EP UK Investments

South Humber Bank Energy Centre Project

Planning Inspectorate Reference: EN010107

South Marsh Road, Stallingborough, DN41 8BZ

The South Humber Bank Energy Centre Order

Document Ref: 5.8: Habitats Regulations Assessment Signposting

Applicant: EP Waste Management Ltd
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GLOSSARY OF ABBREVIATIONS AND DEFINITIONS

Abbreviation	Description
ACC	Air Cooled Condensor
AGIs	Above Ground Installations
CCGT	Combined Cycle Gas Turbine
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger
DCO	Development Consent Order
ECJ	European Court of Justice
EcIA	Ecological Impact Assessment
EfW	Energy from waste
EIA	Environmental Impact Assessment
EPH	Energetický A Prumyslový Holding
EPUKI	EP UK Investments Limited
EPWM	EP Waste Management Limited
ES	Environmental Statement
ExA	Examining Authority
GWTEs	Groundwater Dependant Terrestrial Ecosystems
HRA	Habitat Regulations Assessment
IROPI	Imperative Reasons of Overriding Public Interest
kV	Kilovolt
mAOD	m Above Ordnance Datum
MW	megawatt
NELC	North East Lincolnshire Council
NSIP	Nationally Significant Infrastructure Project
ODPM	Office of Deputy Prime Minister
PA 2008	The Planning Act 2008
RDF	Refuse derived fuel
SAC	Special Area of Conservation
SHBPS	South Humber Bank Power Station
SHG	South Humber Gateway (strategic mitigation approach)

SoS	Secretary of State
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
tpa	tonnes per annum

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TABLES

1.0 EXECUTIVE SUMMARY

1.1.1 EP Waste Management Limited (EPWM) is seeking development consent for the construction, operation and maintenance of an energy from waste power station, a new site access, and other associated development on land at South Humber Bank Power Station, South Marsh Road, near Stallingborough in North East Lincolnshire. This report comprises the Habitats Regulations Assessment (HRA) Signposting document for the Proposed Development.

1.1.2 The power station will be constructed on land adjacent to the Humber Estuary SAC/ SPA/ Ramsar site, and will result in the loss of habitat that is considered functionally linked to the SPA/ Ramsar site.

1.1.3 Mitigation for this loss of habitat will be delivered through the South Humber Gateway (SHG) strategic mitigation approach under Policy 9 of the North East Lincolnshire Local Plan. The appropriate financial contribution towards mitigation required by Policy 9 will be secured via Section 106 Agreement. It is therefore concluded that the loss of functionally linked habitat within the Site will not result in any adverse effects on the integrity of the Humber Estuary SPA/ Ramsar.

1.1.4 There are two other developments proposed in the area that will result in the loss of functionally linked habitat in the vicinity of the Site, but these other developments are also committed to the delivery of habitat mitigation through the SHG strategic mitigation route, so it is concluded that there would be no adverse in-combination effects on the Humber Estuary SPA/ Ramsar site.

1.1.5 Likely significant effects as a result of noise impacts during construction (primarily associated with drop hammer piling noise) and during operation have been identified, however, it is concluded that construction and operation noise would not give rise to an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar site either alone or in-combination with other plans or projects.

1.1.6 Likely significant effects as a result of changes in air quality during operation were identified, however, it is concluded that air quality impacts will not result in an adverse effect on the integrity of the Humber Estuary SACSPA/Ramsar site either alone or in-combination with other plans or projects.

2.0 INTRODUCTION

2.1 Overview

2.1.1 This HRA Signposting document (Document Ref. 5.8) has been prepared on behalf of EP Waste Management Limited (‘EPWM’ or the ‘Applicant’). It forms part of the application (the 'Application') for a Development Consent Order (a 'DCO'), that has been submitted to the Secretary of State (the ‘SoS’) for Business, Energy and Industrial Strategy, under section 37 of ‘The Planning Act 2008’ (the ‘PA 2008’).

2.1.2 EPWM is seeking development consent for the construction, operation and maintenance of an energy from waste (‘EfW’) power station with a gross electrical output of up to 95 megawatts (MW) including an electrical connection, a new site access, and other associated development (together ‘the Proposed Development’) on land at South Humber Bank Power Station (‘SHBPS’), South Marsh Road, near Stallingborough in North East Lincolnshire (‘the Site’).

2.1.3 A DCO is required for the Proposed Development as it falls within the definition and thresholds for a 'Nationally Significant Infrastructure Project' (a 'NSIP') under sections 14 and 15(2) of the PA 2008.

2.1.4 The DCO, if made by the SoS, would be known as the ‘South Humber Bank Energy Centre Order' (‘the Order').

2.1.5 Full planning permission (‘the Planning Permission’) was granted by North East Lincolnshire Council (‘NELC’) for an EfW power station with a gross electrical output of up to 49.9 MW and associated development (‘the Consented Development’) on land at SHBPS (‘the Consented Development Site’) under the Town and Country Planning Act 1990 on 12 April 2019. Since the Planning Permission was granted, the Applicant has assessed potential opportunities to improve the efficiency of the EfW power station, notably in relation to its electrical output. As a consequence, the Proposed Development would have a higher electrical output (up to 95 MW) than the Consented Development, although it would have the same maximum building dimensions and fuel throughput (up to 753,500 tonnes per annum (tpa)).

2.2 The Applicant

2.2.1 The Applicant is a subsidiary of EP UK Investments Limited (‘EPUKI’). EPUKI owns and operates a number of other power stations in the UK. These include SHBPS and Langage (Devon) Combined Cycle Gas Turbine (‘CCGT’) power stations, Lynemouth (Northumberland) biomass-fired power station, and power generation assets in Northern Ireland. EPUKI also owns sites with consent for new power stations in Norfolk (King’s Lynn ‘B’ CCGT) and North Yorkshire (Eggborough CCGT).

2.2.2 EPUKI is a subsidiary of Energetický A Prumyslový Holding ('EPH'). EPH owns and operates energy generation assets in the Czech Republic, Slovak Republic, Germany, Italy, Hungary, Poland, Ireland, and the United Kingdom.

2.3 The Proposed Development Site

2.3.1 The Proposed Development Site (the 'Site' or the 'Order limits') is located within the boundary of the SHBPS site, east of the existing SHBPS, along with part of

the carriageway within South Marsh Road. The principal access to the site is off South Marsh Road.

2.3.2 The Site is located on the South Humber Bank between the towns of Immingham and Grimsby; both over 3 km from the Site. The surrounding area is characterised by industrial uses dispersed between areas of agricultural land with the nearest main settlements being the villages of Stallingborough, Healing and Great Coates. The Site lies within the parish of Stallingborough although Stallingborough village lies over 2 km away.

2.3.3 The Site lies within the administrative area of NELC, a unitary authority. The Site is owned by EP SHB Limited, a subsidiary of EPUKI, and is therefore under the control of the Applicant, with the exception of the highway land on South Marsh Road required for the new Site access.

2.3.4 The existing SHBPS was constructed in two phases between 1997 and 1999 and consists of two CCGT units fired by natural gas, with a combined gross electrical capacity of approximately 1,400 MW. It is operated by EP SHB Limited.

2.3.5 The Site is around 23 hectares ('ha') in area and is generally flat, and typically stands at around 2.0 m Above Ordnance Datum (mAOD).

2.3.6 The land surrounding the Site immediately to the south, west and north-west is in agricultural use with a large polymer manufacturing site, Synthomer, and a waste management facility, NEWLINCS, both located to the north of the Site and also accessed from South Marsh Road. The estuary of the River Humber lies around 175 m to the east of the Site.

2.3.7 Access to the South Humber Bank is via the A180 trunk road and the A1173. The Barton railway line runs north-west to south-east between Barton-on-Humber and Cleethorpes circa 2.5 km to the south-west of the Site and a freight railway line runs north-west to south-east circa 300 m (at the closest point) to the Site.

2.3.8 A more detailed description of the Site is provided at Chapter 3: Description of the Proposed Development Site in the Environmental Statement ('ES') Volume I (Document Ref. 6.2).

2.4 The Proposed Development

2.4.1 The main components of the Proposed Development are summarised below:

- Work No. 1— an electricity generating station located on land at SHBPS, fuelled by refuse derived fuel ('RDF') with a gross electrical output of up to 95 MW at ISO conditions;
- Work No. 1A— two emissions stacks and associated emissions monitoring systems;
- Work No. 1B— administration block, including control room, workshops, stores and welfare facilities;
- Work No. 2— comprising electrical, gas, water, telecommunication, steam and other utility connections for the generating station (Work No. 1);
- Work No. 3— landscaping and biodiversity works;

- Work No. 4— a new site access on to South Marsh Road and works to an existing access on to South Marsh Road; and
- Work No. 5— temporary construction and laydown areas.

2.4.2 Various types of ancillary development further required in connection with and subsidiary to the above works are detailed in Schedule 1 of the DCO. A more detailed description of the Proposed Development is provided at Schedule 1 'Authorised Development' of the Draft DCO and Chapter 4: The Proposed Development in the ES Volume I (Document Ref. 6.2) and the areas within which each of the main components of the Proposed Development are to be built is shown by the coloured and hatched areas on the Works Plans (Document Ref. 4.3).

2.5 Relationship with the Consented Development

2.5.1 The Proposed Development comprises the works contained in the Consented Development, along with additional works not forming part of the Consented Development ('the Additional Works'). The Additional Works are set out below along with an explanation of their purpose.

- a larger air-cooled condenser (ACC), with an additional row of fans and heat exchangers – this will allow a higher mass flow of steam to be sent to the steam turbine whilst maintaining the exhaust pressure and thereby increasing the amount of power generated;
- a greater installed cooling capacity for the generator – additional heat exchangers will be installed to the closed-circuit cooling water system to allow the generator to operate at an increased load and generate more power;
- an increased transformer capacity – depending on the adopted grid connection arrangement the capacity will be increased through an additional generator transformer operating in parallel with the Consented Development's proposed generator transformer or a single larger generator transformer. Both arrangements would allow generation up to 95 MW; and
- ancillary works – the above works will require additional ancillary works and operations, such as new cabling or pipes, and commissioning to ensure that the apparatus has been correctly installed and will operate safely and as intended.

2.5.2 The likely construction scenario is for work on the Consented Development (pursuant to the Planning Permission) to commence in Quarter 2 ('Q2') of 2020 and to continue for around three years. Following grant of a DCO for the Proposed Development (approximately halfway through the three-year construction programme), the Applicant would initiate powers to continue development under the Order instead of the Planning Permission. The Order includes appropriate powers and notification requirements for the 'switchover' between consents, to provide clarity for the relevant planning authority regarding the development authorised and the applicable conditions, requirements, and other obligations. Once the Order has been implemented the additional works would be constructed and the Proposed Development

would be built out in full. The Proposed Development would commence operation in 2023.

2.5.3 Alternative construction scenarios, involving construction entirely pursuant to the Order, are also possible. Accordingly, three representative scenarios are described within Chapter 5: Construction Programme and Management in the ES Volume I (Document Ref. 6.2) and assessed in the Environmental Impact Assessment ('EIA').

2.6 The Purpose and Structure of this Document and Version

2.6.1 This report represents the Habitats Regulations Assessment (HRA) Signposting Document for the Proposed Development. This version of the report (Rev 2.0 dated December 2020) includes updates to the report is response to the ExA's further written questions.

2.6.2 These include updates to the report text where requested by the ExA and the provision of the information cross referenced within the report from those chapters, technical appendices and paragraphs within the ES that contain the information required by the competent authority to undertake an 'Appropriate Assessment' under the terms of Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (commonly referred to as the 'Habitats Regulations') (see new Appendices 3 – 10).

2.6.3 The terms of reference used in this report are consistent with those defined within the main chapters of the ES Volume I (Document Ref. 6.2). References to which are included, under relevant subject headings. The report is still designed to serve two key functions:

- to assist the competent authority by making it easier to undertake and consult on a Habitats Regulations Assessment; and
- to act as a confirmatory checklist that can be used to ensure that the relevant information needed for a HRA is adequately presented.

3.0 SCOPE OF ASSESSMENT

3.1 Introduction

3.1.1 It is a requirement of the EC Habitats Directive 1992 and the Habitats Regulations that plans and projects are subject to an Appropriate Assessment if it is likely that they will lead to significant adverse effects on a Natura 2000 site (the collective name for European designated sites). It is the duty of the 'competent authority' to determine if significant adverse effects are likely and, if necessary, to then undertake the Appropriate Assessment, but the proponent of the Proposed Development can be asked to supply sufficient data/ reports to enable such a decision to be reached.

3.1.2 In the past, the term Appropriate Assessment has been used to describe both the overall process and a particular stage of that process (see below). The term Habitats Regulations Assessment (HRA) has come into use in order to refer to the process that leads to an Appropriate Assessment, thus avoiding confusion. Throughout this report, HRA is used to refer to the overall procedure required by the Habitats Regulations. The Habitats Regulations set out a stepwise process, including an Appropriate Assessment to consider the impacts and effects of the Proposed Development on the Natura 2000 site. Although the necessity for an Appropriate Assessment has not been established, based on engagement with the competent authority and Natural England regarding the similar Consented Development, this document has been prepared on the assumption that the competent authority will conclude that one is required.

3.1.3 For statutory designated nature conservation sites subject to the provisions of the Habitats Regulations, it is usual to consider a search radius of 10 km when examining the potential pathways for air quality impacts on the sites.

3.1.4 One European designated site has been identified within this radius; this is the Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site, which is approximately 175 m east of the Proposed Development. The SAC supports qualifying Annex I habitats that are potentially susceptible to the effects of emissions to air from the Proposed Development. The SPA/ Ramsar site supports internationally important assemblages of wintering and passage waterbirds that may be displaced from functionally linked habitats outside the designation boundary as a result of the Proposed Development.

3.1.5 Surface water pathways to the designated habitats (and thus the qualifying species they support) have also been considered because the surrounding surface water drainage network, into which surface water from the construction and operation of the Proposed Development will outfall, drains into the Humber Estuary.

3.2 The Legislative Basis for Determining Likely Significant Effects and for Subsequent Appropriate Assessment, If Required

3.2.1 The Habitats Directive (1992) states that:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to*

appropriate assessment of its implications for the site in view of the site's conservation objectives." (Article 6 (3))

3.2.2 The Conservation of Habitats and Species Regulations (2017) states that:

"A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site or a European Offshore Marine Site (either alone or in combination with other plans or projects) … must make an appropriate assessment of the implications for the site in view of that sites conservation objectives … The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site …".(Regulation 63)

3.3 European Legislation and Withdrawal from the European Union

3.3.1 The United Kingdom (UK) left the European Union (EU) on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 ('the Withdrawal Act'). This established a transition period, which is currently set to end on 31 December 2020. The Withdrawal Act also retains the body of existing EU-derived law (which includes the Habitats Regulations) within our domestic law.

3.3.2 During the transition period:

- EU law applies to and in the UK, including all EU Directives referenced within the DCO Application documents. If new EU legislation enters into force, it will become part of the EU 'acquis' with which the UK is expected to comply;
- it will remain possible for UK courts and tribunals to hear and decide on cases involving EU law principles and for UK courts and tribunals to seek a preliminary ruling from the Court of Justice of the EU on a point of EU law interpretation.

3.3.3 After the transition period:

- if an agreement on the future relationship is negotiated between the UK and the EU, trade will take place subject to the terms of that agreement. The extent to which new EU legislative proposals will be considered by the UK will largely depend on the terms of the agreement but continuity of law would be ensured by the Withdrawal Act;
- if the UK and EU have not concluded an agreement on the future relationship, then trade will take place subject to world trade organisation (WTO) rules. Continuity of law in the UK will be provided by the Withdrawal Act unless, and subject to the provisions of the Northern Ireland Protocol, the UK legislates to diverge from EU law.

3.4 Overview of HRA Procedure and Context

3.4.1 The Planning Inspectorate Advice Note 10: Habitats Regulations Assessment Relevant to National Significant Infrastructure Projects (Planning Inspectorate, 2017) provides guidance on how the Habitats Regulations should be implemented. This is interpreted and summarised as follows - it should be noted that not all steps must be gone through in every case (see Figure 3.1):

- determination of whether the proposal is likely to have a significant effect, either alone or cumulatively (referred to as 'in-combination' in HRA terms) with other plans or projects, on a European site;
- if a significant effect is likely (or cannot be ruled out), the competent authority must conduct an Appropriate Assessment of the implications for the site in view of the site's conservation objectives (Natural England, 2008);
- in considering the project's effects on the site's conservation objectives, the competent authority must determine whether it can ascertain that the proposal will not adversely affect the integrity of the site;
- taking account of the way in which works are proposed to be carried-out, and the site conditions or other restrictions;
- being satisfied that there are no alternative solutions which would have a lesser effect on site integrity;
- considering whether there are Imperative Reasons of Overriding Public Interest (IROPI) to justify granting of permission for the development despite a potentially negative effect on site integrity; and
- in the absence of alternatives, and where the importance of the development outweighs the harm to a European site, consideration of proposed compensatory measures (to ensure that the overall coherence of the network of Natura 2000 sites is protected).

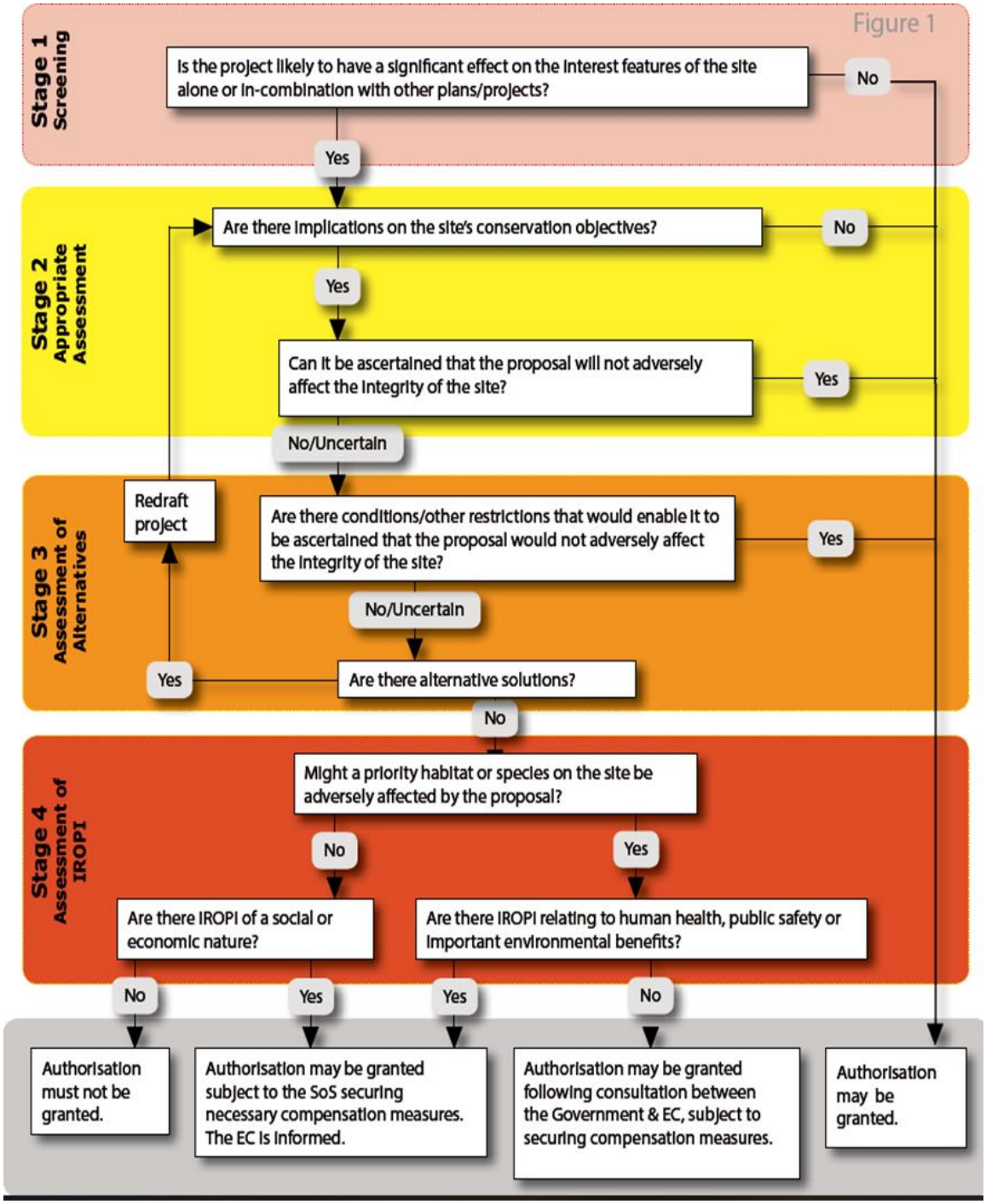
3.4.2 A flow chart of the HRA process (showing the decisions that are required at each stage) is provided as Figure 3.1 below. A four-stage methodology for HRA would therefore include:

- HRA Stage 1: Screening (including a 'likely significant effect' judgement);
- HRA Stage 2: Appropriate Assessment;
- HRA Stage 3: Assessment of Alternatives; and
- HRA Stage 4: Assessment of Imperative Reasons of Overriding Public Interest (IROPI) (where no alternative solutions exist and where adverse effects remain).

