noise predictions at specific NSRs have not been undertaken. Nevertheless, indicative demolition and construction noise predictions have been undertaken using the calculation methods set out in BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' (BSI, 2014a), based upon construction information from other power stations and pipeline construction projects. In addition, indicative information on the expected works associated with the coal-fired power station demolition project has been provided by Eggborough Power Limited (EPL) (the Applicant) has been taken into account.
- 9.3.20 The calculation method provided in BS 5228 (2014a) takes account of factors including the number and types of equipment operating, their associated Sound Power Levels (SWLs), their

modes of operation (% on-times within the working period), the distance to NSRs, and the effects of any intervening ground cover or barrier/ topographical screening. This allows prediction of the magnitude of impact. The construction of the Proposed Borehole Water, Cooling Water (including works at the abstraction point, which is close to NSRs) and Gas Connections are assessed separately to the construction assessment for Proposed Power Plant Site because the types of plant and activities are different.

9.3.21 The subsequent assessment of construction noise ‘effects’ at residential NSRs considers the guidance in ‘example method 1 – the ABC method’ as defined in BS 5228-1:2009+A1:2014 (BSI, 2014a). Table 9.4 (reproduced from BS 5228) provides guidance in terms of appropriate threshold values for residential NSRs, based upon existing ambient noise levels.

Table 9.4: Construction noise thresholds at residential dwellings

Assessment category and threshold value period	Threshold Value $L_{Aeq,T}$ dB(A) – free-field		
	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
<p>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 ambient noise level.</p> <p>NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (<i>i.e.</i> 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.</p> <p>NOTE 3: Applies to residential receptors only.</p>			
<p>(a) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.</p> <p>(b) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values.</p> <p>(c) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.</p> <p>(d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.</p>			

9.3.22 For the appropriate period (day, evening, night, weekend etc.), the ambient noise level is determined and rounded to the nearest 5 dB and the appropriate Threshold Value is then derived. The predicted construction noise level is then compared with this Threshold Value. Based upon this BS 5228 ABC method (BSI, 2014a), the criterion adopted in this assessment for the determination of potentially significant effects is the exceedance of the $L_{Aeq,T}$ threshold level for the category appropriate to the ambient noise level at each NSR. This is considered to be potentially equivalent to the SOAEL, although as stated in BS 5228, other project-specific factors, such as the number of NSRs affected and the duration and character of the impact, should also be considered by the assessor when determining if there is a potentially significant effect. Similarly, the criterion for the LOAEL for this assessment is a predicted construction

noise level equal to the existing ambient noise level at each NSR, *i.e.* resulting in a 3 dB increase in noise level when combined with the ambient noise level. Note that these criteria relate to residential NSRs only, in line with the ABC method.

- 9.3.23 In accordance with the NPPF (DCLG, 2012) and NPSE (Defra, 2010), it is important to identify NSRs that exceed the LOAEL and ensure adverse effects are mitigated and minimised. The assessment focuses on the impact at existing residential NSRs.
- 9.3.24 Based upon the above, the magnitude of the impact of construction noise is classified in accordance with the descriptors in Table 9.5.

Table 9.5: Magnitude of construction noise impacts

Magnitude of Impact	$L_{Aeq,T}$ dB (façade)
High	Exceedance of ABC Threshold Value by ≥ 5 dB
Medium	Exceedance of ABC Threshold Value by up to 5 dB
Low	Equal to or below the ABC Threshold Value by up to 5 dB
Very low	Below the ABC Threshold Value by ≥ 5 dB

Assessment of Daytime Construction Works Traffic on the Public Highway

- 9.3.25 The Proposed Development will affect traffic flows on existing roads in the area surrounding the Site during construction. The assessment focuses on the impact at existing residential properties located alongside the local road network.
- 9.3.26 Construction traffic noise has been assessed by considering the increase in traffic flows during the construction works, following the guidance of CRTN (DfT/ Welsh Office, 1998) and DMRB (Highways Agency, 2011).
- 9.3.27 18-hour (06:00 – 24:00) Annual Average Weekday Traffic (AAWT) data have been obtained for the year 2020 ‘with’ and ‘without’ construction traffic during the peak construction period, in order to determine if any existing roads are predicted to be subject to a potentially significant change in 18-hour traffic flows. Basic Noise Level (BNL) calculations have been undertaken to predict the change in noise level between the ‘with’ and ‘without’ scenarios.
- 9.3.28 The criteria for the assessment of traffic noise changes arising from construction works have been taken from Table 3.1 of DMRB (Highways Agency, 2011) and are provided in Table 9.6 below.

Table 9.6: Traffic noise criteria

Magnitude of impact	Change in traffic noise level $L_{A10,18h}$ dB
High	≥ 5
Medium	3 to <5
Low	1 to <3
Very low	<1

- 9.3.29 DMRB (Highways Agency, 2011) advises that an increase in road traffic flows of 25% (where the traffic speed and composition remain consistent) equates to an increase in road traffic noise of 1 dB(A). A doubling of in traffic flow would be required for an increase in 3 dB(A).
- 9.3.30 It is generally accepted that changes in noise levels of 1 dB(A) or less are imperceptible, and changes of 1 to 3 dB(A) are not widely perceptible. Consequently, at the selected road traffic noise receptors the magnitude of the predicted change in noise levels uses the scale shown in Table 9.6 above with respect to construction traffic. The criteria are based on the current guidance on short-term changes in traffic noise levels in DMRB. The SOAEL is set at a change in traffic noise of +3 dB and the LOAEL at +1 dB.

Assessment of Demolition and Construction Vibration Effects

Effects on Humans – Annoyance

- 9.3.31 Vibration due to construction activities has the potential to result in adverse impacts at nearby NSRs. The transmission of ground-borne vibration is highly dependent on the nature of the intervening ground between the source and receiver and the activities being undertaken. BS 5228-2: 2009+A1: 2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration' (BSI, 2014b) provides data on measured levels of vibration for various construction works, with particular emphasis on piling. Impacts are considered for both damage to buildings and annoyance to occupiers.
- 9.3.32 Table 9.7 details Peak Particle Velocity (PPV) vibration levels and provides a semantic scale for the description of demolition and construction vibration effects on human receptors, based on guidance contained in BS 5228-2 (BSI, 2014b).

Table 9.7: Construction vibration threshold at residential dwellings

Peak Particle Velocity (PPV) level	Description	Magnitude of impact
≥ 10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	High
1.0 to < 10 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.	Medium
0.3 to < 1 mm/s	Vibration might be just perceptible in residential environments.	Low
0.14 to < 0.3 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Very low

- 9.3.33 For residential receptors and other high sensitivity receptors, the LOAEL is defined as a PPV of 0.3 mm/s (millimetres per second), this being the point at which construction vibration is likely to become perceptible. The SOAEL is defined as a PPV of 1.0 mm/s, this being the level at which construction vibration can be tolerated with prior warning.

- 9.3.34 At receptors above the SOAEL, further consideration of whether an effect is significant is undertaken using professional judgement, taking account of the duration and frequency of the effect, as well as the time of evening/ night that the effect would be experienced.
- 9.3.35 In the absence of specific information on likely construction activities and plant, a qualitative assessment based upon professional judgement has been undertaken at this stage. Given the significant distance to residential receptors, no significant vibration (medium or high magnitude impacts) is expected to result from the proposed construction (or demolition) and therefore further assessment is scoped out. However, further consideration is given to the occupants of adjacent commercial buildings including those within the adjacent coal-fired power station site (assuming they could remain occupied during the early part of construction of the Proposed Development). This is also excluding the potential for very short term vibration due to demolition of the existing coal-fired power station's cooling towers and stack, possibly through the use of explosives, which is outside the scope of the DCO and will be considered separately by the demolition contractor.

Effects on Buildings

- 9.3.36 In addition to human annoyance, building structures may be damaged by high levels of vibration. The levels of vibration that may cause building damage are far in excess of those that may cause annoyance. Consequently, if vibration levels are controlled to those relating to annoyance (*i.e.* 1.0 mm/s), then it is highly unlikely that buildings will be damaged by demolition and construction vibration levels.
- 9.3.37 The criteria used in this assessment relate to the potential for cosmetic damage, not structural damage. The principal concern is generally transient vibration, for example due to piling.
- 9.3.38 BS 7385-2: 1993 'Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration' (BSI, 1993) provides guidance on vibration levels likely to result in cosmetic damage and is referenced in BS 5228-2: 2009+A1:2014 (BSI, 2014b). Guide values for transient vibration, above which cosmetic damage could occur, are given in Table 9.8.

Table 9.8: Transient vibration guide values for cosmetic damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mms ⁻¹ at 4 Hz and above	
Unreinforced or light framed structures Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
NOTE 1: Values referred to are at the base of the building.		
NOTE 2: For un-reinforced or light framed structures and residential or light commercial buildings, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded		

- 9.3.39 BS 7385-2:1993 (BSI, 1993) states that the probability of building damage tends to zero for transient vibration levels less than 12.5 mm/s PPV. For continuous vibration, such as from vibratory rollers, the threshold is around half this value.
- 9.3.40 It is also noted that these values refer to the likelihood of cosmetic damage. ISO 4866:2010 (ISO, 2010) defines three different categories of building damage:
- cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick/concrete block constructions;
 - minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick/block; and
 - major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks.
- 9.3.41 BS 7385-2:1993 (BSI, 1993) defines that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration twice that of minor damage. Therefore, this guidance can be used to define the magnitude of impact identified in Table 9.9 below.

Table 9.9: Magnitude of impact – construction vibration building damage

Magnitude of impact	Damage risk	Continuous vibration level ppv mm/s
High	Major	30
Medium	Minor	15
Low	Cosmetic	6
Very low	Negligible	<6

- 9.3.42 In the absence of specific information on likely construction and demolition activities and plant, a qualitative assessment based upon professional judgement has been undertaken. Again given the significant distance to residential receptors, no significant vibration is expected to result from the proposed construction or demolition activities and therefore further assessment of the effects of vibration on buildings is scoped out. However, further consideration is given to the adjacent buildings within the adjacent coal-fired power station site (assuming they have not already been demolished).

Assessment of Operational Noise

- 9.3.43 A noise propagation model has been developed in the SoundPLAN suite of programs to assess the two current layout options for the Proposed Development. SoundPLAN implements the noise prediction method ISO 9613-2: 1996 ‘Attenuation of sound during propagation outdoors’ (ISO, 1996), which has been employed to calculate noise levels at surrounding NSRs due to noise breakout from the proposed buildings and plant at the Proposed Power Plant Site. The AGI does not contain any significant noise emitting plant/ sources and has therefore not been included within the noise model.
- 9.3.44 The noise model consists of a detailed three-dimensional representation of the Proposed Power Plant Site and surroundings. Representative noise level data for the key noise emitting

plant/ buildings within the Proposed Development (turbine halls, Heat Recovery Steam Generator (HRSG), peaking plant) have been sourced from similar CCGT projects and noise level data for other principal buildings have been provided from Original Equipment Manufacturers (OEMs) based on the indicative concept designs for the Proposed Power Plant Site – see Figures 4.1a and 4.1b.

- 9.3.45 Significant topographical details and buildings that may influence the transmission of noise to NSRs are included in the noise model. A digital terrain model, created using ground elevation spot height data has been used to position buildings and other noise sources at the correct height. Local structures, including buildings that will remain after demolition of the existing coal-fired power station (e.g. the National Grid sub station) and off-site buildings, have also been included. The model assumes that the prevailing wind direction is always from source to receiver, which is likely to overestimate the noise effect associated with the Proposed Development. If the existing coal-fired power station was to remain standing at the start of operation of the Proposed Development (i.e. the Opening year scenario), the existing buildings would provide greater attenuation of operational noise from the Proposed Development, so the removal of all buildings except the sub station is a worst case scenario for the Opening year assessment.
- 9.3.46 Based upon the predicted noise levels from the noise model, an assessment of potential noise impact at nearby NSRs has been undertaken using the guidance in BS 4142: 2014 ‘Methods for rating and assessing industrial and commercial sound’ (BSI, 2014a).
- 9.3.47 A key aspect of the BS 4142 assessment procedure is a comparison between the Background Sound Level in the vicinity of residential locations and the Rating Level of the sound source under consideration. The relevant parameters in this instance are as follows:
- Background Sound Level – $L_{A90,T}$ – defined in the Standard as the “*A-weighted sound pressure level that is exceeded by the residual sound for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels*”;
 - Specific Sound Level – $L_s (L_{Aeq,Tr})$ – the “*equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r*”; and
 - Rating Level – $L_{Ar,Tr}$ – the “*specific sound level plus any adjustment made for the characteristic features of the sound*”.
- 9.3.48 Whereas the previous version of BS 4142:1997 allowed for a single correction of +5 dB to be made to the Specific Noise Level if one or more of the distinguishable, impulsive or irregular features were considered to be present, BS 4142: 2014 allows for corrections to be applied based upon the presence or expected presence of the following:
- tonality: up to +6 dB penalty;
 - impulsivity: up to +9 dB penalty (this can be summed with tonality penalty); and
 - other sound characteristics (neither tonal or impulsive but still distinctive): + 3 dB penalty.
- 9.3.49 Once any adjustments have been made, the background sound level and the rating level are compared. The standard states that:
- “*Typically, the greater the difference, the greater the magnitude of impact.*”

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context.
- The lower the rating level is to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon the context.”

