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7.0 AIR QUALITY

7.1 Introduction

7.1.1 This chapter of the Environmental Statement (ES) addresses the potential effects of the Proposed Development on air quality. Emissions associated with combustion plant have the potential to affect human health and sensitive ecosystems, and construction could give rise to potential localised air quality effects from traffic and dust generation if not appropriately managed. This chapter describes the potential environmental effects, including those that are likely to be significant associated with releases to atmosphere during the construction, operation (including maintenance), and decommissioning phases of the Proposed Development.

7.1.2 The assessment considers:

- the potential for particulate matter (dust deposition and PM₁₀ size fractions, which are particulate matter of 10 µm diameter or less) related amenity issues to arise during construction and decommissioning;
- the effects on air quality from traffic movements related to the construction and decommissioning of the Proposed Development;
- the effects from the Proposed Development during operation, with consideration of potential impacts at sensitive human receptors;
- identification of suitable stack heights that avoid likely significant effects to air quality at identified sensitive resources/ receptors;
- the effects on air quality from traffic movements related to the operation of the Proposed Development; and
- the potential for particulate matter (dust deposition and PM₁₀ size fractions) and odour emissions to give rise to amenity effects during operation of the Proposed Development.

7.1.3 The detailed dispersion modelling of impacts due to emissions to air from the stacks and other emission sources is presented in detail within a separate technical air quality impact assessment report (Appendix 7A in ES Volume III, Document Ref. 6.4). This chapter refers to the technical report where required to provide quantitative evidence of the baseline and predicted magnitude of changes in pollutant concentrations, based on conservative assumptions.

7.1.4 This chapter is supported by Figures 7.1 to Figure 7.4 in ES Volume II (Document Ref. 6.3) and Appendices 7A and 7B in ES Volume III (Document Ref. 6.4) which detail the dispersion modelling undertaken and the human health risk assessment respectively.

7.1.5 The impact on designated nature conservation sites associated with emissions from the Proposed Development has been modelled and considered as part of this initial air quality assessment. The significance of the predicted effects is also discussed within Chapter 10: Ecology.

7.1.6 The potential for significant cumulative effects of stack sources and road traffic sources is discussed in Chapter 17: Cumulative and Combined Effects.

7.2 Legislation and Planning Policy Context

Legislative Background

Air Quality Legislation

7.2.1 The principal air quality legislation within the United Kingdom is the Air Quality Standards Regulations 2010 ('the 2010 Regulations'), which transposes the requirements of the European Ambient Air Quality Directive 2008 and the 2004 fourth Air Quality Daughter Directive. The 2010 Regulations set air quality limits for a number of major air pollutants that have the potential to impact public health, such as nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO) and particulate matter (PM₁₀). The 2010 Regulations also include an exposure reduction objective for PM_{2.5} in urban areas and a national target value for PM_{2.5} (PM_{2.5} is particulate matter of 2.5µm diameter or less).

7.2.2 The Environment Act 1995 requires the UK Government to produce a National Air Quality Strategy (NAQS), set out in 2011 (Department for Environment, Food and Rural Affairs (Defra), 2011)) and most recently reviewed in the 2019 Clean Air Strategy (Defra, 2019a), containing air quality objectives and timescales to meet those objectives. These objectives apply to outdoor locations where people are regularly present and do not apply to occupational, indoor or in-vehicle exposure. The NAQS objective values that have been adopted as assessment criteria (hereafter referred to as Air Quality Standard (AQS) values) are set out in Table 7.1 in relation to human health, and Table 7.2 in relation to ecological sites.

Table 7.1: National Air Quality Strategy Objectives - protection of human health

POLLUTANT	SOURCE	CONCENTRATION (µg/m ³)	MEASURED AS
NO ₂	European Union (EU) Air Quality Limit Values	40	Annual mean
		200	1-hour mean, not to be exceeded more than 18 times per year
PM ₁₀	EU Air Quality Limit Values	40	Annual Mean
		50	24-hour mean, not to be exceeded more than 35 times a year
PM _{2.5}	EU Air Quality Limit Values	25	Annual mean
SO ₂	UK National Air Quality Objective	266	15-min mean, not be exceeded more than 35 times a year

POLLUTANT	SOURCE	CONCENTRATION ($\mu\text{g}/\text{m}^3$)	MEASURED AS
	EU Air Quality Limit Values	350	1-hour mean, not to be exceeded more than 24-times a year
	EU Air Quality Limit Values	125	24-hour mean, not to be exceeded more than 3 times a year
Benzene	UK National Air Quality Objective	16.25	Running annual mean
	EU Air Quality Limit Values	5	Annual mean
CO	EU Air Quality Limit Values	10,000	Maximum daily running 8-hour mean
Polyaromatic hydrocarbons (PAH), as benzo[a]pyrene (BaP)	EU Air Quality Target Value	0.001	Annual mean
	UK National Air Quality Objective	0.00025	Annual mean
Lead (Pb)	EU Air Quality Limit Values	0.5	Annual mean
	UK National Air Quality Objective	0.25	Annual mean
Arsenic (As)	EU Air Quality Target Values	0.006	Annual mean
Cadmium (Cd)	EU Air Quality Limit Values	0.005	Annual mean

Table 7.2: Critical Levels for the protection of vegetation and ecosystems

POLLUTANT	SOURCE	CONCENTRATION ($\mu\text{g}/\text{m}^3$)	MEASURED AS	NOTES
Ammonia (NH_3)	Environment Agency Environmental Permit Guidance	1	Annual mean	For sensitive lichen communities & bryophytes and ecosystems where lichens and bryophytes are an important part of the ecosystem's integrity
		3	Annual mean	For all higher plants (all other ecosystems)
SO_2	Environment Agency Environmental Permit Guidance	10	Annual mean	For sensitive lichen communities & bryophytes and ecosystems where lichens and bryophytes are an important part of the ecosystem's integrity
		20	Annual mean	For all higher plants (all other ecosystems)
NO_x (as NO_2)	Environment Agency Environmental Permit Guidance	30	Annual mean	-
		75	Daily mean	-
Hydrogen fluoride (HF)	Environment Agency Environmental Permit Guidance	<5	Daily mean	-
		<0.5	Weekly mean	-

7.2.3 The Environment Act 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.

- 7.2.4 No AQMAs have been declared for the Site or surrounding areas (the nearest being 5.2 km to the south-east of the Site) and based on Defra forecast models and local authority monitoring data, no exceedances of the EU standards have been identified in the vicinity of the Site, as the air quality is generally good.

Environmental Permitting Regulations

- 7.2.5 The Environmental Permitting (England and Wales) Regulations 2016 (EPR) apply to new and existing installations that fall under the regime and transpose the requirements of the EU Industrial Emissions Directive (IED) into UK legislation. Under the IED and EPR, the operator of an installation covered by the IED is required to employ Best Available Techniques (BAT) for the prevention or minimisation of emissions to the environment, to ensure a high level of protection of the environment as a whole.

Industrial Emissions Directive

- 7.2.6 The Integrated Pollution Prevention Control Reference Document on the Best Available Techniques for Waste Incineration (BREF) (European Commission (EC), 2006) provides operational limits and controls to which plants must comply. The Proposed Development will be regulated under the Industrial Emissions Directive (IED) and in accordance with the waste incineration BREF. Consideration has also been given to the revised draft of the waste incineration BREF (version D1, published December 2019) and the BAT conclusions within it. This document has been published, but not yet formally adopted by the EU. At this point, the recommendations of the BREF will become enforceable through Environmental Permits and the Environment Agency (EA) would set specific limits on the Environmental Permit based on the BAT-associated emission levels (BAT-AELs).
- 7.2.7 The design of the flue gas treatment system will be fully compliant with current legislation, meeting the requirements of BAT as well as the EA guidance on risk assessment for environmental permits and the IED. In accordance with Article 15, paragraph 2 of the IED, the emission limits that the Proposed Development will be designed to meet are based on BAT. BAT-AELs are included in the 2019 published waste incineration BREF currently awaiting formal adoption and these have been applied in the air impact assessment accordingly.

Sensitive Ecosystems

- 7.2.8 The UK is bound by the terms of the European Birds and Habitats Directives and the Ramsar Convention. The Conservation of Habitats and Species Regulations 2017 ('the 2017 Regulations') provide for the protection of European Sites created under these, i.e. Special Areas of Conservation (SACs) designated pursuant to the Habitats Directive, and Special Protection Areas (SPAs) and provisional SPAs (pSPAs) classified under the Birds Directive. The 2017 Regulations apply specific provisions of the European Directives to SACs, and candidate SACs (cSACs), which requires these sites to be given special consideration, and for further assessment to be undertaken for any development which is likely to lead to a significant effect upon them (see Regulation 63).

Special consideration within this chapter has also been given to SPAs, pSPAs and Ramsar sites designated as wetlands of international importance.

- 7.2.9 The legislation concerning the protection and management of designated sites and protected species within England is set out within the provisions of the 2010 Regulations, the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000 (as amended).

Planning Policy Context

National Planning Policy

- 7.2.10 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 (NPS) for Energy NPS EN-1 (Department of Energy and Climate Change, 2011a) and the National Policy Statement for Renewable Energy Infrastructure EN-3 (Department of Energy and Climate Change, 2011b) are relevant to the Proposed Development.

- 7.2.11 NPS EN-1 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).

- 7.2.12 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.

7.2.13 The revised National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2019) concisely sets out national policies and principles on land use planning. Paragraph 103 of the NPPF states that:

“The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health.”

7.2.14 Air quality is considered as an important element of the natural environment. Air quality in the UK has been managed through the Local Air Quality Management regime using national objectives. 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.”

7.2.15 The Planning Practice Guidance (PPG) was updated on 24 July 2018 (Ministry of Housing, Communities & Local Government, 2018b), with specific reference to air quality, which was published on 6 March 2014. 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.

7.2.16 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 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.*
- *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.”*

7.2.17 Regarding 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

7.2.18 The North East Lincolnshire Local Plan 2013 to 2032 (adopted 2018) was considered where relevant during the completion of the air quality assessment.

Other Guidance

7.2.19 The EA Risk Assessments for Specific Activities: Environmental Permits guidance (Defra and EA, 2018d) provides guidance 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 NAQS objective values (, as well as criteria values for a range of other substances not included in regulations. The Environmental Standards adopted for use in this assessment as AQS, in addition to the NAQS objective value, are set out in Table 7.1 and Table 7.2 above and Table 7.3 below.

Table 7.3: Environmental assessment levels (Environment Standards) – protection of human health

POLLUTANT	SOURCE	CONCENTRATION (µg/m³)	MEASURED AS
CO	EA Environmental Standards	30,000	1-hour maximum
Hydrogen chloride (HCl)	EA Environmental Standards	750	1-hour maximum

POLLUTANT	SOURCE	CONCENTRATION ($\mu\text{g}/\text{m}^3$)	MEASURED AS
HF	EA Environmental Standards	16	Monthly mean
		160	1-hour maximum
Mercury (Hg)	EA Environmental Standards	0.25	Annual mean
		7.5	1-hour maximum
Antimony (Sb)	EA Environmental Standards	5	Annual mean
		150	1-hour maximum
As	EA Environmental Standards	0.003	Annual mean
Cr, as Cr (II) compounds and Cr (III) compounds	EA Environmental Standards	5	Annual mean
		150	1-hour maximum
Cr (VI), oxidation state in PM_{10} fraction	EA Environmental Standards	0.0002	Annual mean
Manganese (Mn)	EA Environmental Standards	0.15	Annual mean
		1,500	1-hour maximum
Nickel (Ni)	EA Environmental Standards	0.02	Annual mean
Vanadium (V)	EA Environmental Standards	5	Annual mean
		1	1-hour maximum
NH_3	EA Environmental Standards	180	Annual mean
		2,500	1-hour maximum
Polychlorinated biphenyls (PCBs)	EA Environmental Standards	0.2	Annual mean
		6	1-hour maximum

7.2.20 Defra has also published Local Air Quality Management (LAQM) Technical Guidance TG (16) (Defra, 2016) to assist local authorities in fulfilling their duties in relation to LAQM. Parts of this guidance, and associated tools, are also useful in assessing the impacts of individual developments within the planning process.

