Immingham Green Energy Terminal

Environmental Impact Assessment

Preliminary Environmental Information Report

Volume II – Main Report

Chapter 6: Air Quality

Associated British Ports

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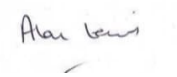
Signed		Date	20/12/2022
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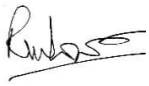
Signed		Date	20/12/2022
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6 Air Quality

6.1 Introduction

6.1.1 This chapter presents the preliminary findings of the assessment of the likely effects of the Project on local air quality.

6.1.2 There may be interrelationships related to the potential effects on Air Quality (AQ) and other disciplines. Therefore, also refer to the following chapters:

a. **Chapter 08: Terrestrial Ecology.**

b. **Chapter 09: Marine Ecology.**

c. **Chapter 12: Marine Transport and Navigation.**

d. **Chapter 13: Traffic and Transport**.

e. **Chapter 24: Human Health and Wellbeing.**

6.1.3 This chapter is also supported by the following figures and appendices:

a. **Figure 6.1: Air Quality Study Area** – showing the location of air quality sensitive receptors, air quality monitoring locations in relation to the proposed red line boundary of the Project (PEI Report, Volume III).

b. **Figure 6.2: Construction Phase Assessment** – showing construction dust receptors and the areas within which unmitigated impacts may occur (PEI Report, Volume III).

c. **Figure 6.3 (a-d): Operational Phase Impacts** – showing operational phase receptors and the magnitude of operational impacts (PEI Report, Volume III).

d. **Appendix 6.A: Construction Phase Assessment Method** – detailing the approach to the construction phase assessment (PEI Report, Volume IV).

e. **Appendix 6.B: Operational Phase Assessment Method** – detailing the approach to the operational phase assessment (PEI Report, Volume IV).

6.1.4 The local air quality assessment is supported by other topic chapters of the PEI Report, including traffic data generated for the assessment reported in **Chapter 13: Traffic and Transport**. Air quality impacts also have the potential to effect nature conservation sites. The significance of any effect on such sites and protected features is described in this air quality chapter, with inputs provided by a competent expert in **Chapter 8: Terrestrial Ecology** and **Chapter 9: Marine Ecology**.

6.2 Approach to Assessment

Scoping Summary

6.2.1 A scoping exercise was undertaken in August 2022 to establish the form and nature of the air quality assessment, and the approach and methods to be followed.

6.2.2 The Scoping Report (**Appendix 1.A** of the PEI Report, Volume IV) records the findings of the scoping exercise and details the technical guidance, standards,

best practice and criteria being applied in the assessment to identify and evaluate the likely significant effects of the Project on air quality.

6.2.3 Following receipt of the Scoping Opinion (**Appendix 1.B** of the PEI Report, Volume IV) as to the information to be provided in the Environmental Statement, the requirements set out in **Table 6.1** have been agreed with the Planning Inspectorate as those to be taken into account as part of the ongoing air quality assessment:

Table 6.1 Scoping Opinion Comments on Air Quality

Consultee	Summary of Response	How comments have been addressed in this chapter
Planning Inspectorate	The Air Quality Chapter refers to modelling of multiple emission release heights from stacks and/ or vents to encourage optimal dispersion of emissions, as well as use of Selective Catalytic Reduction. The project description of the ES needs to describe the energy plant in detail. The maximum height of any stack(s) must be provided and any assumptions regarding minimum stack heights should also be set out.	The Project Description is described in **Chapter 2 The Project**. Dispersion model input parameters, including modelled stack height, are provided in **Appendix 6.B** (PEI Report Volume IV).
	The study area is based on screening criteria for assessments of dust and road traffic emissions. The Scoping Report does not discuss how the study area would be established for the assessment of emissions to air from vessel movements and energy plant process contributions. The ES should describe the study area for the assessment, and this should be established in line with relevant guidance and in consultation with relevant consultation bodies. The study areas should be based on the zone of influence (ZOI) for all sources associated with the Proposed Development including on site plant/machinery and vessel movements serving the site. Figure(s) should be used to illustrate the extent of the study area.	The study area for energy plant is described in **Section 6.5** and is based on Environment Agency guidance. There is no standard guidance that defines a suitable study area for the consideration of vessel emissions. Instead, the AQ assessment will report impacts that include docked vessel emissions at the worst affected air quality sensitive receptors located in each direction from that and all other sources modelled. The study areas used to define the assessment of emissions are described in **Section 6.5**. The extent of the study area is displayed in **Figure 6.1** (PEI Report, Volume III) which shows the spatial extent of air quality sensitive receptors considered in the assessment.
	The Scoping Report proposes to rely on existing air quality survey data. The Inspectorate supports the use of existing data in principle; however the Applicant should ensure that the data is up to date and geographically accurate and is advised to seek agreement with North East Lincolnshire Council (NELC) on the survey requirements.	The assessment reported in the PEI Report is informed by existing data made available by the Local Authority, data published by Defra, and project specific nitrogen dioxide data gathered in the local area. No direct AQ-specific consultation has been held with the Local Authority to date, although all air quality data

Consultee	Summary of Response	How comments have been addressed in this chapter
		gathered by the Local Authority is publicly available from their Annual Status Reports, which are published online. Monitoring data collected in the last calendar year is presented in **Section 6.4.**
	The Scoping Report does not specify which pollutants would be included in the assessments and provides baseline information on NO_2 and PM_{10} only. The Applicant is advised to seek agreement with NELC on the range of pollutants to be included in the assessments, this should include consideration of $PM_{2.5}$, NO_X, NH_3 and SO_2 where relevant.	No direct AQ-specific consultation has been held with the Local Authority to date. But consultation will be had with the Local Authority prior to submission of the ES. Pollutants of concern considered in the air quality assessment for the PEIR do extend beyond nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), and also include oxides of nitrogen (NO_X), ammonia (NH_3), sulphur dioxide (SO_2), carbon monoxide (CO) and nitrogen deposition. The range of pollutants modelled are set out in **Table 6.5**.
	The Scoping Report seeks to scope out impacts arising from decommissioning of landside infrastructure on the grounds that the impacts would be uncertain, working practices unknown, and impacts are likely to be no worse than those arising from the construction and operation phases. Paragraphs 2.4.48 – 2.4.49 commit to producing an Outline Decommissioning Strategy with the application to be secured within the DCO. Subject to the provision of this Outline Decommissioning Plan, the Inspectorate agrees to scope out this matter from the ES.	This is noted.
	Paragraph 5.6.8 suggests that the operational phase assessment would consider emissions from vessel energy plant when vessels are docked at the facility, and not include an assessment of emissions from vessels in transit. The Scoping Report does not provide an estimate of operational vessel movements therefore the Inspectorate is not in a position to scope out an assessment of operational vessel movements. The	There is limited guidance available on the screening of marine vessel emissions for the purpose of air quality assessments. Defra guidance (LAQM TG22 (Ref 6-7)) provides screening criteria for use by Local Authorities in their Local Air Quality Management responsibilities. The Project will not meet the screening criteria set by Defra guidance for LAQM matters, based on the number

Consultee	Summary of Response	How comments have been addressed in this chapter
	Inspectorate considers that the air quality assessment should include the emissions to air from operational vessel movements where significant effects are likely to occur and that such consideration should be based on the application of relevant threshold criteria.	of vessel movements per year and the proximity of sensitive receptors (see **Section 6.3**, **Paragraph 6.3.24**). This does suggest that vessel emissions based on the scale of the Project operations and proximity of receptors is unlikely to be an issue in isolation. To account for the impact of vessels in combination with other onsite sources, the AQ assessment reported in the PEI Report does account for vessel emissions when vessels are docked. The reason being that when docked, emissions are static and assumed to be in operation 8760 hours per year, therefore having the potential to impact on the same location for a prolonged period of time. The AQ assessment does not account for vessel emissions when they are in motion. Such emissions are transient and intermittent - only affecting individual habitat for the limited period of time in which a vessel maneuvers past a sensitive location and only when the wind is blowing from the vessel towards it. Based on the speed of vessels (20 knots (23 mph)) and the frequency of IGET vessel movements (4 movements every 3 days, or 1.3 movements per day), impacts at any one location are likely to occur for less than 1 hour per day (4% of the year). Such an impact is considered unlikely to contribute to a significant effect. The methodology for vessel emissions is discussed in **Paragraphs 6.3.20 to 6.3.37** and **Appendix 6.A** (PEI Report, Volume IV).
	The effect of odour during operation has not been scoped into the assessment or reasons provided why this has been scoped out. This matter should be considered as part of the assessment made for air quality effects, as well as part of the health and well-being assessment, should significant effects be likely to occur.	A qualitative assessment of odour emissions in the PEI Report chapter with reference to Institute of Air Quality Management Odour guidance. The methodology is set out in **Paragraphs 6.3.16 to 6.3.19.** **Chapter 24: Human Health and Wellbeing** will consider the potential health impacts arising from odour.

Consultee	Summary of Response	How comments have been addressed in this chapter
Natural England	We note and welcome the report's reference to the assessment of air quality issues arising from traffic generation during the construction and operational lifetime of the scheme (para 5.2.1) and offer the following comments: Air quality in the UK has improved over recent decades but air pollution remains a significant issue. For example, approximately 85% of protected nature conservation sites are currently in exceedance of nitrogen levels where harm is expected (critical load) and approximately 87% of sites exceed the level of ammonia where harm is expected for lower plants (critical level of 1µg) [1].A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The Government's Clean Air Strategy also has a number of targets to reduce emissions including to reduce damaging deposition of reactive forms of nitrogen by 17% over England's protected priority sensitive habitats by 2030, to reduce emissions of ammonia against the 2005 baseline by 16% by 2030 and to reduce emissions of NOx and SO2against a 2005 baseline of 73% and 88% respectively by 2030. Shared Nitrogen Action Plans (SNAPs) have also been identified as a tool to reduce environmental damage from air pollution. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly, or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts of air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be	The construction and operation of the Project is not anticipated to generate 500 or more two-way Light Duty Vehicle (LDV) movements nor 100 or more two-way LDV movements on the local road network. The number of additional vehicle movements falls well below the screening criteria set by IAQM/EPUK and National Highways guidance to suggest when road traffic emissions have the potential to contribute to a significant effect on air quality at sensitive locations (see **Section 6.8**, **Paragraph 6.8.33** for construction phase and **Section 6.8**, **Paragraph 6.8.43** for operational phase). As such, the air quality assessment reported in the PEI Report does not quantify emissions associated with construction phase or operational road traffic movements. The AQ assessment does quantify the impact of onsite emissions, including those from docked vessels, on air quality sensitive habitats, including nearby saltmarsh habitat within the Special Area of Conservation (SAC). The assessment method is described in **Paragraphs 6.3.20 to 6.3.37** and **Appendix 6.B** (PEI Report, Volume IV). Assessment results are described in **Paragraphs 6.8.39 to 6.8.45.**

Consultee	Summary of Response	How comments have been addressed in this chapter
	found on the Air Pollution Information System (www.apis.ac.uk). Natural England has produced guidance for public bodies to help assess the impacts of road traffic emissions to air quality capable of affecting European Sites. Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations -NEA001	
	With regard to the construction phase the focus on PM_{10}, set out in this para (5.6.2) should be reviewed with regard to its suitability for ecological receptors including designated sites in the context of the APIS information (site relevant critical loads).NO2 and PM2.5 should also be included in this assessment.	The construction phase assessment reported in the PEI Report has been undertaken in line with relevant IAQM guidance and includes consideration of relevant impacts at sensitive habitats. The method of the construction phase assessment is set out in **Paragraphs 6.3.1 to 6.3.7** and **Appendix 6.A** (PEI Report, Volume IV).
	We note the applicants intention to consult Natural England, Should the applicant wish to explore options for avoiding or mitigating effects on the natural environment with Natural England, we recommend that they use our Discretionary Advice Service.	This is noted.
Environment Agency	The Environment Agency will only undertake a detailed review of any air quality assessment when determining an application for an Environmental Permit. We are aware that there are receptors in the area, which are sensitive to dust (e.g. storage of new cars) and it may be prudent for the developer to be aware of this and engage with relevant local stakeholders. Paragraph 5.6.13 does not make explicit reference to Air emissions risk assessment for your environmental permit - **https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit**, however, it is referred to in paragraph 5.6.8. This guidance (although	The AQ assessment reported in the PEI Report does include consideration of potential dust impacts on dust sensitive receptors. The dust assessment method is described in **Paragraphs 6.3.1 to 6.3.7** and **Appendix 6.A** (PEI Report, Volume IV). The AQ assessment will also reference the Environment Agency guidance to inform the method of assessment for point source emissions. This guidance is referenced in **Appendix 6.B** (PEI Report, Volume IV).

