Environmental Statement: Volume I

Chapter 6: Air Quality

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6.0 AIR QUALITY

6.1 Introduction

6.1.1 This Chapter of the Environmental Statement (ES) addresses the potential effects of the Proposed Development on air quality.

6.1.2 The assessment considers:

- The present-day and future baseline conditions during construction and operation of the Proposed Development;
- The effects of construction of the Proposed Development on air quality for human health and ecosystems, with respect to associated construction traffic, construction plant emissions and construction dust;
- The effects of operational process emissions associated with the Proposed Development on air quality for human health and ecosystems;
- The cumulative effects of emissions associated with the Proposed Development and other committed developments in the vicinity; and
- The potential effects of the eventual decommissioning of the Proposed Development.

6.1.3 This Chapter is supported by Figures 6.1 – 6.6 (ES Volume II, Application Document Ref. 6.3) and Appendix 6A (ES Volume III, Application Document Ref. 6.4). Appendix 6A details the dispersion modelling assumptions and full assessment results undertaken to support this Chapter.

6.2 Legislation and Planning Policy Context

Legislative Background

Air Quality Legislation

6.2.1 The principal air quality legislation within the United Kingdom is the Air Quality Standards Regulations 2010 (the 'AQS Regulations'), which transpose the requirements of the European Ambient Air Quality Directive 2008/50 and EU Directive 2004/107 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air (often referred to as the 2004 fourth Air Quality Daughter Directive). The AQS Regulations set air quality limits for a number of major air pollutants that have the potential to impact public health, such as nitrogen dioxide (NO_2), carbon monoxide (CO) and particulate matter (PM_{10}, which is particulate matter of 10µm diameter or less). The AQS Regulations also include a national target value for $PM_{2.5}$ ($PM_{2.5}$ is particulate matter of 2.5µm diameter or less).

6.2.2 The Environment Act 1995 requires the UK Government to produce a National Air Quality Strategy (NAQS), which was last reviewed in 2007 (Department for Environment, Food and Rural Affairs (Defra), 2007), containing air quality objectives and timescales to meet those objectives. The objectives apply to outdoor locations where people are regularly present and do not apply to occupational, indoor or in-vehicle exposure. It requires local authorities to undertake an assessment of local air quality to establish whether the objectives are being achieved, and to designate air quality management areas (AQMAs) if improvements are necessary to meet the objectives. Where an AQMA has been

designated, the local authority must draw up an Air Quality Action Plan (AQAP) describing the measures that will be put in place to assist in achieving the objectives. Defra has responsibility for coordinating assessments and AQAPs for the UK as a whole.

6.2.3 The current objectives and assessment criteria applicable to this assessment for the protection of human health in ambient air quality are presented in Table 6.1. Concentrations are expressed in micrograms per cubic metre ('µg/m^3').

Table Error! No text of specified style in document.**.1: National Air Quality Objectives and European Directive Limits and Target Values for the Protection of Human Health**

Pollutant	Objective (µg/m^3)	Averaging period	Percentile	To be met by
Nitrogen dioxide (NO_2)	200	1 hour mean	99.79th (or not to be exceeded more than 18 times/year)	31 Dec 2005
	40	Annual mean	-	31 Dec 2005
Particulate matter (PM_{10})	50	24 hour mean	90.4th (or not to be exceeded more than 35 times/ year)	31 Dec 2004
	40	Annual mean	-	31 Dec 2004
Particulate matter ($PM_{2.5}$)	25	Annual mean	-	2020
Carbon monoxide (CO)	10,000	8 hour, daily running mean	-	31 Dec 2003

6.2.4 For the protection of vegetation and ecosystems, a number of Critical Levels (CLs) have been developed; CLs are defined as: "*concentrations of pollutants in the atmosphere above which direct adverse effects on...plants [and] ecosystems...may occur according to present knowledge*" (Ref 6-1). The CLs apply at all relevant ecological areas regardless of type of habitat present and those applicable to this assessment are shown in Table 6.2 below.

Table 6.2: Critical Levels ('CL') for the Protection of Vegetation and Ecosystems

Pollutant	Objective (µg/m^3)	Averaging period
Oxides of nitrogen (NO_x)	75	Daily mean
	30*	Annual mean

** denotes objective set in AQS Regulations 2010*

6.2.5 In addition to the above CLs set in legislation, there are non-legislative limits called Critical Loads that have been derived for different habitats covering the deposition of nitrogen and acidifying species. Critical Loads are set at a level below which significant harmful effects on the specific habitat type do not occur (Ref 6-1). Critical Loads are provided on the Air Pollution Information System (APIS) website (Ref 6-1), and the habitat-specific Critical Loads relevant to this assessment are presented in Appendix 6A (ES Volume III, Application Document Ref. 6.4) and in Chapter 9: Ecology (ES Volume I).

Industrial Emissions Directive

6.2.6 The EU's Industrial Emissions Directive (Directive 2010/75/EU (IED)) provides operational limits and controls to which plant must comply, including Emission Limit Values (ELVs) for pollutant releases into the air. The operational generating station at the Proposed

Development would fall under the Large Combustion Plant (LCP) requirements (Chapter III) of the IED, since it will be greater than 50MW_{th} in capacity.

6.2.7 In addition, European Best Available Technique (BAT) reference documents ('BRefs') are published for each industrial sector under the IED, and they include BAT-Associated Emission Levels (BAT-AELs) which are expected to be met through the application of BAT. These levels may be the same as those published in the IED, or they may be more stringent. The current (2017) version of the LCP BRef (European Commission, 2017) includes annual average BAT-AELs for oxides of nitrogen and carbon monoxide from gas turbines which are more stringent than the ELVs included in the IED.

6.2.8 For the purposes of this air quality impact assessment, it has been conservatively assumed that emissions from the generating station will be at the current IED limits for nitrogen oxide emissions (50mg/Nm^3), as these are higher than the annual average BAT-AELs (15 - 35mg/Nm^3), and therefore lead to a conservative assessment of the predicted impacts of NO_x emissions. If emissions were at the lower BAT-AELs, the impacts would be lower than those reported in this assessment. However, as a new plant being constructed after the publication of the LCP BRef, it is envisaged that the BAT-AELs would be set as the emission limits in the Environmental Permit required for the operation of the Proposed Development.

Environmental Permitting Regulations

6.2.9 The Environmental Permitting (England and Wales) Regulations 2016 ('EP Regulations') apply to all new installations and transpose the requirements of the IED into UK legislation. Under the IED and EP Regulations, the operator of an installation covered by the IED is required to employ BAT to ensure a high level of protection of the environment as a whole. Generating stations exceeding 50MW thermal input rating (50MW_{th}), such as the Proposed Development, are covered by the IED and the EP Regulations. Performance against the relevant ELVs, as defined in the IED, would be regulated through an Environment Permit, issued by the Environment Agency (EA).

6.2.10 Where legislative ambient air quality limits or objectives are not specified for the pollutant species potentially released from the Proposed Development, Environmental Assessment Levels (EALs), published in the EA's Risk Assessments for Specific Activities: Environmental Permits guidance 'EA guidance' (Ref 6-2) can be used to assess potential health effects on the general population. The EALs applicable for this assessment for the protection of human health are presented in Table 6.3.

Table 6.3: Environmental Assessment Levels – Protection of Human Health

Pollutant	Objective (µg/m^3)	Averaging period
Carbon monoxide (CO)	30,000	Hourly mean

Planning Policy Context

National Planning Policy

6.2.11 National Policy Statements (NPS) are, where in place, the primary basis for the assessment and determination of applications for Nationally Significant Infrastructure Projects (NSIPs), such as the Proposed Development. The Overarching National Policy Statement on Energy EN-1 ('NPS EN-1') (Ref 6-3) states that:

> "*The planning and pollution control systems are separate but complementary. The planning system controls the development and use of land in the public interest…Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health.*
>
> *In considering an application for development consent, the IPC* [Secretary of State] *should focus on whether the development itself is an acceptable use of the land, and on the impacts of that use, rather than the control of processes, emissions or discharges themselves. The IPC should work on the assumption that the relevant pollution control regime and other environmental regulatory regimes…will be properly applied and enforced by the relevant regulator*" (paragraphs 4.10.2-4.10.3).

6.2.12 NPS EN-1 requires the consideration of significant air emissions, their mitigation and any residual effects, the predicted absolute emission levels after application of mitigation, the relative change in air quality from existing concentrations and any potential eutrophication impacts as a result of the Proposed Development project stages, including contributions from additional road traffic. Where a project could result in deterioration in air quality in an area where national air quality limits are not being met, or may lead to a new area breaching national air quality limits, or where substantial changes in air quality concentrations are predicted, such effects would be expected to be given substantial weight in consideration of the acceptability of the proposal. Where a project is likely to lead to a breach of statutory air quality limits the developer should work with the relevant authorities to secure appropriate mitigation measures to allow the proposal to proceed.

6.2.13 The Overarching National Policy Statement on Fossil Fuel Electricity Generating Infrastructure EN-2 (Ref 6-4), section 2.5, states that:

> "*Fossil fuel generating stations are likely to emit nitrogen oxides (NO_x) and sulphur oxides (SO_x), although SO_x emissions from gas-fired generating stations may be negligible. To meet the requirements of the Large Combustion Plant Directive (LCPD) and the Industrial Emissions Directive (IED) when it comes into force, fossil fuel generating stations must apply a range of mitigation to minimise NO_x and other emissions*".

6.2.14 Table 6.4 below provides a summary of other relevant NPS advice regarding air quality and emissions and presents an assessment of where matters are assessed within this Chapter.

Table 6.4: Summary of Relevant Advice Regarding Air Quality and Emissions

Summary of NPS	Consideration within the Chapter
NPS EN-1	
Paragraph 5.2.1 states: "*Air emissions include particulate matter (for example dust) up to a diameter of ten microns (PM_{10}) as well as gases such as sulphur dioxide, carbon monoxide and nitrogen oxides (NO_x). Levels for pollutants in ambient air are set out in the Air Quality Strategy which in turn embodies EU legal requirements. The Secretary of State for the Environment Food and Rural Affairs is required to make available up to date information on air quality to any relevant interested party*".	Particulate emissions as well as emissions of nitrogen oxides have been included in the assessment of construction and traffic impact. Nitrogen oxide emissions have been assessed in the operational air impact assessment but the gas-fired power station will not give rise to emissions of particulates. Sulphur dioxide emissions are negligible from a gas-fired power station and traffic. Consideration has also been given to baseline air quality conditions in the locality.
Paragraph 5.2.2 states: *"CO_2 emissions are a significant adverse impact from some types of energy infrastructure which cannot be totally avoided". "Any ES on air emissions will include an assessment of CO_2 emissions, but the policies set out in Section 2, including the EU ETS, apply to these emissions".*	An assessment of CO_2 emissions is included in Chapter 15: Sustainability and Climate Change (ES Volume I).
Paragraph 5.2.3 states: *"A particular effect of air emissions from some energy infrastructure may be eutrophication, which is the excessive enrichment of nutrients in the environment."*	Air quality impacts associated with nitrogen deposition on designated ecological receptors have been assessed in Section 6.10 of this Chapter and are detailed in Appendix 6A (ES Volume III, Application Document Ref. 6.4).
Paragraph 5.2.4 states: *"Design of exhaust stacks, particularly height, is the primary driver for the delivery of optimal dispersion of emissions and is often determined by statutory requirements*".	Stack height evaluation is assessed in Appendix 6A (ES Volume III).
Paragraph 5.2.7 states: "*The ES should describe:* • *any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;* • *the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;* • *existing air quality levels and the relative change in air quality from existing levels; and,* • *any potential eutrophication impacts."*	The air quality impacts of all project stages have been assessed in this Chapter including consideration of residual effects in Section 6.13.
NPS EN-2	
Paragraph 2.5.3 states: *"Fossil fuel generating stations are likely to emit nitrogen oxides (NO_x) and sulphur oxides (SO_x), although SO_x emissions from gas-fired generating stations may be negligible… fossil fuel generating stations must apply a range of mitigation to minimise NO_x and other emissions."*	NO_x emissions have been considered in the assessment of operational air impacts. Sulphur Dioxide (SO_2) emissions are negligible from gas-fired power stations. Consideration has also been given to baseline air quality conditions in the locality and the emission limit values that are achievable for the proposed plant technology, based on legislative limits and use of BAT.
Paragraph 2.5.5 states*: "The applicant should carry out an assessment as required in EN-1, consulting the EA and other statutory authorities at the initial stages of developing their proposals, as set out in EN-1 Section 4.2."*	The air quality impacts of all project stages have been assessed and presented in Section 6.10 of this Chapter.

