ABLE MARINE ENERGY PARK (MATERIAL CHANGE 2 – TR030006)

UPDATED ENVIRONMENTAL STATEMENT

CHAPTER 17: AIR QUALITY

Able Marine Energy Park, Killingholme, North Lincolnshire

SLR Ref: 416.01148.00005
Version No: FINAL
June 2021

BASIS OF REPORT

This document has been prepared by SLR Consulting Limited with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Able UK Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

CONTENTS

DOCUMENT REFERENCES

TABLES

17.1.0 Introduction

Development Consent Order Context

17.1.1 The development consent order (DCO) for the site approved a harbour development with the associated land development, to serve the renewable energy sector. The harbour comprises a quay of 1,279m frontage, of which 1,200m is solid quay and 79m is a specialist berth formed by the reclamation of intertidal and subtidal land within the Humber Estuary.

17.1.2 The associated development for the above proposals includes:

- Dredging and land reclamation;
- The provision of onshore facilities for the manufacture, assembly and storage of wind turbines and related items;
- Works to Rosper Road, the A160 and the A180; and
- Surface water disposal arrangements.

17.1.3 To support the DCO Application, an Air Quality Chapter to the Environmental Statement (ES) – Chapter 17 (Ref 1) and associated Annex 17.1 (Ref 2) was prepared. An additional Air Quality Chapter (Chapter 39) was also prepared and specifically related to the Compensation Site but no changes are proposed to that part of the consented development.

17.1.4 The original Air Quality Chapter 17 has been referred to as the "original ES" herein. **In short, all impacts on air quality assessed in the original ES were found '*not significant*'**.

17.1.5 The air quality assessments detailed within the original ES include both qualitative and detailed quantitative methods of assessment, with consideration given to the potential impacts from several key air pollutants, including:

- nitrogen oxides (NOx);
- nitrogen dioxide (NO_2);
- particulate matter with an aerodynamic diameter of ≤10µm (PM_{10});
- particulate matter with an aerodynamic diameter of ≤2.5µm ($PM_{2.5}$);
- sulphur dioxide (SO_2);
- Volatile Organic Compounds (VOCs) assessed as benzene; and
- carbon dioxide (CO_2).

17.1.6 The air quality assessment also considered potential impacts from deposited dust, odour and nitrogen (N) (in terms of N and acid deposition on ecological receptors).

17.1.7 The assessment included detailed assessment of emissions from road sources, non-road sources, rail and shipping, and assessed impacts on sensitive human and ecological receptors.

Consideration of Material Amendment

17.1.8 In terms of air quality, the material amendment amends the deposit site for 1,100,000 tonnes of clay that is to be dredged to form the berthing pocket from its consented location on the *'terrestrial area landward of the existing Killingholme Marshes flood defence wall*', to licenced disposal sites within the Humber Estuary.

17.1.9 The preliminary environmental information issued for consultation considered an increased number and duration of construction vessel movements, reflecting the fact that an additional 1.1M tonnes of dredged clay was to be disposed of within the Humber Estuary. Subsequent review has determined that vessel movements associated with the construction phase are actually equivalent or slightly reduced when compared to the consented scenario.

17.1.10 The original ES considered the dredging programme and associated vessel movements would occur over a 4-month period. The Preliminary Environmental Information Report considered the impact of an eight month dredging period and, whilst this is now a very unlikely scenario, it is carried forward into this UES to demonstrate the insensitivity of the proposed change in respect of air quality impacts.

17.1.11 Beyond the increase in vessel movements and associated emissions, other changes are not considered likely to result in any new or materially different impacts on air quality separate to those previously assessed in the original ES.

Purpose and Structure of Chapter

17.1.12 This chapter of the UES considers the impact of the proposed material amendment on the planning policy, context of the area and air quality impacts on human and ecological receptors.

17.2.0 Methodology

Changes in Legislation, Guidance and Planning Policy

17.2.1 In the interim since the extant DCO and original ES, the changes in legislation, guidance and planning policy detailed in the following subsections have occurred. As noted by the dates, several of the guidance documents were not available at the time of the original air quality assessment.

Legislation

17.2.2 The original ES referred to several legislative documents, including the following:

- The Air Quality Standards Regulations 2010 (AQSR 2010) – transposed from EU Ambient Air Quality Direction (2008/50/EC) and the Fourth Daughter Direction (2004/107/EC);
- The Air Quality (England) Regulations 2000;
- Environmental Protection Act 1990;
- The Habitats Directive (92/43/EEC) (covers the Natura 2000 Network);
- The Conservation of Habitats and Species Regulations 2010 ('Habitats Regulations');
- Wildlife and Countryside Act 1981;
- Countryside and Rights of Way (CRoW) Act 2000; and
- The Environment Act 1995.

17.2.3 Of the above, and since the original ES, the AQSR 2010 were amended by The Air Quality Standards (Amendment) Regulation 2016, and the Habitats Regulations were updated by The Conservation of Habitats and Species Regulations 2017. However, neither amendment would materially change the assessment methodology or conclusions of the original ES.

17.2.4 The air quality legislation within the original ES therefore remains valid, with no significant changes in the interim period.

Local Air Quality Management Technical Guidance LAQM.TG(16)

17.2.5 The original ES utilised Local Air Quality Management Technical Guidance LAQM.TG(09) published by the Department for Environment, Food and Rural Affairs (Defra) in February 2009. This document has been updated several times in the interim, with the most recent update LAQM.TG(16) (Ref 3) published by Defra in April 21. However, the main principles of the guidance document have remained and are therefore still valid.

Land-Use Planning & Development Control: Planning for Air Quality

17.2.6 The original ES utilised guidance produced by Environmental Protection UK (EPUK) '*Development Control: Planning For Air Quality*' (2010 Update) (Ref 4) for the assessment of impacts. In the interim since the DCO came into force, updated versions of this guidance document have been produced.

Most recently in 2017, EPUK and the Institute of Air Quality Management (IAQM) published the guidance document '*Land-Use Planning & Development Control: Planning For Air Quality*' (v1.2). The document provides key guidance for air quality assessments and the assessment of the significance of effects. This document would effectively replace previous versions.

Demolition and Construction Dust Guidance

17.2.7 The original ES refers to the '*Minerals Policy Statement 2*' published by the Office of the Deputy Prime Minister in 2005, and studies by the Building Research Establishment (BRE). Recommendations for assessment have been utilised in the original ES and it therefore considered a qualitative 'risk-based' approach for the assessment of dust impacts.

17.2.8 More recently, in 2014 and later revised in 2016 incorporating minor amendments, the IAQM published the document '*Guidance on the assessment of dust from demolition and construction*' (Ref 5) which details the current, recognised method of assessment of demolition and construction dust.

Odour for Planning

17.2.9 The original ES refers to a '*qualitative risk-based'* approach for the assessment of odour and did not reference specific guidance.

17.2.10 In 2018, the IAQM published an update to the document '*Guidance on the assessment of odour for planning*' (v1.1), originally published in 2014 (Ref 6). The guidance details qualitative and quantitative methods of assessment and is specific to odour.

Design Manual for Roads and Bridges (DMRB)

17.2.11 The original ES refers to the Design Manual for Roads and Bridges (DMRB) and although not specified this reference would relate to Volume 11, Section 3, Part 1 HA207/07 published by the Highways Agency. The DMRB has been updated in the interim period. The new version '*LA 105 Air Quality*' was published by Highways England in 2019 (Ref 7). The identification of receptors up to 200m from an 'affected road' remains, as was referenced within the original ES.

Air Quality Impacts on Designated Conservation Sites

17.2.12 The original ES refers to the H1 Environmental Risk Assessment produced by the Environment Agency (EA). Also, the Air Pollution Information System (APIS) resource produced in partnership by the Centre for Ecology and Hydrology and other UK conservation agencies.

