Energy Recovery Facility: Habitats Regulations Assessment / Appropriate Assessment

Final Report

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This report describes work commissioned by Hartlepool Borough Council. Mairi Gillis of JBA Consulting carried out this work.

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Purpose

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Acknowledgements

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Executive summary

This report presents the results of a screening assessment under the Conservation of Habitats and Species Regulations 2017 for a proposed scheme to build an Energy Recovery Facility on the existing 'Prairie' site north of Grangetown, Cleveland.

The proposed works involve constructing an Energy Recovery Facility capable of handling 450,000 tonnes of waste a year within a 10-hectare development plot, whilst maintaining a 0.9-hectare area of industrial archaeological interest and dedicating 2.3-hectares to a biodiversity area. The proposed works will involve stripping 3m of topsoil off the 10-hectare building footprint and constructing the facility. Access will either be obtained from the north-west side of the plot, or the existing access identified on the south-east corner of the site.

The proposed works are located within 2km of the Teesmouth and Cleveland Coast SPA (including the January 2020 extension) and Ramsar European designated sites as well as the Teesmouth and Cleveland Coast SSSI. The North York Moors SAC and SPA is located 9.4km south-east of the proposed works. The European sites are designated for the following:

- Annex I bird species – Little Tern *Sternula albifrons*, Sandwich Tern *Sterna sandvicensis,* Common Tern *Sterna hirundo*, Pied Avocet *Recurvirostra avosetta,* Merlin *Falco columbarius,* Golden Plover *Pluvialis apricaria*
- Annex II bird species – Knot *Calidris canutus islandica*, Redshank *Tringa totanus*, Ruff *Philomachus pugnax*
- Waterfowl Assemblage
- Ramsar Criterion 5 – Wetland regularly supporting 20,000 or more water birds.
- Ramsar Criterion 6 – Wetland regularly supporting at least 1% of the individuals in a population of one species of water bird.
- Annex I Habitats – 4010 Northern Atlantic wet heaths with *Erica tetralix*; 4030 European dry heaths and; 7130 Blanket bogs (if active bog – priority feature).

A number of likely significant effects were identified from the proposed works. The likely significant effects include:

- Introduction of synthetic compounds – Abnormal and Emergency Conditions
- Introduction of non-synthetic compounds – Abnormal and Emergency Conditions

The conclusion is that in the absence of mitigation, the project will have a likely significant effect on the Teesmouth and Cleveland Coast SPA, pSPA, and Ramsar European designated sites.

An Appropriate Assessment has concluded that the Process Contribution for Teesmouth and Cleveland Coast SPA will not affect the integrity of the European Sites. The North York Moors SAC and SPA has been screened out given its location (9.4km from the site) and potential to impact the integrity of the site.

However, a further HRA will be required to support the Full Planning application.

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Abbreviations

AQTAG	Air Quality Technical Advice Group
CCUS	Carbon Capture Utilisation and Storage
CCGT	Combined Cycle Gas Turbine
CCPP	Combined Cycle Power Plant
DCLG	Department for Communities and Local Government
DO	Dissolved Oxygen
ERF	Energy Recovery Facility
HBC	Hartlepool Borough Council
HRA	Habitats Regulations Assessment
INNS	Invasive Non-native Species
JNCC	Joint Nature Conservation Committee
OSGR	Ordnance Survey Grid Reference
pSPA	Potential Special Protection Area
PC	Process Contribution
SAC	Special Area of Conservation
SIP	Site Improvement Plan
SPA	Special Protection Area
SSI	Sahaviriya Steel Industries
SSSI	Site of Special Scientific Interest
ZoI	Zone of Influence

1 Introduction

1.1 Background

Hartlepool Borough Council have produced a concept design to build an Energy Recovery Facility as part of the South Tees Regeneration Master Plan. The site will be located within an existing industrial area surrounded by steel works. The facility will be designed to handle processing a capacity of around 450,000 tonnes of waste a year, which will come from the four Tees boroughs as well as the potential to come from Hartlepool and Newcastle.

The project proposal has been derived from the Tees Valley Joint Waste Management Strategy (JWMS), which identified, in combination with the Options Appraisal process, the need for a long-term residual waste treatment solution within the area. The chosen site for the development is an existing brownfield site, also known as the 'Grangetown Prairie'. A number of European designated sites surround the chosen site; thus a Habitats Regulations Assessment is required. This will support the Environmental Statement to be submitted with the statutory planning application.

1.2 Habitats Directive

Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, known as the 'Habitats Directive' was adopted in 1992. The Directive establishes the requirement for a European ecological network of protected sites by designated SACs and SPAs, which together make up the Natura 2000 network of designated sites. The Directive is transposed into law through the Conservation of Habitats and Regulations 2017 (hereafter 'the Regulations'). The Regulations (HMSO, 2017) require that an HRA is undertaken by a competent authority prior to the issue of any consent to consider whether a proposed project is likely to have a significant effect on a Natura 2000 site. Government guidance also requires that Ramsar sites (listed under the Convention on Wetlands of International Importance [Ramsar Convention]) are included within an HRA (together, SACs, SPAs and Ramsar sites are known as 'European sites'). Updates to legislation also require that proposed Ramsars (pRamsar), potential SPAs (pSPA), proposed SACs and candidate SACs are assessed as part of the HRA.

For all plans and projects, which are not wholly directly connected with, or necessary to, the conservation management of the site's qualifying features, a formal test for likely significant effects (either alone or in-combination with other plans or projects) on a European site(s) is required. This assessment in based on available ecological information on the designated site(s), other plans, projects and policies relevant to the area and details of the proposed works.

If the assessment concludes that the works may have a significant adverse effect on the conservation objectives of the site(s), or that such an effect cannot be ruled out (adopting a precautionary approach) an Appropriate Assessment must be carried out. An Appropriate Assessment involves an assessment of potential effects of a development on the conservation objectives of the site(s). If significant adverse effects are identified, mitigation or avoidance measures can be applied.

Following the recent ECJ judgement in the case of "people over wind" (Case C-323/17). Measures that are necessary to avoid or reduce impacts on the European site, even when considered standard environmental best-practice, can only be at Stage 2.

If it cannot be concluded that the proposed works will not adversely impact upon the integrity of the site(s), the project will not be able to proceed without further conditions and/or assessment.

1.3 Scope of Assessment

This report comprises a test of likely significant effect of the proposed works and is based on an examination of Natura 2000 Site Synopsis, Standard Data Form and conservation objectives available from the Natural England and Joint Nature Conservation Committee (JNCC), as well as other readily accessible internet resources, concerning the nature and wildlife value of the designated site(s).

The methodology used for this assessment is based upon the following guidance documents:

- The Habitats Regulations Assessment Handbook (DTA Publications, 2019).
- Assessment of plans and projects significantly affecting Natura 2000 sites (European Commission, 2001).
- Planning for the Protection of European Sites: Guidance for Regional Spatial Strategies and Local Development Documents (Department for Communities and Local Government, 2006).
- Planning Inspectorate's Guidance Note 10, Version 8 (November 2017)

This report takes the following format:

- Evidence gathering: Identifying European site(s) and any potentially affected qualifying features.
- Appraisal of hazards: Identifying potential hazards to qualifying features associated with the proposed project.
- Assessment: Deciding whether or not the development is likely to have a significant effect upon the interest features of the European site(s).

1.4 Supporting information

Following submission of the HRA, Natural England Requested that the results from the Air Quality Assessment was integrated into the HRA. This revised document includes the Air Quality data.

A Detailed Assessment for air quality has been completed for the Energy Recovery facility. This document is submitted as an Appendix to this HRA. The construction works have the potential to create dust. During construction it will therefore be necessary to implement a package of mitigation measures to minimise dust emissions. With these measures in place, it is expected that any residual effects will be not significant.