7.2.21 The Highways Agency (HA) (now Highways England publication- the Design Manual for Roads and Bridges (DMRB) Assessment Guidance HA207/07 (HA, 2007), has been used to screen potential traffic air quality impacts to determine those impacts that may require more detailed assessment, and in the assessment of traffic air quality effects and the evaluation of significance. The recent

replacement of Highways England’s DMRB assessment guidance with LA-105 (HE, 2019) has not introduced any material changes to the assessment methods or criteria used in this assessment.

7.2.22 The Institute of Air Quality Management (IAQM) has published several guidance documents relating to the potential effects of dust generation during construction works and development control (IAQM, 2014, 2016 and 2017).

7.3 Assessment Methodology and Significance Criteria

Overview

7.3.1 Full details of the methodology and approach taken in respect of this assessment are provided within Appendix 7A in ES Volume III (Document Ref. 6.4).

7.3.2 The technical assessment report within Appendix 7A in ES Volume III (Document Ref. 6.4) provides a detailed description of the definition of sensitive human receptors, definition of sensitive ecological receptors, the methodology for the dispersion modelling of stack emissions and the methodology for screening operational and construction traffic changes.

7.3.3 A comparison of the effects between the Consented Development and the Proposed Development is provided in Section 7.6. There is little change between the Consented Development design and the Proposed Development design with respect to air quality (i.e. the air emissions and stack heights are exactly the same, and only minor changes have been made to the layout as shown in Figure 4.3 in ES Volume II, Document Ref. 6.3). Where there have been minor changes in the baseline data between the PEI Report and the ES (for example, background pollutant concentrations), the most recent data has been used.

Consultation

7.3.4 The Environmental Health Department at North East Lincolnshire Council (NELC) was contacted between the 8th and 10th August 2018 and consulted on the approach to be taken to the air quality assessment for the Consented Development. At the request of NELC, the three month baseline NO₂ survey proposed by AECOM was extended to six months.

7.3.5 The EA was consulted (through face to face meetings and telephone calls with the Sustainable Places and Permitting teams) to agree the approach to preparing the Consented Development EIA. Consultation on the Proposed Development EIA has continued throughout the DCO process.

7.3.6 A summary of the Section 42 consultation responses received in respect of the PEI Report relevant to the air quality assessment are presented in Table 7.4 below.

Table 7.4: Summary of Section 42 consultation comments and responses

CONSULTEE/ DATE	SUMMARY	RESPONSE
Environment Agency (6 th December 2019)	In respect of PEI Report Chapter 7: Air Quality the EA made the following comments:	Noted. No changes required to the air quality assessment.

CONSULTEE/ DATE	SUMMARY	RESPONSE
	<p>The proposed development will require a permit to operate under the Environmental Permitting Regulations 2016.</p> <p>Ash handling - The permit will prevent these two types of ash being mixed and will contain conditions to ensure that there are no significant emissions from the site from the handling or treatment of the ash.</p>	
<p>Natural England (13th December 2019)</p>	<p>Natural England notes that a detailed air quality assessment has been carried out and is satisfied that all of the relevant information has been provided. Alongside Appendix 10G Habitats Regulations Assessment Signposting document (ES Volume III, Document Ref. 6.4) dated October 2019, your assessment concludes that Likely Significant Effects cannot be ruled out at this stage. This is because the assessment demonstrates that critical levels/ loads for NO_x (both 24 hour mean and annual mean), NH₃ (annual mean) and Nutrient Nitrogen Deposition Rates (annual mean) are exceeded at 3 locations with Humber Estuary (Atlantic Salt Meadow) habitat. On the basis of the information provided, Natural England concurs with this view and considers that an appropriate assessment will be required as part of the Habitats Regulations Assessment Process. However, we note that the Predicted Environmental Concentration/ deposition (PEC) does not exceed 100% of any of the critical loads/levels.</p> <p>We are aware that the assessment of cumulative impacts for this Preliminary Environmental Information Report (dated October 2019) has not included</p>	<p>The Habitats Regulations Assessment (HRA) Signposting document is now provided as Document Ref. 5.8. The conclusions of the final HRA Signposting Document remain unchanged since the PEI Report was published.</p> <p>The cumulative air quality assessment has now been updated to include</p>

CONSULTEE/ DATE	SUMMARY	RESPONSE
	<p>a consideration of the emissions to air from the proposed Sustainable Transport Fuels Facility adjacent to the proposed site, or the proposed VPI Immingham Open Cycle Gas Turbine Development Consent Order which have been reported on since the assessment of this proposed development was undertaken.</p> <p>Therefore, we anticipate that these will be included in the final Environmental Statement. In addition, an updated in-combination assessment to include impacts from air quality should also be considered within the Habitats Regulations Assessment process.</p> <p>Finally, although we do not normally comment on Local Wildlife Sites as these fall within the remit of the Local Authority, we note that critical levels/ loads (for NO_x, NH₃ and Nutrient Nitrogen Deposition Rates) are exceeded at Healing Cress Beds, Stallingborough Fish Ponds and Sweedale Croft Drain and the Nutrient Nitrogen Deposition rates exceed 100% of the PEC. Natural England do not hold any detailed information on these sites and they fall out with the Habitats Regulations process, however, these impacts should be considered further by the relevant authority.</p>	<p>these other potential developments, and this is reported in Appendix 7A (ES Volume III, Document Ref. 6.4) and Chapter 17: Cumulative and Combined Effects.</p> <p>The HRA Signposting Document has also been updated to reflect the additional cumulative air quality assessment.</p> <p>The scope of the ecological impact assessment has been agreed with NELC (see Chapter 10: Ecology).</p>
<p>Public Health England (PHE) (10th December 2019)</p>	<p>We have reviewed the PEIR and can confirm that we are satisfied with the approach taken in preparing this report.</p> <p>With respect to potential emissions to air from the proposed development, air quality modelling indicates that worst case short and long-term impacts will be insignificant at all identified residential receptors.</p>	<p>Noted</p>

CONSULTEE/ DATE	SUMMARY	RESPONSE
	<p>A stack height of 100 m was considered for the main air quality modelling assessment to account for dispersion of emissions. The worst-case assumptions include modelling based upon emissions at Industrial Emissions Directive (IED) limit values and a worst-case meteorological year, including cumulative impacts from existing sources of pollution.</p> <p>The current submission does not include a specific section summarising the potential public health impacts. We understand that the promoter will wish to avoid unnecessary duplication and that many issues including air quality, emissions to water, waste, contaminated land etc. will be covered elsewhere in the ES, but we believe that the summation of relevant issues into a specific section of the report provides a focus which ensures that public health is given adequate consideration and due weight in the planning process.</p> <p>Such a section should summarise key information, risk assessments, outline any proposed mitigation, and identify any residual impacts or uncertainties. Compliance with the requirements of National Policy Statements and relevant guidance and standards should also be highlighted.</p>	<p>A summary of potential impacts on human health has been prepared to meet these requirements and is included within Chapter 18: Human Health.</p>

Summary of Key Changes to Chapter 7 since Publication of the Preliminary Environmental Information (PEI) Report

- 7.3.7 The PEI Report was published for statutory consultation in November 2019, allowing consultees the opportunity to provide informed comment on the Proposed Development, the assessment process and preliminary findings through a consultation process prior to the finalisation of this ES.
- 7.3.8 The key changes since the PEI Report was published are summarised in Table 7.5 below.

Table 7.5: Summary of key changes to Chapter 7 since publication of the PEI Report

SUMMARY OF CHANGE SINCE PEI REPORT	REASON FOR CHANGE	SUMMARY OF CHANGE TO CHAPTER TEXT IN ES
Update of construction and operational road traffic air quality impacts.	Revised traffic data due to the inclusion of the South Humber Bank Link Road in the future baseline scenario for the transport assessment (see Chapter 9: Traffic and Transport), as requested by NELC Highways Officers.	Tables 7.10 - 7.11 and 7.14 – 7.19 have been updated to reflect the updates to the traffic data. No change to assessment conclusions.
Update of cumulative impact assessment to include the proposed Sustainable Transport Fuels Facility (Ref DM/0664/19/FUL) and proposed VPI Immingham OCGT DCO (PINS Ref EN10097) that were not included within the assessment of cumulative air quality impacts that was published in the PEI Report.	To complete the cumulative air quality assessment.	Cumulative effects are described in Chapter 17: Cumulative and Combined Effects. Further detail is presented in Appendix 7A in ES Volume III (Document Ref. 6.4).

Impact Assessment and Significance Criteria

- 7.3.9 The potential emissions to air from construction and operation 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. This 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.
- 7.3.10 The air quality assessment does not use the standard matrix for classification of effects as set out in Chapter 2: Assessment Methodology as specific guidance is used to determine air quality effects (as set out below), however to enable cross-reference between all technical chapters of the ES the same terminology has

been adopted whereby effects are described as negligible, minor, moderate or major. Effects can also be adverse or beneficial.

- 7.3.11 The process and traffic emissions assessments have been made with reference to the AQS values laid out in the Air Quality Standards Regulations or environmental standards set out within EA guidance.

Development Scenarios

- 7.3.12 As outlined in Chapter 5: Construction Programme and Management there are three construction programme scenarios being considered for the purposes of the EIA. The assessment of air quality impacts during construction considers dust and emissions from activities and plant on Site, and construction traffic emissions.

- 7.3.13 The assessments of plant emissions and dust are not affected by the starting date of the construction period, so the assessment of these impacts is relevant to all three construction programme scenarios. However, the assessment of construction traffic emissions could be affected by a change to the starting date of the construction period because baseline traffic flows and background air quality change year on year. Air quality is predicted to improve each year, whereas base traffic flows are predicted to increase each year. The earliest construction scenario is considered to be the worst case for the construction traffic emissions assessment because of the higher vehicle emission factors and higher background concentrations. The assessment of construction traffic emissions therefore considers construction peak traffic in 2021 as a worst case.

- 7.3.14 As described in Section 7.5, the operational air quality assessment is based on a design with two stacks with fixed heights of 102 m AOD. Rochdale Envelope parameters for building dimensions have also been adopted as a worst case for the assessment. The building dimensions used in the air quality assessment are detailed in Appendix 7A (ES Volume III, Document Ref. 6.4).

Extent of Study Area

- 7.3.15 The Study Area for the stack emissions from the operational development extends up to 10 km from the Site, in order to assess the potential impacts on sensitive human health and ecological receptors, in line with the EA risk assessment methodology (Defra and EA, 2017). However, in practice the predicted impacts become negligible within a much smaller distance from the Site (circa 2 km).

- 7.3.16 The Study Area for construction dust and Non-Road Mobile Machinery (NRMM) emissions has been applied, in line with IAQM guidance (IAQM, 2014), extending:

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

Assessment of Dust Emissions Generated During Construction Works

- 7.3.17 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 within the Site, and the nature of the actual activity being carried out.

7.3.18 At present, there are no statutory UK or EU standards relating to the assessment or control of dust.

7.3.19 The emphasis of the regulation and control of construction dust is therefore through the adoption of good working practice on Site. It is intended 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 which is detailed further in Section 7.5 of this chapter.

7.3.20 The IAQM provides guidance for good practice qualitative assessment of risk of dust emissions from construction and demolition activities (IAQM, 2014). The guidance considers the risk of dust emissions from unmitigated activities to cause human health (PM₁₀) 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.

7.3.21 The assessment undertaken for this chapter is consistent with the overarching approach to the assessment of the impacts of construction of the Proposed Development as outlined in Chapter 2: Assessment Methodology, and the application of example descriptors of impact and risk set out in IAQM guidance. It considers 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 Site boundary;
- identify the magnitude of impact through consideration of the scale, duration and location of construction activities being carried out;
- 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.

7.3.22 The criteria for assessment of magnitude, sensitivity and risk are summarised in Tables 7A.1-7A.5 in Appendix 7A in ES Volume III (Document Ref. 6.4).