17.2.13 In the interim period, the EA has produced several guidance notes and documents, including – '*Air emissions risk assessment for your environmental permit*' (2016 and 2020 update) and Operational instructions 66_12 and 67_12 (2012).

17.2.14 Also, in 2020, the IAQM published '*A guide to the assessment of air quality impacts on designated nature conservation sites*' (v1.1) (Ref 8) to set out the requirements for assessment of air quality impacts on designated nature conservation sites.

National Planning Policy Framework

17.2.15 The original ES referenced Planning Policy Statement (PPS) 23: Planning and Pollution Control.

17.2.16 This has since been replaced by the National Planning Policy Framework (NPPF), which was most recently updated in 2019. The NPPF describes the policy context in relation to pollutants including air pollutants, as follows:

"Para 170: Planning policies and decisions should contribute to and enhance the natural and local environment by:

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

"Para 180: Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

17.2.17 The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG) which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values […] It is important that the potential impact of new development on air quality is taken into account […] where the national assessment indicates that relevant limits have been exceeded or are near the limit."

"Whether or not 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 generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)."

17.2.18 The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that "*assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality* […] *Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact*".

North Lincolnshire Planning Policy

17.2.19 The North Lincolnshire Local Plan was replaced by the North Lincolnshire Local Development Framework (LDF) in 2011 (Ref 9).

17.2.20 The Core Strategy is a key part of the LDF and sets out the long-term vision for growth and development in North Lincolnshire. The Strategy includes Spatial Objective 7:

"To ensure the efficient use of resources, maximising recycling of minerals and waste products, minimising pollution, maintaining and improving air, soil and water quality, and employing sustainable building practices in new development."

Scoping Opinion

17.2.21 Table 17-1 outlines issues relating to air quality which were included within the Scoping Opinion adopted by the Planning Inspectorate (PINS).

Table 17-1: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within UES
ID 4.11.1	[…] the Inspectorate notes that the Scoping Report also identifies an anticipated increase in vessel movements during operation. […] Any significant effects on air quality associated with the increased vessel movements should be assessed.	The Scoping Opinion reference to '*increase in vessel movements during operation*' is incorrect: there is a slight decrease in operational phase vessel movements. The original assessment of c.5,500 construction vessel movements has also proved to be conservative and no increase in this is predicted. Reference should be made to Chapter 14: Commercial and Recreational Navigation and Appendix 14.1 Navigation Risk Assessment for details of vessel movements associated with the amendments.	Notwithstanding that there is no predicted increase in vessel movements, this UES includes consideration of a 100% increase in vessel movements and associated emissions as a means to illustrate this precautionary assumption does not significantly change the predicted effect or conclusions to the assessment.	Paragraph 17.4.11
ID 4.11.1	The Applicant should make effort to agree the scope of the updated assessment for air quality with relevant consultation bodies.	-	Additional consultation was undertaken with the NLC Environmental Protection Team to discuss the scope of the updated assessment.	Paragraph 17.2.22

Additional Consultation

17.2.22 In light of the Scoping Opinion detailed in Table 17-1, additional consultation with the NLC Environmental Protection Team was undertaken. The scope of this additional consultation was limited to the assessment construction phase vessel movements and associated emissions, only. No other aspects of the Air Quality Chapter for the UES were discussed with NLC. A copy of the correspondence to the NLC Environmental Protection Team is appended to this Air Quality Chapter of the UES. The response NLC Environmental Protection Team confirms agreement with the considered revisions.

Assessment Methodology

17.2.23 Section 17.3 of the original ES (Ref 1) details the assessment methodology. However, where necessary, this has been reproduced within this Chapter of the UES for ease of reference with any required updates.

Construction Dust Assessment

17.2.24 The original ES (Ref 1) utilised the '*Minerals Policy Statement 2*' published by the Office of the Deputy Prime Minister in 2005, and studies by the Building Research Establishment (BRE). A risk based approach was developed (original ES paragraphs 17.3.10 to 17.3.17).

17.2.25 More recent guidance is the IAQM *'Guidance on the assessment of dust from construction and demolition'* (Ref 5). The assessment of risk is determined by considering the risk of dust effects arising from four activities in the absence of mitigation:

- demolition;
- earthworks;
- construction; and
- track-out.

17.2.26 The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM_{10}; and
- harm to ecological receptors.

17.2.27 The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the site activities associated with the construction phase of the scheme. No further assessment is required if there are no receptors within a certain distance of the works; 350m for human receptors and 50m for designated ecological receptors.

17.2.28 The dust emission class (or magnitude) for each activity is determined on the basis of the guidance, indicative thresholds and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the mitigation requirements.

17.2.29 Descriptors for magnitude of impact and impact significance used in this assessment of construction phase dust are freely available in the guidance from the IAQM website and not reproduced in this report.

Road Traffic Emissions

17.2.30 The original ES included a methodology for the detailed dispersion modelling required to assess emissions from road traffic (paragraphs 17.3.18 to 17.3.21). Whilst updates to the dispersion model revision version have been made in the interim since the original ES, the methodology utilised within the original ES remains valid.

Non-Road Traffic Emissions

17.2.31 The original ES included a methodology for the detailed dispersion modelling required to assess emissions from non-road sources including shipping (paragraphs 17.3.22 to 17.3.24), rail (paragraphs 17.3.25 to 17.3.27), and paint spraying (which considered odour/VOCs) (paragraphs 17.3.28 to 17.3.31). Whilst updates to the dispersion model revision version have been made in the interim since the original ES, the methodology utilised within the original ES remains valid.

Study Area

17.2.32 The study area and receptors assessed are as defined within Section 17.5 'Baseline' of the original ES (Ref 1) and Section 3 'Receptor Locations' of Annex 17.1 'Air Quality: Detailed Methodology and Results' (Ref 2).

17.2.33 As set out in the original ES, sensitive human and ecological receptor locations were considered in the assessment when located within set screening distances from the Site, specific Site pollutant sources and/or roads predicted to witness increases in traffic as a result of the scheme. Section 17.5 'baseline' of the original ES references the following screening distances to identify relevant receptors:

- Human receptors to road traffic emissions: within 200m of roads identified to be subject to significant increases in traffic;
- Human receptors to on-site rail and paint-spraying emissions: within 1 – 2km of the site boundary;
- Human receptors to shipping activities and associated emissions: within 1 – 2km of the dockside and the routes to and from dockside;
- Receptors to construction dust: within 200m of construction activities; and
- Ecological receptors – all European protected habitat sites within 10km and all Nationally protected site within 2km of the AMEP site.

For ease of reference the human receptors sensitive to dust / road / rail / shipping / spraying emissions utilised in the original ES have been reproduced below in

17.2.34 Table 17-2. It is noted that in the interim since the original ES a number of receptors surrounding the site (including North Killingholme Low Lighthouse, the Lookout, and Station House) have been purchased by AHPL and will not return to residential use.

17.2.35 Receptors HR1 to HR17 represent receptors in the vicinity of the Site itself. Receptors. RHR1 to RHR79 represent receptors in the proximity of roads used to access the proposed development.