Summary of NPS	Consideration within the Chapter
Paragraph 2.5.7 states: *"Mitigation will depend on the type of generating station. However, Flue Gas Desulphurisation (FGD) and Selective Catalytic Reduction (SCR) will have additionally adverse impacts for noise and vibration, release of dust and handling of potentially hazardous materials, for example the ammonia used as a reagent."*	FGD is not required for a gas-fired power station due to the negligible SO_2 emissions. The required NO_x emission limits can be achieved without the requirement for SCR abatement.

6.2.15 Table 6.5 provides a summary of relevant NPS advice regarding dust, odour, artificial light, smoke, steam and insect infestation.

Table 6.5: Summary of Relevant NPS Advice Regarding Dust, Odour, Artificial Light, Smoke, Steam and Insect Infestation

Summary of NPS	Consideration within the Chapter
NPS EN-1	
Paragraph 5.6.4 states: *"The applicant should assess the potential for insect infestation and emissions of odour, dust, steam, smoke and artificial light to have a detrimental impact on amenity, as part of the Environmental Statement*."	The operation of the proposed gas-fired power station is not considered to have the potential to cause insect infestation, odour, dust, steam or smoke impacts based on the choice of fuel and nature of plant operation. Management of artificial light will be controlled at the detailed design stage in accordance with the indicative Lighting Strategy (Application Document Ref. 5.6).
Paragraph 5.6.5 states: *"In particular, the assessment provided by the applicant should describe:* • *The type, quantity and timing of emissions;* • *Aspects of the development which may give rise to emissions;* • *Premises or locations that may be affected by the emissions;* • *Effects of the emission on identified premises or locations; and* *Measures to be employed in preventing or mitigating the emissions."*	The air impact assessment details the identified sensitive receptors in the vicinity of the Site, the current baseline air quality conditions, the assumptions regarding the nature, duration and scale of emissions, and the predicted effect of emissions on identified sensitive receptors, using conservative assumptions where necessary in order to present a worst-case scenario. Embedded mitigation measures are also included.
Paragraph 5.6.6 states: *"The applicant is advised to consult the relevant local planning authority and, where appropriate, the EA about the scope and methodology of the assessment."*	The LPA and the EA have been consulted initially through the Scoping Report and then again at Stage 1 and Stage 2 consultation, regarding the proposed approach to assessment of air impacts.

6.2.16 The revised National Planning Policy Framework ('NPPF') was published in February 2019 (Ref 6-5) and concisely sets out national policies and principles on land use planning. Paragraph 103 of the NPPF states that:

> *"The planning system should contribute to and enhance the natural and local environment by: …preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability…"*

6.2.17 Air quality is considered as an important element of the natural environment. On conserving and enhancing the natural environment, Paragraph 170 states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by: …*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality …"*

6.2.18 Air quality in the UK has been managed through the Local Air Quality Management regime using national objectives. The effect of a proposed development on the achievement of such policies and plans are matters that may be a material consideration for planning authorities, when making decisions for individual planning applications. Paragraph 181 of the NPPF states that:

> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

6.2.19 The different roles of a planning authority and a pollution control authority are addressed by the NPPF in paragraph 183:

> *"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."*

6.2.20 The Planning Practice Guidance ('PPG') published on 6 March 2014, was updated on 24 July 2018 (Ref 6-6), with specific reference to air quality. The PPG states that the planning system should consider the potential effect of new developments on air quality where relevant limits have been exceeded or are near the limit. Concerns also arise where the development is likely to adversely affect the implementation of air quality strategies and action plans and/ or, in particular, lead to a breach of EU legislation (including that applicable to wildlife). In addition, dust can also be a planning concern, for example, because of the effect on local amenity.

6.2.21 When deciding whether air quality is relevant to a planning application, the PPG states that a number of factors should be taken into consideration including if the development will:

- Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;
- Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled Combined Heat and Power (CHP) plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;
- Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality;
- Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations; and
- Affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites.

6.2.22 On how detailed an air quality assessment needs to be, the PPG states:

> *"Assessments should be proportionate to the nature and scale of the development proposed and the level of concern about air quality... Mitigation options where necessary will be locally specific, will depend on the proposed development and should be proportionate to the likely impact. It is important therefore that local planning authorities work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented."*

Local Planning Policy

6.2.23 Similarly, local planning policy may be something which the Secretary of State considers is both important and relevant to the determination of the application for the Proposed Development.

6.2.24 North Lincolnshire Council ('NLC') adopted the North Lincolnshire Strategy in 2011 (Ref 6-7), including Policy CS18: Sustainable Resource Use and Climate Change, which states that:

> *"The Council will actively promote development that utilises natural resources as efficiently and sustainably as possible. This will include…*
>
> *(10) Ensuring development and land use helps to protect people and the environment from unsafe, unhealthy and polluted environments, by protecting and improving the quality of the air, land and water."*

(11) Supporting renewable sources of energy in appropriate locations, where possible, and ensuring that development maximises the use of combined heat and power, particularly at the South Humber Bank employment site and where energy demands for more than 2MW are required for development.

(12) Supporting new technology and development for carbon capture and the best available clean and efficient energy technology, particularly in relation to the heavy industrial users in North Lincolnshire, to help reduce CO_2 emissions.

6.2.25 The Proposed Development lies within the South Humber Bank (SHBE-1) Allocated Employment Site, identified within the adopted Housing and Employment Land Allocations Development Plan (2016) (Ref 6-8)[1] for potential future development. The document identifies the potential for environmental impacts from development on locally present protected conservation areas (including the Humber Estuary Special Area of Conservation ('SAC')), Sites of Special Scientific Interest ('SSSI') and Local Nature Reserves, and on nearby residential areas, and therefore the potential requirement for air quality assessment of proposed developments to be carried out.

6.2.26 North East Lincolnshire Council ('NELC') adopted the North East Lincolnshire Local Plan 2013-2014 (Ref 6-9), including the Policy 5: Development boundaries, which states that:

"Development boundaries are identified on the Policies Map. All development proposals located within or outside of the defined boundaries will be considered with regard to suitability and sustainability, having regard to:

D. impact upon neighbouring land uses by reason of noise, air quality, disturbance or visual intrusion.

6.2.27 It should be noted that NELC policies are of lesser relevance given that the Site is not located within the NELC administrative area.

Other Guidance

6.2.28 The EA's guidance provides direction on the assessment of BAT and of impacts from permitted installations, primarily for the purposes of Environmental Permitting. As part of this, the guidance includes objective values set out in regulations as part of the National Air Quality Strategy Objective values, as well as criteria values for a range of other substances not included in regulations. The criteria used in this assessment are set out in Tables 6.1 to 6.3.

6.2.29 Defra has also published technical guidance LAQM TG(16) (Ref 6-10) to assist local authorities in fulfilling their duties in relation to Local Air Quality Management. Parts of this guidance, and associated tools, are also useful in assessing the impacts of individual developments within the planning process.

[1] formerly South Humber Gateway area (IN1-1) identified within the Employment Land Review.

6.2.30 The Institute of Air Quality Management (IAQM), in collaboration with Environment Protection UK ('EPUK') has published several guidance documents relating to planning and development works, including:

- 'Land-Use Planning & Development Control: Planning For Air Quality' (Ref 6-11), which describes the indicative criteria to trigger the initiation of an air quality assessment for a development, together with guidance on the content of an air quality assessment, impact description and significance determination with reference to air quality standards. The guidance states that it is not intended to be applied to the assessment of air quality impacts on designated nature conservation sites; and
- 'Guidance on the assessment of dust from demolition and construction' (Ref 6-12), which presents guidance on qualitative assessment of risk of dust emissions from construction and demolition activities and the level of good practice mitigation that should be applied.

6.2.31 The Land-Use Planning and Development Control: Planning for Air Quality have been used to screen potential traffic air quality impacts to those impacts that may require more detailed assessment, and in the assessment of traffic air quality effects and the evaluation of their significance.

6.3 Assessment Methodology and Significance Criteria

Scope of the Assessment

6.3.1 Matters that have been scoped into the assessment are judged likely, without effective mitigation, to have the potential to cause significant effects. Matters that are scoped out of the assessment are those which it is considered are not likely to lead to significant effects, regardless of mitigation. Where insufficient information is available in relation to a particular matter to make a reasonable judgement at this stage, a precautionary approach is adopted and that matter is scoped in. The decision to scope out matters is based upon professional judgement, taking into account factors such as a high degree of separation between the Proposed Development and the identified receptors, the lack of impact pathways, or the known low value or low sensitivity of impacted resources/ receptors.

6.3.2 Based on the above, those potential air quality impacts associated with the activities detailed in Table 6.6 below have been scoped out of further assessment.

Table 6.6: Potential Air Quality Impacts Screened Out of Further Assessment

Potential Air Quality Impact	Detail	Rationale for Screening Out of Assessment
Operational traffic emissions	Emissions from traffic associated with the on-going operation of the proposed development.	The Annual Average Daily Traffic volumes associated with the on-going operation of the Proposed Development are lower than those assessed for the Construction Phase assessment. As the Construction Phase assessment results in impacts that can be considered negligible at all receptors, and operational traffic volumes are lower, it therefore follows that impacts from operational traffic will be even lower than those presented in this assessment, therefore it is not considered necessary to assess such impacts.

Potential Air Quality Impact	Detail	Rationale for Screening Out of Assessment
Emissions from Operational Power Plant	Emissions of sulphur dioxide and particulates.	Emissions from natural gas of sulphur dioxide and particulates are considered to be negligible and unlikely to result in significant air quality impacts. As such there are no ELVs or BAT-AELs associated with such operations within the relevant legislation.
Auxiliary boiler(s)	Exhaust from auxiliary boilers to provide steam for main open-cycle gas turbine ('OCGT') during a 'warm' start.	Auxiliary boiler(s) will be of small output capacity (less than 2MW) and are expected to be used for less than 30 minutes per day. Good design practice (emission velocity >15m/s) and their limited use mean that the auxiliary boiler(s) are not expected to give rise to significant impacts at receptor locations.
Plume Visibility from OCGT stack	Overshadowing effects due to condensation of water vapour from flue stack.	Low risk of visible plume from the power plant stack due to low water content and high flue gas temperature.

Impact Assessment and Significance Criteria

6.3.3 The potential emissions to air from construction and at the time of opening (i.e. operation emissions from the OCGT unit) of the Proposed Development have been determined or estimated, and key local receptors have been identified, together with the current local ambient air quality. The potential concentrations resulting from the projected emissions arising from the operational Proposed Development have been predicted using atmospheric dispersion modelling techniques where appropriate, which has enabled the assessment of the impacts associated with the Proposed Development on the existing local ambient air quality and in particular on the identified sensitive receptors. The assessment methodology for each type of emission is detailed below.

6.3.4 The assessment has been made with reference to the NAQSs objectives and targets, as laid out in the AQS Regulations.

Extent of Study Area

6.3.5 The 'Construction Dust Study Area' applicable for construction dust and Non-Road Mobile Machinery ('NRMM') emissions has been applied in line with the Institute of Air Quality Management: Land-Use Planning & Development Control: Planning For Air Quality v.1.2. guidance 'IAQM guidance' (Ref 6-12) extending:

- Up to 350m from the Site boundary and 50m from the construction traffic route (up to 500m from the Site entrances), for human health receptors; and
- Up to 50m from the Site boundary or construction traffic route (up to 500m from the Site entrances) for ecological receptors.

6.3.6 For construction traffic assessments, the 'Construction Traffic Study Area' has been defined with reference to the screening criterion provided in the Design Manual for Roads and Bridges ('DMRB') (Ref 6-13) guidance, which states that only properties and habitat sites within 200m of roads need to be considered.

6.3.7 The 'Operational Development' Study Area for the operational development point source emissions extends up to 15km from the Site (as requested by the Planning Inspectorate ('PINS')), in order to assess the potential impacts on ecological receptors, in line with the

EA Risk assessment methodology (Ref 6-2). Sensitive human health receptors within 1km only have been considered, as these represent the locations of peak impacts; therefore result in a worst case assessment. In practice the predicted impacts become negligible beyond this distance from the Site.

Assessment of Dust Generated During Construction and Decommissioning Works

6.3.8 'Dust' is defined in British Standard ('BS') 6069-2:1994 (Ref 6-14) as particulate matter in the size range 1µm - 75µm (microns) in diameter, and is primarily composed of mineral materials and soil particles. This definition is also referred to in NPPF technical guidance (Ref 6-5) in the context of dust impacts from mineral extraction operations. The BS definition has been adopted in this assessment.