Assessment of Construction and Operational Road Traffic

- 7.3.23 The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, as well as the typical combustion products of CO, PM₁₀ and PM_{2.5} in exhaust emissions. Similarly, but to a lesser extent, any sulphur in the fuel can be converted to sulphur dioxide (SO₂) that is then released to atmosphere. In addition, 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. Nitrogen dioxide is associated with adverse effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.
- 7.3.24 Although SO₂, 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 the release concentrations of these pollutants are low enough so as to not be likely to give rise to significant effects. In addition, no areas within the administrative boundaries of NELC are considered to be at risk of exceeding the relevant objectives for these pollutants, and the risks to achievement of the relevant air quality objectives in the vicinity of the Proposed Development are considered negligible. Emissions of SO₂, CO, benzene and 1, 3-butadiene from road traffic are therefore not considered further within this assessment.
- 7.3.25 Exhaust emissions from road vehicles may affect the ambient concentrations of the principal road traffic pollutants, nitrogen dioxide, PM₁₀ 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 air quality impacts.
- 7.3.26 DMRB LA105 – Air quality guidance published by Highways England (HE, 2019) 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 Duty Vehicles (HDV, all vehicles greater than 3.5t gross weight, including buses) movements are considered further through quantitative assessment; guidance published by the IAQM (IAQM, 2017) sets out a criteria of a change of 500 Light Duty Vehicles (LDV, all vehicles less than 3.5t gross weight) or 100 HDV (outside of an AQMA). For changes in traffic below these criteria, significant changes in air quality are not expected. The screening criterion in the DMRB also states that only properties and habitat sites within 200 m of roads should be considered in traffic assessments. This guidance has been utilised for both the construction and opening year assessments.
- 7.3.27 Predicted vehicle movements during the construction of the Proposed Development are shown in Table 7.6 and are detailed in Chapter 9: Traffic and Transport. The change in vehicle movements is predicted to peak at 312 one-way HDV movements accessing the Site via A180, A1173, Kiln Lane, Hobson Way and South Marsh Lane. There are several identified sensitive receptors

within 200 m of affected links, and therefore a detailed assessment of construction traffic impacts has been conducted.

- 7.3.28 This assessment has used the latest version of dispersion model software 'ADMS-Roads' (v4.1.1.0) 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 (Cambridge Environmental Research Consultants (CERC), 2018).
- 7.3.29 The derivation of the traffic data used in this assessment is set out in Chapter 9: Traffic and Transport. The data used in the road traffic dispersion modelling has been provided for the following scenarios, with other proposed developments' traffic forecasts (referred to as 'committed development' traffic) included in the future scenarios as per the transport assessment:
- 2017 baseline traffic (for model verification process);
 - 2021 baseline traffic + committed development traffic (the total future baseline traffic flows for the Construction assessment);
 - 2021 baseline traffic + committed development traffic + peak construction traffic from the Proposed Development (the total traffic flows with the Proposed Development for the Construction assessment);
 - 2023 baseline traffic + committed development traffic (the total future baseline traffic flows for the Operation assessment); and
 - 2023 baseline traffic + committed development traffic + operational traffic from the Proposed Development (the total traffic flows with the Proposed Development for the Operation assessment).
- 7.3.30 The future decommissioning baseline scenario has not been assessed due to the lack of future traffic projections for when the Proposed Development is likely to be decommissioned (after 2053).
- 7.3.31 The traffic data used in the modelling of road traffic emissions are presented in Annex B of Appendix 7A in ES Volume III (Document Ref. 6.4).
- 7.3.32 Data in the form of traffic flows, composition (percentage heavy duty vehicles) and speed for the existing junction layout and the proposed layout have been used in modelling of emissions from road traffic during the construction phase of the Proposed Development.
- 7.3.33 Due to the uncertainty in the rate of vehicle emissions improvement over the coming years, this assessment has used emission rates (EFT Version 9.0.1 emission factor dataset) for 2017 (Defra, 2019b) to represent all assessment year scenarios. This is a conservative assumption.
- 7.3.34 Consideration has been given within the assessment to the potential cumulative traffic emissions from the construction of the Proposed Development as well as the contribution from traffic associated with other committed developments in the area. This is discussed further in Section 7.9 (Residual Effects) and Chapter 17: Cumulative and Combined Effects.

Assessment of Emissions Generated from Construction Site Plant (Non Road Mobile Machinery (NRMM))

- 7.3.35 As outlined in Chapter 5: Construction Programme and Management and above there are three scenarios being considered for the construction phase of the Proposed Development. In all scenarios the construction phase is anticipated to last around 36 months.
- 7.3.36 There are likely to be emissions to air during construction activities arising from on-Site construction plant or NRMM. The IAQM guidance (IAQM, 2014) 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”.*
- 7.3.37 The screening criterion in the DMRB (HE, 2019), which states that only properties and habitat sites within 200 metres of roads should be considered in traffic assessments, has also been considered in determining the potential for impacts from NRMM on sensitive receptors. A qualitative assessment of the potential for impact from nitrogen dioxide and PM₁₀ emissions from the proposed NRMM on identified receptors has therefore been made based on the criteria outlined in the above guidance.

Assessment of Process Emissions from the Operational Plant at Year of Opening

- 7.3.38 Emissions from the Proposed Development, assumed to be operational in 2023, have been assessed using the EA Risk assessment methodology (Defra and EA, 2018b) in order to identify where proposed emissions can be screened as having a negligible impact. Detailed dispersion modelling using the atmospheric dispersion model ADMS 5.2 has been used to calculate the concentrations of pollutants at identified receptors. These concentrations have been compared with the air quality assessment level for each pollutant species, as summarised in Tables 7.1, Table 7.2 and 7.3 above.
- 7.3.39 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.
- 7.3.40 The first year of operation (referred to as opening) of the Proposed Development is assumed to be 2023 for the purpose of this assessment, which is the earliest date that the Proposed Development could realistically start to export power commercially.
- 7.3.41 Critical Loads and Critical Levels are tools for assessing air quality impacts on ecological receptors. These are described further in Chapter 10: Ecology, Section 10.6. The Critical Load relates to the quantity of pollutant deposited from air to the ground, whereas the Critical Level is the atmospheric concentration of a pollutant.

- 7.3.42 The assessment of worst-case long-term (annual mean) and short-term (daily and hourly mean) emissions resulting from operation of the Proposed Development has been undertaken by comparison of the maximum process contributions at identified sensitive receptors with the annual mean and hourly mean objectives, and the Critical Levels set out in Table 7.2 for ecological receptors, taking into consideration the baseline air quality, in accordance with EA risk assessment methodology (Defra and EA, 2018a).
- 7.3.43 An assessment of nutrient nitrogen enrichment has been undertaken by applying published deposition velocities to the predicted annual average NO_x 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 (APIS) (Centre for Ecology and Hydrology and APIS, 2020) for the most sensitive species in each individual Habitat site, taking into consideration the baseline air quality.
- 7.3.44 Potential increases in acidity on designated ecological receptors from depositional contributions of NO_x from the process contribution have also been considered. In this assessment, the nitrogen kilo equivalent Keq/ha/yr, which are the units in which acidity Critical Loads are measured, have been derived from nitrogen deposition modelling values using standard conversion factors. The acidity deposition rates and baseline deposition rates have been used within the Critical Load Function Tool (Centre for Ecology and Hydrology and APIS, 2017) to determine whether the contribution will result in exceedance of the defined acidity Critical Loads for the most sensitive feature. Process contributions of SO₂ to the acidity deposition rate have been included in the acid deposition calculations. Several non-statutory habitat sites have been assessed at the request of Natural England. These are Laporte Road Local Wildlife Site (LWS), Stallingborough Fish Ponds LWS, Healing Cress Beds LWS and Sweedale Croft Drain LWS. North Moss Lane Meadow and Field West of Power Station Sites of Nature Conservation Importance (SNCI) have not been included in dispersion modelling as their associated Critical Loads for nutrient and acid deposition are not on public records.

Evaluation of Significance – Construction Phase Emissions

- 7.3.45 For potential amenity effects, such as those related to dust deposition, the aim is to bring forward a scheme, to include mitigation measures as necessary, that minimises the potential for amenity (including dust soiling), human health, and ecological impacts as a result of the Proposed Development construction works.
- 7.3.46 The IAQM guidance (IAQM, 2014) 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 the application of appropriate mitigation should ensure that residual effects will normally be 'not significant'.

Evaluation of Significance – Operational Emissions

- 7.3.47 The evaluation of the significance of operational emissions on sensitive receptors considers the change in predicted pollutant concentrations against criteria set out

in the 2010 Regulations and published guidance by Defra and the EA (Defra and EA, 2018d).

7.3.48 For a change of a given magnitude, the IAQM publication ‘Land-Use Planning & Development Control: Planning for Air Quality (IAQM, 2017) has published recommendations for describing the magnitude of long term impacts at individual receptors and describing the significance (Table 7.6) of effects. 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’.

Table 7.6: Air quality effect descriptor for long term changes in ambient pollutant concentrations

LONG TERM AVERAGING CONCENTRATION AT RECEPTOR	PERCENTAGE CHANGE IN ANNUAL MEAN CONCENTRATIONS				
	Up to 0.5% Imperceptible	0.5 – 1% Very low	2-5% Low	6-10% Medium	>10% High
75% or less of AQS value	Negligible	Negligible	Negligible	Minor	Moderate
76-94% of AQS value	Negligible	Negligible	Minor	Moderate	Moderate
95-102% of AQS value	Negligible	Minor	Moderate	Moderate	Major
103-109% of AQS value	Negligible	Moderate	Moderate	Major	Major
110% or more of AQS value	Negligible	Moderate	Major	Major	Major

AQS = Air Quality Standard (NAQS objective value or EU Limit Value, EU Target Value or Environmental Standard)

7.3.49 The IAQM guidance (IAQM, 2017) is not explicit in the identification of whether any of the above effect descriptors should be considered ‘significant’ or ‘not significant’, rather it indicates that the descriptors should be applied to individual receptors and a ‘moderate’ adverse effect at one receptor may not mean that the overall effect is significant; other factors need to be considered. However, it indicates further that ‘negligible’ effects are likely to lead to effects that are ‘not significant’ and ‘major’ effects describe the potential for ‘significant’ effects. The judgment of significance of effects adopted within this assessment is discussed below.

7.3.50 The evaluation of the significance of air quality effects from the operational point sources (stack emissions) has been based on the criteria referenced in the IAQM publication (IAQM, 2017), and on the criteria outlined in the EA EPR Risk Assessment (Defra and EA, 2018a).

7.3.51 The IAQM guidance (IAQM, 2017) indicates that the EA threshold criterion of 10% of the short term AQSL is sufficiently small in magnitude to be regarded as having an ‘insignificant’ effect. The IAQM guidance deviates from the EA guidance (discussed below) with respect to the background contribution; the

IAQM guidance indicates that severity of peak short-term concentrations can be described without the need to reference background concentrations as the process contribution (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 \leq 10% of the AQS value represents an 'insignificant' (negligible) impact;
- PC 11-20% of the AQS value is small in magnitude representing a 'slight' (minor) impact;
- PC 21-50% of the AQS value is medium in magnitude representing a moderate impact; and
- PC $>$ 51% of the AQS value is large in magnitude representing a 'substantial' (major) impact.

7.3.52 The EA EPR Risk Assessment (Defra and EA, 2018d) screening criteria for comparison of PCs with AQS values state that an emission may be considered insignificant (or negligible) where:

- Short term PC \leq 10% of the AQS value; and
- Long term PC \leq 1% of the AQS value.

7.3.53 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 AQS value minus twice the long-term background concentration; and
- long term Predicted Environmental Concentration (PEC) (PC + background concentration) $<$ 70% of the AQS value.

7.3.54 Where the PEC is not predicted to exceed the AQS values and the proposed emissions comply with the BAT associated emission levels (or equivalent requirements) the emissions are considered acceptable by the EA.

7.3.55 The effect of point source emissions on ecological receptors, through deposition of nutrient nitrogen or acidity, has been evaluated using the EA insignificance criterion of 1% of the long term objective, as above.

7.3.56 Where emissions are not screened as insignificant (negligible), the descriptive terms for the air quality effect outlined in Table 7.6 above have been applied. For ecological receptors where the effects of air quality impacts cannot be screened out as insignificant, the significance of effects is assessed in Chapter 10: Ecology, Section 10.6.