9.3.50 Importantly, as suggested above, BS 4142:2014 (BSI, 2014a) requires that the rating level of the noise source under assessment be considered in the context of the environment when defining the overall significance of the impact.

9.3.51 BS 4142:2014 (BSI, 2014a) suggests that a one hour assessment period is considered during the day and a 15-minute assessment period at night.

9.3.52 Table 9.10 illustrates the adopted magnitude of impact scale used in this assessment based upon the numerical level difference. For BS 4142 assessment purposes the SOAEL is set at a rating level above the background sound level of +10 dB, and the LOAEL at +5 dB, although it should be remembered that the context assessment (including the absolute level of the sound under consideration) can vary the overall classification of effects.

Table 9.10: Magnitude of impact for industrial noise including building services

Magnitude of impact	BS 4142 descriptor	Rating level – background sound level (dB)
High	No BS 4142 descriptor for this magnitude level	>15
Medium	Indication of a significant adverse effect, depending upon context	+10 approx.
Low	Indication of an adverse effect, depending upon context	+5 approx.
Very low	Indication of low impact, depending upon context	≤ 0

Assessment of Operational Vibration

9.3.53 No causes of significant vibration associated with the Proposed Development are known and therefore further assessment of operational vibration is scoped out of this assessment.

Assessment of Operational Changes in Road Traffic Noise

9.3.54 The Proposed Development will have some limited effect on traffic flows on existing roads in the area surrounding the Site once operational, although significantly below the level expected during the peak construction period. Given the low levels of traffic that will be generated, assessment of operational road traffic has therefore been screened out of further assessment within the transport assessment.

- 9.3.55 Nevertheless, operational traffic movements have been considered against the 18-hour (06:00 – 24:00) AAWT data obtained for the year 2020 ‘without’ the Proposed Development in place. Indicative BNL calculations have again been undertaken to predict the change in noise level between the ‘with’ and ‘without’ development scenarios.
- 9.3.56 The assessment of impact magnitude and significance of effects is based upon the method set out in paragraphs 9.3.25 – 9.3.30 for construction traffic noise.

Receptor Sensitivity

- 9.3.57 In accordance with the principles of environmental impact assessment, the sensitivity of existing receptors to noise (or vibration) impacts during either construction or operational phases has been defined in Table 9.11.

Table 9.11: Sensitivity/ value of receptors

Sensitivity/ value of resource/ receptor	Description	Examples of receptor usage
Very high	Receptors where noise or vibration will significantly affect the function of a receptor	Auditoria/studios Specialist medical/teaching centres, or laboratories with highly sensitive equipment
High	Receptors where people or operations are particularly susceptible to noise or vibration. Sensitive ecological receptors known to be vulnerable to the effects of noise or vibration.	Residential Quiet outdoor areas used for recreation Conference facilities Schools/educational facilities in the daytime Hospitals/residential care homes Libraries Ecologically sensitive areas for example Special Protection Areas (SPAs)
Medium	Receptors moderately sensitive to noise or vibration where it may cause some distraction or disturbance	Offices Restaurants/retail Sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf)
Low	Receptors where distraction or disturbance of people from noise or vibration is minimal	Residences and other buildings not occupied during working hours Factories and working environments with existing high noise levels Sports grounds when spectator or noise is a normal part of the event

Significance of Effects

9.3.58 The following terminology has been used in the assessment to define effects:

- adverse – detrimental or negative effects to an environmental resource or receptor;
- neutral – effects to an environmental resource or receptor that are neither adverse nor beneficial; or
- beneficial – advantageous or positive effect to an environmental resource or receptor.

9.3.59 The effect resulting from each individual potential impact type above is classified according to the magnitude of the impact and the sensitivity or value of the affected receptor using the matrix presented in Table 9.12 below, but where necessary also considering the context of the acoustic environment.

Table 9.12: Classification of effects

Sensitivity/ value of resource/ receptor	Magnitude of impact			
	High	Medium	Low	Very low
Very high	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible

9.3.60 For the purposes of this assessment, negligible and minor effects are considered to be not significant, whereas moderate and major effects are considered to be significant.

Key Parameters for Assessment

9.3.61 The noise and vibration assessment has been undertaken with reference to the Planning Inspectorate’s Advice Note Nine: The Rochdale Envelope (Planning Inspectorate, 2012). The Rochdale Envelope (i.e. the maximum parameters for the Proposed Development and in particular its main buildings and structures) is not applicable to this chapter in that the potential variation in building locations and dimensions presented in Chapter 4: The Proposed Development and defined in the Works Plans and Schedule 14 of the draft DCO is unlikely to adversely affect the overall conclusions regarding the significance of residual noise effects, for reasons described below.

9.3.62 The construction assessment has been based on the worst case assumption of activities occurring at the closest part of the Site to each receptor (and in any event the draft DCO includes a Requirement for noise control including the setting of appropriate noise limits).

9.3.63 The operational assessment is based on indicative layouts within the limits of deviation defined by the draft DCO and accompanying Works Plans, which constrain the design parameters of each element of the Proposed Development (and as for construction, in any event mitigation will be integrated into the detailed design where necessary in order to meet agreed noise limits at the nearest receptors, in accordance with a draft DCO Requirement).

Extent of Study Area

9.3.64 The extent of the study area has been defined to include the nearest receptors/ communities in each direction from the Site and alongside the transport corridors that may be affected by changes in road traffic flows during the construction and operational phases of the Proposed Development. Representative NSRs within this study area in all directions from the Site have been identified for the purposes of assessment, to ensure all effects are appropriately considered.

Sources of Information/ Data

9.3.65 The following sources of information that define the Proposed Development have been reviewed and form the basis of the assessment of likely significant effects of noise and vibration:

- construction plant and equipment from similar power station and pipeline construction projects;
- construction noise data referenced from BS 5228 (BSI, 2014a);
- indicative concept layout plans for the Proposed Power Plant Site (see Figures 4.1a and 4.1b in ES Volume II);
- schedule of buildings and plant for the Proposed Power Plant Site, including Sound Power Levels (SWLs) and internal reverberant sound pressure levels, provided by OEMs and also sourced from similar representative CCGT projects;
- AAWT traffic data from the TA for the Proposed Development (see Appendix 14A, ES Volume III);
- AAWT traffic survey data from the TA for key access routes to the AGI and Proposed Gas Connection corridor (see Appendix 14A, ES Volume III);
- Ordnance Survey mapping of the Site and surrounding area; and
- aerial photography.

Consultation

9.3.66 Consultation undertaken during the preparation of this ES Chapter is presented in Table 9.13 below.

Table 9.13: Consultation summary table

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
Selby District Council and North Yorkshire Council	10 th August 2016 (email from SDC)	Comments received on the scoping briefing note (sent in advance of Scoping Report submission to the Planning Inspectorate): <ul style="list-style-type: none"> • identified additional residential receptors at Roall water works; and • stated that consideration 	Receptor at Roall waterworks included in baseline surveys and within impact assessment. Reference made to WHO guidance within impact

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
		should be given to sleep disturbance in terms of those levels laid down in the WHO guidance as well as BS 4142:2014.	assessment.
	31 st August (email from SDC)	Following request for advice on BS 4142 rating level required by SDC, response confirmed that SDC do not at present have a rating level which would be acceptable and the levels are considered in regard to the individual circumstances of the area and development concerned.	AECOM has developed an appropriate significance of effect scale for the Proposed Development as set out in the Assessment Methodology and Significance Criteria section of this chapter.
	14 th October 2016 (email from SDC)	Comments received regarding the selection of the most appropriate noise monitoring positions around the existing coal-fired power station site.	After consultation, five residential property locations around the existing coal-fired power station site were identified as being representative of potentially sensitive locations with respect to changes in noise levels. Subsequently five baseline noise monitoring positions were located within these most sensitive areas.
	28 th November 2016 (email from SDC)	Confirmation received that SDC content with the scope of the baseline noise monitoring surveys, including additional monitoring positions around the Proposed Gas Connection and AGI.	As a result of this consultation, a further three baseline noise monitoring positions were chosen near to the proposed pipeline and AGI.
	17 th February 2017 (joint response to consultation on PEI)	Comments on construction and demolition noise and vibration: <ul style="list-style-type: none"> Consider vibration from the construction of the pipeline where the line is augered 	Additional commentary has been provided in paragraph 9.6.30.