A detailed assessment of pollutant emissions released from the facility as a result of the combustion of waste as well as pollutant emissions from road traffic associated with the operation of the facility has been undertaken. The air quality effects derived from this assessment on the sensitive habitats have been considered and a summary of the detail has been presented in this HRA.

The Air Quality assessment states that an abnormal operations assessment has not been completed as there is insufficient detail regarding abnormal operations at this stage. However, abnormal operations have been considered in the HRA under precautionary principles.

2 Description of the Project

2.1 Site Location

The site is located within a heavily industrial area north-west of Grangetown, Cleveland at a site known as the 'Grangetown Prairie' at a central OSGR NZ 54353 21355. The site in question is predominantly brownfield with proposed future development areas on the prairie lying to the south and east of the site. Existing industrial facilities in operation lie to the south of the area and defunct historic industry buildings lie to the west. A highly active landfill site is located to the north of the site over the Teesdale Way public footpath and South Bank railway line. The steel works building that is situated on the eastern boundary of the brownfield site is only partly in operation at the time of writing this assessment. Appendix A shows the location of the proposed development site.

2.2 Proposed Works

The works propose the building of a new Energy Recovery Facility (ERF) (hereafter 'the facility') capable of processing up to 450,00 tonnes of waste per annum within a 10-hectare development plot. The facility is estimated to produce 35MW of electricity to feed into the National Grid. The site will also include a dedicated biodiversity area, heritage area, landscaping, internal access roads and car parking areas. The estimated layout of the site is shown below in Appendix A (Area A – Facility area, B – Archaeological interest area and C – Biodiversity area). The main building of the facility will include the reception and waste treatment area. This building will be approximately 140m by 70 m with a height of 45m taking up around 7 hectares and the building stack will be between 70m and 80m in height. The biodiversity area will be around 2.3 hectares and the heritage area around 0.9 hectares.

2.2.1 Construction Stage

The following information has been provided relating to planned works during construction:

- Topsoil and other surface material will be removed down to a depth of 2.5m only in the area where the facility will be built.
- This soil will not be removed from the site but processed on site and returned to the ground. The top will be spread to cover any remaining material.
- A maximum of 300 employees will be on site at any one time during the construction of the facility.
- Construction of the facility will take place over a period of 36 months starting in 2022 and functional by 2025.

2.2.2 Operational Stage

The main purpose of the facility will be to generate electricity by way of a thermal (incineration) process that produces steam and then drive a turbine. It is anticipated that the facility will create 40 jobs with around 30 staff members on site at one time. Access will be obtained either through the north-west edge of the site or via the existing hardstanding road running from the south-east corner of the site. The following processes will be executed during the operation of the facility:

- Domestic waste will be transported by road to the ERF facility;
- Waste is transferred to the ERF tipping hall and boiler hall;
- Waste is put through a combustion process where it is mixed with air (oxidised) at a high temperature to produce heat;
- The produced heat is used to boil water to create steam;
- The steam is then used to generate electricity through the movement of turbines within the turbine hall. The electricity is distributed to the National Grid;
- Pollution control equipment cools and cleans the gases, and a baghouse controls the emissions. This takes place in the air-cooling condenser and flue gas

treatment building and released to the outside environment through the stack. Emissions will be continuously monitored;

- Particulate matter is collected, and metals are recovered for recycling.
- Residual material is beneficially reused. That which cannot be reused is disposed of at landfill or disposal off-site.

This assessment will assess the likely significant impacts on European designated sites during the construction and operation of the facility as well as assessing any likely significant impacts if the facility were to be decommissioned.

2.3 Project Area of Influence and European Sites

Given the preceding information on the proposed works, the area of influence or zone of influence (ZoI) for the project is taken to be 10km from the proposed works location to follow DEFRA air emission guidance (DEFRA, 2016). These distances are based on potential impacts from the facility once in operation as impacts during construction are likely to be more local.

There are four European designated sites within the project zone of influence that will be considered in this assessment (see location map at Appendix B). These include the extensions in January 2020:

- Teesmouth and Cleveland Coast SPA;
- Teesmouth and Cleveland Coast Ramsar;
- North York Moors SAC; and
- North York Moors SPA.

3 Habitats Regulations Assessment

This assessment identifies and considers the likely adverse effects of the proposed works, either individually or in-combination with other projects, upon a European site and considers whether these impacts are likely to be significant. It comprises an identification of the European sites of relevance to this assessment; the potential hazards associated with the proposed works and their relevance to these European sites, and the likelihood that these hazards would cause a significant adverse effect on a European site.

The Conservation of Habitats and Species Regulations 2017 implements Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) into national legislation. In brief, the regulations *"provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other control for the protection of European sites"* (JNCC, 2010).

3.1 HRA Assessment Methodology

Habitat Regulations Assessment follows a four-stage process as outlined in the DCLG guidance "Planning for the Protection of European Sites: Appropriate Assessment". These stages are described in Table 3-1.

Table 3-1: The HRA process

HRA Stage	Description
Stage 1: Screening	This process identifies the likely significant effects upon a European site of a project or plan, either alone or in- combination with other projects or plans and determines whether these impacts are likely to be significant. Following the recent ECJ judgement in the case of "people over wind" (Case C-323/17). Measures that are necessary to avoid or reduce impacts on the European site, even when considered standard environmental best-practice, can only be at Stage 2. If no likely significant effect is determined, the project or plan can proceed. If a likely significant effect is identified, stage 2 is commenced.
Stage 2: Appropriate Assessment	Stage 2 is subsequent to the identification of likely significant effects upon a European site in stage 1. This assessment determines whether a project or plan would have an adverse impact on the integrity of a European site, either alone or in combination with other projects or plans. This assessment is confined to the effects on the internationally important habitats and species for which the site is designated (i.e. the interest features of the site). If no adverse impact is determined, the project or plan can proceed. If an adverse impact is identified, stage 3 is commenced.
Stage 3: Assessment where no alternatives and adverse impacts remain	Where a plan or project has been found to have adverse impacts on the integrity of a European site, potential avoidance/mitigation measures or alternative options should be identified. If suitable avoidance/mitigation or alternative options are identified, that result in there being no adverse impacts from the project or plan on European sites, the project or plan can proceed. If no suitable avoidance/mitigation or alternative options are identified, as a rule the project or plan should not proceed. However, in exceptional circumstances, if there is an 'imperative reason of overriding public interest' for the implementation of the project or plan, consideration can be given to proceeding in the absence of alternative solutions. In these cases, compensatory measures will have to be put in place to offset any negative impacts.
Stage 4: Compensatory measures	Stage 4 comprises an assessment of the compensatory measures where, in light of an assessment of imperative reasons of overriding public interest, it is deemed that the project should proceed.

This study comprises Stage 1 of the process, namely an assessment to identify any likely significant effects of the project on a European site.

3.2 Limitations and Constraints

The screening assessment necessarily relies on some assumptions and it was inevitably subject to some limitations. It is not considered that these would affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- This assessment is based on the outline design for the Energy Recovery Facility at the time of writing this document. The outline design may be subject to change; however, re-assessment will only be required if large changes are made to the processes within the building or the location and footprint of the facility changes.

4 European Sites

4.1 Teesmouth and Cleveland Coast SPA

The Teesmouth and Cleveland Coast SPA is located approximately 1.4km from the proposed works site. The SPA qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting species of European Importance listed on Annex I and Annex II of the Directive.

The assessment includes the Teesmouth and Cleveland Coast pSPA is located approximately 1.4km from the proposed works site and is assessed under the same criteria as the SPA. The qualifying features of the pSPA are identified in Section 4.1.1.3 and 4.1.1.4. The conservation objectives and key vulnerabilities apply to both the SPA and pSPA.