Evaluation of Significance – Proposed Development as a Whole

7.3.57 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 air quality standards (which also relate to compliance with local authority goals for local air quality management and objectives are set for the protection of human health).

- 7.3.58 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 development on local air quality or on amenity is found to be 'moderate' or 'major' this is deemed to be 'significant' for EIA purposes. Effects found to be 'minor' or 'negligible' are considered to be 'not significant'.

Sources of Information / Data

Operational Phase Data

- 7.3.59 The physical parameters for the modelling of emissions from the Proposed Development stacks have been sourced from the concept design data provided by Fichtner Consulting Engineers (FCE), and the pollutant mass emission rates have been calculated by AECOM, based on the relevant IED emission limits or BAT-AELs. They are summarised in Table 7A.12 and Table 7A.13 of Appendix 7A in ES Volume III (Document Ref. 6.4).
- 7.3.60 The dispersion modelling of point source emissions 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.

7.4 Baseline Conditions

Existing Baseline

Sensitive Receptors

- 7.4.1 During the construction phase of the Proposed Development, based on IAQM guidance (IAQM, 2014), receptors potentially affected by dust soiling and short term concentrations of PM₁₀ generated during construction activities are limited to those located within 350 m of the nearest construction activity, and/ or within 50 m of a public road used by construction traffic that is within 500 m of the construction site entrances. Ecological receptors are limited to those located within 50 m of the nearest construction activity and/ or within 50 m of a public road used by construction traffic that is within 500 m of the construction site entrances.
- 7.4.2 Receptors potentially affected by the exhaust emissions associated with construction phase vehicle movements are those located within 200 m of a public road used by construction traffic to access the Site. In this instance, it is assumed for the purposes of assessment (in accordance with Chapter 9: Traffic and Transport) that construction vehicles will use South Marsh Lane, Hobson Way, Kiln Lane, A1173 and the A180.

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- 7.4.3 Receptors potentially affected by operational emissions from the Proposed Development including local residential and amenity receptors have been identified through site knowledge, desk study of local mapping and consultation. Isoleth figures of pollutant dispersion have been examined to identify the receptors that will receive the highest point source contributions and the assessment of impact has been made at these receptors; the assessment also includes designated AQMAs within the Study Area, described below.
- 7.4.4 Ecological receptors potentially affected by operational emissions have been identified through desk study of Defra Magic mapping (Defra, 2017c) and consultation (see Chapter 10: Ecology). Statutory designated sites including Sites of Special Scientific Interest (SSSIs) up to 2 km and SACs up to 10 km from the Site have been considered, with those further from the Site identified through consultation with NELC and the EA. The Humber Estuary Ramsar site, SSSI, SPA and SAC is within 2 km of the Site. Several non-statutory designated sites including SNCIs and LWSs have been identified through consultation and included in the assessment where required. Further details of these sites and reasons for designations are provided in Chapter 10: Ecology.
- 7.4.5 Identified receptors are detailed in Table 7.7 below, for construction and operational phases, and are shown on Figure 7.1 and 7.2 in ES Volume II (Document Ref. 6.3). The distances quoted from construction phase activities include the proximity of any part of the designated routes used by construction vehicles for the Proposed Development.

Table 7.7: Identified receptors with potential for air quality impacts from construction and operation of the Proposed Development

ID	RECEPTOR NAME	RECEPTOR TYPE	GRID REFERENCE		DISTANCE FROM BOUNDARY FOR IMPACTS FROM:	
			X	Y	Operation (m)	Dust (m)
R1	Mauxhall Farm	Residential	519164	413247	3,780	420
R2	Property on North Moss Lane	Residential	521290	413089	1,300	850
R3	Property on South Marsh Road	Residential	521591	413001	1,680	1,150
R4	Property on South Marsh Road	Residential	521298	412771	1,760	1,230
R5	Property on South Marsh Road	Residential	521258	412700	1,800	1,290
R6	Property on South Marsh Road	Residential	521171	412590	1,900	1,380
R7	Primrose Cottage, north of A180	Residential	521900	412105	1,640	2,130
R8	Cress Cottage, north of A180	Residential	521988	411994	1,680	2,330
R9	The Meadows, south of A180	Residential	522051	411669	1,920	1,530

ID	RECEPTOR NAME	RECEPTOR TYPE	GRID REFERENCE		DISTANCE FROM BOUNDARY FOR IMPACTS FROM:	
			X	Y	Operation (m)	Dust (m)
R10	Meadows Farm, south of A180	Residential	521900	411653	2,170	1,600
R11	Meadows Cottages, south of A180	Residential	521900	411605	2,170	1,600
R12	Property on South Marsh Road in Stallingborough	Residential	520822	412113	2,500	2,150
R13	Property on Woad Lane in Grimsby	Residential	524372	410818	2,900	2,570
R14	Property on Kendal Road, Immingham	Residential	519215	414218	3,820	1,100
R15	Property on Hadleigh Road, Immingham	Residential	518810	414142	4,180	1,280
R16	Property on Arran Close, Immingham	Residential	518580	413796	4,400	1,190
R17	Property on Mull Way, Immingham	Residential	518388	413642	4,570	500
R18	Willows Court, Immingham	Residential	517721	413749	5,220	270

ID	RECEPTOR NAME	RECEPTOR TYPE	GRID REFERENCE		DISTANCE FROM BOUNDARY FOR IMPACTS FROM:	
			X	Y	Operation (m)	Dust (m)
R19	Property north of Habrough	Residential	515237	414003	7,700	100
R20	Property on Station Road in Habrough	Residential	515087	414241	7,900	70
R21	Grimsby AQMA	Residential	527731	410459	5,470	5,290
PROW 1	Public Right of Way (various points along the same route).	Transient	522277	413722	720	60
PROW 2		Transient	522434	413788	620	240
PROW 3		Transient	522603	413840	510	380
PROW 4		Transient	522762	413932	500	440
PROW 5		Transient	522985	413983	490	460
PROW 6		Transient	523270	413886	405	360
PROW 7		Transient	523401	413749	345	300
PROW 8		Transient	523538	413599	390	390
PROW 9		Transient	523644	413397	470	470
PROW 10		Transient	523787	413140	620	620
PROW 11		Transient	523985	413119	880	880
PROW 12		Transient	524146	412958	1,050	1,050
E1_1	Atlantic Salt Meadows	Humber Estuary SSSI, Ramsar site, SPA and SAC	523841	413152	680	680
E1_2	Atlantic Salt Meadows		523795	413177	680	680
E1_3	Atlantic Salt Meadows		523891	413167	680	680

ID	RECEPTOR NAME	RECEPTOR TYPE	GRID REFERENCE		DISTANCE FROM BOUNDARY FOR IMPACTS FROM:	
			X	Y	Operation (m)	Dust (m)
E2_1	Atlantic Salt Meadows		525875	411461	3,300	3,300
E2_2	Atlantic Salt Meadows		526051	411348	3,500	3,500
E2_3	Atlantic Salt Meadows		526204	411085	3,780	3,780
E2_4	Atlantic Salt Meadows		526384	411077	3,940	3,940
E3_1	Atlantic Salt Meadows		527221	410770	4,790	4,790
E4_1	Acid Fixed Dunes		531237	408287	9,550	9,550
E4_2	Acid Fixed Dunes		531313	408200	9,620	9,620
E4_3	Acid Fixed Dunes		531397	408097	9,770	9,770
E4_4	Acid Fixed Dunes		531499	408035	9,900	9,900
E4_5	Acid Fixed Dunes		531547	407962	10,000	10,000
E4_6	Acid Fixed Dunes		531540	407912	10,000	10,000
E5_1	Atlantic Salt Meadows		531682	408046	10,050	10,050
E5_2	Atlantic Salt Meadows		531750	407998	10,130	10,130

ID	RECEPTOR NAME	RECEPTOR TYPE	GRID REFERENCE		DISTANCE FROM BOUNDARY FOR IMPACTS FROM:		
			X	Y	Operation (m)	Dust (m)	
E5_3	Atlantic Salt Meadows		531793	407923	10,200	10,200	
E5_4	Atlantic Salt Meadows		531863	407852	10,300	10,300	
E5_5	Atlantic Salt Meadows		531926	407779	10,400	10,400	
E5_6	Atlantic Salt Meadows		532034	407667	10,500	10,500	
E5_7	Atlantic Salt Meadows		532175	407545	10,600	10,600	
E5_8	Atlantic Salt Meadows		532324	407415	10,700	10,700	
E5_9	Atlantic Salt Meadows		532520	407260	10,800	10,800	
E5_10	Atlantic Salt Meadows		532616	407081	11,000	11,000	
E6_1	neutral grassland		Laporte Road LWS	521571	414727	1,870	1,870
E6_2	neutral grassland			521576	414769	1,920	1,920
E7_1	Broadleaved, mixed and yew woodland	Stallingborough Fish Ponds LWS	521306	412565	1,850	1,850	
E7_2	Broadleaved, mixed and yew woodland		521391	412451	1,840	1,840	

ID	RECEPTOR NAME	RECEPTOR TYPE	GRID REFERENCE		DISTANCE FROM BOUNDARY FOR IMPACTS FROM:	
			X	Y	Operation (m)	Dust (m)
E8_1	Broadleaved, mixed and yew woodland	Healing Cress Beds LWS	522076	412246	1,430	1,430
E8_2	Broadleaved, mixed and yew woodland		522170	412159	1,500	1,500
E9_1	Fen, Marsh and Swamp	Sweedale Croft Drain LWS	523451	411593	1,850	1,850
E9_2	Fen, Marsh and Swamp		523599	411714	1,740	1,740
E9_3	Fen, Marsh and Swamp		523710	411805	1,680	1,680

Existing Air Quality

- 7.4.6 Existing air quality conditions in the vicinity of the Site have been evaluated through a review of local authority air quality management reports; Defra published data and other sources. The key pollutants of concern resulting from construction and operation of the Proposed Development and that have potentially elevated background concentrations from other sources are oxides of nitrogen, carbon monoxide, ammonia, PM₁₀ and PM_{2.5}, therefore the assessment of baseline conditions within this chapter considers these pollutants only. Baseline concentrations of the other pollutants such as hydrogen chloride (HCl), hydrogen fluoride (HF), twelve metals (cadmium (Cd), thallium (Tl), mercury (Hg), antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V)), Polycyclic Aromatic Hydrocarbons (PAH) as benzo[a]pyrene, polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans), and volatile organic compounds (VOCs) such as benzene are also included in the dispersion modelling assessment and are set out in Appendix 7A in ES Volume III (Document Ref. 6.4).
- 7.4.7 NELC has designated one AQMA in Grimsby. The Grimsby AQMA was declared for an exceedance of the annual mean NO₂ objective. This AQMA is located approximately 5.5 km south-east of the Site. The Grimsby AQMA is shown in Figure 7.1 (ES Volume II, Document Ref. 6.3).
- 7.4.8 NELC undertake monitoring within Immingham and Grimsby (NELC, 2019) at 32 locations for NO₂, by diffusion tube monitoring, and with one continuous monitoring station for NO₂, operated as part of the Defra AURN. The nearest NO₂ continuous monitor CM2 is located on Woodlands Avenue in Immingham 3.7 km north-east of the Site. Annual mean NO₂ concentrations for 2018 were reported as 13.9 µg/m³. The diffusion tubes located in Immingham are DIF23, DIF24 and DIF25 which have an average annual mean concentration for 2018 of 26.6 µg/m³.
- 7.4.9 NELC monitoring data has been used to provide information on background concentrations within the Grimsby AQMA (DIF14, DIF15 and DIF16).
- 7.4.10 A summary of the NELC monitoring data are presented in Table 7.8. The available NELC monitoring data is not located in the vicinity of the Site, nor along any roads that are likely to be used during the construction and operational phases of the Proposed Development. These monitoring locations are not considered to be suitable for model verification. Therefore, AECOM has undertaken project specific diffusion tube monitoring.
- 7.4.11 A programme of NO₂ diffusion tube surveys was carried out between June and December 2018. A summary of the project specific monitoring locations and monitoring results is presented in Table 7.9.