Table 17-2: Sensitive Human Receptor Locations

Reference	Easting	Northing	Name
HR_1	515307	418775	Unnamed
HR_2	514427	418212	Old Vicarage
HR_3	514650	418797	Fairfield (Brick

Reference	Easting	Northing	Name
			Lane)
HR_4	514407	419071	Scrub Lane
HR_5	514394	419346	Swinster Lane
HR_6	514091	419851	Lease Farm
HR_7	514066	420301	The Willows Farm
HR_8	514463	417708	Manor Farm - N Killingholme
HR_9	514758	417330	Nicholson Road - N Killingholme
HR_10	514695	416772	Westfield Farm
HR_11	515312	416292	Community Centre – S Killingholmes
HR_12	515649	415824	Cow Farm
HR_13	516331	415721	East End Farm
HR_14	517233	416783	Fire Station (south of site)
HR_15	516500	418185	Rosper Road
HR_16	517341	418344	Onsite building
HR_17	517801	415361	Church Field House - Immingham
RHR_1	514620	415948	Unnamed
RHR_2	514604	415940	Unnamed
RHR_3	514587	415933	Unnamed
RHR_4	514571	415925	Unnamed
RHR_5	514380	415873	Unnamed
RHR_6	514350	415865	Unnamed
RHR_7	513720	415474	Unnamed
RHR_8	514793	415893	Unnamed
RHR_9	514816	415898	Unnamed
RHR_10	514847	415900	Unnamed
RHR_11	514827	416004	Unnamed
RHR_12	514842	416011	Unnamed
RHR_13	514862	416019	Unnamed
RHR_14 1	51488	416028	Unnamed
RHR_15	514902	416034	Unnamed
RHR_16	514921	416042	Unnamed
RHR_17	514942	416051	Unnamed
RHR_18	514962	416059	Unnamed
RHR_19	514980	416067	Unnamed
RHR_20	515017	416054	Unnamed

Reference	Easting	Northing	Name
RHR_21	515050	416082	Unnamed
RHR_22	515089	416078	Unnamed
RHR_23	515094	416095	Unnamed
RHR_24	515110	416112	Unnamed
RHR_25	515208	416118	Unnamed
RHR_26	515026	415998	Unnamed
RHR_27	515186	416048	Unnamed
RHR_28	515212	416049	Unnamed
RHR_29	515239	416057	Unnamed
RHR_30	515268	416065	Unnamed
RHR_31	515033	415961	Unnamed
RHR_32	515019	415962	Unnamed
RHR_33	515006	415953	Unnamed
RHR_34	515331	416055	Unnamed
RHR_35	515349	416061	Unnamed
RHR_36	515357	416068	Unnamed
RHR_37	515229	416157	Unnamed
RHR_38	515464	416102	Unnamed
RHR_39	515477	416107	Unnamed
RHR_40	515488	416109	Unnamed
RHR_41	515514	416117	Unnamed
RHR_42	515502	416114	Unnamed
RHR_43	515547	416119	Unnamed
RHR_44	515559	416135	Unnamed
RHR_45	515491	414162	Unnamed
RHR_46	515089	414248	Unnamed
RHR_47	515074	415978	Unnamed
RHR_48	515146	415999	Unnamed
RHR_49	515211	416009	Unnamed
RHR_50	515195	416022	Unnamed
RHR_51	515243	416022	Unnamed
RHR_52	515255	416032	Unnamed
RHR_53	515152	416009	Unnamed
RHR_54	515296	416052	Unnamed
RHR_55	515305	416048	Unnamed
RHR_56	515286	416036	Unnamed
RHR_57	515065	416098	Unnamed
RHR_58	514997	416082	Unnamed

Reference	Easting	Northing	Name
RHR_59	515001	416081	Unnamed
RHR_60	515008	416083	Unnamed
RHR_61	515022	416089	Unnamed
RHR_62	515089	416109	Unnamed
RHR_63	515201	416125	Unnamed
RHR_64	517334	417313	Unnamed
RHR_65	517337	418351	Unnamed
RHR_66	517778	418446	Unnamed
RHR_67	517232	416783	Unnamed
RHR_68	516511	418179	Unnamed
RHR_69	515267	414045	Unnamed
RHR_70	515264	414028	Unnamed
RHR_71	515250	414029	Unnamed
RHR_72	515225	414014	Unnamed
RHR_73	515416	414303	Unnamed
RHR_74	515505	414307	Unnamed
RHR_75	515482	414422	Unnamed
RHR_76	515474	414447	Unnamed
RHR_77	515446	414585	Unnamed
RHR_78	515427	414330	Unnamed
RHR_79	516187	419838	Unnamed

17.2.36 The following ecological receptors were identified and remain valid:

- The Humber Estuary Site of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar;
- North Killingholme Haven Pits SSSI (within the Humber SPA/SAC/Ramsar);
- South Killingholme NNR; and
- Burkinshaws Covert Woods NNR.

Sensitivity Criteria

17.2.37 In the interim period from the original ES, new guidance documents have been published by the IAQM in relation to construction dust (Ref 5) and odour (Ref 6). The documents are based on current research and knowledge and set out sensitivity criterion defining receptors as ‘low’, ‘medium’ or ‘high’ sensitivity.

17.2.38 A summary of the sensitivity of receptors to deposited dust and odour, based on the IAQM guidance documents, is displayed in Table 17-3 and Table 17-4, respectively.

Table 17-3: Sensitivity Criteria – Deposited Dust

Sensitivity	Indicative Examples
High	• Residential dwellings • Museums and other culturally important collections • Medium- and long-term car parks • Car showrooms • International or national designated sites with designated features that may be affected by dust soiling. • Designated sites where there is a community of a particular dust sensitive species such as vascular species including in the Red Data List for Great Britain. • E.g. SAC designated for acid heathlands or local site designated for lichens near to demolition of a concrete (alkali) building.
Medium	• Parks • Places of Work • Designated sites where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. • Designated sites with a national designation where the features may be affected by dust deposition. • E.g. SSSI with dust sensitive features.
Low	• Playing fields • Farmland (unless commercially sensitive horticultural) • Footpaths • Short term car parks • Roads • Locations with a local designation where the features may be affected by dust deposition. • E.g. local nature reserve with dust sensitive features.

17.2.39 The sensitivity of human receptors and international and national designated ecological sites (i.e. SPA, SAC, Ramsar, SSSI) to emissions to air from road vehicle, plant, and industrial processes/stacks is generally considered high. Updated sensitivity of receptors has been considered upon the above IAQM dust guidance and all receptors are considered to be of 'high' sensitivity.

Table 17-4: Sensitivity Criteria – Odour

Sensitivity	Indicative Examples
High	• Residential dwellings • Hospitals • Schools/education • Tourist/cultural
Medium	• Places of Work • Commercial/retail premises • Playing/recreation fields
Low	• Industrial use • Farms • Footpaths • Roads

17.2.40 Updated sensitivity of human residential receptors has been considered upon the above IAQM odour guidance and all receptors are considered to be of 'high' sensitivity.

17.2.41 For human receptors (those sensitive to road traffic and process emissions (i.e. paint spraying / rail / industrial emissions), the sensitivity is relative to the existing, baseline concentrations at a given receptor location. For example, as set out within the magnitude of change matrix (Table 17-5, below), receptors subject to lower baseline concentrations are less sensitive to the magnitude of change. As baseline concentrations increase, a receptor becomes increasingly sensitive to a smaller magnitude of change. Therefore, where background concentrations are elevated, in AQMAs for example, the receptors located here would be considered more sensitive. This was recognised within the original ES.

17.2.42 For designated ecological sites, the sensitivity of the site is defined based on the habitats, species and features within the site. For example, certain vegetation / habitat types may be more susceptible to air pollution than others. This was recognised within the original ES.

Magnitude of Change (Impact)

17.2.43 For pollutants which have Air Quality Objectives (AQOs) defined within legislation and guidance, the magnitude of change (impact) is compared against the AQO and existing baseline concentrations at the receptor.

17.2.44 In the interim period from the original ES, the previously applied EPUK guidance document and subsequent magnitude of change matrix has been updated. Table 17-5 displays the current matrix, reproduced from the EPUK-IAQM guidance document '*Land-Use Planning & Development Control: Planning For Air Quality*' (Ref 4). This is applied in the assessment of long-term (annual mean) impacts from road vehicle emissions and process emissions on human receptors.