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
	Report)	<p>under roads and the river and there are nearby receptors.</p> <ul style="list-style-type: none"> • The preparation of a detailed noise and vibration assessment to identify specific mitigation measures for the proposed development including construction traffic, undertaken as part of the CEMP, is welcomed and should involve protection of NSR's on the pipeline and borehole corridors. • During construction it is noted that some of the predicted levels exceed the identified limits at receptors: NSR1, NSR4, NSR5 and NSR6. Additional mitigation measures are requested to be considered in the Environmental Statement to reduce the levels to the accepted limits. • It is recommended that the control of work outside the normal working time is subject to a Requirement where each section of work is considered in detail together with the mitigation to be provided, time scales and the NRS affected. • Access to the AGI construction area is via a small village road. To reduce the impact on residents of West Lane it is recommended that staff are required to park on the main construction site and travel together to the site. Reference to this should 	<p>Comment noted.</p> <p>Additional commentary has been provided in paragraph 9.7.3 to confirm how appropriate measures will be put in place.</p> <p>Additional commentary has been provided in paragraph 9.7.3 to confirm that control noise from construction works will be subject to a DCO Requirement.</p> <p>It has been agreed with NYCC that due to the low volumes of traffic (15 arrivals, 15 departures per day) over a very limited period along West Lane that such a measure would not be required. However it is include as a</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
		<p>be made in the Environmental Statement.</p> <ul style="list-style-type: none"> The effects of the pipeline construction on residential receptors should be considered in detail in the Environmental Statement. <p>Comments on operational noise:</p> <ul style="list-style-type: none"> In considering the Significance of Effects in sections 9.3.58 to 9.3.61 Table 9.12 relates the sensitivity of the receptor to the magnitude of impact so indicating that an: <ul style="list-style-type: none"> increase in noise level at a residential unit of approximately 5 dBA will have a slight, very short or highly localised effect of no significance, and an increase in noise level at a residential unit of approximately 10dBA will have a limited effect (by extent, duration or magnitude), which may be considered significant. <p>These do not relate to the descriptions given by BS 4142:2014 where an increase of approximately 5dB is an indication of an adverse impact and 10dB of a significant adverse impact.</p> <ul style="list-style-type: none"> If consultees on the PEIR require amendment to the Transport Assessment, it is suggested that the data used should be subject to reconsideration in the Environmental Statement. 	<p>recommendation in the TA (Appendix 14A, Annex Y in ES Volume III).</p> <p>Assessment has been included of the potential effects of pipeline construction at sample residential receptors.</p> <p>The BS 4142 magnitude of impact scale in Table 9.10, Sensitivity/value of receptors Table 9.11 and Significance of effects Table 9.12 have been retained in order to define potential operational effects of the Proposed Power Plant Site. However, PEI Report paragraph 9.3.60 defining the significance of effects descriptors has been removed to avoid conflict with the BS 4142 assessment.</p> <p>The construction traffic noise assessment has been updated to reflect changes to the TA.</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
		<ul style="list-style-type: none"> As the assessment is based on the assumption that tonality, impulsivity and intermittency will be designed out at the detailed design stage it is recommended that this is subject to a suitably worded Requirement with obligations to monitor, investigate and mitigate any issues found following complaint. Assessment in line with a BS4142:2014, identifies that some receptors during the night time will suffer Adverse/Significant Adverse impacts. It is noted that in that mitigation measures to reduce the impact are provided in Section 9.7 but further consideration to these measures should be given in the Environmental Statement. It is noted that the Specific Sound Level given in Tables 9.32 to 9.35 for NSR4 is lower than those for receptors 1 to 3 which are a similar distance or further away and would ask for the reason for this to be discussed in the Environmental Statement. The provision of agreed boundary noise levels as referred to in paragraph 9.9.1 is supported. 	<p>Additional commentary has been provided in paragraph 9.7.10 to confirm that control of noise from the operational Power Plant Site will be through the Environmental Permit for the Proposed Development.</p> <p>Additional commentary has been provided in paragraph 9.7.10, including to confirm that control of noise from the operational Power Plant Site will be through the Environmental Permit for the Proposed Development.</p> <p>An explanatory footnote has been included under Table 9.31.</p> <p>Comment noted.</p>
	27 th April 2017 (email)	<ul style="list-style-type: none"> Concern is expressed regarding the potential noise levels due to construction of the cofferdam and concrete breaking out at the cooling water abstraction point. 	<p>Additional text has been provided in paragraph 9.6.16</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
		<p>More detail of potential noise mitigation measures is requested in the event that breaking out is required.</p>	
		<ul style="list-style-type: none"> The review and update of the construction noise predictions since the PEIR is acknowledged. Further consideration of mitigation is requested in the Final CEMP with respect to the potential for significant effects at NSR1, which are due largely to demolition noise. 	<p>The Framework CEMP at Appendix 5A (ES Volume III) includes consideration of noise. The draft DCO includes a separate Requirement regarding the control of construction noise so noise is excluded from the wording of the CEMP Requirement. The ES chapter has been updated through to reflect this.</p>
		<ul style="list-style-type: none"> It is recommended that additional mitigation is considered in the CEMP and the CEMP noise assessment to ensure noise due to cofferdam construction and concrete breaking out at the cooling water abstraction point are minimised, and significant adverse effects avoided. 	<p>The draft DCO includes a Requirement for the control of construction noise. This requires a scheme for the control of noise, including the definition of agreed noise limits, to be submitted prior to the start of construction.</p>
		<ul style="list-style-type: none"> Comment acknowledges that the draft DCO includes a requirement for the control of construction noise. 	<p>Comment noted.</p>
		<ul style="list-style-type: none"> Comment acknowledges that out of hours work will be considered as part of the CEMP and associated noise assessment. 	<p>Noise limits for out of hours work will be agreed in accordance with a draft DCO Requirement.</p>
		<ul style="list-style-type: none"> Group transfer of workers to the pipeline route is welcomed during construction. 	<p>Comment noted.</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
		<ul style="list-style-type: none"> Comment acknowledges removal of former paragraph 9.3.60 with respect to significance scale descriptions, but states that this does not alter the method and still appears to reduce the significance of impacts. 	<p>The BS 4142 magnitude of impact scale in Table 9.10, sensitivity/ value of receptors in Table 9.11 and significance of effects in Table 9.12 of this ES chapter have been retained in order to define potential operational effects of the Proposed Power Plant Site. The assessment methodology used in this ES chapter is considered to be consistent with BS 4142.</p>
		<ul style="list-style-type: none"> Comment makes further reference to interpretation of the BS 4142 scale of impact and the results of the assessment at NSRs. Comment also states that rating level to be achieved will require agreement and should work towards reducing the impact on all receptors as far as possible and be subject to boundary noise levels agreed between the developer and the planning authority as per the draft DCO requirement on control of noise during operation. 	<p>Comment noted. Noise limits will be agreed in accordance with a draft DCO Requirement.</p>
		<ul style="list-style-type: none"> Comment refers to the suggested change of control of operational noise from the DCO to the Environmental Permit, but that this approach is not agreed. 	<p>In an early draft of the ES chapter it was suggested that operational noise could be controlled by the Environmental Permit only (to avoid duplication between the DCO and the Permit). However, in response to this comment a draft DCO Requirement regarding operational</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
	16 th May 2017 (email regarding proposed draft DCO Requirement wording)	<p>Comments on draft Requirement 25 for the control of construction noise:</p> <ul style="list-style-type: none"> • requesting the addition of vibration monitoring and measurement, agreement of construction vibration limits, and vibration control measures; and • suggesting the removal of reference to ‘each specific construction activity’ to avoid the potential for concurrent construction activities to result in a cumulative breach of the agreed limits and avoid issues with monitoring each activity when activities are occurring concurrently. <p>Comments on draft Requirement 26 for the control of operational noise:</p> <ul style="list-style-type: none"> • requested the scheme includes for the management and monitoring of noise; • request that the noise rating level is defined as per BS 4142:2014; • suggestion that the noise limits should be based on achievement of ‘no greater than +0 dB to the defined representative background sound level adjacent to the nearest residential properties’ because under BS 4142 a rating level of +5 dB above background is an indication of ‘adverse impact’. 	<p>noise is included.</p> <p>The assessment of construction vibration in Section 9.6 of this chapter does not identify any significant adverse vibration effects. As such vibration monitoring and measurement, agreement of vibration limits and a vibration control measures are not considered to be necessary. The draft DCO Requirement has therefore not included the suggested amendments, but discussion is ongoing on the matter.</p> <p>The first two bullet points have been addressed in the draft DCO Requirement wording.</p> <p>With regard to the final bullet point, the noise impact assessment methodology applied in this chapter seeks to identify significant adverse noise effects, in accordance with the EIA methodology. The proposed definition of operational noise limits based on +5 dB above background is intended to avoid ‘significant adverse impacts’ as defined by BS 4142, in accordance with EIA methodology. Discussion on this point is</p>

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/how comments have been addressed
			ongoing.
The Planning Inspectorate	September 2016	Various comments with respect to the scope of assessment related to the construction and operation of the Proposed Development and the decommissioning of the existing power station.	Incorporated with the scope of assessment as appropriate.
Doncaster Borough Council	19 th September 2016 (formal EIA Scoping Opinion response)	If in the future gas pipelines or other ancillary works are required and located within the Doncaster area, this office would have concerns of noise associated with the construction works or plant equipment and therefore may seek to impose conditions to minimise the impact on residential dwellings once additional information has been submitted.	The Proposed Development is located entirely within Selby District.

Summary of Key Changes to Chapter 9 since Publication of the Preliminary Environmental Information (PEI) Report

- 8.1.1 The PEI Report was published for statutory consultation in January 2017, allowing consultees the opportunity to provide informed comment on the Proposed Development, the assessment process and preliminary findings through a consultation process prior to the finalisation of this ES.
- 8.1.2 The key changes since the PEI Report was published are summarised in Table 9.14 below.

Table 9.14: Summary of key changes to Chapter 9 since publication of the PEI Report

Summary of change since PEI Report	Reason for change	Summary of change to chapter text in the ES
Cofferdams have been confirmed as being required at the Proposed Cooling Water Connection abstraction and discharge locations – this was only discussed as a possibility in the PEI Report.	Refinement of design information regarding works required to the cooling water abstraction and discharge points – cofferdams are required to allow construction activities to take place safely within the River.	The noise assessment has been updated to include assessment of noise from construction of the cofferdam and breaking out methods at NSR5 and NSR6 in Chapel Haddlesey, resulting in up to major adverse (significant)

Summary of change since PEI Report	Reason for change	Summary of change to chapter text in the ES
		short term effects. There are no NSRs located close to the cooling water discharge location.
Traffic count surveys have been conducted along Millfield Road and Fox Lane which are to be used as access points for the Proposed Gas Connection corridor.	Commitment made in PEI Report Chapter 14: Traffic and Transport to undertaking additional surveys to inform assessment of impacts on these roads during construction of the Proposed Gas Connection.	The noise assessment has been updated for NSRs in the vicinity of these proposed access routes to consider a possible increase in traffic noise. The effects have been reduced from minor/moderate in the PEI Report to minor adverse in the ES.

9.4 Baseline Conditions

Existing Baseline

Noise Survey Results

- 9.4.1 The processed results from each long-term noise survey position are provided in Tables 9.15 to 9.22 below. The L_{A90} values presented are the 10th percentile of all 15-minute measurements within the time period. Observations regarding the general baseline noise environment at each monitoring location are detailed after the tables.

Table 9.15: ML1 – 4 The Bungalows, Wand Lane, Gallows Hill

Date (2016)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 10 th November	15:30 – 23:00*	45.2	72.4	38.0
Friday 11 th November	23:00 – 07:00	41.2	60.2	36.5
	07:00 – 23:00	51.2	88.8	42.5
Saturday 12 th November	23:00 – 07:00	47.7	61.7	39.7
	07:00 – 23:00	48.4	81.6	41.8
Sunday 13 th November	23:00 – 07:00	40.8	61.2	37.0
	07:00 – 23:00	45.9	80.7	38.4
Monday 14 th November	23:00 – 07:00	43.6	61.8	36.1
	07:00 – 23:00	48.1	79.6	41.2
Tuesday 15 th November	23:00 – 07:00	42.8	65.7	38.2
	07:00 – 23:00	48.2	77.7	41.5
Wednesday 16 th November	23:00 – 07:00	42.9	62.0	36.2
	07:00 – 23:00	49.0	77.7	41.7
Thursday 17 th	23:00 – 07:00	45.3	61.2	36.7

Date (2016)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
November	07:00 – 11:00*	48.4	73.8	37.2

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Table 9.16: ML2 – Hazel Old Lane

Date (2016)	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 10th November	13:30 – 23:00*	51.8	78.7	38.0
Friday 11th November	23:00 – 07:00	46.8	74.0	34.6
	07:00 – 23:00	55.3	87.6	46.5
Saturday 12th November	23:00 – 05:00*	49.1	68.1	39.7
	13:30 – 23:00*	52.6	75.9	42.3
Sunday 13th November	23:00 – 07:00	44.7	71.6	36.6
	07:00 – 23:00	50.2	81.2	42.6
Monday 14th November	23:00 – 07:00	49.1	66.6	36.2
	07:00 – 23:00	53.1	78.1	42.3
Tuesday 15th November	23:00 – 07:00	47.3	70.8	35.4
	07:00 – 23:00	53.2	81.9	45.7
Wednesday 16th November	23:00 – 07:00	50.1	71.8	38.5
	07:00 – 23:00	55.3	80.0	44.3
Thursday 17th November	23:00 – 06:30*	49.2	72.9	37.4

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Table 9.17: ML3 – 1 Roall Waterworks, Goole

Date (2016)	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 10th November	12:00 – 23:00*	59.4	77.5	38.5
Friday 11th November	23:00 – 07:00	55.4	80.4	30.0
	07:00 – 23:00	60.7	83.5	44.7
Saturday 12th November	23:00 – 07:00	54.8	73.5	42.0
	07:00 – 23:00	59.7	82.3	37.0
Sunday 13th November	23:00 – 07:00	53.0	77.8	32.0
	07:00 – 23:00	58.7	91.0	40.2
Monday 14th November	23:00 – 07:00	55.3	75.1	36.0
	07:00 – 23:00	62.7	91.4	38.2
Tuesday 15th	23:00 – 07:00	53.5	78.3	35.5

Date (2016)	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
November	07:00 – 23:00	59.6	81.0	40.7
Wednesday 16th November	23:00 – 07:00	54.0	78.4	35.6
	07:00 – 23:00	60.0	89.5	42.0
Thursday 17th November	23:00 – 07:00	54.5	75.4	39.5
	07:00 – 11:15*	61.5	79.4	50.0

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Table 9.18: ML4 – Eggborough Sports and Leisure Complex

Date (2016)	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 24th November	12:20 – 23:00*	56.6	86.1	46.9
Friday 25th November	23:00 – 07:00	56.6	62.9	55.0
	07:00 – 23:00	57.9	79.6	43.3
Saturday 26th November	23:00 – 07:00	54.9	84.4	37.2
	07:00 – 23:00	58.1	107.0	42.0
Sunday 27th November	23:00 – 07:00	44.7	60.6	36.2
	07:00 – 23:00	56.6	89.8	41.7
Monday 28th November	23:00 – 07:00	51.1	75.4	36.3
	07:00 – 23:00	54.7	75.6	45.1
Tuesday 29th November	23:00 – 07:00	46.6	60.4	39.7
	07:00 – 23:00	54.0	79.1	44.2
Wednesday 30th November	23:00 – 02:35*	41.8	57.1	35.9

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Table 9.19: ML5 – Property on Millfield Road, Chapel Haddlesey

Date	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 10th November	11:45 – 23:00*	49.9	81.2	38.1
Friday 11th November	23:00 – 07:00	45.3	75.7	34.0
	07:00 – 23:00	49.2	80.7	44.1
Saturday 12th November	23:00 – 07:00	49.3	69.2	45.4
	07:00 – 23:00	48.4	72.3	40.7
Sunday 13th November	23:00 – 07:00	44.6	74.8	36.6
	07:00 – 23:00	47.3	81.8	39.2
Monday 14th November	23:00 – 07:00	46	69.0	38.1
	07:00 – 23:00	50.1	78.7	40.8
Tuesday 15th November	23:00 – 07:00	45.8	70.5	37.5
	07:00 – 23:00	59.1	89.5	44.2
Wednesday 16th November	23:00 – 07:00	64.6	86.3	55.2
	07:00 – 23:00	57.5	85.0	36.4
Thursday 17th November	23:00 – 07:00	62.2	86.7	42.1
	07:00 – 9:30*	62.2	85.8	51.9

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Table 9.20: ML6 – 1 Manor Cottages, Chapel Haddlesey