Table 7.8: NELC NO₂ diffusion tube monitoring

ID	MONITORING LOCATION	SITE TYPE	GRID REFERENCE		2018 ANNUAL MEAN CONC. (µg/m ³)
			X	Y	NO ₂
DIF 14	113 Cleethorpe Road, Grimsby	Kerbside	527761	410446	33.3
DIF 15	123 Cleethorpe Road, Grimsby	Kerbside	527802	410436	32.9
DIF 16	6 Freeman Street, Grimsby	Kerbside	527693	410423	30.9
DIF 23	Kings Road, Immingham	Roadside	519193	415279	26.6
DIF 24					
DIF 25					

Table 7.9: Project specific NO₂ diffusion tube monitoring

ID	MONITORING LOCATION	SITE TYPE	GRID REFERENCE		SURVEY PERIOD MEAN CONC. (µg/m ³) NO ₂	2017 ANNUALISED MEAN CONC. (µg/m ³) NO ₂
			X	Y		
KOA T1	Near salt marsh section of Humber Estuary SSSI, Ramsar site, SPA, SAC	Other	523788	413171	13.4	12.5
KOA T2	Woad Lane, Grimsby	Roadside	524382	410798	18.4	17.1
KOA T3	Ephams Lane north of Stallingborough	Roadside	521150	412579	17.6	16.4
KOA T4	Station Road, Stallingborough	Roadside	520824	412134	15.0	13.9
KOA T5	Roxton Road, Immingham	Roadside	517726	413761	21.6	20.9
KOA T6	Near Wold Chapel Hotel, Habrough	Roadside	515250	413996	18.8	17.5

- 7.4.12 Background data has also been obtained from Defra published maps for the locations of likely maximum impact due to point source emissions from the Proposed Development, and at the selected sensitive receptor locations (R1 to R20). The most recent data available from the background maps is for a base year of 2017, which has been conservatively assumed to be representative of the peak construction year (2021) and opening year baselines (2023).
- 7.4.13 The background NO₂ concentration for receptors R1 to R20 was sourced from project specific monitoring at location KOA T1. The background NO₂ concentration for R21 was sourced from NELC monitoring location DIF 14, which is a kerbside location within the Grimsby AQMA.
- 7.4.14 Background NO₂, CO, PM₁₀ and PM_{2.5} concentrations assumed for the selected sensitive receptors are provided in Table 7.10 below. It indicates NO₂ concentrations within the vicinity of the Proposed Development are consistently well below the annual mean AQS values. Background data for NO₂ and PM₁₀ at sensitive receptors for point source and traffic emission impacts is provided in Table 7.10.
- 7.4.15 The background air pollutant concentrations in the vicinity of the Proposed Development are consistently well below the annual mean AQS value for nitrogen dioxide at all reported monitoring locations. Data reported by NELC (NELC, 2019) also indicate that air quality is generally very good in the borough, with only monitoring locations within the centre of Grimsby and Immingham reporting elevated concentrations of nitrogen dioxide.

Table 7.10: Background concentrations at receptors

POLLUTANT	ANNUAL MEAN CONCENTRATION (µg/m ³)
	2015
Nitrogen dioxide (NO ₂)	12.5 for R1 to R20 33.3 for R21
PM ₁₀	14.1
PM _{2.5}	8.2
Carbon monoxide (CO)	258

- 7.4.16 Baseline annual mean concentrations of NO₂, PM₁₀ and PM_{2.5}, and the number of expected exceedances of the 24-hour 50 µg/m³ PM₁₀ air quality objectives at the selected receptors during the current 2017 baseline scenario are listed in Table 7.11 below.

Table 7.11: Air quality statistics predicted for baseline scenario in 2017

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50 \mu\text{g}/\text{m}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R1	Mauxhall Farm	17.1	14.9	8.7	1
R2	Property on North Moss Lane	15.4	14.6	8.5	1
R3	Property on South Marsh Road	15.6	14.6	8.5	1
R4	Property on South Marsh Road	16.9	14.9	8.7	1
R5	Property on South Marsh Road	17.4	15.0	8.7	1
R6	Property on South Marsh Road	19.1	15.3	8.9	1
R7	Primrose Cottage, north of A180	21.2	15.7	9.2	1
R8	Cress Cottage, north of A180	23.5	16.1	9.4	1
R9	The Meadows, south of A180	17.6	15.0	8.8	1
R10	Meadows Farm, south of A180	15.9	14.7	8.6	1
R11	Meadows Cottages, south of A180	15.5	14.6	8.5	1
R12	Property on South Marsh Road in Stallingborough	15.9	14.7	8.6	1
R13	Property on Wood Lane in Grimsby	17.1	14.9	8.7	1
R14	Property on Kendal Road, Immingham	14.2	14.4	8.4	1
R15	Property on Hadleigh Road, Immingham	14.4	14.4	8.4	1
R16	Property on Arran Close, Immingham	15.1	14.6	8.5	1
R17	Property on Mull Way, Immingham	15.8	14.7	8.6	1
R18	Willows Court, Immingham	17.3	15.0	8.7	1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50 \mu\text{g}/\text{m}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R19	Property north of Habrough	16.3	14.8	8.6	1
R20	Property on Station Road in Habrough	24.4	16.3	9.5	1
R21	Grimsby AQMA	33.5	14.1	8.2	1

7.4.17 The baseline values show that annual mean concentrations of all pollutants in the vicinity of the Site are well below the AQS values, indicating that air quality in the vicinity of the Proposed Development is good. More elevated concentrations of NO₂ are found within the Grimsby AQMA; however they are still within their respective environmental standards.

7.4.18 The existing air quality concentrations and acid and nutrient nitrogen deposition rates at the designated habitat sites have been obtained from the APIS website. This data is presented in full in Appendix 7A in ES Volume III (Document Ref. 6.4). The data indicates that existing baseline NO_x concentrations at the ecological receptors are generally well within the daily mean and annual mean Critical Levels. The exception is the salt marsh location closest to the Site (E1) (refer to Figure 7.2 in ES Volume II, Document Ref. 6.3), where the APIS NO_x background value is very close to exceeding the Critical Level. The existing baseline nutrient nitrogen deposition and acid deposition levels for many of the identified designated ecological sites exceed the lower range Critical Loads (see paragraph 7.3.411 to 7.3.44) defined for the most sensitive species present in Appendix 7A (ES Volume III, Document Ref. 6.4), including the acid fixed dune habitat at Cleethorpes, 9.5 km to the south-east of the Site.

Future Construction Baseline

7.4.19 Predicted annual mean concentrations of NO₂, PM₁₀ and PM_{2.5}, and the number of exceedances of the 24-hour $50 \mu\text{g}/\text{m}^3$ PM₁₀ air quality objective, at the selected receptors during the future 2021 baseline scenario for the Consented Development are listed in Table 7.12. As described at paragraph 7.3.26 the future baseline traffic flows used for the assessment include other committed developments.

Table 7.12: Air quality baseline statistics predicted for 2021 baseline scenario (including other committed developments)

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50 \mu\text{g}/\text{m}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R1	Mauxhall Farm	17.6	15.0	8.7	1
R2	Property on North Moss Lane	15.6	14.6	8.5	1
R3	Property on South Marsh Road	15.7	14.7	8.5	1
R4	Property on South Marsh Road	17.1	14.9	8.7	1
R5	Property on South Marsh Road	17.6	15.0	8.7	1
R6	Property on South Marsh Road	19.3	15.3	8.9	1
R7	Primrose Cottage, north of A180	21.4	15.7	9.2	1
R8	Cress Cottage, north of A180	23.8	16.2	9.5	1
R9	The Meadows, south of A180	17.8	15.0	8.8	1
R10	Meadows Farm, south of A180	16.0	14.7	8.6	1
R11	Meadows Cottages, south of A180	15.6	14.7	8.5	1
R12	Property on South Marsh Road in Stallingborough	16.1	14.7	8.6	1
R13	Property on Woad Lane in Grimsby	17.2	14.9	8.7	1
R14	Property on Kendal Road, Immingham	14.4	14.4	8.4	1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50 \mu\text{g}/\text{m}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R15	Property on Hadleigh Road, Immingham	14.6	14.5	8.4	1
R16	Property on Arran Close, Immingham	15.4	14.6	8.5	1
R17	Property on Mull Way, Immingham	16.2	14.8	8.6	1
R18	Willows Court, Immingham	17.9	15.1	8.8	1
R19	Property north of Habrough	16.8	14.9	8.7	1
R20	Property on Station Road in Habrough	26.0	16.6	9.7	1
R21	Grimsby AQMA	33.5	14.1	8.2	1

7.4.20 The predicted baseline construction year pollutant concentrations are well below all AQS values for all pollutants, indicating that air quality in the vicinity of the Proposed Development is good. As for 2017, higher concentrations of NO₂ are predicted within the Grimsby AQMA, though still within the NAQS objective values.

Future Operational Baseline

7.4.21 Predicted annual mean concentrations of NO₂, PM₁₀ and PM_{2.5}, and the number of predicted exceedances of the 24-hour $50 \mu\text{g}/\text{m}^3$ PM₁₀ air quality objective, at the selected receptors during the 2023 future baseline scenario are listed in Table 7.13.

Table 7.13: Air quality statistics predicted for 2023 baseline scenario (including other committed developments)

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50 \mu\text{g}/\text{m}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R1	Mauxhall Farm	17.9	15.0	8.8	1
R2	Property on North Moss Lane	15.7	14.7	8.5	1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50 \mu\text{g}/\text{m}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R3	Property on South Marsh Road	15.8	14.7	8.6	1
R4	Property on South Marsh Road	17.3	14.9	8.7	1
R5	Property on South Marsh Road	17.8	15.0	8.8	1
R6	Property on South Marsh Road	19.5	15.4	9.0	1
R7	Primrose Cottage, north of A180	21.7	15.8	9.2	1
R8	Cress Cottage, north of A180	24.1	16.3	9.5	1
R9	The Meadows, south of A180	17.9	15.1	8.8	1
R10	Meadows Farm, south of A180	16.1	14.7	8.6	1
R11	Meadows Cottages, south of A180	15.7	14.7	8.5	1
R12	Property on South Marsh Road in Stallingborough	16.2	14.7	8.6	1
R13	Property on Woad Lane in Grimsby	17.4	15.0	8.7	1
R14	Property on Kendal Road, Immingham	14.5	14.5	8.4	1
R15	Property on Hadleigh Road, Immingham	14.7	14.5	8.4	1
R16	Property on Arran Close, Immingham	15.6	14.6	8.5	1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50 \mu\text{g}/\text{m}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R17	Property on Mull Way, Immingham	16.5	14.8	8.6	1
R18	Willows Court, Immingham	18.2	15.1	8.8	1
R19	Property north of Habrough	17.0	14.9	8.7	1
R20	Property on Station Road in Habrough	26.6	16.8	9.8	1
R21	Grimsby AQMA	33.5	14.1	8.2	1

7.4.22 Predicted baseline pollutant concentrations in the 2023 baseline scenario (including other committed developments) show that concentrations of all pollutants are below AQS values, indicating that air in the vicinity of the Proposed Development is of good quality.

Point Source Emissions Background Concentrations for different averaging times

7.4.23 In accordance with EA risk assessment methodology (Defra and EA, 2018a), the annual mean background pollutant concentrations have been obtained from Defra background mapping (2017 base year) as described above and the short-term background concentration is assumed to be twice the long-term concentration for NO₂ and CO and one and a half times the long-term background concentration for PM₁₀.

7.5 Development Design and Impact Avoidance

Construction

Construction Environmental Management Plan

7.5.1 Emissions of dust and particulates from the construction phase of the Proposed Development will be controlled in accordance with good working practices regularly employed in the construction industry, 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 embedding measures in the Construction Environmental Management Plan (CEMP). A Framework CEMP has been prepared and is included as Appendix 5A in ES Volume III (Document Ref. 6.4).

