## CONTENTS



## TABLES

# 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 likely significant environmental effects 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 $PM_{10}$) 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, and identification of suitable stack heights that avoid 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 and $PM_{10}$ size fractions) and odour emissions to give rise to amenity effects during operations.

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). 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, Appendix 7A (ES Volume III) which details the dispersion modelling undertaken, and Appendix 7B (ES Volume III) which presents a human health risk assessment (HHRA).

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 air quality assessment. The significance of the predicted effects is also discussed within Chapter 10: Ecology and Nature Conservation.

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 ($NO_2$), sulphur dioxide ($SO_2$), carbon monoxide (CO) and particulate matter ($PM_{10}$, which is particulate matter of 10µm diameter or less). 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), last reviewed in 2007 (Department for Environment, Food and Rural Affairs (Defra), 2007)), 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 objectives that are applicable to this assessment are set out in Table 7.1 in relation to human health, and Table 7.2 in relation to ecological sites.

**Table 7.1: Air Quality Strategy Objectives (NAQS) - protection of human health**

| POLLUTANT | SOURCE | CONCENTRATION (µg/m$^3$) | MEASURED AS |
|---|---|---|---|
| $NO_2$ | 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 Air Quality Strategy Objective | 266 | 15-min mean, not be exceeded more than 35 times a year |
| | 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 Air Quality Strategy Objectives | 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 |
| PAH, as BaP | EU Air Quality Target Value | 0.001 | Annual mean |

| POLLUTANT | SOURCE | CONCENTRATION ($\mu g/m^3$) | MEASURED AS |
|---|---|---|---|
| | UK Air Quality Strategy Objectives | 0.00025 | Annual mean |
| Pb | EU Air Quality Limit Values | 0.5 | Annual mean |
| | UK Air Quality Strategy Objectives | 0.25 | Annual mean |
| As | EU Air Quality Target Values | 0.006 | Annual mean |
| 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 ($\mu g/m^3$) | MEASURED AS | NOTES |
|---|---|---|---|---|
| $NH_3$ | Environmental 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) |
| $SO_2$ | Environmental 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 |

| POLLUTANT | SOURCE | CONCENTRATION (µg/m$^3$) | MEASURED AS | NOTES |
|---|---|---|---|---|
| | | 20 | Annual mean | For all higher plants (all other ecosystems) |
| $NO_X$ (as $NO_2$) | Environmental Agency Environmental Permit Guidance | 30 | Annual mean | - |
| | | 75 | Daily mean | - |
| HF | Environmental 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 May 2017) and the BAT conclusions within it; while these are only draft at this stage it is envisaged that these conclusions will largely apply in the final version of the revised BREF, expected to be published at the end of 2018. 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 needs to 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 draft waste incineration BREF currently under review 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 The revised National Planning Policy Framework (NPPF) was published in July 2018 (Ministry of Housing, Communities & Local Government, 2018a) and 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."*

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

*"Planning policies and decisions should contribute to and enhance the natural and local environment by: …*

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

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

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

7.2.13 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."*

7.2.14 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.

7.2.15 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."*

7.2.16 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*

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

*Other Guidance*

7.2.18 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 criteria used in this assessment 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 ($\mu g/m^3$) | MEASURED AS |
|---|---|---|---|
| CO | EA Environmental Standards | 30,000 | 1-hour maximum |
| HCl | EA Environmental Standards | 750 | 1-hour maximum |
| HF | EA Environmental Standards | 16 | Monthly mean |
| | | 160 | 1-hour maximum |
| Hg | EA Environmental Standards | 0.25 | Annual mean |
| | | 7.5 | 1-hour maximum |
| 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 |
| Mn | EA Environmental Standards | 0.15 | Annual mean |
| | | 1,500 | 1-hour maximum |

| POLLUTANT | SOURCE | CONCENTRATION (µg/m$^3$) | MEASURED AS |
|---|---|---|---|
| Ni | EA Environmental Standards | 0.02 | Annual mean |
| V | EA Environmental Standards | 5 | Annual mean |
| | | 1 | 1-hour maximum |
| $NH_3$ | EA Environmental Standards | 180 | Annual mean |
| | | 2,500 | 1-hour maximum |
| PCBs | EA Environmental Standards | 0.2 | Annual mean |
| | | 6 | 1-hour maximum |

7.2.19 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.

7.2.20 The Highways Agency (HA) (now Highways England) publication the Design Manual for Roads and Bridges (DMRB) (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.

7.2.21 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.

7.3.2 The technical assessment report within Appendix 7A in ES Volume III 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.

Consultation

7.3.3 The Environmental Health Department at North East Lincolnshire Council (NELC) was contacted and consulted on the approach to be taken to the air quality assessment between the 8$^{th}$ and 10$^{th}$ August 2018. At the request of NELC, the three month baseline $NO_2$ survey proposed by AECOM was extended to six months. This assessment has been prepared using the first three months of monitoring results, the final three months of results of monitoring will be provided following completion of the survey in December 2018. This approach has been agreed with the Environmental Health Department at NELC.

7.3.4 The EA has been consulted (through face to face meetings and telephone calls with the Sustainable Places and Permitting teams) to agree the approach to preparing the EIA as well as the separate Environmental Permit application for the Proposed Development.

Impact Assessment and Significance Criteria

7.3.5 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.

7.3.6 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 and adverse of beneficial.

7.3.7 The process and traffic emissions assessments have been made with reference to the air quality standards (NAQSs) and objectives laid out in the Air Quality Standards Regulations and environmental standards set out within EA guidance.

*Development Scenarios*

7.3.8 As described in Chapter 4: The Proposed Development, there are a number of possible development scenarios – a single stream plant, a two stream plant built in a single phase, or a two stream plant built in two phases. For the air quality assessment, the construction of a two stream plant built in a single phase is considered to be the 'worst case' and is therefore the scenario used for the assessment.

7.3.9 For the assessment of air quality impacts during construction (in terms of construction traffic emissions and particulate matter) the construction of a two stream plant in a single phase is a 'worst case' because construction traffic generation will be greater and the level of activity on the Site will be greater. The same applies to the decommissioning phase assessment.

7.3.10 For the assessment of air quality impacts during operation (in terms of operational traffic emissions and process emissions) the two stream plant is a 'worst case' because operational traffic generation will be greater and process emissions will also be greater.

*Extent of Study Area*

7.3.11 The Study Area for the operational development point source emissions 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).

7.3.12 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*

7.3.13 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.

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

7.3.15 The emphasis of the regulation and control of construction dust is therefore through the adoption of Best Practicable Means (BPM) when working 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.

7.3.16 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 ($PM_{10}$) impacts, dust soiling impacts, and ecological impacts (such as physical smothering, and chemical impacts for example from deposition of alkaline materials). The appraisal of risk is based on the scale and nature of activities and on the sensitivity of receptors, and the outcome of the appraisal is used to determine the level of good practice mitigation required for adequate control of dust.