4.1.1 Qualifying Interest Features

The Teesmouth and Cleveland Coast SPA is designated for the following qualifying features (all information acquired from the JNCC and Natural England websites):

4.1.1.1 Annex I Species

- Little Tern *Sterna albifrons* (Breeding)
- Sandwich Tern *Sterna sandvicensis* (Passage)

4.1.1.2 Annex II Species

- Knot *Calidris canutus islandica* (Wintering)
- Redshank *Tringa totanus* (Passage)

Waterfowl assemblage of over 20,000 individuals consisting of the following species:

- Cormorant *Phalacrocorax carbo*
- Shelduck *Tadorna tadorna*
- Teal *Anas crecca*
- Shoveler *Anas clypeata*
- Sanderling *Calidris alba*
- Knot *Calidris canutus islandica*

4.1.1.3 Extended SPA Annex I Species

- Common Tern *Sterna hirundo* (Breeding)
- Pied Avocet *Recurvirostra avosetta* (Breeding)

4.1.1.4 Extended SPA Annex II Species

- Ruff *Philomachus pugnax* (Passage)

4.1.2 Conservation Objectives

The conservation objectives for the Teesmouth and Cleveland Coast SPA are to 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 habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

4.1.3 Key Vulnerabilities

Known threats and pressures on the SPA are 'Outdoor sports and leisure activities, recreational activities' (G01), 'Pollution to surface waters (limnic & terrestrial, marine & brackish)' (H01), 'Human induced changes in hydraulic conditions' (J02), 'Industrial or commercial areas' (E02) and 'Fishing and harvesting aquatic resources' (F02).

4.2 Teesmouth and Cleveland Coast Ramsar

The Teesmouth and Cleveland Coast Ramsar is located approximately 1.6km from the proposed works site. The Ramsar qualifies in accordance with two Ramsar Criteria (5 and 6). In January 2020 the site was extended to cover additional designated areas and is also assessed under the same criteria. The conservation objectives and key vulnerabilities apply to both the Ramsar and pRamsar.

4.2.1 Qualifying Features

The Teesmouth and Cleveland Ramsar is designated for the following criterion (all information acquired from the JNCC and Natural England websites):

4.2.1.1 Ramsar Criterion 5

A wetland should be considered internationally important it if regularly supports 20,000 or more water birds.

Assemblages of international importance:

- Peak counts in winter – 21,312 individuals

4.2.1.2 Ramsar Criterion 6

A wetland should be considered internationally important if it regularly supports 1% or more of the individuals in a population of the following bird species, in any season.

Species/populations occurring at levels of international importance:

- Knot *Calidris canutus islandica*
- Redshank *Tringa totanus totanus*
- Sandwich Tern *Sterna sandvicensis*

4.2.2 Conservation Objectives

The conservation objectives for the Teesmouth and Cleveland Coast Ramsar are to 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 habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

4.2.3 Key Vulnerabilities

The known threat and pressure on the Ramsar and is 'Eutrophication'.

4.3 North York Moors SAC

The North York Moors SAC is located approximately 9.4km from the proposed works site. The SAC qualifies under Article 4.1 of the Habitats Directive (92/43/EEC) by supporting habitats of European importance listed on Annex I of the Directive.

4.3.1 Qualifying Features

The North York Moors SAC is designated for the following qualifying features (all information acquired from the JNCC and Natural England websites):

4.3.1.1 Annex I Habitats

- 4010: Northern Atlantic wet heaths with *Erica tetralix*
- 4030: European dry heaths
- 7130: Blanket bogs (if active bog – priority feature)

4.3.2 Conservation Objectives

The conservation objectives for the North York Moors SAC are to ensure that the integrity of the site 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 the qualifying natural habitats
- The structure and function (including typical species) of the qualifying natural habitats, and,
- The supporting processes on which the qualifying natural habitats rely.

4.3.3 Key Vulnerabilities

Known threats and pressures on the SAC are 'Changes in abiotic conditions' (M01), 'Air pollution, air-borne pollutants' (H04), 'Invasive non-native species' (I01), 'Interspecific floral relations' (K04) and 'Fire and fire suppression' (J01).

4.4 North York Moors SPA

The North York Moors SPA falls approximately 9.4km from the proposed works site. The SPA qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting species of European importance listed on Annex I of the Directive.

4.4.1 Qualifying Features

The North York Moors SPA is designated for the following qualifying features (all information acquired from the JNCC and Natural England websites):

4.4.1.1 Annex I Species

- Merlin *Falco columbarius*
- Golden Plover *Pluvialis apricaria*

4.4.2 Conservation Objectives

The conservation objectives for the North York Moors SPA are to 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 habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

4.4.3 Key Vulnerabilities

Known threats and pressures on the SPA are 'Invasive non-native species' (I01), 'Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental

capture (e.g. due to fishing gear), etc.)' (F03), 'Changes in abiotic conditions' (M01), 'Fire and fire suppression' (J01) and 'Air pollution, air-borne pollutants' (H04).

4.5 Interest Features Present in Vicinity of Proposed Works

4.5.1 Habitats

An ecological assessment of the site was undertaken by Hartlepool Borough Council (HBC) in August 2019 and a further assessment was undertaken by HBC and JBA Consulting in November 2019, in which no qualifying species were identified using or flying over the proposed works site (HBC, 2019), however this data is limited due to only two visits being undertaken throughout the year.

A further desk-based assessment was undertaken after the site visit gathering data from the Environmental Records Information Centre North East, Durham Bird Club and Teesmouth Bird Club. The results of the assessment identified no qualifying species within 2km of the proposed works site most likely due to large areas surrounding the site being inaccessible to the public (including the site itself).

No habitats were recorded on site during the site visit that would be suitable or provide support for foraging or breeding species related to the European designated sites. The area is highly industrial with no suitable habitats or land functionally linked to the European designated sites apparent in the vicinity of the proposed works site (See Appendix C for a map showing an aerial of the habitats between the proposed works area and the closest designated site). Industrial buildings are dominant in the landscape with areas of brownfield present in the gaps where developments have become derelict or been demolished in the past. Mudflats and intertidal substrate foreshores are present within the designated sites around 1.6km and 1.5km away respectively from the proposed works site.

4.5.2 Habitat sensitivity

Predicted impact on the ecological receptors has followed the IAQM guidance (Holman et al (2019). A guide to the *assessment of air quality impacts on designated nature conservation sites – version 1.0,* Institute of Air Quality Management). Baseline information for Air Quality is provided in Air Quality Assessment (Appendix A).

Habitats are sensitive to deposition resulting in eutrophication and acidification. Deposition occurs both in the form of dry deposition and wet deposition. Critical loads are defined as:

"a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge"

While critical levels are:

"concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge".

The critical loads used to assess the impact of compounds deposited to land which result in eutrophication and acidification are expressed in terms of kilograms of the relevant pollutant deposited per hectare per year (for example for nitrogen the unit is kg N/ha/yr) and kilo-equivalents H+ ions deposited per hectare per year (keq/ha/yr). The unit of 'equivalent' (eq) is used, rather than a unit of mass, for the purposes of assessing acidification from multiple species. The unit eq. (1 keq ≡ 1,000 eq) refers to molar equivalent of potential acidity resulting from e.g. sulphur, oxidised and reduced N, as well as base cations. Essentially, it is a measure of how acidifying a particular chemical species can be.

Critical loads are set by the United Nations Economic Commission for Europe (UNECE) Convention on Long- Range Transboundary Air Pollution. Natural England site-specific critical loads for SPA, SAC and SSSI sites in England are established from The Working Group on Effects of the UNECE Convention on Long Range Transboundary Air Pollution. The information is available via the Air Pollution Information Service (APIS) which contains information on applicable critical loads for various habitats and species.

The critical loads used in this assessment are presented in Table 4-1 and Table 4-2. These include a range for each site. The lower end of the range has been used for a conservative assessment.