7.5.2 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) (refer to Appendix

7A in ES Volume III, Document Ref. 6.4), and as described in Section 7.6 below, 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:

- where appropriate, storage of sand and aggregates in bunded areas and storage of cement powder and fine materials in silos;
- use of water suppression and regular cleaning to minimise mud on roads;
- covering of vehicles leaving the construction site that are carrying construction waste materials or spoil;
- employment of a wheel wash system at site exits;
- restriction where practicable of the use of unmade road access;
- minimising storage duration of top soil or spoil during construction; and
- prohibiting open fires on Site.

7.5.3 Good working practice measures will also be employed for the siting and operation of NRMM to control associated emissions, including where possible:

- minimising vehicle and plant idling; and
- locating static plant away from sensitive boundaries or receptors, including by retaining (where possible) the existing landscaping around the Site.

Operation

IED/ BAT-AEL Emission Limit Value (ELV) Compliance

7.5.4 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 Proposed Development.

Stack Height

7.5.5 The stack heights for the Proposed Development have been set at 102 m above Ordnance Datum (approximately 100m above finished ground level), in order to provide appropriate dispersion of the emitted pollutants. An analysis of the effect of increasing stack height on ground level impacts has been included in Appendix 7A in ES Volume III (Document Ref. 6.4).

7.6 Likely Impacts and Effects

Pollutants

Impacts on Human Health and Sensitive Ecosystems

7.6.1 The pollutants considered within the assessment of emissions for the main stacks are primarily those prescribed within the IED (European Commission, 2010). These are:

- oxides of nitrogen (NO_x), expressed as NO₂;
- particulate matter (as PM₁₀ size fraction);

- carbon monoxide (CO);
- sulphur dioxide (SO₂);
- hydrogen chloride (HCl);
- hydrogen fluoride (HF);
- twelve metals (cadmium (Cd), thallium (Tl), mercury (Hg), antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V));
- polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans); and
- volatile organic compounds (VOCs), as a measure of total organic compounds.

7.6.2 Emissions of the following pollutants not included within the IED are also considered:

- the Polycyclic Aromatic Hydrocarbons (PAH), benzo[a]pyrene;
- ammonia (chemical formula NH₃); and
- particulate matter (as PM_{2.5} size fraction).

7.6.3 PAHs are produced as a result of incomplete combustion. One of the key PAH species, benzo[a]pyrene, is subject to a NAQS objective value in the UK. Ammonia is recognised as having the potential to impact on sensitive ecological habitats, both directly and as a component of acid and nutrient nitrogen deposition. The finer size fraction of particulate matter (PM_{2.5}) has increasingly become associated with impacts on health in recent years and has subsequently been included within the statutory limit values set out within the most recent European and UK air quality legislation.

7.6.4 Of the pollutants listed above, the primary pollutants of interest in relation to the impacts due to emissions from the Proposed Development and road traffic are nitrogen dioxide and particulate matter (PM₁₀ and PM_{2.5} size fractions). The primary pollutant of concern for ecological impacts is ammonia.

Impacts on Amenity

7.6.5 'Dust' is defined in British Standard (BS) 6069-2:1994 (British Standards Institute (BSI), 1994) as particulate matter in the size range 1 µm – 75 µm (microns) in diameter, and is primarily composed of mineral materials and soil particles. This definition is also referred to in NPPF technical guidance (Ministry of Housing, Government & Local Government, 2018b) in the context of dust impacts from mineral extraction operations. The BSI definition has been adopted in this assessment.

7.6.6 Odour could be generated through the receipt and handling of waste materials at the Proposed Development. The presence of an odour may or may not cause annoyance and depends on a number of factors that vary between individuals. Odour events may only last a few seconds, but could cause annoyance if they frequently recur or are perceived to be particularly offensive. The potential for

odour impacts is discussed further in the assessment of operational impacts at paragraphs 7.6.35 to 7.6.41 below.

Construction

Assessment of Construction Dust

- 7.6.7 Identified sensitive receptors to dust soiling and PM₁₀ effects from construction works are detailed in Table 7.2. The area sensitive to dust soiling and PM₁₀ health effects has been assessed, as detailed in Appendix 7A in ES Volume III (Document Ref. 6.4), from the sensitivity of receptors and the proximity of the Proposed Development activities to these receptors.
- 7.6.8 The Humber Estuary Ramsar site, SPA and SAC is greater than 50 m from the construction works associated with the Proposed Development, therefore an assessment of demolition and construction dust on ecological receptors has been screened out.
- 7.6.9 The scale and nature of activities have been estimated to define the potential uncontrolled dust generation magnitude, according to the criteria outlined in Appendix 7A, Table 7A.1 (refer to ES Volume III, Document Ref. 6.4).
- 7.6.10 Whilst a detailed construction management plan has yet to be developed for the Proposed Development, estimates of the likely scale of activities, with reference to the guidance magnitude definitions in Table 7A.1 (refer to ES Volume III, Document Ref. 6.4) have been made for the purposes of mitigation definition:
- there are no structures that require demolition prior to the construction of the Proposed Development, therefore demolition has not been considered;
 - the earthworks will cover an area of approximately 7 ha, and may involve the export of approximately 160,000 tonnes of materials from the Site during part of the first year of construction;
 - an on-site concrete batching is likely to be employed for periods during the construction phase of the Proposed Development; and
 - Heavy Duty Vehicle movements associated with construction would be more than 50 vehicles per day at peak (Chapter 9: Traffic and Transport predicts 58 Heavy Goods Vehicles will visit the Site per day at the peak of construction).
- 7.6.11 According to IAQM criteria, the Site has been classified in terms of its potential for earthworks and construction activities to generate emissions of dust as a 'large' site. In terms of the potential for the trackout of mud onto local roads, the Proposed Development has been classed as a 'medium' site.
- 7.6.12 Potential dust impacts (pre-mitigation) have been assessed based on the receptor sensitivity and distance criteria outlined in Tables 7A.2 - 7A.4 (refer to Appendix 7A in ES Volume III, Document Ref. 6.4) using professional judgment. The area sensitivity has been judged to be 'low' for dust soiling impacts from all activities and 'medium' sensitivity for human health impacts from PM₁₀ releases from all activities, on account of the distance from the activity source to the receptors, and the existing low background concentration particulates (<24 µg/m³).

7.6.13 The potential risks from emissions from construction activities associated with the Proposed Development (i.e. not taking into account the impact avoidance measures set out in Section 7.5 above) have been defined with reference to the magnitude of the potential emission and the sensitivity of the impact area, in accordance with the classification defined in Appendix 7A (ES Volume III, Document Ref. 6.4), Table 7A.8. The results are shown in Table 7.14 below.

Table 7.14: Risk of dust and particulates impacts (pre-mitigation)

POTENTIAL IMPACT	RISK OF IMPACT FROM ACTIVITY			
	PRE-CONSTRUCTION DEMOLITION	EARTHWORKS	CONSTRUCTION	TRACKOUT
Dust Soiling	No demolition	Low risk	Low risk	Low risk
Human Health PM ₁₀	No demolition	Low risk	Low risk	Low risk
Ecology	No demolition	Not applicable	Not applicable	Not applicable

7.6.14 The level of mitigation required to reduce dust and particulates from the construction activities to avoid significant impacts on receptors has been determined based on the above risk assessment and indicative measures are outlined in Table 7.15 for the Proposed Development activities.

Table 7.15: Example mitigation for dust and particulates during construction phase

ACTIVITY	EXAMPLE MITIGATION BASED ON RISK LEVEL	CLASSIFICATION OF RESIDUAL RISK OF IMPACT	EFFECT DESCRIPTOR
Earthworks	Medium/ low risk: re-vegetate earthworks and any soil stockpiles to stabilise surfaces as soon as practicable; minimise working area and use temporary cover or damping down to minimise dust formation during dry and windy conditions	Negligible	Not significant
Construction	Medium/ low risk: avoid mechanical roughening of concrete surfaces where possible; store sand and aggregates in bunded areas and finer materials in silos with	Negligible	Not significant

ACTIVITY	EXAMPLE MITIGATION BASED ON RISK LEVEL	CLASSIFICATION OF RESIDUAL RISK OF IMPACT	EFFECT DESCRIPTOR
	suitable emission control systems		
Trackout	Medium/ low risk: use water suppression and regular cleaning to minimise mud on road; cover vehicles leaving the site with spoil or waste materials; employ wheel wash systems at site exits; restrict unmade road access where possible	Negligible	Not significant

7.6.15 The application of good working practice measures and mitigation regularly employed in the construction industry, along with the CEMP will reduce potential effects at receptors to a not significant level.

Assessment of Construction Traffic

7.6.16 Predicted annual mean concentrations of NO₂, PM₁₀ and PM_{2.5}, and the number of exceedances of the 24-hour 50 µg/m³ PM₁₀ air quality objective at the selected existing receptors in the 2021 Construction scenario are listed in Table 7.16.

Table 7.16: Air quality statistics predicted for 2021 construction scenario

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m ³)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50µG/M ³ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R1	Mauxhall Farm	17.7	15.0	8.7	1
R2	Property on North Moss Lane	15.6	14.6	8.5	1
R3	Property on South Marsh Road	15.8	14.7	8.5	1
R4	Property on South Marsh Road	17.2	14.9	8.7	1
R5	Property on South Marsh Road	17.6	15.0	8.7	1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50\mu\text{G}/\text{M}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R6	Property on South Marsh Road	19.3	15.3	8.9	1
R7	Primrose Cottage, north of A180	21.5	15.7	9.2	1
R8	Cress Cottage, north of A180	23.8	16.2	9.5	1
R9	The Meadows, south of A180	17.8	15.1	8.8	1
R10	Meadows Farm, south of A180	16.0	14.7	8.6	1
R11	Meadows Cottages, south of A180	15.6	14.7	8.5	1
R12	Property on South Marsh Road in Stallingborough	16.1	14.7	8.6	1
R13	Property on Woad Lane in Grimsby	17.2	14.9	8.7	1
R14	Property on Kendal Road, Immingham	14.5	14.4	8.4	1
R15	Property on Hadleigh Road, Immingham	14.6	14.5	8.4	1
R16	Property on Arran Close, Immingham	15.5	14.6	8.5	1
R17	Property on Mull Way, Immingham	16.3	14.8	8.6	1
R18	Willows Court, Immingham	18.0	15.1	8.8	1
R19	Property north of Habrough	16.9	14.9	8.7	1
R20	Property on Station Road in Habrough	26.2	16.7	9.8	1
R21	Grimsby AQMA	33.5	14.1	8.2	1

- 7.6.17 Predicted pollutant concentrations in the 2021 Construction scenario show that concentrations of all pollutants are below all AQS values for all pollutants, indicating that air quality in the vicinity of the Proposed Development remains of a good quality.
- 7.6.18 The changes in air quality statistics between the 2021 future baseline and 2021 Construction scenarios are shown in Table 7.17.

Table 7.17: Air quality impacts predicted for 2021 construction scenario

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50\mu\text{G}/\text{M}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R1	Mauxhall Farm	<0.1	<0.1	<0.1	<1
R2	Property on North Moss Lane	<0.1	<0.1	<0.1	<1
R3	Property on South Marsh Road	<0.1	<0.1	<0.1	<1
R4	Property on South Marsh Road	<0.1	<0.1	<0.1	<1
R5	Property on South Marsh Road	<0.1	<0.1	<0.1	<1
R6	Property on South Marsh Road	<0.1	<0.1	<0.1	<1
R7	Primrose Cottage, north of A180	<0.1	<0.1	<0.1	<1
R8	Cress Cottage, north of A180	<0.1	<0.1	<0.1	<1
R9	The Meadows, south of A180	<0.1	<0.1	<0.1	<1
R10	Meadows Farm, south of A180	<0.1	<0.1	<0.1	<1
R11	Meadows Cottages, south of A180	<0.1	<0.1	<0.1	<1
R12	Property on South Marsh Road in Stallingborough	<0.1	<0.1	<0.1	<1
R13	Property on Woad Lane in Grimsby	<0.1	<0.1	<0.1	<1
R14	Property on Kendal Road, Immingham	<0.1	<0.1	<0.1	<1

ID	RECEPTOR NAME	ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu\text{g}/\text{m}^3$)			NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50\mu\text{G}/\text{M}^3$ (DAYS)
		NO ₂	PM ₁₀	PM _{2.5}	
R15	Property on Hadleigh Road, Immingham	<0.1	<0.1	<0.1	<1
R16	Property on Arran Close, Immingham	<0.1	<0.1	<0.1	<1
R17	Property on Mull Way, Immingham	<0.1	<0.1	<0.1	<1
R18	Willows Court, Immingham	+0.1	<0.1	<0.1	<1
R19	Property north of Habrough	<0.1	<0.1	<0.1	<1
R20	Property on Station Road in Habrough	+0.3	<0.1	<0.1	<1
R21	Grimsby AQMA	<0.1	<0.1	<0.1	<1

7.6.19 The magnitude of the change in pollutant concentrations due to construction traffic on the road network associated with the Proposed Development is predicted to be imperceptible or very low for all pollutants at all receptor locations. A change of this magnitude is considered to have a negligible effect, which is considered to be not significant.