6.3.9 Respirable particulate matter (PM_{10}) is composed of material with an aerodynamic diameter of less than 10µm, and includes the size fractions of greatest concern to impacts on human health. The majority of construction dust is larger than 10µm in diameter and, therefore is typically associated with material depositing onto property and potential amenity effects, although there is evidence that PM_{10} and $PM_{2.5}$ (material with an aerodynamic diameter of less than 2.5µm) emissions may result from construction and demolition activities. Particulate matter may therefore have an effect whilst airborne, or as a result of its deposition onto a surface. Consequently the nature of the impact requiring assessment varies between different types of receptor.

6.3.10 The movement and handling of soils and spoil during the Proposed Development construction activities is anticipated to lead to the generation of some short-term airborne dust. The occurrence and significance of dust generated by earth moving operations is difficult to estimate, and depends heavily upon the meteorological and ground conditions at the time and location of the work, and the nature of the actual activity being carried out.

6.3.11 At present, there is no statutory UK or EU standard relating to the assessment or control of dust. The NPPF technical guidance provides an assessment framework for mineral extraction sites, which indicates that where there are residential properties within 1km of site activity and the concentration of PM_{10} is not likely to exceed the NAQS objective, then good practice measures should be employed. The IAQM Guidance on assessing mineral dust impacts (Ref 6-15) indicates that; *"the level of dust deposition likely to lead to a change in vegetation is very high (over 1 g/m^2/day) and the likelihood of a significant effect is therefore very low except on the sites with the highest dust release close to sensitive habitats".*

6.3.12 The emphasis of the regulation and control of construction dust should similarly be the adoption of Best Practicable Means (BPM) of working on a site. IAQM Guidance recommends that significant adverse environmental effects are avoided at the design stage and through embedded mitigation where possible, including the use of good working practices to minimise dust formation.

6.3.13 The IAQM guidance for good practice qualitative assessment of risk of dust emissions from construction and demolition activities (Ref 6-12). The guidance considers the risk of dust emissions from unmitigated activities to cause human health (PM_{10}) impacts, dust soiling impacts, and ecological impacts (such as physical smothering, and chemical impacts for example from deposition of alkaline materials). The appraisal of risk is based on the scale and nature of activities and on the sensitivity of receptors, and the outcome of the appraisal is used to determine the level of good practice mitigation required for adequate control of dust.

6.3.14 The assessment undertaken for this ES is consistent with the overarching approach to the assessment of the impacts of construction and eventual decommissioning, and the application of example descriptors of impact and risk set out in IAQM guidance. It considered the significance of potential impacts with no mitigation, and recommends mitigation measures appropriate to the identified risks to receptors. The steps in the assessment are to:

- Identify receptors within the screening distance of the Construction Dust Study Area;
- Identify the magnitude of impact through consideration of the scale, duration and location of activities being carried out (including demolition, earthworks, construction and trackout, where construction vehicles could carry mud onto the public highway);
- Establish the sensitivity of the area through determination of the sensitivity of receptors and their distance from construction activities;
- Determine the risk of significant impacts on receptors occurring as a result of the magnitude of impact and the sensitivity of the area, assuming no additional mitigation (beyond the identified development design and impact avoidance measures) is applied;
- Determine the level of mitigation required based on the level of risk, to reduce potential impacts at receptors to insignificant or negligible; and
- Summarise the potential residual effects of the mitigated works.

6.3.15 The criteria for assessment of magnitude, sensitivity and risk are summarised in Tables 6A.1-6A.6 in Appendix 6A (ES Volume III, Application Document Ref. 6.4).

Assessment of Construction Traffic

6.3.16 The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons such as benzene and 1,3-butadiene, as well as the typical combustion products of NO_x, CO, PM_{10} and $PM_{2.5}$ in exhaust emissions. Similarly but to a lesser extent, any sulphur in the fuel can be converted to SO_2 that is then released to atmosphere. At the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form oxides of nitrogen, mainly in the form of nitric oxide (NO), which is then converted to nitrogen dioxide in the atmosphere. NO_2 is associated with adverse effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle over time.

6.3.17 Although SO_2, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this Proposed Development. This is because it is widely recognised that the concentrations of release from modern vehicles of these gases are not likely to give rise to significant effects. In particular, no areas within the administrative boundaries of NLC and NELC are considered to be at risk of exceeding the relevant objectives for these pollutant species, and the risks to achievement of the relevant air quality objectives from the Proposed Development in respect of these gases are considered negligible. Emissions of SO_2, CO, benzene and 1, 3-butadiene from road traffic are therefore not considered further within this assessment.

6.3.18 Exhaust emissions from road vehicles may affect the concentrations of principal pollutants of concern, NO_2, PM_{10} and $PM_{2.5}$, at sensitive receptors in the vicinity of the Proposed

Development. Therefore, these pollutants are the focus of the assessment of the significance of road traffic impacts.

6.3.19 The Highways England DMRB guidance (Ref 6-13) sets out criteria to establish the need for an air quality assessment. The guidance considers the changes in traffic anticipated as a result of a development, to identify the need for further evaluation or assessment. For example, in the DMRB guidance, changes in Annual Average Daily Traffic (AADT) flows of more than 1,000 vehicles or 200 Heavy Goods Vehicles movements (HGV, all vehicles greater than 3.5t gross weight, including buses) are considered to require quantitative assessment. Guidance published by the IAQM (Ref 6-11) sets out indicative criteria, to trigger the initiation of an assessment of air quality for a proposed development, of a change of 500 AADT Light Goods Vehicle flows (LGV, all vehicles less than 3.5t gross weight) or 100 AADT HGV flows (outside of an AQMA). For changes in traffic below these criteria, significant changes in air quality are not expected.

6.3.20 Predicted vehicle movements during the construction of the Proposed Development are detailed in Chapter 7: Traffic and Transport (ES Volume I). The change in total vehicle movements is predicted to peak at 168 AADT, including 45 AADT HGV movements, accessing the Site from the A180 (via the A160, Humber Road and Rosper Road).

6.3.21 The Site and principal traffic routes are not located within an AQMA and the peak construction traffic therefore falls below the DMRB and IAQM screening criteria. However it is recognised that the cumulative air quality effects from this and other developments should be considered, in particular in relation to the potential effects on nearby ecological receptors, and therefore the traffic impacts associated with the construction phase have been modelled.

6.3.22 Predicted vehicle movements during the operation of the Proposed Development phase are expected to peak at 15 one-way LGV movements and a maximum of 3 one-way HGV movements. These vehicle movements fall well below the DMRB and IAQM screening criteria, and would represent only a very small addition to the total pollutants along the local road network, therefore it is not considered necessary to conduct a detailed assessment of operational road traffic for the Proposed Development.

6.3.23 The assessment of construction traffic has used the latest version of dispersion model software 'ADMS-Roads' (v4.1.1) to quantify baseline pollution levels at selected receptors due to road traffic emissions. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies (Ref 6-16).

6.3.24 Model verification is the exercise undertaken to account for dispersion model bias. This involves aligning model output data with actual measurements gathered at locations within the Construction Traffic Study Area. The factor of the difference between modelled output and measured data is then applied to all representative locations in the model domain. In this scenario, a verification factor of 1.75 was applied to the road NO_x concentrations achieved in the modelling. This derivation of this value is explained further in Appendix 6A (ES Volume III, Application Document Ref. 6.4).

6.3.25 Consideration has been given within the assessment to the potential cumulative traffic emissions from 'Committed Developments'. These are defined and discussed further in Chapter 17: Cumulative and Combined Effects (ES Volume I).

6.3.26 In the assessment 'Baseline' refers to the traffic that would exist on each road with or without the Proposed Development and "Peak Construction" refers to the peak flow of construction related traffic for the Proposed Development.

6.3.27 Data used in dispersion modelling have been for the following scenarios:

- 2021 Baseline + other Committed Development scenarios; and
- 2021 Baseline + other Committed Development scenarios + Peak Construction scenario for the Proposed Development.

Assessment of Emissions Generated from Construction Site Plant

6.3.28 The construction phase for the Proposed Development is anticipated to last approximately 21 months, between 2021 and 2022 as described in Chapter 4: The Proposed Development (ES Volume I).

6.3.29 There are likely to be emissions to air during construction activities arising from on-Site construction plant or Non-Road Mobile Machinery ('NRMM'). The IAQM guidance states:

> "*Experience of assessing the exhaust emissions from on-site plant … and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur*".

6.3.30 The screening criterion in the DMRB, which states that only properties and habitat sites within 200m of roads should be considered in traffic assessments, has also been considered in determining the potential for impacts from the Proposed Development NRMM on sensitive receptors. A qualitative assessment of the potential for impact from nitrogen dioxide and PM_{10} emissions from NRMM on identified receptors has therefore been made based on the criteria outlined in the DMRB guidance.

Assessment of Process Emissions from the Plant During Operation

6.3.31 The IED defines ELVs for gas turbines (including OCGTs) for NO_x and CO only. No ELVs are defined for emissions of SO_2 and PM_{10} from gas-fired plant, as their presence in natural gas is minimal and consequently their emissions are at such low levels relative to the air quality objectives that they are considered trivial and the risk to the achievement of the PM_{10} and SO_2 air quality objectives is considered negligible. It is therefore considered that no assessment of such emissions is required for the Proposed Development.

6.3.32 Emissions from the Proposed Development, assumed to be operational by the end of 2022, have been assessed using the EA Risk Assessment methodology (Ref 6-2) in order to identify where proposed emissions can be screened out as having a negligible impact. Detailed dispersion modelling using the atmospheric dispersion model ADMS 5.2 has been used to predict the concentrations of pollutants at identified receptors. These concentrations have been compared with the air quality assessment level for each pollutant, as summarised in Tables 6.1 to 6.3.

6.3.33 Dispersion modelling calculates the predicted concentrations arising from the emissions to atmosphere, based on Gaussian approximation techniques. The model employed has been developed for UK regulatory use.

6.3.34 The assessment has been based on the operational design parameters for the Proposed Development, as described in more detail below. The worst-case operational scenarios, with respect to the potential air quality impacts, have been determined and are reported in this Chapter. The determination of the optimum stack height has been driven by the predicted impacts from NO_x emissions, and is detailed in Appendix 6A (ES Volume III, Application Document Ref. 6.4)

6.3.35 The assessment of worst-case long-term (annual mean) and short-term (daily or hourly mean) emissions, resulting from the operation of the Proposed Development, has been undertaken by comparison of the maximum process contributions at identified sensitive human health receptors with the NAQS annual mean and hourly mean objectives, and Critical Levels for ecological receptors, taking into consideration the baseline air quality, in accordance with EA Risk Assessment methodology, and factoring the medium- to long-term impacts for annual operating hours, as described in Appendix 6A (ES Volume III, Application Document Ref. 6.4).

6.3.36 An assessment of nutrient nitrogen enrichment has been undertaken by applying published deposition velocities to the predicted annual average NO_2 concentrations at the identified statutory habitat sites, determined through dispersion modelling, to calculate nitrogen deposition rates. These deposition rates have then been compared to the Critical Loads for nitrogen, published by UK Air Pollution Information System (Ref 6-1), for each identified individual habitat type present at the identified ecological receptors, taking into consideration the baseline nitrogen deposition.

6.3.37 Potential increases in acidity from deposition contributions of NO_2 from the process contribution have also been considered. In this assessment, the nitrogen kilo equivalent (Keq/ha/yr), which is the unit in which acidity Critical Load are described, has been derived from nitrogen deposition modelling values using standard conversion factors. The acidity deposition rates and baseline deposition rates have been used within the APIS Critical Load Function Tool (Ref 6-1) to determine whether the contribution would result in exceedance of the defined Critical Levels for the habitat features present at each identified statutory habitat site. Process contributions of SO_2 to the acidity deposition rate have been assumed to be zero as the emissions from the process are negligible.

6.3.38 Nutrient nitrogen and acid deposition at non-statutory habitat sites have not been assessed, as the sensitive species present at these receptors and their associated Critical Loads for nutrient and acid deposition are not on public records.

6.3.39 There is also potential for cumulative impacts from other committed developments in the vicinity of the Proposed Development. These are considered in Section 6.10 of this Chapter and also within Chapter 17: Cumulative and Combined Effects (ES Volume I).