Table 4-1: Nitrogen Nutrient Critical Loads (Air Pollution Information Service (APIS)

Site	Habitat / Ecosystem	N Critical Load (CL) range (kg N/ha/yr)
Teesmouth and Cleveland Coast Ramsar/SPA/SSSI	Shifting coastal dunes	10 - 20
	Coastal stable dune grasslands - acid type	8 - 10
	Coastal stable dune grasslands - calcareous type	10 - 15
	Pioneer, low-mid mid-upper saltmarshes	20 -30
North York Moors SAC	Raised and blanket bogs	5 - 10
	Northern wet heath: *Erica tetralix* dominated	10 - 20
	Dry Heaths	10 -20

Table 4-2: Nitrogen Nutrient Critical Loads

Site	Habitat	Acidity CLminN-CLmaxN (keq /ha/yr)	Acidity CLmaxS (keq /ha/yr)
Teesmouth and Cleveland Coast Ramsar/SPA/SSSI	Acid Grassland	MinCLminN: 0.223 | MaxCLminN: 0.438 MinCLMaxN: 1.998 | MaxCLMaxN: 4.508	MinCLMaxS: 1.56 | MaxCLMaxS: 4.07
	Calcareous grassland	MinCLminN: 0.856 |MaxCLminN: 1.071 MinCLMaxN: 4.856 | MaxCLMaxN: 5.071	CLmaxS: 4
North York Moors SAC	Bogs	MinCLminN: 0.321 | MaxCLminN: 0.321 MinCLMaxN: 0.504 | MaxCLMaxN: 0.705	MinCLMaxS: 0.183 | MaxCLMaxS: 0.384
	Dwarf Shrub Heath	MinCLminN: 0.499 | MaxCLminN: 1.25 MinCLMaxN: 0.792 | MaxCLMaxN: 4.962	MinCLMaxS: 0.15 |MaxCLMaxS: 4.07

APIS advises that where the total acid nitrogen deposition is greater than the Nmin, the sum of acid nitrogen, sulphur and hydrochloric (and other contributors like hydrofluoric) acid deposition should be compared against the Nmax value.

5 Assessment

5.1 Introduction

The following section identifies potential hazards of the proposed works. The effects of relevant hazards are then assessed in relation to each of the relevant qualifying features of the site(s). The likelihood of potential exposure to the hazard and the mechanism of effect are also identified where possible. This then allows for likely significant effects on the interest features of the designated sites to be identified.

5.2 Potential Hazard to European Sites

The proposed project, as detailed in Section 2, was assessed in order to identify potential hazards that might arise to the relevant interest features of the site(s). For the purposes of this assessment, the Teesmouth and Cleveland Coast SPA and pSPA are assessed together, and the Teesmouth and Cleveland Coast Ramsar and pRamsar are assessed together. The results of the HRA screening assessment are shown in Table 5-1 to Table 5-4 below.

As the proposed project is not located within any of the designated sites, it is anticipated that only indirect impacts will occur such as pollution from construction and transportation. The hazards identified in Table 5-1 to Table 5-4 are mainly based on those identified using Natural England's conservation advice package for the European Marine Site and Site Improvement Plan (SIP) for each designated site.

Table 5-1: Potential hazards to the Teesmouth and Cleveland Coast SPA qualifying features

Potential Hazards	Annex I Species	Annex II Species	Waterfowl assemblage
Noise/vibration disturbance	✓	✓	✓
Visual disturbance	✓	✓	✓
Introduction of synthetic compounds	✓	✓	✓
Introduction of non-synthetic compounds	✓	✓	✓
Changes in nutrient loading from waste discharge	✓	✓	✓
Changes in organic loading from waste discharge	✓	✓	✓
Introduction of Invasive Non-native Species	✓	✓	✓
Air pollution	✓	✓	✓

Table 5-2: Potential hazards to the Teesmouth and Cleveland Coast Ramsar qualifying features

Potential Hazards	Criterion 5	Criterion 6
Noise/vibration disturbance	✓	✓
Visual disturbance	✓	✓
Introduction of synthetic compounds	✓	✓
Introduction of non-synthetic compounds	✓	✓
Changes in nutrient loading from waste discharge	✓	✓
Changes in organic loading from waste discharge	✓	✓
Introduction of Invasive Non-native Species	✓	✓
Air pollution	✓	✓

Table 5-3: Potential hazards to North York Moors SAC qualifying features

Potential Hazards	Annex I Habitats
Noise/vibration disturbance	x
Visual disturbance	x
Introduction of synthetic compounds	✓
Introduction of non-synthetic compounds	✓
Changes in nutrient loading from waste discharge	x
Changes in organic loading from waste discharge	x
Introduction of Invasive Non-native Species	✓
Air pollution	✓

Table 5-4: Potential hazards to North York Moors SPA qualifying features

Potential Hazards	Annex I Species
Noise/vibration disturbance	x
Visual disturbance	x
Introduction of synthetic compounds	✓
Introduction of non-synthetic compounds	✓
Changes in nutrient loading from waste discharge	x
Changes in organic loading from waste discharge	x
Introduction of Invasive Non-native Species	✓
Air pollution	✓

The maximum background deposition fluxes to the Teesmouth and Cleveland Coast SAC, SPA and Ramsar have been taken from the APIS website (APIS, 2019), where they are reported as a three-year average (2015-2017), Table 5-5.

Background nutrient deposition rates exceeded the critical loads in this period, while the acid nitrogen deposition rate exceeded the CLminN critical load in this period and therefore is considered against the CLmaxN; the acid nitrogen and sulphur deposition rates are below the CLmaxN and CLmaxS critical loads (the relevant AQALs) in this period.

Table 5-5: Baseline Nitrogen Nutrient Deposition and Activity Deposition

Pollutant	Air Quality Assessment Levels (AQAL)	Unit	Background
Nitrogen nutrient deposition	8	kg/ha/yr	17.78
Nitrogen acid deposition	1.998	keq/ha/yr	1.27
Sulphur acid deposition	1.56	keq/ha/yr)	0.42

5.3 Assessment of Likely Significant Effects

Assessment of the potential hazards identified in Table 5-1 to Table 5-4 was undertaken to determine whether they would be likely to have a significant effect on the relevant qualifying features of the site(s) and their supporting habitats, as a consequence of the proposed works.

The AQTAG approach, for nationally and internationally designated sites (SSSI, SAC, SPA and Ramsar sites) where long-term process contributions (PCs) are below 1% of the assessment level (critical level or critical load) the impacts from the development in isolation are considered to be negligible. Where short-term impacts are considered, if the PC is less than 10% of the assessment level the impacts are considered negligible. Where impacts are above these levels LSE cannot be ruled out at the screening stage.

The results of this assessment are shown in 6.

Table 5-6: Assessment of likely significant effects

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
Teesmouth and Cleveland Coast SPA		
Annex I Breeding Species: Little Tern *Sterna albifrons* Annex I Passage Species: Sandwich Tern *Sterna sandvicensis* Annex II Wintering Species: Knot *Calidris canutus islandica* Annex II Passage Species: Redshank	Noise/vibration disturbance	Proposed works will result in an increase in road transport vehicles due to the transport of materials for construction and transport of waste during the operation of the facility. This increase in traffic levels has the potential to cause noise and vibration disturbance to the qualifying features of the SPA. Construction activities will result in an increase in noise during the proposed works. Vibrations may be caused by construction works depending on the exact processes involved during the construction of the facility. The noise/vibration could disturb wintering and passage birds making them spend more time in the air instead of foraging. In the case of breeding Little Tern, they are highly sensitive to disturbance which in some instances could cause the adult to desert the nest and leave eggs as well as leaving the colony in extreme cases. Despite this, due to the distance of the SPA from the proposed works area (1.6km and 1.4km respectively) it is not anticipated that the qualifying features of the SPA will be impacted. **No Likely Significant Effect**
	Visual disturbance	The existing surrounding area consists of steel works, a landfill site and other large industrial buildings. The construction of the facility will alter the landscape causing temporary visual disturbance due to the presence of people and plant/machinery, however the building is expected to fit in with the aesthetic of the area and the birds are anticipated to become accustomed to the