3.4.3 With regards to NSIPs, The Planning Inspectorate published a technical advice note in 2017, which sets out the approach to HRA that has already been summarised above. A set of matrices has been developed by the Planning Inspectorate to assist the relevant secretary of state, as the competent authority, in fulfilling the requirements of the Habitats Directive and the Habitats Regulations in the context of the 2008 Act process. The matrices comprise:

- Screening Matrices (HRA Stage 1: Screening) - which summarise the screening exercise for LSE of the project on the European sites and qualifying features considered (presented in this report as Appendix 1); and
- Integrity Matrices (HRA Stage 2: AA) - which summarise the potential adverse effects on integrity of the European sites, where LSE have been identified (presented in this report as Appendix 2).

Figure 3.1: HRA process (Planning Inspectorate, 2017)



3.4.4 Whilst the Appropriate Assessment and any subsequent assessments are undertaken by a competent authority, the information needed to undertake the assessments is generally provided by the applicant. For the Proposed Development the necessary information is presented within the following chapters in ES Volume I (Document Ref. 6.2), with specific assessment text and information required to inform the HRA reproduced in Appendices 3 – 9 of this HRA Signposting document for ease of reference:

- Chapter 4: The Proposed Development;
- Chapter 5: Construction Programme and Management;
- Chapter 6: Need, Alternatives and Design Evolution;
- Chapter 7: Air Quality;
- Chapter 8: Noise and Vibration;
- Chapter 10: Ecology;
- Chapter 14: Water Resources, Flood Risk and Drainage; and
- Chapter 17: Cumulative and Combined Effects.

3.4.5 ES Volume I (Document Ref. 6.2) concludes that the Proposed Development will not result in any significant adverse residual effects on the statutory designated sites identified above. It should be appreciated that the mechanism for Environmental Impact Assessment (EIA) used in the ES (including how terminology is used, and how the importance of receptors is evaluated) differs from that adopted for HRA. Consequently, whilst it is considered that all the information necessary to undertake an HRA is contained within the main chapters of the ES in Volume I , a separate process is required to address the specific obligations of the Habitats Regulations. This is the role that this document seeks to provide by assisting the competent authority in directing them to the necessary topic Chapters and specific paragraphs in ES Volume I.

3.4.6 One primary difference between EIA and HRA relates to the context of the assessments. HRA is specifically designed to consider the effects of a plan or project on the integrity of a Natura 2000 site, including its designated features (regardless of whether or not they are geographically located within the site at the time). It considers the whole of the Natura 2000 site in some detail, and by definition focuses on a site acknowledged to be of international importance. EIA, on the other hand, adopts a different perspective. It considers the impacts resulting from a development, and whether they have the potential to affect different receptors. The significance of the effect on any receptor is generally measured by combining the magnitude of the impact, and the importance and sensitivity of the receptor itself. EIA therefore seeks to establish the level at which significant effects occur, which may include Natura 2000 receptors at less than an international (possibly just at a local) level. Readers should be aware of this distinction when applying this signposting document.

3.4.7 Appendix 10 has been included to provide a summary of the qualifications of the lead authors and technical approver.

3.5 Consideration of People Over Wind, Peter Sweetman v Coillte Teoranta ECJ Ruling

3.5.1 This report has been prepared having regard to all relevant case law relating to the Habitats Regulations. In particular, the ruling by the European Court of Justice (ECJ) in the case of *People Over Wind, Peter Sweetman v Coillte Teoranta* (C-323/17) has been taken into account, because it influences the approach to HRA Screening Stage 1.

3.5.2 This case held that "*it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site*" (paragraph 40). This establishes that 'mitigation measures' cannot be taken into account at the screening stage, but it is important to note that not all mitigation measures are excluded from consideration – only those "*intended to avoid or reduce the harmful effects of the… project on that site*" (emphasis added). Mitigation measures which are, for example, intended to avoid effects on a local watercourse outside the European site designated boundary but which outfalls into the European designated site, can be taken into account as the benefit conveyed to the European site is coincidental and the measures would be delivered as part of good practice even if no European sites were present.

3.5.3 This represents a deviation from the approach usually adopted in the EIA, which considers embedded mitigation (even those measures that are included to directly avoid or reduce harmful effects on a European designated site) to form a part of the Proposed Development, and takes these measures into account when assessing the potential impacts on qualifying habitats and species.

3.5.4 Where mitigation measures are mentioned in this report and taken into account at the screening stage, they are therefore ones which may reduce or avoid harmful effects on certain (local) habitats or species, but are not introduced or relied on to directly avoid or reduce harmful effects on the European sites that are the subject of this signposting report. This includes standard good practice mitigation measures incorporated into the Construction Environmental Management Plan (CEMP) such as surface water drainage attenuation. This approach is therefore compliant with the People over Wind case.

4.0 BASELINE EVIDENCE GATHERING

4.1 Proposed Development Description and Alternatives

4.1.1 A detailed description of the Proposed Development is provided in Chapter 4: The Proposed Development in ES Volume I (Document Ref. 6.2.4).

4.1.2 The Proposed Development is an energy from waste power station with a gross electrical output of up to 95 MW.

4.1.3 The Proposed Development will operate 24 hours a day, 7 days a week with occasional offline periods for maintenance. The Proposed Development will utilise Refuse Derived Fuel (RDF) as the main source of fuel.

4.1.4 Consideration of the alternatives identified by the Applicant, and a comparison of their environmental effects, is provided in Chapter 6: Need, Alternatives and Design Evolution in ES Volume I (Document Ref. 6.2.6).

4.2 The Need for the Proposed Development

4.2.1 A description of the Proposed Development's rationale is presented in Chapter 6: Need, Alternative and Design Evolution in ES Volume I (Document Ref. 6.2.6).

4.3 Designated Sites Scoped in to HRA Screening

4.3.1 Three European and international designations associated with the Humber Estuary have been scoped into the impact assessment in ES Volume I Chapter 10: Ecology (Document Ref. 6.2.10). The rationale for inclusion of these sites is set out in paragraph 4.1.2 of the PEA Report in ES Volume III Appendix 10C (Document Ref. 6.4.15) (refer to Appendix 8 of this HRA for the full cross referenced text).

4.3.2 The locations of the sites relative to the Proposed Development are shown in Figure 10C.2 of the PEA Report (Document Ref. 6.4.15) (refer to Appendix 9 of this HRA).

4.3.3 A summary of the qualifying features for each of the three sites and their distance from the Proposed Development is summarised in Table 4.1 below.

Table 4.1: Natura 2000 sites scoped into HRA screening

SITE	APPROX. DISTANC-E FROM SITE	TOTAL AREA (HA)	SUMMARY OF PRIMARY REASONS FOR SITE SELECTION	SUMMARY OF QUALIFYING FEATURES
Humber Estuary SAC	175 m east	36,657.15	Estuaries Mudflats and sandflats not covered by seawater at low tide	Sandbanks which are slightly covered by sea water all the time Coastal lagoons *Salicornia* and other annuals colonizing mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with common sea buckthorn (*Hippophae• rhamnoides*) River lamprey (Lampetra fluviatilis) Sea lamprey (*Petromyzon marnius*) Grey seal (*Halichoerus grypus*)
Humber Estuary SPA	175 m east	37,630.24	Populations of European importance of Annex I and Annex II breeding, over-wintering wildfowl and wading birds. Internationally important assemblage of migratory and wintering birds.	N/A

Humber Estuary Ramsar site	175 m east	37,987.8	Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons. Grey seal Internationally important populations of passage wildfowl and waders.	N/A

4.4 Conservation Objectives

4.4.1 The conservation objectives for each relevant site are summarised in Table 4.2 below.

Table 4.2: Conservation objectives for relevant Natura 2000 sites

SITE	CONSERVATION OBJECTIVES
Humber Estuary SAC	Ensure that the integrity of the qualifying natural habitat is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • the extent and distribution of qualifying natural habitats and habitats of qualifying species; • the structure and function (including typical species) of the qualifying natural habitats; • the structure and function of the habitats of qualifying species; • the supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • the populations of qualifying species, and • the distribution of qualifying species within the site.
Humber Estuary SPA	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: • the extent and distribution of the habitats of the qualifying features; • the structure and function of the qualifying features; • the supporting processes on which the habitats of the qualifying features rely; • the populations of each of the qualifying features; and • the distribution of the qualifying features within the site.
Humber Estuary Ramsar site	Not specifically listed. Assumed as for Humber Estuary SAC and SPA.

5.0 STAGE 1: SCREENING FOR LIKELY SIGNFICANT EFFECTS

5.1 Identification of Potential Construction Impacts

Source-Receptor Pathways Scoped In

5.1.1 The potential source-receptor pathways by which the Proposed Development could impact the qualifying features of each Natura 2000 site during construction, and which were scoped into the ecological impact assessment, are as follows:

- physical displacement of SPA/ Ramsar birds – loss of high tide feeding, roosting and loafing habitat within the Proposed Development that is functionally linked to the Humber Estuary;
- noise/ vibration and visual disturbance to SPA/ Ramsar birds – disturbance to birds feeding, roosting and loafing in the large arable fields to the north and south of the Proposed Development, which are functionally linked to the Humber Estuary, and on mudflats within the boundary of the Natura 2000 site;
- surface water quality – potential pathways for the surface water pollution to the adjacent drainage network, and ultimately to the Humber Estuary SAC/ SPA/ Ramsar into which the surface water drainage flows during the construction phase of the Proposed Development e.g. sedimentation, vehicle fuel spill; and
- air quality - potential pathways identified through emissions to air from fugitive dust emissions during the construction phase of Proposed Development resulting in smothering of susceptible habitats within the Humber Estuary SAC/ SPA/ Ramsar.

Source-Receptor Pathways Scoped Out

5.1.2 There is no suitable habitat for the Humber Estuary SPA qualifying species of breeding birds (Annex I species; bittern, marsh harrier, avocet and little tern) within the potential zone of influence of noise and visual disturbance arising from the Proposed Development. This pathway is therefore scoped out.

5.1.3 No pathways by which underwater noise could give rise to likely significant effects on Humber Estuary SAC marine mammals and fish (river lamprey, sea lamprey and grey seal) or Humber Estuary Ramsar marine mammals (grey seal) have been identified, given that any works associated with the Proposed Development will be 175 m from the nearest part of the designated site. Over this distance it is reasonable to conclude that there would be no propagation of underwater noise such that the qualifying features could be affected. This pathway is therefore scoped out.

5.1.4 Given the distance between the Natura 2000 sites and the Proposed Development there is no pathway that could result in direct habitat loss or direct physical damage to any of the designated habitats.

5.1.5 Similarly, there are no groundwater pathways over this distance through which the Proposed Development could give rise to any effects on the

groundwater dependent terrestrial ecosystems (GWTEs) of the Natura 2000 sites. These pathways are therefore scoped out.

5.1.6 Given the distance between the Proposed Development and the South Humber Gateway (SHG) mitigation area at Cress Marsh (*c*. 500 m), it is considered that there is no potential for likely significant effects on birds using this habitat as a result of noise and visual disturbance during construction. All construction activities will be on the eastern side of the existing power station, which provides screening of the construction works to waterbirds using the Cress Marsh mitigation area. These pathways are therefore scoped out.

5.2 Identification of Potential Operational Impacts

Source-Receptor Pathways Scoped In

5.2.1 The potential source-receptor pathways by which the Proposed Development could impact the qualifying features of each Natura 2000 site during operation, and which were scoped into the ecological impact assessment are as follows:

- noise and visual disturbance to SPA/ Ramsar birds – disturbance to birds feeding, roosting and loafing in the large arable field to the north and south of the Proposed Development, which is functionally linked to the Humber Estuary, and on mudflats within the boundary of the Natura 2000 site;
- surface water quality – potential pathways for surface water pollution to the adjacent drainage network, and ultimately to the Humber Estuary SAC/ SPA/ Ramsar into which the surface water drainage flows e.g. sedimentation, vehicle fuel spill, discharge of treated foul drainage from a package treatment plant; and
- air quality - potential pathways identified through emissions to air during the operational phase of Proposed Development resulting in effects on susceptible habitats within the Humber Estuary SAC/ SPA/ Ramsar.

Source-Receptor Pathways Scoped Out

5.2.2 There is no suitable habitat for the Humber Estuary SPA qualifying species of breeding birds (Annex I species; bittern, marsh harrier, avocet and little tern) within the potential zone of influence of noise and visual disturbance arising from the operation of the Proposed Development. This pathway is therefore scoped out.

5.2.3 Potential air quality impacts on intertidal and subtidal habitats in the Humber Estuary SAC (Sandbanks which are slightly covered by sea water all the time, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows (Glauco-Puccinellietalia maritimae)) were scoped out of the assessment because intertidal habitats are not susceptible to the effects of changes in air quality arising from stack emissions during operation (increased nitrogen and acid deposition) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

5.3 Identification of Potential Decommissioning Impacts

5.3.1 Paragraphs 10.6.91 and 10.6.92 of ES Chapter 10: Ecology (Document Ref. 6.2.10) provide the assessment of decommissioning impacts and it is concluded that "*Potential effects on ecological features are not anticipated to differ significantly from those predicted at construction*" (refer to Appendix 3 for the full text).

5.3.2 On this basis, the LSE screening of decommissioning impacts has assumed that the same source-receptor pathways should be included as for the construction phase, with the exception of the loss of functionally linked land because this impact will have already occurred at the construction phase. This approach represents the worst-case scenario assessment for noise impacts, because there are unlikely to be any piling works associated with the decommissioning phase.

5.4 Summary of HRA Signposting

5.4.1 Table 5.1 below presents the signposting to the relevant ES Volume I (Document Ref. 6.2) chapters in which detailed assessment of the relevant potential construction source-receptor pathways identified above can be found.

5.4.2 Table 5.2 below presents the signposting to the relevant ES Volume I (Document Ref. 6.2) chapters in which detailed assessment of the relevant operational construction source-receptor pathways identified above can be found.

5.4.3 The decommissioning phase is not assessed in detail in the ES because it is assumed that the impacts would be the same/ similar (and no environmentally worse than) as for construction phase. Table 5.3 below presents the signposting to the relevant ES Volume I (Document Ref 6.2) chapters in which detailed assessment of the construction source-receptor pathways that are applicable to the decommissioning phase can be found.

5.4.4 For ease of reference the ES text that is cross-referenced within Tables 5.1 - 5.3 is provided in Appendices 3 and 4 of this HRA Signposting Document.

Table 5.1: HRA signposting: Likely Significant Effects during construction

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED IN ES	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING OF CROSS REFERENCED TEXT)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Humber Estuary SAC					
Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with	Changes in air quality during construction phase	Dust deposition during site clearance works resulting in smothering of vegetation and damage to habitats	These habitat types are not present in close proximity to the Proposed Development. The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Proposed Development, and at this distance no dust smothering would be anticipated. This pathway was therefore scoped out of the ecological impact assessment.	Chapter 10: Ecology, paragraph 10.6.4 Chapter 7: Air Quality, paragraph 7.6.8	No

common sea buckthorn (*Hippophae rhamnoides*) *Salicornia* and other annuals colonizing mud and sand					
Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by seawater all the time Coastal lagoons *Salicornia* and other annuals colonising mud and sand	Surface water pollution during construction phase	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too).	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No

Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) River lamprey Sea lamprey Grey seal					
Humber Estuary SPA					
Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds. Internationally important assemblage of migratory and wintering birds.	Loss of habitat within Proposed Development boundary	Permanent displacement of birds from habitat that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Loss of habitat will be addressed through South Humber Bank strategic mitigation, with the mitigation area at Cress Marsh having already been created. Impacts on passage and wintering waterbirds will therefore be avoided, because this habitat will be delivered prior to the commencement of construction. However, this has not been taken into account in the stage 1 screening due to the *People Over Wind* ruling.	Chapter 10: Ecology, paragraphs 10.5.3 to 10.5.5 (impact avoidance) and paragraphs 10.6.6 to 10.6.7 (assessment)	Yes

	Surface water pollution during construction phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
	Noise/vibration impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity (drop hammer piling) results in estimated levels of 75 dB L_{Amax} at the nearest part of the Estuary. This is significantly higher than the ambient noise level at the measured location on the edge of the SAC.	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes
	Noise/vibration impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times,	Piling activity (drop hammer piling) results in predicted noise levels of 62 dB $L_{Aeq,1hr}$, which in excess of the ambient noise level. Peak noise resulting from piling is estimated to be 76 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes

		increased energy expenditure and reduced survival rates.			
	Noise/vibration impacts during construction to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity (drop hammer piling) results in predicted noise levels of 59 dB $L_{Aeq,1hr}$, which is slightly higher than the ambient noise level. Peak noise resulting from piling is estimated to be 72 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.27 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes
	Visual impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing	Minimal risk of visual disturbance, seawall provides substantial screening to birds on the mudflats.	Chapter 10: Ecology, paragraph 10.6.29	No

		habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.			
	Visual impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Nature and scale of development similar to existing, but potential for some visual impacts identified.	Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32	Yes
Humber Estuary Ramsar					
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.	Surface water pollution during construction phase to habitats	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and	No

		Development will outfall.		Drainage, paragraph 14.6.18	
Grey seal	Surface water pollution during construction phase to habitats supporting breeding grey seal	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall. Impacts on fish resources/ food chain sustaining breeding colony.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
Internationally important populations of passage wildfowl and waders.	Surface water pollution during construction phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
	Noise/vibration impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival	Piling activity results in estimated levels of 75 dB L_{Amax} at the nearest part of the Estuary. This is significantly higher than the ambient noise level at the measured location on the edge of	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes

		rates.	the SAC.		
	Noise/vibration impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity results in predicted noise levels of 62 dB $L_{Aeq,1hr}$, which in excess of the ambient noise level. Peak noise resulting from piling is estimated to be 76 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes
	Noise/vibration impacts during construction to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival	Piling activity results in predicted noise levels of 59 dB $L_{Aeq,1hr}$, which is slightly higher than the ambient noise level. Peak noise resulting from piling is estimated to be 72 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.28 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes

		rates.			
	Visual impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Minimal risk of visual disturbance, seawall provides substantial screening to birds on the mudflats.	Chapter 10: Ecology, paragraph 10.6.29	No
	Visual impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival	Nature and scale of development similar to existing, but potential for some visual impacts identified.	Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32	Yes

		rates.			