Consultee	Summary of Response	How comments have been addressed in this chapter
	written for environmental permitting) will also be useful for the assessment.	
East Lindsey District Council	“I can advise that this authority has no comments to make.”	This is noted.
North East Lincolnshire Council	AQ Officer has read and reviewed the proposed EIA Scoping report, they are happy with the suggested approach and methodology used to assess the potential air quality impacts and effects of the Project on human receptors.	This is noted.

6.2.4 Having regard to the information presented within the Scoping Report (**Appendix 1.A** of the PEI Report, Volume IV), the Planning Inspectorate's Scoping Opinion (**Appendix 1.B** of the PEI Report, Volume IV) has also confirmed the Applicant's view that significant effects on air quality effects during the decommissioning phase are unlikely. Accordingly, this matter will remain scoped out of consideration in the Environmental Statement (ES).

6.3 Assessment Method

Construction Phase

Construction Dust Emissions

6.3.1 According to the Institute of Air Quality Management (IAQM), the main air quality impacts that may arise during demolition and construction activities are:

a. Dust deposition, resulting in the soiling of surfaces;

b. Visible dust plumes, which are evidence of dust emissions;

c. Elevated PM_{10} concentrations resultant of dust generating activities on site; and

d. An increase in concentration of airborne particles and NO_2 due to exhaust emissions from diesel powered vehicles and equipment on site and vehicles accessing the site.

6.3.2 Activities on construction sites are classified into four types to reflect their different potential impacts:

a. Demolition;

b. Earthworks;

c. Construction (erection of buildings and structures); and

d. Track-out (the deposition of material onto the public road network by construction vehicles leaving site).

6.3.3 The following steps, as defined by the IAQM, were followed as part of the construction dust assessment:

a. Step 1: Screen the need for a detailed assessment. Human and ecological receptors were identified and distance to the Project and construction routes were determined;

b. Step 2: Assess the risk of dust impacts arising. The potential risk of dust impacts occurring for each activity was determined, based on the magnitude of the potential dust emissions and the sensitivity of the area;

c. Step 3: Identify the need for site-specific mitigation. Based on the risk of impacts occurring, site specific mitigation measures were determined; and

d. Step 4: Define impacts and their significance. The significance of the potential residual dust impacts (taking mitigation into account) for each activity was determined.

6.3.4 The IAQM construction dust methodology used to inform this assessment is provided in more detail in **Appendix 6.A** (PEI Report, Volume IV).

6.3.5 For amenity effects from coarser dust (>PM_{10}), the aim of the IAQM guidance method is to bring forward a scheme, including mitigation measures where necessary, that would control impacts so that they give rise to negligible or minor effects (at worst) at the closest sensitive receptors. Measures that reduce dust emissions will also reduce emissions of finer particles (PM_{10}). Determination of whether an effect is likely to be significant or not is based on professional judgement (based on experience of similar projects), taking account of whether effects are permanent or temporary, direct or indirect, constant or intermittent and whether any secondary effects are caused (in this instance, secondary effects refer to dust that is generated and deposited (primary impact) and then re-suspended and deposited again by further activity).

6.3.6 The classification of dust soiling (amenity) and health effects on receptors exposed to impacts has been assessed using the relationship between the magnitude of impact identified, in combination with receptor sensitivity and other related factors where appropriate (as described in the IAQM guidance (Ref 6-19)), which results in a classification of effects as defined in **Table 6.2**.

6.3.7 The impacts associated with the construction phase of the Project have been qualitatively assessed following the approach set out in the IAQM guidance on the Assessment of Dust from Demolition and Construction (Ref 6-19).

Table 6.2 Definition of Significance for Fugitive Dust and PM_{10} Effects

Effect	Change in Dust Deposition Rate and Short-term PM_{10} Concentrations	Significance
Major	Impact is likely to be intolerable for any more than a very brief period of time and is very likely to cause complaints from local people. Increase in PM_{10} concentrations at a location where concentrations are already elevated and to the extent that the short term PM_{10} air quality objective is likely to be exceeded. Deposition impact likely to harm habitat within a designated nature conservation area of international importance.	A significant effect that is likely to be a material consideration in its own right.
Moderate	Impact is likely to cause annoyance and might cause complaints, but may be tolerated if short-term and prior warning and explanation has been given. Increase in PM_{10} concentrations at a location where concentrations are already elevated and to the extent that the short term PM_{10} air quality objective is at risk of being exceeded.	A significant effect that may be a material consideration in combination with other significant effects but is unlikely to be a material consideration in its own right.

Effect	Change in Dust Deposition Rate and Short-term PM_{10} Concentrations	Significance
	Deposition impact likely to harm habitat within a designated nature conservation area of national importance.	
Minor	Impact may be perceptible, but of a magnitude or frequency that is unlikely to cause annoyance to a reasonable person or to cause complaints. Limited increase in PM_{10} concentrations. Deposition impact likely to harm habitat within a designated nature conservation area of local importance.	An effect that is not significant but that may be of local concern.
Negligible	Impact is unlikely to be noticed by and/or have an effect on sensitive receptors. Negligible increase in PM_{10} concentrations and deposition.	An effect that is not significant.

Construction Site Plant and Non-Road Mobile Machinery Emissions

6.3.8 Emissions from construction-related Non-Road Mobile Machinery (NRMM) and site plant will have the potential to increase NO_2, PM_{10} and $PM_{2.5}$ concentrations at locations close to working areas of the site.

6.3.9 IAQM guidance (Ref 6-19) states that:

> *"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) 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."*

6.3.10 The assessment of potential emissions from NRMM and site plant is, therefore, qualitative in nature and focuses on the justification as to why impacts from this source can be mitigated to ensure any effect is not significant.

Construction Vessel Emissions

6.3.11 Construction phase vessel emissions have been considered in a qualitative manner in this assessment. The risk of this source contributing to a significant effect is determined by review of construction phase vessel emissions, their duration and frequency, and the proximity of those emissions to the nearest air quality sensitive receptors.

Construction Road Traffic Emissions

6.3.12 A screening assessment of construction phase road traffic emissions has been undertaken at the PEI Report stage. Preliminary traffic data has been provided that incudes daily average two-way Light Duty Vehicle (LDV) (vehicles <3.5 tonnes) movements and Heavy Duty Vehicle (HDV) (vehicles >3.5 tonnes) movements on the local road network and the nearest sections of the Strategic Road Network (SRN).

6.3.13 Daily average flows on the local road network have been screened against criteria published in IAQM and Environmental Protection (EPUK) guidance (Ref 6-25). The guidance suggests that a detailed assessment of local air quality is likely to be required where:

a. A road link not situated within or adjacent to an Air Quality Management Area (AQMA) experiences a:
   i. change in annual average daily two-way LDV flow of 500 or more; and/or
   ii. change in annual average daily two-way HDV flow of 100 or more.
b. A road link that is situated within or adjacent to an AQMA that experiences a:
   i. change in annual average daily two-way LDV flow of 100 or more; and/or
   ii. change in annual average daily two-way HDV flow of 25 or more.

6.3.14 Daily average flows on the SRN have been screened against criteria published in National Highways guidance (Ref 6-18). The guidance suggests that a detailed assessment of local air quality is required where:

a. Annual average daily traffic (AADT) flow changes by 1000 or more two-way movements; or
b. HDV AADT changes by 200 or more two-way movements.

Operational Phase

Operational Road Traffic Emissions

6.3.15 A screening assessment of operational road traffic emissions has also been undertaken at the PEI Report stage. Preliminary data has been provided that includes staff numbers and daily monthly truck visits. This has been used to estimate likely LDV and HDV movements on the local road network and SRN. Those anticipated movements have then been compared to the screening criteria provided in the IAQM/EPUK guidance and National Highways guidance (Ref 6-18).

Operational Odour emissions

6.3.16 A qualitative odour assessment has been undertaken with reference to IAQM odour guidance (Ref 6-3). The Project is not expected to be a significant source of odour emissions, due to the closed nature of the process system. However, with all such systems, there is the risk of fugitive emissions from potential leaks and/or accidents.

6.3.17 Odours are highly subjective. The perception of odours, whether they are pleasant or offensive, and to what extent is partly determined through the life experiences of the individual. It is, however, generally accepted that the odour associated with NH_3 is offensive.

6.3.18 Before an adverse effect (such as harm to amenity) can occur, there must be odour exposure. For odour exposure to occur all three links in the source-pathway-receptor chain must be present:

a. An emission source - a means for the odour to get into the atmosphere.

b. A pathway - for the odour to travel through the air to locations offsite, noting that:

   i. Anything that increases dilution and dispersion of an odorous pollutant plume as it travels from source to receptor will reduce the concentration at the receptor, and hence reduce exposure.

   ii. Increasing the length of the pathway (e.g. by releasing the emissions from a high stack or moving odour sources as far away from receptors as possible) will, all other things being equal, increase the dilution and dispersion.

c. The presence of receptors (such as residential properties or places where people would expect a certain level of amenity) that could experience an adverse effect, noting that people vary in their sensitivities to odour, determined by the level of amenity associated with the land use and the typical duration of exposure.

6.3.19 The effect of odour has been assessed with reference to the IAQM odour guidance (Ref 6-3). The IAQM guidance includes a description of methods by which odour effects can be determined at the pre-planning stage. It states that in order to determine the impact of odour emissions, the following elements need to be determined:

a. Description of baseline odour conditions.

b. Description of the location of receptors and their relative sensitivities to odour effects.

c. Details of potential odour sources.

d. Description of control/mitigation measures incorporated into the scheme.

e. Prediction of the likely odour effects at relevant sensitive receptors, taking into account:

   i. The likely magnitude of odour emissions;

   ii. The likely meteorological characteristics at the site;

   iii. The dispersion and dilution afforded by the pathway to receptors and the resulting magnitude of odour that could result;

   iv. The sensitivity of the receptors; and

   v. The potential cumulative odour effects.

f. Appropriate additional mitigation recommended where necessary; and

g. Residual odour effects and the determination of impact significance.

Operational Site and Vessel Emissions

6.3.20 Site emissions consist of a number of onshore hydrogen production units and flares, and offshore vessel combustion plant emissions.

6.3.21 The onshore hydrogen production units will be fuelled initially by natural gas. The main pollutant of concern from this will therefore be NO_X, although some NH_3 may be present in emissions also, particularly if Selective Catalytic Reduction (SCR) is applied to control the NOx emissions. NO_X and NH_3 at elevated concentrations are harmful to nature conservations sites and, when NO_X is converted to NO_2, it is also harmful to human health. NO_2 and NH_3 also contribute to nitrogen deposition, which is another pollutant that is harmful to nature conservation sites. Flares on site will be required to operate in an emergency or during plant start-up to burn off the release of NH_3, which will therefore also be a source of NO_X emissions.

6.3.22 Exhaust emissions from berthed vessels during operation have the potential to impact on local air quality. At such time, the vessel emissions source is static and, given the anticipated frequency of vessels in dock, all but constant throughout the year. This means that docked vessel emissions will impact on the same locations consistently throughout the year, subject to meteorological conditions. Docked vessel emission impacts on local air quality have been quantified in this assessment.

6.3.23 Emissions from vessels in motion during operation have not been quantified in this assessment. This is because, when in motion, the vessel emissions source is transient and will not impact on the same location for more than a few minutes per vessel movement. The Project includes up to two berths, and it has been assumed that each vessel will be docked for a period of three days. Smaller vessels may be docked for shorter periods but the three day assumption produces a worst case for ship emissions when moored at the berths. It is anticipated that there will be up to 400 calls per year, which will equate to 2.2 two-way vessel movements per day. At a speed of 10 to 20 knots, vessel emissions when in movement will be intermittent to the extent that they will not contribute to a significant air quality effect.

6.3.24 It is also noted that the number of operational vessel movements fall below the Defra LAQM-TG(22) guidance criteria (Ref 6-7), which states that for the purpose of Local Air Quality Management, emissions from port expansions may need to be considered where:

a. There are more than 5,000 ship movements per year (i.e. cross-channel ferries, roll on-roll off ships, bulk cargo, container ships, cruise liners, etc – one ship generating two movements (arrival and departure)), with relevant exposure within 250 m of the berths and main areas of manoeuvring; or

b. There are more than 15,000 large ship movements per year, with relevant exposure within 1 km of these areas.

6.3.25 Pollutants of concern vary depending on the fuel type of the vessel engine, such as Liquified Natural Gas (LNG) and Marine Gas Oil (MGO) but will include NO_X (NO and NO_2). Vessels using the Project in the operational phase will need to comply with relevant International Convention for the Prevention of Pollution from Ships (MARPOL) NO_X and SO_2 emission standards (Ref 6-25). For SO_2, engines will either have to operate using MGO with a low sulphur content (0.10 and 1.50 m/m %), or with an SO_2 scrubber. Sulphur emissions are therefore likely to be negligible and are not considered further in this assessment.

6.3.26 The detailed assessment methodology followed to quantify the impact and total concentrations of the pollutants of concern is set out in **Appendix 6.B** (PEI Report, Volume IV).