Date	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 24th November	14:00 – 23:00*	44.1	79.2	34.2
Friday 25th November	23:00 – 07:00	40.9	58.6	32.4
	07:00 – 23:00	47.8	78.8	37.2
Saturday 26th November	23:00 – 07:00	43.1	73.9	36.0
	07:00 – 23:00	46.3	73.9	39.7
Sunday 27th November	23:00 – 07:00	42.1	66.7	34.0
	07:00 – 23:00	45.5	73.6	35.9
Monday 28th November	23:00 – 07:00	40.8	61.9	32.4
	07:00 – 23:00	45.7	82.4	37.3
Tuesday 29th November	23:00 – 07:00	44.8	59.3	37.2
	07:00 – 23:00	47.3	81.8	41.2
Wednesday 30th November	23:00 – 07:00	44.5	69.5	36.8
	07:00 – 23:00	50.0	85.2	41.4

Date	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 1st December	23:00 – 07:00	44.4	59.4	37.1
	07:00 – 12:45*	49.7	79.5	44.4

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Table 9.21: ML7 - Burns Lodge Farm, off A19

Date	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 1st December	13:00 – 23:00*	54.1	76.6	45.0
Friday 2nd December	23:00 – 07:00	49.9	72.8	26.9
	07:00 – 23:00	55.0	78.1	42.4
Saturday 3rd December	23:00 – 07:00	50.0	78.2	26.0
	07:00 – 23:00	54.9	83.7	40.8
Sunday 4th December	23:00 – 07:00	62.7	85.5	39.7
	07:00 – 23:00	64.6	89.3	57.1
Monday 5th December	23:00 – 07:00	58.8	88.8	55.1
	07:00 – 23:00	55.5	95.1	42.6
Tuesday 6th December	23:00 – 02:15*	51.3	73.8	37.6

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Table 9.22: ML8 - Gateforth Grange, West Lane

Date	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Thursday 1st December	11:30 – 23:00*	42.0	56.3	29.0
Friday 2nd December	23:00 – 07:00	35.3	64.2	23.0
	07:00 – 23:00	42.1	76.9	31.6
Saturday 3rd December	23:00 – 07:00	38.2	62.0	21.7
	07:00 – 23:00	45.7	74.0	36.4
Sunday 4th December	23:00 – 07:00	37.1	61.5	26.6
	07:00 – 23:00	44.7	70.0	37.1
Monday 5th December	23:00 – 07:00	42.7	64.7	30.6
	07:00 – 23:00	48.4	74.4	41.0
Tuesday 6th December	23:00 – 07:00	37.5	56.2	29.3
	07:00 – 23:00	44.6	78.5	37.8

Date	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,15min}$ dB	$L_{A90,15min}$ dB
Wednesday 7th December	23:00 – 07:00	39.3	59.5	31.2
	07:00 – 11:00*	46.9	76.8	42.4

* Note – this period does not cover the full 16-hr day or 8-hr night period and is therefore may not be directly comparable with other complete time periods.

Gallows Hill (ML1)

- 9.4.2 The dominant noise sources at this location during the daytime were noted to be road traffic noise from Wand Lane, commercial activity from the nearby Fairdeal Solutions (Motor Vehicle Retailer) and industrial noise from activity within the existing coal-fired power station site.

Hensall Village (ML2)

- 9.4.3 Noise within this area was observed to be generally dominated by road traffic noise, primarily from Weeland Road, but with further contribution from Hazel Old Lane. Noise from activity in neighbouring residential gardens was also noted, including dog barking which occurred for some of the time. Occasional train noise from the line into Hensall Train Station approximately 160 m to the south was also audible.

Residential Property 1 Roall Waterworks (ML3)

- 9.4.4 Noise at this position was dominated by road traffic noise from the A19, approximately 25 m to the east of the measurement position.

Eggborough Sports and Leisure Complex (ML4)

- 9.4.5 Noise at this position was generally dominated by road traffic noise from the A19 to the west. However, some contribution was also made by car movements in the Sports and Leisure Complex's car park and from activity from the patrons moving between the club house and golf course. Post-processing of the measurement data at this located highlighted one 15-minute interval on Saturday 26th November with a recorded L_{Amax} value of 107 dB. This resulted in an elevated $L_{Aeq,15min}$ value of 76 dB, approximately 25-30 dB higher than intervals either side of the event, which also affected the overall daytime noise level as presented in Table 9.18. Therefore, the data from this 15-minute interval have been excluded from the subsequent impact assessment as a conservative approach.

Chapel Haddlesey (ML5)

- 9.4.6 At this position the noise environment was observed to generally comprise road traffic noise from the A19 to the west and Millfield Road to the north.
- 9.4.7 On collection of the monitoring equipment, the surveyor was informed by local residents that construction activity on the southern bank of the River Aire, approximately 90 m from the measurement location, commenced on Tuesday 15th November, which has resulted in the significant increase in measured noise levels compared with the period prior to commencement of the works. Therefore, the data from the affected period have been excluded from the subsequent impact assessment.

Manor Cottages, east of Chapel Haddlesey (ML6)

- 9.4.8 Noise levels at this position were observed to predominantly comprise road traffic from the A19 to the west and Millfield Road to the north.

Burn Lodge Farm (ML7)

- 9.4.9 At this location noise levels were dominated by road traffic from the A19. In addition, trains using the East Coast Main Line approximately 320 m to the north, frequently and at high speeds, were also audible and contributed to the noise environment.
- 9.4.10 An initial survey was undertaken at this location from Thursday 24th November to Thursday 1st December, but on collection of the measurement equipment, the cable had become disconnected. The data from the period prior to this have been excluded from the subsequent impact assessment and not reported. The equipment was then reconfigured and recalibrated and the survey recommenced.
- 9.4.11 Post-processing of the measurement data from 1st December highlighted a further issue with the data collected from the early morning hours of Sunday 4th December, when noise levels increased sharply for a sustained period until late Monday morning, when they appear to return to levels similar to the period before the increase. The cause of the increase is unknown, however, as a conservative approach, the data from the affected period have been excluded from the subsequent impact assessment.

Gateforth Grange (ML8)

- 9.4.12 Noise levels at this location were noticeably generally low. The two main noise sources observed during the site visit were road traffic from the A19 and train noise from the East Coast Main Line running north/ north-east of the measurement position.

Representative Background Sound Levels

- 9.4.13 Representative background sound levels have been established for daytime and night-time periods based upon review and comparison of the modal and lowest 10th percentile of all 15-minute interval results throughout the daytime and night-time periods surveyed (other than those periods excluded as detailed above), together with a review of the graphical representation of the time history of all $L_{A90,15mins}$ data at each location.
- 9.4.14 Table 9.23 summarises the defined representative background sound levels taken forward for the NSR adjacent to each noise monitoring location within the BS 4142 assessment.

Table 9.23: Representative background sound levels

Receptor	NSR1	NSR2	NSR3	NSR4	NSR5	NSR6	NSR7	NSR8
Daytime L_{A90} dB (07:00-23:00 hrs)	41	43	41	43	40	37	45	30
Night-time L_{A90} dB (23:00-07:00 hrs)	37	35	32	36	34	33	27	24

Future Baseline

- 9.4.15 In the absence of the Proposed Development, future baseline noise levels at NSRs will depend largely on traffic flows on surrounding road/ rail networks and the future operations at other industrial and commercial premises. The existing coal-fired power station is expected to cease operation by the end of 2019, potentially resulting in a reduction in future baseline at properties within the vicinity compared with current periods when the existing coal-fired power station is in periods of operation.

9.5 Development Design and Impact Avoidance

Construction Noise

- 9.5.1 Construction activities will typically be undertaken during weekday daytime and Saturday mornings, although some works during peak construction may take place outside of normal working hours, provided that they do not give rise to unacceptable noise impacts. Measures to mitigate noise will be implemented during the construction phase of the Proposed Development in order to minimise impacts at local residential receptors, particularly with respect to activities required outside of normal working hours. Mitigation (which will be confirmed in further detail prior to construction in accordance the draft DCO Requirement for the control of noise during construction shall include, but not be limited to:

- abiding by construction noise limits at nearby NSRs, which will be agreed in accordance with a draft DCO Requirement;
- ensuring that all processes are in place to minimise noise before works begin and ensuring that BPM are being achieved throughout the construction programme, including the use of localised screening around significant noise producing plant and activities;
- ensuring that modern plant is used, complying with the latest European noise emission requirements. Selection of inherently quiet plant where possible;
- hydraulic techniques for breaking to be used in preference to percussive techniques where practical;
- use of lower noise piling (such as rotary bored or hydraulic jacking) rather the driven piling techniques (if required), where possible, for works within the Proposed Power Plant Site and at the cooling water abstraction point;
- off-site pre-fabrication, where practical;
- all plant and equipment being used for the works to be properly maintained, silenced where appropriate, operated to prevent excessive noise and switched off when not in use;
- all contractors to be made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2) (BSI, 2014a and b), which should form a prerequisite of their appointment;
- loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials around the Site to be conducted in such a manner as to minimise noise generation;
- appropriate routing of construction traffic on public roads and along access tracks, including group transfer of site staff along the pipeline route to minimise vehicle movements (see Chapter 14: Traffic and Transportation);
- consultation with SDC and local residents to advise of potential noisy works that are due to take place; and

- noise complaints should be monitored, reported to the contractor and immediately investigated.

9.5.2 Method statements regarding construction management, traffic management, and overall site management will be prepared in accordance with best practice and relevant British Standards, to help to minimise impacts of construction works. One of the key aims of such method statements will be to minimise noise disruption to local residents during the construction phase.

9.5.3 Consultation and communication with the local community throughout the construction period will also serve to publicise the works schedule, giving notification to residents regarding periods when higher levels of noise may occur during specific operations, and providing lines of communication where complaints can be addressed.

9.5.4 As mentioned above, the draft DCO Requirement for the control of noise during construction requires a scheme to be submitted prior to construction to ensure that the noise impacts relating to construction activities are minimised through appropriate mitigation. A detailed noise assessment will be carried out once the contractor is appointed and further details of construction methods are known, in order to identify specific mitigation measures for the Proposed Development (including construction traffic).

9.5.5 In addition, it is recommended that the contractor should be a member of the 'Considerate Constructors Scheme' which is an initiative open to all contractors undertaking building work.

Operational Noise

9.5.6 The selection of the Proposed Power Plant Site and development of the indicative concept layout have included consideration of potential noise effects and proximity to NSRs. During the detailed design stage, potential significant residual noise effects will be mitigated by design (see Section 9.7 (Mitigation and Enhancement)). The generating station will be operated in accordance with an Environmental Permit, issued and regulated by the Environment Agency. This will require operational noise from the generating station to be controlled through the use of BAT, which will be determined through the Environmental Permit application. Operational noise will also be controlled via a draft DCO Requirement.

9.6 Likely Impacts and Effects

Construction Noise and Vibration

9.6.1 This section discusses the potential noise and vibration effects on sensitive receptors arising during the construction phase of the Proposed Development, including cumulative effects due to demolition of the existing coal-fired power station which may occur concurrently.

9.6.2 Noise levels experienced by local receptors during such works depend upon a number of variables, the most significant of which are:

- the noise generated by plant or equipment used on site, generally expressed as Sound Power Levels (L_w) or the vibration generated by the plant;
- the periods of use of the plant on site, known as its on-time;
- the distance between the noise/ vibration source and the receptor;

- the noise attenuation due to ground absorption, air absorption and barrier effects;
- in some instances, the reflection of noise due to the presence of hard surfaces such as the sides of buildings; and
- the time of day or night the works are undertaken.

- 9.6.3 Residential NSRs are located at distance in different directions around the Site. The closest residential NSRs to the existing power station site (which includes the Proposed Power Plant Site, Proposed Construction Laydown area, Proposed Borehole and Electrical Connections and CCR Land, as well as the existing coal-fired power station demolition works) include those located on Wand Lane in Gallows Hill approximately 210 m to the east of the Proposed Construction Laydown area, those located close to the junction of Hazel Old Lane and Weeland Road approximately 570 m to the south, and the Eggborough Sports and Leisure Complex located approximately 550 m to the west of the Proposed Power Plant Site.
- 9.6.4 With respect to the Proposed Gas Connection, the corridor passes approximately 80 m from NSRs at the eastern limit of Chapel Haddlesey, and approximately 120 m from Burn Lodge Farm (off the A19) north of Chapel Haddlesey before turning westwards and terminating at the AGI compound location west of West Lane, south-west of Burn. The closest NSR to the proposed location for the AGI is Gateforth Grange, located approximately 350 m to the south-west of the AGI. The distance of the closest NSR to the cooling water abstraction on the south bank of the River Aire near Chapel Haddlesey is approximately 70 m.
- 9.6.5 The indicative construction programme for the Proposed Development is anticipated to span approximately three years, commencing in early 2019 and running through until early 2022. The majority of construction works will be undertaken during the period Monday to Friday 07:00 to 19:00 and Saturday 07:00 to 13:00, although it is likely that some construction activities will be required to be 24 hours during the peak periods, provided these do not give rise to unacceptable noise impacts.
- 9.6.6 Construction works related to the AGI will be relatively short-term (up to nine months, with the majority of work being completed within the first three months) when compared to the overall programme for the construction of the Proposed Power Plant Site (around 40 months). Works related to the Proposed Cooling Water Connection abstraction point will span an 18 month period. It is currently proposed that during the initial three month period a cofferdam will be required in the River Aire to allow dewatering and protection of the work site during investigation of the integrity of the existing structure. Construction of the cofferdam will require piling over the initial days of the three-month period. At the end of the first three months, the cofferdam is proposed to be removed, and followed by a six month off-site design period. The final three months is expected to require reconstruction of the cofferdam, followed by potential upgrade of the structure in-situ (through breaking out of concrete and reconstruction of parts of the structure), or removal of the entire structure and replacement, depending upon the findings of the initial investigation and the resulting nature of the design requirements.
- 9.6.7 As previously outlined, the timing and programme for the demolition of the existing coal-fired power station is currently uncertain. The existing power station is anticipated to cease operation by the end of 2019 although the earliest that decommissioning/ demolition could begin is 2018. Given the above, there is the potential for cumulative noise effects from the demolition of the existing coal-fired power station and construction of the Proposed Development within the existing power station site. Therefore, both demolition and

construction noise predictions have been carried out using noise data for plant and calculation methodologies from BS 5228 (2014a).