Evaluation of Significance – Construction Dust

6.3.40 For potential amenity effects, such as those related to dust deposition, the intention is to include appropriate mitigation measures as necessary during construction works, which minimise the potential for amenity, human health, and ecological impacts.

6.3.41 The IAQM guidance (Ref 6-12) does not provide a method for the evaluation of impacts on receptors from construction dust, rather a means to determine the level of mitigation required to avoid significant impacts on receptors. The guidance indicates that application of appropriate mitigation should ensure that residual effects will normally be 'not significant'.

Evaluation of Significance – Traffic and Operational Emissions

Human Health Impacts

6.3.42 The evaluation of the significance of construction traffic and operational emissions on sensitive receptors considers the change in predicted pollutant concentrations against the AQS Regulations and published guidance by Defra and the EA (Ref 6-2). The current objectives and assessment criteria applicable in this assessment for the protection of human health are presented in Table 6.1 to Table 6.3.

6.3.43 For a change of a given magnitude, the IAQM has published recommendations for describing the magnitude of impacts at individual receptors and describing the significance (Table 6.7) of such impacts. This terminology has been changed where appropriate in order to maintain consistency with the rest of this ES – where the IAQM uses 'substantial' this has been changed to 'major', and 'slight' has been changed to 'minor'.

6.3.44 Particular significance should be given to a change that takes the concentration from below to above the NAQS objective (or vice versa) because of the importance ascribed to the objectives in assessing local air quality.

Table 6.7: Effect Descriptors at Individual Receptors – Annual Mean Impacts

Long Term Average Concentration at Receptor	Percentage Change in Annual Mean Concentration				
	Up to 0.5% Imperceptible	0.5-1% Very low	2-5% Low	6-10% Medium	>10% High
75% or less of AQAL	Negligible	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	Negligible	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	Negligible	Minor	Moderate	Moderate	Major
103-109% of AQAL	Negligible	Moderate	Moderate	Major	Major
110% or more of AQAL	Negligible	Moderate	Major	Major	Major

AQAL = Air Quality Assessment Level (NAQS objective or EU limit value or EAL)

6.3.45 The IAQM guidance is explicit that significance only applies to an overall effect and never to an effect at an individual receptor. Consequently, a 'moderate' adverse impact at one receptor may not mean that the overall effect is significant; other factors need to be considered. However it indicates further that 'negligible' impacts are likely to lead to effects that are 'not significant' and 'major' impacts describe the potential for 'significant' effects. The judgement of significance of effects adopted within this assessment is discussed below.

6.3.46 In addition to the criteria set out in the IAQM guidance, screening criteria outlined in the EA EPR Risk Assessment guidance has also been considered for the assessment of significance. The EA EPR Risk Assessment screening criteria for comparison of process contributions (PCs) with NAQS objectives states that effects due to an emission may be considered insignificant where:

- Short-term PC <=10% of the NAQS objective; and
- Long-term PC <=1% of the NAQS objective.

6.3.47 The second stage of screening considers the PCs in the context of the existing background pollutant concentrations; the predicted environmental concentration (PEC) is considered acceptable where:

- Short term PC <20% of the short-term NAQS objective minus twice the long-term background concentration; and
- Long term PEC (PC + background concentration) <70% of the NAQS objective.

6.3.48 Where the PEC is not predicted to exceed the NAQS objective and the proposed emissions comply with the BAT-AELs (or equivalent requirements) the emissions are considered acceptable by the EA.

6.3.49 The IAQM guidance indicates that the EA threshold criterion of 10% of the short term AQAL is sufficiently small in magnitude to be regarded as having an 'insignificant' effect. The IAQM guidance deviates from the EA guidance with respect to the background contribution; the IAQM guidance indicates that the severity of peak short-term concentrations can be described without the need to reference background concentrations as the PC is used to measure impact, not the overall concentration at a receptor. The peak short term PC from an elevated source is described as follows:

- PC <=10% of the NAQS objective is imperceptible in magnitude, and represents a negligible effect;
- PC 11-20% of the NAQS objective is small in magnitude, representing a 'slight' (minor) effect;
- PC 21-50% of the NAQS objective is medium in magnitude, representing a moderate effect; and
- PC >51% of the NAQS objective is large in magnitude representing a 'substantial' (major) effect.

6.3.50 Impacts of the Proposed Development have been assessed relative to both the adapted IAQM/ EPUK criteria and EA screening criteria.

6.3.51 Research undertaken on behalf of Defra and the devolved administrations (Ref 6-17) concluded that a trigger value of 60µg/m^3 NO_2 as an annual mean (150% of the NAQS objective) should be used to consider the likelihood of traffic emissions exceeding the hourly mean NO_2 objective (200µg/m^3 NO_2 not more than 18 times per year). Where predicted concentrations are below this value, it can be concluded with confidence that the hourly mean NO_2 NAQS objective will be achieved; this assessment has followed this approach.

Ecological Impacts

6.3.52 The impact of point source emissions on ecological receptors with statutory designation e.g. Special Areas of Conservation ('SACs'), Special Protection Areas ('SPAs'), RAMSAR and Sites of Special Scientific Interest ('SSSIs') has been evaluated using the EA guidance (Ref 6-2) criteria for short-term and long-term objectives for ecological receptors. For short-term impacts, where the PC >100% of the Critical Level the EA guidance indicates such an impact would not be acceptable.

Table 6.8: Effect Descriptors at SPA/ SAC/ Ramsar/ SSSI

Average Period	Percentage Change	Effect Descriptor
Annual mean PC/AQAL	< 1%	Imperceptible
Annual mean PEC/AQAL	< 70%	Negligible
Short term PC/AQAL	< 10%	Negligible

Average Period	Percentage Change	Effect Descriptor
Short term PC/AQAL	10 – 100%	Minor to Moderate
Short term PC/AQAL	> 100%	Moderate to Major

6.3.53 For all other nature conservation sites, i.e. Local Wildlife Sites - 'LWS', the assessment needs to determine whether the Proposed Development will result in 'significant pollution' i.e. where Critical Levels are predicted to be exceeded as a result of the Proposed Development. Therefore the EA guidance states that if the long and short term PC is less than 100% of the relevant standard, the impact is considered to be not significant (negligible).

6.3.54 The assessment against Critical Loads has been carried out in accordance with AQTAG06 'Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air' (Ref 6-18). However, it should be noted that this does not provide definitive advice on interpreting the likely effects on different habitat types of changes in air quality.

6.3.55 As with Critical Levels where process contributions of nitrogen and acids are less than 1% of the Critical Load, the EA and Natural England consider that impacts can be considered to be insignificant. Should PCs be greater than 1% of the Critical Load then the potential to be significant is dependent upon the context, i.e. sensitivity of the habitat to nitrogen/ acid deposition or other factors such as buffering capacity of the local soils. The impact of point source emissions on ecological receptors with statutory designation, through deposition of nutrient nitrogen or acidity, has been evaluated using the EAs 'insignificant' criterion of 1% of the long term objective, as above.

6.3.56 Where emissions are not screened as having the potential to have an insignificant (negligible) effect, the descriptive terms for the air quality effect outlined in Tables 6.7 -6.8 have been applied as an indication to the potential severity of the impacts.

Evaluation of Significance – Proposed Development as a Whole

6.3.57 Following the assessment of each individual air quality effect, the significance of all of the reported effects is then considered for the Proposed Development in overall terms. The potential for the Proposed Development to contribute to, or interfere with, the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principal focus is any change to the likelihood of future achievement of the NAQS values set out in Tables 6.1 – 6.3.

6.3.58 The achievement of local authority goals for local air quality management is directly linked to the achievement of the NAQS objectives and as such this assessment focuses on the likelihood of future achievement of the objective values.

6.3.59 In terms of the significance of the effects (consequences) of any impacts, an effect is reported as being either 'not significant' or as being 'significant'. If the overall effect of the Proposed Development on local air quality or on amenity is found to be 'moderate' or 'major' this is deemed to be 'significant'. Effects found to be 'minor' are considered to be 'not significant'; 'negligible' effects are considered to be 'not significant'.

6.4 Sources of Information/ Data

Construction Phase Data

6.4.1 The traffic data within this assessment has been sourced from Chapter 7: Traffic and Transportation (ES Volume I) and is set out in Table 6.9 below.

Table 6.9: Peak Traffic Volumes Associated with Construction of Proposed Development

Location	Proposed Development total vehicles (AADT)	Proposed Development HGVs (AADT)
Rosper Road North of Site Access	23	0
Rosper Road (South of Site Access)	168	45
Marsh Road	0	0
Rosper Road (South of Marsh Road)	168	45
Rosper Road (Gyratory southbound oneway)	84	22
Humber Road (Gyratory northbound one-way)	84	22
Humber Road (West of Gyratory - westbound)	84	22
A160	79	27
A180 - west of A160 Interchange	79	27

Operational Phase Data

6.4.2 The Proposed Development consists of an OCGT power station of up to 299MW electrical output capacity. The full details of the Proposed Development are detailed in Chapter 4 - The Proposed Development (ES Volume I).

6.4.3 Point source emissions data for the operation of the OCGT has been determined from information supplied by two Original Equipment Manufacturers ('OEMs') that would potentially supply the OCGT unit for the Proposed Development. The data determined to lead to the worst case predicted impacts has been used in the assessment.

6.4.4 Conservative assumptions have been made with regard to likely operational parameters, to determine the maximum potential effects of the operation of the Proposed Development on sensitive receptors; these assumptions include:

- Worst case IED emissions limits from the OEM-provided information;
- The largest building massing and configuration from OEM-provided information;
- Assessment of short term impacts from the OCGT at IED limits, over the whole year to ensure meteorological conditions that lead to the worst case impacts are taken into consideration; and
- Assessment of annual average impacts from the OCGT at IED limits assuming operation of 2,250 hours per year (the potential maximum number of operating hours expected to be allowed in any one year allowed under the Environmental Permit).

6.4.5 The assessment of annual average emissions for the maximum of 2,250 hours operation has been carried out by factoring the annual emission rate by the proposed operational hours (i.e. 2,250 / 8,760) x 100 = 25.7%), and this has been used in the model. As actual

hours of operation for the Proposed Development are not known, it is considered that this is more appropriate than modelling a time varying emission.

6.4.6 The actual hours of operation of the OCGT will be subject to the national demand for electricity and the economic viability of gas-fired generation. The likely operation of the plant would be to meet short-term peak demand, and therefore the plant would be likely to operate for periods of only a few hours at a time.

6.4.7 It is considered that the assumptions outlined above will provide a worst case (conservative) assessment of the effect on local air quality from the operation of the Proposed Development. The modelled emission parameters are summarised in Table 6.10.

Table 6.10: Modelled Combustion Plant Atmospheric Release Parameters

Parameter		OCGT Unit
Stack Height (m above finished ground level (assumed to be 6m AOD))		35 – 55m[2]
Average Efflux Velocity (m/s)		35.5
Volumetric Flow (Nm^3/hr) [1]		2,601,880
Volumetric flow at stack exit conditions (Am^3/s)		1,695
Average stack exit conditions:	Temp (°C)	600
	O_2 (% dry)	12.1
	Moisture (%)	5.5
Approx. flue diameter (m)		7.8
Assumed maximum operating hours/ year		2,250
Oxides of nitrogen (NO_x) ELV (IED, mg/Nm^3)		50
Oxides of nitrogen (NO_x) emission rate (g/s)		36.1
Carbon monoxide (CO) ELV (IED, mg/Nm^3)		100
Carbon monoxide (CO) emission rate (g/s)		72.3
Approximate stack location (OS Grid reference), based on OEM Layout Plans		516640, 417405

[1] Reference conditions: 273K, 15%, O_2, dry

6.4.8 The dispersion modelling of point source emissions for the operational scenario has taken into consideration the sensitivity of predicted results to model input variables, and to ultimately identify the realistic worst-case results for inclusion in the assessment. These variables include:

- Meteorological data, for which five years' recent data from a representative meteorological station (Humberside Airport) have been used; and
- Inclusion of buildings, structures and local topography that could affect dispersion from the source into the modelling scenarios.

6.4.9 Sensitivity on the stack location within the Works 1 Area of the Proposed Development Site has been carried out during initial model runs, and was found to have limited impact

[2] It should be noted that this is above the maximum stack height assessed in Chapter 10: Landscape and Visual Amenity of this ES, which assessed a maximum height of 50m above ground level (56m AOD).

on the predicted concentrations at receptor locations, and therefore would not affect the outcome of the assessment. The main influencing factor was found to be the meteorological year and the height of the buildings compared to the stack height. Stack height considerations are discussed below.