6.3.27 Significance of local air quality effects is then determined in line with IAQM and EPUK guidance (Ref 6-25). This approach does not define a graduating scale of human health receptor sensitivity. Instead, human health receptors are considered either sensitive or not, depending on the period of time for which they are exposed to emissions. The absolute magnitude of change in pollutant concentrations between the baseline and assessment scenarios, relative to the air quality objective value, is described and this is used to consider the risk of those objectives being exceeded.

6.3.28 For a change in annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, of a given magnitude, the IAQM and EPUK guidance provides recommendations for describing the effects of such impacts at individual receptors. These are set out in **Table 6.3**.

Table 6.3 Impact Descriptors at Individual Receptors - Annual Mean NO_2, PM_{10} and $PM_{2.5}$

Annual Mean Concentrations at Receptor in Assessment Year (% of air quality objective)	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)				
	<1 %[1]	1 %[2]	2-5 %[3]	6-10 %[4]	> 10 %[5]
≤75 %	Negligible	Negligible	Negligible	Slight	Moderate
76 % – 94 %	Negligible	Negligible	Slight	Moderate	Moderate
95 % – 102 %	Slight	Slight	Moderate	Moderate	Substantial
103 % – 109 %	Moderate	Moderate	Moderate	Substantial	Substantial
≥110 %	Moderate	Moderate	Substantial	Substantial	Substantial

[1] Imperceptible; [2] Very low; [3] Low; [4] Medium; and [5] Large

6.3.29 The IAQM/EPUK guidance states that the descriptors are for individual receptors only and that overall significance is determined using professional judgement. It also states that it is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the objective value. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the objective value, rather than being exactly equal to it.

6.3.30 A change in predicted long-term (annual mean) concentrations of less than 0.5 % of an air quality objective is considered to be ‘Imperceptible’. An impact that is

'Negligible', given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant.

6.3.31 The guidance suggests the potential for 'Low' air quality impacts as a result of changes in pollutant concentrations between 2 % and 5 % of relevant air quality objective. For example, for annual mean NO_2 and PM_{10} concentrations, this relates to changes in concentrations ranging from 0.6 – 2.1 µg/m^3. In practice, changes in concentration at the lower end of this magnitude band are likely to be very difficult to distinguish from the inter-annual effects of varying meteorological conditions and are therefore not considered likely to be capable of having a direct effect on local air quality that could be considered to be significant.

6.3.32 Changes in concentration of more than 5% are considered to be of a magnitude which is far more likely to be discernible above the normal variation in baseline conditions and, as such, carry additional weight within the overall evaluation of significance for air quality. 'Moderate' impacts do not necessarily constitute a significant effect, where they do not contribute to an exceedance or risk of an exceedance of an air quality objective, particularly where such impacts relate to a small minority of receptors when the majority experience lesser impacts. A 'Substantial' impact will almost certainly constitute a significant effect that will require additional mitigation to address.

6.3.33 The IAQM and EPUK guidance also provides thresholds for determining whether short-term (1-hour mean and 24-hour mean) impacts on human health sensitive receptors have the potential to cause a significant effect or not. The guidance indicates that severity of peak short-term concentrations can be described without the need to reference background concentrations as the source contribution is used to measure impact, not the overall short-term concentration at the receptor. The guidance suggests the following criteria to determine the impact of peak short-term source contributions:

a. Source contributions ≤10 % of the air quality objective represents an Imperceptible impact that is 'Negligible';

b. Source contributions between 11-20 % of the air quality objective or is Small in magnitude, representing a 'Slight' impact;

c. Source contributions 21-50 % of the air quality objective is Medium in magnitude, representing a 'Moderate' impact; and

d. Source contributions ≥51 % of the air quality objective is Large in magnitude, representing a 'Substantial' impact.

6.3.34 In addition to the short-term criteria provided by the IAQM/EPUK, the magnitude of the change in the predicted number of exceedances of the short-term 24-hour PM_{10} objective can be directly derived from the predicted annual average PM_{10} value using the relationship defined in LAQM.TG (22) (Ref 6-7). An exceedance of the short-term PM_{10} air quality objective is unlikely where annual mean PM_{10} concentrations are less than 32 µg/m^3. Research projects completed on behalf of Defra and the Devolved Administrations (Ref 6-1 and Ref 6-22) have concluded that the short-term 1-hour NO_2 objective is unlikely to be exceeded where annual mean concentrations are predicted to be less than 60 µg/m^3.

6.3.35 For impacts at nature conservation receptors, whether the effect is significant or not is determined by a competent expert in ecology. To inform this judgement, the Environment Agency provide guidance (Ref 6-13) that states that impacts may be considered insignificant ('not significant') where the long-term (annual) impact is less than 1% of the long-term air quality objective or environmental assessment level for the nature conservation site.

6.3.36 Where the long-term impact at a nature conservation receptor exceeds these criteria, it may also be considered insignificant ('not significant') where:

6.3.37 The long-term total concentration after the impact is <70% of the air quality objective or environmental assessment level for the nature conservation site.

6.4 Legislation, Policy and Guidance

6.4.1 **Table 6.4** presents the legislation, policy and guidance relevant to the air quality assessment and details how their requirements will be met in the assessment.

Table 6.4 Relevant legislation, policy and guidance regarding local air quality

Legislation / Policy / Guidance	Consideration within the PEI Report
Clean Air for Europe	
The Clean Air for Europe (CAFE) programme consolidated and replaced (with the exception of the 4th Daughter Directive) preceding directives with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Ref 6-4) (hereafter referred to as the 'EU Air Quality Framework Directive'). This directive is transcribed into UK legislation by the Air Quality Standards Regulations 2010 (Ref 6-14) which came into force on 11 June 2010. The 2010 Regulations were amended by the Air Quality Standards Regulations 2016 (Ref 6-15), which came into force on 31 December 2016. The limit values defined therein are legally-binding and are considered to apply everywhere (with the exception of the carriageway and central reservation of roads and any locations where the public do not have access). EU limit values were published in these regulations for 7 pollutants, as well as target values for an additional 5 pollutants.	Informed methodology described in **Section 6.2** and results in **Section 6.6**.
UK Air Quality Strategy	
Part IV of the Environment Act (2021) (Ref 6-17) requires H.M. Government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. Defra's Clean Air Strategy is the current revision of the Strategy (Ref 6-6). The AQS outlines proposals to tackle emissions from a range of sources. This includes providing clear and effective guidance on how Air Quality Management Areas (AQMAs), Clean Air Zones (CAZ) and Smoke Control Areas interrelate and how they can be used by local government to tackle pollution. New legislation will seek to shift the focus towards prevention of exceedances rather than tackling pollution when limits have been surpassed. The AQS sets out air quality objectives that are maximum ambient pollutant concentrations that are not to be exceeded either without	Informed methodology described in **Section 6.2** and results in **Section 6.6**.

Legislation / Policy / Guidance	Consideration within the PEI Report
exception or with a permitted number of exceedances over a specified timescale. Air quality objectives, as defined by the Air Quality Strategy, are generally in line with the EU Limit Values, although they have different dates for compliance, and a different legal status as follows: a. EU limit values (as transcribed into UK legislation) are legally binding in the UK. National government compliance at the agglomeration scale is mandatory. b. UK air quality objectives are for the purposes of LAQM and there is no legal obligation for local authorities to achieve them. They do have a responsibility to work towards achieving them. The EU limit values and air quality objectives for the remaining pollutants are displayed in **Table 6.3**.	
National Policy Statement for Ports (NPSfP)	
Section 5.7 of the NPSfP (Ref 6-12) sets out the Government's policy for ports relating to air quality. It highlights key air quality concerns relating to ports as emissions from vehicles accessing and leaving ports, emissions from ship engines and dust emissions from potentially dust generating cargo. Paragraph 5.13.5 of the NPSfP describes what an air quality chapter of an ES should include: • *"Any significant air emissions, their mitigation and any residual effects, distinguishing between the construction and operation stages and taking account of any significant emissions from any road traffic generated by the project;* • *The predicted absolute emission levels from the proposed project, after mitigation methods have been applied; and* • *Existing air quality levels and the relative change in air quality from existing levels."* Section 5.8 of the NPSfP sets out policy for ports relating to emissions of dust and odour and the potential harm to amenity. It is acknowledged in the NPSfP that *"some impact on amenity for local communities is likely to be unavoidable. The aim should be to keep impacts to a minimum and at a level that is acceptable".* Paragraph 5.8.5 of the NPSfP describes what an air quality chapter of an Environmental Statement should include with regards to potential emissions of dust and odour: • *"the type, quantity and timing of emissions;* • *aspects of the development which may give rise to emissions;* • *premises or locations that may be affected by the emissions;* • *effects of the emission on identified premises or locations; and*	Informed methodology described in **Section 6.2** and specifically a description of emissions and how they have informed the impact assessment. Informed the impact results reported in **Section 6.8**, specifically predicted future baseline and future operational pollutant concentrations and impacts. Informed mitigation section described in **Section 6.7** and **Section 6.9**, including measures to reduce emissions during construction and operational phases.

Legislation / Policy / Guidance	Consideration within the PEI Report
• *measures to be employed in preventing or mitigating the emissions."*	
UK Marine Policy Statement (MPS)	
Section 2.6.2 of the UK MPS (Ref 6-5) sets out the Government's policy for marine environments relating to air quality. In paragraph 2.6.2.1 it is noted that *"The construction, operation and decommissioning phases of projects can involve emissions to air which could lead to adverse impacts on human health, biodiversity, or on the wider environment."*	Informed methodology described in **Section 6.2**.
Marine Plan – East Inshore	
The Marine Plan for the UK East Inshore region (Ref 6-23) includes some policies that are relevant to air quality and this assessment. They focus on potential impacts on nature conservation as follows: a. Policy BIO1 Biodiversity – *"Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole, taking account of the best available evidence including on habitats and species that are protected or of conservation concern in the East marine plans and adjacent areas (marine, terrestrial)"*; b. Policy ECO1 Ecosystem – *"Cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) should be addressed in decision-making and plan implementation";* c. Policy MPA1 Marine protected areas – *"Any impacts on the overall Marine Protected Area network must be taken account of in strategic level measures and assessments, with due regard given to any current agreed advice on an ecologically coherent network."*	Informed methodology described in **Section 6.2**.
National Planning Policy Framework (NPPF)	
The revised NPPF (Ref 6-24) sets out the Government's planning policies for England and how these are expected to be applied. The revised NPPF maintains the presumption in favour of sustainable development which should be delivered in accordance with three main objective areas: economic, social and environmental (Paragraph 8). The revised NPPF aims to enable local people and their local authorities to produce their own distinctive local and neighbourhood plans, which should be interpreted and applied in order to meet the needs and priorities of their communities. Air quality is considered as an important element of the natural environment. On conserving and enhancing the natural environment, Paragraph 174 states that: *"Planning policies and decisions should contribute to and enhance the natural and local environment by:* *…*	Informed methodology described in **Section 6.2** and results in **Section 6.6**.

Legislation / Policy / Guidance	Consideration within the PEI Report
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 …" Air quality in the UK has been managed through the LAQM regime using national objectives. The effect of a proposed development on the achievement of such policies and plans may be a material consideration by planning authorities when making decisions for individual planning applications. Paragraph 186 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."*	
Planning Practice Guidance (PPG)	
Sections of the PPG (Ref 6-11) were updated in November 2019. With regards to air quality, the updated guidance (paragraph 003 Reference ID: 32-003-20191101) states that: *"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity."* In paragraph 005 (Reference ID: 32-005-20191101) it is stated that: *"Where air quality is a relevant consideration the local planning authority may need to establish:* • *the 'baseline' local air quality, including what would happen to air quality in the absence of the development;* • *whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and* • *whether occupiers or users of the development could experience poor living conditions or health due to poor air quality."*	Informed methodology described in **Section 6.2** and results in **Section 6.6**.

Legislation / Policy / Guidance	Consideration within the PEI Report
The PPG goes on to state that considerations that may be relevant to determining a planning application include whether the development would (Paragraph: 006 Reference ID: 32-006-20191101): a. Lead to changes in vehicle-related emissions in the immediate vicinity of the proposed development or further afield; b. Introduce new point sources of air pollution; c. Expose people to harmful concentrations of air pollutants; d. Give rise to potentially unacceptable impacts during construction for nearby sensitive locations; and e. Have a potential adverse effect on biodiversity. f. The PPG also suggests that the following items could form part of an air quality assessment suitable for an EIA (Paragraph: 007 Reference ID: 32-007-20191101): g. A description of baseline conditions; h. Consideration of sensitive habitats (including designated sites of importance for biodiversity); i. The assessment methods to be adopted and any requirements for the verification of modelling air quality; j. The basis for assessing impacts and determining the significance of an impact; k. Where relevant, the cumulative or in-combination effects arising from several developments; l. Construction phase impacts; m. Acceptable mitigation measures to reduce or remove adverse effects; and n. Measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached.	
North East Lincolnshire Local Plan (2013 – 2032)	
The Local Plan was adopted in 2018 and sets out a strategic vision for the county (Ref 6-27). The plan is centered around set challenges for the Local Council and policy which has been implemented to solve them and support local economic sectors. A key challenge highlighted in the Local Plan (paragraph 14.151) is to *"ensure transport contributes to environmental excellence, improved air quality and reduced greenhouse gas emissions"* and aims to enhance the environment in parallel with delivering economic growth. A key weakness identified by the council with regards to the environment is pockets of poor air quality in Grimsby and Immingham. Immingham town itself serves the surrounding rural community. The main challenges in this area concern traffic movements and air quality in relation to proximity to the Port of Immingham.	Informed methodology described in **Section 6.2,** baseline in **Section 6.4** and results in **Section 6.6**.