7.3.17 The assessment undertaken for this chapter is consistent with the overarching approach to the assessment of the impacts of construction, 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 activities being carried out (including demolition, earthworks, construction and trackout, where construction vehicles could carry mud onto the public highway);
- establish the sensitivity of the area through determination of the sensitivity of receptors and their distance from construction activities;
- determine the risk of significant impacts on receptors occurring as a result of the magnitude of impact and the sensitivity of the area, assuming no additional mitigation (beyond the identified development design and impact avoidance measures) is applied;
- determine the level of mitigation required based on the level of risk, to reduce potential impacts at receptors to insignificant or negligible; and
- summarise the potential residual effects of the mitigated works.

7.3.18 The criteria for assessment of magnitude, sensitivity and risk are summarised in Tables 7A.1-7A.5 in Appendix 7A in ES Volume III.

*Assessment of Construction and Operational Road Traffic*

7.3.19 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, $PM_{10}$ and $PM_{2.5}$ in exhaust emissions. Similarly but to a lesser extent, any sulphur in the fuel can be converted to sulphur dioxide ($SO_2$) 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.

7.3.20 Although $SO_2$, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this Proposed Development. This is because 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 $SO_2$, CO, benzene and 1, 3-butadiene from road traffic are therefore not considered further within this assessment.

7.3.21 Exhaust emissions from road vehicles may affect the ambient concentrations of the principal road traffic pollutants, nitrogen dioxide, $PM_{10}$ and $PM_{2.5}$, at sensitive receptors in the vicinity of the Proposed Development. Therefore, these pollutants are the focus of the assessment of the significance of road traffic air quality impacts.

7.3.22 DMRB HA207/07 guidance (HA, 2007) 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.

7.3.23 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.

7.3.24 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).

7.3.25 The derivation of the traffic data used in this assessment is set out in Chapter 9: Traffic and Transport.

7.3.26 The data used in the road traffic dispersion modelling has been provided for the following scenarios:

- 2017 Baseline Scenario (for model verification process);
- 2020 Base + Committed Development Scenario;

- 2020 Base + Committed + Peak Construction Scenario;
- 2022 Base + Committed Development Scenario; and
- 2022 Base + Committed + Operation Scenario

7.3.27 The future decommissioning baseline scenario was not provided due to unknowns regarding the life cycle of the Proposed Development and the future traffic projections for 2050.

7.3.28 The traffic data used in the modelling of road traffic emissions are presented in Annex B of Appendix 7A in ES Volume III.

7.3.29 Data in the form of traffic flows, composition (percentage heavy goods 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.

7.3.30 Due to the uncertainty in the rate of vehicle emissions improvement over the coming years, this assessment has used emission rates (EFT Version 8.0.1 emission factor dataset) for 2015 to represent all assessment year scenarios.

7.3.31 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 schemes 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))*

7.3.32 As outlined in Chapter 5: Construction Programme and Management the construction phase for the Proposed Development is anticipated to last around 36 months, from Q3 2019 to 2022. .

7.3.33 There are likely to be emissions to air during construction activities arising from on-site construction plant or NRMM. The IAQM guidance (IAQM, 2017) 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".*

7.3.34 The screening criterion in the DMRB (HA, 2007), which states that only properties and habitat sites within 200 m of roads should be considered in traffic assessments, has also been considered in determining the potential for impacts from NRMM the Proposed Development on sensitive receptors. A qualitative assessment of the potential for impact from nitrogen dioxide and $PM_{10}$ emissions from NRMM on identified receptors has therefore been made based on the criteria outlined in the above guidance.

*Assessment of Process Emissions from the Operation Plant at Year of Opening*

7.3.35 Emissions from the Proposed Development, assumed to be operational in 2022, have been assessed using the EA Risk assessment methodology (Defra and EA, 2018d) 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.

7.3.36 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.

7.3.37 The first year of operation (referred to as opening) of the Proposed Development is assumed to be 2022 for the purpose of this assessment, which is the earliest date that the Proposed Development could realistically start to export power commercially.

7.3.38 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 Critical Levels for ecological receptors, taking into consideration the baseline air quality, in accordance with EA risk assessment methodology (Defra and EA, 2017).

7.3.39 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, 2017) for the most sensitive species in each individual Habitat site, taking into consideration the baseline air quality.

7.3.40 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 $SO_2$ 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*

7.3.41 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, human health, and ecological impacts as a result of the Proposed Development construction works.

7.3.42 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 application of appropriate mitigation should ensure that residual effects will normally be ‘not significant’.

*Evaluation of Significance – Operational Emissions*

7.3.43 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).

7.3.44 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 7.4) 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 7.4: 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 AQAL | Negligible | Negligible | Negligible | Minor | Moderate |
| 76-94% of AQAL | Negligible | Negligible | Minor | Moderate | Moderate |
| 95-102% of AQAL | Negligible | Minor | Moderate | Moderate | Major |
| 103-109% of AQAL | Negligible | Moderate | Moderate | Major | Major |
| 110% or more of AQAL | Negligible | Moderate | Major | Major | Major |

AQAL = Air Quality Assessment Level (NAQS objective or EU Limit Value or Environmental Standard)

7.3.45 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.

7.3.46 The evaluation of the significance of air quality effects from the operational point sources 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, 2018d).

7.3.47 The IAQM guidance (IAQM, 2017) indicates that the EA threshold criterion of 10% of the short term AQAL is sufficiently small in magnitude to be regarded as having an 'insignificant' effect. The IAQM guidance deviates from the EA guidance (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 <=10% of the NAQS represents an 'insignificant' (negligible) impact;
- PC 11-20% of the NAQS is small in magnitude representing a 'slight' (minor) impact;
- PC 21-50% of the NAQS is medium in magnitude representing a moderate impact; and

- PC >51% of the NAQS is large in magnitude representing a 'substantial' (major) impact.

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

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

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

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

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

7.3.51 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.

7.3.52 Where emissions are not screened as insignificant (negligible), the descriptive terms for the air quality effect outlined in Table 7.4 above have been applied.

*Evaluation of Significance – Proposed Development as a Whole*

7.3.53 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).

7.3.54 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*

7.3.55 The physical parameters for the modelling of emissions from the Proposed Development stacks have been sourced from 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.

7.3.56 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, based on IAQM guidance (IAQM, 2014), receptors potentially affected by dust soiling and short term concentrations of $PM_{10}$ 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 6: Traffic and Transport) that construction vehicles will use South Marsh Lane, Hobson Way, Kiln Lane, A1173 and the A180 towards the M180.

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. Isopleth 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 7: Ecology and Nature Conservation). 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 and Nature Conservation.

7.4.5 Identified receptors are detailed in Table 7.5 below, for construction and operational phases, and are shown on Figure 7.1 and 7.2 in ES Volume II. The distances quoted from construction phase activities include the proximity of any part of the designated routes used by construction vehicles.