6.4.10 The maximum predicted concentrations, taking into account these worst-case/ conservative modelling assumptions, at the worst affected human health and ecological receptors associated with the Proposed Development are provided in Tables 6.19 – 6.22.

6.5 Consultation

6.5.1 The consultation undertaken with statutory consultees to inform this Chapter is summarised in Table 6.11 below.

Table 6.11: Consultation Summary Table

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
Secretary of State (SoS)	July 2018 (Scoping Opinion)	The residential receptors that will be assessed are listed in paragraph 2.3 of the Scoping Report. The aspect chapter has not provided justification for why these receptors have been chosen or the precise location for each of the receptors. The methodology used to determine the receptors as well as a concise description of their locations should be included within the ES. For greater clarity the Applicant may consider presenting the receptors on a figure within the ES.	The receptors identified for the assessment are detailed in Table 6.12 of this Chapter and are shown in Figure 6.1 (ES Volume II, Application Document Ref. 6.3).
		The baseline conditions are described with reference to one air quality monitoring station measuring NO_2, SO_2 and PM_{10} which is located in South Killingholme. The Applicant should ensure that the baseline data is representative of the entire study area and is applicable for the extent of the impacts likely to result in significant effects.	Justification of the background air quality used in the assessment, to represent the study area, is detailed in Section 6.8. A review of available data has been carried out, with the chosen baseline concentrations justified in the context of this assessment.

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
Secretary of State (SoS)	July 2018 (Scoping Opinion)	Paragraph 6.2.3 states that the ambient air quality is "generally good". If the Applicant is to describe the air quality qualitatively then an applicable definition (including the relevant criteria) should be included within the ES. The Applicant should consider using the air quality data collected from the monitoring station to provide a quantitative air quality baseline which would align with the quantitative methodology proposed in paragraph 6.2.15 of the Scoping Report. Furthermore, a thorough description of how the air quality future baseline will be conducted should be included within the ES. Reference to the Immingham AQMA should be made when considering the current and future baseline conditions for this aspect of the assessment.	Justification of the background air quality used in the assessment, to represent the study area, is detailed in Section 6.8.
		The ES should state any assumptions that are made in order to complete the atmospheric dispersion modelling study of operational emissions. Furthermore, the predicted residual emission values post implementation of mitigation measures should be included within the ES. The Applicant should ensure that the operating pattern used to inform the dispersion model and the assessment in the ES appropriately reflects the enabled operating powers in the DCO. The Applicant should make effort to agree the appropriate operating pattern with relevant consultation bodies.	The methodology for the assessment of operational emissions is detailed in Section 6.3, with additional information provided in Appendix 6A, ES Volume III, Application Document Ref. 6.4.
Secretary of State (SoS)	July 2018 (Scoping Opinion)	A 10km study area is proposed to assess the air quality effects within the internationally designated habitat sites including the Special Area of Conservation (SACs), Special Protection Area, Ramsar sites, and Sites of Special Scientific Interest (SSSIs). The Inspectorate notes the Environment Agency's guidance on "Air emission risk assessment for your environmental permit" states that some larger (greater than 50MW) emitters may be required to screen to 15km for European sites and 10 to 15km for SSSIs. The Inspectorate therefore recommends that the ES contains a robust justification to support the selected study area relevant to the designated ecological sites, with reference to relevant guidance, the extent of the likely impacts, and any agreement reached with relevant consultation bodies.	The receptors identified for the assessment are detailed in Table 6.12, Section 6.3 and shown in Figure 6.2 (ES Volume II, Application Document Ref. 6.3). A study area of 15km has been utilised for internationally designated habitat sites, as requested by PINS, however it is considered that the assessment demonstrates that effects are negligible from the Proposed Development at the point of maximum impact.

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
		The Scoping Report indicates that there will be between 600-900 one way vehicle movements per day but proposes not to conduct detailed road traffic dispersion modelling. The Scoping Report does not provide information regarding the baseline position in respect of road traffic. In absence of this data it is unclear as to the extent of change resulting from the Proposed Development and whether detailed road traffic dispersion modelling should be carried out. The Applicant should ensure that the assessment in the ES is suitably informed by relevant information sufficient to identify the likely significant effects. The need for detailed modelling should be considered in light of the anticipated change in road traffic flows and having regard to relevant guidance e.g The Guidelines for the Environmental Assessment of Road Traffic. The Applicant should make effort to agree the need for detailed modelling for the ES with relevant consultation bodies.	The air impacts of traffic associated with the development have been assessed as per the relevant DMRB and IAQM guidance. The guidance provides clear criteria to determine when an assessment is appropriate, and therefore no consultation was required. The methodology and justification for assessment is included in Section 6.3.
Secretary of State (SoS)	July 2018 (Scoping Opinion)	Paragraph 6.2.4 of the Scoping Report references the potential for air quality impacts to arise from operational vehicles but the road traffic screening assessment discussion at paragraph 6.2.12 only refers to a construction traffic assessment. Therefore it is unclear to the Inspectorate whether the assessment of air quality effects arising from operational traffic will be considered. For the avoidance of doubt, the Inspectorate considers that operational road traffic assessment should be assessed where significant effects are likely to occur.	The air impacts of traffic associated with the development have been assessed as per the relevant DMRB and IAQM guidance. The methodology and justification for assessment is included in Section 6.3. It has not been deemed necessary to assess operational traffic, as the numbers are much lower than those associate with the construction phase. The assessment of construction traffic carried out results in results that can be shown to be not significant, Section 6.10.

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
		The Scoping Report states that a screening assessment of dust and mobile plant exhaust emissions will be undertaken in respect of site clearance, construction and decommissioning activities. However, the Scoping Report omits reference to screening for PM_{10}. The Inspectorate considers that PM_{10} should also be included within the screening assessment. The Applicant should also have regard to the Institute of Air Quality Management (IAQM) "guidance on the assessment of dust from demolition and construction" in undertaking this assessment. No study area for the screening assessment has been proposed. A clearly defined and justified study area with reference to relevant guidance should be included within the ES.	PM_{10} impacts have been addressed in the dust and NRMM assessments carried out in Section 6.10.
		The Scoping Report refers to the AECOM significance criteria and proposes to use this within the ES. However, the criteria itself has not been provided, consequently the Inspectorate is unable to comment on its suitability. The significance criteria used to inform the assessment should be clearly explained in the ES and should be appropriate to ensure that significant effects are appropriately assessed.	Screening criteria used in the assessment is detailed in Section 6.3, and is based on appropriate guidance.
North Lincolnshire Council (Engie)	July 2018 (Scoping Opinion)	Advised that North East Lincolnshire Council should consider the air quality impacts, with specific reference made to the Immingham AQMA.	Not included. The Immingham AQMA was over 2km from the Proposed Development and was designated for PM_{10}. It was however revoked in 2016.
North Lincolnshire Council	July 2018 (Scoping Opinion)	The proposed scope of the assessment is adequate, however this department recommends that the operational phase of the development should be assessed with regard to the cumulative impact of the development and neighbouring industrial land uses including the CHP plant and gas fired power station.	It is considered that the background concentrations used to represent local air quality include the emissions of currently operational industry, such as the existing VPI CHP. Cumulative impacts of other consented developments that are not currently operational have been considered in Chapter 17: Cumulative and Combined Effects (ES Volume I). This includes the proposed adjacent VPI Energy Park A development.

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
Public Health England	July 2018 (Scoping Opinion)	An overall assessment should present the impacts of all emission sources on short and long-term air quality (i.e., assessment of the operational traffic (road) emissions, construction plant emissions, installation (stack and fugitive) emissions, and emissions from any nearby facilities (ie, each component should not be assessed in isolation, and if a detailed assessment of road traffic emissions is screened out, the contribution of road traffic to the installation's overall air quality impacts should not be excluded).	An assessment of the impacts from the Proposed Development as a whole is provided in Section 6.10.
Natural England	19th December (Stage 2 Consultation)	The air quality information provided does not rule out air quality impacts on the Humber Estuary SSSI/ SAC due to the NO_x process contributions from operational phase of the scheme. We welcome further evaluation of these impacts on the SSSI prior to the submission of the DCO. As part of this we advise that an in-combination assessment is undertaken of 24 hour NO_x levels with other scheme. It may be possible to rule out impacts on sensitive Humber SAC/ SSSI habitats if further information is provided on the location of sensitive habitats in relation to the development site.	An additional model scenario assuming 8 hours operation per day of the OCGT (therefore still representing a worst case operational scenario as this would equate to 2,920 hours per year) has been run, in order to predict a more realistic level of 24 hour NO_x impact at the Humber Estuary. In addition, an isopleth figure of the daily NO_x has been produced (Figure 6.5, ES Volume II, Application Document Ref. 6.3) showing the habitat types present at the Humber Estuary receptor at the location of maximum predicted impacts. All impacts are considered to be not significant.
North Lincolnshire Council	16th January 2019 (Stage 2 Consultation)	With respect to the construction phase of the development the Local Planning Authority would expect the submission of a Construction Environmental Management Plan (CEMP), which gives adequate consideration of mitigation measures, prior to development commencing. This plan could be included as part of the final ES or secured via a requirement as part of the DCO.	A framework CEMP is provided in Appendix 4A (ES Volume III, Application Document Ref. 6.4).

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
		With regards to the operational phase it is noted that the report concludes that a stack height of 45m is sufficient to allow for adequate dispersion of emissions. However, no justification as to why a taller stack has not been selected, which would result in a reduced process contribution.	Whereas it is recognised that a taller stack would reduce process contributions further, consideration has been given to minimising the visual impacts of a taller stack. As the impacts can be considered imperceptible at all stack heights considered, it was not deemed necessary to propose a higher stack, thereby reducing the visual impacts of the Proposed Development.
		It is noted that the consideration of emissions from SO_2 and PM_{10} from the plant have been screened out of modelling as the report concludes that the impact of these pollutants is so small that it can be considered trivial. This conclusion has not been supported by any robust information or emissions data from the proposed plant.	The sulphur and particulate content of natural gas are very low, resulting in very low emissions. As such no emission limits for these species are specified in the relevant legislation, as there is limited potential for emissions to impact on NAQs objectives.
		The EHO identified some inaccuracies in the submitted information. Section 6.5.8 of the report discusses the Local Air Quality Management regime and AQMA's within the district of North Lincolnshire. It should be noted that the Santon AQMA was formally revoked in March 2018 and the Scunthorpe AQMA boundary was amended in March 2018, this should be reflected in the report. In addition the information presented in Table 6.14 Titled Annual Mean NO2 Diffusion Tube Monitoring Data (2017) is incorrect, clarification is therefore required in relation to the source of this data	The information on the AQMAs within the borough has been updated, although it should be noted that the Proposed Development does not affect the AQMAs in any case. The diffusion tube monitoring information detailed in Table 6.14 has been updated to ensure it is correct with regards to the data provided in the latest Annual Status Report.

6.6 Changes Since the Preliminary Environmental Information (PEI) Report

6.6.1 The changes in the Proposed Development since the publication of the PEI Report are presented in Chapter 4: Proposed Development. It is not considered that the changes described in that Chapter have any effect on this assessment as they relate to the route of the new gas pipeline which would not affect operational emissions and are covered by the assessment of construction impacts.

6.6.2 There have been no notable changes in the assessment methodology, since the PEIR. In addition, there have been no changes to either the traffic data used in the assessment, or the operational OCGT emissions data modelled.

6.6.3 An additional model run has been carried out, in order to provide a more realistic worst case assessment of the 24 hour NO_x impacts at ecological receptors, and additional figures have been provided to more clearly demonstrate the extent of the effects associated with the Proposed Development on identified ecological receptors.

6.7 Use of the Rochdale Envelope

6.7.1 A focussed use of the Rochdale Envelope approach has been adopted to present a worst case assessment of potential environmental effects of the different parameters of the Proposed Development that cannot yet be fixed. The parameters included within the Rochdale Envelope are described in Chapter 4: Proposed Development.

6.7.2 In the case of this assessment, the emission parameters for the OCGT units proposed by the OEMs under consideration have been compared and the unit considered to lead to the worst case predicted impacts has been used in the assessment.

6.7.3 The building dimensions included within the assessment are the maximum dimensions under consideration. It is considered that should the actual buildings be smaller in size, specifically in height than those used in the assessment, then this would have the potential to reduce the plume downwash effects associated with buildings in close proximity to the stack, therefore improving emission dispersion. This would lead to a reduction in the level of impact predicted in the assessment.