Table 5.2: HRA signposting: Likely Significant Effects during Operation

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED IN ES	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR CROSS REFERENCED TEXT)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Humber Estuary SAC					
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (Ammophila arenaria) (white dunes) Fixed coastal dunes with herbaceous	Changes in air quality during operational phase	NOx emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Annual mean NOx change > 1% of critical level. This exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraphs 10.6.63 – 10.6.64 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	Yes
		Nutrient nitrogen deposition resulting in changes to critical loads and potential effects on vegetation assemblage.	Change is >1% of critical load. This exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraphs 10.6.65 – 10.6.66 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	Yes

vegetation (grey dunes) Dunes with common sea buckthorn (Hippophae rhamnoides)		Acid deposition resulting in changes to critical loads and potential effects on vegetation assemblage.	Change resulting from Proposed Development is negligible and is well below the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.67 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
		SO2 emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Change <1% of critical load and is not significant. This does not exceed the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.68 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by seawater all the	Surface water pollution during operational phase	Pollution of Humber Estuary via adjacent surface water drains, into which surface water run-off and treated foul drainage from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drain during operational phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.70 – 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph	No

time Coastal lagoons Salicornia and other annuals colonising mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritimae) River lamprey Sea lamprey Grey seal				14.6.36	
Humber Estuary SPA					
Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds. Internationally	Surface water pollution during operational phase to habitats supporting internationally important bird populations	Pollution of Humber Estuary via adjacent surface water drain, into which surface water run-off and treated foul drainage from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drain during operational phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.70 to 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage,	No

important assemblage of migratory and wintering birds.				paragraph 14.6.36	
	Noise impacts during operation to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are 5 dB below the ambient noise level of 52 dB LAeq.	Chapter 10: Ecology, paragraphs 10.6.72 – 10.6.75 Chapter 8: Noise and Vibration, Table 8.30 and paragraphs 8.6.39-8.6.40, and 8.6.44	No
	Noise impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are within ambient range across central portion of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 10: Ecology, paragraphs 10.6.76 – 10.6.77 Chapter 8: Noise and Vibration, Table 8.31 and paragraphs 8.6.39, 8.6.41, 8.6.42 and 8.6.44	No

	Noise impacts during operation to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are within ambient range across central and eastern portions of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 10: Ecology, paragraphs 10.6.76 – 10.6.77 Chapter 8: Noise and Vibration, Table 8.32 and paragraphs 8.6.39, 8.6.41 8.6.43 and 8.6.44	No
	Visual impacts during operation to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Topic scoped out of assessment due to distance and presence of similar structures in the surrounding environment.	Chapter 10: Ecology, paragraph 10.6.55	No

	Visual impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Reasonable to assume that waterbirds using this field are habituated to presence of existing power station and its industrial nature, as such that they would not be disturbed by the presence of tall chimney structures and other buildings on adjacent land; Proposed Development operation not significantly different to this.	Chapter 10: Ecology, paragraphs 10.6.80 – 10.6.81	No
Humber Estuary Ramsar					
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.	Changes in air quality during operational phase	NOx emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Annual mean NOx change > 1% of critical level. This exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraphs 10.6.63 – 10.6.64 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	Yes
		Nutrient nitrogen deposition resulting	Change is >1% of critical load. This	Chapter 10: Ecology,	Yes

		in changes to critical loads and potential effects on vegetation assemblage.	exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	paragraphs 10.6.65 to 10.6.66 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	
		Acid deposition resulting in changes to critical loads and potential effects on vegetation assemblage.	Change <1% of critical load and is not significant. This does not exceed the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.67 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
		SO2 emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Change <1% of critical load and is not significant. This does not exceed the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.68 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
	Surface water pollution during operational phase to habitats	Pollution of Humber Estuary via adjacent surface water drain, into which surface	Standard environmental measures to control pollution to the drain	Chapter 10: Ecology, paragraphs 10.6.70 to	No

		water run-off and treated foul drainage from the Proposed Development will outfall.	during operational phase will adequately minimise risk.	10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	
Grey seal	Surface water pollution during operational phase to habitats supporting breeding grey seal	Pollution of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drain during operational phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.70 to 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	No
	Foul drainage pollution during operational phase to habitats supporting breeding grey seal	Pollution of Humber Estuary via adjacent surface water drains, into which foul drainage discharge from an on-site package treatment plant for the Proposed Development will outfall.	Foul drainage will be processed via an on-site package treatment plant. The volume of processed discharge is anticipated to be below the threshold for which a Permit is required; and as such is not	Chapter 10: Ecology, paragraph 10.5.16	No

			considered to represent a significant effect		
Internationally important populations of passage wildfowl and waders.	Surface water pollution during operational phase to habitats supporting internationally important bird populations	Pollution of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drain during operational phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.70 to 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	No
	Noise impacts during operation to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are 5 dB below the ambient noise level of 52 dB LAeq.	Chapter 10: Ecology, paragraphs 10.6.72 to 10.6.75 Chapter 8: Noise and Vibration, Table 8.30 and paragraphs 8.6.39, 8.6.40 and 8.6.44	No
	Noise impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is ‘functionally linked’	Predicted operational noise levels are within ambient range across central	Chapter 10: Ecology, paragraphs 10.6.78 – 10.6.79	No

		to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	portion of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 8: Noise and Vibration, Table 8.31 and paragraphs 8.6.39, 8.6.41, 8.6.42 and 8.6.44	
	Noise impacts during operation to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are within ambient range across central and eastern portions of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 10: Ecology, paragraphs 10.6.76 to 10.6.77 Chapter 8: Noise and Vibration, Table 8.32 and paragraphs 8.6.39, 8.6.41, 8.6.43 and 8.6.44	No
	Visual impacts during operation to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked'	Topic scoped out of assessment due to distance and presence of similar structures in the	Chapter 10: Ecology, paragraph 10.6.55	No

		to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	surrounding environment.		
	Visual impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Reasonable to assume that waterbirds using this field are habituated to presence of existing power station and its industrial nature, as such that they would not be disturbed by the presence of tall chimney structures and other buildings on adjacent land; Proposed Development operation not significantly different to this.	Chapter 10: Ecology, paragraphs 10.6.80 to 10.6.81	No

Table 5.3: HRA signposting: Likely Significant Effects during decommissioning

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED IN ES	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR CROSS REFERENCED TEXT)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Humber Estuary SAC					
Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with common sea buckthorn (*Hippophae rhamnoides*)	Changes in air quality during decommissioning phase	Dust deposition during site clearance works resulting in smothering of vegetation and damage to habitats	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. These habitat types are not present in close proximity to the Proposed Development. The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the	Chapter 10: Ecology, paragraph 10.6.4 Chapter 7: Air Quality, paragraph 7.6.8	No

			Proposed Development, and at this distance no dust smothering would be anticipated. This pathway was therefore scoped out of the ecological impact assessment.		
Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by seawater all the time Coastal lagoons *Salicornia* and other annuals colonising mud and sand	Surface water pollution during decommissioning phase	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains will adequately minimise risk to local surface water bodies (consequently minimising risk to	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No

Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)			the Humber Estuary too).		
Humber Estuary SPA					
Populations of European importance of Annex I and Annex II over-wintering wildfowl and wading birds. Internationally important assemblage of migratory and wintering birds.	Surface water pollution during decommissioning phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
	Noise/vibration impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes

		energy expenditure and reduced survival rates.	worse than) as for construction phase.		
	Noise/ vibration impacts during decommissioning to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes
	Noise/ vibration impacts during decommissioning to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.27 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and	Yes

		and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	phase.	paragraphs 8.6.20 to 8.6.24 (vibration)	
	Visual impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. Minimal risk of visual disturbance, seawall provides substantial screening to birds on the mudflats.	Chapter 10: Ecology, paragraph 10.6.29	No
	Visual impacts during decommissioning to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for	Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32	Yes

		roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	construction phase. Nature and scale of development similar to existing, but potential for some visual impacts identified.		
Humber Estuary Ramsar					
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.	Surface water pollution during decommissioning phase to habitats	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
Grey seal	Surface water pollution during decommissioning phase to habitats	Pollution/ siltation of Humber Estuary via adjacent surface water	Decommissioning phase not specifically assessed in ES;	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35	No

	supporting breeding grey seal	drain, into which surface water run-off from the Proposed Development will outfall. Impacts on fish resources/ food chain sustaining breeding colony.	impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	
Internationally important populations of passage wildfowl and waders.	Surface water pollution during decommissioning phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No

	Noise/vibration impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes
	Noise/ vibration impacts during decommissioning to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes
	Noise/ vibration impacts during decommissioning to birds using	Disturbance/ displacement of birds from fields to the north that are	Decommissioning phase not specifically assessed in ES;	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.28	Yes

	arable fields to the north (fields 30 and 31)	'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 8: Noise and Vibration Paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	
	Visual impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Decommissioning phase not specifically assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. Minimal risk of visual disturbance, seawall provides substantial screening to birds on the mudflats.	Chapter 10: Ecology, paragraph 10.6.29	No
	Visual impacts during decommissioning	Disturbance/ displacement of birds from fields to	Decommissioning phase not specifically	Chapter 10: Ecology, paragraphs	Yes

	to birds using arable field to the south (field 37)	the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	assessed in ES; impacts assumed the same (or no environmentally worse than) as for construction phase. Nature and scale of development similar to existing, but potential for some visual impacts identified.	10.6.30 to 10.6.32	

6.0 IN-COMBINATION EFFECTS WITH OTHER PLANS OR PROJECTS

6.1.1 As part of the Stage 1 Screening exercise, it is also necessary to undertake an assessment in combination with other plans or projects. Relevant projects considered as part of the in-combination effects assessment undertaken for the ecological impact assessment, along with potential in-combination effect topics of relevance to the HRA in-combination assessment are signposted below, along with the relevant signposting to ES Volume I (Document Ref. 6.2) chapters.

6.1.2 Plans or projects (schemes) that could potentially result in in-combination effects with the Proposed Development are identified in Chapter 17: Cumulative and Combined Effects of the ES Volume I (Document Ref. 6.2). Developments have been scoped in to the screening task only where they could potentially affect the European site through loss of functionally linked habitat, noise or visual disturbance/ displacement to Humber Estuary SPA/ Ramsar waterbirds, or air quality impacts on sensitive habitats.

6.1.3 A summary of the HRA stage 1 screening exercise for in-combination construction impacts arising from the shortlisted schemes identified in ES Volume I, Chapter 17: Cumulative and Combined Effects (Document Ref. 6.2) is provided in Table 6.1. A summary of the HRA stage 1 screening exercise for in-combination operational impacts arising from the shortlisted schemes identified in Chapter 17 is provided in Table 6.2. Topics are highlighted in shaded cells where likely significant effects have been identified and they have been taken forward to HRA stage 2 appropriate assessment.

Table 6.1: HRA signposting: potential Likely Significant in-combination effects during construction

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SPA/ RAMSAR?		
	NOISE DISTURBANCE TO SPA/ RAMSAR	NOISE DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT	LOSS OF SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT
1 – Stallingborough Link Road DM/0094/18/FUL	No – HRA concluded that the distance of the scheme from the designated site (c. 1 km), along with visual screening provided by existing developments north-east of Moody Lane that were between the scheme and the SPA/ Ramsar, resulted in there being no potential for construction-related disturbance to qualifying features within the boundaries of the designations.	Yes – HRA concluded that there was potential for temporary noise disturbance to functionally linked habitat and could not rule out likely significant effects.	Yes – HRA identified potential for scheme to result in loss of supporting habitat (i.e. functionally linked land).
2 – Sustainable Transport Fuels Facility DM/0664/19/FUL	No - HRA states that potential direct noise and vibration disturbance of SPA was scoped out of the assessment.	Yes - HRA states that significant effects would be unlikely, but included for further consideration as likely significant effects cannot be ruled out at this stage.	Yes - HRA states that significant effects would be unlikely, but included for further consideration as likely significant effects cannot be ruled out at this stage.
3 – Engineering Works – Paragon House SM/0147/16/FUL	No – due to distance from Estuary (c. 1.2 km) and presence of	No - not considered in impact assessment therefore assume	No – habitats not used by large aggregations of waterbirds above

	industrial areas between the scheme and the Estuary.	scoped out.	1% Humber Estuary populations, and are not considered to be functionally linked to the SPA/ Ramsar.
4 – Renewable Energy Power Facility – Kiln Lane DM/0848/14/FUL	No - not considered in impact assessment therefore assume scoped out.	No - not considered in impact assessment therefore assume scoped out.	No – habitats within the scheme boundary are not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
5 – Selvic Shipping CHP Boilers DM/0449/17/FUL	No – no potential for in-combination noise effects identified.	No – no potential for In-combination noise effects identified.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
6 – Waste Tyre Pyrolysis – Immingham Rail Freight DM/0333/17/FUL	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
7 – VPI Immingham - Energy Park A PA/2018/918	No – HRA concluded no likely significant effects.	No – HRA concluded no likely significant effects.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
8 – Great Coates Renewable Energy Centre DM/0329/18/FUL	No – HRA concluded no likely significant effects. Operational noise levels within ambient range at Pyewipe mudflats.	No – HRA concluded no likely significant effects.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
9 – Waste to Energy –	No - not considered in impact	No - not considered in impact	No – habitats not suitable for

Immingham Rail Freight DM/0628/18/FUL	assessment therefore assume scoped out.	assessment therefore assume scoped out.	wintering birds and therefore not functionally linked to the SPA/ Ramsar.
10 – North Beck Energy Centre DM/0026/18/FUL	No – implementation of best practice construction methods means that there will be no potential for in-combination effects.	No – not considered in noise impact assessment so assume scoped out.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
11 – Stallingborough Interchange Business Park DM/0105/18/FUL	No – not specifically addressed in impact assessment, but reasonable to scope out on the basis of distance (c. 2 km from SPA/ Ramsar).	No – not considered in impact assessment so assume scoped out.	No – habitats do not support important assemblages of SPA/ Ramsar wintering birds and are therefore not functionally linked to the SPA/ Ramsar.
12 – VPI Immingham OCGT DCO EN010097	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.	No – habitats do not support important assemblages of SPA/ Ramsar wintering birds and are therefore not functionally linked to the SPA/ Ramsar.
13 – 525 Residential Development DM/0728/18/OUT	No – not specifically addressed in impact assessment, but reasonable to scope out on the basis of distance (c. 2 km from SPA/ Ramsar).	No – not considered in impact assessment so assume scoped out.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.

Table 6.2: HRA Signposting: Potential Likely Significant In-Combination Effects during Operation

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SAC/ SPA/ RAMSAR?		
	CHANGES IN AIR QUALITY TO SAC/ RAMSAR	NOISE DISTURBANCE TO SPA/ RAMSAR	NOISE DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT
1 – Stallingborough Link Road DM/0094/18/FUL	No – no potential for in-combination air quality effects identified.	No – HRA concluded that the distance of the scheme from the designated site (c. 1 km), along with visual screening provided by existing developments north-east of Moody Lane that were between the scheme and the SPA/ Ramsar, resulted in there being no potential for operational disturbance to qualifying features within the boundaries of the designations.	Yes – HRA concluded that there was potential for noise disturbance to functionally linked habitat and could not rule out likely significant effects due to an increase in ambient noise.
2 – Sustainable Transport Fuels Facility DM/0664/19/FUL	Yes – ADMS 5 modelling has been undertaken to consider in-combination air quality effects.	No – due to distance from Estuary (c. 1 km) and presence of industrial areas between the scheme and the Estuary.	Yes - HRA states that significant effects would be unlikely, but included for further consideration as likely significant effects cannot be ruled out at this stage.
3 – Engineering Works – Paragon House SM/0147/16/FUL	No – scheme will not result in emissions to air.	No – due to distance from Estuary (c. 1.2 km) and presence of	No - not considered in impact assessment therefore assume

		industrial areas between the scheme and the Estuary.	scoped out.
4 – Renewable Energy Power Facility – Kiln Lane DM/0848/14/FUL	No – no potential for in-combination air quality effects identified. Air quality assessment for the scheme concluded that emissions were insignificant and would not affect the Humber Estuary designated site.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
5 – Selvic Shipping CHP Boilers DM/0449/17/FUL	No – no potential for in-combination air quality effects identified	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
6 – Waste Tyre Pyrolysis – Immingham Rail Freight DM/0333/17/FUL	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
7 – VPI Immingham Energy Park A PA/2018/918	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise impacts identified	No – no potential for in-combination noise impacts identified
8 – Great Coates Renewable Energy Centre DM/0329/18/FUL	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
9 – Waste to Energy – Immingham Rail Freight DM/0628/18/FUL	No – no potential for in-combination air quality effects identified. Scheme occupies the same space as Development Ref: 6 and it is not	No – noise impact assessment concluded that there would be no increase in ambient noise during operation.	No – noise impact assessment concluded that there would be no increase in ambient noise during operation.

	possible for both developments to occur.		
10 – North Beck Energy Centre DM/0026/18/FUL	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
11 – Stallingborough Interchange Business Park DM/0105/18/FUL	No – information provided in the planning application is inadequate to undertake dispersion modelling.	No – operational noise for this scheme is 5dB below ambient levels.	No – not considered in impact assessment so assume scoped out.
12 – VPI Immingham OCGT DCO EN010097	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
13 – 525 Residential Development DM/0728/18/OUT	No – no potential for in-combination air quality effects identified due to the type of development.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.

7.0 STAGE 2: APPROPRIATE ASSESSMENT

7.1 Introduction

7.1.1 The Proposed Development has been identified at the HRA stage 1 screening as resulting in likely significant effects on the Humber Estuary SAC/ SPA/ Ramsar . To avoid repetition, the assessments for some of the features have been combined in this report (for example, where LSE on waterbird assemblages for which both the SPA and Ramsar are designated):

- loss of functionally linked habitat used by SPA/ Ramsar waterbirds during construction of the Proposed Development alone and in-combination with other proposed developments;
- noise disturbance to SPA/ Ramsar waterbirds using Pyewipe mudflats during construction of the Proposed Development alone;
- noise disturbance to SPA/ Ramsar waterbirds using functionally linked arable field (Field 37) to the south of the Proposed Development during construction and decommissioning of the Proposed Development alone and in-combination with other proposed developments;
- noise disturbance to SPA/ Ramsar waterbirds using functionally linked arable fields (Fields 30 and 31) to the north of the Proposed Development during construction and decommissioning of the Proposed Development alone and in-combination with other proposed developments;
- visual disturbance to SPA/ Ramsar waterbirds using functionally linked arable field (Field 37) to the south of the Proposed Development during construction, operation and decommissioning of the Proposed Development alone and in combination with other proposed developments; and
- changes in air quality during the operation of the Proposed Development resulting in impacts on sensitive SAC/ Ramsar habitats alone and in combination with other proposed developments.

7.2 Construction Impacts

Loss of Functionally Linked Habitat

7.2.1 The loss of functionally linked habitat within the Main Development Area, in the absence of mitigation, has the potential to displace SPA/ Ramsar waterbirds, which could result in decreased resting/ feeding times and increased energy expenditure (as birds seek new areas to roost/ feed in that are further from the mudflats), and have subsequent impacts on body condition and winter survival rates.