- 9.6.8 Predicted noise levels for construction of the Proposed Development within the existing power station site and demolition of the existing power station have been based upon construction methods used for other power stations in the UK, and supplemented by information about the potential worst case activity during demolition (concrete breaking) provided by EPL. No predictions have been undertaken for the use of explosives to raise the cooling towers or stack to the ground on the basis that it will occur for a very short time period. Predicted noise levels for construction of the Proposed Cooling Water pipeline and abstraction infrastructure on the bank and in the River Aire near Chapel Haddlesey, Proposed Gas Connections, the Proposed Surface Water Drainage Connection to Hensall Dyke, and the AGI compounds have been based upon construction methods assessed for another major underground pipeline project, including AGIs, and other construction projects in the UK. As a conservative approach, it is assumed that all plant and activities area taking place at the closest approach to each NSR, whereas in reality this will not occur for any significant duration if at all.
- 9.6.9 The predicted levels apply to normal weekday daytime (07:00 – 19:00) working, although they could approximate to other time periods where working at the same rate and intensity is proposed. Full details on the noise prediction methodology, including a full list of demolition/construction plant and associated sound power levels for each construction phase, are presented in Appendix 9A (ES Volume III).
- 9.6.10 A summary of noise predictions at NSR locations around the Site (using the closest NSR to the proposed works in the vicinity of the baseline noise surveys) are presented in Table 9.24 to 9.26. Free-field noise levels have been predicted to allow subsequent comparison with the ABC categories derived from free-field baseline ambient noise levels at NSRs. With respect to prediction of pipeline construction (including the River Aire cooling water abstraction point) and surface water drainage connection noise levels, the presented values are for ‘pipe stringing, pipe bending and pipeline welding’, representing the highest noise levels predicted from 14 potential sub-activities considered (see Appendix 9A, ES Volume III).
- 9.6.11 With respect to the works at the Proposed Cooling Water Connection abstraction point, predictions have been undertaken for piling of the cofferdam and breaking out of the existing concrete structure. Given the potential for cumulative effects of demolition and construction noise from the Site, an additional column of cumulative demolition and construction noise is provided in Table 9.25, based upon the higher predicted construction phase noise levels at each NSR. Since preparation of the PEI Report, the predictions have been further reviewed and soft ground attenuation between the works and NSRs has now also been taken into account in accordance with BS 5228 methodology, where previously it was excluded. As advised by BS 5228, noise levels predicted at distances over 300 m should be treated with caution due to the increasing importance of meteorological effects.

Table 9.24: Demolition noise predictions for the existing coal-fired power station (to inform assessment of potential cumulative effects with the Proposed Development)

Receptor	Predicted free-field noise level for daytime demolition activity dB L _{Aeq,12h}
NSR1 – Waterworks House, Wand Lane, Gallows Hill (west)	63

Receptor	Predicted free-field noise level for daytime demolition activity dB L _{Aeq,12h}
of ML1)	
NSR2 – Residential property, Hazel Old Lane, Hensall (north of ML2)	50
NSR3 – 1 Roall Waterworks, Goole	54
NSR4 – Eggborough Sports and Leisure Complex	69
NSR5 – Property on Millfield Road, Chapel Haddlesey	57
NSR6 – 1 Manor Cottage, Chapel Haddlesey	57

Table 9.25: Construction noise predictions for the Proposed Development within the existing coal-fired power station site (note the Proposed Borehole Connection in the south-west of the Site is considered in Table 9.26 below)

Receptor	Predicted free-field noise level for daytime construction activity dB L _{Aeq,12h}					
	Site clearance	Piling and foundation	Building	Fit out	Landscaping	Demolition & construction
NSR1 – Waterworks House, Wand Lane, Gallows Hill (west of ML2)	62	62	61	58	43	64
NSR2 – Residential property, Hazel Old Lane, Hensall (north of ML2)	49	53	51	49	30	55
NSR3 – 1 Roall Waterworks, Goole	48	52	51	48	30	56
NSR4 – Eggborough Sports and Leisure Complex	49	53	51	49	30	69
NSR5 – Property on Millfield	43	47	45	43	24	54

Receptor	Predicted free-field noise level for daytime construction activity					
	dB L _{Aeq,12h}					
	Site clearance	Piling and foundation	Building	Fit out	Landscaping	Demolition & construction
Road, Chapel Haddlesey						
NSR6 – 1 Manor Cottage, Chapel Haddlesey	43	47	45	43	24	54

Table 9.26: Construction noise predictions for the Proposed Borehole Water, Cooling Water, Surface Water Drainage and Gas Connections, and AGI)

Receptor	Predicted free-field noise level for daytime construction activity			
	dB L _{Aeq,12h}			
	Proposed Borehole Water, Cooling Water, Surface Water Drainage and Gas Connections	AGI construction	Cofferdam construction at cooling water abstraction	Cooling water abstraction structure breaking-out
NSR1 – 4 The Bungalows/ Waterworks House, Wand Lane, Gallows Hill	55	n/a	n/a	n/a
NSR2 – Brimmond/ residential properties, Hazel Old Lane, Hensall	49	n/a	n/a	n/a
NSR3 – 1 Roall Waterworks, Goole	55	n/a	n/a	n/a
NSR4 – Eggborough Sports and Leisure Complex	68	n/a	n/a	n/a
NSR5 – Property on Millfield Road, Chapel Haddlesey	65	n/a	65	73
NSR6 – 1 Manor Cottage, Chapel Haddlesey	62	n/a	40	50
NSR7 – Burn Lodge Farm, off A19	62	48	n/a	n/a
NSR8 – Gateforth Grange, West Lane	52	56	n/a	n/a

Construction Noise Emission Criteria

- 9.6.12 Based upon the analysis and summary of the results of the existing free-field baseline ambient noise surveys undertaken for the project (excluding those periods when noise levels were elevated and not deemed representative), Table 9.27 sets out the BS 5228 ‘ABC’ noise

threshold categories (BSI, 2014a) at each monitoring location in the vicinity of each NSR for the time periods as set out in Table 9.4.

Table 9.27: Measured free-field $L_{Aeq,T}$ noise levels and associated 'ABC' assessment category

Receptor	Weekday daytime 07:00 – 19:00		Weekday evening 19:00 – 23:00		Night 23:00 – 07:00		Saturday 07:00 – 13:00		Saturday 13:00 – 23:00		Sunday 07:00 – 23:00	
	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC	$L_{Aeq,T}$ dB	ABC
NSR1 – 4 The Bungalows/ Waterworks House, Wand Lane, Gallows Hill	50	A	46	A	44	B	50	A	47	A	46	A
NSR2 – Brimmond/ residential properties, Hazel Old Lane, Hensall	55	A	50	A	49	C	55	A	50	A	50	A
NSR3 – 1 Roall Waterworks, Goole	62	A	56	B	54	C	61	A	59	C	59	C
NSR4 – Eggborough Sports and Leisure Complex	56	A	55	B	53	C	51	A	47	A	57	B
NSR5 – Property on Millfield Road, Chapel Haddlesey	49	A	47	A	47	B	49	A	48	A	47	A
NSR6 – 1 Manor Cottage, Chapel Haddlesey	49	A	45	A	43	B	46	A	46	A	46	A
NSR7 – Burn Lodge Farm, off A19	56	A	53	B	50	C	55	A	55	B	-	-
NSR8 – Gateforth Grange, West Lane	46	A	43	A	39	A	48	A	44	A	45	A

- 9.6.13 Construction noise limits have been derived for each NSR in Table 9.28 below using the BS5228 ABC methodology (described in Table 9.4).

Table 9.28: Construction noise limits

Receptor	Construction noise limit $L_{Aeq,T}$ dB (Free-field)					
	Weekday daytime 07:00 – 19:00	Weekday evening 19:00 – 23:00	Night 23:00 – 07:00	Saturday 07:00 – 13:00	Saturday 13:00 – 23:00	Sunday 07:00 – 23:00
NSR1 – 4 The Bungalows/Water works House, Wand Lane, Gallows Hill	65	55	50	65	55	55
NSR2 – Brimmond / residential properties, Hazel Old Lane, Hensall	65	55	55	65	55	55
NSR3 – 1 Roall Waterworks, Goole	65	60	55	65	65	65
NSR4 – Eggborough Sports and Leisure Complex	65	60	55	65	55	60
NSR5 – Property on Millfield Road, Chapel Haddlesey	65	55	50	65	55	55
NSR6 – 1 Manor Cottage, Chapel Haddlesey	65	55	50	65	55	55
NSR7 – Burn Lodge Farm, off A19	65	60	55	65	60	55*
NSR8 – Gateforth Grange, West Lane	65	55	45	65	55	55

* Assigned based upon a conservative approach in the absence of representative baseline data.

Construction Noise Effects

- 9.6.14 The effects of the predicted daytime demolition and construction noise levels (as presented in Tables 9.24 – 9.26) have been classified by considering the daytime ABC noise limit values in Table 9.29, and using the semantic scales in Tables 9.5, 9.11 and 9.12. These effects are summarised in Table 9.29 below. Noise associated with demolition of the existing coal-fired

power station is assessed together with the noisiest construction activity associated with the Proposed Development (piling and foundations), as a worst case.

Table 9.29: Daytime construction noise effects (potentially significant effects underlined)

Receptor	Construction of the Proposed Power Plant					Demolition of existing coal-fired power station & piling and foundations	Proposed Borehole Water, Cooling Water, Surface Water Drainage Pipeline and Gas Connections	AGI	Cofferdam construction at cooling water abstraction	Cooling water abstraction structure breaking-out
	Site clearance	Piling and foundations	Building	Fit out	Landscaping					
NSR1 – Waterworks House, Wand Lane, Gallows Hill (west of ML1)	Minor adverse	Minor adverse	Minor adverse	Negligible adverse	Negligible adverse	Minor adverse	Negligible adverse	n/a	n/a	n/a
NSR2 – Residential property, Hazel Old Lane, Hensall (north of ML2)	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	n/a	n/a	n/a
NSR3 – 1 Roall Waterworks, Goole	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	n/a	n/a	n/a
NSR4 – Eggborough Sports and Leisure Complex	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	<u>Moderate adverse</u>	<u>Moderate adverse</u>	n/a	n/a	n/a
NSR5 – Property on Millfield Road, Chapel Haddlesey	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Minor adverse	n/a	Minor adverse	<u>Major adverse</u>
NSR6 – 1 Manor Cottage, Chapel Haddlesey	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Minor adverse	n/a	Negligible adverse	Negligible adverse
NSR7 – Burn Lodge Farm, off A19	n/a	n/a	n/a	n/a	n/a	n/a	Minor adverse	Negligible adverse	n/a	n/a
NSR8 – Gateforth Grange, West Lane	n/a	n/a	n/a	n/a	n/a	n/a	Negligible adverse	Negligible adverse	n/a	n/a

- 9.6.15 Construction noise effects at all receptors during construction of the Proposed Power Plant Site in isolation (*i.e.* without concurrent demolition of the existing coal-fired power station) are predicted to be **negligible or minor adverse (not significant)** during the daytime period due largely to the distances between the works and NSRs, and the acoustic screening provided by the existing earth bund around the east, south and west of the Proposed Power Plant Site and screening to the east and south of the Proposed Construction Laydown Area.
- 9.6.16 During the worst predicted periods of the Proposed Borehole Water/ Cooling Water/ Surface Water Drainage/ Gas Connections pipeline construction, short term potential effects of up to moderate adverse (significant) are predicted at the Eggborough Sports and Leisure Complex when works are taking place at their closest approach. As the works progress and move further away, adverse effects will reduce. Noise effects at the nearest receptors during construction of the cofferdam are predicted to be **minor adverse (not significant)** due to the proposed use of a quieter piling technique (hydraulic jacking rather than driven). However, potential short term **major adverse (significant)** effects are predicted to occur during breaking out of concrete at the existing cooling water abstraction structure. Some acoustic screening of breaking out impact noise will be provided by the cofferdam structure which will be extended in height above the level of the abstraction structure to be broken out. However, given the position of the excavator on the bank of the river, no acoustic screening has been allowed within the predictions as a conservative approach. If breaking out is identified as being required as a result of the initial investigation phase (instead of full excavation and replacement of the structure), detailed consideration will be given to mitigation methods to minimise noise from breaking out (for example localised temporary screening, where practical).
- 9.6.17 The cumulative noise effect of the construction of the Proposed Development and demolition of the existing coal-fired power station at the Eggborough Sports and Leisure Complex is predicted to be **moderate adverse (significant)**. It should be noted that the majority of this effect is due to the demolition rather than the construction of the Proposed Development.
- 9.6.18 It may be necessary for some construction activities to take place continuously over day, evening and night periods during peak construction times of the Proposed Development, although the exact nature of the works is unknown. Due to the potential sensitivity of NSRs to construction noise generated outside of normal working hours, the potential impact of construction activities at these times is considered to be potentially significant. Noise limits during non-weekday daytime periods have been defined in Table 9.28. Comparison of the predicted daytime noise levels against the lower limit values for evening, weekend and particularly night-time working indicate potential moderate/ major adverse effects (significant) could occur at some NSRs during these times if the same intensity of working as for the daytime is assumed. Therefore, construction activities taking place outside normal working hours will need to be planned, managed and mitigated appropriately so they do not exceed the limits for construction noise that have been defined in Table 9.28. Provided noise limits are not exceeded, construction activities outside of normal working hours can be considered as having a **minor adverse effect or less (not significant)**. Potential measures to ensure that appropriate mitigation is in place during the works have already been discussed in Section 9.5 Development Design and Impact Avoidance.