**Table 7.5: 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: | | FIGURE REFERENCE |
|---|---|---|---|---|---|---|---|
| | | | X | Y | OPERATION (m) | DUST (m) | |
| R1 | Mauxhall Farm | Residential | 519164 | 413247 | 3,780 | 420 | Figure 7.1 |
| R2 | Property on North Moss Lane | Residential | 521290 | 413089 | 1,300 | 850 | Figure 7.1 |
| R3 | Property on South Marsh Road | Residential | 521591 | 413001 | 1,680 | 1,150 | Figure 7.1 |
| R4 | Property on South Marsh Road | Residential | 521298 | 412771 | 1,760 | 1,230 | Figure 7.1 |
| R5 | Property on South Marsh Road | Residential | 521258 | 412700 | 1,800 | 1,290 | Figure 7.1 |
| R6 | Property on South Marsh Road | Residential | 521171 | 412590 | 1,900 | 1,380 | Figure 7.1 |
| R7 | Primrose Cottage, north of A180 | Residential | 521900 | 412105 | 1,640 | 2,130 | Figure 7.1 |
| R8 | Cress Cottage, north of A180 | Residential | 521988 | 411994 | 1,680 | 2,330 | Figure 7.1 |
| R9 | The Meadows, south of A180 | Residential | 522051 | 411669 | 1,920 | 1,530 | Figure 7.1 |
| R10 | Meadows Farm, south of A180 | Residential | 521900 | 411653 | 2,170 | 1,600 | Figure 7.1 |

| ID | RECEPTOR NAME | RECEPTOR TYPE | GRID REFERENCE | | DISTANCE FROM BOUNDARY FOR IMPACTS FROM: | | FIGURE REFERENCE |
|---|---|---|---|---|---|---|---|
| | | | X | Y | OPERATION (m) | DUST (m) | |
| R11 | Meadows Cottages, south of A180 | Residential | 521900 | 411605 | 2,170 | 1,600 | Figure 7.1 |
| R12 | Property on South Marsh Road in Stallingborough | Residential | 520822 | 412113 | 2,500 | 2,150 | Figure 7.1 |
| R13 | Property on Woad Lane in Grimsby | Residential | 524372 | 410818 | 2,900 | 2,570 | Figure 7.1 |
| R14 | Property on Kendal Road, Immingham | Residential | 519215 | 414218 | 3,820 | 1,100 | Figure 7.1 |
| R15 | Property on Hadleigh Road, Immingham | Residential | 518810 | 414142 | 4,180 | 1,280 | Figure 7.1 |
| R16 | Property on Arran Close, Immingham | Residential | 518580 | 413796 | 4,400 | 1,190 | Figure 7.1 |
| R17 | Property on Mull Way, Immingham | Residential | 518388 | 413642 | 4,570 | 500 | Figure 7.1 |
| R18 | Willows Court, Immingham | Residential | 517721 | 413749 | 5,220 | 270 | Figure 7.1 |
| R19 | Property north of Habrough | Residential | 515237 | 414003 | 7,700 | 100 | Figure 7.1 |
| R20 | Property on Station Road in Habrough | Residential | 515087 | 414241 | 7,900 | 70 | Figure 7.1 |
| R21 | Grimsby AQMA | Residential | 527731 | 410459 | 5,470 | 5,290 | Figure 7.1 |
| PROW 1 | Public Right of Way (various | Transient | 522277 | 413722 | 720 | 60 | Figure 7.1 |

| ID | RECEPTOR NAME | RECEPTOR TYPE | GRID REFERENCE | | DISTANCE FROM BOUNDARY FOR IMPACTS FROM: | | FIGURE REFERENCE |
|---|---|---|---|---|---|---|---|
| | | | X | Y | OPERATION (m) | DUST (m) | |
| PROW 2 | points along the same route). | Transient | 522434 | 413788 | 620 | 240 | Figure 7.1 |
| PROW 3 | | Transient | 522603 | 413840 | 510 | 380 | Figure 7.1 |
| PROW 4 | | Transient | 522762 | 413932 | 500 | 440 | Figure 7.1 |
| PROW 5 | | Transient | 522985 | 413983 | 490 | 460 | Figure 7.1 |
| PROW 6 | | Transient | 523270 | 413886 | 405 | 360 | Figure 7.1 |
| PROW 7 | | Transient | 523401 | 413749 | 345 | 300 | Figure 7.1 |
| PROW 8 | | Transient | 523538 | 413599 | 390 | 390 | Figure 7.1 |
| PROW 9 | | Transient | 523644 | 413397 | 470 | 470 | Figure 7.1 |
| PROW 10 | | Transient | 523787 | 413140 | 620 | 620 | Figure 7.1 |
| PROW 11 | | Transient | 523985 | 413119 | 880 | 880 | Figure 7.1 |
| PROW 12 | | Transient | 524146 | 412958 | 1,050 | 1,050 | Figure 7.1 |
| E1_1 | Atlantic Salt Meadows | Humber Estuary SSSI, Ramsar site, SPA and SAC | 523841 | 413152 | 680 | 680 | Figure 7.2 |
| E1_2 | Atlantic Salt Meadows | | 523795 | 413177 | 680 | 680 | Figure 7.2 |
| E1_3 | Atlantic Salt Meadows | | 523891 | 413167 | 680 | 680 | Figure 7.2 |
| E2_1 | Atlantic Salt Meadows | | 525875 | 411461 | 3,300 | 3,300 | Figure 7.2 |
| E2_2 | Atlantic Salt Meadows | | 526051 | 411348 | 3,500 | 3,500 | Figure 7.2 |

| ID | RECEPTOR NAME | RECEPTOR TYPE | GRID REFERENCE | | DISTANCE FROM BOUNDARY FOR IMPACTS FROM: | | FIGURE REFERENCE |
|---|---|---|---|---|---|---|---|
| | | | X | Y | OPERATION (m) | DUST (m) | |
| E2_3 | Atlantic Salt Meadows | | 526204 | 411085 | 3,780 | 3,780 | Figure 7.2 |
| E2_4 | Atlantic Salt Meadows | | 526384 | 411077 | 3,940 | 3,940 | Figure 7.2 |
| E3_1 | Atlantic Salt Meadows | | 527221 | 410770 | 4790 | 4,790 | Figure 7.2 |
| E4_1 | Acid Fixed Dunes | | 531237 | 408287 | 9,550 | 9,550 | Figure 7.2 |
| E4_2 | Acid Fixed Dunes | | 531313 | 408200 | 9,620 | 9,620 | Figure 7.2 |
| E4_3 | Acid Fixed Dunes | | 531397 | 408097 | 9,770 | 9,770 | Figure 7.2 |
| E4_4 | Acid Fixed Dunes | | 531499 | 408035 | 9,900 | 9,900 | Figure 7.2 |
| E4_5 | Acid Fixed Dunes | | 531547 | 407962 | 10,000 | 10,000 | Figure 7.2 |
| E4_6 | Acid Fixed Dunes | | 531540 | 407912 | 10,000 | 10,000 | Figure 7.2 |
| E5_1 | Atlantic Salt Meadows | | 531682 | 408046 | 10,050 | 10,050 | Figure 7.2 |
| E5_2 | Atlantic Salt Meadows | | 531750 | 407998 | 10,130 | 10,130 | Figure 7.2 |
| E5_3 | Atlantic Salt Meadows | | 531793 | 407923 | 10,200 | 10,200 | Figure 7.2 |
| E5_4 | Atlantic Salt Meadows | | 531863 | 407852 | 10,300 | 10,300 | Figure 7.2 |
| E5_5 | Atlantic Salt Meadows | | 531926 | 407779 | 10,400 | 10,400 | Figure 7.2 |
| E5_6 | Atlantic Salt Meadows | | 532034 | 407667 | 10,500 | 10,500 | Figure 7.2 |
| E5_7 | Atlantic Salt Meadows | | 532175 | 407545 | 10,600 | 10,600 | Figure 7.2 |