7.2.2 When examining the potential for adverse effects on integrity, the Stage 2 appropriate assessment has taken into account the mitigation at Cress Marsh that has been delivered to meet Policy 9 of the Local Plan. Within the Mitigation Zone identified on the policies map, development proposals on greenfield land that adversely affect the Humber Estuary SPA/ Ramsar site due to the loss of functionally linked land are required to make contributions

towards the provision and management of the mitigation sites identified. This is secured on a proportional approach relating to the site area. As the Site lies within the Mitigation Zone, as per the policy, the Applicant is required to commute a sum of money based on the relevant site area lost to the Cress Marsh SHG strategic mitigation site.

7.2.3 The calculation of the sum of money required for the application of Policy 9 to the Proposed Development was undertaken for the Consented Development. The same will apply to the Proposed Development as the area of land to be lost is the same. The financial contribution for the Consented Development was secured by a Section 106 agreement and this provision would be varied to ensure that the financial contribution would also be secured for the Proposed Development (although the sum would only need to be paid once, for either the Consented Development or the Proposed Development). The relevant area of mitigation land at Cress Marsh has already been created by the Council.

7.2.4 There will therefore be no net loss of functionally linked habitat available for SPA/ Ramsar waterbirds.

7.2.5 It is considered that the rationale presented in ES Volume I Chapter 10: Ecology paragraphs 10.6.4 to 10.6.5 (refer to Appendix 3 for full text), embedded mitigation and payment by the Applicant to of the sum of money towards the SHG strategic mitigation scheme (via a Section 106 agreement) as presented in ES Volume I Chapter 10: Ecology paragraphs 10.5.3 to 10.5.4 (refer to Appendix 3 for full text) is sufficient to provide evidence that the Proposed Development will result in no adverse effects on the integrity of the Humber Estuary SPA/ Ramsar.

<u>Noise Disturbance to Pyewipe Mudflats</u>

7.2.6 The impact assessment has identified that construction noise during piling works will give rise to noise levels of up to 75 dB L_{Amax} at the nearest part of the mudflats to the Proposed Development. Noise levels of this magnitude may be expected to result in disturbance to birds. However, the assessment concludes that there would only be a minor adverse effect on birds given that there would be some attenuation of noise reaching the mudflats as a result of the seawall.

7.2.7 Predicted ambient noise levels across the nearest mudflats for the majority of the construction activities (excluding piling) are below 44 dB $L_{Aeq,1hr}$ and are therefore within the ambient range. The majority of construction activities would therefore not be expected to disturb birds.

7.2.8 Piling activity associated with construction would be temporary, and the elevated noise levels would only reach the portion of Pyewipe mudflats closest to the Main Development Area. This may result in some localised disturbance, which would likely cause displacement of waterbirds within the mudflat area, rather than causing them to leave the mudflats altogether. However, this would be temporary for the duration of the piling activity nearest the SPA/ Ramsar boundary, and thus would occur over a relatively short period of time (i.e. weeks rather than months). Any such short-term

displacement would not reasonably be considered likely to adversely affect the survival of waterbirds, or result in them being permanently displaced from the Pyewipe mudflats or wider Estuary.

7.2.9 It is also necessary to examine the context of any temporary displacement of birds against the availability of large areas of this mudflat, which is at its narrowest point (and thus least area of exposed mudflat across low tide) in the closest part to the Proposed Development, and which extends for over 6 km south-east, that would be unaffected by elevated noise resulting from piling. It is reasonable to assume that such a large area of mudflat would be able to accommodate any birds displaced from the area potentially affected by piling noise.

7.2.10 The ecological assessment of noise impacts on birds feeding, roosting and loafing at Pyewipe mudflats is presented in ES Volume I Chapter 10: Ecology paragraphs 10.6.8 to 10.6.14 (refer to Appendix 3 for full text) It is concluded that construction piling noise reaching this location will not result in an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar.

7.2.11 The results of the assessment are applicable to the decommissioning phase, for which the impacts are reasonably considered similar/ no environmentally worse than those arising during construction.

Noise Disturbance to Arable Field to the South (Field 37)

7.2.12 The potential for piling activity to result in the displacement of birds (either partially or entirely) from or within field 37, which is adjacent to the southern boundary of the Main Development Area, was identified in the ecological impact assessment. Although only temporary in duration given the limited duration of piling, this has the potential to result in increased energy expenditure while birds attempt to seek alternative feeding, roosting and loafing locations, and reduced feeding times over the high tide period when favoured mudflats are covered by seawater. This has implications on body condition and winter survival rates.

7.2.13 At this stage, the noise mitigation measures to be employed have not been fixed; this is to allow the contractor to determine the best available technique for noise abatement during the piling works which will be agreed with North East Lincolnshire Council. For the purposes of this HRA Signposting document, it is assumed that mitigation will comprise:

- seasonal piling restrictions – piling will be restricted for two hours either side of high tide in the period September to March inclusive, to avoid the most sensitive winter months, and the time period when birds are most likely to be present in the fields (i.e. when they are pushed off the coastal mudflats at high tide); and/ or
- Continuous Flight Auger (CFA) piling – this technique is virtually vibration free, and one of the quietest forms of piling because it does not require the loud ‘bangs’ associated with drop hammer piling techniques. If this technique is adopted, it will be possible to reduce construction noise to within ambient levels. The use of alternative piling methods e.g. CFA piling are expected to reduce the noise to 50 dB $L_{Aeq,1h}$ to mitigate impacts

on waterbirds in the fields to the south of the Site (R4). This is up to 8 dB below the ambient noise level measured at the Site boundary. In addition, the nature of the noise from CFA piling is less disturbing to birds as there is no impulsive noise.

7.2.14 The assessment of piling noise on the field to the south of the Proposed Development is presented in ES Volume I Chapter 10: Ecology paragraphs 10.6.16 to 10.6.23 (refer to Appendix 3 for full text). The mitigation measures are discussed in ES Volume I Chapter 10: Ecology paragraphs 10.7.2 to 10.7.3 (refer to Appendix 5 for full text) . Whilst the specific mitigation measures are not fixed at this stage, the commitment to implement appropriate mitigation (to be secured by DCO requirement) reduces the moderate adverse (significant) effect at Receptor R4 (field to south of the Site) before mitigation to a residual minor adverse effect (not significant) (see ES Volume I Chapter 10: Ecology, paragraph 10.9.4 (refer to Appendix 5 for full text)). It is therefore concluded that piling noise reaching this location will not result in an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar.

7.2.15 The results of the assessment are applicable to the decommissioning phase, for which the impacts are reasonably considered similar/ no environmentally worse than those arising during construction.

Noise Disturbance to Arable Fields to the North (Fields 30 and 31)

7.2.16 The potential for piling activity to result in the displacement of birds (either partially or entirely) from or within fields 30 and 31, which are on the opposite side of South Marsh Road to the Proposed Development, was identified in the ecological impact assessment. Although only temporary in duration given the limited duration of piling, this has the potential to result in increased energy expenditure while birds attempt to seek alternative feeding, roosting and loafing locations, and reduced feeding times over the high tide period when favoured mudflats are covered by seawater. This has implications on body condition and winter survival rates.

7.2.17 The assessment concluded that there could be minor localised displacement of birds within the fields, although it was considered that the noise levels were not sufficiently high to result in complete displacement from the fields, particularly given that the southern and western extents of these fields (particularly field 30) were subject to relatively high ambient noise levels as result of traffic along Hobson Way and South Marsh Road.

7.2.18 The assessment of piling noise on the fields to the north of the Proposed Development is presented in Chapter 10: Ecology paragraphs 10.6.24 to 10.6.28 (refer to Appendix 3 for full text). It is concluded that piling noise reaching these locations will not result in an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar.

7.2.19 The results of the assessment are applicable to the decommissioning phase, for which the impacts are reasonably considered similar/ no environmentally worse than those arising during construction.

Visual Disturbance to Arable Field to the South (Field 37)

7.2.20 The assessment concluded that there could be minor localised displacement of birds within the field given its proximity to construction works. Precautionary mitigation in the form of a 2.5 m high close-boarded fence will be installed along part of the southern boundary of the Site (see Figure 4.2 in ES Volume II, Document Ref. 6.3) to provide visual screening from vehicle and personnel movements during construction to any waterbirds feeding, roosting or loafing in the field. Construction temporary lighting will be arranged so that glare is minimised outside the construction site. Measures to minimise the impact of lighting are detailed in the ES Volume III Appendix 5A CEMP (ES Volume III, Document Ref. 6.4).

7.2.21 The assessment of visual impacts on the field to the south of the Proposed Development is presented in Chapter 10: Ecology paragraphs 10.6.30 to 10.6.32 (refer to Appendix 3 for full text). Embedded mitigation measures are described in Chapter 10: Ecology paragraph 10.6.31. It is concluded that visual disturbance at this location will not result in an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar.

7.2.22 The results of the assessment are applicable to the decommissioning phase, for which the impacts are reasonably considered similar/ no environmentally worse than those arising during construction.

7.3 Operational Impacts

Changes in Air Quality

7.3.1 The assessment of likely significant effects concluded that there was a risk of air quality impacts on the nearest sensitive habitats within the SAC/ Ramsar as a result of increased NOx emissions and increased nutrient N deposition during operation.

7.3.2 The assessment of air quality impacts on the relevant designated habitats is presented in ES Volume I Chapter 10: Ecology paragraphs 10.6.57 to 10.6.69 (refer to Appendix 7 for full text).It is concluded that air quality impacts will not result in an adverse effect on the integrity of the Humber Estuary SAC.

Visual Disturbance to Arable Field to the South (Field 37)

7.3.3 Although not identified as an LSE in Table 5.2, for the operational phase, the precautionary mitigation in the form of a 2.5 m high close-boarded fence installed along part of the southern boundary of the Site (see Figure 4.2 in ES Volume II, Document Ref. 6.3) during construction (as described at paragraph 7.2.16 above) will be retained during operation to provide visual screening from vehicle and personnel movements to any waterbirds feeding, roosting or loafing in the field.

7.3.4 Operational lighting impacts beyond the Site boundary will be minimised as far as possible, for example by directing lighting away from adjacent habitats, in accordance with the Indicative Lighting Strategy (Document Ref. 5.12).

7.4 In-Combination Impacts (Construction)

Losses of Functionally Linked Habitat

In-Combination Effects with Stallingborough Link Road and Sustainable Transport Fuels Facility

7.4.1 The applicants for these developments have committed to commuting sums of money via Local Plan Policy 9 to the SHG strategic mitigation scheme, which will draw down mitigation habitat. With this mitigation, there is therefore no potential for adverse in-combination effects on the integrity of the Humber Estuary SPA/ Ramsar as a result of the loss of functionally linked habitat. The relevant assessment is set out in paragraphs 17.8.1 to 17.8.3 of Chapter 17 (Cumulative and Combined Effects) (Document Ref. 6.2.17) (refer to Appendix 6 for full text).

Noise Disturbance to Functionally Linked Habitats

In-Combination Effects with Stallingborough Link Road and Sustainable Transport Fuels Facility

7.4.2 The combined (in-combination) noise and vibration assessment presented in Chapter 17: Cumulative and Combined Effects (ES Volume I, Document Ref. 6.2) concludes that the construction of the Proposed Development at the same time as the construction or use of the other developments would not result in a significant in-combination noise effect on functionally linked fields to the north and south of the Proposed Development. As described above the other developers will commit to commuting sums of money to enable mitigation habitat to be created. With this mitigation providing alternative bird habitat, and taking into account the proposed contributions to the SHG strategic mitigation scheme, there is therefore no potential for adverse in-combination effects on the Humber Estuary SPA/ Ramsar as a result of construction disturbance to functionally linked habitat.

7.5 In-Combination Impacts (Operation)

Changes in Air Quality

In-Combination Effects with Waste Tyre Pyrolysis, VPI Immingham Energy Park A, Great Coates Renewable Energy Centre, North Beck Energy Centre, Sustainable Transport Fuels Facility and VPI Immingham OCGT DCO.

7.5.1 The assessment of likely significant effects concluded that there was a risk of combined (in-combination) air quality impacts on the nearest sensitive habitats within the SAC/ Ramsar as a result of increased NO_x emissions and increased nutrient N deposition during the simultaneous operation of these developments.

7.5.2 The in-combination assessment for air quality is presented in ES Volume I Chapter 17: Cumulative and Combined Effects paragraphs 17.5.12 to 17.5.15 and paragraphs 17.8.6 to 17.8.15 (refer to Appendix 6 for full text)

and detailed in Appendix 7A in ES Volume III (Document Ref. 6.4). The assessment has concluded that there would be no adverse in-combination air quality effects on the Humber Estuary SAC/ SPA/ Ramsar, and it is considered that the assessment is sufficient to demonstrate no adverse effects on integrity for the Proposed Development in-combination with these other schemes.

Noise Disturbance to Functionally Linked Habitat

In-combination Effects with Stallingborough Link Road and Sustainable Transport Fuels Facility

7.5.3 The cumulative (in-combination) noise and vibration assessment presented in Chapter 17: Cumulative and Combined Effects (ES Volume I, Document Ref. 6.2) concludes that the operation of the Proposed Development at the same time as the construction or use of other developments would not result in a significant in-combination noise effect. The other developers will also be required to commit to commuting a sum of money via Local Plan Policy 9 to the South Humber Gateway strategic mitigation scheme. With this mitigation providing alternative bird habitat, and taking into account the proposed contribution to the SHG strategic mitigation scheme for the Proposed Development, there is therefore no potential for adverse in-combination effects on the Humber Estuary SPA/ Ramsar as a result of operational disturbance to functionally linked habitat.

8.0 CONCLUSIONS

8.1.1 The Proposed Development will be constructed on land adjacent to the Humber Estuary SAC/ SPA/ Ramsar site, and will result in the loss of habitat that is considered functionally linked to the SPA/ Ramsar site due to the aggregations of feeding, roosting and loafing waterbirds it supports over the high tide period.

8.1.2 Mitigation for this loss has been delivered through the SHG strategic mitigation approach which has been put in place through the North East Lincolnshire Local Plan (Policy 9). The habitats have been prepared are and in place. It is therefore concluded that the loss of functionally linked habitat within the Site will not result in any adverse effects on the integrity of the Humber Estuary SPA/ Ramsar.

8.1.3 There are two other developments proposed in the area that will result in the loss of functionally linked habitat in the vicinity of the Site (Stallingborough Link Road and Sustainable Transport Fuels Facility), and the potential for likely significant effects was identified at the HRA screening stage. However, these other developments are also committed to the delivery of habitat mitigation through the SHG strategic mitigation route, so it is concluded that there would be no adverse effects on the Humber Estuary SPA/ Ramsar in-combination with the Proposed Development as a result of the losses of functionally linked habitat.

8.1.4 Likely significant effects as a result of noise impacts during construction (primarily associated with drop hammer piling noise) were identified at the HRA screening stage. However, following detailed assessment in ES Volume I (Document Ref. 6.2) Chapter 8: Noise and Vibration, Chapter 10: Ecology and Chapter 17: Cumulative and Combined Effects and, it is concluded that construction noise would not give rise to an adverse effect on the integrity of the Humber Estuary SAC/ SPA/ Ramsar site. This conclusion applies to the Proposed Development alone or in-combination with other plans or projects.

8.1.5 Likely significant effects as a result of noise impacts during operation were also identified at the HRA screening stage. However, following detailed assessment in Chapter 8: Noise and Vibration, Chapter 10: Ecology and Chapter 17: Cumulative and Combined Effects, it is concluded that construction noise would not give rise to an adverse effect on the integrity of the Humber Estuary SAC/ SPA/ Ramsar site, alone or in-combination with other plans or projects.

8.1.6 Likely significant effects as a result of changes in air quality during operation were identified at the HRA screening stage. However, following detailed assessment in Chapter 7: Air Quality, it is concluded that air quality impacts will not result in an adverse effect on the integrity of the Humber Estuary SAC/ SPA/ Ramsar site, alone or in-combination with all other plans or projects that have been assessed to date.

9.0 REFERENCES

European Commission (2007) Guidance Document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Published online:

http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

Planning Inspectorate (2017) Advice Note Ten: Habitats Regulations Assessment Relevant to Nationally Significant Infrastructure Projects, version 4, November 2017

APPENDIX 1: PLANNING INSPECTORATE HRA SCREENING MATRICES

Table 1A.1: Effects Considered Within the Screening Matrices

DESIGNATION	EFFECTS DESCRIBED IN SUBMISSION INFORMATION	PRESENTED IN SCREENING MATRICES AS
Humber Estuary SAC	Deterioration in air quality	Air quality
	Deterioration in water quality during construction or operation	Water quality
Humber Estuary SPA	Displacement of qualifying species using functionally linked habitat	Loss of functionally linked habitat
	Deterioration in water quality during construction or operation	Water quality
	Deterioration in air quality	Air quality
	Disturbance of qualifying species using functionally linked habitat	Noise / visual disturbance
Humber Estuary Ramsar site	Displacement of qualifying species using functionally linked habitat	Loss of functionally linked habitat
	Deterioration in water quality during construction or operation	Water quality
	Deterioration in air quality	Air quality
	Disturbance/ displacement of qualifying species using functionally linked habitat	Noise/ visual disturbance

1A.1 The European sites included within this screening assessment are:

- Humber Estuary SAC;
- Humber Estuary SPA; and
- Humber Estuary Ramsar site.

1A.2 Evidence for, or against, likely significant effects on the European site(s) and its qualifying feature(s) is detailed as necessary within the footnotes to the screening matrices below.

Matrix key:

✓ = Likely significant effect **cannot** be excluded

× = Likely significant effect **can** be excluded

NA = feature not susceptible to potential effect OR is outside the zone of influence

C = construction

O = operation

D = decommissioning

Table 1A.2: Screening Matrix for Humber Estuary SAC

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	AIR QUALITY			AIR QUALITY IN-COMBINATION EFFECTS			WATER QUALITY			WATER QUALITY IN- COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Estuaries	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Mudflats and sandflats not covered by seawater at low tide	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Sandbanks which are slightly covered by seawater all the time	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Coastal lagoons	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Salicornia and other annuals colonizing mud and sand	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a

Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
STAGE OF PROPOSED DEVELOPMENT	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**
Embryonic shifting dunes	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
Shifting dunes along the shoreline with European marram grass (white dunes)	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
Fixed coastal dunes with herbaceous vegetation (grey dunes)	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
Dunes with common sea buckthorn	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
River lamprey	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Sea lamprey	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Grey seal	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a

a. Standard environmental measures to control pollution to the drains during construction, operation and decommissioning will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too). Relevant ES references signposted in Table 5.1: ES Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 (Document Ref. 6.2.10), ES Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18 (Document Ref. 6.2.14) (refer to Appendix 3 for full text)

b. Habitat type not within the zone of influence of dust emissions during construction/ decommissioning and therefore no pathway for likely significant effects. Relevant ES references signposted in Table 5.1: ES Chapter 10: Ecology, paragraph 10.6.4 (Document Ref. 6.2.10); ES Chapter 7: Air Quality, paragraph 7.6.8 Document Ref. 6.2.&) (refer to Appendix 3 for full text)

c. Emissions to air of nutrient nitrogen and NOx will result in increases in the critical levels and loads respectively at the nearest part of the SAC. This pathway is assessed in paragraphs 10.6.55 to 10.6.68 in the ES Volume I, Chapter 10: Ecology (Document Ref. 6.2.10), which concluded no adverse effect on the SAC (refer to Appendix 7 for full text). The Stage 2 Appropriate Assessment conclusion is therefore **no adverse effects on the integrity of the SAC**.