6.7.4 A range of stack heights (35m – 55m AOD) have been assessed and all resulted in impacts at the worst case human health receptor that could be considered negligible, largely due to the high level of thermal buoyancy associated with the stack emission (600°C). There is therefore potential for a lower stack to be used for the Proposed Development, should the maximum building dimensions be smaller than presented in Chapter 4, or if lower emission limits are achievable from the OCGT. However, a lower stack height would only be proposed that did not increase the level of effect on sensitive receptors from that presented in this assessment.

6.8 Baseline Conditions

Sensitive Receptors

6.8.1 Sensitive receptors have been restricted to those in the vicinity of the Proposed Development, with no receptors associated with the Existing Gas Pipeline, as no works to the pipeline are planned.

6.8.2 During the construction phase, based on IAQM guidance, receptors potentially affected by dust soiling and short-term concentrations of PM_{10} generated during construction activities are limited to those located within 350m of the nearest construction activity, and/ or within 50m of a public road used by construction traffic that is within 500m of the construction site entrances. Ecological receptors are limited to those located within 50m of the nearest construction activity and/ or within 50m of a public road used by construction traffic that is within 500m of the construction site entrances.

6.8.3 Receptors potentially affected by the exhaust emissions associated with construction phase vehicle movements are those located within 200m of a public road used by construction traffic to access the Site. It is assumed that construction traffic will access the Site by a new temporary access off Rosper Road.

6.8.4 Receptors potentially affected by operational emissions from the Proposed Development including local residential and amenity receptors have been identified through desk studies of local mapping and consultation. Isopleth figures of pollutant dispersion have been examined to identify the human health receptors that will receive the highest point source contributions surrounding the Proposed Development, and the assessment of impact has been made at these receptors, as it is considered that other receptors will experience lower impacts. The assessment also includes designated AQMAs within the defined Study Areas, described below.

6.8.5 Ecological receptors potentially affected by operational emissions have been identified through a desk study of Defra Magic mapping (Ref 6-19) and consultation (see Chapter 9: Ecology). Statutory designated sites (including SPAs, SACs, Ramsar sites and SSSIs up to 15km from the Proposed Development have been included in the assessment; and non-statutory designations; LWS and Sites of Nature Conservation Interest (SNCI) within 2km have been included in the assessment. Details of the sites and reasons for their designations are provided in Chapter 9: Ecology. The worst-case point source contributions at these receptors have been determined from the isopleth figures as described above.

6.8.6 Identified receptors are detailed in Table 6.12 for construction and operational phases, and are shown in Figures 6.1 and 6.2 (ES Volume II, Application Document Ref. 6.3). The receptors with the prefix 'R' are designated for human health. The receptors with the prefix 'E' are designated due to the ecological designation. Human health receptors R1, R8 and R13 to R19 are used for the construction traffic assessment; these receptors are representative of any resident affected by the construction traffic.

Table 6.12: Identified Receptors with Potential for Air Quality Impacts from the Proposed Development

ID	Receptor name	Receptor type	Grid Reference		Distance (km)[1] and direction
			X	y	
R1[c]	Hazel Dene	Residential	517330	417311	325m East
R2	Church Lane, North Killingholme	Residential	514763	417331	1.6km West
R3	Station House	Residential	517333	418345	890m Northeast
R4	Old Vicarage, North Garth	Residential	514428	418197	2.2km Northwest
R5	Manor Farm, North Killingholme	Residential	514515	417653	1.9km Northwest
R6	Westfield Farm, North Killingholme	Residential	514708	416785	1.7km West
R7	Staple Road, South Killingholme	Residential	515115	416417	1.5km Southwest
R8[c]	Humber Road, South Killingholme	Residential	515516	416120	1.3km Southwest
R9	East End Farm	Residential	515935	415730	1.3km Southwest
R10	Immingham	Residential	517765	415255	1.8km South

ID	Receptor name	Receptor type	Grid Reference		Distance (km)[1] and direction
			X	y	
R11	Station Road	Residential	517775	418445	1.3km Northeast
R12	Fairfield House, North Garth	Residential	514687	418769	2.3km Northwest
R13[c]	The Poplars	Residential	514376	415867	2.7km West
R14[c]	Ulceby Road	Residential	514606	415936	2.5km West
R15[c]	Cravens Lane	Residential	514715	414020	3.9km West
R16[c]	Town Street	Residential	515216	416117	1.9km West
R17[c]	Primitive Chapel Lane	Residential	515278	416071	1.9km West
R18[c]	Property north of Habrough	Residential	515237	414003	3.7km Southwest
R19[c]	Property on Station Road in Habrough	Residential	515087	414241	3.5km Southwest
E1[c]	Humber Estuary[c]	SAC, SPA, Ramsar	517600 to 519000	418700 to 417500	1.4km Northeast
E2[c]	North Killingholme Haven Pits[c]	SSSI	516851	419535	2km North
E3[c]	Kirmington Pits[c]	SSSI	510450	411815	8.3km Southwest
E4[c]	Kelsey Hill Gravel Pits[c]	SSSI	523840	426400	11km Northeast
E5[c]	Swallow Wold[c]	SSSI	516950	404990	12.3km South
E6[c]	Wrawby Moor[c]	SSSI	503350	411120	14.6km Southwest
E7[c]	Eastfield Railway[c]	LWS	515313	417108	1km West
E8[c]	Burkinshaws Covert[c]	LWS	516432	417874	400m North
E9[c]	Station Road Fields[c]	LWS	516569	417957	400m North
E10[c]	Rosper Road Pools[c]	LWS	517224	416937	245m Southeast
E11[c]	Chase Hill Wood[c]	LWS	515702	418875	1.6km Northwest
E12[c]	Mayflower Wood Meadow[c]	LWS	516000	415920	1.1km Southwest
E13[c]	Homestead Park Pond[c]	LWS/ SINC	517935	415625	1.7km Southeast
E14[c]	Eastfield Road Pit[c]	SINC	515350	417040	1km West

[1] All measurements taken as the closest point to the Red Line Boundary of the OCGT Power Station Site

[c] Denotes receptor carried forward to construction traffic assessment

Existing Air Quality

6.8.7 Existing air quality conditions in the vicinity of the Proposed Development have been evaluated through a review of local authority air quality management reports; Defra published data and other sources. As described in Section 6.3, the key pollutants of concern resulting from construction and operation of the Proposed Development are NO_x, NO_2, CO, PM_{10} and $PM_{2.5}$, therefore the assessment of baseline conditions considers these pollutants only.

Local Air Quality Management

6.8.8 Under the requirements of Part IV of the Environment Act, NLC have a duty to undertake the periodic review and assessment of local air quality within their administrative area. Over the course of its review and assessment process, NLC has declared two AQMAs

(Scunthorpe and Low Santon, both for PM_{10}) within its administrative area. The Low Santon AQMA was formally revoked in March 2018 and the Scunthorpe AQMA boundary was amended in March 2018. The Scunthorpe AQMA is located more than 5km from the Site and therefore is highly unlikely to be affected by any construction dust emissions which could potential result in particulate impacts. No further consideration of these AQMAs is therefore included in this assessment.

6.8.9 The adjacent local authority (i.e. NELC) has also declared two AQMAs (Immingham (also for PM_{10}) and Grimsby (for NO_2)). The Immingham AQMA was revoked in 2016, and again, given the distance from the site (over 2km) it is very unlikely that particulate impacts would occur from construction of the Proposed Development; operational particulate impacts would be negligible. The Grimsby AQMA is located over 10km to the southeast of the Site. Given the distance of all the AQMAs from the Site, it is considered that the Proposed Development would not result in significant impacts at these locations.

6.8.10 The 2018 Annual Status Report ('ASR') available from NLC (Ref 6-20) stated that during 2017 there were no recorded exceedances of the relevant NAQS objectives for NO_2, CO, PM_{10} or the $PM_{2.5}$ target within the area. The review and assessment process has not identified any air quality issues in the vicinity of the Site, nor the air quality study area surrounding it.

6.8.11 Automatic monitoring for NO_2 is undertaken by NLC at four locations within the borough, with two of the monitoring sites located within 2km of the Site (Killingholme School monitoring site located in South Killingholme and Killingholme Roadside monitoring site). Typically annual mean concentrations of NO_2 at the automatic monitoring sites within the vicinity of the Site have shown a reduction in NO_2 concentrations since 2012. Summary monitoring data from 2011 - 2017 is presented in Table 6.13.

Table 6.13: NLC Automatic Monitoring Data for NO_2 µg/m^3

Monitoring Site	2011 µg/m^3	2012 µg/m^3	2013 µg/m^3	2014 µg/m^3	2015 µg/m^3	2016 µg/m^3	2017 µg/m^3
CM9 Killingholme School	21.4	21.1	22.4	22.1	20.4	17.0	17.0
CM10 Killingholme Roadside	ND	ND	27.1	28.5	24.6	23.0	22.0

6.8.12 Provisional data for the Killingholme School monitoring site (CM9) for 2018 suggests that the annual average NO_2 concentration was 18µg/m^3 and therefore in line with the data shown in Table 6.13. The CM10 Killingholme Roadside site is now closed.

6.8.13 NLC also operates a number of NO_2 diffusion tubes within the borough including background, roadside and kerbside locations. The closest tubes to the Site are located within South Killingholme. Summary monitoring data, as reported in the ASR 2018 for 2017 is presented in Table 6.14 below.

Table 6.14: Annual Mean NO_2 Diffusion Tube Monitoring Data (2017)

Monitoring Site	Distance to Site (km)	NO_2 Concentration 2017 µg/m^3	Monitor type

Monitoring Site	Distance to Site (km)	NO_2 Concentration 2017 µg/m^3	Monitor type
DT13 Ulcerby Road, Killingholme	2.5	20	Roadside
DT14 School Road, Killingholme	2.3	27	Roadside
DT15 Humber Road, Chip Shop	1.7	19	Urban Background
DT16 Humber Road, LP 695	1.8	25	Roadside

6.8.14 Automatic monitoring for PM_{10} is undertaken at ten locations within the borough, although only one of these sites (CM9 Killingholme School is within 2km of the Site). There are no monitoring sites within the vicinity of the Site that monitor $PM_{2.5}$ or CO.

6.8.15 Typically annual mean concentrations of PM_{10} at the CM9 Killingholme School monitoring site have shown a reduction since 2012. Summary monitoring data from 2011 - 2017 is presented in Table 6.15.

Table 6.15: NLC Automatic Monitoring Data for PM_{10} in the Vicinity of the Site

Monitoring Site	2011 µg/m^3	2012 µg/m^3	2013 µg/m^3	2014 µg/m^3	2015 µg/m^3	2016 µg/m^3	2017 µg/m^3
CM9 Killingholme School	21.1	20.2	19.3	19.1	18.0	18.0	18.0

6.8.16 Provisional data for the Killingholme School monitoring site for 2018 suggests that the annual average PM_{10} concentration was 15µg/m^3 and therefore shows a reduction from the data shown in Table 6.15.

6.8.17 Background data has also been obtained from Defra published maps (Ref 6-21) for the locations of likely maximum impact from point source emissions from the Proposed Development, and at identified sensitive receptor locations. Background mapping data for 2015 (based on 2015 background maps) is conservatively assumed to be representative of the construction (2021 peak construction) and opening (2022) baselines; as general trends are showing a reduction in both NO_2 and PM_{10} concentrations over time this is considered to be a conservative assumption. Background data assumed for the maximum impact location from the point source emissions is provided in Table 6.16 and indicates NO_2, CO, PM_{10} and $PM_{2.5}$ concentrations within the vicinity of the Proposed Development are consistently well below the NAQS annual mean objectives.

6.8.18 Defra background data has also been obtained at the location of the Killingholme School Automatic Monitor, in order to compare the data with the monitored data.

Table 6.16: Defra Background Air Quality Data (Annual Mean) – 2015 (1km^2 average)

Location	Pollutant	2015 (µg/m^3) Assumed for Baseline and Future Opening Years
Maximum Impact Location (down-wind of the Site at 517500, 418500)	NO_2	17.4
	CO	113.1
	PM_{10}	14.3
	$PM_{2.5}$	9.4
Killingholme School Automatic Monitor	NO_2	13.5

Location	Pollutant	2015 (µg/m^3) Assumed for Baseline and Future Opening Years
(514500, 416500)	PM_{10}	15.4

Based on 2015 background-mapping except CO which is based on the 2001 background map, with the appropriate adjustment factors applied.

6.8.19 The Defra NO_2 and PM_{10} background mapping data for the Killingholme School location is lower than the automatic monitoring data in the same location for 2017.