| ID | RECEPTOR NAME | RECEPTOR TYPE | GRID REFERENCE | | DISTANCE FROM BOUNDARY FOR IMPACTS FROM: | | FIGURE REFERENCE |
|---|---|---|---|---|---|---|---|
| | | | X | Y | OPERATION (m) | DUST (m) | |
| E5_8 | Atlantic Salt Meadows | | 532324 | 407415 | 10,700 | 10,700 | Figure 7.2 |
| E5_9 | Atlantic Salt Meadows | | 532520 | 407260 | 10,800 | 10,800 | Figure 7.2 |
| E5_10 | Atlantic Salt Meadows | | 532616 | 407081 | 11,000 | 11,000 | Figure 7.2 |
| E6_1 | neutral grassland | Laporte Road LWS | 521571 | 414727 | 1,870 | 1,870 | Figure 7.2 |
| E6_2 | neutral grassland | | 521576 | 414769 | 1,920 | 1,920 | Figure 7.2 |
| E7_1 | Broadleaved, mixed and yew woodland | Stallingborough Fish Ponds LWS | 521306 | 412565 | 1,850 | 1,850 | Figure 7.2 |
| E7_2 | Broadleaved, mixed and yew woodland | | 521391 | 412451 | 1,840 | 1,840 | Figure 7.2 |
| E8_1 | Broadleaved, mixed and yew woodland | Healing Cress Beds LWS | 522076 | 412246 | 1,430 | 1,430 | Figure 7.2 |
| E8_2 | Broadleaved, mixed and yew woodland | | 522170 | 412159 | 1,500 | 1,500 | Figure 7.2 |
| E9_1 | Fen, Marsh and Swamp | Sweedale Croft Drain LWS | 523451 | 411593 | 1,850 | 1,850 | Figure 7.2 |
| E9_2 | Fen, Marsh and Swamp | | 523599 | 411714 | 1,740 | 1,740 | Figure 7.2 |
| E9_3 | Fen, Marsh and Swamp | | 523710 | 411805 | 1,680 | 1,680 | Figure 7.2 |

*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, $PM_{10}$ 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 (TI), 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) as benzene are also included in the dispersion modelling assessment and are set out in Appendix 7A in ES Volume III.

7.4.7 NELC has designated one AQMA in Grimsby. The Grimsby AQMA was declared for an exceedance of the annual mean $NO_2$ objective. This AQMA is located approximately 5.5 km south-east of the Site. The AQMA is shown in Figure 7.1.

7.4.8 NELC undertake monitoring within Immingham and Grimsby (NELC, 2017) at 32 locations for $NO_2$, by diffusion tube monitoring, and with three continuous monitoring stations (three for $NO_2$, and one for $PM_{10}$). The nearest $NO_2$ continuous monitor CM2 is located on Kings Road in Immingham 3.7 km north-east of the Site. Annual mean $NO_2$ concentrations for 2016 were reported as 28.2 $\mu g/m^3$. The diffusion tubes located in Immingham are DIF23, DIF24 and DIF25 which have annual mean concentrations for 2016 of 32.6, 32.4 and 34.9 $\mu g/m^3$ respectively.

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 7.6. 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 $NO_2$ diffusion tube surveys commenced in June 2018 and is ongoing until December 2018 to supplement the baseline data. A summary of the project specific monitoring results for the first twelve weeks of the survey period (29th June 2018 to 20th September 2018) are presented in Table 7.7.

**Table 7.6: NELC $NO_2$ Diffusion Tube Monitoring**

| ID | MONITORING LOCATION | SITE TYPE | GRID REFERENCE | | 2016 ANNUAL MEAN CONC. ($\mu g/m^3$) |
|---|---|---|---|---|---|
| | | | X | Y | $NO_2$ |
| DIF 14 | 113 Cleethorpe Road, Grimsby | Kerbside | 527761 | 410446 | 37.3 |
| DIF 15 | 123 Cleethorpe Road, Grimsby | Kerbside | 527802 | 410436 | 35.7 |
| DIF 16 | 6 Freeman Street, Grimsby | Kerbside | 527693 | 410423 | 33.0 |
| DIF 23 | Kings Road, Immingham | Roadside | 519193 | 415279 | 32.6 |
| DIF 24 | | | | | 32.4 |
| DIF 25 | | | | | 34.9 |

**Table 7.7: Project Specific $NO_2$ Diffusion Tube Monitoring**

| ID | MONITORING LOCATION | SITE TYPE | GRID REFERENCE | | SURVEY PERIOD MEAN CONC. ($\mu g/m^3$) | 2017 ANNUALISED MEAN CONC. ($\mu g/m^3$) |
|---|---|---|---|---|---|---|
| | | | X | Y | $NO_2$ | $NO_2$ |
| KOA T1 | Near salt marsh section of Humber Estuary SSSI, Ramsar site, SPA, SAC | Other | 523788 | 413171 | 9.8 | 11.8 |
| KOA T2 | Woad Lane, Grimsby | Roadside | 524382 | 410798 | 15.2 | 18.3 |
| KOA T3 | Ephams Lane north of Stallingborough | Roadside | 521150 | 412579 | 14.2 | 17.1 |
| KOA T4 | Station Road, Stallingborough | Roadside | 520824 | 412134 | 13.4 | 16.1 |
| KOA T5 | Roxton Road, Immingham | Roadside | 517726 | 413761 | 20.0 | 24.2 |
| KOA T6 | Near Wold Chapel Hotel, Habrough | Roadside | 515250 | 413996 | 16.5 | 20.3 |

7.4.12 Background data has been obtained from Defra published maps for the locations of likely maximum impact due to point source emissions from the Proposed Development, and at identified sensitive receptor locations. The most recent data available from the background maps is for a base year of 2015, which has been conservatively assumed to be representative of the peak construction year (2020) and opening year baselines (2022).

7.4.13 The background $NO_2$ concentration for receptors R1 to R20 was sourced from project specific monitoring at location KOA T1. The background $NO_2$ concentration for R21 was sourced from NELC monitoring location DIF 14, which is a kerbside location within the Grimsby AQMA.

7.4.14 Background $NO_2$, CO, $PM_{10}$ and $PM_{2.5}$ concentrations assumed for the selected sensitive receptors are provided in Table 7.8 below. It indicates $NO_2$ concentrations within the vicinity of the Proposed Development are consistently well below the NAQS annual mean objective. Background data for $NO_2$ and $PM_{10}$ at sensitive receptors for point source and traffic emission impacts is provided in Table 7.8.