Table 1A.3: Screening Matrix for Humber Estuary SPA

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of Annex I and Annex II non-breeding wildfowl and wading birds	✓a	×	×	✓a	×	×	✓b	×c	×c	×c	×c	×c
Internationally important assemblage of migratory and wintering birds	✓a	×	×	✓a	×	×	✓b	×c	×c	×c	×c	×c

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE DISTURBANCE IN COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of Annex I and Annex II non-breeding wildfowl and wading birds	×d	×d	×d	×d	×d	×d	NA	NA	NA	NA	NA	NA	✓e	×f	×	✓g	✓g	×
Internationally important assemblage of migratory and wintering birds	×d	×d	×d	×d	×d	×d	NA	NA	NA	NA	NA	NA	✓e	×f	×	✓**g**	✓g	×

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the Stage 1 screening due to the *People over Wind* ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation scheme at Cress Marsh. Relevant ES references signposted in Table 5.1: ES Chapter 10: Ecology, paragraphs 10.5.3 to 10.5.5 (impact avoidance) and 10.6.6 to 10.6.7 (assessment) (Document Ref. 6.2.10) (refer to Appendix 3 for full text).

b. Paragraph 10.6.29 of the ES Volume I, Chapter 10: Ecology (Document Ref. 6.2.10) states that there is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats (refer to Appendix 3 for full text). However, there is a risk of visual disturbance to birds using the fields to the south that is functionally linked. This is assessed in paragraphs 10.6.30 to 10.6.32 of the ES Volume I, Chapter 10: Ecology (refer to Appendix 3 for full text).

c. Reasonable to assume that waterbirds are habituated to presence of existing power station; Proposed Development operation not significantly different to this. Relevant ES references signposted in Table 5.1: ES Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32 (Document Ref. 6.2.10) (refer to Appendix 3 for full text).

d. Standard environmental measures to control pollution to the drains during construction, operation and decommissioning will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too). Relevant ES references signposted in Table 5.1 (construction, and also relevant to decommissioning): ES Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 (Document Ref. 6.2.10); Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18 (Document Ref. 6.2.14) and Table 5.2 (operation): ES Chapter 10: Ecology, paragraphs 10.6.70 – 10.6.71 (Document Ref. 6.2.10) (refer to Appendix 3 for full text).

e. Paragraphs 10.6.8 to 10.6.27 in ES Volume I, Chapter 10: Ecology (Document Ref. 6.2.10)states that piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site (refer to Appendix 3 for full text). Mitigation measures are proposed (to be secured by DCO requirement).

f. Predicted operational noise levels are within ambient range at the nearest part of the SPA/ Ramsar, and the fields to the north and south which are functionally linked. Relevant ES references signposted in Table 5.2: ES Chapter 10: Ecology, paragraphs 10.6.76 – 10.6.77 (Document Ref. 6.2.10); Chapter 8: Noise and Vibration Table 8.31 and paragraphs 8.6.39, 8.6.41, 8.6.42 and 8.6.44 (Document Ref. 6.2.8) (refer to Appendix 4 for full text).

g. Table 6.1 identifies two developments that could potentially result in likely significant effects in combination with the Proposed Development.

Table 1A.4: Screening Matrix for Humber Estuary Ramsar Site

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Internationally important populations of non-breeding wildfowl and waders	✓a	×	×	✓a	×	×	✓b	×f	×f	✓b	×f	×f

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE DISTURBANCE IN COMBINATION EFFECTS		
Stage of Proposed Development	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons	×c	×c	×c	×c	×c	×c	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Grey seal	×c	×c	×c	×c	×c	×c	NA	NA	NA	NA	NA	NA	×e	×e	×e	×e	×e	×e
Natterjack toad	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Internationally important populations of non-breeding wildfowl and waders	×c	×c	×c	×c	×c	×c	NA	NA	NA	NA	NA	NA	✓d	×f	×f	Xh	Xh	Xh

Migrating river lamprey and sea lamprey	✕c	✕c	✕c	✕c	✕c	✕c	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the Stage 1 screening due to the *People over Wind* ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation scheme at Cress Marsh.

b. Paragraph 10.6.29 of the ES Volume I, Chapter 10: Ecology (Document Ref. 6.2.10) (refer to Appendix 3 for full text) states that there is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats. However, there is a risk of visual disturbance to birds using the fields to the north and south that are functionally linked. However the assessment in the ES concludes that this will not be significant. Similarly, no significant in combination effects were identified.

c. Paragraphs 10.6.33 to 10.6.35 of the ES Volume I, Chapter 10: Ecology (Document Ref. 6.2.10) (refer to Appendix 3 for full text) state that standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too) during construction, operation and decommissioning.

d. Paragraphs 10.6.8 to 10.6.28 of the ES Volume I, Chapter 10: Ecology (Document Ref. 6.2.10) (refer to Appendix 3 for full text) states that piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site. The assessment concluded that the elevated noise levels would not be sufficiently loud to displace waterbirds.

e. Feature is not within the zone of influence and is therefore screened out. The nearest grey seal breeding colony is over 30 km to the east at Donna Nook.

f. Reasonable to assume that waterbirds are habituated to presence of existing power station; Proposed Development operation not significantly different to this. Relevant ES references signposted in Table 5.1: ES Chapter 10: Ecology, Paragraphs 10.6.30 to 10.6.32 (Document Ref. 6.2.10) (refer to Appendix 3 for full text).

APPENDIX 2: PLANNING INSPECTORATE HRA INTEGRITY MATRICES

2A.1 Where Likely Significant Effects (LSE) upon the sites were identified in the screening stage, the sites have been subject to further assessment in order to establish if the NSIP could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below, with references to mitigation as necessary.

Matrix Key

✓ = Adverse effect on integrity cannot be excluded

× = Adverse effect on integrity can be excluded

C = construction

O = operation

D = decommissioning

Table 2A.1: Integrity Matrix for Humber Estuary SAC

QUALIFYING FEATURES	**ADVERSE EFFECT ON INTEGRITY**											
EFFECT	**AIR QUALITY**			**AIR QUALITY IN COMBINATION EFFECTS**			**WATER QUALITY**			**WATER QUALITY IN COMBINATION EFFECTS**		
STAGE OF PROPOSED DEVELOPMENT	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**
Embryonic shifting dunes		× [a]			× [b]							
Shifting dunes along the shoreline with European marram grass (white dunes)		× [a]			× [b]							
Fixed coastal dunes		× [a]			× [b]							

with herbaceous vegetation (grey dunes)												
Dunes with common sea buckthorn		✗ a			✗ b							

a. Emissions to air of nutrient nitrogen and NOx will result in increases in the critical levels and loads respectively at the nearest part of the SAC. This pathway is assessed in paragraphs 10.6.57 to 10.6.66 in the ES,which concluded no adverse effect on the SAC. The Stage 2 Appropriate Assessment conclusion is therefore **no adverse in-combination effects on the integrity of the SAC**.

b. The in-combination assessment for air quality is presented in ES Volume I Chapter 17: Cumulative and Combined Effects paragraphs 17.5.12 to 17.5.15 and paragraphs 17.8.6 to 17.8.15 (Document Ref. 6.2.17) and detailed in Appendix 7A in ES Volume III (Document Ref. 6.4.5) (refer to Appendix 6 for full text). The assessment has concluded that there would be no adverse in-combination air quality effects on the Humber Estuary SAC/ SPA/ Ramsar, and it is considered that the assessment is sufficient to conclude that there would be **no adverse in-combination effects on the integrity of the SAC**.

Table 2A.2: Integrity Matrix for Humber Estuary SPA

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of Annex I and Annex II non-breeding wildfowl and wading birds	×[a]			×[a]			×[b]					
Internationally important assemblage of migratory and wintering birds	×[a]			×[a]			×[b]					

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE DISTURBANCE IN COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of Annex I and Annex II non-breeding wildfowl and wading birds													×[c]			×[d]	×[d]	
Internationally important assemblage of migratory and wintering birds													×[c]			×[d]	×[d]	

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the Stage 1 screening due to the People over Wind ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. With this mitigation in place, it is concluded that there will be **no adverse effect on the integrity of the SPA**. Relevant ES references signposted in Table 5.1: ES Chapter 10: Ecology, Paragraphs 10.5.3 to 10.5.5 (impact avoidance) and 10.6.6 to 10.6.7 (assessment) (Document Ref. 6.2.10) (refer to Appendix 3 for full text). This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation scheme at Cress Marsh. The relevant assessment is set out in Paragraphs 17.8.1 to 17.8.3 of ES Chapter 17 (Cumulative and Combined Effects) (Document Ref. 6.2.17) (refer to Appendix 6 for full text). .

b. Paragraph 10.6.29 of the ES Chapter 10 (Document Ref. 6.2.10) (refer to Appendix 3 for full text) states that there is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats. However, there is a risk of visual disturbance to birds using the field to the south that is functionally linked. This is assessed in paragraphs 10.6.30 to 10.6.32 of the ES (refer to Appendix 3 for full text), and it is therefore concluded at the Stage 2 Assessment that there will be **no adverse effect on the integrity of the SPA**.

c. Paragraphs 10.6.8 to 10.6.28 of ES Chapter 10 (Document Ref. 6.2.10) (refer to Appendix 3 for full text) states that piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site. Mitigation measures are proposed (to be secured by DCO requirement) (see paragraphs 10.7.2 to 10.7.3 of the ES (refer to Appendix 5 for full text)). The Stage 2 Appropriate Assessment therefore concludes that there will be **no adverse effect on the integrity of the SPA**.

d. Table 6.1 identifies two developments that could potentially result in likely significant effects in combination with the Proposed Development. However, any displacement of birds will be offset by the mitigation habitat delivered at Cress Marsh, and therefore it is concluded in the Stage 2 Appropriate Assessment that there will be **no adverse effect on the integrity of the SPA**. The relevant assessment is set out in paragraphs 17.8.1 to 17.8.3 of ES Chapter 17: Cumulative and Combined Effects (Document Ref. 6.2.17) (refer to Appendix 6 for full text).

Table 2A.3: Integrity Matrix for Humber Ramsar site

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Internationally important populations of non-breeding wildfowl and waders	×[a]			×[a]			×[b]			×[b]		

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE DISTURBANCE IN COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Internationally important populations of													×[c]			× d		

non-breeding wildfowl and waders																		
Estuarine habitats including dune systems, intertidal mud and sand flats, saltmarshes and brackish lagoons.								×e	×f									

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the Stage 1 screening due to the People over Wind ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. With this mitigation in place, it is concluded that there will be **no adverse alone or in-combination effect on the integrity of the Ramsar**. Relevant ES references signposted in Table 5.1: Chapter 10: Ecology, Paragraphs 10.5.3 to 10.5.5 (impact avoidance) and 10.6.6 to 10.6.7 (assessment) (refer to Appendix 3 for full text). This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation scheme at Cress Marsh. The relevant assessment is set out in Paragraphs 17.8.1 to 17.8.3 of Chapter 17 (Cumulative and Combined Effects) Document Ref. 6.2.17 (refer to Appendix 6 for full text).

b. Paragraph 10.6.29 of ES Chapter 10 (Document Ref. 6.2.10) (refer to Appendix 3 for full text) states that there is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats. However, there is a risk of visual disturbance to birds using the field to the south that is functionally linked. However the assessment in the ES concludes that this will not be significant, and therefore the Stage 2 Appropriate Assessment has concluded that there will be **no adverse in-combination effect on the integrity of the Ramsar**. Similarly, no significant in combination effects were identified.

c. Paragraphs 10.6.8 to 10.6.28 of ES Chapter 10 (Document Ref. 6.2.10) (refer to Appendix 3 for full text) states that piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site. Mitigation measures are proposed (to be secured by DCO requirement) (see ES paragraphs 10.7.2 to 10.7.3 (refer to Appendix 6 for full text)). The Stage 2 Appropriate Assessment therefore concludes that there will be **no adverse in-combination effect on the integrity of the Ramsar**.

d. The cumulative combined (in-combination) noise and vibration assessment presented in Chapter 17: Cumulative and Combined Effects (ES Volume I, Document Ref. 6.2.17) concludes that the construction of the Proposed Development at the same time as the construction or use of the other developments would not result in a significant in-combination noise effect on functionally linked fields to the north and south of the Proposed Development. As described above the other developers will commit to commuting sums of money to enable mitigation habitat to be created. With this mitigation providing alternative bird habitat, and taking into account the proposed contributions to the SHG strategic mitigation scheme, there is therefore **no potential for cumulative adverse in-combination effects on the Humber Estuary Ramsar**.

e. Emissions to air of nutrient nitrogen and NOx will result in increases in the critical levels and loads respectively at the nearest part of the SAC. This pathway is assessed in paragraphs 10.6.57 to 10.6.66 in the ES (Document Ref. 6.2.10),which concluded no adverse effect on the SAC. The Stage 2 Appropriate Assessment conclusion is therefore **no adverse effects on the integrity of the Ramsar**.

f. The in-combination assessment for air quality is presented in ES Volume I Chapter 17: Cumulative and Combined Effects paragraphs 17.5.12 to 17.5.15 and paragraphs 17.8.6 to 17.8.15 (Document Ref. 6.2.17) and detailed in Appendix 7A in ES Volume III (Document Ref. 6.4.5) (refer to Appendix 6 for full text). The assessment has concluded that there would be no adverse in-combination air quality effects on the Humber Estuary SAC/ SPA/ Ramsar, and it is considered that the assessment is sufficient to conclude that there would be **no adverse in-combination effects on the integrity of the Ramsar**.

APPENDIX 3: KEY ES CHAPTER TEXT CROSS REFERENCED IN TABLE 5.1 LIKELY SIGNIFICANT EFFECTS DURING CONSTRUCTION AND TABLE 5.3 LIKELY SIGNIFICANT EFFECTS DURING DECOMMISSIONING.

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Signposting Document. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 7: Air Quality (Document Ref. 6.2.7)

Section 7.6: Likely Impacts and Effects

Assessment of Construction Dust

7.6.8 The Humber Estuary Ramsar site, SPA and SAC is greater than 50 m from the construction works associated with the Proposed Development, therefore an assessment of demolition and construction dust on ecological receptors has been screened out.

Extracts from ES Chapter 8: Noise and Vibration (Document Ref. 6.2.8)

Section 8.6: Likely Impacts and Effects

Construction Noise Effects

8.6.14 At Receptor R3 (Humber Estuary), predicted noise levels during all but one construction activity (drop hammer piling) fall below the daytime ambient noise level of 58 dB LAeq so no impact is predicted. During drop hammer piling works, noise levels at R3 are predicted to exceed the daytime ambient noise level by up to 4 dB. In addition, the type of noise being emitted by drop hammer piling (regular impulsive high noise levels) may be considered as more disturbing to birds. Considering the position of the birds (on mudflats behind the existing flood defence embankment), the ecological impact assessment considers the effect on birds to be minor adverse (not significant) (see Chapter 10: Ecology).

8.6.15 At the ecological Receptor areas R4 (field to the south of the Site) and R5 (field to the north of the Site), noise from construction works varies across each area depending on the proximity to the Site. At the parts of these fields (R4 and R5) closest to the Site, daytime ambient noise levels are exceeded by up to 21 dB. At the parts of these fields (R4 and R5) furthest from the Site, noise levels are predicted to fall below daytime ambient noise levels. The greatest noise impact at Receptor areas R4 and R5 is predicted to occur during piling works. The ecological impact assessment in Chapter 10: Ecology concludes that the majority of waterbirds will be located towards the central and eastern parts of the southern field (R4) where the effect of piling noise on birds at R4 is assessed to be moderate adverse (significant) if piling takes place within the winter months when the highest aggregations of waterbirds are present in the field (September to March inclusive). Mitigation

of this potential effect is discussed further in Section 8.7 below, Chapter 10: Ecology Section 10.7, and the Habitats Regulations Assessment Signposting Report (Document Ref 5.8). The ecological impact assessment concludes that the effect on waterbirds using the fields to the north of the Site (R5), where the predicted piling noise levels are lower, will be minor adverse (not significant) even if piling takes place within the winter months (see Chapter 10: Ecology).

Construction Vibration

8.6.20 It has been assumed for the purposes of a worst case assessment that drophammer piling will be required. This type of piling produces much higher levels of groundborne vibration compared to other piling methods. However, given the significant distance to residential receptors (>500 m), no significant vibration (medium or high magnitude impacts) is expected to result from the construction of the Proposed Development at residential receptors. Vibration effects upon residential receptors are therefore not expected to exceed the LOAEL.

8.6.21 Sensitive receptors at the Humber Estuary and the fields located to the south and north of the Site may be adversely affected from vibration during piling. Estimated vibration levels at the Humber Estuary and ecological Receptor areas R4 (field south of the Site) and R5 (field north of the Site) are given in Table 8.25 below.

Table 8.25 Predicted vibration levels at ecological areas from drop-hammer piling

RECEPTOR	DISTANCE FROM PILING WORKS (M)	ESTIMATED VIBRATION LEVEL PPV MMS^{-1}	MAGNI-TUDE OF IMPACT	RECEP-TOR SENSI TIV-ITY	CLASSIFIC-ATION OF EFFECT
R3 – Humber Estuary	500	0.34	Low	High	Minor adverse
R4 – field south of Site	100 - 615	<0.34 to 2.7	Low to Medium	High	Minor to moderate adverse
R5 – field north of Site	75 to 490	<0.34 to 4.3	Low to Medium	High	Minor to moderate adverse

8.6.22 The classification of vibration effects described in Table 8.25 above and discussed below is based on standards and guidance for human receptors in the absence of standards or guidance for assessment of vibration effects on ecological receptors.

8.6.23 The estimated vibration levels at the Humber Estuary are predicted to result in a low magnitude of impact, resulting in a minor adverse (not significant) effect. Although vibration levels may just be perceptible, vibration will be caused along the Estuary from the breaking of waves and will likely mask vibration incident along the Humber Estuary.

8.6.24 At Receptors R4 (field south of the Site) and R5 (field north of the Site), vibration levels at the closest part of the field to the piling works are estimated to result in a moderate adverse (significant) effect, and at locations further from the construction works, the significance of effect is estimated to be minor adverse (not significant). The effects of vibration from piling on birds using these fields will be the same as described for piling noise in paragraphs 8.6.14 and 8.6.15 above, and the mitigation is the same (see Section 8.7 and Chapter 10: Ecology Section 10.7).

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.5: Development Design and Impact Avoidance

Construction: Measures to Avoid Impacts on the Humber Estuary SPA/ Ramsar

10.5.3 The calculation of the sum of money required for the application of Policy 9 to the Proposed Development (to contribute towards the SHG strategic mitigation land that has been delivered at Cress Marsh, which is part of a wider package of 120 ha of strategic mitigation land to be delivered in the SHG region for the SHIIP) was undertaken for the Consented Development. The same will apply to the Proposed Development as the area of land to be lost is the same. This ensures that the loss of functionally linked land within the footprint of the Proposed Development will not result in adverse effects on the integrity of the Humber Estuary SPA/ Ramsar, and is therefore compliant with the Habitat Regulations see HRA Signposting Report (Document Ref. 5.8).

10.5.4 The total sum of money to be commuted to NELC to contribute to the SHG mitigation scheme is calculated as follows: Site Area^3 x £11,580. The financial contribution for the Consented Development was secured by a Section 106 agreement and this provision would be varied to ensure that the financial contribution would also be secured for the Proposed Development (although the sum would only need to be paid once, for either the Consented Development or the Proposed Development, as explained above).

10.5.5 In addition, a close board fence approximately 2.5 m in height will be installed along part of the southern boundary of the Site (see Figure 4.2 in ES Volume II, Document Ref. 6.3), to provide visual screening during construction and operation to the adjacent field to the south (Field 37). This field has been identified as a key high tide roost for SPA/ Ramsar waterbirds, and the eastern portion of the field is allocated as part of the SHG strategic mitigation package for the SHIIP (referred to in the SHIIP documents as 'Mitigation Site C').