17.2.45 However, for the purpose of consistency across all Chapters the impact descriptor has been expanded as follows:

- The 'substantial' impact descriptor following the EPUK & IAQM guidance is additionally termed a 'major' impact;

- The 'slight' impact descriptor following the EPUK & IAQM guidance is additionally termed a 'minor' impact; and
- The 'negligible' impact descriptor following the EPUK & IAQM guidance is additionally termed a 'neutral' impact.

Table 17-5: Impact Descriptors for Individual Receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1*	2-5	6-10	>10
75% or less of AQAL	Negligible / Neutral	Negligible / Neutral	Slight / Minor	Moderate
76-94% of AQAL	Negligible / Neutral	Slight / Minor	Moderate	Moderate
95-102% of AQAL	Slight / Minor	Moderate	Moderate	Substantial / Major
103-109% of AQAL	Moderate	Moderate	Substantial / Major	Substantial / Major
110% or more of AQAL	Moderate	Substantial / Major	Substantial / Major	Substantial / Major
Table note: *percentage changes of 0%, i.e. less than 0.5%, will be described as Negligible.				

17.2.46 As noted in Table 17-5, the matrix considers both the magnitude of change, and the total concentration at the receptor in the assessment opening year to determine the impact.

17.2.47 Whilst the original ES utilised an earlier version of the matrix, when considering the predicted results of the assessment, the overall conclusions would not alter in terms of the magnitude of change classification.

17.2.48 This UES includes an updated assessment of impact utilising the updated EPUK & IAQM guidance.

Significance of Effect

17.2.49 The original ES sets out the determination of significance for human and ecological receptors within Section 17.3, paragraphs 17.3.43 to 17.3.46. This included consideration of the following:

- Process Contribution (PC) – the impact associated with emissions from the AMEP only; and
- Predicted Environmental Concentration (PEC) – the impact associated with emissions from the AMEP added to the existing baseline concentrations.

17.2.50 For human receptors, the original ES utilised the EPUK 2010 magnitude of change matrix, combined with other factors e.g. the presence of AQMAs/elevated baseline concentrations, to determine the significance of effect from emissions.

17.2.51 For ecological receptors, the original ES utilised principles set out with the EA's H1 Environmental Risk Assessment to determine the significance of effect from emissions, whereby impacts can be

classified as insignificant if:

- PC is <1% of the long-term Critical Level (CLe) or Critical Load (CLo); or
- If PC is >1% but the PEC is <70% of the CLe or CLo.

17.2.52 The above principles are still considered valid and suitable in the context of the material amendment and this UES.

17.2.53 For the assessment of short-term (e.g. 1-hour mean) impacts on human receptors, the recent 2017 EPUK-IAQM guidance indicates the following – when the PC is <10% of the objective it can be classified as 'negligible', 10-20% 'small', 20-50% 'medium', and >50% 'large' and the significance of this impact can be described as 'negligible', 'slight', 'moderate', or 'substantial' respectively without considering background concentrations.

17.2.54 In regard to ecological receptors, the EA's '*Operational instruction 66_12*' provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects (alone and in-combination)' for European sites, 'no likely damage' for SSSIs and 'no significant pollution' for other sites, as follows:

- PC does not exceed 1% long-term CLe and/or CLo or that the PEC does not exceed 70% long-term CLe and/or CLo for European sites and SSSIs;
- PC does not exceed 10% short-term CLe for NO_x for European sites and SSSIs;
- PC does not exceed 100% long-term CLe and/or CLo other conservation sites; and
- PC does not exceed 100% short-term CLe for NO_x (if applicable) for other conservation sites.

17.2.55 The above bullet points are in line with the original ES, although provide additional criteria in relation to short-term impacts and other conservation sites. That said, the conclusions of the original ES, which found all impacts on ecological receptors to be '*not significant*' (Table 17.11 and paragraphs 17.6.26 and 17.6.27), would not be altered by use of the additional criteria.

17.2.56 However, this UES includes an updated assessment of impact utilising the updated EA Operational Instruction 66_12 guidance.

17.2.57 The material amendments would not affect construction dust and therefore the assessment undertaken as part of the original ES remain valid. The effects would remain to be 'not significant'.

17.2.58 The material amendment would not affect odour and therefore the assessment undertaken as part of the original ES remains valid. The effects would remain to be 'not significant'.

Mitigation Hierarchy

17.2.59 The original ES did not employ or detail the use of a mitigation hierarchy. However, in reviewing whether any alternate or additional mitigation is required in response to the findings of this UES, SLR has utilised the basic hierarchy principles, provided by the IAQM, for determining appropriate mitigation measures for a development scheme. These are as follows:

1 **Preventing and Avoiding** - the initial step should be to, if possible, prevent or avoid exposure to the pollutant by isolating or removing potential sources. The design process should take air quality into account.

2 **Reduction and Minimisation** - all options for avoiding exposure and preventing exposure should be implemented. Preference should be given to measures which are close to the potential source, then those which act on the pathway and finally measures close to the point of exposure.

3 **Off-setting** - compensating for impacts associated with the new development by contributing to air quality improvements elsewhere.

17.2.60 This hierarchy for mitigation measures has been considered in the determination of mitigation measures required.

17.2.61 The mitigation measures are detailed within Section 17.7 of the original ES and were determined based on the predicted effects of the assessments and industry good practice.

Effects Not Requiring Further Assessment

17.2.62 Beyond considering construction phase vessel movements and associated emissions, the material amendment is not considered to result in any new or materially different impacts separate to those previously assessed and/or of a greater magnitude.

17.2.63 Therefore, wider impacts arsing during the construction phase (as road traffic emissions and construction dust) and impacts during the operational phase (as road traffic emissions, vessel / shipping emissions and emissions from paint spraying of products) and considered as part of the original ES are not considered to require assessment in this Chapter.

17.3.0 Changes in Baseline Conditions

DCO Baseline

17.3.1 The receptors detailed within the original ES are still considered relevant and their respective sensitivities are not expected to have altered. For example, residential dwellings and European designated ecological sites would still be considered of 'high' sensitivity. The reasoning for the inclusion of a receptor within the air quality assessment is likely still valid. Reference should be made to Section 3 'Receptor Locations' of Annex 17.1 'Air Quality: Detailed Methodology and Results (Ref 2) for details of modelled human receptor locations, and paragraphs 17.5.17 to 17.5.19 of the original ES for details of modelled ecological receptors. These have also been reproduced in Table 17.2 It is noted that since the original ES as produced a number of receptors surrounding the site (including North Killingholme Low Lighthouse and the Lookout, and Station House) have been purchased by AHPL and will not return to residential use.

17.3.2 The original ES identified four Air Quality Management Areas (AQMAs) that may be potentially impacted by the AMEP. These were identified in paragraphs 17.5.6 to 17.5.7 of the original ES. AQMAs are declared for exceedances of the air quality objectives at locations of relevant human exposure. Two of the four AQMAs identified have since been revoked – the Immingham AQMA declared for PM_{10} was revoked in 2016, and the Low Stanton AQMA also declared for PM_{10} was revoked in 2018.

17.3.3 The original ES also identified an area in close proximity to the Humber Road (A160) in Killingholme, as recording NO_2 concentrations near to or above the air quality objectives – potentially triggering the need for the declaration of an AQMA. However, a review of the NLC 2019 Air Quality Annual Status Report (ASR) indicates annual mean NO_2 concentrations in this area of concern have improved/reduced in the interim since the original ES and therefore an AQMA was not declared.

17.3.4 Recent air quality monitoring results, including near the A160, to inform the baseline air quality within the Site locale were presented within the original Air Quality Chapter and Annex.

17.3.5 The original ES identified a number of existing emissions sources in the vicinity of the Site.

DCO Future Baseline

17.3.6 In the interim period between the DCO Application in 2011, there is the potential for new sensitive human receptor locations to have been introduced into the study area by new developments. The sensitivities of such receptors would be defined and assessed as per the original ES.