Legislation / Policy / Guidance	Consideration within the PEI Report
A relevant strategic objective outlined in the Local Plan is SO [Strategic Objective] 2: Climate change. Whilst titled *"Climate change"*, this objective also includes managing air quality in the North East Lincolnshire Council area, decreasing the number of active AQMAs, and improving use of sustainable modes of transport. Several policies within the Local Plan are relevant to air quality in the Immingham port area: a. Policy 5: Development boundaries sets out how all proposed developments within the Council must consider noise and air quality, in line with sustainability considerations. b. Policy 31: Renewable and low carbon infrastructure was introduced to maximise renewable energy capacity and developments must consider use of renewable energy along with air quality impacts. c. Policy 36: Promoting sustainable transport aims to reduce congestion and improve environmental quality. This policy highlights priority areas, including the A180 corridor, where sustainable transport measures and highway improvements will be focused.	
North East Lincolnshire Council Transport Plan	
This Plan also highlights air quality in Transport Challenge H (section 1.3), which recognises that emissions of transport account for a large part of the council's total carbon emissions and is a source of poor air quality in Immingham and Grimsby (Ref 6-26).	Informed methodology described in **Section 6.2,** baseline in **Section 6.4** and results in **Section 6.6**.
North Lincolnshire Local Development Framework (LDF) (2006 to 2026)	
The North Lincolnshire Local Plan has been replaced by the Local Development Framework (LDF) (2006 to 2026). The LDF consists of a Core Strategy (Ref 6-29) which states that a key goal of the Framework is to reduce pollution levels and frame North Lincolnshire local environmental needs within the wider global picture. Most air quality management objectives focus on the AQMA at Scunthorpe. However, a relevant objective to the proposed development is: a. Spatial Objective 7: Efficient Use and Management of Resources. This aims to support measures to minimise pollution and improve air quality and ensure adequate infrastructure is in place to serve new developments.	Informed methodology described in **Section 6.2,** baseline in **Section 6.4** and results in **Section 6.6**.
North Lincolnshire Local Transport Plan (2011 – 2026)	
The plan details a strategic vision for transport management in the borough (Ref 6-30). Local transport goals include supporting sustainable modes of transport and reducing traffic related CO_2 and NO_2 emissions so as to protect and enhance the natural environment. In the Transport Plan, the A160 at South Killingholme was identified as an area of concern regarding levels of NO_2.	Informed methodology described in **Section 6.2,** baseline in **Section 6.4** and results in **Section 6.6**.

6.4.2 The EU limit values, UK air quality objectives and Environmental Assessment Levels for the pollutants of concern are displayed in **Table 6.5**. Limits and objectives are expressed in one of two ways: as annual mean concentrations which are not to be exceeded without exception, due to their chronic effects; or as shorter term (24 hour or one hour) mean concentrations for which only a specified number of exceedances are permitted within a specified time frame, due to their acute effects.

6.4.3 An air quality objective for NO_X of 30 µg/m^3 and SO_2 of 20 µg/m^3 are set for the protection of vegetation. In addition to these, critical loads for nitrogen deposition have also been determined which represent (according to current knowledge) the exposure below which there should be no significant harmful effects on sensitive elements of those habitats. Critical loads are set for different types of habitat based on their respective sensitivity to nutrient nitrogen and have been obtained for each designated site with the potential to be affected by the Project.

Table 6.5 Air quality objectives and EU limit values (H.M. Government (2010))

Pollutant	Averaging Period	Concentration	Maximum Permitted Exceedances	Target Date (AQO)	Target Data (EULV)
AQOs/EULVs for the Protection of Human Health					
Nitrogen Dioxide (NO_2)	Annual mean	40µg/m^3	None	31 Dec 2005	1 Jan 2010
	1 hour mean	200µg/m^3	18 times per year	31 Dec 2005	1 Jan 2010
Particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10})	Annual mean	40µg/m^3	None	31 Dec 2004	1 Jan 2005
	24 hour mean	50µg/m^3	35 times per year	31 Dec 2004	1 Jan 2005
Particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$)	Annual mean	20 µg/m^3	None	1 Jan 2020	1 Jan 2010
Sulphur Dioxide (SO_2)	24 hour mean	125 µg/m^3	3 times per year	31 Dec 2004	1 Jan 2005
	1 hour mean	350 µg/m^3	24 time per year	31 Dec 2004	1 Jan 2005

Pollutant	Averaging Period	Concentration	Maximum Permitted Exceedances	Target Date (AQO)	Target Data (EULV)
AQOs/EULVs for the Protection of Vegetation and Ecosystems					
Nitrogen oxides (NO_X)	Annual mean	30 µg/m^3	None	31 Dec 2000	19 Jul 2001
Sulphur dioxide (SO_2)	Annual mean	20 µg/m^3	None	31 Dec 2000	19 Jul 2001
Ammonia (NH_3)	Annual mean	1 – 3 µg/m$^{3(1)}$	None	N/A	N/A
Nutrient nitrogen deposition	Annual mean	Salt marsh: 20-30 kg N/ha/yr	None	N/A	N/A
		Coastal and floodplain grazing marsh: 10-15 kg N/ha/yr			
		Deciduous woodland: 10-20 kg N/ha/yr			
[1] 1 µg/m^3 where lichens or bryophytes (including mosses, liverworts and hornworts) are present, 3 µg/m^3 where they're not present					

Stakeholder Engagement

6.4.4 A range of stakeholders have been engaged as part of the scoping process to obtain their views on the Project and the scope of the Air Quality assessment, the results of which are presented within the Scoping Opinion (**Appendix 1.B** of the PEI Report, Volume IV).

Limitations and Assumptions

6.4.5 The information presented in this preliminary assessment reflects that obtained and evaluated at the time of reporting and is based on an emerging design for the Project and the maximum likely extents of land required for its construction and operation, based on the principles of the Rochdale Envelope.

6.4.6 The air quality assessment is informed by construction phase and operational traffic data from the traffic and transport assessment and therefore is subject to the relevant limitations, assumptions and uncertainties described in **Chapter 11: Traffic and Transport**.

6.4.7 The air quality assessment is informed by onsite emissions source characteristics and data provided by the Project design team, including the location, indicative height and internal diameter of stack emission points and vents, and the temperature, rate, and mass by pollutant of emissions released. Where there is uncertainty, precautionary assumptions have been made, including those

associated with emissions release heights and the frequency of operation of emergency sources (ie. flares).

6.4.8 The air quality assessment is informed by vessel emissions data. Actual vessel fleet and emissions data is currently unknown at this stage of Project design. In the absence of known fleet data, a reasonable estimate of likely vessel emissions has been considered. This estimate is based on the potential energy demand of vessels of the size anticipated to use the facility, emissions characteristics of a typical marine vessel engine capable of meeting that energy demand, and mass emissions limited by MARPOL Tier II emission limits.

6.4.9 Meteorological data used in the air quality assessment has been sourced from the nearest and most representative meteorological monitoring site, Humberside Airport, which is approximately 13 km southwest of the Site. This data is considered the most representative data available close to the Site. However, there is still some uncertainty on how representative that data can be across the entire air quality study area, when localised factors may affect meteorology and the dispersion of emissions. Therefore, five years of representative meteorological data have been used in the assessment to account for variability, in accordance with Environment Agency guidance.

6.4.10 The modelling of onsite and marine vessel emissions is informed by building dimensions data to account for the effect of building downwash within the dispersion modelling exercise. At this stage of project design, there is some uncertainty in the exact location and dimensions of onsite buildings and structures. To account for this uncertainty, some buildings and structures have been grouped together to be represented larger, collective structures, which will provide a precautionary means of accounting for building downwash in the model.

6.4.11 In the absence of alternative data, Defra background data (Ref 6-8) and Air Pollution Information Service (APIS) background data (Ref 6-2) has been used to represent background pollutant concentration data in the study area. These background concentrations have not had any sources removed and are therefore considered to include emissions associated with neighbours of the Site, including nearby industry and the Port of Immingham. Such an approach is considered proportionate and not unreasonable.

6.4.12 The findings of this preliminary assessment may be subject to change as the design of the Project is developed and refined further through the assessment and consultation processes, and as further research and investigative surveys are completed to fully understand its potential effects.

6.5 Study Area

6.5.1 The study area is the area over which potentially significant direct and indirect effects of the Project may occur during construction and operation (decommissioning having been screened out of the assessment).

6.5.2 The Project will be developed across several areas on and in close proximity to the Port of Immingham, which is an existing and well-established port with a number of existing sources of emissions to air. Onsite emissions associated with

the construction and operation of the Project will form a small proportion of the overall emissions associated with the Port of Immingham.

6.5.3 The study area for potential construction impacts from dust and particulate matter (particles with an aerodynamic diameter of less than 10 micrometres (PM_{10})) has been determined with reference to IAQM guidance (Ref 6-19). They are only likely to occur at locations where there are human health or amenity sensitive receptors within 350 m of the Site Boundary (taken to represent the construction site boundary in this assessment) and/or 50 m of a public road used by construction vehicles that is within 500 m of a site access point, and where there are sensitive ecological receptors within 50 m of the Site Boundary and/or 50 m of a public road used by construction vehicles that is within 500 m of a site access point.

6.5.4 Potential road traffic emissions impacts during construction and operation are only likely to occur where there are sensitive human and/or ecologically sensitive receptors within 200 m of an 'affected' road link (Ref 6-24). An 'affected' road link is defined by the following criteria:

a. Any urban or rural road link not situated within or adjacent to an Air Quality Management Area (AQMA) that will experience a change in two-way traffic flow of 500 or more annual average daily Light Duty Vehicles (LDV) (vehicles <3.5 tonnes) and/or 100 or more annual average daily Heavy Duty Vehicles (HDV) (all vehicles >3.5 tonnes), as defined within EPUK and IAQM guidance (Ref 6-25).

b. Any urban or rural road link that is situated within or adjacent to an AQMA that will experience a change in two-way traffic flow of 100 or more annual average daily LDVs and/or 25 or more annual average daily HDVs, as defined within EPUK and IAQM guidance (Ref 6-25).

c. Any road link that forms part of the Strategic Road Network (SRN) that will experience a change in two-way traffic flow of 1000 or more Annual Average Daily Traffic (AADT) and/or 200 or more annual average daily HDVs, as defined within National Highways guidance LA105 (Ref 6-18).

6.5.5 The study area for onsite point source emissions during operation is determined with reference to Environment Agency permitting guidance, in the absence of any alternative (Ref 6-13), which includes worst-case human health and nature conservation impacts within 10km of the emissions sources.

6.5.6 Vessel emissions impacts during construction and operation will occur close to the source. In the absence of guidance, the study area applied to the onsite point source emissions will apply to this source also. The assessment will focus on worst-case impacts at the nearest human health and/or ecologically sensitive receptors, where present, in each direction of the vessel sources.

6.5.7 The study area for the odour assessment is again determined by the guidance documents used to inform the assessment (Ref 6-3). The guidance document does not specifically refer to a study area based on any distance criteria from the site boundary. Instead, the odour study area can be assumed to include the nearest odour sensitive receptors in each direction from the Site.

6.5.8 The air quality ES chapter will, through further desk-based analysis and assessment, refine the study area for the purposes of the impact assessment.

6.6 Baseline Conditions

6.6.1 A desk-based study has been undertaken to inform the baseline characterisation on which the impact assessment is then based. This has included review of the following key data sources:

a. North East Lincolnshire Council Local Air Quality Management Data (Ref 6-28);

b. North Lincolnshire Council Local Air Quality Management Data (Ref 6-31);

c. A baseline nitrogen dioxide diffusion tube survey;

d. Defra's Pollution Climate Mapping (PCM) Model Compliance Link Outputs (Ref 6-9);

e. Defra's Background Pollutant Concentration Maps (Ref 6-8); and

f. APIS Background Pollutant Concentration Maps (Ref 6-2).