7.4.15 The background air pollutant concentrations in the vicinity of the Proposed Development are consistently well below the national objective value for nitrogen dioxide at all reported monitoring locations. Data reported by NELC (NELC, 2017) 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 7.8: Background Concentrations at Receptors**

| POLLUTANT | ANNUAL MEAN CONCENTRATION (µg/m$^3$) |
|---|---|
| | 2015 |
| Nitrogen dioxide ($NO_2$) | 11.8 for R1 to R20<br>37.3 for R21 |
| $PM_{10}$ | 15.6 |
| $PM_{2.5}$ | 10.7 |
| Carbon monoxide (CO) | 258 |

7.4.16 Baseline annual mean concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$, and the number of expected exceedances of the 24-hour 50 µg/m$^3$ $PM_{10}$ air quality objectives at the selected receptors during the current 2017 baseline scenario are listed in Table 7.9 below.

**Table 7.9: Air Quality Statistics Predicted for Baseline Scenario in 2017**

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m$^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 µg/m$^3$ (DAYS) |
|---|---|---|---|---|---|
| | | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ | |
| R1 | Mauxhall Farm | 18.9 | 16.7 | 11.4 | 1 |
| R2 | Property on North Moss Lane | 16.3 | 16.3 | 11.1 | 1 |
| R3 | Property on South Marsh Road | 16.5 | 16.4 | 11.1 | 1 |
| R4 | Property on South Marsh Road | 18.5 | 16.7 | 11.3 | 1 |
| R5 | Property on South Marsh Road | 19.2 | 16.8 | 11.4 | 1 |
| R6 | Property on South Marsh Road | 21.7 | 17.3 | 11.7 | 1 |
| R7 | Primrose Cottage, north of A180 | 24.9 | 17.8 | 12.0 | 2 |
| R8 | Cress Cottage, north of A180 | 28.2 | 18.4 | 12.4 | 2 |
| R9 | The Meadows, south of A180 | 19.6 | 16.9 | 11.5 | 1 |
| R10 | Meadows Farm, south of A180 | 17.0 | 16.5 | 11.2 | 1 |
| R11 | Meadows Cottages, south of A180 | 16.4 | 16.4 | 11.1 | 1 |
| R12 | Property on South Marsh Road in Stallingborough | 17.0 | 16.5 | 11.2 | 1 |
| R13 | Property on Woad Lane in Grimsby | 18.8 | 16.8 | 11.4 | 1 |
| R14 | Property on Kendal Road, Immingham | 14.5 | 16.1 | 10.9 | 1 |
| R15 | Property on Hadleigh Road, Immingham | 14.7 | 16.1 | 11.0 | 1 |
| R16 | Property on Arran Close, Immingham | 15.8 | 16.3 | 11.1 | 1 |
| R17 | Property on Mull Way, Immingham | 17.0 | 16.5 | 11.2 | 1 |
| R18 | Willows Court, Immingham | 19.3 | 16.8 | 11.4 | 1 |

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu g/m^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 $\mu g/m^3$ (DAYS) |
|---|---|---|---|---|---|
| | | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ | |
| R19 | Property north of Habrough | 17.7 | 16.6 | 11.3 | 1 |
| R20 | Property on Station Road in Habrough | 29.8 | 18.7 | 12.6 | 3 |
| R21 | Grimsby AQMA | 37.6 | 15.7 | 10.7 | 1 |

7.4.17 The baseline values show that concentrations of all pollutants in the vicinity of the Site are well below the national objective values, indicating that air quality in the vicinity of the Proposed Development is good. More elevated concentrations of $NO_2$ 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. 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), 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 defined for the most sensitive species present, 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 $NO_2$, $PM_{10}$ and $PM_{2.5}$, and the number of exceedances of the 24-hour 50 $\mu g/m^3$ $PM_{10}$ air quality objective, at the selected receptors during the future 2020 Base + Committed scenario are listed in Table 7.10.

**Table 7.10: Air Quality Baseline Statistics Predicted for 2020 Base + Committed Scenario**

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu g/m^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 $\mu g/m^3$ (DAYS) |
|---|---|---|---|---|---|
| | | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ | |
| R1 | Mauxhall Farm | 19.5 | 16.8 | 11.4 | 1 |
| R2 | Property on North Moss Lane | 16.6 | 16.4 | 11.1 | 1 |
| R3 | Property on South Marsh Road | 16.8 | 16.4 | 11.2 | 1 |
| R4 | Property on South Marsh Road | 19.0 | 16.8 | 11.4 | 1 |
| R5 | Property on South Marsh Road | 19.7 | 16.9 | 11.5 | 1 |
| R6 | Property on South Marsh Road | 22.4 | 17.4 | 11.7 | 1 |
| R7 | Primrose Cottage, north of A180 | 25.7 | 18.0 | 12.1 | 2 |
| R8 | Cress Cottage, north of A180 | 29.2 | 18.6 | 12.5 | 2 |
| R9 | The Meadows, south of A180 | 20.1 | 17.0 | 11.5 | 1 |
| R10 | Meadows Farm, south of A180 | 17.4 | 16.5 | 11.2 | 1 |
| R11 | Meadows Cottages, south of A180 | 16.7 | 16.4 | 11.2 | 1 |
| R12 | Property on South Marsh Road in | 17.4 | 16.5 | 11.2 | 1 |

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m$^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 µg/m$^3$ (DAYS) |
|---|---|---|---|---|---|
| | | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ | |
| | Stallingborough | | | | |
| R13 | Property on Woad Lane in Grimsby | 19.3 | 16.9 | 11.4 | 1 |
| R14 | Property on Kendal Road, Immingham | 14.7 | 16.1 | 11.0 | 1 |
| R15 | Property on Hadleigh Road, Immingham | 15.0 | 16.1 | 11.0 | 1 |
| R16 | Property on Arran Close, Immingham | 16.2 | 16.3 | 11.1 | 1 |
| R17 | Property on Mull Way, Immingham | 17.4 | 16.5 | 11.2 | 1 |
| R18 | Willows Court, Immingham | 19.9 | 16.9 | 11.5 | 1 |
| R19 | Property north of Habrough | 18.2 | 16.7 | 11.3 | 1 |
| R20 | Property on Station Road in Habrough | 31.2 | 18.9 | 12.7 | 3 |
| R21 | Grimsby AQMA | 37.6 | 15.7 | 10.7 | 1 |

7.4.20 The predicted baseline construction year pollutant concentrations are well below all national objective values for all pollutants, indicating that air quality in the vicinity of the Proposed Development is good. As for 2017, higher concentrations of $NO_2$ are predicted within the Grimsby AQMA, though still within the objective values.

Future Operational Baseline

7.4.21 Predicted annual mean concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$, and the number of predicted exceedances of the 24-hour 50 µg/m$^3$ $PM_{10}$ air quality objective, at the selected receptors during the 2022 Base + Committed scenario are listed in Table 7.11.