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
Tringa totanus totanus Waterfowl assemblage		addition of the building. There is also the potential for visual disturbance caused during the construction, operation and decommissioning of the facility as a result of increased traffic movements due to the addition of new employees to run and build the plant, plus haulage vehicles carrying building materials and domestic waste. It is expected that the qualifying species of the SPA will be accustomed to high levels of traffic in the area. Therefore, due to the distance of the SPA from the proposed works area and the roads in the area already being subjected to large volumes of traffic, it is not anticipated that the qualifying features of the SPA will be impacted. **No Likely Significant Effect**
	Introduction of synthetic compounds – Normal operating conditions (Emissions)	The operation of the facility requires the burning of domestic waste. The facility will be state of the art. Compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution abatement measures to abide by statutory legislation. The PC is 3.3% of the AQAL and therefore cannot be screened out as insignificant and there is the potential for significant effects. However, baseline annual mean NOx concentrations at the Teesmouth and Cleveland Coast exceed the critical level regardless of the emissions associated with the proposed development. **Likely Significant Effect**
	Introduction of synthetic compounds – Abnormal or emergency operating conditions (Emissions)	Consideration must be given to abnormal or emergency operating conditions leading to the release of synthetic compounds during the incineration process and waste disposal. Birds are particularly susceptible to pollution. Pollutants released into the air and water can cause health issues for birds due to an accumulation in fatty tissues causing reproductive problems among others (Sanderfoot & Holloway, 2017). Pollution of mudflats and scrapes used for foraging and nesting by the birds is also possible on accidental release of synthetic compounds. Therefore, potential releases of synthetic compounds into both the atmosphere and the water environment during abnormal or emergency operating conditions may cause an adverse impact on breeding and foraging bird species. However, baseline annual mean NOx concentrations at the Teesmouth and Cleveland Coast exceed the critical level regardless of the emissions associated with the proposed development. The PC is 3.3% of the AQAL and therefore cannot be screened out as insignificant and there is the potential for significant effects. **Likely Significant Effect**
	Introduction of non-synthetic compounds – Normal operating conditions	As with synthetic compounds, non-synthetic compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution measures to abide by statutory legislation. The operation of the facility requires the burning of domestic waste. Due to statutory facility design requirements, it is unlikely that synthetic compounds will be released into the water environment. **No Likely Significant Effect**
	Introduction of non-synthetic compounds – Abnormal or emergency operating conditions	Consideration must be given to abnormal or emergency operating conditions leading to the release of synthetic compounds during the incineration process and waste disposal. Birds are particularly susceptible to pollution. Pollutants released into the air and water can cause health issues for birds due to an accumulation in fatty tissues causing reproductive problems among others. Pollution of mudflats and scrapes used for foraging and nesting by the birds is also possible on accidental release of non-synthetic compounds.

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
		Despite this, it is expected that the facility design shall include backup measures in case of an emergency in which operation of the facility involves the release of compounds. Therefore, potential releases of non-synthetic compounds into both the atmosphere and the water environment are unlikely to cause an adverse impact on breeding and foraging bird species. **No Likely Significant Effect**
	Changes in nutrient loading from waste discharge	It is anticipated that waste products produced from the incineration process will be disposed of at a landfill site. An existing landfill site will most likely conduct waste disposal procedures in line with current environmental guidance to reduce the impacts on the surrounding area. It is expected that this form of waste disposal will be sufficient to negate impacts on the SPA if the landfill is within the ZoI of the designated sites, therefore nutrient loading from waste discharge in the watercourse is not anticipated. **No Likely Significant Effect**
	Changes in organic loading from waste discharge	It is anticipated that waste products produced from the incineration process will be disposed of at a landfill site. An existing landfill site will most likely conduct waste disposal procedures in line with current environmental guidance to reduce the impacts on the surrounding area. It is expected that this form of waste disposal will be sufficient to negate impacts on the SPA if the landfill is within the ZoI of the designated sites, therefore organic loading from waste discharge in the watercourse is not anticipated. **No Likely Significant Effect**
	Introduction of Invasive Non-native Species	Small-leaved Cotoneaster *Cotoneaster integrifolius* was recorded on site by both JBA Consulting and HBC in November 2019. There is the potential to spread this species out-with the site through vehicles and people. It is not anticipated that the project will cause the direct spread of this species to the SPA, however it could aid in spreading the species closer to the designated site. Biosecurity practices such as Check-Clean-Dry should be in place, however these can only be considered at the Appropriate Assessment stage. **No Likely Significant Effect**
	Air pollution – Construction Activities / Traffic	Air pollution levels will be elevated by an increase in the number of vehicle movements as a result of the construction, operation and decommissioning of the facility. The incineration of waste may cause changes to the atmospheric nitrogen deposition depending on the type of waste to be incinerated. Elevations in vehicle movements during construction or decommissioning are expected to be temporary. During the operation of the facility, exact levels of traffic movements are unknown however given the already high levels of traffic within the area, it is not anticipated that the operation of the facility will cause a dramatic increase in the air pollution levels. Therefore, air pollution it is not expected to cause an adverse impact on breeding and foraging bird species within the sensitive sites. **No Likely Significant Effect**
Teesmouth and Cleveland Coast Ramsar		
Ramsar Criterion 5 – Supports large water bird	Noise/vibration disturbance	Proposed works will result in an increase in road transport vehicles due to the transport of materials for construction and transport of waste during the operation of the facility. This increase in traffic levels has the potential to cause noise and vibration disturbance to water bird populations.

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
populations (>20,000 individuals) Ramsar Criterion 6 – Regularly supports 1% of the population of a water bird species		Construction activities will result in an increase in noise during the proposed works. Vibrations may be caused by construction works depending on the exact processes involved during the construction of the facility. The noise/vibration could disturb water bird populations making them spend more time in the air instead of foraging. Despite this, due to the distance of the Ramsar and proposed Ramsar from the proposed works area (both 1.6km) it is not anticipated that the qualifying features of the designated sites will be impacted. **No Likely Significant Effect**
	Visual disturbance	The existing surrounding area consists of steel works, a landfill site and other large industrial buildings. The construction of the facility will alter the landscape causing temporary visual disturbance; however the building is expected to fit in with the aesthetic of the area and the birds are anticipated to become accustomed to the addition of the building. There is also the potential for visual disturbance caused during the construction, operation and decommissioning of the facility as a result of increased traffic movements due to the addition of new employees to run and build the plant, plus haulage vehicles carrying building materials and domestic waste. It is expected that the qualifying species of the Ramsar will be accustomed to high levels of traffic in the area. Therefore, due to the distance of the Ramsar from the proposed works area and the roads in the area already being subjected to large volumes of traffic, it is not anticipated that the qualifying features of the designated sites will be impacted. **No Likely Significant Effect**
	Introduction of synthetic compounds – Normal operating conditions (Emissions)	The operation of the facility requires the burning of domestic waste. The facility will be state of the art. Compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution abatement measures to abide by statutory legislation. There are no Critical Levels set on the APIS website for Ramsar sites, however the SPA data has been applied. The PC is 3.3% of the AQAL and therefore cannot be screened out as insignificant and there is the potential for significant effects. However, baseline annual mean NOx concentrations at the Teesmouth and Cleveland Coast exceed the critical level regardless of the emissions associated with the proposed development. **Likely Significant Effect**
	Introduction of synthetic compounds – Abnormal or emergency operating conditions (Emissions)	Consideration must be given to abnormal or emergency operating conditions leading to the release of synthetic compounds during the incineration process and waste disposal. Birds are particularly susceptible to pollution. Pollutants released into the air and water can cause health issues for birds due to an accumulation in fatty tissues causing reproductive problems among others (Sanderfoot & Holloway, 2017). Pollution of mudflats and scrapes used for foraging and nesting by the birds is also possible on accidental release of synthetic compounds. Therefore, potential releases of synthetic compounds into both the atmosphere and the water environment during abnormal or emergency operating conditions may cause an adverse impact on breeding and foraging bird species. There are no Critical Levels set on the APIS website for Ramsar sites, however the SPA data has been applied. However, baseline annual mean NOx concentrations at the Teesmouth and Cleveland Coast exceed the critical level regardless of the emissions associated with the proposed development. The PC is 3.3% of the AQAL and therefore cannot be screened out as insignificant and there is the potential for