Local Air Quality Management Data

6.6.2 North East Lincolnshire Council undertake monitoring of air quality in their administrative area as part of their Local Air Quality Management duties. This includes the monitoring of nitrogen dioxide (NO_2) at two automatic monitoring sites and 30 passive monitoring sites. Of those monitoring sites, four are located at Immingham, including one of the automatic monitoring sites. In 2019, when conditions were not affected by the Covid-19 pandemic, concentrations ranged from 16.5 µg/m^3 to 24.5 µg/m^3 at roadside locations in the town and 13.5 µg/m^3 at an urban background location. Concentrations had generally returned to pre-pandemic levels in 2021. These data are summarised in **Table 6.6** and demonstrate concentrations below the air quality objective and below the value to suggest any risk of the one-hour NO_2 objective being exceeded.

6.6.3 North Lincolnshire Council also undertake monitoring of air quality within their administrative area using passive and automatic monitoring. The North Lincolnshire Council Annual Status Report (2020) details recorded annual mean NO_2 monitoring results for the past few years (Ref 6-31), including locations close to the A160 at South Killingholme. These data are summarised in **Table 6.7** and also demonstrate concentrations below the air quality objective and below the value to suggest any risk of the one-hour NO_2 objective being exceeded.

6.6.4 Both Councils (North East Lincolnshire Council and North Lincolnshire Council) have current AQMAs declared. One is located adjacent to the A180 through Grimsby and was designated due to elevated NO_2 concentrations, and another is located at Scunthorpe and was designated due to elevated concentrations of particulate matter (PM_{10}). Immingham itself has historically had an AQMA, close to the Port of Immingham on Kings Road, due to elevated concentrations of PM_{10}. However, this AQMA has been revoked to reflect PM_{10} concentrations that are now well below the relevant air quality objectives.

Table 6.6 Recorded NO_2 Concentrations in Immingham and Grimsby from North East Lincolnshire Air Quality Monitoring Network.

Site ID	Grid Reference		Site Type	NO_2 Annual Mean Concentration (µg/m³)[1,2]					
	X	Y		2015	2016	2017	2018	2019	2021
Immingham									
AURN[3]	518277	415116	Background	-	-	16.9	13.9	13.5	12.1
NEL 23[4]	519193	415279	Roadside	30.0	33.3	28.5	26.5	24.5	25.3
NEL 24[4]	517543	414312	Kerbside	-	-	-	-	16.5	15.0
NEL 25[4]	518108	414533	Kerbside	-	-	-	-	19.1	18.2
Cleethorpe Road AQMA, Grimsby									
Cleethorpe Road[2]	527761	410425	Roadside	**46.5**	**41.6**	35.9	-	32.0	33.4
NEL 11/12/13[5]	527761	410425	Roadside	**42.7**	**45.2**	**47.3**	38.0	37.8	39.1
NEL 14[4]	527754	410445	Kerbside	34.7	37.3	34.7	33.3	31.6	34.2
NEL 15[4]	527789	410438	Kerbside	30.8	35.7	37.3	32.9	31.0	35.8

[1] Values in **Bold** signify an exceedance of the annual mean NO_2 air quality objective

[2] Values for 2020 not reported due to the influence of Covid-19 lockdowns on emissions

[3] Continuous monitoring station with reference monitor

[4] Diffusion tube

[5] Triplicate diffusion tubes and average reported

Table 6.7 Recorded NO_2 concentrations in South Killingholme from North Lincolnshire Air Quality Monitoring Network

Site ID	Grid Ref.		Site Type	Annual Mean Conc. (µg/m³)[1,2,3]				
	X	Y		2015	2016	2017	2018	2019
South Killingholme								
CM6[4]	514880	416133	Other	20	17	17	18	15
DT13[5]	514573	415901	Roadside	26	31	20	17	17
DT14[5]	514782	415971	Roadside	34	31	27	28	29

Site ID	Grid Ref.		Site Type	Annual Mean Conc. (µg/m^3)[1,2,3]				
	X	Y		2015	2016	2017	2018	2019
DT15[5]	515452	416107	Background	19	21	19	20	18
DT16[5]	515279	416085	Roadside	27	26	25	26	25

[1] North Lincolnshire report concentrations as whole numbers

[2] Values for 2020 not reported due to the influence of Covid-19 lockdowns on emissions

[3] No data published by North Lincolnshire for 2021 at time of writing

[4] Continuous monitoring station with reference monitor

[5] Diffusion tube

Baseline Survey Data

6.6.5 To supplement the existing NO_2 monitoring data gathered by the Local Authorities in the study area, a project specific NO_2 survey has been undertaken from November 2021 to February 2022. The data gathered during the survey has been annualised and adjusted for diffusion tube bias in line with Defra's LAQM TG (22) guidance (Ref 6-7), to represent annual mean concentrations for 2019.

6.6.6 These results are summarised in **Table 6.8** and demonstrate concentrations below the air quality objective and below the value to suggest any risk of the one-hour NO_2 objective being exceeded.

Table 6.8 Baseline NO_2 survey results, annualisation and bias-adjustment

Diffusion Tube ID	Period Mean Concentration (µg/m^3)			Annualised Mean (2019)[1]	Bias-adjusted mean (2019)[2]
	Period 1 (9/11/21 – 6/12/21)	Period 2 (6/12/21 – 6/1/22)	Period 3 (6/1/22 – 3/2/22)		
DT1	26.5	20.4	25.0	20.0	16.8
DT2	36.2	28.3	36.8	28.2	23.7
DT3	-[3]	-[3]	-[3]	-	-
DT4	25.5	18.6	36.1	22.3	18.8
DT5	19.9	20.7	27.2	18.9	15.9
DT6	24.5	20.4	29.5	20.7	17.4
DT7	15.4	15.8	21.3	14.6	12.3
DT8	18.4	18.4	24.9	17.2	14.4
DT9	20.7	18.4	26.4	18.2	15.3

Diffusion Tube ID	Period Mean Concentration (µg/m^3)			Annualised Mean (2019)[1]	Bias-adjusted mean (2019)[2]
	Period 1 (9/11/21 – 6/12/21)	Period 2 (6/12/21 – 6/1/22)	Period 3 (6/1/22 – 3/2/22)		

[1] Annualisation factor of 0.83 calculated by comparison of period mean and 2019 annual mean concentrations from the following automatic monitoring stations on the Automatic Urban and Rural Network: Immingham and Hull Freetown.

[2] Bias-adjustment factor of 0.84 sourced from Defra's National Bias Adjustment Spreadsheet (Ref 6-9) calculated from a co-location study was undertaken during the survey at the Immingham AURN monitoring station, but ratified data from the AURN site for the survey period is not currently available.

[3] Diffusion tube not present when collected following exposure

Defra Pollution Climate Mapping (PCM) Model

6.6.7 The closest PCM link to the site is A1173 located approximately 120m from the western edge of the site. This link has a modelled concentration of 22.6 µg/m^3 in 2019 (Ref 6-9).

Defra Background Data

6.6.8 Defra has produced publicly available maps of background pollutant concentrations covering the whole of the UK, for the purpose of Local Air Quality Management. These maps provide a useful resource for locations where background monitoring data is limited. The maps give background pollutant concentrations for each 1 km x 1 km grid square within the UK for all years between 2018 and 2030 for NO_X, NO_2, PM_{10} and $PM_{2.5}$, and 2001 for SO_2.

6.6.9 **Table 6.9** outlines the average 2019 background concentrations of NO_X, NO_2, PM_{10} and $PM_{2.5}$, and the 2001 background for SO_2, within the grid squares where the Project is approximately located. The background concentration values account for existing sources of emissions to air within each and neighbouring grid squares and none of these sources have been removed from the values reported or those used to inform the assessment. Total background concentrations within these grid squares are well below the respective Air Quality Standards.

Table 6.9 Defra Mapped Annual mean Background Concentrations for approximate area of site (µg/m^3)

Grid Square		NO_X	NO_2	PM_{10}	$PM_{2.5}$	SO_2
X	Y					
521500	415500	22.4	15.8	14.0	8.5	3.5
520500	415500	23.6	16.7	13.5	8.4	3.6
519500	414500	23.1	16.3	15.2	8.9	2.9
520500	414500	21.8	15.5	14.4	8.6	3.0

APIS Background Data

6.6.10 APIS also publish publicly available maps of background pollutant data across the UK for pollutants including nitrogen deposition rates and NH_3 (Ref 6-2). The background concentrations are based on a 5 km x 5 km grid across the UK and include for existing sources of emissions to air within each and neighbouring grid squares.

6.6.11 **Table 6.10** provides 2019 background pollutant data (based on a 3-year average of 2018 – 2020 inclusive) for nitrogen deposition and NH_3 concentrations within the grid squares where the Project is approximately located. The background concentration values account for existing sources of emissions to air within each and neighbouring grid squares and none of these sources have been removed from the values reported or those used to inform the assessment. Background nitrogen deposition rates for short vegetation are just below the Critical Load for saltmarsh habitat, but above the Critical Load for coastal and floodplain grazing marsh. Background nitrogen deposition rates for tall vegetation are above the Critical Load for deciduous woodland. Background NH_3 concentrations are above the lower Critical Level but below the upper Critical Level.

Table 6.10 APIS Mapped Annual Mean Background Concentrations for approximate area of site (µg/m³)

Grid Square		Nitrogen Deposition Rate (kg N/ha/yr)		Annual Mean NH_3 Conc. (µg/m³)
X	Y	Short vegetation[1]	Tall vegetation[2]	
521500	415500	19.3	32.5	2.0
520500	415500	19.5	32.8	2.0
519500	414500	19.6	33.0	2.1
520500	414500	19.5	32.7	2.1

[1] Short vegetation, such as grassland and marsh, has a lower deposition velocity then tall vegetation, hence lower background deposition rates.

[2] Tall vegetation, such as woodland, has a higher deposition velocity than short vegetation, hence higher background deposition rates.

Future Baseline

6.6.12 In addition to describing the existing baseline environment, the air quality chapter of the ES will seek to explain what the environmental change, in air quality terms, would likely be in the future if the Project were not to go ahead.

6.6.13 It is anticipated that this will show a general decrease in pollutant concentrations and deposition rates over future years. Whilst other developments may increase the number of emission sources in the area, there is a general trend of reducing pollutant concentrations and deposition rates over time, due to improving

emission technology and the evolution of the vehicle fleet and other emissions sources.

6.6.14 The East Site is adjacent to and the West site close to the operational Port of Immingham, which has been in active use for port purposes for a number of decades and will continue to do so into the future. The current use of the site for bulk cargo, steel sections, lorry and automotive storage is also likely to continue into the future.

6.7 Development Design and Impact Avoidance

6.7.1 The Project has been designed, as far as possible, to avoid and minimise impacts and effects to population and health through the process of design development, and by embedding mitigation measures into the design.

6.7.2 Emissions to air and potential impacts at sensitive locations are mitigated by direct and indirect control measures including those embedded within the Project design. These include, but are not limited to:

a. Project layout design and the locating of onsite sources with consideration of nearby air quality sensitive receptors, including the position of the jetty and docked vessels;

b. Closed system for ammonia handling with leak detection;

c. Emergency flares to burn off NH_3 or hydrogen emissions should the need arise; hydrogen flares will also be used in plant start up and shut down

d. Emissions release heights to encourage optimal dispersion;

e. Use of electricity powered steam raising plant;

f. Demonstration of the application of best available techniques in plant design and operation as part of the environmental (EPR) permit;

g. The enforcement of relevant emissions standards including those set by MARPOL for Marine Vessels; and

h. Measures set out within the Construction Environmental Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) will reduce emissions of dust from construction activities and combustion emissions from traffic movements. It should be noted that the description of impacts presented in **Section 6.8** do not account for the measures set out in the CEMP and CTMP.

6.8 Potential Impacts and Effects

Construction Phase

6.8.1 The preliminary assessment has identified that the construction of the Project has the potential to adversely impact on local air quality at sensitive locations in the vicinity of the Site.

6.8.2 These impacts are associated with the following pathways:

a. Dust emissions;

b. Site plant and NRMM emissions;

c. Vessel emissions; and

d. Traffic emissions.

Construction Dust Emissions

6.8.3 The construction dust assessment follows the step-by-step approach set out in relevant IAQM guidance (Ref 6-19). This process is summarised in the sub-sections below.

6.8.4 It is anticipated that the construction of the Project will be undertaken in six phases and will last for approximately 11 years. The construction dust assessment is based on a single time-slice assuming peak construction activity and is conservatively used to represent all 11 years of construction.

6.8.5 Peak construction will occur during phase 1 of the construction works, which will last for approximately three years and include the following works:

a. Construction of jetty structure and berths;

b. Laying of jetty access road and other internal site access roads;

c. Construction of jetty topside infrastructure;

d. Installation of pipelines;

e. Drainage, utilities and cabling;

f. Construction of one West Site liquefier;

g. Construction of West Site Tanker loading bays;

h. Construction of West Site supporting buildings and facilities;

i. Construction of East Site ammonia tank; and

j. Construction of one East Site hydrogen production unit

6.8.6 Phases 2 – 6 will each have a duration of two years and collectively occur over a period of eight years, if built consecutively. These phases relate to increasing the capacity of the facility, with the installation of two additional hydrogen production units on the West Site, and three hydrogen production units and three liquefiers on the East Site. Due to the length of time over which these activities will occur, the construction works during Phases 2 – 6 will be less intensive than those undertaken during Phase 1.