17.3.7 From a review of Defra's interactive Magic (Ref 10) mapping service, there are no new European or National designated ecological sites (e.g. SPA/SAC/Ramsar/SSSI) are present within the study area since the original ES. Sensitives of the existing ecological receptors would be defined as per the original ES.

17.3.8 Additionally, there are no new human receptors within the study area that are considered to be of greater sensitivity to those receptors which have already been considered as part of the original ES. Therefore, those receptors considered within the original ES are considered to be worst-case for the determination of worst-case potential impacts.

17.3.9 Baseline air quality, as concentrations of NO_2, SO_2 and PM_{10} considered within the original ES was

sourced from air quality monitoring undertaken by NLC at the 'CM6 Killingholme School' monitoring location, sited within North Killingholme. As a precautionary approach, the original ES appears to consider maximum monitored concentrations from the 'CM6 Killingholme School' monitoring location, as the applied background concentration. No trends were assumed regarding future-year background concentrations, in terms of DEFRA forecast year-on-year reductions.

17.3.10 However, since the original ES, concentrations of NO_2, SO_2 and PM_{10} monitored at the 'CM6 Killingholme School' monitoring location have reduced in comparison to those applied as part of the original ES. Reference should be made to Table 17-6 to Table 17-12 for recent monitoring data from the site locale including the 'CM6 Killingholme School' monitoring location. These reductions mirror national predictions and the trends in air pollutant concentrations across the UK and, therefore, it may be reasonable to expect the DCO future baseline will exhibit an improved outlook in terms of air quality.

Current Baseline

17.3.11 The receptors defined within the original ES are still considered to be unchanged and have the same sensitivities as previously defined. It is noted that since the original ES a number of receptors surrounding the site (including North Killingholme Low Lighthouse and the Lookout, and Station House) were subsequently purchased by AHPL and will not return to residential use.

17.3.12 To determine the current baseline air quality conditions, Local Air Quality Management (LAQM) reports and monitoring data within the administrative areas of North Lincolnshire Council (NLC), and North East Lincolnshire Council (NELC) were considered.

17.3.13 From review of the Site locale, two of the AQMAs detailed within the original ES are still present – the Hull AQMA declared for NO_2, and the Scunthorpe AQMA declared for PM_{10}. However, neither of these AQMAs are located within 10km of the Site. Given that the number of declared AQMAs within the study area have decreased in the interim since the original ES, this suggests an improvement in the air quality baseline conditions. For an AQMA to be revoked, Defra would require long-term evidence of the downward trend in pollutant concentrations and therefore such revocations present a positive outlook in terms of air quality. A review of the NLC 2020 Air Quality ASR (Ref 11) and the NELC 2020 Air Quality ASR (Ref 12) demonstrates this improving air quality through annual year-on-year reductions of monitored air pollutants.

Automatic Air Quality Monitoring

17.3.14 Table 17-6 to Table 17-12 provide details and recent monitoring results since the original ES, from the closest locations to Site within NLC and NELC.

17.3.15 The automatic monitor located in Immingham is affiliated with the Automatic Urban and Rural Network (AURN) operated on behalf of Defra.

17.3.16 As stated within the 2020 NLC ASR (Ref 11), PM_{10} data for Osiris monitors located at Killingholme East Halton Road (site ID: CM8) is included within the report, however Osiris monitors do not meet the standard for the European reference method for particulate monitoring within the UK and the results should be treated with caution.

Table 17-6: Automatic Monitors: Details

Site ID / Name	Site Type	NGR (m)		Within AQMA	Pollutants Measured
		X	Y		
CM6 – Killingholme School	Other	514880	416133	No	NO_2, PM_{10}, SO_2
CM8 – Killingholme East Halton Road	Other	514148	417514	No	PM_{10}, $PM_{2.5}$
AURN – Woodlands Avenue, Immingham	Urban Background	518277	415116	No	NO_2

Table 17-7: Automatic Monitors: 2014-2019 Annual Mean NO_2 Results

Site ID	Annual Mean NO_2 Concentration (µg/m^3)					
	2014	2015	2016	2017	2018	2019
CM6	22.1	20.4	17.0	17.0	18.0	15.0
AURN – Immingham	-	-	-	16.9	13.9	13.5

Table 17-8: Automatic Monitors: 2014-2019 Number of NO_2 Hourly Mean Exceedances

Site ID	Hourly NO_2 Means in Excess of 200µg/m^3					
	2014	2015	2016	2017	2018	2019
CM6	0	0	0	0	0	0
AURN – Immingham	-	-	-	0 (56.8)	0 (27.5)	0
Note: If the period of valid data is less than 85%, the 99.79th percentile of 1-hour means is provided in brackets.						

Table 17-9: Automatic Monitors: 2014-2019 Annual Mean PM_{10} Results

Site ID	Annual Mean PM_{10} Concentration (µg/m^3)					
	2014	2015	2016	2017	2018	2019
CM6	19.1	18.0	18.0	18.0	19.0	19.0
CM8	-	-	-	-	20.0	31.0

Table 17-10: Automatic Monitors: 2014-2019 Number of PM_{10} Daily Mean Exceedances

Site ID	Daily PM_{10} Means in Excess of 50µg/m^3					
	2014	2015	2016	2017	2018	2019
CM6	6	2	1	4	3	5
CM8	-	-	-	-	7	4

Table 17-11: Automatic Monitors: 2014-2019 Annual Mean $PM_{2.5}$ Results

Site ID	Annual Mean $PM_{2.5}$ Concentration (µg/m^3)					
	2014	2015	2016	2017	2018	2019
CM8	-	-	-	-	7.0	7.0

Table 17-12: Automatic Monitors: 2018 SO_2 Monitoring Results

Site ID	Number of Exceedances 2019		
	15-minute Objective (266µg/m³)	1-hour Objective (350µg/m³)	24-hour Objective (125µg/m³)
CM6	0	0	0

17.3.17 As noted from the above results tables, all monitoring results, years, and pollutants presented are found to be below the relevant air quality objectives, with the exception of the 1-hour mean in 2017/2018 at the AURN – Immingham as presented in Table 17-8, where calculation of the 99.79th percentile of 1-hour means indicates concentrations are likely exceeding the objective.

17.3.18 Annual mean NO_2 concentrations (a key pollutant of concern for human health) exhibit a decrease in concentrations over the period presented.

Passive Diffusion Tube Monitoring

The details and results from passive NO_2 diffusion tube monitoring undertaken by NLC and NELC are presented in Table 17-13 and

17.3.19 Table 17-14.

17.3.20 Where possible, monitoring results from the monitors that featured in the original ES have been presented i.e. Humber Road Chip Shop, Humber Road LP 695 and monitors in Killingholme – years 2008-2011 were presented in the original ES Annex, Table A17.6 (Ref 2).