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
		significant effects. **Likely Significant Effect**
	Introduction of non-synthetic compounds – Normal operating conditions	As with synthetic compounds, non-synthetic compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution measures to abide by statutory legislation. The operation of the facility requires the burning of domestic waste. Due to statutory facility design requirements, it is unlikely that synthetic compounds will be released into the water environment. **No Likely Significant Effect**
	Introduction of non-synthetic compounds – Abnormal or emergency operating conditions	Consideration must be given to abnormal or emergency operating conditions leading to the release of synthetic compounds during the incineration process and waste disposal. Birds are particularly susceptible to pollution. Pollutants released into the air and water can cause health issues for birds due to an accumulation in fatty tissues causing reproductive problems among others. Pollution of mudflats and scrapes used for foraging and nesting by the birds is also possible on accidental release of non-synthetic compounds. Despite this, it is expected that the facility design shall include backup measures in case of an emergency in which operation of the facility involves the release of compounds. Therefore, potential releases of non-synthetic compounds into both the atmosphere and the water environment are unlikely to cause an adverse impact on breeding and foraging bird species. **No Likely Significant Effect**
	Changes in nutrient loading from waste discharge	It is anticipated that waste products produced from the incineration process will be disposed of at a landfill site. An existing landfill site will most likely conduct waste disposal procedures in line with current environmental guidance to reduce the impacts on the surrounding area. It is expected that this form of waste disposal will be sufficient to negate impacts on the SPA if the landfill is within the ZoI of the designated sites, therefore nutrient loading from waste discharge in the watercourse is not anticipated. **No Likely Significant Effect**
	Changes in organic loading from waste discharge	It is anticipated that waste products produced from the incineration process will be disposed of at a landfill site. An existing landfill site will most likely conduct waste disposal procedures in line with current environmental guidance to reduce the impacts on the surrounding area. It is expected that this form of waste disposal will be sufficient to negate impacts on the SPA if the landfill is within the ZoI of the designated sites, therefore organic loading from waste discharge in the watercourse is not anticipated. **No Likely Significant Effect**
	Introduction of Invasive Non-native Species	Small-leaved Cotoneaster *Cotoneaster integrifolius* was recorded close to the site by both JBA Consulting and HBC in November 2019. There is the potential to spread this species to the surrounding area through vehicles and people. It is not anticipated that the project will cause the direct spread of this species to the SPA, however it could aid in spreading the species closer to the designated site. **No Likely Significant Effect**
	Air pollution – Construction	Air pollution levels will be elevated by an increase in the number of vehicle movements as a result of the construction, operation

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
		and decommissioning of the facility. The incineration of waste may cause changes to the atmospheric nitrogen deposition depending on the type of waste to be incinerated. As stated during the assessment of synthetic and non-synthetic compounds, birds are particularly susceptible to pollution. Pollutants released into the air and water can cause health issues for birds due to an accumulation in fatty tissues causing reproductive problems among others. Elevations in vehicle movements during construction or decommissioning are expected to be temporary. During the operation of the facility, exact levels of traffic movements are unknown however given the already high levels of traffic within the area, it is not anticipated that the operation of the facility will cause a dramatic increase in the air pollution levels. Therefore, air pollution it is not expected to cause an adverse impact on breeding and foraging bird species. **No Likely Significant Effect**
North York Moors SAC		
Annex I Habitats: 4010 Northern Atlantic wet heaths with Erica tetralix 4030 European dry heaths 7130 Blanket bogs (if active bog - priority feature)	Introduction of synthetic compounds	Compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution measures to abide by statutory legislation. If accidental discharges were to occur, due to the distance of the Tees Estuary from the qualifying habitats and a lack of pathway in which the discharge products could locate from the Tees Estuary/North Sea to the SAC, it is not expected that any discharges into the water environment will impact upon the habitats of the SAC. The operation of the facility requires the burning of domestic waste. Due to statutory facility design requirements, it is unlikely that synthetic compounds will be released into the atmosphere. However, consideration must be given to the accidental release of synthetic compounds during the incineration process. Heath habitats are particularly sensitive to air pollution. Pollutants in the air can alter the chemical composition of the substrate, in turn causing alterations to plant growth, thus changing the vegetation composition by losing any sensitive species within the heathland. Defra guidance advises the assessment of air emission impacts on any vulnerable protected sites within 10km of the proposed works site. However, Natural England data on impact zones estimates that impacts on the SAC will not occur beyond 5km. Thus, due to the distance from the proposed works area, any accidental releases of synthetic compounds into the atmosphere are unlikely to cause an adverse impact on the SAC habitats. **No Likely Significant Effect**
	Introduction of non-synthetic compounds	As with synthetic compounds, non-synthetic compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution measures to abide by statutory legislation. If accidental discharges were to occur, due to the distance of the Tees Estuary from the qualifying habitats and a lack of pathway in which the discharge products could locate from the Tees Estuary/North Sea to the SAC, it is not expected that any discharges into the water environment will impact upon the habitats of the SAC. The operation of the facility requires the burning of domestic waste. Due to statutory facility design requirements, it is unlikely that non-synthetic compounds will be released into the atmosphere. However, consideration must be given to the accidental release of non-synthetic compounds during the incineration process. Heath habitats are particularly sensitive to air pollution. Pollutants in the air can alter the chemical composition of the substrate, in turn causing alterations to plant growth, thus changing the vegetation composition by losing any sensitive species within the

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
		heathland. Defra guidance advises the assessment of air emission impacts on any vulnerable protected sites within 10km of the proposed works site. However, Natural England data on impact zones estimates that impacts on the SAC will not occur beyond 5km. Thus, due to the distance from the proposed works area, any accidental releases of synthetic compounds into the atmosphere are unlikely to cause an adverse impact on the SAC habitats. **No Likely Significant Effect**
	Introduction of Invasive Non-native Species	Small-leaved Cotoneaster *Cotoneaster integrifolius* was recorded close to the site by both JBA Consulting and HBC in November 2019. There is the potential to spread this species to the surrounding area through vehicles and people. It is not anticipated that the project will cause the direct spread of this species to the SAC, however it could aid in spreading the species closer to the designated site. Biosecurity practices such as Check-Clean-Dry should be in place to prevent the spread of INNS to the wider area surrounding the proposed works site. **No Likely Significant Effect**
	Air pollution	Air pollution levels will be elevated by an increase in the number of vehicle movements as a result of the construction, operation and decommissioning of the facility. The incineration of waste may cause changes to the atmospheric nitrogen deposition depending on the type of waste to be incinerated. This may affect the qualifying habitats of the SAC due to the highly sensitive nature of these habitats and given that air pollution is listed as a known threat to the SAC. Pollutants in the air can alter the chemical composition of the substrate, in turn causing alterations to plant growth, thus changing the vegetation composition by losing any sensitive species within the heathland. It has been highlighted by Natural England that the SAC is currently exceeding the critical load for nitrogen. Defra guidance advises the assessment of air emission impacts on any vulnerable protected sites within 10km of the proposed works site. However, Natural England data on impact zones estimates that impacts on the SAC will not occur beyond 5km. Thus, due to the distance from the proposed works area, air pollution is unlikely to cause an adverse impact on the SAC habitats. **No Likely Significant Effect**
North York Moors SPA		
Annex I Species: Merlin *Falco columbarius* Golden Plover *Pluvialis apricaria*	Introduction of synthetic compounds	Compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution measures to abide by statutory legislation. If accidental discharges were to occur, due to the distance of the Tees Estuary from the qualifying features, the unlikely event that birds will use habitats over 5km away from the SPA and a lack of pathway in which the discharge products could locate from the Tees Estuary/North Sea to the SPA, it is not expected that discharges into the water environment will impact upon the species or functionally-linked habitats of the SPA. The operation of the facility requires the burning of domestic waste. Due to statutory facility design requirements, it is unlikely that synthetic compounds will be released into the atmosphere. However, consideration must be given to the accidental release of synthetic compounds during the incineration process. Defra guidance advises the assessment of air emission impacts on any vulnerable protected sites within 10km of the proposed works site. However, Natural England data on impact zones estimates that impacts on the SPA will not occur beyond 5km. Thus, due to the distance from the proposed works area, any accidental