**Table 7.11: Air Quality Statistics Predicted for 2022 Base + Committed Scenario**

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION (µg/m$^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 µg/m$^3$ (DAYS) |
|---|---|---|---|---|---|
| | | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ | |
| R1 | Mauxhall Farm | 20.0 | 16.9 | 11.5 | 1 |
| R2 | Property on North Moss Lane | 16.8 | 16.4 | 11.2 | 1 |
| R3 | Property on South Marsh Road | 17.0 | 16.5 | 11.2 | 1 |
| R4 | Property on South Marsh Road | 19.3 | 16.8 | 11.4 | 1 |
| R5 | Property on South Marsh Road | 20.0 | 17.0 | 11.5 | 1 |
| R6 | Property on South Marsh Road | 22.7 | 17.4 | 11.8 | 1 |
| R7 | Primrose Cottage, north of A180 | 26.1 | 18.1 | 12.2 | 2 |
| R8 | Cress Cottage, north of A180 | 29.7 | 18.7 | 12.6 | 3 |
| R9 | The Meadows, south of A180 | 20.4 | 17.0 | 11.5 | 1 |
| R10 | Meadows Farm, south of A180 | 17.6 | 16.6 | 11.3 | 1 |
| R11 | Meadows Cottages, south of A180 | 16.9 | 16.5 | 11.2 | 1 |
| R12 | Property on South Marsh Road in Stallingborough | 17.6 | 16.6 | 11.2 | 1 |
| R13 | Property on Woad Lane in Grimsby | 19.5 | 16.9 | 11.5 | 1 |
| R14 | Property on Kendal Road, Immingham | 14.9 | 16.1 | 11.0 | 1 |
| R15 | Property on Hadleigh Road, Immingham | 15.2 | 16.2 | 11.0 | 1 |
| R16 | Property on Arran Close, Immingham | 16.4 | 16.4 | 11.1 | 1 |
| R17 | Property on Mull Way, Immingham | 17.7 | 16.6 | 11.3 | 1 |

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu g/m^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF 50 $\mu g/m^3$ (DAYS) |
|---|---|---|---|---|---|
| | | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ | |
| R18 | Willows Court, Immingham | 20.3 | 17.0 | 11.5 | 1 |
| R19 | Property north of Habrough | 18.5 | 16.7 | 11.3 | 1 |
| R20 | Property on Station Road in Habrough | 32.0 | 19.1 | 12.8 | 3 |
| R21 | Grimsby AQMA | 37.6 | 15.7 | 10.7 | 1 |

7.4.22 Predicted baseline pollutant concentrations in the 2022 Baseline + Committed scenario show that concentrations of all pollutants are below national objective 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, 2017), the annual mean background pollutant concentrations have been obtained from Defra background mapping (2015 base year) as described above and the short-term background concentration is assumed to be twice the long-term concentration for $NO_2$ and CO and one and a half times the long-term background concentration for $PM_{10}$.

## 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 industry best practice, through incorporation of appropriate control measures according to the risks posed by the activities undertaken, as determined through this assessment process. The management of dust and particulates and application of adequate mitigation measures will be enforced through 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.

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), 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 duration of storage of top soil or spoil during construction; and

- prohibiting open fires on Site.

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

- minimising vehicle and plant idling; and
- where possible, locating static plant away from sensitive boundaries or receptors, in particular by retaining 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, or, if tighter, the revised draft waste incineration BREF. 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 100 m above the 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.

## 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 nitrogen dioxide ( chemical formula $NO_2$);
- particulate matter (as $PM_{10}$ size fraction);
- carbon monoxide ( chemical formula CO);
- sulphur dioxide ( chemical formula $SO_2$);
- hydrogen chloride ( chemical formula HCl);
- hydrogen fluoride ( chemical formula 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 $NH_3$); 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 national air quality objective 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 ($PM_{10}$ 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.

Construction

*Assessment of Construction Dust*

7.6.7 Identified sensitive receptors to dust soiling and $PM_{10}$ effects from construction works are detailed in Table 7.2. The area sensitive to dust soiling and $PM_{10}$ health effects has been assessed, as detailed in Appendix 7A in ES Volume III, 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 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).

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) 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; 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 The magnitude of impacts for dust and NRMM emissions has been determined as 'large' for earthworks and construction activities and 'medium' for trackout activities.

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) using professional judgement. The area sensitivity has been judged to be 'low' for dust soiling impacts from all activities and 'medium' sensitivity for human health impacts from $PM_{10}$ 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/$m^3$).

7.6.13 The potential risks from emissions from unmitigated demolition and construction activities (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, Table 7A.5; the results are shown in Table 7.12 below.

**Table 7.12: Risk of dust and particulates impacts (pre-mitigation)**

| POTENTIAL IMPACT | RISK OF IMPACT FROM ACTIVITY | | | |
|---|---|---|---|---|
| | PRE-CONSTRUC-TION 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 activities to avoid significant impacts on receptors has been determined based on the above risk assessment and indicative measures are outlined in Table 7.13 for the Proposed Development activities.

**Table 7.13: 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 | Negligible | Not significant |

| ACTIVITY | EXAMPLE MITIGATION BASED ON RISK LEVEL | CLASSIFICATION OF RESIDUAL RISK OF IMPACT | EFFECT DESCRIPTOR |
|---|---|---|---|
| | possible; store sand and aggregates in bunded areas and finer materials in silos with 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 industry good practice controls and mitigation, along with the CEMP would reduce potential effects at receptors to a not significant level.

Assessment of Construction Traffic

7.6.16 Predicted annual mean concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$, and the number of exceedances of the 24-hour 50 µg/m$^3$ $PM_{10}$ air quality objective at the selected existing receptors during the 2020 Base + Committed + Construction scenario are listed in Table 7.14.

**Table 7.14: Air Quality Statistics Predicted for 2020 Base + Committed + 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 | 19.6 | 16.8 | 11.4 | 1 |
| R2 | Property on North Moss Lane | 16.7 | 16.4 | 11.2 | 1 |
| R3 | Property on South Marsh Road | 16.9 | 16.4 | 11.2 | 1 |
| R4 | Property on South Marsh Road | 19.1 | 16.8 | 11.4 | 1 |
| R5 | Property on South Marsh Road | 19.9 | 16.9 | 11.5 | 1 |
| R6 | Property on South Marsh Road | 22.5 | 17.4 | 11.8 | 1 |
| R7 | Primrose Cottage, north of A180 | 25.8 | 18.0 | 12.1 | 2 |
| R8 | Cress Cottage, north of A180 | 29.3 | 18.6 | 12.5 | 2 |
| R9 | The Meadows, south of A180 | 20.1 | 17.0 | 11.5 | 1 |
| R10 | Meadows Farm, south of A180 | 17.4 | 16.5 | 11.2 | 1 |
| R11 | Meadows Cottages, south of A180 | 16.8 | 16.4 | 11.2 | 1 |
| R12 | Property on South Marsh Road in Stallingborough | 17.5 | 16.5 | 11.2 | 1 |
| R13 | Property on Woad Lane in Grimsby | 19.3 | 16.9 | 11.4 | 1 |
| R14 | Property on Kendal Road, Immingham | 14.8 | 16.1 | 11.0 | 1 |
| R15 | Property on Hadleigh Road, Immingham | 15.0 | 16.1 | 11.0 | 1 |
| R16 | Property on Arran Close, Immingham | 16.2 | 16.3 | 11.1 | 1 |
| R17 | Property on Mull Way, Immingham | 17.5 | 16.5 | 11.2 | 1 |
| R18 | Willows Court, Immingham | 19.9 | 16.9 | 11.5 | 1 |

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu g/m^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50\mu G/M^3$ (DAYS) |
|---|---|---|---|---|---|
| | | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ | |
| R19 | Property north of Habrough | 18.2 | 16.7 | 11.3 | 1 |
| R20 | Property on Station Road in Habrough | 31.2 | 19.0 | 12.7 | 3 |
| R21 | Grimsby AQMA | 37.6 | 15.7 | 10.7 | 1 |

7.6.17 Predicted pollutant concentrations in the 2020 Base + Committed + Construction scenario show that concentrations of all pollutants are below all national objective values for all pollutants, indicating that air quality in the vicinity of the Proposed Development remains of a good quality.