6.8.20 The 2015 Defra background maps have also been consulted for each identified human health receptor location, with NO_2 concentrations ranging from 13.2 – 17.7µg/m^3 and PM_{10} concentrations ranging from 13.2 – 16.8µg/m^3. In order to carry out a conservative assessment, the concentrations measured during 2017 at the Killingholme School automatic monitoring station for both NO_2 and PM_{10} have been assumed to be representative of all human health receptors in the immediate vicinity of the Proposed Development, as these are generally higher than the Defra data.

6.8.21 Baseline pollutant concentrations at human health receptors show that concentrations of all pollutants are well below all national objective values for all pollutants, indicating that there are no potential breaches of the standards in the vicinity of the Proposed Development.

6.8.22 The baseline NO_x pollutant concentrations and acid and nutrient nitrogen deposition rates at the identified statutory designation ecological receptors have been obtained from APIS and are provided in Appendix 6A (ES Volume III, Application Document Ref. 6.4).

6.8.23 The data indicates that baseline NO_x concentrations at the closest statutory ecological receptor (Humber Estuary) is already well in excess of the Critical Level, with NO_x concentrations up to twice the annual average Critical Level being present in some areas in the vicinity of the Proposed Development.

6.8.24 All other ecological receptors are well within the daily mean and annual mean Critical Levels.

6.8.25 In addition, the baseline nutrient nitrogen deposition and acid deposition levels for most of the ecological receptors exceed the lower Critical Loads defined for the habitat types present.

6.9 Development Design and Impact Avoidance

Construction

Construction Environmental Management Plan

6.9.1 Emissions of dust and particulates from the construction phase of the Proposed Development will be controlled in accordance with industry best practice, through incorporation of appropriate control measures according to the risks posed by the activities undertaken, as determined through this assessment process. The management of dust and particulates and application of adequate mitigation measures will be enforced through a Construction Environmental Management Plan ('CEMP'). A framework CEMP is provided in Appendix 4A (ES Volume III, Application Document Ref. 6.4). The

Considerate Constructors Scheme ('CCS') will be adopted to assist in reducing pollution and nuisance from the Proposed Development.

6.9.2 Based on an initial assessment of the area of sensitivity to dust impacts and the likely risk of impacts arising from each of the key construction activities (earthworks, construction and 'trackout' of material onto roads (see Appendix 6A, ES Volume III), appropriate embedded measures to be implemented during construction (good site techniques drawn from the 'high risk' site schedule in IAQM guidance) that have been identified are:

- Avoid mechanical roughening or grinding of concrete surfaces;
- Store sand and aggregates in bunded areas and store cement powder and fine materials in silos;
- Use water suppression and regular cleaning to minimise mud on roads;
- Cover vehicles leaving the construction site that are carrying waste materials or spoil;
- Employ wheel wash systems at site exits;
- Restrict unmade road access;
- Use water suppression to control dust during earth moving activities;
- Minimise duration of storage of top soil or spoil during pipeline construction; and
- Prohibit open fires on Site.

6.9.3 Good practice will also be employed for the siting and operation of NRMM to control associated emissions, including:

- Minimise vehicle and plant idling;
- Locate static plant away from sensitive boundaries or receptors, in particular by retaining the existing landscaping embankment around the Site; and
- Minimise operating time outside of normal working hours/ daylight hours.

Operation

IED ELV Compliance

6.9.4 The Proposed Development will be designed such that process emissions to air comply with the ELV requirements specified in the IED. This will be regulated by the EA through the Environmental Permit required for the operation of the OCGT Power Station Site.

6.9.5 The OCGT technology under consideration incorporates lean NO_x burners, which enables the plant to meet the ELVs within IED without the requirement for further abatement.

Stack Height

6.9.6 The final stack height for the Proposed Development will be determined at the detailed design stage and will be optimised with consideration given to minimisation of ground-level air quality impacts and the visual impacts of a taller stack. This will be dependent upon the final stack location and building heights for the Proposed Development.

6.9.7 Dispersion modelling has been undertaken to determine the optimum stack height range through comparison of the maximum impacts at human health and ecological receptors.

6.9.8 The stack height assessment determines the required stack height relative to adjacent building heights. Off-site predicted concentrations at receptors are influenced by the relative dimensions of buildings and stacks, as well as the absolute stack height and the mass emission rate of any pollutant. For example, should the as-built building heights reduce from the maximum building heights currently used in the assessment, it may be possible to reduce the stack height accordingly, as the building downwash effects on the plume will reduce. A shorter stack height could then be utilised, provided that this would result in a comparable level of impact at receptor locations as presented in this assessment.

6.9.9 A 45m stack has been used as the optimum stack height and these results have been presented in the main assessment. Further information on the determination of the stack height is provided in Appendix 6A (ES Volume III, Application Document Ref. 6.4). A change in the stack height at the detailed design stage would only be proposed if this resulted in an equivalent level of impact at sensitive receptors as presented in this assessment. This optimum stack height is lower than the maximum stack height assessed in Chapter 10: Landscape and Visual, which assessed a maximum stack of 50m agl (56m AOD).

6.10 Likely Impacts and Effects

Construction

Assessment of Construction Dust

6.10.1 One residential receptor (high sensitivity), and three ecological receptors (all LWSs and therefore considered low sensitivity) have been identified within 350m of the site boundary or site exit (Table 6A.7, Appendix 6A, ES Volume III, Application Document Ref. 6.4). The assessment has considered risks from earthworks, construction and trackout (of mud to the road) and, based on the potential scale of activities and the sensitivity of the receptor area (as defined in Appendix 6A, ES Volume III), dust impacts are considered to be 'low risk' therefore mitigation measures appropriate to the scale of risk would be applied as part of the CEMP. A framework CEMP is provided in Appendix 4A (ES Volume III).

6.10.2 With the implementation of mitigation measures appropriate to the 'low risk' of dust impact potential from the Proposed Development construction phase activities, the effects of emissions to air on the identified receptors are considered to be not significant. Further detail of the assessment is provided in Appendix 6A (ES Volume III).

Assessment of Construction Traffic

6.10.3 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, and the number of exceedances of the 24-hour 50µg/m^3 PM_{10} air quality objective at the selected existing receptors during the 2021 Baseline + Committed Developments + Peak Construction scenario are listed in Table 6.17 below.

Table 6 Error! No text of specified style in document.**.17: Predicted Results for 2021 Base + Committed + Construction Scenario**

ID	Receptor Name	Annual Mean Pollutant Concentration (µg/m^3)			Number of Days of exceedance of PM_{10} 24-hour mean of 50 µg/m^3 (days)
		NO_2	PM_{10}	$PM_{2.5}$	
Annual Average NAQS µg/m^3		40	40	25	

ID	Receptor Name	Annual Mean Pollutant Concentration (µg/m^3)			Number of Days of exceedance of PM_{10} 24-hour mean of 50 µg/m^3 (days)
		NO_2	PM_{10}	$PM_{2.5}$	
R1	Hazel Dene	18.4	14.5	9.5	<1
R8	Humber Road, South Killingholme	19.6	14.9	9.8	<1
R13	The Poplars	19.0	14.7	9.6	<1
R14	Ulceby Road	20.1	15.0	9.8	<1
R15	Cravens Lane	17.5	14.3	9.4	<1
R16	Town Street	21.4	15.5	10.1	<1
R17	Primitive Chapel Lane	20.3	15.1	9.9	<1
R18	Property north of Habrough	17.5	14.3	9.4	<1
R19	Property on Station Road in Habrough	17.5	14.3	9.4	<1

6.10.4 Predicted pollutant concentrations in the 2021 Baseline + Committed Developments + Peak Construction scenario show that concentrations of all pollutants are below all national objective values for all pollutants, indicating that air quality in the vicinity of the Proposed Development would remain of a good quality.

6.10.5 The changes in the annual average concentrations between the 2021 Baseline + Committed Developments and 2021 Baseline + Committed Developments + Peak Construction scenarios are shown in Table 6.18 below.

Table 6 Error! No text of specified style in document.**.18: Predicted Changes in Air Quality Predicted for 2021 Base + Committed + Construction Scenario**

ID	Receptor Name	Annual Mean Pollutant Concentration (µg/m^3)			Number of Days of exceedance of 24-hour mean of 50 µg/m^3 (days)
		NO_2	PM_{10}	$PM_{2.5}$	
R1	Hazel Dene	<0.1	<0.1	<0.1	No change
R8	Humber Road, South Killingholme	<0.1	<0.1	<0.1	No change
R13	The Poplars	<0.1	<0.1	<0.1	No change
R14	Ulceby Road	<0.1	<0.1	<0.1	No change
R15	Cravens Lane	<0.1	<0.1	<0.1	No change
R16	Town Street	<0.1	<0.1	<0.1	No change
R17	Primitive Chapel Lane	<0.1	<0.1	<0.1	No change
R18	Property north of Habrough	<0.1	<0.1	<0.1	No change
R19	Property on Station Road in Habrough	<0.1	<0.1	<0.1	No change
E1	Humber Estuary SAC, SPA Ramsar	<0.01	Not assessed for ecological receptors, as beyond the Construction Traffic Study Area		
E2	North Killingholme Haven Pits SSSI	<0.01			
E3	Kirmington Pits SSSI	<0.01			
E4	Kelsey Hill Gravel Pits SSSI	<0.01			

ID	Receptor Name	Annual Mean Pollutant Concentration (µg/m^3)			Number of Days of exceedance of 24-hour mean of 50 µg/m^3 (days)
		NO_2	PM_{10}	$PM_{2.5}$	
E5	Swallow Wold SSSI	<0.01			
E6	Wrawby Moor SSSI	<0.01			
E7	Eastfield Railway LWS	<0.01			
E8	Burkinshaws Covert LWS	<0.01			
E9	Station Road Fields LWS	0.01			
E10	Rosper Road Pools LWS	0.06			
E11	Chase Hill Wood LWS	<0.01			
E12	Mayflower Wood Meadow LWS	0.01			
E13	Homestead Park Pond LWS/SINC	<0.01			
E14	Eastfield Road Pit SINC	<0.01			

6.10.6 The magnitude of the change in pollutant concentrations due to construction traffic on the road network due to the Proposed Development is predicted to be imperceptible for all pollutants at all human health receptor locations. A change of this magnitude is considered to have a negligible effect, which is considered to be not significant and would not compromised local planning policy.

6.10.7 The change in annual mean NO_2 concentration at the identified ecological receptors represent a maximum of <0.5% (of the Critical Level of 30µg/m^3) and therefore is considered to be imperceptible. The effect of construction traffic emissions on identified ecological receptors is not significant.

Assessment of Emissions Generated from Construction Site Plant (NRMM)

6.10.8 The assessment has identified no properties or designated habitat sites within 200m of the Site and therefore the potential for NRMM emissions within the Site to result in air quality impacts on local air quality receptors is considered to be negligible with reference to the DMRB screening criterion. The effect of NRMM emissions on air quality receptors is not significant.

Operation

Assessment of Operation Point Source Emissions

Human Health Impacts

6.10.9 The impact of point source emissions at human health receptors has been determined from isopleth figures of pollutant dispersion and maximum model output at discrete receptor locations (Tables 6.19 and 6.20). The maximum hourly, daily and annual mean predicted concentrations have been compared with the relevant AQALs, as summarised in Table 6.8; the detailed concentrations at all identified receptor locations are provided in Tables 6A.13 - 6A20 within Appendix 6A (ES Volume III, Application Document Ref. 6.4). Isopleth figures showing the maximum predicted annual and short-term process contributions of NO_2 are provided in Figures 6.3 - 6.4 (ES Volume II, Application Document Ref. 6.3).

6.10.10 The dispersion modelling includes a number of conservative assumptions in combination, including:

- Use of the worst-case year of meteorological data modelled;
- Maximum building sizes within the assessed Rochdale Envelope;
- Maximum annual operation for the plant configuration assessed (2,250 hours);
- Operation of the plant at IED emission limits, when annual average emissions are likely to be below these; and
- Conservative estimates of background concentrations for the commencement of operation at the receptor locations.

6.10.11 The following abbreviations are used in Tables 6.19 to 6.22:

- PC: this is the Process Contribution and represents the change caused by the Proposed Development;
- Headroom: this is the short term PC as a percentage of the available headroom between the baseline (ambient) concentration (AC) and the NAQS objective; and
- PEC: this is the Predicted Environmental Concentration and is PC plus baseline (ambient) concentration (AC). It is the concentration expected at a particular receptor once the effect of the Proposed Development is taken into account.