Table 17-13: NO_2 Passive Diffusion Tube Monitoring Sites: Details

Authority	Site ID	Site Name	Site Type	NGR (m)		Within AQMA
				X	Y	
NLC	DT13	Ulceby Road, Killingholme	Roadside	514573	415901	No
	DT14	School Road, Killingholme	Roadside	514782	415971	No
	DT15	Humber Road Chip Shop	Urban Background	515452	416107	No
	DT16	Humber Road, LP 695	Roadside	515279	416085	No
	DT22	East Halton Road, Killingholme	Roadside	514141	417483	No
NELC	NEL 23	Kings Road, Immingham AQM Station	Roadside	519193	415279	No
	NEL 24	Bluestone, Immingham	Kerbside	517543	414312	No
	NEL 25	St Margret/Pelham Ave, Immingham	Kerbside	518108	414533	No

Table 17-14: NO_2 Passive Diffusion Tube Monitoring Sites: Results

Authority	Site ID	Annual Mean NO_2 Concentration (µg/m^3)					
		2014	2015	2016	2017	2018	2019
NLC	DT13	42.9	26.2	31.0	20.0	17.0	17.0
	DT14	46.7	33.7	31.0	27.0	28.0	29.0
	DT15	27.3	19.4	21.0	19.0	20.0	18.0
	DT16	35.1	27.0	26.0	25.0	26.0	25.0
	DT22	-	-	-	-	21.0	21.0
NELC	NEL 23	31.3	30.0	33.3	28.5	26.6	24.5
	NEL 24	-	-	-	-	-	16.5
	NEL 25	-	-	-	-	-	19.1

As noted from the monitoring results presented in

17.3.21 Table 17-14, annual mean NO_2 concentrations were above the Air Quality Objective (AQO) at monitors DT13 and DT14 in 2014. NO_2 concentrations at these monitors reduce to below the AQO in 2015 and have since shown continued improvement.

17.3.22 All other monitors and years presented are below the annual mean NO_2 AQO.

Changes in Baseline

17.3.23 As noted in the above sections, pollutant concentrations at nearby monitors within the study area have shown an improvement in recent years and since the original ES. This is consistent with current predictions and trends for pollutant concentrations across the UK.

17.3.24 The original ES raised concerns about the potentially elevated concentrations near to the Humber Road (A160) in Killingholme. The reduction/improvement in concentrations exhibited alleviates such concerns and acts to support the conclusions of the original ES given that no AQMA was declared and concentrations would not be classified as 'elevated' when considering the magnitude of change matrix presented in Table 17-4 of this Chapter.

17.3.25 It has been assumed that there have been no changes to the receptor sensitivities within the study area. That said, a reduction/improvement in baseline concentrations would result in a receptor being less sensitive to changes in concentrations (as set out within the EPUK-IAQM matrix). However, given that the original ES concluded all impacts as 'not significant', this 're-classification' of sensitivity would not alter this.

17.4.0 Assessment of Effects

Construction Phase Effects

Construction Dust

17.4.1 The material amendment is not anticipated to result in any additional construction phase dust effects to those detailed in the original ES.

Construction Phase – Road Sources

17.4.2 The material amendment is not anticipated to result in any additional construction phase road traffic effects to those detailed in the original ES.

Construction Phase – Non-Road Sources

17.4.3 The original ES considered the dredging programme and associated vessel movements would occur over a 4-month period. The material amendment would not result in any more vessel movements than that predicted in the original ES but nevertheless, dredging over an 8-month period, representing a 100 per cent increase, is considered in this UES. Therefore, as a precautionary approach, a 100 per cent uplift to the modelled impacts arising from all non-road sources (construction and operational phases) has been considered and applied to demonstrate the sensitivity of this impact assessment to such a change. The results of this sensitivity test are detailed in the sections below for both human and ecological receptors.

Human Receptors

17.4.4 The assessment of impacts associated with non-road sources at sensitive human receptors is presented in the table below, updated to the stated EPUK & IAQM assessment method. It is noted that the presented Process Contributions (PC) / impacts are maximum concentrations at any considered receptor location. Impacts at all other locations will be lower than presented.

17.4.5 It should be noted that SO_2 impacts on annual mean not presented for human receptors as this AQO no longer exists.

17.4.6 All human receptors have been categorised as a high sensitivity.

17.4.7 As referenced in Table 17-15, the PC associated with the material amendment is predicted to result in a ‘not significant’ effect on all considered pollutants / averaging periods at human receptor locations.

Table 17-15: Summary of Impacts Arising from Non-Road Sources at Sensitive Human Receptors

Pollutant	Averaging Period	Applied AQO (µg/m^3)	Original Chapter Process Contribution (PC) (µg/m^3)	Notional 100% increase PC (µg/m^3)	PC as a Percentage of the AQO Level (%)	Predicted Environmental Concertation (PEC) (µg/m^3) (A)	PEC as a Percentage of the AQO (%) (A)	Magnitude	Significance
NO_2	Annual mean	40	0.0172	0.0344	0.09	-	-	Negligible	Not Significant
	1-hour mean 99.79%ile	200	0.0686	0.1372	0.07	-	-	Negligible	Not Significant
SO_2	15-minute mean 99.9%ile	266	0.112	0.224	0.08	-	-	Negligible	Not Significant
	1-hour mean 99.73%ile	350	0.0635	0.127	0.04	-	-	Negligible	Not Significant
	24-hour mean 99.18%ile	125	0.0352	0.0704	0.06	-	-	Negligible	Not Significant
PM_{10}	Annual mean	40	0.00105	0.0021	0.01	-	-	Negligible	Not Significant
	24-hour mean 90.41%ile	50	0.00373	0.00746	0.01	-	-	Negligible	Not Significant
$PM_{2.5}$	Annual mean	25	0.00105	0.0021	0.01	-	-	Negligible	Not Significant
Benzene (B)	Annual mean	5	0.529	1.058	21.16	2.66	53.2	Negligible	Not Significant

Note:

(A) EPUK & IAQM guidance states where changes in concentration of <0.5% of the applied limit will be described as 'negligible' (imperceptible following the applied ES terminology) irrespective of the background concentration. Therefore, background concentrations not considered.

(B) C_6H_6 (Benzene) background concentrations are no longer forecast by DEFRA as part of the background pollutant concentration data on a 1km x 1km spatial resolution. The most up to date C_6H_6 DEFRA mapped background concentrations are based upon a 2001 base-year. Therefore, the annual mean background concentration applied as part of the original ES is considered to be relevant and has been applied as part of the assessment of the material amendment.

Ecological Receptors

17.4.8 The assessment of impacts associated with a precautionary 100 per cent increase from non-road sources at sensitive ecological receptors is presented in the tables below, updated to the stated EA Operational Instruction 66_12 assessment method. It is noted that the presented PC / impacts are maximum concentrations at any considered receptor location. Impacts at all other locations will be lower than presented.

Annual Mean NO_x

17.4.9 Table 17-19below provides a summary of the annual mean NOx impacts arising from non-road sources at sensitive ecological receptors.

Table 17-16: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – NOx Annual Mean

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Level (µg/m³)	Original ES PC (µg/m³)	Notional 100% increase PC (µg/m³)	Material Amendment PC as a % of the Applied Critical Level (%)	Significance
Maximum at compensation site	30	0.000396	0.000792	<0.01	Not significant
Maximum at Swallow Wold SSSI	30	0.00101	0.00202	0.01	Not significant
Maximum at North Killingholme Pits SSSI	30	0.0329	0.0658	0.22	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	30	0.100	0.2	0.67	Not significant

17.4.10 The PC associated with the material amendment is predicted to be <1% of the applied annual mean NOx Critical Level (CLe). Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- *'no significant pollution'* at the compensation site;
- *'no likely damage'* at SSSI ecological receptor designations; and
- *'no likely significant effects (alone and in-combination)'* at SAC / SPA / Ramsar ecological receptor designations.

17.4.11 Impacts on the annual mean NOx CLe are, therefore, predicted to remain 'not significant'.

Annual Mean SO_2

17.4.12 Table 17-17 below provides a summary of the annual mean SO_2 impacts arising from non-road sources at sensitive ecological receptors.