Section 10.6: Likely Impacts and Effects

Construction

10.6.4 The following potential source-receptor pathways have been scoped out of the impact assessment:

- dust smothering of habitats within the Humber Estuary SAC/ SSSI – there are no terrestrial SAC/ SSSI habitats within the zone of influence of fugitive dust emissions during the construction phase, which is reasonably expected to be very small (see Chapter 7: Air Quality). The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Main Development Area, and at this distance no dust smothering would be anticipated;
- noise/ visual disturbance to SPA/ Ramsar qualifying breeding bird species (bittern, marsh harrier, avocet and little tern) – there is no suitable habitat for the qualifying species of breeding birds within the potential zone of influence of noise and visual disturbance arising from the construction of the Proposed Development. There is therefore no pathway by which these features could be affected by the construction of the Proposed Development;
- noise/ visual disturbance to birds within the SHG mitigation area at Cress Marsh, which is approximately 500 m south-west of the Main Development Area – all construction activities will be on the eastern side of the SHBPS, which provides screening of the construction works to waterbirds using the Cress Marsh mitigation area.
- vibration impacts on the Humber Estuary SPA/ Ramsar – this pathway was scoped out of assessment based on distance and baseline conditions (see Chapter 8: Noise and Vibration); and
- air quality impacts on intertidal and subtidal habitats in the SAC/ SSSI – intertidal habitats are not susceptible to the effects of changes in air quality arising from construction (through dust deposition and smothering of habitats) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

10.6.5 Impacts during the construction period that have potential to result in significant effects on relevant ecological features, and which were screened into the impact assessment, are considered further below:

- potential effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI (loss of functionally linked habitat for wintering birds, noise/ vibration and visual disturbance and surface water pollution);
- loss of semi-improved neutral grassland;
- potential effects on aquatic invertebrates (loss/ damage to habitat and surface water pollution);
- potential effects on Schedule 1 breeding birds (disturbance), specifically peregrine falcon;

- potential effects on water vole (loss/ damage to habitat, noise and visual disturbance); and
- potential effects on otter (loss/ damage to habitat, noise and visual disturbance).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Loss of High Tide Roosting/ Loafing/ Feeding Habitat that is Functionally Linked to the SPA/ Ramsar

10.6.6 Although the habitat within the Site boundary has been demonstrated to support low numbers of SPA/ Ramsar waterbirds, and there have been no recorded aggregations above 1% of the Humber Estuary threshold, a precautionary approach has been applied to the Proposed Development because it lies within the Mitigation Zone to which Policy 9 is applicable. This states that *"…proposals which adversely affect the Humber Estuary SPA/ Ramsar site due to the loss of functionally linked land will normally be required to provide their own mitigation in order to comply with the requirements of the Habitats Regulations"*.

10.6.7 To ensure Habitats Regulations compliance for the Proposed Development, it has been assumed that the land within the Proposed Development boundary is 'functionally linked' to the Humber Estuary SPA/ Ramsar. This policy has therefore been applied to the Site and the Proposed Development. Taking into account this embedded mitigation, the Proposed Development is assessed to give rise to a neutral effect on the Humber Estuary SPA/ Ramsar as a result of the loss of functionally linked habitat

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage at Pyewipe Mudflats

10.6.8 A noise impact assessment has been completed, and baseline monitoring and noise modelling undertaken to determine whether the Proposed Development would result in any construction phase noise impacts on waterbirds in the nearest part of the Humber Estuary SPA/ Ramsar (see Chapter 8: Noise and Vibration), which is at the Pyewipe mudflats (represented by Receptor R3 on Figure 8.1 in ES Volume II, Document Ref. 6.3). The dB LAeq,1h values provide an 'average' of noise levels expected to occur in any one hour as a result of each activity. Such 'continuous equivalent noise levels' form the basis of most noise assessment protocols, but are of limited relevance when considering the effect of noise on waterbirds because waterbirds are perceived to be more susceptible to being disturbed by short, sharp 'peaks' of noise e.g. during piling (IECS, 2009). Therefore, for piling activities, the LAmax values have been predicted at the nearest sensitive receptors to provide an indication of the likely 'peak' noise events so that they can be compared to the ambient conditions.

10.6.9 Ambient noise levels at noise receptor R3 (on the seawall at the edge of the Humber Estuary SPA/ Ramsar boundary) were recorded at 47 – 53 dB LAeq,T (see Table 8.14 in Chapter 8: Noise and Vibration). The main

sources of noise at this location were found to be waves breaking along the shoreline and birdsong. Occasional vehicle usage along the top of the sea wall (motorbikes and quad bikes) resulted in an increase in ambient noise, with a peak noise range of 51.3 – 77.7 dB LAFMax15 min.

10.6.10 Predicted noise levels for the majority of construction activities at R3 were predicted to be within the range 47 – 52 dB LAeq,1hr, which is within the ambient range at the nearest part of Pyewipe mudflats. There will therefore be no discernible change in the noise levels reaching the Humber Estuary SPA/ Ramsar during the majority of the construction phase of the Proposed Development.

10.6.11 The noisiest construction activity that potentially could be used is drop hammer piling, which the modelling predicts will result in noise levels of 62 dB LAeq,1hr at R3, which represents an exceedance in the ambient noise level by up to 4 dB. In addition, the type of noise being emitted by drop hammer piling (regular impulsive high noise levels) may be considered as more disturbing to birds. An estimation of the peak noise from drop hammer piling activity results in predicted levels of 75 dB LAmax at the nearest part of the Estuary. This is significantly higher than the ambient noise level at the measured location on the edge of the Estuary, although as discussed above it is reasonable to assume that there would be some attenuation due to the topography of the seawall, and the fact that the mudflats are below the level of the measured receptor location.

10.6.12 Previous studies such as IECS (1999) and ERM (1996) have demonstrated that birds occupying mudflats elsewhere in the Estuary, such as the Salt End and Pyewipe mudflats, are relatively tolerant of piling noise levels (e.g. marine piling to construct new jetties). Based on bird behaviour and noise monitoring studies undertaken by Xodus Group during construction piling for the Grimsby River Terminal (Xodus Group 2012), the significance criteria for disturbance to birds are summarised below:

- ≤ 65 dB LAmaxF – negligible;
- > 65 to ≤ 75 dB LAmaxF – minor adverse;
- > 75 to ≤ 85 dB LAmaxF – moderate adverse; and
- > 85 dB LAmaxF – major adverse.

10.6.13 The significance levels in the Xodus study were determined based on the visible responses of waterbirds to noise stimuli and included a variety of behaviours including a ‘heads-up’ response, physical movement on the ground away from the disturbance source and taking flight.

10.6.14 Predicted noise levels across the nearest mudflats are within the range 52-62 dB LAeq,1hr, depending on the piling technique used which represents an exceedance in the ambient noise level by up to 4 dB. However, the peak noise clearly results in a much greater increase in baseline noise levels to which waterbirds may be more susceptible. It is therefore reasonable to conclude that noise impacts (taking into account the regular impulsive nature

of drop hammer piling noise, and thus its higher likelihood of disturbance to birds) would result in a minor adverse effect on waterbirds at Pyewipe Mudflats that is not significant.

10.6.15 If CFA piling was to be undertaken instead of drop hammer piling, noise levels will be reduced to 50 dB LAeq,1h at R3, falling below the ambient noise level at this location. Peak noise levels will also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There will therefore be no discernible change in the noise levels reaching the Humber Estuary SPA/ Ramsar during the majority of the construction phase of the Proposed Development if CFA piling is used.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Noise/ Vibration Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Field to the South

10.6.16 The noise impact assessment also considers the potential for noise and vibration impacts during construction on the fields to the south of the Proposed Development (i.e. field 37), which although outside the boundary of the Humber Estuary SPA/ Ramsar is considered to be functionally linked due to the important aggregations of wintering waterbirds present (see Chapter 8: Noise and Vibration).

10.6.17 Baseline noise levels were monitored along the southern edge of the Proposed Development at location LT3. This therefore represents the nearest part of the field 37 to the Proposed Development, and is considered to be the worst case for assessment of effects on this receptor because in reality, the majority of waterbirds will be orientated towards the centre of the field/ towards the eastern edge that borders the Estuary (for predator avoidance reasons).

10.6.18 Noise at this location was generally dominated by noise from the SHBPS, as well as noise from the associated cooling water pumping station and the adjacent chemical plant (Synthomer). Ambient noise levels were in the range 47 – 53 $L_{Aeq,T}$ and 49 – 65 dB L_{AFmax}.

10.6.19 Predicted noise levels arising from construction at this location are in the range 42 – 73 dB $L_{Aeq,1hr}$, at the nearest modelled receptors (on the boundary fence), with the noisiest activity assessed, as expected, being the drop hammer piling. This represents an increase of up to 20 dB on the ambient noise levels, which is a significant increase. However, this would be the worst case scenario, with the modelled receptors being right on the boundary fence. In reality, most waterbirds would be located towards the central and eastern portions of this field (closer to the Estuary), and would therefore be further away from the noise source. The estimated noise levels at various points across the field have therefore been examined to establish the proportion of the field that would be subject to construction noise levels in excess of ambient levels. Vibration associated with drop hammer piling is also assessed in Section 8.6 of Chapter 8: Noise and Vibration in ES Volume I and the same approach has been applied to the assessment of effects on birds.

10.6.20 In the centre of field 37, noise from the drop hammer piling activities is predicted to be 62 dB LAeq,1hr, which is still in excess of the ambient noise level. Peak noise resulting from drop hammer piling is estimated to be 76 dB LAmax, which is within the 'moderate adverse' disturbance threshold based on the Xodus study considered earlier in this assessment. At even the furthest receptors, estimated peak noise levels are in the range 69 – 70 dB LAmax, which would be expected to also result in 'minor adverse' disturbance. For all other construction activities, noise will have attenuated to within the ambient range at this distance from the Proposed Development, and it is reasonable to conclude that the other construction activities would not result in the disturbance or displacement of waterbirds feeding, roosting and loafing in field 37.

10.6.21 In the absence of mitigation, it is therefore assessed that piling noise and vibration associated with construction will likely result in disturbance to birds feeding, roosting and loafing in field 37, if this takes place within the winter months when the highest aggregations of waterbirds are present in the field (September to March inclusive). This may result in displacement of birds within this field i.e. birds choose to move further away from the source of the noise but remain within the field (e.g. moving further south and east), or displacement of birds from this field entirely. This may result in increased energy expenditure as birds are spending more time flying between the mudflats and high tide roosts, and reduced feeding time as they are using more time and energy to find high tide roosting, loafing and feeding sites. This may have adverse effects on body condition and winter survival rates.

10.6.22 It is therefore assessed that in the absence of mitigation, drop hammer piling noise and vibration has the potential to cause moderate disturbance to waterbirds in field 37, and this is assessed as giving rise to a moderate adverse effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar, which is significant. Mitigation is discussed in Section 10.7.

10.6.23 However, if CFA piling is used instead of drop hammer piling, noise levels will be reduced significantly (44 - 59 dB LAeq,1h). Peak noise levels will also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There will therefore be no discernible change in the noise levels reaching the qualifying SPA/ Ramsar wintering bird assemblage in the field to the south of the Main Development Area during the majority of the construction phase of the Proposed Development if CFA piling is used.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Noise/ Vibration Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Fields to the North

10.6.24 Fields to the north of the Proposed Development on the north side of South Marsh Road (fields 30 and 31) have also been scoped into the noise and vibration impact assessment, because they are considered to be functionally linked to the Humber Estuary SPA/ Ramsar due to the aggregations of wintering birds they support. These fields are expected to experience

typically higher ambient noise levels than those to the south, as a result of HGV and other vehicle movements along South Marsh Road and Hobson Way, which runs along the western boundary of field 30.

10.6.25 The central point of these two fields is approximately 400 m north-west for the nearest part of the Proposed Development. For all construction activities except the drop hammer piling, noise levels will have attenuated to within the ambient range at this distance from the works, and would therefore not be reasonably expected to displace waterbirds in fields 30 and 31. Vibration from drop hammer piling also decreases with distance from the piling location.

10.6.26 For drop hammer piling, the predicted noise level at the centre of the fields is 59 dB $L_{Aeq,1hr}$, which is slightly higher than the ambient noise level. Peak noise levels are estimated to be 72 dB L_{Amax} at this location, which is within the threshold for 'minor adverse' disturbance effects based on the Xodus study previously referred to in this chapter. This may result in some localised displacement of waterbirds within the field, should the drop hammer piling activity overlap with the wintering period when birds are present. However, it is considered that the noise levels are not sufficiently high to result in complete displacement from the fields, particularly given that the southern and western extents of these fields (particularly field 30) are subject to relatively high ambient noise levels as a result of traffic along Hobson Way and South Marsh Road.

10.6.27 It is assessed that, in the absence of mitigation, drop hammer piling noise and vibration has the potential to cause minor disturbance to waterbirds in fields 30 and 31, and this is assessed as giving rise to a minor adverse effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar, which is not significant.

10.6.28 However, if CFA piling is used instead of drop hammer piling, noise levels will be reduced significantly (42 - 62 dB $L_{Aeq,1h)}$. Peak noise levels will also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There will therefore be a slight increase above ambient in the noise levels reaching the qualifying SPA/ Ramsar wintering bird assemblage in the field to the north of the Main Development Area during the majority of the construction phase of the Proposed Development with CFA piling, however this is within the threshold for negligible disturbance effects based on the Xodus study previously referred to in this chapter.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Visual Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage at Pyewipe Mudflats

10.6.29 Given the distance of the Proposed Development from the Pyewipe mudflats, and the fact that construction will be set against the backdrop of the adjacent SHBPS, waterbirds feeding, roosting or loafing within the boundary of the SPA/ Ramsar. Furthermore, the substantial flood embankment wall will provide screening of construction activities to birds present on the mudflats/ shoreline. It is assessed that the Proposed Development will not result in any

visual disturbance to waterbirds within the boundary of the Humber Estuary SPA/ Ramsar.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Visual Disturbance to Qualifying Wintering Bird Assemblage in Adjacent Field to the South

10.6.30 The nature and scale of the construction activities associated with the Proposed Development will be set against the backdrop of the SHBPS, and will therefore not represent a significant change in the type of structures already present in habitats adjacent to fields used by waterbirds. Regardless of this, it is difficult to predict with any degree of certainty what the response of waterbirds will be to changes in the visual environment. It is reasonable to assume that such birds are resilient to changes that do not directly affect habitats within which they are feeding, roosting and loafing, because they are present in a dynamic and highly commercial environment associated with the busy Humber Estuary. This includes the presence of tall structures such as power stations, bulk handling facilities, jetties and cranes, and the movement of large commercial vessels in and out of the nearby ports of Immingham and Grimsby.

10.6.31 As a precaution, a c.2.5 m high close board fence will be installed along part of the southern boundary of the Site (see Figure 4.2 in ES Volume II, Document Ref. 6.3) during the establishment of the construction site to provide visual screening from vehicle and personnel movements to any waterbirds feeding, roosting or loafing in the field.

10.6.32 Visual impacts on waterbirds feeding, roosting and loafing in the field to the south are, with this mitigation in place, therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Surface Water Pollution to Habitats

10.6.33 The ditches within the Site boundary currently capture surface water run-off and divert it to either Oldfleet Drain (to the south of the Site) or Middle Drain (to the north of the Site), from where it is discharged into the Humber Estuary. In the absence of mitigation, there is therefore the potential for contaminated surface water run-off to enter the drainage system and ultimately the Estuary. These pathways are considered in Chapter 14: Water Resources, Flood Risk & Drainage.

10.6.34 However, potential pollution (with sediment or contaminants) arising from surface water run-off from within the Site during construction will be controlled through the adoption of standard best practice construction methods to meet environmental requirements. This may include temporary measures to attenuate surface water run-off (e.g. SUDS, containment lagoon or similar), the use of drip trays beneath plant and/ or bunding of fuel or oil tanks and the use of double skinned fuel or oil tanks to minimise the risk of spillage. These measures will be detailed in the CEMP, and a pollution plan

will be prepared to deal with an accidental pollution event. These are measures which are put in place as standard on similar construction projects and are not included here specifically to avoid an effect on the Humber Estuary.

10.6.35 It is reasonable to conclude that, with these measures in place, there is a negligible risk of surface water pollution to the Estuary during the construction phase. This is assessed as a neutral effect on the Humber Estuary SAC/ SPA/ Ramsar/ SSSI designated habitats, and the ecology features they support (waterbirds, sea lamprey, river lamprey and grey seal).

10.6.91 The extent of habitat loss that is likely to be required during decommissioning is likely to be much less than at construction (i.e. no further habitat loss), and the resulting effects on ecological features are therefore likely to be reduced. As described in Section 10.9, appropriate pre-works surveys and mitigation or impact avoidance measures will be implemented for the decommissioning phase as necessary.

10.6.92 In a number of cases impacts associated with the decommissioning phase of the Proposed Development are likely to be of a similar nature to those associated with the construction phase, because the decommissioning methodology will be of a similar impact level to that of construction in terms of noise, vibration, and air quality. As a result the potential effects on ecological features are not anticipated to differ significantly from those predicted at construction.

Extracts from ES Chapter 14: Water Resources, Flood Risk and Drainage (Document Ref. 6.2.14)

Section 14.6: Likely Impacts and Effects

Construction: Potential Impact C – Pollution of surface watercourses within or near the Proposed Development Site during construction due to spillages or polluted surface water runoff entering the watercourse

14.6.18 Humber Estuary (considered ‘High’ importance (see Table 14.)) receives water indirectly via the land drains and then then Middle Drain and Middle Drain pumping station and Oldfleet Drain and its tidal flapped outfall. Therefore, the nature of the effect of the construction activity on the Humber Estuary is assessed as ‘Negligible’: with low probability, reversible and short term adverse effects on the water quality. Given the likely character of the Humber Estuary is ‘High’ and the nature of the effects is ‘Negligible’, the likely significance of the effects from this construction activity is ‘Negligible’.

APPENDIX 4: KEY ES CHAPTER TEXT CROSS REFERENCED IN TABLE 5.2: LIKELY SIGNIFICANT EFFECTS DURING OPERATION

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Signposting Document. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 7: Air Quality (Document Ref. 6.2.7)

Section 7.6: Likely Impacts and Effects

Impacts on Ecological Receptors

7.6.32 The impact of process contributions of point source emissions at ecological receptors has been determined from the maximum model output at discrete receptor locations. The process contribution to Critical Level values (predicted from operation of the plant at BAT-AEL ELVs) have been compared with Critical Level and Critical Load values at each of the identified sensitive ecological receptors. As described at paragraph 7.3.40, Critical Levels are atmospheric concentrations and Critical Loads relate the pollutant deposition on the ground.

7.6.33 The significance of effects associated with emissions from the Proposed Development on designated nature conservation sites (in particular nitrogen oxides, ammonia (having impact through nutrient nitrogen and acid deposition) and sulphur dioxide) are discussed in Chapter 10: Ecology. In summary:

- in terms of NOx and nutrient nitrogen deposition, at the closest sensitive receptor within the Humber Estuary designated site (an area of saltmarsh approximately 400 m south-east of the Site), the PC is predicted to exceed the 1% increase threshold, triggering further assessment, but the total NOx and nutrient nitrogen deposition levels do not exceed the Critical Levels so no significant effects are anticipated;
- the 1% increase threshold is not exceeded for NOx or nutrient nitrogen deposition at any of the other assessed receptor locations within the Humber Estuary designated site, so no further assessment was required and significant effects are not predicted; and
- no exceedances of the 1% increase threshold are identified for acid deposition or sulphur dioxide at any of the assessed receptor locations within the Humber Estuary designated site, so no significant effects are predicted.