Table 6.19: Maximum Short-term PCs at the Worst-affected Human Health Receptor

Pollutant	NAQS ($\mu g/m^3$)	PC ($\mu g/m^3$)	PC/NAQS	Short-term AC[1] ($\mu g/m^3$)	PC as % of Headroom (PC/(NAQS – AC))	Effect Descriptor
NO_2 Hourly Mean (as the 99.79th %ile)	200	4.4	2%	34.0	3%	Negligible adverse
CO Hourly Mean (as the 100th %ile)	30,000	57.1	0.2%	226.2	0.2%	Negligible adverse
CO 8-hour Running Mean	10,000	28.5	0.3%	226.2	0.3%	Negligible adverse

[1] Twice the annual average ambient concentration, as per EA Guidance

6.10.12 The maximum hourly mean predicted concentration of NO_2 from the Proposed Development at the worst affected residential receptor (R3, Station House) represents 2% of the hourly mean NAQS objective and therefore is considered to be negligible adverse, as defined by the IAQM and EA criteria. The impacts at all other receptors are therefore less than this.

6.10.13 Whilst not required to be specifically assessed under the IAQM guidance, the maximum hourly mean predicted concentration of NO_2 at any off-site location is predicted to be 3% of the available headroom and therefore well below the NAQS hourly mean objective. Therefore no exceedance of the short-term NAQS objectives is predicted from process contributions from the Proposed Development, and the effects at all receptors can be considered to be not significant.

6.10.14 The maximum 8-hour and 1-hour mean process contributions of CO at identified receptors represent a negligible change, with worst-case PC of <0.3% of the 8-hour mean NAQS and 0.2% of the hourly mean EAL at all receptors.

Table 20: Long-term NO_2 Predicted Concentrations at Human Health Receptors

Receptor I.D.	Annual Average PC ($\mu g/m^3$)	PC/NAQs	Magnitude of Change	Annual Average AC ($\mu g/m^3$)	PEC/ NAQS	Effect Descriptor
R1	0.03	0.1%	Imperceptible	17.0	43%	Negligible
R2	0.01	<0.1%	Imperceptible		43%	Negligible
R3	0.1	0.3%	Imperceptible		43%	Negligible
R4	0.005	<0.1%	Imperceptible		43%	Negligible
R5	0.01	<0.1%	Imperceptible		43%	Negligible
R6	0.02	0.1%	Imperceptible		43%	Negligible
R7	0.02	<0.1%	Imperceptible		43%	Negligible
R8	0.02	<0.1%	Imperceptible		43%	Negligible
R9	0.01	<0.1%	Imperceptible		43%	Negligible
R10	0.005	<0.1%	Imperceptible		43%	Negligible
R11	0.06	0.2%	Imperceptible		43%	Negligible
R12	0.004	<0.1%	Imperceptible		43%	Negligible

6.10.15 The maximum long-term process contribution of nitrogen dioxide results in an imperceptible magnitude of change in the annual mean concentration at all human health receptors. The annual mean baseline concentration at all human health receptors is well below the NAQS objective, and with the Proposed Development, the maximum long-term predicted environmental concentration (PEC) is only 43% of the NAQS objective, therefore the effect of the Proposed Development emissions are described as negligible at all receptors (not significant).

Ecological Impacts

6.10.16 Figures showing the maximum predicted annual and daily process contributions of NO_x at the habitat receptors, and the habitat types present, are provided in Figures 6.5 - 6.6 (ES Volume II, Application Document Ref. 6.3).

6.10.17 The impact of process contributions of point source emissions at the identified ecological receptors has been determined from isopleth figures of pollutant dispersion and maximum model output at the receptor locations. The NO_x process contribution has been compared with the Critical Levels at the worst-affected statutory and non-statutory ecological receptors, as shown in Tables 6.21 – 6.22.

Table 6.21: Maximum 24 Hour NO_x PCs at the Worst-affected Ecological Receptor

Receptor ID	Critical Level ($\mu g/m^3$)	Daily Mean PC ($\mu g/m^3$)	PC/Critical Level	Effect Descriptor
E1 Humber Estuary SAC, SPA, Ramsar	75	7.41	10%	Negligible
E9 Station Road Fields LWS		8.16	11%	Minor

6.10.18 The maximum daily mean NO_x at any statutory designated receptor occurs at E1 Humber Estuary and represents 10% of the Critical Level, and therefore can be considered a negligible adverse impact. It should be noted that this maximum impact occurs where

saltmarsh and mudflat habitat types occur, and therefore it is considered that they are not sensitive to atmospheric nitrogen. Furthermore this represents a very conservative maximum operation of 24-hours per day, every day of the year, which would be more than the potential rolling average annual operation of circa 1,500 hours per year. It is very unlikely that the Proposed Development would be operational continuously for 24 hours, with operation likely to be only for a few hours per day. For comparison, an additional model has been run with operation of the Proposed Development only occurring for 8 hours per day (during the morning and afternoon peak times). The maximum daily mean NO_x at the E1 receptor reduces for this scenario to 2.9µg/m^3, or 4% of the Daily Critical Level, demonstrating that actual impacts are likely to be significantly lower than those reported.

6.10.19 The maximum daily mean PC of NO_x at any of the non-statutory LWS in the vicinity of the Proposed Development is predicted to be 11%, which is only 1% over the EA's guidance threshold to be able to be considered negligible. Again given the worst case assumption of 24-hour operation, every day of the year, when it is unlikely that 24 hour continuous operation will occur at any time, it is considered that the actual impacts of the Proposed Development would be less than this. For comparison, an additional model has been run with operation of the Proposed Development only occurring for 8 hours per day. The maximum daily mean NO_x at the E9 receptor reduces for this scenario to 2.6µg/m^3, or 3% of the Daily Critical Level, demonstrating that actual impacts are likely to be lower than reported. It is therefore considered that the Proposed Development's contribution to daily mean NO_x at all ecological receptors is considered to be not significant, in accordance with the assessment criteria applied.

Table 6.22: Maximum Annual Mean NO_x Predicted Concentrations

Receptor ID	Annual Mean PC (µg/m^3)	PC/ Critical Level	Change Descriptor	Annual Mean AC (µg/m^3)	PEC/ Critical Level	Effect Descriptor
E1	0.14	0.5%	Imperceptible	30.0 – 66.9	100 – 223%	Negligible
E2	0.06	0.2%	Imperceptible	24.4	82%	Negligible
E3	0.01	<0.1%	Imperceptible	19.9	66%	Negligible
E4	0.02	0.1%	Imperceptible	19.4	65%	Negligible
E5	0.005	<0.1%	Imperceptible	18.8	63%	Negligible
E6	0.009	<0.1%	Imperceptible	20.2	67%	Negligible
E7	0.04	0.1%	Imperceptible	21.9	73%	Negligible
E8	0.03	0.1%	Imperceptible	23.4	78%	Negligible
E9	0.06	0.2%	Imperceptible	23.4	78%	Negligible
E10	0.01	<0.1%	Imperceptible	28.1	94%	Negligible
E11	0.02	0.1%	Imperceptible	21.8	73%	Negligible
E12	0.02	0.1%	Imperceptible	22.3	74%	Negligible
E13	0.006	<0.1%	Imperceptible	24.2	81%	Negligible
E14	0.04	0.1%	Imperceptible	21.9	73%	Negligible

6.10.20 The average annual mean PCs of NO_x at all receptors (assuming continuous maximum emissions factored for the total annual operating hours) represents <1% of the annual Critical Level and therefore would be considered to be negligible according to the EA's significance criteria. The process contribution at all receptors is considered to be negligible adverse (not significant).

6.10.21 In addition to the above assessment of the ground level concentration at the identified ecological receptors, an assessment of deposition impacts at the identified statutory designated receptors has also been undertaken and is presented in Appendix 6A (ES Volume III, Application Document Ref. 6.4).

6.10.22 The maximum process contribution of nutrient nitrogen deposition at all identified ecological receptors is less than 0.1% of the Critical Load published for the most sensitive habitat type; this is considered to be negligible and not significant.

6.10.23 The process contribution of sulphur deposition at the ecological receptor is expected to be negligible as the emissions of SO_2 from natural gas combustion are negligible; therefore only the process contribution of nitrogen kilo-equivalent deposition has been compared with the acidity Critical Load, and the maximum nitrogen deposition process contribution to acid deposition at all ecological receptors is less than <0.1% of the Critical Load published for all habitat types; therefore the effect of nutrient nitrogen and acid deposition from the Proposed Development is described as negligible (not significant).

Decommissioning

6.10.24 The effects of eventual decommissioning are considered to be comparable to (or less than) those assessed for construction activities and would be controlled in a similar way to the proposed use of a CEMP, with the development and implementation of a Decommissioning Environmental Management Plan (DEMP).

Summary of Evaluation of Effects for the Proposed Development as a Whole

6.10.25 The effects of construction emissions from construction dust, with the application of best practice mitigation, as identified through the risk assessment described within this assessment, are considered to be not significant.

6.10.26 The effects of construction road traffic and on-site plant are also considered to be not significant. Therefore the effects of construction activities on air quality from the Proposed Development as a whole are considered to be not significant.

6.10.27 The operational point source emissions effects on identified receptors have been determined to have a negligible adverse effect and therefore the operational effects are considered to be not significant.

6.10.28 The effects of eventual decommissioning are considered to be comparable to (or less than) those assessed for construction activities and are therefore considered to be not significant.

6.10.29 The effects on air quality from the Proposed Development as a whole are therefore not significant.

6.11 Mitigation and Enhancement Measures

6.11.1 The management of dust and particulates and the application of adequate mitigation measures will be enforced through the CEMP, and through the application of appropriate mitigation according to the risk of dust emissions from Site activities as identified in this assessment. A framework CEMP is included with this ES to support the Application (as Appendix 4A), and a Requirement included in the draft DCO will secure the submission and approval (prior to construction), and then implementation of a final CEMP.

6.12 Limitations or Difficulties

6.12.1 No technical limitations or difficulties that could have implications for the assessment were encountered.

6.13 Residual Effects and Conclusions

Construction and Decommissioning

6.13.1 The air quality assessment of construction impacts assumes that the measures outlined within the Development Design and Impact Avoidance section of this Chapter would be incorporated into the design of the Proposed Development, as they are standard best practice measures that are routinely applied across UK construction sites. No additional mitigation has been identified as necessary for the construction phase of the Proposed Development. For this reason, the residual effects would be as reported within section 6.10 (i.e. not significant).

6.13.2 Consistent with construction mitigation, it has been assumed that relevant best practice mitigation measures would be in place during any decommissioning works. No additional mitigation has been identified as necessary for the decommissioning phase of the Proposed Development.

Operation

6.13.3 The air quality assessment of impacts during operation has assumed that the ELVs will be met for the operational plant as required under IED, and in accordance with use of BAT under the environmental permitting regime. No additional mitigation has been identified as necessary for the operational phase of the Proposed Development. For this reason, the residual effects would be as reported within Section 6.10 (i.e. not significant).

6.14 References

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Ref 6-7 North Lincolnshire Council (2011). North Lincolnshire Local Development Framework Core Strategy.

Ref 6-8 North Lincolnshire Council (2016). North Lincolnshire Local Development Framework Housing and Employment Land Allocations Development Plan Document.

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Ref 6-10 Department for Environment Food and Rural Affairs (2018). Local Air Quality Management Technical Guidance TG(16).

Ref 6-11 Institute of Air Quality Management (2017). Land-Use Planning & Development Control: Planning For Air Quality v.1.2.

Ref 6-12 Institute of Air Quality Management (2014). Guidance on the Assessment of Dust from Demolition and Construction.

Ref 6-13 The Highways Agency (now Highways England). (2007). Design Manual for Roads and Bridges, Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1, HA 207/07, Air QualityBSi (1994). British Standard 6069-2:1994 – Characterisation of air quality glossary.

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Ref 6-16 Cambridge Environmental Research Consultants (CERC) (2017), ADMS Roads and ADMS 5 Validation Papers, Available at:: http://www.cerc.co.uk/environmental-software/model-validation.html *[Accessed September 2018*]

Ref 6-17 Air Quality Consultants (2003) Analysis of the Relationship Between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites.

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Ref 6-19 Defra *et al* (2013). MAGiC, (Available at: www.magic.gov.uk *[Accessed September 2018]*)

Ref 6-20 North Lincolnshire Council (2017). Annual Status Report 2018.

Ref 6-21 Defra Background mapping (Available at: https://uk-air.defra.gov.uk/data/laqm-background-home *[Accessed September 2018]*)