Construction Traffic Noise

9.6.19 For the purposes of assessment, it is assumed that construction traffic access to the Proposed Construction Laydown area and Proposed Power Plant Site within the existing coal-fired power station will be via the A19 and either along Tranmore Lane, a private access road used for coal deliveries, or via the existing Hensall Gate entrance on Wand Lane. Data have been provided from the Transport Assessment (see Appendix 14A, ES Volume III) for the traffic scenario ‘without’ and ‘with’ Proposed Development construction traffic in 2020 for the roads within the scope of the transport assessment, as follows:

- Scenario 1 - ‘without’ Proposed Development construction - 2020 Base (excluding demolition traffic for the existing coal-fired power station);
- Scenario 2 - ‘with’ Proposed Development construction - 2020 Base + Proposed Development construction traffic (and including demolition traffic for the existing coal-fired power station).

9.6.20 The traffic data are presented in Table 9.30 below. For the purposes of assessment, these are based on the assumption that HGVs will access the construction site within the existing coal-fired power station via Tranmore Lane and cars/ light vehicles via Hensall Gate, although it should be noted that the details of construction access have not yet been fixed and there are three accesses to the Proposed Power Plant Site included within the Site (see Chapter 3: Description of the Site).

Table 9.30: Changes in road traffic as a result of the Proposed Development construction traffic

Link	Scenario 1 Without Proposed Development construction (excluding demolition)			Scenario 2 With Proposed Development construction (and including demolition)		
	AAWT	% HGV	Speed (kph)	AAWT	% HGV	Speed (kph)
A19 (north of M62 Junction 34)	14,678	4.7	83	15,672	5	83
Wand Lane (west of Hensall Gate entrance)	755	0	91	1,765	0	91
A19 (north of Wand Lane)	11,634	3.8	84	11,804	3.8	84

9.6.21 The potential changes in road traffic noise from these roads as a result of the Proposed Development have been considered by calculating the BNL at 10 m from the road and comparing the change. Table 9.31 presents the results of the BNL assessment.

Table 9.31: Changes in BNL as a result of the Proposed Development construction traffic

Link	Predicted BNL, $L_{A10, 18hr}$ dB		Change in BNL, dB (Scenario 2 minus Scenario 1)
	Scenario 1 Without Proposed Development construction (excluding demolition of existing coal-fired power station)	Scenario 2 With Proposed Development construction (and including demolition of existing coal-fired power station)	
A19 (north of M62 Junction 34)	71.7	72.1	+0.4
Wand Lane (west of Hensall Gate entrance)	58.5	62.2	+3.7
A19 (north of Wand Lane)	70.6	70.7	+0.1

- 9.6.22 Table 9.31 above shows either no change or very low magnitudes of noise impact are expected due to changes in traffic flows along the main A19 routes north and south of Wand Lane during construction of the Proposed Development (with additional demolition traffic). This will result in **neutral or negligible adverse effects (not significant)** at local residential NSRs. With respect to Wand Lane, the change in BNL is higher, but there are no local NSRs to be significantly impacted by this potential increase at source. In addition, noise from the A19, not Wand Lane, will be the dominant road traffic noise source at the closest properties to Wand Lane, thereby preventing any significant change in noise level. Based upon the above, no further specific mitigation measures are proposed in addition to those listed in Section 9.5 Development Design and Impact Avoidance section under construction noise.
- 9.6.23 In addition to the road traffic related to the Proposed Development construction, occasional rail transport may be used to import material to Site (subject to feasibility), using the existing railway line to the coal-fired power station site. Details regarding the number of trips will not be known until the contractor is appointed, but on the current understanding that this may be one movement per day on average along a route used for import of coal to the existing coal-fired power station, it is considered that any noise from this source in addition to noise from works already on-going will be **negligible adverse (not significant)**.
- 9.6.24 With respect to construction traffic related to the Proposed Gas Connection pipeline and AGI, indicative numbers of plant and consumable deliveries and site staff movements have been estimated for the Transport Assessment (Appendix 14A, ES Volume III), as follows:
- access to AGI site - using West Lane –
 - 5 low loaders/ 10 HGV deliveries (average of 2 per day during first two weeks of construction site start-up only),
 - 30 site staff (at the peak of site works); and
 - access to pipeline (at different access points along the route as works progress – see Chapter 5: Construction Programme and Management) –

- 5 HGVs per day for general construction materials (during first two weeks of construction site start-up only),
- 12 flatbed deliveries per day for delivery of pipes (during first two weeks of construction site start-up only),
- 15 low loaders for delivery of plant pipes (during first two weeks of construction site start-up only),
- 5 HGV trips per day for consumables (for the duration of the construction of the pipeline), and
- 60 site staff (at the peak of construction of the pipeline).

9.6.25 Therefore, there is the potential for adverse effects to occur at NSRs (**minor adverse (not significant)** or at worst **moderate adverse (significant)**), although the effects would be temporary and largely concentrated around the first two weeks of construction site start-up when the highest number of HGV movements are anticipated.

9.6.26 In order to assess the more routine levels of construction traffic associated with the construction of the Proposed Gas Connection, 2017 baseline traffic flow data have been collected through traffic count surveys (as detailed in Chapter 14: Traffic and Transport) for the West Lane access to the AGI. After factoring the 2017 baseline flows to 2021 baseline flows, the predicted total 18-hour AAWT for West Lane is 367 vehicles, of which 5 vehicles are HGVs. With construction ongoing in 2021, the predicted total 18-hour AAWT for West Lane is 401 vehicles, of which 9 vehicles are HGVs. This is based upon 30 site staff and 2 HGVs per day and equates to less than a 10% increase in overall traffic flows. These numbers show that the AAWT flows are very low (without any allowance for staff to meet at the Proposed Construction Laydown area and be transferred to site together as described in Section 9.5 Development Design and Impact Avoidance above) and therefore whilst individual vehicle movements may be noticeable at NSRs, overall it would be expected that the change in $L_{A10,18h}$ noise levels would be less than + 1 dB and classified as very low, and therefore the effect is predicted to be **negligible adverse (not significant)**, and temporary in nature.

9.6.27 With respect to the Proposed Gas Connection corridor for pipeline construction, access is proposed to be provided at a number of locations, some of which are close to existing NSRs (including Lodge Farm, Burn Lodge Farm and residential properties on Millfield Road in Chapel Haddlesey). 2017 baseline traffic data have also been collected via traffic surveys for the Millfield Road and Fox Lane access points to the Proposed Gas Connection corridor. After factoring the 2017 baseline flows to 2021 baseline flows, the predicted total 18-hour AAWT for Millfield Road is 988 vehicles, of which 12 vehicles are HGVs. With construction ongoing in 2021, the predicted total 18-hour AAWT for Millfield Road is 1,058 vehicles, of which 22 vehicles are HGVs. This is based on 60 site staff and 5 HGV trips per day for delivery of consumable materials (with no allowance for group transfer of construction staff as set out in Section 9.5 Development Design and Impact Avoidance above). This shows that the AAWT flow numbers again are low with less than a 10% increase in overall traffic flows as a result of the construction works traffic. Overall it would be expected that the change in $L_{A10,18h}$ noise levels would be less than + 1 dB and classified as very low, and therefore the effect is predicted to be **negligible adverse (not significant)**, and temporary in nature.

9.6.28 With respect to the Fox Lane access to the Proposed Gas Connection corridor, after factoring the 2017 baseline flows to 2021 baseline flows, the predicted total 18-hour AAWT is 161 vehicles, of which 3 vehicles are HGVs. With construction ongoing in 2021, the predicted total 18-hour AAWT is 231 vehicles, of which 13 vehicles are HGVs (with no allowance for group

transfer of construction staff as set out in Section 9.5 Development Design and Impact Avoidance above). Prediction of noise levels for such low flows are outside of the scope of the CRTN prediction method, although it might be expected that increases in flow of this magnitude could result in up to an approximately +3 dB increase in traffic noise levels on Fox Lane. However, given the position of the only NSR at this location (Lodge Farm) close to the A19, the overall noise level increase at the NSR would be expected to be significantly less than this, resulting in an expected **minor adverse effect** at worst (**not significant**), and which is temporary in nature.

- 9.6.29 The construction noise management measures listed within the Section 9.5 Development Design and Impact Avoidance section under construction noise, which will be further developed as the project progresses and more details of the construction phase are known, will assist in minimising adverse effects at nearby NSRs.

Construction Vibration

- 9.6.30 The level of impact at different receptors will be dependent upon a number of factors including distance between the works and receptors, ground conditions, the nature and method of works required close to receptors and the specific activities being undertaken at any given time.
- 9.6.31 There are no residential receptors within close proximity to the Proposed Power Plant Site to be significantly affected by construction vibration. However, there is the potential for some vibration impacts upon commercial properties within the vicinity of the Site, primarily the existing buildings at the coal-fired power station (if they have not been demolished). Whilst it is considered unlikely that most typical construction working routines would generate levels of vibration above which building damage would be expected to be sustained (subject to final plant and working requirements), there is the potential that vibration impacts could cause annoyance to occupants and exceed the LOAEL and SOAEL set out in Section 9.3. The need for piling, and the type of any piling potentially required is not yet confirmed, but at this stage it is assumed that (as a worst case) driven piling will be necessary.
- 9.6.32 Where piling, heavy earthworks, vibratory rollers or other significant vibration producing operations are proposed in close proximity to any existing sensitive buildings within the existing coal-fired power station that remain in use at the time of these construction activities, further consideration will be given to potential impacts once the contractor is appointed and the construction methods and requirements are developed. As both the construction of the Proposed Development and the use of many of the existing coal-fired power station buildings (with the exception of the National Grid 400 kV sub station) are both within the control of EPL, any identified issues can be effectively managed by EPL and their contractor. Potential measures to ensure that appropriate mitigation is in place during the works are discussed in Section 9.5 Development Design and Impact Avoidance.
- 9.6.33 With respect to construction of the Proposed Gas Connection under the A19 and the River Aire, auger boring and horizontal directional drilling (HDD) are proposed for these two crossings respectively. The worst case distance between the auger boring (A19) and NSR is approximately 200 m and based on the case history data provided in BS 5228 Part 2, any vibration emitted from the works is expected to have no more than a **negligible adverse (not significant)** effect at the NSRs. With regards to the HDD (River Aire), although no data relating to vibration emissions has been available to inform this assessment, similar vibration emissions

to the auger boring are anticipated (or less given that the majority of the works will occur at greater depth below ground than the auger boring under the A19). Given the distance to nearest NSR is approximately 650 m, any vibration emitted from the work is expected to have no more than a **negligible adverse (not significant)** effect at the receptor.