7.6.18 The changes in air quality statistics between the 2020 Base + Committed and 2020 Base + Committed + Construction scenarios are shown in Table 7.15.

**Table 7.15: Air Quality Impacts Predicted for Construction Year Scenario in 2020**

| ID | RECEPTOR NAME | ANNUAL MEAN POLLUTANT CONCENTRATION ($\mu g/m^3$) | | | NUMBER OF DAYS OF EXCEEDANCE OF 24-HOUR MEAN OF $50\mu G/M^3$ (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 |
| 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 | +<0.1 | +<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 due to 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 $NO_2$ 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 ($PM_{10}$ 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.

7.6.22 The maximum hourly, and annual mean predicted $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations have been compared with the NAQS objectives, as summarised in Tables 7.13 to 7.16 below; full concentrations are provided in Table 7A.13 in Appendix 7A in ES Volume III. Isopleth figures showing the annual and hourly mean process contributions of $NO_2$ are provided in Figures 7.3 and 7.4 in ES Volume II.

7.6.23 The assessment has been undertaken for the Proposed Development opening year, likely to be around 2022. 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 7.16:

- PC: this is the Process Contribution and represents the change caused by the Proposed Development; and
- 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.

**Table 7. 16: Maximum Predicted Long Term $NO_2$ Concentrations at Human Health Receptors**

| RECEPTOR | 2022 BASELINE SCENARIO | CHANGE DUE TO ROAD TRAFFIC | PC SHBEC STACKS | PC % ENV STD | PEC | PEC % ENV STD | EFFECT AT INDIVIDUAL RECEPTOR |
|---|---|---|---|---|---|---|---|
| R1 | 20.0 | 0.4 | 0.1 | 1.2 | 20.5 | 51.2 | Negligible |
| R2 | 16.8 | 0.3 | 0.2 | 1.4 | 17.4 | 43.5 | Negligible |
| R3 | 17.0 | 0.3 | 0.3 | 1.6 | 17.6 | 44.1 | Negligible |

| RECEPTOR | 2022 BASELINE SCENARIO | CHANGE DUE TO ROAD TRAFFIC | PC SHBEC STACKS | PC % ENV STD | PEC | PEC % ENV STD | EFFECT AT INDIVIDUAL RECEPTOR |
|---|---|---|---|---|---|---|---|
| R4 | 19.3 | 0.4 | 0.3 | 1.6 | 19.9 | 49.7 | Negligible |
| R5 | 20.0 | 0.4 | 0.3 | 1.6 | 20.7 | 51.6 | Negligible |
| R6 | 22.7 | 0.4 | 0.3 | 1.7 | 23.4 | 58.5 | Negligible |
| R7 | 26.1 | 0.5 | 0.3 | 1.8 | 26.9 | 67.2 | Negligible |
| R8 | 29.7 | 0.6 | 0.2 | 2.0 | 30.5 | 76.2 | Minor adverse |
| R9 | 20.4 | 0.3 | 0.2 | 1.2 | 20.8 | 52.1 | Negligible |
| R10 | 17.6 | 0.2 | 0.2 | 1.0 | 17.9 | 44.9 | Negligible |
| R11 | 16.9 | 0.2 | 0.2 | 0.9 | 17.3 | 43.1 | Negligible |
| R12 | 17.6 | 0.3 | 0.2 | 1.1 | 18.0 | 45.0 | Negligible |
| R13 | 19.5 | 0.2 | 0.1 | 0.8 | 19.8 | 49.5 | Negligible |
| R14 | 14.9 | 0.2 | 0.1 | 0.6 | 15.1 | 37.8 | Negligible |
| R15 | 15.2 | 0.1 | 0.1 | 0.5 | 15.3 | 38.4 | Negligible |
| R16 | 16.4 | 0.2 | 0.1 | 0.6 | 16.7 | 41.6 | Negligible |
| R17 | 17.7 | 0.2 | 0.1 | 0.7 | 18.0 | 44.9 | Negligible |
| R18 | 20.3 | 0.2 | 0.1 | 0.7 | 20.5 | 51.4 | Negligible |
| R19 | 18.5 | 0.2 | <0.1 | 0.5 | 18.7 | 46.6 | Negligible |
| R20 | 32.0 | 0.4 | <0.1 | 1.0 | 32.4 | 81.1 | Negligible |
| R21 | 37.6 | <0.1 | 0.1 | 0.2 | 37.7 | 94.2 | Negligible |

**Table 7.17: Maximum Predicted Short Term $NO_2$ Concentrations at Worst Affected Human Health Receptors**

| RECEPTOR ID | PC ($\mu G/M^3$) | PC % ENV STD | PC AS % OF HEADROOM | EFFECT AT INDIVIDUAL RECEPTOR |
|---|---|---|---|---|
| PROW 10 | 8.4 | 4.2 | 4.8 | Negligible |

**Table 7.18: Maximum Predicted Long Term $PM_{10}$ Concentrations at Worst Affected Human Health Receptors**

| RECEPTOR | 2022 BASELINE SCENARIO | CHANGE DUE TO ROAD TRAFFIC | PC SHBEC STACKS | PC % ENV STD | PEC | PEC % ENV STD | EFFECT AT INDIVIDUAL RECEPTOR |
|---|---|---|---|---|---|---|---|
| R1 | 16.9 | <0.1 | <0.1 | 0.1 | 16.9 | 42.4 | Negligible |
| R2 | 16.4 | <0.1 | <0.1 | 0.1 | 16.5 | 41.2 | Negligible |
| R3 | 16.5 | <0.1 | <0.1 | 0.1 | 16.5 | 41.3 | Negligible |
| R4 | 16.8 | <0.1 | <0.1 | 0.2 | 16.9 | 42.2 | Negligible |
| R5 | 17.0 | 0.1 | <0.1 | 0.2 | 17.0 | 42.6 | Negligible |
| R6 | 17.4 | 0.1 | <0.1 | 0.2 | 17.5 | 43.8 | Negligible |
| R7 | 18.1 | 0.1 | <0.1 | 0.2 | 18.1 | 45.4 | Negligible |
| R8 | 18.7 | 0.1 | <0.1 | 0.3 | 18.8 | 47.0 | Negligible |
| R9 | 17.0 | <0.1 | <0.1 | 0.1 | 17.1 | 42.7 | Negligible |
| R10 | 16.6 | <0.1 | <0.1 | 0.1 | 16.6 | 41.5 | Negligible |
| R11 | 16.5 | <0.1 | <0.1 | 0.1 | 16.5 | 41.2 | Negligible |
| R12 | 16.6 | <0.1 | <0.1 | 0.1 | 16.6 | 41.5 | Negligible |
| R13 | 16.9 | <0.1 | <0.1 | 0.1 | 16.9 | 42.3 | Negligible |
| R14 | 16.1 | <0.1 | <0.1 | 0.1 | 16.1 | 40.3 | Negligible |