Table 17-17: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – SO_2 Annual Mean

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Level (µg/m³)	Original ES PC (µg/m³)	Notional 100% increase PC (µg/m³)	Material Amendment PC as a % of the Applied Critical Level (%)	Significance
Maximum at compensation site	20	0.0000665	0.000133	<0.01	Not significant
Maximum at Swallow Wold SSSI	20	0.000374	0.000748	<0.01	Not significant
Maximum at North Killingholme Pits SSSI	20	0.0110	0.022	0.11	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	20	0.0376	0.0752	0.38	Not significant

17.4.13 The PC associated with the material amendment is predicted to be <1% of the applied annual mean SO_2 CLe. Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- *'no significant pollution'* at the compensation site;
- *'no likely damage'* at SSSI ecological receptor designations; and
- *'no likely significant effects (alone and in-combination)'* at SAC / SPA / Ramsar ecological receptor designations.

17.4.14 Impacts on the annual mean SO_2 CLe are, therefore, predicted to remain 'not significant'.

24-hour NOx

17.4.15 Table 17-18 below provides a summary of the 24-hour mean NOx impacts arising from non-road sources at sensitive ecological receptors.

Table 17-18: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – NOx 24-hour

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Level / Critical Load	Original ES PC (µg/m³)	Notional 100% increase PC (µg/m³)	Material Amendment PC as a % of the Applied Critical Level (%)	Significance
Maximum at compensation site	75	0.0439	0.0878	0.12	Not significant
Maximum at Swallow Wold SSSI	75	0.0234	0.0468	0.06	Not significant

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Level / Critical Load	Original ES PC (µg/m³)	Notional 100% increase PC (µg/m³)	Material Amendment PC as a % of the Applied Critical Level (%)	Significance
Maximum at North Killingholme Pits SSSI	75	0.144	0.288	0.38	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	75	0.425	0.85	1.13	Not significant

17.4.16 The PC associated with the material amendment is predicted to be <10% of the applied annual mean NOx 24-hour mean CLe. Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- *'no significant pollution'* at the compensation site;
- *'no likely damage'* at SSSI ecological receptor designations; and
- *'no likely significant effects (alone and in-combination)'* at SAC / SPA / Ramsar ecological receptor designations.

17.4.17 Impacts on the 24-hour mean NOx CLe are, therefore, predicted to remain 'not significant'.

Acid Deposition

17.4.18 Table 17-19 below provides a summary of the acid deposition impacts arising from non-road sources at sensitive ecological receptors.

Table 17-19: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – Acid Deposition

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Load (kg $_{eq}$/ha/yr)	Original ES PC (kg $_{eq}$/ha/yr)	Notional 100% increase PC (kg $_{eq}$/ha/yr)	PC as a Percentage of the Applied Critical Load (%)	Significance
Maximum at compensation site	4.0	0.0000119	0.0000238	<0.001	Not significant
Maximum at Swallow Wold SSSI	4.71	0.0000546	0.0001092	<0.01	Not significant
Maximum at North Killingholme Pits SSSI	4.0	0.00164	0.00328	0.08	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	4.81	0.0110	0.022	0.46	Not significant

17.4.19 The PC associated with the material amendment is predicted to be <1% of the applied acid Critical

Load (CLo). Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- *'no significant pollution'* at the compensation site;
- *'no likely damage'* at SSSI ecological receptor designations; and
- *'no likely significant effects (alone and in-combination)'* at SAC / SPA / Ramsar ecological receptor designations.

17.4.20 Impacts on the acid CLo are, therefore, predicted to remain 'not significant'.

17.4.21 Table 17-20 below provides a summary of the nitrogen deposition impacts arising from non-road sources at sensitive ecological receptors.

Table 17-20: Summary of Impacts Arising from Non-Road Sources at Sensitive Ecological Receptors – Nitrogen Deposition

Ecological Receptor / Pollutant and Averaging Period	Applied Critical Load (kg N/ha/yr)	Original ES PC (kg N/ha/yr)	Notional 100% increase PC (kg N/ha/yr)	Material Amendment PC as a % of the Applied Critical Level (%)	Significance
Maximum at compensation site	8	0.000571	0.001142	0.01	Not significant
Maximum at Swallow Wold SSSI	5	0.000145	0.00029	0.01	Not significant
Maximum at North Killingholme Pits SSSI	10	0.00473	0.00946	0.09	Not significant
Maximum at Humber Estuary SAC/SPA/Ramsar/SSSI	8	0.0144	0.0288	0.36	Not significant

17.4.22 The PC associated with the material amendment is predicted to be <1% of the applied nutrient nitrogen CLo. Therefore, following EA Operational Instruction 66_12, there is predicted to be:

- *'no significant pollution'* at the compensation site;
- *'no likely damage'* at SSSI ecological receptor designations; and
- *'no likely significant effects (alone and in-combination)'* at SAC / SPA / Ramsar ecological receptor designations.

17.4.23 Impacts on the nutrient nitrogen CLo are, therefore, predicted to remain 'not significant'.

Additional Operational Phase Effects

17.4.24 The material amendment is not anticipated to result in any additional operational phase effects to those detailed in the original ES.

Additional Cumulative Effects

17.4.25 The material amendment is not anticipated to result in any additional cumulative effects to those detailed in the original ES.

Consideration of DCO

17.4.26 There are no changes to note from the assessment of effects contained within the original ES.

17.5.0 Requirement for Additional Mitigation

17.5.1 The original ES included a range of appropriate mitigation measures from relevant guidance at the time. As discussed in Section 17.4.11, updates to guidance in the interim has resulted in further standard mitigation now being available for application within air quality assessments.

17.5.2 For example, the IAQM construction dust guidance (Ref 5) includes a number of mitigation measures that can be applied based on the determined dust impact risk, calculated in Section17.4.9. This concept whereby mitigation measures are determined on the basis of risk is consistent with the approach of the original ES.

DCO Mitigation

17.5.3 Mitigation measures proposed as part of the DCO are set out in Section 17.7 of the original ES.

17.5.4 These include the following measures for construction dust, which are taken from the relevant good practice guidance documents available at the time:

- where possible dust generation activities will be undertaken away from the site boundary, particularly those locations adjacent to sensitive receptors;
- stockpiles of debris and overburden will be kept watered or sheeted as required, and for long term stockpiles the use of surface bonding materials or vegetating will be implemented if practicable;
- disturbance of stockpiles will be minimised;
- open surfaces and working areas will be watered as required to minimise dust, and surfaces will be converted to permanent hardstanding as soon as possible, or sealed or vegetated is practicable;
- wind breaks and barriers will be erected where possible to minimise wind blow across open areas of the site;
- drop heights will be minimised where possible;
- vehicles will be washed to remove any dusty materials or mud on a regular basis;
- vehicles will be washed to remove any dusty materials from the body and wheels immediately before leaving the construction site;
- the construction access routes will be kept clear of dusty materials with the use of streetcleaners or sprayed with water to maintain the entire road surface wet;
- the speed of vehicles will be limited on unpaved surfaces; and
- containers and trucks will be sheeted to prevent escape of dust during transfer to or from site.

17.5.5 The above measures are still considered relevant and applicable and are effectively secured by Requirements 22 and 28 of Schedule 11 of the extant DCO

17.5.6 The original ES details further mitigation measures relating to shipping, the operation of facilities, and operational phase traffic in line with industry good practice. This is detailed in Section 17.7 of the original ES.

Alternate or Additional Mitigation

17.5.7 No additional mitigation measures are considered to be required beyond those proposed within the original ES. However, the IAQM Construction Dust Guidance (Ref 5) details up to date mitigation measures required to ensure a 'not significant' effect.

17.6.0 Residual Effects

17.6.1 The following sections detail the residual effects of the material amendment.

Construction Phase

17.6.2 Construction phase effects would be considered as short-term and temporary in nature.

17.6.3 With the correct implementation of appropriate dust mitigation measures, residual effects would be rendered 'not significant'.