Qualifying Feature	Potential Hazards	Assessment of Likelihood of Significant Effects
		releases of synthetic compounds into the atmosphere are unlikely to cause an adverse impact on the SPA species or functionally-linked habitats. **No Likely Significant Effect**
	Introduction of non-synthetic compounds	As with synthetic compounds, non-synthetic compounds are unlikely to be discharged into the Tees Estuary as correct disposal and design of the facility shall include anti-pollution measures to abide by statutory legislation. If accidental discharges were to occur, due to the distance of the Tees Estuary from the qualifying features, the unlikely event that birds will use habitats over 5km away from the SPA and a lack of pathway in which the discharge products could locate from the Tees Estuary/North Sea to the SPA, it is not expected that discharges into the water environment will impact upon the species or functionally-linked habitats of the SPA. The operation of the facility requires the burning of domestic waste. Due to statutory facility design requirements, it is unlikely that non-synthetic compounds will be released into the atmosphere. However, consideration must be given to the accidental release of non-synthetic compounds during the incineration process. Defra guidance advises the assessment of air emission impacts on any vulnerable protected sites within 10km of the proposed works site. However, Natural England data on impact zones estimates that impacts on the SPA will not occur beyond 5km. Thus, due to the distance from the proposed works area, any accidental releases of synthetic compounds into the atmosphere are unlikely to cause an adverse impact on the SPA species or functionally-linked habitats. **No Likely Significant Effect**
	Introduction of Invasive Non-native Species	Small-leaved Cotoneaster *Cotoneaster integrifolius* was recorded close to the site by both JBA Consulting and HBC in November 2019. There is the potential to spread this species to the surrounding area through vehicles and people, however it is not anticipated that the project will cause the spread of invasive non-native species to the North York Moors SPA. Biosecurity practices such as Check-Clean-Dry should be in place to prevent the spread of INNS to the wider area surrounding the proposed works site. **No Likely Significant Effect**
	Air pollution	Air pollution levels will be elevated by an increase in the number of vehicle movements as a result of the construction, operation and decommissioning of the facility. The incineration of waste may cause changes to the atmospheric nitrogen deposition depending on the type of waste to be incinerated. Defra guidance advises the assessment of air emission impacts on any vulnerable protected sites within 10km of the proposed works site. However, Natural England data on impact zones estimates that impacts on the SPA will not occur beyond 5km. Thus, due to the distance from the proposed works area, air pollution is unlikely to cause an adverse impact on the SPA species or functionally-linked habitats. **No Likely Significant Effect**

5.4 Potential In-combination Effects: Local Planning Projects

A review of the Redcar and Cleveland Borough Council planning portal (https://planning.redcar-cleveland.gov.uk/) and the Hartlepool Borough Council planning portal (eforms.hartlepool.gov.uk:7777/portal/servlets/ApplicationSearchServlet) found eight projects within 2.5km of the proposed works planned within the last five years that could potentially act in-combination with the proposed ERF facility.

5.4.1 Power Station Developments (R/2018/0098/FF and R/2008/0671/EA)

Two of these applications involve the construction of a power generation plant. Applications have been made to construct a 12 MWe peaking power plant (re-submitted 2018 after 2016 and 2017 submissions for different locations) and a 300MW power generation plant. The 12 MWe plant is planned to be constructed 700m south-east of the ERF. The facility is planned to contain six 2MW gas fired engine-driven electricity generators. The 300MW plant will produce energy by the incineration of biomass and will be located around 1.75km north from the ERF (OSGR NZ 54191 23232).

The in-combination effects anticipated from these two projects are expected to be from noise/vibration disturbance and visual disturbance during the construction stage and air pollution (including the introduction of synthetic and non-synthetic compounds into the atmosphere) during the operational stage.

5.4.2 Demolition of South Bank Works Temporary Storage Facility (R/2019/0427/FFM)

A planning application submitted in 2019 to demolish the South Bank Works temporary storage facility (located at OSGR NZ 55969 22788) has been approved. The in-combination effects of this project with the ERF are anticipated to be temporary visual disturbance, noise/vibration disturbance and release of synthetic and non-synthetic compounds into the Tees Estuary. Due to the nature of this project, there will be no operational stage.

5.4.3 Train Maintenance and Fuelling Facility (R/2019/0245/SC)

Due to the requirement to decommission diesel-only trains by 2040, a screening opinion has been submitted in 2019 to construct a maintenance and fuelling facility for Tees Valley hydrogen trains to Redcar and Cleveland Borough Council. This may cause visual disturbance and noise/vibration disturbance during construction, plus the location of the planned facility will cause the loss of brownfield habitat within the STDC area, which may cause in-combination effects on habitat connectivity within the STDC site.

5.4.4 Northern Gateway Container Terminal (R/2006/0433/OO)

A proposed container terminal at Teesport, Grangetown that will increase the numbers of vessels running to and from Teesport. The development is estimated to be located at OSGR NZ 55495 23555 around 2.4km north-east of the ERF.

This could result in in-combination effects with the construction of the ERF through increased levels of noise/vibration disturbance and visual disturbance during both construction and operation.

5.4.5 Peak Resources Refinery (R/2017/0876/FFM)

The application area lies 1.6km south-east of the ERF facility. The works will involve the construction and operation of a mineral processing and refining facility including ancillary development, car parking and landscaping. The refinery will produce approximately 35,000 tonnes of solid commercial and industrial waste, plus approximately 620,000m^3 of liquid effluent.

Potential in-combination effects with the ERF development could include noise/vibration disturbance, visual disturbance and air pollution (including introduction of synthetic and non-synthetic compounds into the atmosphere).

5.4.6 Residential Development (R/2014/0372/OOM)

A large housing development is planned 850m south of the ERF site. The development will involve the construction of up to 1250 homes. This development is likely to cause additional in-combination effects through noise/vibration disturbance as well as visual disturbance from increased traffic on main routes in the area near the ERF facility.

5.5 Potential In-combination Effects: Major Infrastructure Projects

Major infrastructure projects within the last five years were assessed for potential in-combination effects. Three major infrastructure projects are planned within 5km of the

proposed works and within the last five years. Two of the three projects have been granted planning permission. Information available on these are included in the following sections.

5.5.1 Tees Combined Cycle Power Plant (CCPP)

A gas fired combined cycle gas turbine (or CCGT) power station with an estimated maximum generating capacity of up to 1,700 MWe. This project will utilise existing Gas and National Grid connections. The power station will be located at the site of the former Teesside Power Station on Greystone Road, Grangetown at OSGR NZ 56642 20384 approximately 2.5km south-east of the ERF proposed site (https://infrastructure.planninginspectorate.gov.uk/projects/north-east/tees-ccpp/).

The HRA for this project concluded that there were no likely significant effects on the Teesmouth and Cleveland Coast SPA, pSPA, Ramsar, plus the North York Moors SAC and SPA from the proposed development of the power station. A Development Consent Order was granted on 05 April 2019 for this project.