| RECEPTOR | 2022 BASELINE SCENARIO | CHANGE DUE TO ROAD TRAFFIC | PC SHBEC STACKS | PC % ENV STD | PEC | PEC % ENV STD | EFFECT AT INDIVIDUAL RECEPTOR |
|---|---|---|---|---|---|---|---|
| R15 | 16.2 | <0.1 | <0.1 | 0.1 | 16.2 | 40.4 | Negligible |
| R16 | 16.4 | <0.1 | <0.1 | 0.1 | 16.4 | 41.0 | Negligible |
| R17 | 16.6 | <0.1 | <0.1 | 0.1 | 16.6 | 41.5 | Negligible |
| R18 | 17.0 | <0.1 | <0.1 | 0.1 | 17.0 | 42.6 | Negligible |
| R19 | 16.7 | <0.1 | <0.1 | 0.1 | 16.7 | 41.8 | Negligible |
| R20 | 19.1 | 0.1 | <0.1 | 0.2 | 19.2 | 47.9 | Negligible |
| R21 | 15.7 | <0.1 | <0.1 | <0.1 | 15.7 | 39.2 | Negligible |

**Table 7.19: Maximum Predicted Long Term $PM_{2.5}$ Concentrations at Worst Affected Human Health Receptors**

| RECEPTOR | 2022 BASELINE SCENARIO | CHANGE DUE TO ROAD TRAFFIC | PC SHBEC STACKS | PC % ENV STD | PEC | PEC % ENV STD | EFFECT AT INDIVIDUAL RECEPTOR |
|---|---|---|---|---|---|---|---|
| R1 | 11.5 | <0.1 | <0.1 | 0.1 | 11.5 | 46.0 | Negligible |
| R2 | 11.2 | <0.1 | <0.1 | 0.1 | 11.2 | 44.8 | Negligible |
| R3 | 11.2 | <0.1 | <0.1 | 0.2 | 11.2 | 44.9 | Negligible |
| R4 | 11.4 | <0.1 | <0.1 | 0.2 | 11.5 | 45.8 | Negligible |
| R5 | 11.5 | <0.1 | <0.1 | 0.2 | 11.5 | 46.2 | Negligible |
| R6 | 11.8 | <0.1 | <0.1 | 0.2 | 11.8 | 47.3 | Negligible |
| R7 | 12.2 | <0.1 | <0.1 | 0.2 | 12.2 | 48.9 | Negligible |
| R8 | 12.6 | 0.1 | <0.1 | 0.3 | 12.6 | 50.6 | Negligible |
| R9 | 11.5 | <0.1 | <0.1 | 0.1 | 11.6 | 46.3 | Negligible |
| R10 | 11.3 | <0.1 | <0.1 | 0.1 | 11.3 | 45.1 | Negligible |
| R11 | 11.2 | <0.1 | <0.1 | 0.1 | 11.2 | 44.9 | Negligible |
| R12 | 11.2 | <0.1 | <0.1 | 0.1 | 11.3 | 45.1 | Negligible |
| R13 | 11.5 | <0.1 | <0.1 | 0.1 | 11.5 | 45.9 | Negligible |
| R14 | 11.0 | <0.1 | <0.1 | 0.1 | 11.0 | 44.0 | Negligible |
| R15 | 11.0 | <0.1 | <0.1 | 0.1 | 11.0 | 44.1 | Negligible |
| R16 | 11.1 | <0.1 | <0.1 | 0.1 | 11.1 | 44.6 | Negligible |
| R17 | 11.3 | <0.1 | <0.1 | 0.1 | 11.3 | 45.1 | Negligible |
| R18 | 11.5 | <0.1 | <0.1 | 0.1 | 11.5 | 46.2 | Negligible |
| R19 | 11.3 | <0.1 | <0.1 | 0.1 | 11.4 | 45.4 | Negligible |
| R20 | 12.8 | <0.1 | <0.1 | 0.2 | 12.9 | 51.4 | Negligible |
| R21 | 10.7 | <0.1 | <0.1 | <0.1 | 10.7 | 42.9 | Negligible |

7.6.26 The maximum long term process contribution of $NO_2$ from the operational traffic and process emissions results in a negligible to minor adverse magnitude of change to the annual mean concentration. The highest predicted change in annual mean $NO_2$ concentrations due to emissions from the stacks only is at R3 to R6 on South Marsh Lane. Effects at other receptors are lower.

7.6.27 The annual mean baseline concentration at these receptors is well below the NAQS objective; with the addition of the Proposed Development therefore, the effect of the predicted emissions at the worst-case receptor is described as **minor adverse (not significant)**. The magnitude of change in annual mean $NO_2$ at all other human health receptors is low or very low and the effect of the emissions is therefore described as a **negligible effect (not significant)** at these individual receptor locations.

7.6.28 The magnitude of change in annual mean nitrogen dioxide concentration at the identified AQMA (represented by R21) from the Proposed Development is less than 1% of the NAQS. As the predicted annual mean concentration of $NO_2$ at these receptors is below the objective value, a change of this magnitude would represent a **negligible effect (not significant)** on conditions in the AQMA.

7.6.29 The maximum short term (1 hour mean) predicted concentration of nitrogen dioxide at the worst affected receptor (PROW 10) represents 4.8% of the hourly mean NAQS objective and impacts are smaller in magnitude at all other receptors. The predicted changes to short term concentrations of $NO_2$ at any human health receptor would have a **negligible effect (not significant)**.

7.6.30 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 $NO_2$ 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 air quality objectives values. The effect of NOx emissions from the Proposed Development on $NO_2$ concentrations is considered to be overall **not significant**.

*Impacts on Concentrations of Other Pollutants*

7.6.31 For the majority of the other pollutants included within the scope of the modelling assessment (see Appendix 7A in ES Volume III), 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 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.

7.6.32 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.

*Impacts on Ecological Receptors*

7.6.33 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.

7.6.34 The significance of effects associated with emissions from the Proposed Development on designated nature conservation sites (in particular nitrogen oxides, nutrient nitrogen, acid deposition and sulphur dioxide) are discussed in Chapter 10: Ecology and Nature Conservation. 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 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.

7.6.35 The 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.

*Emissions of Odour*

7.6.36 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.

7.6.37 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.

7.6.38 Other control measures to minimise odour include 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.

7.6.39 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.

7.6.40 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.

7.6.41 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.

<u>Decommissioning and Demolition</u>

7.6.42 The relevant best practice mitigation measures 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.

## 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 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 as insignificant. 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 and Nature Conservation. This 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 measured 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 the worst case scenario for 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 best 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 opening/ 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.

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