Opening and Operation Noise

- 9.6.34 Operational noise modelling has been undertaken for the two indicative concept layouts (see Figures 4.1a and 4.1b in ES Volume II). The assessment described below sets out first the impacts and effects associated with operation of the Proposed Development alone (the Operation assessment scenario which would be long-term), and then considers the potential impacts and effects if demolition of the existing coal-fired power station was to be taken place during the early stages of operation (the Opening assessment scenario which would be likely to be only short-term until coinciding demolition activities were complete).
- 9.6.35 The following assumptions have been made when undertaking the operational noise modelling:
- the Proposed Development will operate continually at full load, 24 hours a day (note this is a 'worst case' assumption for the purposes of the noise assessment and may not occur in practice – in particular the operation of the peaking plant will be intermittent);
 - noise levels provided by OEMs for all principal noise emitting buildings/ elements (air inlet filters, electrical buildings, transformers, workshops etc.) are understood to be external radiated Sound Power Levels (SWL);
 - proposed cooling towers have been modelled as individual point sources, located 0.1 m above the top of each cooling tower;
 - stacks have been modelled as individual point sources, located 0.1 m above the top of each stack; and
 - corrections for tonality, impulsivity, and intermittency have not been applied on the assumption that these potential features will be designed out of the Proposed Development during the detailed design phase by the selection of appropriate plant, building cladding louvres and silencers/ attenuators. However, a +3dB correction has been applied to the specific noise levels predicted from the Proposed Power Plant Site on the basis that the noise emissions may be distinctive above the residual acoustic environment. This is considered conservative in the context of the prevailing noise environment which includes the existing coal-fired power station in operation.
- 9.6.36 Details of the noise source SWL data, the settings used in the noise modelling software and the list of assumptions used are presented in Appendix 9B (ES Volume III).

Operation (Without Concurrent Demolition of the Existing Coal-Fired Power Station)

- 9.6.37 The predicted free-field operational specific sound levels at the NSRs around the Proposed Power Plant Site, for both indicative concept layouts, are presented in Table 9.32. The results presented are the highest predicted at any NSR within the vicinity of each monitoring location. Assuming continual 24-hr operation, the predicted noise levels could apply to 1-hour daytime or 15-minute night-time BS 4142 assessment periods.

Table 9.32: Predicted operational noise levels – Proposed Power Plant Site

Receptor	Predicted operational specific sound level $L_{Aeq,1h}$ dB	
	Indicative concept layout shown in Figure 4.1a (including 3 single shaft CCGT units)	Indicative concept layout shown in Figure 4.1b (including single + multi shaft CCGT units)
NSR1 – Waterworks House, Wand Lane, Gallows Hill (near ML1)	37	36
NSR2 – 168 Weeland Road, Hensall (near ML2)	37	36
NSR3 – 1 Roall Waterworks, Goole (at ML3)	37	36
NSR4 – Eggborough Sports and Leisure Complex (at ML4)	31 *	30 *
NSR5 – Property on Millfield Road, Chapel Haddlesey (at ML5)	27	26
NSR6 – 1 Manor Cottage, Chapel Haddlesey (at ML6)	28	27

* Predicted noise levels at NSR4 benefit from the acoustic screening provided by the National Grid sub station building which will remain at the existing coal-fired power station site after demolition of the existing power station.

9.6.38 The daytime BS 4142 assessments for receptors NSR1 - 6 are presented in Tables 9.33 and 9.34 for the two indicative concept layouts. In addition, the magnitude of impact and effect classification has been included based upon the BS 4142 assessment outcomes, with reference to the semantic scales in Tables 9.10, 9.11 and 9.12. The representative background sound levels used are those presented in Table 9.23, to present an assessment against existing baseline conditions.

Table 9.33: Daytime BS 4142 assessment – 3 single shaft CCGT units (as per Figure 4.1a)

Receptor	NSR1	NSR2	NSR3	NSR4	NSR5	NSR6
Specific Sound Level L _s (L _{Aeq,Tr}), dB	37	37	37	31	27	28
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3
Rating Level (L _{Ar,Tr}), dB	40	40	40	34	30	31
Representative Background Sound Level (L _{A90,T}), dB	41	43	41	43	40	37
Excess of rating level over background sound level (L _{Ar,Tr} - L _{A90,T}), dB	-1	-3	-1	-9	-10	-6
BS 4142:2014 assessment outcome	Low impact	Low Impact	Low impact	Low impact	Low impact	Low impact
Magnitude of impact (assigned from Table 9.10)	Very low	Very low	Very low	Very low	Very low	Very low
Classification of effect (assigned from Table 9.12)	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
<p><u>Uncertainty:</u> Given the large extent of sound level data obtained during the surveys, significantly different ‘representative’ background sound level values can be obtained using different statistical analysis methods. The example analysis used in BS 4142 is the ‘mode’. However, in this assessment the mode has been considered alongside the 10th percentile of the measured L_{A90,15mins} values and the graphical representation of all of the L_{A90,15mins} data at each location. As a result, background sound levels equal to or lower than the mode (lower by up to 13 dB during the daytime and 6 dB at night at some NSRs) have been assigned as ‘representative’ in this assessment. Therefore, conservative (‘worst case’) assessment results are provided.</p>						

Table 9.34: Daytime BS 4142 Assessment – single + multi shaft CCGT units (as per Figure 4b)

Receptor	NSR1	NSR2	NSR3	NSR4	NSR5	NSR6
Specific Sound Level L _s (L _{Aeq,Tr}), dB	36	36	36	30	26	27
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3
Rating Level (L _{Ar,Tr}), dB	39	39	39	33	29	30
Representative Background Sound Level (L _{A90,T}), dB	41	43	41	43	40	37
Excess of rating level over background sound level (L _{Ar,Tr} - L _{A90,T}), dB	-2	-4	-2	-10	-11	-7
BS 4142:2014 assessment outcome	Low impact	Low Impact	Low impact	Low impact	Low impact	Low impact
Magnitude of impact (assigned from Table 9.10)	Very low	Very low	Very low	Very low	Very low	Very low
Classification of effect (assigned from Table 9.12)	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse	Negligible adverse
<u>Uncertainty:</u> See Table 9.33.						

9.6.39 The night-time BS 4142 assessments for receptors NSR1 - NSR6 are presented in Tables 9.35 and 9.36 for the two indicative concept layouts.

Table 9.35: Night-time BS 4142 Assessment – 3 single shaft CCGT units (as per Figure 4.1a)

Receptor	NSR1	NSR2	NSR3	NSR4	NSR5	NSR6
Specific Sound Level L _s (L _{Aeq,Tr}), dB	37	37	37	31	27	28
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3
Rating Level (L _{Ar,Tr}), dB	40	40	40	34	30	31
Representative Background Sound Level (L _{A90,T}), dB	37	35	32	36	34	33
Excess of rating level over background sound level (L _{Ar,Tr} - L _{A90,T}), dB	+3	+5	+8	-2	-4	-2
BS 4142:2014 assessment outcome	Below adverse impact	Adverse impact	Adverse impact / Significant adverse impact	Low impact	Low impact	Low impact
Magnitude of impact (assigned from Table 9.10)	Very low/ low	Low	Low / medium	Very low	Very low	Very low
Classification of effect (assigned from Table 9.12)	Negligible / minor adverse	Minor adverse	Minor/ moderate adverse	Negligible adverse	Negligible adverse	Negligible adverse
<u>Uncertainty:</u> As Table 9.33.						

Table 9.36: Night-time BS 4142 Assessment – single + multi shaft CCGT units (as per Figure 4b)

Receptor	NSR1	NSR2	NSR3	NSR4	NSR5	NSR6
Specific Sound Level Ls ($L_{Aeq,Tr}$), dB	36	36	36	30	26	27
Acoustic feature correction, dB	+3	+3	+3	+3	+3	+3
Rating Level ($L_{Ar,Tr}$), dB	39	39	39	33	29	30
Representative Background Sound Level ($L_{A90,T}$), dB	37	35	32	36	34	33
Excess of rating level over background sound level ($L_{Ar,Tr} - L_{A90,T}$), dB	+2	+4	+7	-3	-5	-3
BS 4142:2014 assessment outcome	Below Adverse impact	Adverse impact	Adverse Impact / Significant adverse impact	Low impact	Low impact	Low impact
Magnitude of impact (assigned from Table 9.10)	Very low/ low	Low	Low/ medium	Very low	Very low	Very low
Classification of effect (assigned from Table 9.12)	Negligible / minor adverse	Minor adverse	Minor/ moderate adverse	Negligible adverse	Negligible adverse	Negligible adverse
<u>Uncertainty:</u> See Table 9.33.						

- 9.6.40 During the daytime, effects are categorised as negligible for both indicative concept layouts, with no specifically designed mitigation in place. However, due to lower measured background sound levels at night, the predicted night-time effects are higher with up to **minor/ moderate adverse (significant)** effects predicted for both indicative concept layouts at the worst-case NSRs assessed. However, the predicted noise levels at NSRs remain below the LOAEL (+5 dB) at all NSRs assessed during the day for both indicative concept layouts, but increases at some NSRs to just meet and slightly exceed the LOAEL for the single shaft indicative concept layout and slightly exceed the LOAEL for the single + multi shaft indicative concept layout at night based upon the relative BS 4142 assessment comparison of rating levels and background sound levels.
- 9.6.41 SDC requested that the assessment consider recommendations of the WHO. The WHO ‘Guidelines for Community Noise’ (WHO, 1999) recommend external environmental daytime and evening limits of 55 dB L_{Aeq} or less over the 16-hour daytime period (07:00 to 23:00) “to avoid minimal serious annoyance”, and 50 dB L_{Aeq} “to avoid minimal moderate annoyance”.
- 9.6.42 For night-time sources the WHO Guidelines recommend a night-time (23:00 to 07:00) 8-hour noise level of 30 dB L_{Aeq} inside bedrooms (for a reasonably steady noise source) to avoid sleep

disturbance and that a criterion of 60 dB L_{AFmax} (façade) should not be regularly exceeded to avoid sleep disturbance, if windows are left partially open. The WHO assumes a 15 dB reduction for a partially open window therefore the corresponding internal criterion is 45 dB L_{AFmax} .

9.6.43 The WHO Night Noise Guidelines (WHO, 2009) for Europe consider the long term effect of night time noise on the population. The requirement for health-based guidelines originated from the European Union Directive 2002/49/EC relating to the assessment and management of environmental noise (known as the Environmental Noise Directive).

9.6.44 It is noted that the 2009 WHO Guidelines are intended to complement rather than replace the 1999 WHO Guidelines.

9.6.45 The 2009 WHO Guidelines assess the effect of noise during the night time using the $L_{night, outside}$ parameter. This considers the external noise level averaged over a complete year for the 8 hour night time period. The Guidelines state:

“There is no sufficient evidence that the biological effects observed at the level below 40 dB $L_{night, outside}$ are harmful to health. However, adverse health effects are observed at the level above 40 dB $L_{night, outside}$, such as self-reported sleep disturbance, environmental insomnia, and increased use of somnifacient drugs and sedatives. Therefore, 40 dB $L_{night, outside}$ is equivalent to the lowest observed adverse effect level (LOAEL) for night noise.”

9.6.46 The 2009 WHO Guidelines suggest a night time noise guideline of 40 dB $L_{night, outside}$ and an interim target of 55 dB $L_{night, outside}$ in situations where the achievement of the night time noise guideline is not feasible in the short term. With regard to the suggested night time noise guideline of 40 dB $L_{night, outside}$ the guidance states:

“The LOAEL of night noise, 40 dB $L_{night, outside}$, can be considered a health-based limit value of the night noise guidelines necessary to protect the public, including most of the vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of night noise.”

9.6.47 Given that operation of the Proposed Development will be 24 hours, provided that noise levels are acceptable during night-time hours, they will automatically be acceptable during daytime period when existing ambient noise levels are higher. Data collected at the monitoring locations (and nearby NSRs) used within this assessment confirm that night-time noise levels already exceed the 40 dB $L_{night, outside}$ recommendation, as shown in summary of average night-time ambient noise levels in Table 9.27, whilst all summary levels are below the higher recommended interim value of 55 dB $L_{night, outside}$.

9.6.48 Summation of the predicted specific sound levels with the existing night-time summary noise levels in Table 9.27 would result in less than a 1 dB increase in existing ambient noise levels at worst (at Gallows Hill), which would not be perceptible and indeed negligible above existing average ambient $L_{Aeq, 8h}$ night-time noise levels. Therefore, considering the BS 4142 assessment outcomes in the context of the existing environment, noise level increases would not be deemed significant.

9.6.49 However, on the basis that there may be a desire to reduce noise levels to the LOAEL (no greater than +5 dB excess of rating level over background sound level), potential options to reduce noise levels are discussed in Section 9.7 (Mitigation and Enhancement Measures).