Operational Phase

17.6.4 There are not considered to be any significant residual effects associated with the operational phase.

Consideration of DCO

17.6.5 There are no changes to the residual effects identified within the original ES of the DCO.

17.6.6 The original ES mentioned that the possible AQMA declaration in Killingholme could have altered this conclusion. However, as discussed in Section 17.3.2, no AQMA was declared and there has been noted improvements in pollutant concentrations in Killingholme. Therefore, the conclusions of the original ES stand and remain precautionary in terms of the assessment of receptor sensitivity and subsequent magnitude of change predicted.

17.7.0 Other Environmental Issues

17.7.1 This Section seeks to detail any considerations and environmental effects which have been identified with regard to the range of topics which have been introduced into EIA requirements through the EIA Regulations 2017. Where there are no such considerations or environmental effects, this is also specified below for clarity.

17.7.2 Refer to Chapter 25 for a summary of the 'Other Environmental Issues' identified across all of the technical assessments undertaken and the Chapters prepared as part of the UES.

Other Environmental Issues of Relevance

Infrastructure

17.7.3 Infrastructure has been indirectly considered, in terms of construction and demolition and road traffic/plant associated with this. The significance of effects were concluded as 'not significant'.

Waste

17.7.4 The issue of waste has not been directly considered; however, it is recognised that the waste materials from construction activities has the potential to generate dust and therefore this has been covered within the assessment of construction dust.

Population and Human Health

17.7.5 The scope of any air quality assessment inherently considers the population and human health, given the known impacts of air pollutants on human health.

17.7.6 Potential impacts on human health have been assessed for both the construction and operational phases, and the significance of effects were concluded as 'not significant'.

Climate and Carbon Balance

17.7.7 The original ES considered climate change and the carbon balance primarily through consideration and assessment of CO_2 emissions – from road traffic, rail, and shipping.

17.7.8 The assessment quantified the predicted CO_2 emissions of the operational phase. The original ES did not draw any conclusions from this. However, the impact on CO_2 emissions identified within the original ES was accepted as part of the DCO: it is noted that the material amendment do not relate to operational phase in terms of the air quality scope and, therefore, CO_2 impacts will not change as a result.

Risks of Major Accidents and/or Disasters

17.7.9 The risks of major accidents and/or disasters is not considered of relevance to the air quality Chapter.

Summary

17.7.10 With regards to the EIA regulations 2017, in terms of air quality there are not considered to be any

likely significant effects with regards to Other Environmental Issues.

17.8.0 Summary of Effects

17.8.1 An air quality assessment was undertaken to assess potential impacts and effects of both the construction and operational phases of the AMEP. Full details of the assessment can be found in the original ES (Chapter 17).

17.8.2 A summary of the predicted effects for air quality are presented below in Table 17-21.

17.8.3 It is assumed that construction and operational activities would be undertaken in line with recognised industry good practice.

Table 17-21: Summary of Effects for Air Quality

Effect	Receptor	Significance of effect prior to mitigation [A]	Summary of mitigation	Residual Effect
Construction Phase				
Changes in dust emissions from construction activities	All considered receptors	**Moderate to Negligible / - / T / D / ST**	Not considered to be required, detailed in original ES.	**Negligible / - / T / D / ST**
Changes in pollutant concentrations from emissions of NO_x/NO_2, PM_{10} and $PM_{2.5}$ from road traffic and plant	All considered receptors	**Negligible / - / P / D / LT**	Not considered to be required, detailed in original ES.	**Negligible / - / P / D / LT**
Operational Phase				
Changes in pollutant concentrations from emissions from non-road sources i.e. rail and shipping	All considered receptors	**Negligible / - / P / D / LT**	Not considered to be required, detailed in original ES.	**Negligible / - / P / D / LT**
Changes in pollutant concentrations from emissions of NO_x/NO_2, PM_{10} and $PM_{2.5}$ from road traffic and plant	All considered receptors	**Negligible / - / P / D / LT**	Not considered to be required, detailed in original ES.	**Negligible / - / P / D / LT**
Changes in VOC emissions from operational activities i.e. paint spraying	All considered receptors	**Negligible / - / P / D / LT**	Not considered to be required, detailed in original ES.	**Negligible / - / P / D / LT**
Changes in odour emissions from operational activities i.e. paint spraying	All considered receptors	**Negligible / - / P / D / LT**	Not considered to be required, detailed in original ES.	**Negligible / - / P / D / LT**

Table note:
[A] + / - = Positive or Negative, P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N/A = Not Applicable

17.9.0 Conclusions

17.9.1 The Air Quality Chapter of the original ES which supported the DCO Application, included detailed qualitative and quantitative air quality assessments to assess the construction and operational phases of the AMEP.

17.9.2 The assessment considered several pollutants and several emissions sources, across a range of human and ecological receptors existing within the study area.

17.9.3 This Chapter of the UES has considered the predicted effects of the original ES, and the current and future baseline, in the context of the material amendment and whether the material amendment and current baseline will materially alter the conclusions of the original Air Quality Chapter to the ES. This includes a notional 100 per cent increase in emission from all non-road sources.

17.9.4 It has been concluded that the original ES conclusions, which predicted all effects as 'not significant' remain valid. Furthermore, the assessment of even a notional 100 per cent increase in emissions from all non-road sources still concludes a 'not significant' effect at all relevant receptors. The material amendment is therefore not considered to result in any new/different effects or effects of a greater magnitude than were previously assessed.

REFERENCES

- Original ES Chapter 17 Air Quality, https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000322-17%20-%20Air%20Quality.pdf
- Original ES Chapter Annexe 17.1 Air Quality: Detailed Methodology and Results https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030001/TR030001-000414-17.1%20-%20Detailed%20Methodology%20and%20Results.pdf
- Defra Local Air Quality Management Technical Guidance (2021).
- Environmental Protection UK and Institute of Air Quality Management, 'Land-Use Planning and Development Control: Planning for Air Quality' (2017).
- Institute of Air Quality Management (IAQM), Guidance on the assessment dust from demolition and construction (2016), https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf
- IAQM, 'Guidance on the assessment of odour for planning' (v1.1) (2018).
- DMRB, LA 105-Air Quality, Highways England, 2019.
- IAQM, '*A guide to the assessment of air quality impacts on designated nature conservation sites*' (v1.1)(2020).
- North Lincolnshire council, North Lincolnshire Council Local Development Framework (2011).
- DEFRA, https://magic.defra.gov.uk/MagicMap.aspx
- North Lincolnshire Council, 2020 Air Quality Annual Status Report, 2020.
- North East Lincolnshire Council, 2020 Air Quality Annual Status Report, 2020.

EUROPEAN OFFICES

United Kingdom

AYLESBURY
T: +44 (0)1844 337380

BELFAST
T: +44 (0)28 90732493

BRADFORD-ON-AVON
T: +44 (0)1225 309400

BRISTOL
T: +44 (0)117 9064280

CAMBRIDGE
T: + 44 (0)1223 813805

CARDIFF
T: +44 (0)2920 491010

CHELMSFORD
T: +44 (0)1245 392170

EDINBURGH
T: +44 (0)131 3356830

EXETER
T: + 44 (0)1392 490152

GLASGOW
T: +44 (0)141 3535037

GUILDFORD
T: +44 (0)1483 889800

LEEDS
T: +44 (0)113 2580650

LONDON
T: +44 (0)203 6915810

MAIDSTONE
T: +44 (0)1622 609242

MANCHESTER
T: +44 (0)161 8727564

NEWCASTLE UPON TYNE
T: +44 (0)191 2611966

NOTTINGHAM
T: +44 (0)115 9647280

SHEFFIELD
T: +44 (0)114 2455153

SHREWSBURY
T: +44 (0)1743 239250

STAFFORD
T: +44 (0)1785 241755

STIRLING
T: +44 (0)1786 239900

WORCESTER
T: +44 (0)1905 751310

Ireland

DUBLIN
T: + 353 (0)1 296 4667

France

GRENOBLE
T: +33 (0)4 76 70 93 41