Step 1 Screen the requirement for a detailed assessment

6.8.7 Step 1 of the guidance is to screen the requirement for a more detailed assessment. According to the guidance, no further assessment is required if there are no receptors within a specified distance of the works. The screening distances set by the IAQM guidance are:

a. Receptors sensitive to amenity and human health impacts within 350 m of the construction site boundary and/or within 50 m of a public road used by construction traffic that is within 500 m of the site entrance; and

b. Nature conservation receptors located within 50 m of the construction site boundary and/or within 50 m of a public road used by construction traffic that is within 500 m of the site entrance.

6.8.8 There are a number of nature conservation receptors within 50 m of the construction site boundary, including the high sensitivity Humber Estuary Special Area of Conservation (SAC)/Special Protection Area (SPA), which is immediately adjacent to the north and north-eastern sections of the site.

6.8.9 The nearest human health sensitive receptors are residential properties and local businesses located on Queens Road along the northern boundary of the West Site.

6.8.10 Due to the presence of the high sensitivity amenity, human health and nature conservation sensitive receptors within the screening distances set by the guidance, the more detailed assessment is required and is set out in the following steps.

Step 2 Assess the Risk of Dust Impacts

Step 2A Determine the Dust Emissions Magnitude

6.8.11 Step 2A requires the determination of the dust emission magnitude, which the guidance states is based on the scale of the anticipated works with the following activities: demolition; earthworks; construction (i.e. the building and erection of structures); and trackout (the deposition of dust and particulate matter onto public roads by construction vehicles), and should be classified as Small, Medium, or Large.

6.8.12 The scale of demolition works is likely to be limited, given the current land uses across the Project site. However, a worst-case scenario is assumed for this activity. The dust emission magnitude for the proposed demolition works is classed as Large.

6.8.13 The Site is anticipated to require earthworks associated with soil-stripping, ground levelling and excavation works. Whilst the total ground area of earthworks is currently undefined, it is likely to exceed the highest criteria set by the IAQM guidance (>10,000 m^2). It is also anticipated that there could be more than ten heavy earth moving vehicles in operation at any one time. As such the dust emissions magnitude of effect for earthworks is classed as Large.

6.8.14 Potentially dusty materials that may be in use during construction works are concrete (if delivered dry), sand and hard core, which will be stored and handled at the Site throughout the construction phase. The volume of the construction work is currently undefined; however, it is likely to exceed the highest criteria set by the IAQM guidance (>100,000 m^3). Therefore, the worst-case scenario is assumed. As such, the dust emissions magnitude of effect for construction is classed as Large.

6.8.15 Trackout is associated with the deposition of mud and potentially dusty material onto the public network from construction vehicles leaving the Site. On any one day, there is considered to be a high possibility that there will be more than 50

outward construction related HDV (all vehicles > 3.5 tonnes) movements. The assigned dust emission magnitude for trackout is classed as Large.

Step 2B Determine the Sensitivity of the Area

6.8.16 Step 2B of the IAQM construction dust guidance requires the determination of the sensitivity of the area to construction dust impacts. According to the guidance, this is based on the sensitivity of individual receptors, the proximity and number of those receptors, background PM_{10} concentrations and site-specific factors, such as local terrain, meteorology, and natural and existing windbreaks.

6.8.17 The limited number of receptors combined with their proximity to the Site, means that the sensitivity of the area to dust soiling effects on people and property is Medium.

6.8.18 Background PM_{10} concentrations are estimated to be 13 – 15 µg/m^3 and this, coupled with the limited number of receptors and their proximity to the Site, means that the sensitivity of the area to human health impacts is Low.

6.8.19 The proximity of the Humber Estuary SAC/SPA means that there is a high sensitivity nature conservation receptor within 20 m of the construction site boundary. However, the areas of the SAC/SPA that are within 20 m of the Site Boundary are tidal mudflats, which are not considered sensitive to construction dust impacts, due to any material deposited being washed away with the retreating tide.

Step 2C Determine the Risk of Dust Impacts

6.8.20 Step 2C of the IAQM construction guidance concerns the determination of the risk of dust impacts, which is informed by the dust emission magnitude identified in Step 2A and the sensitivity of the area identified in Step 2B.

6.8.21 The risk of dust impacts is shown in **Table 6.11**.

Table 6.11 Summary Dust Risk Table

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	High	Medium	Medium	Medium
Human health	Medium	Low	Low	Low
Nature Conservation	High	Medium	Medium	Medium

6.8.22 Following the determination of dust risk, the level of mitigation is confirmed to control dust emissions to the extent that the effect of impacts is not significant. Mitigation measures are described in **Section 6.9**. Without the application of the identified level of mitigation, there is the potential for the effect of construction impacts to be **Significant**.

Non-Road Mobile Machinery (NRMM) and Site Plant

6.8.23 Peak construction will occur during phase 1 and the NRMM and site plant anticipated to be onsite across the Pipeline, West Site and East Site, at any one during this phase of the works, is likely to include:

a. 4 x Crawler crane;
b. 6 x Truck crane, capacity <100Te;
c. 6 x Truck crane, capacity >100 t;
d. 6 x Telehandler;
e. 4 x Diesel generator 550 kW;
f. 4 x Diesel generator 450 kW;
g. 4 x Transformer 2x630 kW;
h. 10 x Piling rig;
i. 20 x Concrete mixer;
j. 3 x Pump;
k. 4 x Caterpillar type tracked front loader;
l. 4 x Caterpillar 226 Bobcat;
m. 2 x JCB type wheel loaders / excavators;
n. 6 x Excavators;
o. 6 x Dumpers;
p. 2 x Rollers;
q. 12 x Four-axle dump truck;
r. 2 x Three-axle dump truck;
s. 4 x 3-5t truck; and
t. 4 x Pickup.

6.8.24 The NRMM and site plant listed above may be present onsite at the same time, but will not all be operational simultaneously. Furthermore, operation of all individual NRMM and site plant is limited to as and when required, within the working day.

6.8.25 The West Site is located immediately adjacent to a small number of residential properties (c.10) alongside its northern boundary, on Queens Road. Beyond those, the nearest residential properties are located on Chestnut Avenue, 450m away to the west. The Queens Road properties are also the nearest air quality sensitive receptors to the Pipeline works area, and the East Site works area, albeit with a greater setback distance (c.100m to the nearest property from the Pipeline works area and 750m from the East Site works area).

6.8.26 Whilst the properties on Queens Road are in close proximity to the West Site boundary, they do experience some setback from the main area of works within that site. Any NRMM machinery or site plant that is operational within 100m of

those properties will only be for a limited number of days or weeks at most, with the vast majority of operations occurring within the works area being more than 100m away.

6.8.27 The East Site works area is immediately adjacent to the SAC, although the nearest sections of the SAC to the Site are not considered sensitive to air quality impacts. The nearest nature conservation sensitive locations are saltmarsh habitat, approximately 3km away to the southeast.

6.8.28 In light of this, the intermittent nature of NRMM and site plant emissions, and the limited number of receptors close enough to be potentially impacted upon, it is considered that the effect of impacts from this source are **not significant**, before mitigation. NRMM and site plant emissions would not contribute to a significant effect on local air quality.

Marine Vessel Emissions

6.8.29 Peak construction vessel operation will also occur during Phase 1, when the jetty structure and berths, and jetty topside infrastructure will be constructed. Anticipated construction phase vessels will comprise of:

a. 1 x Backhoe dredger;
b. 1 x Jackup barge;
c. 2 x Floating barges;
d. 2 x Multicats;
e. 6 x Flat-top barges; and
f. 1 x Safety boat.

6.8.30 Not all of these vessels will be in use at any one time, and, with the exception of the dredger, operations and/or emissions of individual vessels will be periodic and intermittent.

6.8.31 The closest human health sensitive receptors to the construction phase vessel working area are the residential properties on Queens Road, approximately 1.5 km away from the nearest marine works and 2.5 km away from the furthest marine works.

6.8.32 The construction vessel working area is immediately adjacent to the Humber Estuary SAC, although, as previously noted, the nearest sections of the SAC to the Site are not considered sensitive to air quality impacts and the sensitive locations of the SAC are the saltmarsh habitat, approximately 3km away to the northeast and 3km to the southeast.

6.8.33 Given the limited number of construction vessel emissions sources, the frequency of operation and distance between source and sensitive receptors, it is considered highly likely that the effect of unmitigated impacts from this source would be **not significant**. Construction vessel emissions would not contribute to a significant effect on local air quality.

Road Traffic Emissions

6.8.34 Peak construction traffic impacts will occur across the three years of Phase 1 of the construction works. During that Phase, there is anticipated to be an annual average of 195 two-way HDV movements visiting the construction site per day. All 195 two-way movements will approach to and from the site via Queens Road, Kings Road and the A1173. Construction phase HDVs will approach the A1173 to and from the A180, which forms part of the SRN. The A180 will experience maximum two-way HDVs of 106 movements per day to the west of the A1173 junction.

6.8.35 The two-way construction phase HDV movements on the A180 and SRN fall below the National Highways guidance criteria of 200 two-way HDV movements per day to suggest that they could not contribute to a significant effect. However, the two-way HDV movements on the local road network, between the A180 and the site entrances on Queens Road, exceed the IAQM and EPUK guidance criteria (Ref 6-25) of 100 two-way HDV movements per day to suggest that they could potentially contribute to a significant effect.

6.8.36 On this construction route, sensitive exposure to construction HDV emissions is only present on a short section of Queens Road where there are eight residential properties. Baseline air quality has been quantified by means of NO_2 monitoring and review of background pollutant conditions for NO_2, PM_{10} and $PM_{2.5}$ at this location. Existing conditions suggest that air quality at this location on Queens Road is of a good standard (see **Table 6.8**). The emissions associated with c.200 additional HDV movements per day will not increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ to the extent that the air quality objectives will be put at risk of exceedance.

6.8.37 In line with National Highways guidance, and following review of baseline air quality on Queens Road, it is considered that the construction phase traffic impact is unlikely to contribute to a significant effect on local air quality. Before mitigation, the effect of construction phase road traffic emissions impact is **not significant**.

Operational Phase

6.8.38 This section contains an assessment of the potential impacts to air quality as a result of the operational phase of the Project. The following impact pathways have been assessed:

a. Onsite marine-side vessel emissions and landside combustion and process emissions;

b. Road traffic emissions; and

c. Odour emissions.

Marine Vessel Emissions and Landside Plant Emissions

6.8.39 The impact of docked vessel emissions and onsite plant emissions has been quantified at the nearest air quality sensitive human health and nature conservation receptors in the vicinity of the Site. The approach to the assessment

is described in detail in **Appendix 6.B** (PEI Report, Volume IV). The assessment is based on the following key assumptions, which will be reviewed and updated, where required, in the ES:

a. There will be two vessels docked at the facility, using both berths, at any one time for 8760 hours of the year, which produces a worst case assessment;

b. When in dock, vessel energy demand will be met by auxiliary engines based on a peak demand of around 8MW, to load and discharge cargo;

c. That 50% of docked vessel engines will be fuelled by LNG and 50% fuelled by MGO;

d. That MARPOL Tier II emissions standards shall apply;

e. Combustion and process emissions associated with the landside hydrogen production units will be operational up to 8760 hours per year;

f. Hydrogen plant will be fitted with Selective Catalytic Reduction technology to reduce emissions of NO_X;

g. Furnaces will initially be gas-fired, but hydrogen or biogas may be used in future

h. Steam raising will be performed using electricity rather than gas, removing the requirement for gas or diesel-fired steam generating plant; and

i. Combustion emissions associated with flares will be operational on pilot mode for 8760 hours per year and on operational mode for approximately 365 hours per year.

6.8.40 The impact of marine vessel emissions and landside plant emissions on the worst-affected human health sensitive receptors considered in this assessment is provided in **Table 6.12**. Impacts provided are for annual mean and hourly mean NO_2. Impact for other pollutants modelled account for less than 1% of the relevant air quality objectives. The impact predicted at other human health sensitive receptors for all pollutants modelled are provided in **Appendix 6.B** (PEI Report, Volume IV).

Table 6.12 Worst-affected Human Health Receptor Impacts

Pollutant	Impact (µg/m^3)	Impact/AQO (%)	Baseline (µg/m^3)	Total Conc. (µg/m^3)	Total Conc./AQO (%)
Annual Mean NO_2	1.2	3	15.5	16.7	42
Hourly Mean NO_2	27.3	14	31.0	58.3	29.1

6.8.41 At the worst affected human health sensitive receptor (R12, located on Queens Road), a change in annual mean NO_2 concentration of 5% or less of the annual mean air quality objective, at a location where total pollutant concentrations with the Project in operation account for 75% or less of the objective, equates to a

negligible impact which is considered to be **not significant**. This is in accordance with the IAQM and EPUK guidance referred to in this assessment (Ref 6-25).