Opening (With Concurrent Demolition of the Existing Coal-Fired Power Station)

- 9.6.50 In addition to the above assessment using existing ambient and background sound levels, it is also possible to consider the potential future ambient and background sound levels during ongoing demolition of the existing coal-fired power station, together with operational effects of the Proposed Development.
- 9.6.51 With respect to the BS 4142 (BSI, 2014c) assessment, it is not possible to accurately predict a future (temporary) background sound level at NSRs against which to reassess operational noise from the Proposed Development. However, it is not unreasonable to assume that background sound levels could be elevated during demolition works and therefore the BS 4142 assessments presented above should represent a conservative assessment.
- 9.6.52 With respect to future (temporary) elevated absolute ambient sound levels during ongoing daytime demolition works at the existing coal-fired power station and operation of the Proposed Development, addition of the predicted operational specific sound levels in Table 9.32 with the existing daytime noise levels in Table 9.27 and the indicative predicted demolition noise levels would result in just a 0.0 - 0.1 dB $L_{Aeq,12hr}$ increase in predicted future ambient daytime noise levels at all NSRs assessed around the Proposed Power Plant Site. Therefore, whilst the ambient level itself would at some NSRs be elevated due to demolition noise, the predicted change in noise due to operation of the Proposed Development would be imperceptible and therefore classified as **neutral to negligible adverse (not significant)**. At other times during the demolition programme when noise emissions are lower, and the combined existing ambient and demolition noise gives rise to lower future ambient noise levels, the level of increase due to operational noise may be slightly higher, but would remain below 1 dB as stated in paragraph 9.6.42.

Operational Traffic

- 9.6.53 For the purposes of assessment (although this is not yet fixed) it is assumed that operational workforce traffic (cars) will use Wand Lane to access the Site via Hensall Gate towards the north-east corner of the existing coal-fired power station site. Data provided from the Transport Assessment (Appendix 14A, ES Volume III) for the operational noise assessment for the following scenarios have been used to provide an indication of the potential noise level change upon opening of the Proposed Development:
- Scenario 1 - 'without' Proposed Development operation - 2020 Base (excluding existing operational traffic associated with the existing coal-fired power station and excluding demolition traffic);
 - Scenario 2 - 'with' Proposed Development operation (at Opening) - 2020 Base (excluding existing operational traffic associated with the existing coal-fired power station and including demolition traffic and Proposed Development operational traffic (AAWT flow of 126 cars using Wand Lane)).
- 9.6.54 It is assumed for the purposes of assessment that all 126 cars will arrive and depart Hensall Gate entrance from the west. Table 9.37 presents the traffic data considered.

Table 9.37: Changes in road traffic as a result of the Proposed Development operational traffic

Link	Scenario 1 Without Proposed Development operation (excluding demolition)			Scenario 2 With Proposed Development operation (and including demolition)		
	AAWT	% HGV	Speed (kph)	AAWT	% HGV	Speed (kph)
Wand Lane (west of Hensall Gate entrance)	755	0.0	91	881	0.0	91

9.6.55 The above flows are below the 1,000 vehicles AAWT lower limit of the CRTN calculation method (DfT/ Welsh Office, 1998) and therefore BNL values cannot be accurately predicted. However, indicative BNL values have been calculated as 58.5 dB and 59.2 dB for the two scenarios respectively. This would result in less than a 1 dB increase in noise from the road source and would be classified as a very low magnitude of impact resulting in a **negligible adverse effect (not significant)**. As mentioned previously, however, there are no NSRs within the close vicinity of Wand Lane to be affected by this potential increase, and due to existing significantly higher baseline flows on the A19, the addition of 126 vehicles would result in lower noise level increases at nearby NSRs.

Decommissioning

9.6.56 It is reasonable to assume that noise and vibration during decommissioning would result in broadly similar levels of impacts and effects to those presented for demolition of the existing coal-fired power station, albeit there could be some greater impacts at NSRs to the south and east (potentially up to **minor/moderate adverse (significant)**) where the distance to NSRs from the Proposed Power Plant compared with the existing coal-fired power station buildings is less. The potential impacts and effects would require further consideration at the decommissioning stage of the Proposed Development, but potential measures to ensure that appropriate mitigation is in place during the works have already been discussed in Section 9.5 Development Design and Impact Avoidance. The benefit to the Eggborough Sports and Leisure Complex will be that the Proposed Development will be slightly further away compared to the existing coal-fired power station, and therefore the predicted moderate adverse effects should be reduced, and may not be significant.

9.7 Mitigation and Enhancement Measures

Construction

9.7.1 There is the potential for moderate adverse effects at NSRs at the Eggborough Sports and Leisure Complex during pipeline construction works or during demolition of the existing coal-fired power station, and there is the potential for short term major adverse effects at the nearest receptors to the cooling water abstraction structure at Chapel Haddlesey when breaking out of the structure is undertaken. In addition, there is the potential for some

vibration effects at buildings, primarily at the existing coal-fired power station during construction of the Proposed Development depending upon the nature of piling and other vibration emitting activities required (and whether the existing power station buildings are still present at the time of these construction activities).

- 9.7.2 The preferred approach for controlling construction noise and vibration is to reduce levels at source where possible, but with due regard to practicality. Sometimes a greater noise or vibration level may be acceptable if the overall construction time, and therefore length of disruption, is reduced.
- 9.7.3 The list of noise control measures presented within Section 9.5 of this chapter provides a detailed but not exhaustive list of construction noise management measures. The measures listed will be implemented and supplemented as necessary with further bespoke measures identified through further detailed assessment once the contractor is appointed, and once the detailed nature of required works at the cooling water abstraction is known, in order to ensure that the ABC category noise limits relevant to different groups of receptors in the vicinity of the Site are met, and thereby avoid significant adverse effects. Such measures may include extending the cofferdam above the top of the abstraction structure to provide acoustic screening during concrete breaking out at the existing cooling water abstraction point, or other additional localised screening around this location where possible, to reduce noise impacts on nearby NSRs. The draft DCO (Application Document Ref. No. 2.1) includes a Requirement securing the control of construction noise. This requires a scheme for the monitoring and control of noise from the construction of the Proposed Development to be agreed with the local planning authority and then implemented, and includes setting and adhering to maximum permitted noise limits at each monitoring location.
- 9.7.4 Residual effects after mitigation are described in Section 9.9 below.

Operational Noise

- 9.7.5 The assessment has assumed that potential noise of a tonal, impulsive or intermittent nature will be designed out of the Proposed Development during the detailed design phase by the selection of appropriate plant, building cladding, louvres and silencers/ attenuators as necessary. However, a +3 dB correction has been applied to the specific noise levels predicted from the Proposed Power Plant Site on the basis that the noise emissions may be distinctive above the residual acoustic environment.
- 9.7.6 Assessment has indicated that predicted noise levels at some NSRs just meet and slightly exceed the LOAEL for Option 1 and slightly exceed the LOAEL for Option 2 at night based upon the relative BS 4142 assessment comparison of rating levels and background sound levels, without specific mitigation in place.
- 9.7.7 Analysis of the noise source contributions from each modelled plant item/ building in the two indicative concept layouts indicates that there are a range of noise sources contributing to the predicted levels at NSRs, whilst the exact noise contribution from each building or plant item at each NSR is dependent upon the source and NSR position.
- 9.7.8 For example, reducing the breakout noise (by increasing the sound insulation/ attenuation or reducing the SWL of the source) from the following plant items/ buildings in Table 9.38 would be predicted to reduce rating levels to +5 dB or lower at all NSRs assessed for both indicative concept layouts (as per Figure 4.1a and Figure 4.1b, ES Volume II), *i.e.* to reduce all effects to

‘not significant’. The reductions required to reduce noise effects to ‘not significant’ are anticipated to be achievable through design, given that the elements of plant identified in Table 9.38 are located within buildings which could be designed to incorporate higher levels of sound insulation than currently assumed within the predictions.

- 9.7.9 Residual effects after mitigation are described in Section 9.9 below, and are not considered to be significant.

Table 9.38: Predicted operational noise levels – Proposed Power Plant Site

Indicative concept layout shown in Figure 4.1a (including 3 single shaft CCGT units)		Indicative concept layout shown in Figure 4.1b (including single + multi shaft CCGT units)	
Plant item/ building	Indicative sound reduction required dB(A)	Plant item/ building	Indicative sound reduction required dB(A)
HRSB (north) – south façade	-9	HRSB multi shaft (north) – north façade	-6
HRSB 3 (south) – north façade	-9	HRSB single shaft – north façade	-4
HRSB (central) – north façade	-8	HRSB multi shaft (south) – north façade	-2
HRSB (north) – north façade	-6		

- 9.7.10 As the design progresses to the detailed design stage, the existing noise model will be refined and additional acoustic assessment will be undertaken in consultation with the designers to determine the most appropriate mitigation options. The findings of the further assessment will inform the design to ensure that rating levels meet with a target of no greater than +5 dB above the representative background sound level at each NSR, resulting in a low magnitude of impact and a minor adverse effect. Operational noise will be controlled via a DCO Requirement, by agreement with SDC Environmental Health Officer.

Decommissioning

- 9.7.11 At this stage the requirements of decommissioning are unknown although mitigation measures are likely to be similar to those identified for demolition.

9.8 Limitations or Difficulties

Construction

- 9.8.1 Detailed demolition and construction information is not yet available (because the contractor not yet been appointed) and therefore this assessment draws upon the experience and assessments undertaken for other similar projects. The assessment is therefore indicative, but is considered to be robust. However, construction noise thresholds (limit values) have been provided in Table 9.28 based upon existing ambient sound levels at NSRs, and further assessment has been identified to ensure that appropriate mitigation is developed to achieve

the limit values once the contractor is appointed. This and other mitigation measures detailed above, which will be secured by a DCO Requirement, will help to ensure that construction noise and vibration is minimised although it is inevitable as with most construction projects, particularly during demolition (and explosions), that some temporary adverse effects will be experienced.

Operation

- 9.8.2 Lists of assumptions made during the noise modelling and assessment of the Proposed Development are as presented in paragraph 9.6.29 and in Appendix 9B (ES Volume III). Further uncertainties are detailed in Table 9.33 with respect to the defining of representative background sound levels. However, it is considered that the assumptions made will have led to a conservative ('worst case') assessment. Further assessment will be undertaken at the detailed design stage to ensure that appropriate noise limits are achieved at sensitive receptors. Boundary noise limits will be agreed in accordance with the draft DCO Requirement on the control of noise during operation", based on the noise limits required at the sensitive receptors.

9.9 Residual Effects and Conclusions

- 9.9.1 A summary of the residual effects, assuming the implementation of all appropriate mitigation to reduce noise and vibration during construction, operational and decommissioning phases, is presented in Table 9.39 below.

Table 9.39: Summary of significant effects

Development stage	Environmental effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Construction	Noise effect during concurrent demolition of the existing coal-fired power station and construction of the Proposed Development	Up to moderate adverse at the nearest residential NSRs (significant).	Further detailed assessment and preparation of a construction noise control scheme (including agreed noise limits) once contractor appointed in accordance with a draft DCO Requirement.	Minor adverse or less, on the basis that BS 5228 ABC noise limits will be met (not significant).	St, T, D
Construction	Noise effects during construction of the Borehole Water, Cooling Water and Gas Connection pipelines	Up to moderate adverse at nearest residential NSRs during daytime (significant).	Further detailed assessment and preparation of a construction noise control scheme (including agreed noise limits) once contractor appointed in accordance with a draft DCO Requirement.	Minor adverse or less, on the basis that BS 5228 ABC noise limits will be met (not significant).	St, T, D
Construction	Noise effects during works at cooling water abstraction	Up to major adverse (during concrete breaking out, if	Further detailed assessment and preparation of a	Minor/ moderate adverse (significant) or less during concrete	St, T, D

Development stage	Environmental effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
	point	required) at nearest residential NSRs during daytime (significant).	construction noise control scheme (including agreed noise limits) once contractor appointed in accordance with a draft DCO Requirement.	breaking out, if required.	
Construction	Noise effects due to construction traffic on public highways	Negligible adverse (not significant), but up to moderate adverse (significant) largely during initial 2-week peak period.	Further detailed assessment and preparation of a construction noise control scheme (including agreed noise limits) once contractor appointed in accordance with a draft DCO Requirement.	Negligible adverse (not significant), but up to minor/moderate adverse (significant) during initial two week peak period.	St, T, D
Operation	Operation of the Proposed Power Plant Site	Negligible to minor/moderate adverse – night-time (significant).	Reduction of SWL/ breakout noise from key plant/ buildings. Further assessment as design progresses and preparation of operational noise control scheme	Minor adverse/negligible, on the basis that the excess of the rating level over the background sound level will be ≤5dB (not significant).	Lt, T, D

Development stage	Environmental effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
			(including agreed noise limits) in accordance with the draft DCO Requirement.		
Decommissioning	Noise effects during decommissioning of the Proposed Power Plant	Up to moderate adverse at nearest residential NSRs during daytime (significant).	Further detailed assessment and DEMP, particularly regarding working outside of daytime working hours, in accordance with a draft DCO Requirement.	Minor adverse or less, on the basis that BS 5228 ABC noise limits will be met (not significant).	St, T, D

Note: Lt = long term, Mt = medium term, St = short term, P = permanent, T = temporary, D = direct and In = indirect.

9.10 References

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- British Standards Institute (1993) *BS 7385-2 – Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration*
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- British Standards Institute (2008) *BS 6472-1 – Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting*
- British Standards Institute (2014a) *BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise.*
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World Health Organisation (WHO) (2009) *Night Noise Guidelines for Europe*