7.6.34 The assessment concludes that the Proposed Development will not give rise to significant adverse air quality effects on sensitive habitats within the Humber Estuary SPA/ SAC/ Ramsar site/ SSSI.

Extracts from ES Chapter 8: Noise and Vibration (Document Ref. 6.2.8)

Section 8.6: Likely Impacts and Effects

Operational Noise Levels at Ecological Sites

8.6.39 Predicted operational noise levels at ecological sites close to the Proposed Development (R3- Humber Estuary, R4- field to south of the Site and R5- field to north of the Site) during the three operational scenarios are given in Tables 8.30 to 8.32. A noise contour map illustrating predicted noise levels at the Humber Estuary and the fields to the north and south of the Site during the worst-case night-time hour of 06:00 – 07:00 are given in Figure 8.2 in ES Volume II (Document Ref. 6.3).

Table 8.30: Predicted operational noise levels: R3 – Humber Estuary

RECEPTOR R3	PREDICTED NOISE LEVELS FROM OPERATION $L_{AEQ,1H}$ DB		
	SCENARIO 1: WORST-CASE HOUR – DAY (09:00 – 10:00)	SCENARIO 2: WORST-CASE HOUR – NIGHT (06:00 – 07:00)	SCENARIO 3: TYPICAL-CASE HOUR – NIGHT (23:00 – 06:00)
Predicted noise level $L_{Aeq,T}$ dB	47	47	46
Ambient noise level $L_{Aeq,T}$ dB	53	52	54
Ambient + Predicted $L_{Aeq,T}$ dB	54	53	55
Increase in ambient dB	+1	+1	+1

Table 8.31: Predicted operational noise levels: R4 – field to south of the Site

RECEPTOR R4	PREDICTED NOISE LEVELS FROM OPERATION $L_{AEQ,1H}$ DB		
	SCENARIO 1: WORST-CASE HOUR – DAY (09:00 – 10:00)	SCENARIO 2: WORST-CASE HOUR – NIGHT (06:00 – 07:00)	SCENARIO 3: TYPICAL-CASE HOUR – NIGHT (23:00 – 06:00)
Predicted noise level $L_{Aeq,T}$ dB	45-61	45-62	44-56
Ambient noise level $L_{Aeq,T}$ dB	48	50	50
Ambient + Predicted $L_{Aeq,T}$ dB	50-61	51-63	51-57
Increase in ambient dB	+2 to +13	+1 to +13	+1 to +7

Table 8.32: Predicted operational noise levels: R5 – field to north of the Site

RECEPTOR R5	PREDICTED NOISE LEVELS FROM OPERATION $L_{AEQ,1H}$ DB		
	SCENARIO 1: WORST-CASE HOUR – DAY (09:00 – 10:00)	SCENARIO 2: WORST-CASE HOUR – NIGHT (06:00 – 07:00)	SCENARIO 3: TYPICAL-CASE HOUR – NIGHT (23:00 – 06:00)
Predicted noise level $L_{Aeq,T}$ dB	41-59	41-60	40-58
Ambient noise level $L_{Aeq,T}$ dB*	48	50	50
Ambient + Predicted $L_{Aeq,T}$ dB	49-60	51-60	50-59
Increase in ambient dB	+1 to +12	+1 to +10	0 to +9

* For a worst-case assessment, ambient noise levels at this Receptor are assumed to be the same as at R4.

8.6.40 At Receptor R3 (Humber Estuary), predicted noise levels are 5 dB below the weekend ambient noise level of 52 dB LAeq during the worst-case hour at night (06:00 – 07:00). This results in an increase in the ambient level of no more than 1 dB. The assessment in Chapter 10: Ecology therefore concludes that there will be no effect on Receptor R3.

8.6.41 At the closest parts of Receptors R4 (field to the south of the Site) and R5 (field to the north of the Site), noise impacts from the operation of the Proposed Development are predicted to be greater due to proximity.

8.6.42 The increase in the ambient noise level across the fields to the south of the Site (R4) is predicted to be between 1 dB and 7 dB during the night (when there are fewer HGV movements) and between 2 dB and 13 dB during the day. During the worst-case night-time hour (06:00 – 07:00) when the number of HGVs entering and leaving the Site is predicted to be at its highest, the ambient noise level is predicted to increase from between 1 and 13 dB. As discussed in Chapter 10: Ecology Section 10.6 (see paragraph 10.6.75), based on studies of the waterbird behaviour, waterbirds will tend to use parts of the field closest to the Estuary and away from field boundary features, which are further away from the Main Development Area; at these locations the noise levels will be similar to ambient levels, so the effect on waterbirds at R4 is considered to be neutral (not significant).

8.6.43 At Receptor R5 (the field north of the Site), noise from the operation of the Proposed Development is predicted to increase the ambient noise level between 1 and 9 dB during the night (when there are fewer HGV movements). During the day and the worst-case night-time hour of 06:00-07:00 (when there are a much larger number of HGV movements), ambient levels are expected to increase by between 1 and 12 dB. This is due to all vehicles entering and leaving the Site travelling from South Marsh Lane. As waterbirds will tend to use parts of the field away from field boundary features and therefore further away from the Main Development Area (see Chapter 10: Ecology Section 10.6 paragraph 10.6.73), at these locations the noise impact will be similar to ambient levels, so the effect on waterbirds is assessed in Chapter 10: Ecology to be neutral (not significant).

8.6.44 With regards to L_{AFmax} levels during operation of the Proposed Development, it is not expected that significant L_{AFmax} events will occur at the Site which will be audible along the Humber Estuary or at the fields located to the north and south of the Site (Receptors R4 and R5). The events that are likely to result in the highest L_{AFmax} levels are the tipping of waste into the bunker when it is delivered and the placing of waste into the shredder. As these activities are undertaken within the fuel reception hall and fuel bunker parts of the building, L_{AFmax} levels from these activities are unlikely to be audible at the Humber Estuary (R3) but may be just perceptible at the ecological Receptor areas to the north and south of the Site (R4 and R5).

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.5: Development Design and Impact Avoidance

Operation

10.5.16 Domestic foul drainage will be discharged to foul sewer, tankered off-site, or treated on-site using a package treatment plant which discharges to one of the surface water ditches within the Main Development Area (which ultimately discharges to the Humber Estuary). If treated foul drainage is discharged to surface water, the volume will be small and this is not considered to represent a potential adverse operational effect on the ditch habitats and the protected species they support (water vole).

Section 10.6: Likely Impacts and Effects

Operation

10.6.55 The following potential source-receptor pathways have been scoped out of the impact assessment:

- noise/ visual disturbance to Humber Estuary SPA/ Ramsar qualifying breeding bird species (bittern, marsh harrier, avocet and little tern) - there is no suitable habitat for the qualifying species of breeding birds within the potential zone of influence of noise and visual disturbance arising from the operation of the Proposed Development. There is therefore no pathway by which these features could be affected by the Proposed Development;
- visual disturbance to qualifying Humber Estuary SPA/ Ramsar wintering bird species feeding on mudflats – the nearest mudflats are approximately 175 m from the Proposed Development, and the cooling water pumping station and substantial flood embankment and seawall lies between the mudflats and the Proposed Development. The type and scale of buildings associated with the Proposed Development are not significantly different from those already present on the SHBPS site, and therefore there would be no discernible visual change in the baseline environment; and
- air quality impacts on intertidal and subtidal habitats in the Humber Estuary SAC/ SSSI – intertidal habitats are not susceptible to the effects of changes in air quality arising from stack emissions during operation (increased nitrogen and acid deposition) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Nitrogen Oxides (NO_x)

10.6.63 The air quality impact assessment has modelled a number of receptors within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI that are sensitive to NO_x emissions. The nearest to the Proposed Development is an area of saltmarsh habitat approximately 400 m south-east (receptors E1_1, E1_2 and E1_3 as shown on Figure 7.2 in ES Volume II (Document Ref. 6.3)). At these receptors, the process contribution resulting from the maximum annual mean NO_x emissions is 2.4%, 2.4% and 2.5% respectively of the Critical

Level for the Humber Estuary SAC/ SPA/ Ramsar. This therefore exceeds the screening threshold at which an adverse effect on the designated habitats (and therefore the species they support) may occur, and indicates that further assessment is required.

10.6.64 At this location, APIS data indicate that the background annual mean NO_x concentration at these receptors is 25.9 µg/m^3. The process contribution from the Proposed Development, although greater than 1%, results in total NO_x of 26.7 µg/m^3, which does not exceed the Critical Level for all vegetation types from the effects of NO_x of 30 µg/m^3. As most of the reported concentration of NO_x is due to the published background value used in the calculations, further analysis was undertaken using project-specific survey data, which concluded that the annual mean NO_x process contribution would be 2.5% of the Critical Level, resulting in total annual mean NO_x concentration of 18.6 µg/m^3.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Nutrient Nitrogen (N) Deposition

10.6.65 The air quality impact assessment has concluded that the annual N deposition rate (kg N/Ha/year) process contribution at the nearest saltmarsh habitat would be 2.1% of the Critical Load at receptors E1_1, E1_2 and E1_3. As this is above the 1% screening threshold, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

10.6.66 The total annual N deposition predicted at these three receptors is 0.4 kg N/ha/yr, resulting from NOx and ammonia (NH_3), compared to the background deposition of 15.5 kg N/ha/yr. With the Proposed Development there would therefore be no exceedance of the Critical Load for this habitat type, which is 20 – 30 kg N/ha/yr. It is therefore assessed that N deposition resulting from the Proposed Development will result in a neutral effect on the Humber Estuary SPA/ SAC/ Ramsar/ SSSI that is not significant.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Acid Deposition

10.6.67 For acid deposition (keq/Ha/year), the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would be no significant effects on the Humber Estuary designated site as a result of acid deposition.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Sulphur Dioxide (SO_2)

10.6.68 For sulphur dioxide, the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would

be no significant effects on the Humber Estuary designated site as a result of SO_2 emissions from the Proposed Development.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Surface Water Pollution to Habitats Supporting Marine Species

10.6.70 Potential pollution (sediment or contaminants) arising from surface water run-off and treated foul drainage discharge from within the Site during operation will be controlled through the drainage design. This is set out in Chapter 14: Water Resources, Flood Risk and Drainage (ES Volume I, Document Ref. 6.2).

10.6.71 There is therefore no surface water pathway by which the Proposed Development could impact on the Humber Estuary SAC/ SPA/ Ramsar/ SSSI designated habitats, and the marine ecology features they support (sea lamprey, river lamprey and grey seal).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage at Pyewipe Mudflats

10.6.72 Predicted operational noise levels at receptor R3 (at the edge of the Humber Estuary SPA/ Ramsar boundary) are 5 dB below the ambient noise level of 52 dB L_{Aeq} during the worst case hour at night (06:00 – 07:00). This results in an increase in the ambient level at receptor R3 of no more than 1 dB, which is not significant.

10.6.73 With regards to L_{AFmax} levels during operation of the Proposed Development, it is not expected that significant L_{AFmax} events will occur at the Site which will be audible along the Humber Estuary. The activities that are likely to result in the highest L_{AFmax} levels are the tipping of waste into the bunker when it is delivered and the placing of waste into the shredder. As these activities are undertaken within the enclosed fuel reception hall and fuel bunker parts of the building, which are located at the furthest point of the building from the Estuary, L_{AFmax} levels from these activities are unlikely to be audible at the Estuary.

10.6.74 It is assessed that operational noise arising from the Proposed Development will result in a neutral effect on waterbirds feeding, roosting and loafing in the Pyewipe mudflats.

10.6.75 Noise associated with planned and unplanned outages and other maintenance activities, or operation of boiler safety valves or steam turbine bypass valves, has not been specifically modelled as part of the noise assessment presented in Chapter 8: Noise and Vibration, but noise from such activities (which do not include piling) are expected to be lower than construction noise effects, which are assessed in paragraphs 10.6.8 to 10.6.28 above.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Fields to North

10.6.76 At the nearest part of the northern fields to the Proposed Development operational noise is predicted to be up to 68 dB L_{Aeq}, which is above the ambient level for the 'worst case hour' between 06:00 and 07:00 (see Chapter 8: Noise and Vibration and the noise contours are shown on Figure 8.2 in ES Volume II (Document Ref. 6.3). However, as discussed above in respect of the assessment for construction noise, it is reasonable to assume that waterbirds using these fields would not be using habitats close to boundary features (due to the requirement for scanning distances for predator avoidance), and are therefore more likely to be orientated towards the middle of the fields. In the centre of fields 30 and 31, operational noise levels will have attenuated with distance to around 50 dB L_{Aeq}, which is similar to ambient levels. No displacement of waterbirds would therefore be anticipated.

10.6.77 Noise associated with the operation of the Proposed Development is therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar using the functionally linked fields to the north (fields 30 and 31).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Field to South

10.6.78 At the nearest part of the southern field to the Proposed Development, operational noise is predicted to be up to 62 dB L_{Aeq}, which is above the ambient level. However, as discussed above in respect of the assessment for construction noise, it is reasonable to assume that waterbirds using the fields would not be using habitats close to boundary features (due to the requirement for scanning distances for predator avoidance), and are therefore more likely to be orientated towards the middle of the field. Towards the centre of field 37, operational noise levels will have attenuated to around 50 dB L_{Aeq}, which is similar to ambient levels. No displacement of waterbirds would therefore be anticipated.

10.6.79 Noise associated with the operation of the Proposed Development is therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar using the functionally linked field to the south (field 37).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Visual Disturbance to Qualifying Wintering Bird Assemblage in Adjacent Field to the South

10.6.80 The nature and scale of the operational activities associated with the Proposed Development will be set against the backdrop of the SHBPS, and will therefore not represent a significant change in the type of structures already present in habitats adjacent to fields used by waterbirds. Regardless of this, it is difficult to predict with any degree of certainty what the response of waterbirds will be to changes in the visual environment. It is reasonable to assume that such birds are resilient to any changes that do not directly affect habitats within which they are feeding, roosting and loafing, because they are

present in a dynamic and highly commercial environment associated with the busy Humber Estuary. This includes the presence of tall structures such as power stations, bulk handling

10.6.81 It is therefore reasonable to assume that any SPA/ Ramsar waterbirds roosting/ loafing/ foraging in the field to the south of the Site are habituated to the industrial nature of the surrounding area such that they would not be disturbed by the presence of tall chimney structures and other buildings on adjacent land. As a general precaution the c.2.5 m high close-boarded fence along the southern border of the Site will be retained for the operational lifespan of the Proposed Development to reduce potential visual disturbance on wintering birds from ground level activities (operational traffic and staff). Visual impacts on waterbirds feeding, roosting and loafing in the adjacent field to the south are therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar.

Extracts from ES Chapter 14: Water Resources, Flood Risk and Drainage (Document Ref. 6.2.14)

Section 14.6: Likely Impacts and Effects

Operation: Potential Impact G – Pollution of surface watercourses within or near the Site during operation and maintenance of the Proposed Development, due to potential spillages, untreated foul drainage or polluted surface water runoff entering the watercourse

14.6.36 Humber Estuary (considered 'High' importance (see Table 14.)) receives water indirectly via the land drains and then Middle Drain and Middle Drain pumping station and Oldfleet Drain and its tidal flapped outfall. Therefore, the nature of the effect in operation and maintenance of the Proposed Development on the Humber Estuary is assessed as 'Negligible'; with low probability, reversible and long term adverse effects on the water quality. Given the likely character of the Humber Estuary is 'High' and the nature of the effects is 'Negligible', the likely significance of the effects from this activity is 'Negligible'.

APPENDIX 5: OTHER CROSS REFERENCED ES CHAPTER TEXT (ECOLOGY MITIGATION)

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Signposting Document. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.7: Mitigation and Enhancement Measures

Humber Estuary SPA/ Ramsar Mitigation (Piling Noise and Vibration)

10.7.2 The assessment has concluded that there is the potential for significant adverse effects on waterbirds in the adjacent field to the south (field 37), which is functionally linked to the Humber Estuary SPA/ Ramsar, as a result of piling noise and vibration during construction. Although the piling activity will only be undertaken for a relatively short period of time (estimated at 2 to 4 months), it is not possible at this stage to determine whether this will overlap with the sensitive wintering bird period. It may therefore occur when birds are present and they could be disturbed or displaced.

10.7.3 At this stage, the mitigation measures to be employed have not been fixed; this is to enable sufficient flexibility for the contractor to determine the best available technique for noise abatement during piling works. For the purposes of this EcIA, it is assumed that mitigation will comprise:

- seasonal piling restrictions – piling will be restricted for two hours either side of high tide in the period September to March inclusive, to avoid the most sensitive winter months, and the time period when birds are most likely to be present in the fields (i.e. when they are pushed off the coastal mudflats at high tide); and/ or
- Continuous Flight Auger (CFA) piling – this technique is virtually vibration free, and one of the quietest forms of piling. If this technique is adopted, it will be possible to reduce construction noise reaching the fields to within ambient levels, and vibration disturbance effects would also be reduced.

Section 10.9: Residual Effects and Conclusions

Construction: Noise/ Vibration Disturbance

10.9.4 With mitigation, piling noise and vibration during construction will be reduced to within ambient levels (e.g. through seasonal restrictions or the use of CFA piling) in the field to the south of the Proposed Development that is considered to be also functionally linked to the Humber Estuary SPA/ Ramsar. Residual effects on waterbirds in this field, and thus the Humber Estuary, are therefore predicted to be minor adverse and not significant.

APPENDIX 6: OTHER CROSS REFERENCED ES CHAPTER TEXT (IN-COMBINATION EFFECTS)

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Signposting Document. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 17: Cumulative and Combined Effects (Document Ref. 6.2.17)

Section 17.5: Cumulative Air Quality Effects

Operational Cumulative Effects - Ecological Receptors: Proposed Development Stacks and Operational Road Traffic

17.5.12 The modelling results show that the predicted cumulative impacts cannot be screened out as insignificant at several ecological receptors, although total Critical Levels remain below the relevant criteria for all pollutants with the exception of E3_1 and E6_1 and 2 for annual mean oxides of nitrogen. At E3_1, the background concentration currently exceeds the criteria for annual mean oxides of nitrogen, while at E6 the Proposed Development's contribution to the change in annual mean oxides of nitrogen is 0.1%.

17.5.13 A cumulative Process Contribution (PC) of more than 1% of the long term Critical Load for nutrient nitrogen deposition has been predicted to occur at receptors E1, E6, E7, E8 and E9. At E1 and E6, the predicted deposition rates are not above the Critical Load, while at E7, E8 and E9 the background deposition rate is above the Critical Load. At these locations, the PC from the Proposed Development is approximately half of the cumulative PC.

17.5.14 A cumulative PC of more than 1% of the long term Critical Load for acid deposition has been predicted to occur at receptor, E4 within the Humber Estuary SAC (Acid Fixed Dunes) in an area which already exceeds the relevant standard, if all the identified developments are implemented.

17.5.15 At the acid fixed dunes, the cumulative PC from all the identified developments to acid deposition is 1.2% of the lower range Critical Load. The PC from the Proposed Development alone was 0.6% of the lower range Critical Load.

Section 17.8: Cumulative Ecology Effects

Construction: Losses of Functionally Linked Habitat

17.8.1 There is the potential for cumulative effects on waterbirds using functionally linked habitat surrounding the Estuary in the absence of mitigation, should multiple developments proceed that result in the loss of such habitat.