Operation

Assessment of Operational Emissions from the Proposed Development Stacks and Operational Road Traffic on NO₂ Concentrations

- 7.6.20 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.
- 7.6.21 Of the pollutants emitted from the Proposed Development and road traffic, the primary pollutants of interest in relation to the impacts from road traffic emissions are nitrogen dioxide and particulate matter (PM₁₀ and PM_{2.5} size fractions), although the full suite of pollutants potentially emitted from the Proposed Development is assessed in Appendix 7A in ES Volume III (Document Ref. 6.4).
- 7.6.22 The maximum hourly, and annual mean predicted NO₂, PM₁₀ and PM_{2.5} concentrations have been compared with the AQS values, as summarised in Tables 7.18 to 7.21 below; full concentrations are provided in Table 7A.13 in Appendix 7A in ES Volume III (Document Ref. 6.4). Isopleth figures showing the annual and hourly mean process contributions of NO₂ are provided in Figures 7.3 and 7.4 in ES Volume II (Document Ref. 6.3).

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- 7.6.23 The assessment has been undertaken for the Proposed Development opening year scenario (2023). By assessing the effects of the Proposed Development being operational at the earliest possible opening year, a worst case background ambient air quality is assumed for the purposes of the operational impact assessment.
- 7.6.24 The dispersion modelling includes a number of conservative assumptions in combination, including:
- use of the worst case year of meteorological data modelled;
 - operation of the plant at the proposed IED or BAT-AEL emission limits, whichever is tighter; in practice the actual operational emissions will have to be lower than these limits in order to ensure that the limits are adhered to; and
 - conservative estimates of background concentrations at the sensitive receptors.
- 7.6.25 The following abbreviations are used in Table 7.18:
- PC: this is the Process Contribution and represents the change caused by the Proposed Development;
 - PEC: this is the Predicted Environmental Concentration and is PC plus background concentration. It is the concentration expected at a particular receptor once the effect of the Proposed Development is taken into account; and
 - AQS: the relevant NAQS objective value or environmental standard.

Table 7.18: Maximum predicted long term NO₂ concentrations at human health receptors

RECEPTOR	2023 BASELINE SCENARIO	CHANGE DUE TO ROAD TRAFFIC	PC PROPOSED DEVELOPMENT STACKS	PC % AQS	PEC	PEC % AQS	EFFECT AT INDIVIDUAL RECEPTOR
R1	17.9	+0.3	+0.1	0.8	18.2	45.5	Negligible
R2	15.7	+0.1	+0.2	1.0	16.1	40.2	Negligible
R3	15.8	+0.2	+0.3	1.2	16.3	40.8	Negligible
R4	17.3	+0.2	+0.3	1.1	17.7	44.3	Negligible
R5	17.8	+0.2	+0.3	1.1	18.2	45.5	Negligible
R6	19.5	+0.2	+0.3	1.1	20.0	49.9	Negligible
R7	21.7	+0.2	+0.3	1.2	22.2	55.5	Negligible
R8	24.1	+0.3	+0.2	1.2	24.6	61.5	Negligible
R9	17.9	+0.1	+0.2	0.8	18.3	45.6	Negligible
R10	16.1	<0.1	+0.2	0.7	16.4	41.0	Negligible
R11	15.7	<0.1	+0.2	0.6	16.0	39.9	Negligible
R12	16.2	+0.1	+0.2	0.8	16.5	41.2	Negligible
R13	17.4	+0.1	+0.1	0.4	17.5	43.8	Negligible
R14	14.5	+0.1	+0.1	0.4	14.7	36.7	Negligible
R15	14.7	<0.1	+0.1	0.4	14.9	37.1	Negligible
R16	15.6	+0.1	+0.1	0.5	15.7	39.4	Negligible
R17	16.5	+0.1	+0.1	0.5	16.7	41.6	Negligible
R18	18.2	+0.2	+0.1	0.6	18.5	46.2	Negligible
R19	17.0	+0.1	+<0.1	0.4	17.2	42.9	Negligible
R20	26.6	+0.3	+<0.1	0.9	27.0	67.5	Negligible
R21	33.5	<0.1	+0.1	0.2	33.6	83.9	Negligible

Table 7.19: Maximum predicted short term NO₂ concentrations at human health receptors

RECEPTOR ID	PC (µG/M ³)	PC % ENV STD	PC AS % OF HEADROOM	EFFECT AT INDIVIDUAL RECEPTOR
PROW 10	8.4	4.2	4.8	Negligible

Table 7.20: Maximum predicted long term PM₁₀ concentrations at human health receptors

RECEPTOR	2023BASELINE SCENARIO	CHANGE DUE TO ROAD TRAFFIC	PC PROPOSED DEVELOPMENT STACKS	PC % AQS	PEC	PEC % AQS	EFFECT AT INDIVIDUAL RECEPTOR
R1	15.0	<0.1	<0.1	0.1	15.1	37.7	Negligible
R2	14.7	<0.1	<0.1	0.1	14.7	36.8	Negligible
R3	14.7	<0.1	<0.1	0.1	14.7	36.8	Negligible
R4	14.9	<0.1	<0.1	0.1	15.0	37.5	Negligible
R5	15.0	<0.1	<0.1	0.1	15.1	37.7	Negligible
R6	15.4	<0.1	<0.1	0.1	15.4	38.5	Negligible
R7	15.8	<0.1	<0.1	0.2	15.9	39.6	Negligible
R8	16.3	<0.1	<0.1	0.2	16.3	40.8	Negligible
R9	15.1	<0.1	<0.1	0.1	15.1	37.8	Negligible
R10	14.7	<0.1	<0.1	0.1	14.8	37.0	Negligible
R11	14.7	<0.1	<0.1	0.1	14.7	36.8	Negligible
R12	14.7	<0.1	<0.1	0.1	14.8	36.9	Negligible
R13	15.0	<0.1	<0.1	0.1	15.0	37.5	Negligible
R14	14.5	<0.1	<0.1	0.0	14.5	36.2	Negligible
R15	14.5	<0.1	<0.1	0.0	14.5	36.3	Negligible
R16	14.6	<0.1	<0.1	0.1	14.7	36.7	Negligible
R17	14.8	<0.1	<0.1	0.1	14.8	37.1	Negligible
R18	15.1	<0.1	<0.1	0.1	15.2	37.9	Negligible
R19	14.9	<0.1	<0.1	0.1	14.9	37.4	Negligible

RECEPTOR	2023BASELINE SCENARIO	CHANGE DUE TO ROAD TRAFFIC	PC PROPOSED DEVELOPMENT STACKS	PC % AQS	PEC	PEC % AQS	EFFECT AT INDIVIDUAL RECEPTOR
R20	16.8	<0.1	<0.1	0.2	16.9	42.2	Negligible
R21	14.1	<0.1	<0.1	0.0	14.1	35.4	Negligible

Table 7.21: Maximum predicted long term PM_{2.5} concentrations at human health receptors

RECEPTOR	2023 BASELINE SCENARIO	CHANGE DUE TO ROAD TRAFFIC	PC PROPOSED DEVELOPMENT STACKS	PC % AQS	PEC	PEC % AQS	EFFECT AT INDIVIDUAL RECEPTOR
R1	8.8	<0.1	<0.1	0.1	8.8	35.2	Negligible
R2	8.5	<0.1	<0.1	0.1	8.6	34.3	Negligible
R3	8.6	<0.1	<0.1	0.1	8.6	34.3	Negligible
R4	8.7	<0.1	<0.1	0.1	8.7	35.0	Negligible
R5	8.8	<0.1	<0.1	0.1	8.8	35.2	Negligible
R6	9.0	<0.1	<0.1	0.1	9.0	36.0	Negligible
R7	9.2	<0.1	<0.1	0.1	9.3	37.0	Negligible
R8	9.5	<0.1	<0.1	0.1	9.5	38.2	Negligible
R9	8.8	<0.1	<0.1	0.1	8.8	35.3	Negligible
R10	8.6	<0.1	<0.1	0.1	8.6	34.5	Negligible
R11	8.5	<0.1	<0.1	0.1	8.6	34.3	Negligible
R12	8.6	<0.1	<0.1	0.1	8.6	34.4	Negligible
R13	8.7	<0.1	<0.1	0.0	8.7	35.0	Negligible
R14	8.4	<0.1	<0.1	0.0	8.4	33.7	Negligible
R15	8.4	<0.1	<0.1	0.0	8.4	33.8	Negligible
R16	8.5	<0.1	<0.1	0.0	8.5	34.2	Negligible
R17	8.6	<0.1	<0.1	0.0	8.6	34.6	Negligible
R18	8.8	<0.1	<0.1	0.1	8.8	35.4	Negligible

RECEPTOR	2023 BASELINE SCENARIO	CHANGE DUE TO ROAD TRAFFIC	PC PROPOSED DEVELOPMENT STACKS	PC % AQS	PEC	PEC % AQS	EFFECT AT INDIVIDUAL RECEPTOR
R19	8.7	<0.1	<0.1	0.0	8.7	34.8	Negligible
R20	9.8	<0.1	<0.1	0.1	9.9	39.4	Negligible
R21	8.2	<0.1	<0.1	0.0	8.2	32.9	Negligible

- 7.6.26 The maximum long-term process contribution of NO₂ from the operational traffic and process emissions associated with the operation of the Proposed Development results in a very low to low magnitude of change to the annual mean concentration. The highest predicted change in annual mean NO₂ concentrations due to emissions from the stacks only is at R3 to R6 on South Marsh Lane. Predicted impacts at other receptors are lower. At the most affected receptors, the effect can be described as minor adverse, while at other human health receptors the impact of emissions can be described as having a negligible effect.
- 7.6.27 The magnitude of change in annual mean nitrogen dioxide concentration at the identified AQMA (represented by R21) from the Proposed Development is less than 0.5% of the AQS values, which is classed as an imperceptible change. The predicted annual mean concentration of NO₂ at these receptors is below the objective value. This can therefore be described as a negligible effect.
- 7.6.28 The maximum short-term (1 hour mean) predicted concentration of nitrogen dioxide at the worst affected receptor (PROW 10) represents 4.2% of the hourly mean AQS values and impacts are smaller in magnitude at all other receptors. The predicted changes to short term concentrations of NO₂ at any human health receptor would not result in the risk of exceedance of the AQS value and can therefore be described as a negligible effect.
- 7.6.29 As described in the IAQM guidance (IAQM, 2017), the effect descriptors are applied to individual receptors and if the effect at a receptor is described as moderate or major it does not necessarily follow that the overall effect is significant. Given the worst-case assumptions made in the assessment, the magnitude of the predicted impacts and the predicted annual mean NO₂ concentrations with Proposed Development, it is considered unlikely that the Proposed Development will interfere with policies or plans in place to bring about sustained achievement of the AQS values. The overall effect of changes in NO₂ concentrations due to NO_x emissions from the Proposed Development is considered to be not significant.