6.8.42 For hourly mean NO_2, a change of between 11% and 20% of the air quality objective is described as a slight adverse impact in IAQM and EPUK guidance. A slight adverse impact is considered to be **not significant**. As explained in **Chapter 22: Major Accidents and Disasters**, **Table 22.2**, further assessment is required of the consequences of the operation of the hydrogen production facility on surrounding land uses in terms of major hazard planning. It is currently anticipated that the HSE will advise against the continued use of the seven residential properties on the west side of Queens Road and therefore that those properties are likely to need to be acquired for the Project. The Applicant is currently in discussions with those landowners / occupiers with a view to negotiating acquisition of the seven residential properties. Where it is not possible to acquire those properties through negotiation, acquisition powers for these properties will be sought through the DCO. In the event of acquisition of the properties ahead of the either construction or operation commencing, the adverse effect would not arise.

6.8.43 Marine vessel and site plant emissions would not contribute to a significant effect on local air quality.

6.8.44 The impact of marine vessel emissions and landside plant emissions on the selected nature conservation sensitive receptor considered in this assessment is provided in **Table 6.13**.

Table 6.13 Worst Affected Nature Conservation Receptor Impacts (µg/m^3)

Pollutant	Impact	Impact/AQO (%)	Baseline[1]	Total Conc.	Total Conc./AQO (%)
Annual Mean NO_X	3.3 µg/m^3	11	18.1 µg/m^3	21.4 µg/m^3	71
Annual Mean NH_3	0.01 µg/m^3	<1[2]	2 µg/m^3	2.01 µg/m^3	201[2]
Annual Mean SO_2	<0.01 µg/m^3	<1	2.2 µg/m^3	2.2 µg/m^3	11
Annual N Deposition Rate[3]	0.4 kgN/ha/yr	2	18.7 kgN/ha/yr	19.1 kgN/ha/yr	96

[1] As reported by APIS

[2] Assuming lichens or bryophytes (including mosses, liverworts and hornworts) are present

[3] NO_2 + NH_3 contribution

6.8.45 At the worst affected nature conservation receptor (E11, saltmarsh habitat on the northern shore of the Estuary), the change in annual mean NH_3 and SO_2 can be screened as insignificant (‘not significant’) in line with Environment Agency

guidance. However, the annual mean NO_X concentration and annual N deposition rate cannot be screened as insignificant ('not significant). For these pollutants, the impacts at the relevant habitats affected have been reviewed by the competent experts for ecology (also presented in **Chapter 9: Marine Ecology**) and they have determined the following:

a. For saltmarsh, the APIS provides a Critical Load range of 20-30 kg/ha/yr and nitrogen inputs have been experimentally demonstrated to have an effect on overall species composition of saltmarsh. However, the Critical Loads on APIS are relatively generic for each habitat type and cover a wide range of deposition rates. They do not (and are not intended to) take other influences (to which the habitat on a given site may be exposed) into consideration.

b. Moreover, it is important to note from APIS that the experimental studies which underlie conclusions regarding the sensitivity of saltmarsh have "… *neither used very realistic N doses nor input methods i.e. they have relied on a single large application more representative of agricultural discharge"*, which is far in excess of anything that would be deposited from atmosphere. Therefore, APIS indicates that determining which part of the critical load range to use for saltmarsh requires expert judgment. Overall, there is good reason to believe the upper part of the critical load range (30 kgN/ha/yr) may be more appropriate than the lower part (20 kgN/ha/yr) for upper saltmarsh.

c. Generally, nitrogen inputs from the air are not as important as nitrogen from other sources. Effects of nitrogen deposition from atmosphere are likely to be dominated by much greater impacts from marine or agricultural sources. This is reflected on APIS itself, which states regarding saltmarsh that '*Overall, N deposition [from atmosphere] is likely to be of low importance for these systems as the inputs are probably significantly below the large nutrient loadings from river and tidal inputs'*. Another mitigating factor is that the nature of intertidal saltmarsh in the Humber estuary means that there is daily flushing from tidal incursion. This is likely to further reduce the role of nitrogen from atmosphere in controlling botanical composition.

d. Therefore, the additional predicted contribution from nitrogen emissions from the Project does not result in any exceedance of the Critical Load range for saltmarsh, and it is concluded that there will be no adverse effect on the Humber Estuary designated site.

6.1.2 Before mitigation, marine vessel and site plant emissions would not contribute to a significant effect on nature conservation.

Road Traffic Emissions

6.8.46 At this preliminary stage, only limited information of operational traffic movements is available, including the number of staff working at the facility each day and some anticipated numbers of HDV movements facilitating imports and exports to the site, and maintenance.

6.8.47 From the data currently available, it is likely that operational traffic impacts will fall below the IAQM and EPUK guidance (Ref 6-25) of 100 two-way HDV movements per day and the National Highways guidance (Ref 6-18) of 200 two-way HDV

movements per day. It is currently anticipated that there will be 96 two-way HDV movements into and out of the site. Also, if assuming all staff working at the site commute to and from site using their own car, 208 two-way LGV movements.

6.8.48 In line with those guidance documents, a traffic impact of less than the screening criteria that they set out is unlikely to contribute to a significant effect on local air quality or sensitive nature conservation sites. Before mitigation, the effect of operational phase road traffic emissions impact is **not significant**.

Odour

6.8.49 The odour impact assessment is summarised in **Table 6.14**. The table sets out the factors used to determine the likely odour impacts and resulting effect from Project sources. It follows the stepped approach described in IAQM guidance (Ref 6-20).

Table 6.14 Odour Impact Assessment

IAQM Guidance Criteria	Assessment of Project Conditions
A description of existing baseline odour conditions.	The Project East Site is located adjacent to the eastern extent of the Port of Immingham and has existing industrial facilities as neighbours, including petroleum storage and chemical manufacturing. The wider port area, petroleum storage and chemical manufacturing are likely to be existing sources of odour emissions. The East Site also has a small Sewage Treatment Works nearby, which will be a source of odour. The Project West Site is also close to the Port of Immingham and has some existing industrial facilities as neighbours, including the manufacture of building products. The West Site also has a household recycling centre nearby, which will be a source of odour.
A description of the location of receptors and their relative sensitivities to odour effects.	The nearest receptors to the Project East Site are the existing commercial and industrial land uses. These are considered to have a low sensitivity to odour impacts. The nearest receptors to the West Site are residential properties on Queens Road. These are considered to have a high sensitivity to odour impacts.
Details of potential odour sources and the resulting potential for generating odours.	Sources are limited to fugitive emissions of NH_3 from potential leaks and controlled emissions from stacks and vents. Emissions from leaks will be intermittent and short in duration. Emissions from stacks will be continuous, but the proportion of NH_3 is minimal.
A description of control/mitigation measures incorporated into the scheme (including management controls and, where appropriate, engineering controls).	To control fugitive emissions, a leak detection system will be in place, meaning that leaks can be identified and repaired quickly. The flares are used to combust any ammonia that would otherwise be released to atmosphere, thereby removing any odorous content from the emission.

IAQM Guidance Criteria	Assessment of Project Conditions
	To control emissions from stacks, emissions are released from such a height that dispersion is encouraged and combustion temperatures are such that NH_3 emissions are minimised.
A prediction of the likely odour impact and resulting effects at relevant sensitive receptors, and taking into account: a. the likely magnitude of odour emissions (after control by measures incorporated into the scheme, if applicable); b. the likely meteorological characteristics at the site; c. the dispersion and dilution afforded by the pathway to the receptors and the resulting magnitude of odour that could result; d. the sensitivity of the receptors; and e. the potential cumulative odour effects with any odours of a similar character.	a. Wind rose plots from Humberside Airport over a five year period (see **Appendix 6.B**, PEI Report, Volume IV) demonstrate the greatest frequency of winds blow from the southwest to the northeast across a narrow vector from 190º to 230º. Although winds do blow from all other directions at times during the year. b. Both the East Site and the West Site and surrounding area are reasonably flat with limited natural or artificial barriers. c. There is limited distance between the East Site and the West Site boundaries and the nearest odour sensitive receptors, although there will be some setback from potential odour emissions. Over such distances there will be some potential for the dilution of emissions. d. The majority of receptors in close proximity to both the East Site and the West site are commercial or industrial land used with limited sensitivity to odour impacts. There are a limited number of high sensitivity residential properties (c.10) adjacent to the West Site, on Queens Road. e. There are numerous cumulative sources of odour emissions in the area, although those existing sources are unlikely to be of a similar character.
Where odour effects are assessed as significant, details of appropriate further mitigation and control measures that could allow the proposal to proceed without causing significant loss of amenity.	Given the limited nature of emissions associated with the Project's operation and control measures incorporated into the Project design, a significant odour effect is considered to be unlikely. Before additional mitigation, the effect of operational phase road traffic emissions impact is **not significant**. However, to demonstrate good practice, and to demonstrate compliance with its Environmental Permit, the operation of the Project will be subject to an Odour Management Plan. Such a Plan would set out: a. Additional odour control requirements beyond those incorporated in the Project design; b. Establish best practice processes; c. Assign responsibilities, including record keeping; and d. Set out the odour monitoring regime, including the frequency of sniff tests, the monitoring of meteorological conditions, maintaining an odour diary and logging and investigating complaints.
The residual odour impacts and their effects	Given the nature of the potential odour sources, the control measures incorporated into the Project design, and the

IAQM Guidance Criteria	Assessment of Project Conditions
	commitment to review odour throughout the operational lifetime of the Project facility, the residual impacts considered not likely to contribute to a significant effect.

6.9 Mitigation and Enhancement Measures

Construction Phase

Construction Dust Emissions

Step 3 Determine Site Specific Mitigation

6.9.1 Step 3 of the IAQM construction dust guidance uses the risk of dust impacts identified in Step 2C to compile an appropriate list of dust mitigation to offset that risk and ensure that a significant effect does not occur. The IAQM guidance relevant to the construction dust assessment (Ref 6-19) lists measures that should be applied, if practical, relative to the risk identified.

6.9.2 A Low/ Medium risk of dust impacts was identified due to the potential dust emission magnitude and the sensitivity of the area. Therefore, the list of IAQM recommended mitigation measures provided below is proportionate to the risk identified. These measures will be secured through the CEMP. The IAQM recommended dust (and particulate matter) mitigation measures for low and medium risk sites are as follows:

a. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;

b. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;

c. Display the head or regional office contact information;

d. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections;

e. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;

f. Make the complaints log available to the local authority when asked;

g. Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book;

h. Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes;

i. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary;

j. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;

k. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions;

l. Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction;

m. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;

n. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;

o. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;

p. Avoid site runoff of water or mud;

q. Keep site fencing, barriers and scaffolding clean using wet methods;

r. Remove materials that have a potential to produce dust from the Site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below;

s. Cover, seed or fence stockpiles to prevent wind whipping;

t. Ensure all on-road vehicles comply with the requirements of relevant NRMM standards, where applicable;

u. Ensure all vehicles switch off engines when stationary - no idling vehicles;

v. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;

w. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control

measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);

x. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;

y. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing);

z. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;

aa. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;

bb. Use enclosed chutes and conveyors and covered skips;

cc. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;

dd. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;

ee. Avoid bonfires and burning of waste materials;

ff. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);

gg. Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;

hh. Avoid scabbling (roughening of concrete surfaces) if possible;

ii. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;

jj. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;

kk. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust;

ll. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;

mm. Avoid dry sweeping of large areas;

nn. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;

oo. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;

pp. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);

qq. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and

rr. Access gates to be located at least 10m from receptors where possible.

Other Construction Phase Emissions

6.9.3 It is best practice to mitigate emissions to air, when possible, even if a significant effect has not been identified. Additional mitigation measures to reduce emissions from construction phase vessel and road traffic emissions sources include:

a. Prohibit unnecessary vehicle or vessel movements;

b. Prohibit unnecessary idling of vehicle and vessel engines;

c. Encourage/promote the use of cleaner engines and fuels; and

d. Discourage single-user car journeys.

Operational Phase

6.9.4 As stated previously, it is best practice to mitigate emissions to air, when possible, even if a significant effect has not been identified. Mitigation to reduce operational phase sources include:

a. Implementation of an Odour Management Plan;

b. Prohibit unnecessary vehicle or vessel movements;

c. Prohibit unnecessary idling of vehicle and vessel engines;

d. Encourage/promote the use of cleaner engines and fuels;

e. Operational process control and monitoring of emissions in accordance with the environmental permit; and

f. Discourage single-user car journeys.

6.9.5 The need for further operational phase mitigation, if any, will be confirmed and reported within the Environmental Statement.

6.10 Preliminary Assessment of Residual Effects

6.10.1 Based on the implementation of the embedded and standard mitigation measures as detailed herein, this preliminary assessment of local air quality effects for the Project is summarised below.