17.8.2 Only two of the developments considered on the cumulative effects shortlist (Table 17.5) were identified as potentially combining with the Proposed Development to result in a cumulative adverse effect through this pathway; these are the Stallingborough Link Road (Development Ref: 1) and the

Sustainable Transport Fuels Facility (Development Ref: 2), which will result in the loss of waterbird habitat to the south and west of the Proposed Development. Both of these are located in North East Lincolnshire, and Policy 9 of the NELC Local Plan stipulates that for developments affecting such habitats full mitigation is provided, through a commuted sum secured via legal agreement to draw down from a dedicated strategic mitigation scheme (South Humber Gateway) being delivered directly by NELC ahead of the construction of the relevant development.

17.8.3 The applicant for the Stallingborough Link Road, NELC, has committed to commuting a sum of money that will draw down 6.3 ha of mitigation habitat. The applicant for the Sustainable Transport Fuels Facility also proposes to mitigate for the loss of habitat within the development site in accordance with NELC Local Plan Policy 9. With mitigation, there will therefore be no cumulative adverse effects on the Humber Estuary SPA/ Ramsar with the Proposed Development, as a result of the loss of functionally linked habitat.

Construction: Noise and Vibration Disturbance to Functionally Linked Habitats

17.8.4 The cumulative noise and vibration assessment (see Section 17.6 above) concludes that the construction of the Proposed Development at the same time as the construction or use of the other developments (including the potential off-Site electrical and gas connections associated with the Proposed Development) would not result in a significant cumulative noise effect.

17.8.5 As described above the other developers will also be committed to commuting sums of money to enable mitigation habitat to be created. With this mitigation providing alternative bird habitat, and taking into account the proposed contribution to the SHG strategic mitigation scheme for the Proposed Development, there is therefore no potential for cumulative adverse effects the Humber Estuary SPA/ Ramsar as a result of construction disturbance to functionally linked habitat.

Operation: Changes in Air Quality

17.8.6 Cumulative effects on the Humber Estuary designated sites may occur where the cumulative PC exceeds the 1% screening threshold of the Critical Level and the Predicted Environmental Concentration (PEC) exceeds the relevant Critical Level/ Load. Unless both these criteria are exceeded, no likely significant effects on habitats within the designated sites would be predicted either because the relevant assessment threshold would not be breached, or because the other plans/ projects scoped into the cumulative effects assessment would collectively make an imperceptible contribution to emissions/ deposition.

Operation: Cumulative Emissions of Nitrogen Oxides (NOx)

17.8.7 The air quality assessment has identified that the cumulative process contribution of NOx at the nearest saltmarsh habitat to the Proposed Development (receptors E1_1, E1_2 and E1_3 in Chapter 7: Air Quality) is between 7.3 and 8.0%. This therefore exceeds the threshold for insignificance and indicates that further assessment is required.

17.8.8 On this basis, the total contribution from all developments to the habitat has been combined with the background concentration to determine total annual mean deposition rates. Using the background concentration from the APIS website, the cumulative PEC results in total annual mean NOx concentrations of 28.1 – 28.3 µg/m3 at these locations, which is slightly below the Critical Level for all vegetation types from the effects of NOx of 30 µg/m3. However, using a more precise background NOX concentration derived from NO2 project-specific measurement data recorded at the saltmarsh site itself (see Appendix 7A in ES Volume III, Document Ref. 6.4 for details), the total PEC is between 19.9 µg/m3 and 20.1 µg/m3, which is well below the Critical Level.

17.8.9 An additional saltmarsh habitat receptor within the Humber Estuary (receptor E3_1) slightly exceeds the 1% process contribution threshold (1.3%), although the total PEC results in a cumulative contribution of 45.1 µg/m3. However, as the baseline levels of NOx at this receptor are already exceeding the Critical Level (baseline level is 44.7 µg/m3), this small additional contribution is not reasonably considered to result in any adverse effects on the designated site, in combination with the other developments that have been assessed.

Operation: Cumulative Nutrient Nitrogen (N) Deposition

17.8.10 The air quality impact assessment has concluded that the annual N deposition rate (kg N/Ha/year) process contribution at the nearest saltmarsh habitat would be between 3.9% and 4.2% of the Critical Load at receptors E1_1, E1_2 and E1_3. As this is above the 1% insignificance screening threshold, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

17.8.11 The total cumulative annual N deposition predicted at these three receptors is 0.8 kg N/ha/yr, resulting from NOx and ammonia (NH3). When combined with the background deposition of 15.5 kg N/ha/yr the cumulative PEC for nitrogen deposition will remain below the Critical Load for saltmarsh; being a maximum of 16.3 kg N/ha/yr compared to a Critical Load range of 20 – 30 kg N/ha/yr. This is therefore assessed as a neutral cumulative effect on the Humber Estuary SPA/ SAC/ Ramsar/ SSSI (not significant).

17.8.12 Moreover, it is important to note that the experimental studies that underlie conclusions regarding the sensitivity of saltmarsh to nitrogen deposition, and the selection of 20 kg N/ha/yr as the minimum Critical Load have "… neither used very realistic N [nitrogen] doses nor input methods i.e. they have relied on a single large application more representative of agricultural discharge" (APIS website), which is far in excess of anything that would be deposited from atmosphere. For coastal saltmarshes such as those for which Humber Estuary SAC is partly designated, nitrogen inputs from air are not as important as nitrogen effects from other sources because the effect of any deposition of nitrogen from the atmosphere is likely to be dominated by much greater flushes of more readily utilized nitrogen from marine, fluvial or agricultural sources. This is reflected on APIS itself, which states regarding saltmarsh that "Overall, N deposition [from the 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". In addition, the nature of intertidal saltmarsh in this area means that there is flushing by tidal incursion twice per day. This is likely to further reduce the role of nitrogen from atmosphere in controlling botanical composition.

Operation: Cumulative Acid Deposition

17.8.13 For acid deposition (keq/Ha/year), the air quality impact assessment identified that at the nearest sensitive receptors (sand dune habitats at E4_1, E4_2, E4_3, E4_4 and E4_5, E4_6) the cumulative process contribution would slightly exceed the 1% insignificance screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI (predicted to be between 1.1 and 1.2%). However, given the very small process contribution resulting from these developments, it is assessed that there would be no significant effects on the Humber Estuary designated site as a result of acid deposition in combination with the other developments as outlined in Table 17.5.

Operation: Cumulative Emissions of Sulphur Dioxide (SO2)

17.8.14 For SO2, the air quality impact assessment identified that there would be exceedances of the 1% Critical Level insignificance screening threshold at receptors E1_1, E1_2 and E1_3 (nearest saltmarsh habitat) within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI of 2.4 – 2.7%. However, the PEC for sulphur dioxide is not exceeded, and therefore it is concluded that there will be a neutral effect on the Humber Estuary SAC/ SPA/ Ramsar/ SSSI in combination with developments as outlined in Table 17.5.

17.8.15 As a result of the Air Dispersion Modelling used to inform the air quality assessment (see Appendix 7A in ES Volume III, Document Ref. 6.4) and the cumulative air quality assessment undertaken, it is concluded that there would be no adverse cumulative air quality effects on the Humber Estuary SAC/ SPA/ Ramsar/ SSSI.

APPENDIX 7: CROSS REFERENCED ES CHAPTER TEXT (CHAPTER 10: ECOLOGY) WHERE RELEVANT TO OPERTIONAL CHANGES IN AIR QUALITY- 10.6.55 to 10.6.69)

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Signposting Document. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.6: Impacts and Effects

Operation

10.6.53 This section describes the impacts and potential effects during the operational and maintenance phase of the Proposed Development on relevant ecological features in the absence of any mitigation, over and above that which is inherent to the design.

10.6.54 To enable a proportionate impact assessment, screening was undertaken of potential impacts of the operational phase that are likely to result in adverse or beneficial effects on relevant ecological features and that require further impact assessment. The relevant impacts are taken forward in the more detailed impact assessment that follows. Those impacts that are considered unlikely to result in significant effects are scoped out and not considered further.

10.6.55 The following potential source-receptor pathways have been scoped out of the impact assessment:

- noise/ visual disturbance to Humber Estuary SPA/ Ramsar qualifying breeding bird species (bittern, marsh harrier, avocet and little tern) - there is no suitable habitat for the qualifying species of breeding birds within the potential zone of influence of noise and visual disturbance arising from the operation of the Proposed Development. There is therefore no pathway by which these features could be affected by the Proposed Development;
- visual disturbance to qualifying Humber Estuary SPA/ Ramsar wintering bird species feeding on mudflats – the nearest mudflats are approximately 175 m from the Proposed Development, and the cooling water pumping station and substantial flood embankment and seawall lies between the mudflats and the Proposed Development. The type and scale of buildings associated with the Proposed Development are not significantly different from those already present on the SHBPS site, and therefore there would be no discernible visual change in the baseline environment; and
- air quality impacts on intertidal and subtidal habitats in the Humber Estuary SAC/ SSSI – intertidal habitats are not susceptible to the effects of changes in air quality arising from stack emissions during operation (increased

nitrogen and acid deposition) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

10.6.56 Impacts during the operational period that have potential to result in significant effects on relevant ecological features, and which were screened into the impact assessment are considered further below:

- potential effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI (changes in air quality, noise and visual disturbance and surface water pollution);
- potential effects on Local Wildlife Sites (changes in air quality);
- potential effects on aquatic invertebrates (surface water pollution);
- potential effects on Schedule 1 breeding birds (disturbance);
- potential effects on water vole (noise and visual disturbance, surface water pollution to ditches); and
- potential effects on otter (noise and visual disturbance, surface water pollution to ditches).

Operation: Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation - Air Quality Impacts on Habitats

10.6.57 An air quality impact assessment has been undertaken and is presented in ES Chapter 7: Air Quality. The proposed stack heights are fixed at 102 m AOD to provide certainty to the assessment.

10.6.58 There are two measures of particular relevance when considering the potential for significant effects on habitats to result from changes in air quality arising from the Proposed Development. The first is the concentration of oxides of nitrogen (known as NOx) in the atmosphere. The main importance is as a source of nitrogen (N), which is then deposited on adjacent habitats either directly (known as dry deposition, including directly onto the plants themselves) or washed out in rainfall (known as wet deposition). The deposited nitrogen can then have a range of effects, primarily growth stimulation or inhibition, but also biochemical and physiological effects such as changes to chlorophyll content. NOx may also have some effects which are un-related to its role in total nitrogen intake (such as the acidity of the gas potentially affecting lipid biosynthesis) but the evidence for these effects is limited and they do not appear to occur until high annual concentrations of NOx are reached.

10.6.59 The guideline atmospheric concentration of NOx advocated by Government for the protection of vegetation is 30 micrograms per cubic metre (µgm-3), known as the Critical Level (Hall et al. 2006). This is driven by the role of NOx in N deposition and in particular in growth stimulation and inhibition. If the total NOx concentration in a given area is below the Critical Level, it is unlikely that N deposition will be an issue, unless there are other sources of nitrogen (e.g. ammonia). If it is above the Critical Level then local N deposition from NOx could be an issue and should be investigated.

10.6.60 The second important metric is a direct determination of the rate of the resulting N deposition, which is habitat specific because different habitats have varying

tolerance to nitrogen. For many habitats there are measurable effects in the form of published dose-response relationships for N deposition, which do not exist for NOx. Unlike NOx, the N deposition rate below which current evidence suggests that effects should not arise is different for each habitat. The rate (known as the Critical Load) is provided on the UK Air Pollution Information System website (www.apis.ac.uk) and is expressed as a quantity (kilograms) of nitrogen over a given area (hectare) per year (kg N/ha/yr). More recently, there has also been research compiled that investigates N dose-response relationships in a range of habitats (Caporn et al. 2016).

10.6.61 For completeness, rates of acid deposition were also calculated. Acid deposition derives from both sulphur and nitrogen. It is expressed in terms of kiloequivalents (keq) per hectare per year. The thresholds against which acid deposition is assessed are referred to as the Critical Load Function.

10.6.62 The effects of elevated Hydrogen Fluoride (HF) emissions have been discounted from the assessment for ecological receptors on the basis that habitats are not sensitive to this type of pollutant.

Operation: Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation - Air Quality Impacts on Habitats: Nitrogen Oxides (NOx)

10.6.63 The air quality impact assessment has modelled a number of receptors within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI that are sensitive to NOx emissions. The nearest to the Proposed Development is an area of saltmarsh habitat approximately 400 m south-east (receptors E1_1, E1_2 and E1_3 as shown on Figure 7.2 in ES Volume II (Document Ref. 6.3)). At these receptors, the process contribution resulting from the maximum annual mean NOx emissions is 2.4%, 2.4% and 2.5% respectively of the Critical Level for the Humber Estuary SAC/ SPA/ Ramsar. This therefore exceeds the screening threshold at which an adverse effect on the designated habitats (and therefore the species they support) may occur, and indicates that further assessment is required.

10.6.64 At this location, APIS data indicate that the background annual mean NOx concentration at these receptors is 25.9 µg/m^3. The process contribution from the Proposed Development, although greater than 1%, results in total NOx of 26.7 µg/m^3, which does not exceed the Critical Level for all vegetation types from the effects of NOx of 30 µg/m^3. As most of the reported concentration of NOx is due to the published background value used in the calculations, further analysis was undertaken using project-specific survey data, which concluded that the annual mean NOx process contribution would be 2.5% of the Critical Level, resulting in total annual mean NOx concentration of 18.6 µg/m^3.

Nutrient Nitrogen (N) Deposition

10.6.65 The air quality impact assessment has concluded that the annual N deposition rate (kg N/Ha/year) process contribution at the nearest saltmarsh habitat would be 2.1% of the Critical Load at receptors E1_1, E1_2 and E1_3. As this is above the 1% screening threshold, it is therefore necessary to examine the

output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

10.6.66 The total annual N deposition predicted at these three receptors is 0.4 kg N/ha/yr, resulting from NOx and ammonia (NH_3), compared to the background deposition of 15.5 kg N/ha/yr. With the Proposed Development there would therefore be no exceedance of the Critical Load for this habitat type, which is 20 – 30 kg N/ha/yr. It is therefore assessed that N deposition resulting from the Proposed Development will result in a neutral effect on the Humber Estuary SPA/ SAC/ Ramsar/ SSSI that is not significant.

Acid Deposition

10.6.67 For acid deposition (keq/Ha/year), the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would be no significant effects on the Humber Estuary designated site as a result of acid deposition.

Sulphur Dioxide (SO_2)

10.6.68 For sulphur dioxide, the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would be no significant effects on the Humber Estuary designated site as a result of SO_2 emissions from the Proposed Development.

Operation: Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation - Air Quality Impacts on Habitats (Cumulative)

10.6.69 A cumulative air quality impact assessment has been undertaken and a summary is presented in Chapter 17: Cumulative and Combined Effects in ES Volume I (Document Ref. 6.2).

APPENDIX 8: RELEVANT CROSS REFERENCED TEXT FROM PEA (DOCUMENT REF. 6.4.15) PARAGRAPH 4.1.2

Section 4: Methods

4.1 Desk Study

4.1.2 A stratified approach was taken when defining the desk study area, based on the likely worst case zone of influence of the Proposed Development on different ecological features, and an understanding of the maximum distances typically considered by statutory consultees. Accordingly, the desk study identified any international nature conservation designations within 10 km of the Main Development Area1, other statutory nature conservations designations within 2 km of the Main Development Area, local non-statutory nature conservation designations within 2 km of the Main Development Area, and protected and notable habitats and species within 1 km of the Main Development Area.

[1] This has been extended to reflect the potential zone of influence considered for developments that may result in changes in air quality.

APPENDIX 9: FIGURE 10C.2 FROM PEA (DOCUMENT REF. 6.4.15)

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

LEGEND

- Order Limits
- 2km Study Area
- 10km Study Area

National designated sites within 2km

- Priority Habitat

Non-statutory designations within 2km

- Local wildlife site
- Site of nature conservation interest

Statutory designations within 10km

- RAMSAR
- Special area of conservation
- Special protection area
- Site of special scientific interest

Purpose of Issue
ENVIRONMENTAL STATEMENT

Client
EP WASTE MANAGEMENT LTD

Project Title
SOUTH HUMBER BANK ENERGY CENTRE DCO

Application Document Ref
STATUTORY AND NON-STATUTORY DESIGNATIONS

Drawn	Checked	Approved	Date
LC	LD	LK	12/03/2020

AECOM Internal Project No.	Scale @ A3
60580855	1:80,000

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Drawing Ref
FIGURE 10C.2

Rev

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APPENDIX 10: QUALIFICATIONS AND EXPERIENCE OF ECOLOGISTS CONTRIBUTING TO THE HRA

NAME	AECOM ROLE	QUALIFICATIONS/ MEMBERSHIPS	YEARS OF PROFESSIONAL EXPERIENCE	SUMMARY OF EXPERIENCE AND EXPERTISE	CONTRIBUTION TO SHBEC ECOLOGICAL IMPACT ASSESSMENT (ES CHAPTER 10, APPENDICES AND HRA SIGNPOSTING)
E. Checkley*	Senior Ecologist	BSc (Hons) Wildlife Conservation Graduate member CIEEM	5	Ecological survey and assessment and experienced across all fields of ecology (including habitats, bats, amphibians, water vole, dormouse, reptiles, otter, badger, aquatic macrophytes). Regularly completes PEA, EcIA and HRA for a range of projects across private and public sector.	PEA report (Document Ref. 6.4.15). Reptile survey report (Document Ref. 6.4.18). Aquatic macroinvertebrates and macrophyte survey report (Document Ref. 6.4.16). HRA Signposting Report (Document Ref. 5.8).
L. Deacon	Associate Ecologist	BSc (Hons) Biological Sciences PhD Microbial Ecology Chartered Environmentalist	20	Ecological survey and assessment and experienced across all fields of ecology (including habitats, reptiles,	PEA report (Document Ref. 6.4.15). Ecology Chapter (Document Ref. 6.2.10). HRA Signposting Report (Document Ref. 5.8).

		(CEnv) Full member CIEEM		otter, water vole, amphibians, bats and badgers) Regularly completes PEA, EcIA and HRA for a range of projects across private and public sector. Environmental management and academic experience post-degree, including lecturing, research and publication in peer reviewed journals. Biodiversity net gain specialist.	
J. Atkinson	Associate Ecologist	BSc (Hons) Zoology Full member CIEEM	17	Experienced in Phase 1 Habitat surveys, scoping and surveying for a range of protected species (including breeding birds, wintering birds, reptiles, otter,	Otter and water vole report (Document Ref. 6.4.17). Ecology Chapter (Document Ref. 6.2.10). HRA Signposting (Document Ref.5.8).

				water vole, amphibians, white-clawed crayfish, bats, badgers). Regularly completes PEA, EcIA and HRA for a range of projects across private and public sector.	
J. Riley	Habitats Regulation Assessment (HRA) Practice Area Lead	BSc (Hons) Biology MSc Crop Protection PhD Calcareous grassland restoration to hard rock quarries Chartered Environmentalist (CEnv)	22	HRA specialist, lecturer and trainer (providing HRA training to local authorities and RTPI). Co-ordinates technical standards on HRA within AECOM and completes technical reviews. Led HRA work on numerous high profile projects including the Thames Tideway Tunnel, the expansion of	HRA Signposting Report (Document Ref. 5.8)

				Seabank Power Station, the expansion of the Army Training Estate at Salisbury Plain SAC/SPA, the undergrounding of powerlines across the New Forest SPA /SAC and dozens of projects on behalf of both applicants and local authorities. Part of the authorship team for the Institute of Air Quality Management guidance on assessing impacts on nature conservation sites and is currently working with the Chartered Institute of Ecology & Environmental Management on	

				air quality impact assessment advice for ecologists likely to be published later in 2020.	

*No longer at AECOM