Impacts on Concentrations of Other Pollutants

- 7.6.30 For the majority of the other pollutants included within the scope of the modelling assessment (see Appendix 7A in ES Volume III, Document Ref. 6.4), the model predictions demonstrate that emissions from the stacks would result in very low magnitude changes to baseline pollutant concentrations. The model predictions were, however, based upon a modelling approach that used highly pessimistic assumptions, including that of industrial metals being emitted at 100% of the respective overall emission limit for each metal. This does not take into account that modern energy from waste plants typically emit metals at concentrations far below IED limits. Further analysis of potential impacts using current guidance (Defra, 2016) was therefore carried out, in order to refine the impact predictions. The further work considers potential impacts using a range of typical emission rates.
- 7.6.31 The further analysis confirmed that the original modelling at IED emission limits was highly conservative and concluded that the impact on annual mean concentrations of all the metals considered by the assessment would result in a

negligible effect (not significant). The results of the other pollutants can be found in the dispersion modelling report in Appendix 7A in ES Volume III (Document Ref. 6.4).

Impacts on Ecological Receptors

- 7.6.32 The impact of process contributions of point source emissions at ecological receptors has been determined from the maximum model output at discrete receptor locations. The process contribution to Critical Level values (predicted from operation of the plant at BAT-AEL ELVs) have been compared with Critical Level and Critical Load values at each of the identified sensitive ecological receptors. As described at paragraph 7.3.40, Critical Levels are atmospheric concentrations and Critical Loads relate the pollutant deposition on the ground.
- 7.6.33 The significance of effects associated with emissions from the Proposed Development on designated nature conservation sites (in particular nitrogen oxides, ammonia (having impact through nutrient nitrogen and acid deposition) and sulphur dioxide) are discussed in Chapter 10: Ecology. In summary:
- in terms of NO_x and nutrient nitrogen deposition, at the closest sensitive receptor within the Humber Estuary designated site (an area of saltmarsh approximately 400 m south-east of the Site), the PC is predicted to exceed the 1% increase threshold, triggering further assessment, but the total NO_x and nutrient nitrogen deposition levels do not exceed the Critical Levels so no significant effects are anticipated;
 - the 1% increase threshold is not exceeded for NO_x or nutrient nitrogen deposition at any of the other assessed receptor locations within the Humber Estuary designated site, so no further assessment was required and significant effects are not predicted; and
 - no exceedances of the 1% increase threshold are identified for acid deposition or sulphur dioxide at any of the assessed receptor locations within the Humber Estuary designated site, so no significant effects are predicted.
- 7.6.34 The assessment concludes that the Proposed Development will not give rise to significant adverse air quality effects on sensitive habitats within the Humber Estuary SPA/ SAC/ Ramsar site/ SSSI.

Emissions of Odour

- 7.6.35 Several potential odour release sources have been identified; predominantly around presence of the Refuse Derived Fuel (RDF). Some of the process residues, chemicals and reagents which are required to mitigate operational stack emissions are also a potential source of odour if experienced at high concentrations.
- 7.6.36 Odours from the storage of RDF will be contained within the main building due to the negative pressure maintained by drawing air from the fuel reception into the combustion process. Air from within the building envelope is used as feed air to the combustion plant, which ensures destruction of odorous compounds before they are emitted to atmosphere. During normal operations, therefore, odour emissions from the Proposed Development are unlikely to occur.

- 7.6.37 Other control measures to minimise odour utilise various good housekeeping measures, including: the cleaning of storage areas on a regular basis, monitoring odour, storing flue gas treatment (FGT) residues in sealed containers, loading FGT residues to tankers using sealed systems, storing reagents in sealed containers, and recording and investigating odour issues. These measures represent BAT for the control of odours from the Proposed Development.
- 7.6.38 In the event that primary odour control measures (e.g. negative pressure and odour destruction by combustion) require additional support, odour suppression, including mist spray deodorising suppression systems would be implemented as necessary. Personnel will be trained in how and when to use the odour suppression system.
- 7.6.39 During planned maintenance, it is common for only one of the two lines to be shut down at a time, leaving the other line to draw feed air from within the building envelope. When both combustion lines need to be shut down, alternative mitigation can be implemented as outlined above.
- 7.6.40 Under normal operations, therefore, the containment measures built into the building design mean that fugitive odour emissions from the Proposed Development would be unlikely to be perceptible at locations outside of the Site boundary, which would not be significant.
- 7.6.41 As part of the Environmental Permitting process, there is a need to ensure adequate control of odour emissions so as to avoid odour impacts at sensitive receptors. The operator has an obligation to ensure the control are effective, and will be detailed within an Odour Management Plan as part of the Environmental Permit for the Proposed Development.

Decommissioning and Demolition

- 7.6.42 The relevant best practice mitigation measures for the time will be in place during any decommissioning and demolition works, and the surrounding environment and receptors at the time of decommissioning will be identified through due process and documented in a Demolition Environmental Management Plan. No additional mitigation for decommissioning and demolition of the Proposed Development beyond such best practice is foreseen to be required at this stage. The predicted air quality effects of eventual decommissioning and demolition of the Proposed Development are considered to be comparable to, or less than, those assessed for construction activities.

Comparison of Proposed Development and Consented Development

- 7.6.43 The impacts and effects of the Proposed Development compared to the impacts and effects of the Consented Development are described below.

Construction

- 7.6.44 The construction activities associated with the Proposed Development are expected to be the same as those required for the Consented Development, with appropriate construction management measures and mitigation implemented through a CEMP. Therefore the Proposed Development is predicted to have no additional construction dust or site plant emissions effects on receptors compared to the construction of the Consented Development.

7.6.45 As described in the TA (Appendix 9A ES Volume III, Document Ref. 6.4), the forecast construction traffic associated with the Proposed Development is the same as the forecast construction traffic associated with the Consented Development. In addition, the same methods for managing construction traffic (as set out in Section 9.5 of Chapter 9: Traffic and Transport) are proposed for both the Consented Development and the Proposed Development. As such, the construction traffic for the Proposed Development is predicted to have no additional air quality impact compared to the construction of the Consented Development.

Operation

7.6.46 The stack emissions from the Proposed Development would be the same as the stack emissions from the Consented Development, and the stack heights are fixed at 102 m AOD for both developments. There would therefore be no additional effect on human or ecological receptors due to predicted ground level concentrations of air pollutants from stack emissions associated with the Proposed Development compared to the Consented Development stack emissions.

7.6.47 Similarly the forecast operational traffic associated with the Proposed Development is the same as the forecast operational traffic associated with the Consented Development so operational traffic noise for the Proposed Development is predicted to have no additional air quality effect compared to the operational traffic of the Consented Development.

Decommissioning

7.6.48 The nature and scale of decommissioning activities required for the Proposed Development are proposed to be the same as that for the Consented Development. As such, the decommissioning of the Proposed Development is predicted to have no additional air quality effect compared to the decommissioning of the Consented Development.

7.7 Mitigation and Enhancement Measures

7.7.1 As described earlier, the management of dust and particulates and application of adequate mitigation measures will be enforced through the CEMP, and through application of appropriate mitigation according to the risk of dust emissions from Site activities as identified in this assessment.

7.7.2 The environmental effects from construction of the Proposed Development have been identified as not significant; therefore no specific additional mitigation has been identified as necessary for the construction phase of the Proposed Development other than the measures outlined in Section 7.5.

7.7.3 The air quality assessment of operational impacts has assumed that the ELVs will be met for the operational plant as required under the IED as amended by the revised BREF and in accordance with use of BAT under the environmental permitting regime. The environmental effects from operation of the Proposed Development have been identified as not significant at all human health receptors.

7.7.4 Detailed modelling of predicted impacts at ecological receptors indicates that potential effects at ecological receptors as a result of the operation of the Proposed Development cannot be completely screened out. Further assessment of the predicted effects at ecological receptors and the determination of the significance of these effects has therefore been undertaken – see Chapter 10: Ecology. This assessment concludes that the Proposed Development will give rise to no significant adverse air quality effects on sensitive habitats within the Humber Estuary SPA/ SAC/ Ramsar site/ SSSI.

7.7.5 No specific additional mitigation has therefore been identified as necessary for the operation or decommissioning phases of the Proposed Development, other than the embedded mitigation measures outlined in Section 7.5.

7.8 Limitations or Difficulties

7.8.1 No technical limitations or difficulties that could have implications for the assessment were encountered. The assessment presented in this Chapter utilises the data available and assesses a robust scenario for the likely effects of the Proposed Development.

7.9 Residual Effects and Conclusions

Construction

7.9.1 The air quality assessment of construction impacts assumes that the impact avoidance measures outlined within Section 7.5 will be incorporated into the design of the Proposed Development, as they are standard good practice measures that are routinely applied across UK construction sites. No specific 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 7.6 of this chapter. No significant effects have been identified.

Operation

7.9.2 The air quality assessment of impacts at opening has assumed that the ELVs will be met for the operational plant as required and in accordance with use of BAT under the environmental permitting regime. No specific 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 7.6 of this chapter. No significant effects have been identified.

Decommissioning and Demolition

7.9.3 Consistent with construction mitigation, it has been assumed that relevant best practice mitigation measures would be in place during any decommissioning and demolition works. No specific additional mitigation has been identified as necessary for the decommissioning and demolition phase of the Proposed Development at this stage and no significant effects have been identified.

7.10 References

British Standards Institute (1994) *British Standard 6069-2:1994 Characterisation of air quality. Glossary.*

Cambridge Environmental Research Consultants (CERC) (2017) *ADMS Roads Validation Papers*, from: <http://www.cerc.co.uk/environmental-software/model-validation.html>

Centre for Ecology and Hydrology and APIS (2020) *Critical Load Function Tool*. [Online]. [Accessed February 2020]. Available from: <http://www.apis.ac.uk>

Department for Environment, Food and Rural Affairs (2003) *Analysis of the Relationship between 1-hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites*.

Department for Environment, Food and Rural Affairs (2003) *Local Air Quality Management Technical Guidance TG(03)*.

Department for Environment, Food & Rural Affairs (DEFRA). *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (National Ambient Air Quality Standards)*. (Online) Available from: https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

Department for Environment, Food and Rural Affairs (2011) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*.

Department for Environment, Food and Rural Affairs (2016) *Local Air Quality Management Technical Guidance (TG16)*.

Department for Environment, Food and Rural Affairs (2018b) *Magic Map Application*. [Online]. [Accessed 6th August 2018]. Available from: <http://www.magic.gov.uk>;

Department for Environment, Food & Rural Affairs and Environment Agency (2018a) *Air emissions risk assessment for your environmental permit*. [Online]. [Accessed 6th August 2018]. Available from: <https://www.gov.uk/government/collections/risk-assessments-for-specific-activities-environmental-permits>

Department for Environment, Food and Rural Affairs and the Environment Agency (2018b) *Air Emissions Risk Assessment for your Environmental Permit*, URL: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>, Accessed: 06/08/2018

Department for Environment, Food and Rural Affairs (2019a) *Clean Air Strategy 2019*. [Online]. [Accessed 8th October 2019]. Available from: <https://www.gov.uk/government/publications/clean-air-strategy-2019>

Department for Environment, Food and Rural Affairs (2019b) *Emission Factors Toolkit v9.0.1 Application*. [Online]. [Accessed 8th October 2019]. Available from: <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>

Department of Energy and Climate Change (2011a) *Overarching National Policy Statement on Energy EN-1*.

Department of Energy and Climate Change (2011b). *National Policy Statement on Renewable Energy Infrastructure EN-3*

European Commission (2006) *Integrated Pollution Prevention and Control Reference Document on the Best Available Techniques for Waste Incineration, August 2006*

European Commission (2019) *Best Available Techniques (BAT) Reference Document on Waste Incineration Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control)*

Highways Agency (2007) *Design Manual for Roads and Bridges (DMRB) Advice Note HA207/07*

Highways England (2019) *Design Manual for Roads and Bridges (DMRB), LA105 – Air Quality.*

Institute of Air Quality Management (2014) *Guidance on the assessment of dust from demolition and construction Version 1.1 dated 01/06/16.*

Institute of Air Quality Management (2016) *Guidance on the assessment of mineral dust impacts for planning.*

Institute of Air Quality Management (2017) *Land-Use Planning & Development Control: Planning for Air Quality v1.2.*

Ministry of Housing, Communities & Local Government (2019) *National Planning Policy Framework*

Ministry of Housing, Communities & Local Government (2018) *National Planning Practice Guidance.*

North East Lincolnshire Council (2018) *North East Lincolnshire Local Plan 2013 to 2032.*