Construction Phase

Construction Dust Emissions

6.10.2 Step 4 of the IAQM construction dust guidance (Ref 6-19) is to determine whether or not the effects, after the application of the identified level of mitigation are, significant or not. The IAQM guidance states that:

"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'".

6.10.3 Therefore, providing a sufficient level of dust mitigation is implemented on site throughout the works, with reference to those recommended by the IAQM, which are considered standard practice on all well managed construction sites, and secured through the CEMP, it is considered that the residual construction effects from the Project are **not significant**.

NRMM and Site Plant Emissions

6.10.4 A review of site plant and NRMM has deemed that impacts are likely to be **not significant**, in line with the IAQM guidance (Ref 6-19), for the following reasons:

a. The transient and intermittent nature of emissions;

b. The limited number of emissions sources;

c. The distance between emission sources and the nearest high sensitivity receptors; and

d. The effectiveness of standard practice emission control measures.

Construction Vessel Emissions

6.10.5 A review of construction vessel emissions has deemed that impacts are likely to be **not significant**, for the following reasons:

a. The number of vessel movements falls well below the number stipulated in Defra guidance (Ref 6-25) to represent a Local Air Quality Management concern;

b. The limited number of emissions sources; and

c. The distance between emission sources and the nearest high sensitivity receptors.

Construction Road Traffic Emissions

6.10.6 Anticipated construction phase traffic impacts have been screened against criteria in relevant guidance. This screening exercise has identified that no SRN road link will experience a traffic impact above the screening criteria. Baseline air quality has been reviewed for sensitive locations that are adjacent to the local road network used by construction traffic. Baseline air quality is such that the additional emissions from construction traffic are unlikely to put any air quality objective at risk of exceedance. This indicates that construction traffic emissions

impacts will not contribute to a significant effect and in themselves are **not significant**.

Operational Phase

Operational Site and Vessel Emissions

6.10.7 Emissions from site plant and operational vessel emissions have been quantified. Impacts at human health sensitive receptors have been found to be negligible and the effect **not significant**.

6.10.8 Impacts at the majority of designated nature conservations sites are screened as **not significant**. However, a section of saltmarsh habitat within the SAC, to the north and downwind of the Project site, does experience an impact of more than 1% of the Critical Load for that habitat.

6.10.9 This potential impact has been reviewed by an ecologist. The predicted Process Contribution from nitrogen emissions from the Project does not result in any exceedance of the upper Critical Load range for saltmarsh, and it is concluded that there will be no residual adverse effect on the Humber Estuary designated site.

Operational Road Traffic Emissions

6.10.10 Anticipated operational phase traffic impacts have been screened against criteria in relevant guidance. This screening exercise has identified that no road link will experience a traffic impact above the screening criteria. This in turn indicates that operational traffic emissions impacts will not contribute to a significant effect and in themselves are **not significant**.

6.11 Summary of Preliminary Assessment

6.11.1 A summary of the impact pathways that have been assessed, and the identified residual effects and level of confidence are presented in **Table 6.15.**

Table 6.15: Summary of potential impact, mitigation measures and residual effect

Receptor	Impact Pathway	Impact Significance	Mitigation Measure	Residual Impact	Confidence
Construction Phase					
Human health and amenity sensitive receptors	Construction dust emissions	Low – High Risk	Standard practice dust mitigation as recommended by the IAQM, outlined in **Section 6.7**	Low	High – assessment based on industry standard guidance and precautionary assumptions
	Site Plant and NRMM emissions	Low	Standard practice mitigation as recommended by the IAQM, outlined in **Section 6.7**	Negligible	High – assessment based on industry standard guidance and precautionary assumptions
	Marine vessel emissions	Negligible	Good practice mitigation outlined in **Section 6.7**	Negligible	Medium – conclusion drawn on professional judgement informed by the number of construction vessels and the distance between those vessels and the nearest highly sensitive receptors
	Road traffic emissions	Negligible	Good practice mitigation outlined in **Section 6.7**	Negligible	High – detailed assessment screened following criteria provided in industry standard guidance and review of baseline air quality
Nature conservation sensitive receptors	Construction dust emissions	Low – High Risk	Standard practice dust mitigation as recommended by the	Low	High – assessment based on industry standard guidance and precautionary assumptions

Receptor	Impact Pathway	Impact Significance	Mitigation Measure	Residual Impact	Confidence
			IAQM, outlined in **Section 6.7**		
	Site Plant and NRMM emissions	Low	Standard practice mitigation as recommended by the IAQM, outlined in **Section 6.7**	Negligible	High – assessment based on industry standard guidance and precautionary assumptions
	Marine vessel emissions	Negligible	Good practice mitigation outlined in **Section 6.7**	Negligible	Medium – conclusion drawn on professional judgement informed by the number of construction vessels and the distance between those vessels and the nearest highly sensitive receptors
	Road traffic emissions	Negligible	Good practice mitigation outlined in **Section 6.7**	Negligible	High – detailed assessment screened following criteria provided in industry standard guidance
Operational Phase					
Human health and amenity sensitive receptors	Marine-side vessel and landside combustion and process emissions	Negligible	Good practice mitigation outlined in **Section 6.7**	Negligible	High – assessment based on industry standard guidance and precautionary assumptions
	Road traffic emissions	Negligible	Good practice mitigation outlined in **Section 6.7**	Negligible	High – detailed assessment screened following criteria provided in industry standard guidance

Receptor	Impact Pathway	Impact Significance	Mitigation Measure	Residual Impact	Confidence
	Odour emissions	Low	Standard practice odour mitigation as recommended by the IAQM, outlined in **Section 6.7**	Negligible	High – assessment based on industry standard guidance
Nature conservation sensitive receptors	Marine-side vessel and landside combustion and process emissions	Low	Good practice mitigation outlined in **Section 6.7**	Low	High – assessment based on industry standard guidance and precautionary assumptions
	Road traffic emissions	Negligible	Good practice mitigation outlined in **Section 6.7**	Negligible	High – detailed assessment screened following criteria provided in industry standard guidance

6.12 References

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Ref 6-26 North East Lincolnshire Council. (2016). North East Lincolnshire Local Transport Plan.

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6.13 Abbreviations and Glossary of Terms

Table 6.16 Glossary and Abbreviations

Acronym	Term	Meaning
AADT	Annual Average Daily Traffic	Annual average daily traffic flow (AADT or AADF) is the total volume of vehicle traffic on a highway or road for a year divided by 365 days. AADT is a useful and simple measurement of how busy a road is.
ABP	Associated British Ports	One of UK's leading and established connected ports groups, owning and operating 21 ports across England, Wales and Scotland.
AQMA	Air Quality Management Area	Zones declared by Local Authorities where areas of relevant exposure exceed or are at risk of exceeding an air quality objective
AQS	Air Quality Strategy	The air quality strategy sets out air quality objectives and policy options to further improve air quality in the UK.
CAFE	Clean Air For Europe	In May 2001, the European Commission launched its " Clean Air for Europe " (CAFE) programme. This is a three-year programme intended to investigate all sources of air pollution and provide solutions to reduce them.
CAZ	Clean Air Zone	A Clean Air Zone is an area in which a local authority has brought measures into place to improve the air quality.
CEMP	Construction Environment Management Plan	A Construction Environmental Management Plan describes the specific mitigation measures to be followed by the appointed construction contractor to reduced potential nuisance impacts.
CO	Carbon monoxide	A colourless, highly poisonous,odourless, tasteless and flammable gas that is slighted less dense than air.
CL	Critical Load	A quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge
DCLG	Department for Communities and Local Government	A former government department (now the Ministry of Housing, Communities and Local Government).
DCO	Development Consent Order	The consent for a Nationally Significant Infrastructure Project required under the Planning Act 2008.
DEFRA	Department for Environment, Food and Rural Affairs	The Government department responsible for policy and regulations on environmental, food and rural issues. The department's priorities are to ground the rural economy, improve the environment and safeguard animal and plant health.

Acronym	Term	Meaning
DMP	Dust Management Plan	A Dust Management Plan manages dust emissions generated within the project area, so that the appropriate dust criteria is met during both the construction and operational stages of the project
DMRB	Design Manual for Roads and Bridges	The Design Manual for Roads and Bridges contains information about current standards relating to the design, assessment and operation of motorway and all-purpose trunk roads in the United Kingdom.
EIA	Environmental Impact Assessment	The statutory process by which information about environmental effect is collected, assessed and used to inform decision making.
EPA	Environmental Protection Act	The Environmental Protection Act 1990 is an Act of the Parliament of the United Kingdom that as of 2008 defines, within England and Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment.
EPUK	Environmental Protection UK	Environmental Protection UK is a national charity that provides expert policy analysis and advice on air quality, land quality, waste and noise.
ES	Environmental Statement	A statutory document which reports the EIA process produced in accordance with the EIA Directive as transposed into UK law by EIA Regulations.
EU	European Union	An economic and political union of 28 countries which operations an internal (or single) market which allows the free movement of goods, capital, services and people between member states.
EULV	EU Limit Value	The Environmental Protection Act 1990 (initialism: EPA) is an Act of the Parliament of the United Kingdom that as of 2008 defines, within England and Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment.
HCs	Hydrocarbons	Hydrocarbons, an organic compound consisting entirely of hydrogen and carbon, and a by-product of fossil fuel combustion
HDV	Heavy Duty Vehicle	Any vehicle with a weight greater than 3.5 tonnes
HGV	Heavy Good Vehicle	Any truck with a weight greater than 3.5 tonnes
HIT	Humber International Terminal	A terminal located within the Port of Immingham.

Acronym	Term	Meaning
IAQM	Institute of Air Quality Management	The professional body for air quality practitioners.
LAQM	Local Air Quality Management	A key part in the UK Government's and the Devolved Administrations' strategies to achieve the air quality objectives.
LDF	Local Development Framework	Local Plans are used to help decide on planning applications and other planning related decisions
LDV	Light Duty Vehicle	Any vehicle with a weight less than 3.5 tonnes
LNG	Liquefied Natural Gas	Liquefied Natural Gas is natural gas that has been cooled to a liquid state (liquefied), for shipping and storage.
MARPOL	The International Convention for the Prevention of Pollution from Ships	The main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.
MGO	Marine Gas Oil	Marine gasoil (MGO) describes marine fuels that consist exclusively of distillates. Distillates are all those components of crude oil that evaporate in fractional distillation and are then condensed from the gas phase into liquid fractions. Marine gasoil usually consists of a blend of various distillates.
MHCLG	Ministry of Housing, Communities and Local Government	The Ministry of Housing, Communities and Local Government's (formerly the Department for Communities and Local Government).
MPS	Marine Policy Statement	The UK Marine Policy Statement provides the framework for preparing Marine Plans and is key when making decisions directly affecting the marine environment.
NO_2	Nitrogen dioxide	A gas produced when fuels are burned and is often present in motor vehicle and boiler exhaust fumes. It is an irritant to the respiratory system.
NO_X	Oxides of nitrogen	Oxides of nitrogen, a mixture of gases that are composed of nitrogen and oxygen, and a by-product of fossil fuel combustion
NPPF	National Planning Policy Framework	A planning framework which sets out the Government's planning policies for England and how these are expected to be applied.
NPSfP	National Policy Statement for Ports	The National Policy Statement fo Ports provides the framework for decisions on proposals for new port development.

Acronym	Term	Meaning
NRMM	Non-Road Mobile Machinery	Any mobile machine, item of transportable industrial equipment, or vehicles which are fitted with an internal combustion engine and are not intended for transporting goods or passengers on roads.
NSIP	Nationally Significant Infrastructure Projects	A type of project listed in the Planning Act 2008, which must be consented by a Development Consent Order.
PEIR	Preliminary Environmental Information Report	The information referred to in Part 1 of Schedule 4 of the EIA Regulations that has been reasonably compiled by the application and is reasonably required to assess the environmental effects of a project.
PINS	Planning Inspectorate	An executive agency with responsibilities for planning appeals, national infrastructure planning applications, local plan examinations and other planning related casework in England and Wales.
PM_{10}	Particulate matter	Particles with an aerodynamic diameter of less than 10 µm, and a by-product of combustion of some fossil fuels
$PM_{2.5}$	Fine particulate matter	Particles with an aerodynamic diameter of less than 2.5 µm, and a by-product of combustion of some fossil fuels
PPG	Planning Practice Guidance	A series of guidance documents which support the content of the National Planning Policy Framework.
SAC	Special Area of Conservation	Sites designated under EU legislation for the protection of habitat and species considered to be of European interest.
SO_2	Sulphur Dioxide	Sulphur dioxide is a colorless, reactive air pollutant with a strong odour.
SPA	Special Protection Area	Sites designated under the European Directive on the Conservation of Wild Birds for the protection of birds in member states.
SSSI	Site of Special Scientific Interest	Areas of land notified by Natural England under section 28 of the Wildlife and Countryside Action 1981 as being of special interest due to its flora, fauna or geological or physiological features.