5.5.2 York Potash Harbour Facilities Order

This development includes the installation of wharf/jetty facilities with two ship loaders capable of loading bulk dry material at a rate of 12m tons per annum. Associated dredging operations will be carried out to create berth, and a storage building will be built with a conveyor connecting it to the wharf/jetty. A materials handling facility will be included, which will be served by a pipeline and conveyor to the storage building and jetty. The Potash facility will be located at Bran Sand, Teesport at OSGR NZ 55035 24937 approximately 3.6km north of the ERF proposed site (https://infrastructure.planninginspectorate.gov.uk/projects/north-east/york-potash-harbour-facilities-order/).

The HRA process for this project proceeded to Appropriate Assessment due to the identification of likely significant effects from the following:

- Direct habitat loss;
- Water level changes;
- Noise, vibration and visual disturbance;
- Potential dust deposition;
- Sediment release from piling and dredging;
- Changes to coastal processes and sediment transport pathways.

5.5.3 A Development Consent Order for the York Potash Harbour Facilities Order was granted on 20 July 2016.Teesside Cluster Carbon Capture and Usage project

This is a 'full chain' carbon capture, utilisation and storage (CCUS) project, comprising a combined cycle gas turbine electricity generating station with a capacity of up to 2,000 megawatts output. Cooling water, gas and electricity grid connections, carbon capture and compression equipment are included within the development as well as a booster station, low-pressure CO^2 pipeline connections to industrial users and a high-pressure CO^2 pipeline for onward transport of CO^2 to a geological storage site in the North Sea. The Carbon Capture facility is to be located in the vicinity of the Sahaviriya Steel Industries (SSI) Steel Works Site, Redcar at OSGR NZ 56971 25200 approximately 4.6km north-east of the ERF proposed site (https://infrastructure.planninginspectorate.gov.uk/projects/north-east/teesside-cluster-carbon-capture-and-usage-project/).

An HRA has not been completed for this project, but an assessment of impacts on European designated sites is recommended in the Scoping Opinion. As the project is only at the early stages of planning, it is not possible to predict any likely significant effects on the European designated sites.

5.6 Future Developments

Within the STDC Regeneration Master Plan, other developments have been planned for the 'Grangetown Prairie' area. Future in-combination effects with these planned developments will be assessed in future HRAs during the planning process.

5.7 Summary of In-combination Effects

Overall, in-combination effects with the development may occur from both local planning projects and major infrastructure projects. It should be noted that this has been assessed with an outline summary of the proposed works for the ERF facility. A summary of potential in-combination effects along with what stage the effect is anticipated to occur from both project types is summarised in Table 5-5 below.

Table 5-5: Summary of In-Combination Effects Assessment

Potential Hazards	Local Planning Projects			Major Infrastructure Projects		
	C*	O*	D*	C*	O*	D*
Noise/vibration disturbance	✓	✓	✓	✓	✓	✓
Visual disturbance	✓	✓	✓	✓	✓	✓
Introduction of synthetic compounds	✓	✓	✓	✓	✓	✓
Introduction of non-synthetic compounds	✓	✓	✓	✓	✓	✓
Changes in nutrient loading from waste discharge	x	x	x	x	x	x
Changes in organic loading from waste discharge	x	x	x	x	x	x
Introduction of Invasive Non-native Species	x	x	x	x	x	x
Air pollution	✓	✓	✓	✓	✓	✓

* C=Construction, O=Operation, D=Decommissioning.

In-combination effects may occur from projects at different stages, or at the same stages. Major infrastructure projects assessed as having no likely significant effect may still have in-combination effects with the ERF proposed works.

6 Screening Statement and Conclusion

6.1 Potential Hazard to European Site

Based on the assessment in Table 5-6, Emissions (normal and abnormal) are deemed to have Likely Significant Effect. The nitrogen nutrient baseline deposition exceeds the minimum critical level (AQAL) of 8 kg/ha/yr regardless of the operation of the Proposed Facility. The maximum Process Contribution from the Proposed Facility anywhere within the Teesmouth and Cleveland Coast ecological site is 0.75 kg/ha/yr, which is 9.4% of the AQAL. As such the potential for significant effects cannot be discounted.

In the absence of avoidance and reduction measures. the proposed works, alone and in-combination, are likely to have a significant effect on the Teesmouth and Cleveland Coast SPA, and Ramsar. It is anticipated that all bird species, populations and habitats will be affected. The likely significant effects both alone, and in-combination, could be caused by:

- Introduction of synthetic compounds (Normal Conditions)
- Introduction of synthetic compounds (Abnormal Conditions)

The HRA process must therefore proceed to an Appropriate Assessment.

7 Information for Appropriate Assessment

7.1 Introduction

Following submission of the HRA, Natural England Requested that the results from the Air Quality Assessment was integrated into the HRA.

7.2 European sites

Table 7-1 below shows the European sites that have been screened into the Appropriate Assessment, as summarised in **Error! Reference source not found.**. No o ther European designated sites are within the area of influence of the project.

Table 7-1: European sites screened into this assessment

Site	Proximity to site
Teesmouth and Cleveland Coast Ramsar/SPA/SSSI	2 km
North York Moors SAC /SPA	9.4 km

7.3 Conservation Objectives

Refer to Section 4 for the Conservation Objectives for the two European Sites. In line with the Holohan v An Bord Pleanala ECJ case (C-462/17), this assessment considers typical habitats or species, within or outside of a European site boundary, if they are necessary to the conservation of the habitat types and species listed for the protected area.

7.4 Appropriate assessment of project impacts alone

Taking into account the prevailing site conditions, screened in qualifying features, and the typical habitats and species necessary to the conservation of these features, the proposed works and mitigation measures and the conservation objectives for each European site, the following tables detail the Appropriate Assessment undertaken for the project.

The North York Moors SAC / SPA have been screened out given that the site is over 9 km of the proposal and therefore the integrity of the site unlikely to be affected given the its likely exposure.

Table 7-2: Air Emissions Normal and Abnormal Operations

Site	Interest feature	Prevailing environmental conditions	Scale and seriousness of potential effect	Proposed mitigation and confidence in measures	Residual impacts on site integrity.
Teesmouth and Cleveland Coast Ramsar/SPA/SSSI	Annex I Breeding Species: Little Tern *Sterna albifrons* Annex I Passage Species: Sandwich Tern *Sterna sandvicensis* Annex II Wintering Species: Knot *Calidris canutus islandica* Annex II Passage Species: Redshank *Tringa totanus totanus* Waterfowl assemblage	The maximum background deposition fluxes to the Teesmouth and Cleveland Coast SAC, SPA and Ramsar have been taken from the APIS website (APIS, 2019), where they are reported as a three-year average (2015-2017). Background nutrient deposition rates exceeded the critical loads in this period, while the acid nitrogen deposition rate exceeded the CLminN critical load in this period and therefore is considered against the CLmaxN; the acid nitrogen and sulphur deposition rates are below the CLmaxN and CLmaxS critical loads (the relevant AQALs) in this period. Baseline annual mean NOx concentrations at	Following the approach set out in the IAQM guidance the percentage Process Contribution compared to the relevant AQAL has been calculated. Where long-term PCs are below 1% of the AQAL, the impacts can be considered insignificant. Where the PC is greater than 1% the baseline levels need to be considered. The operational air quality effects on sensitive habitats without mitigation are judged to be potentially significant due to current exceedances of the AQALs. However: • Baseline annual mean NOx concentrations at the Teesmouth and Cleveland Coast ecological site exceed the critical level regardless of the emissions associated	The current application is for outline design only based on a preliminary design. During the Environmental Permitting process, the Proposed Facility will be required to demonstrate that Best Available Techniques (BAT) have been implemented. This represents a substantial improvement on the former industrial facilities. A further Appropriate Assessment will be required once the detailed design has been completed.	No impact on the site integrity is predicted.

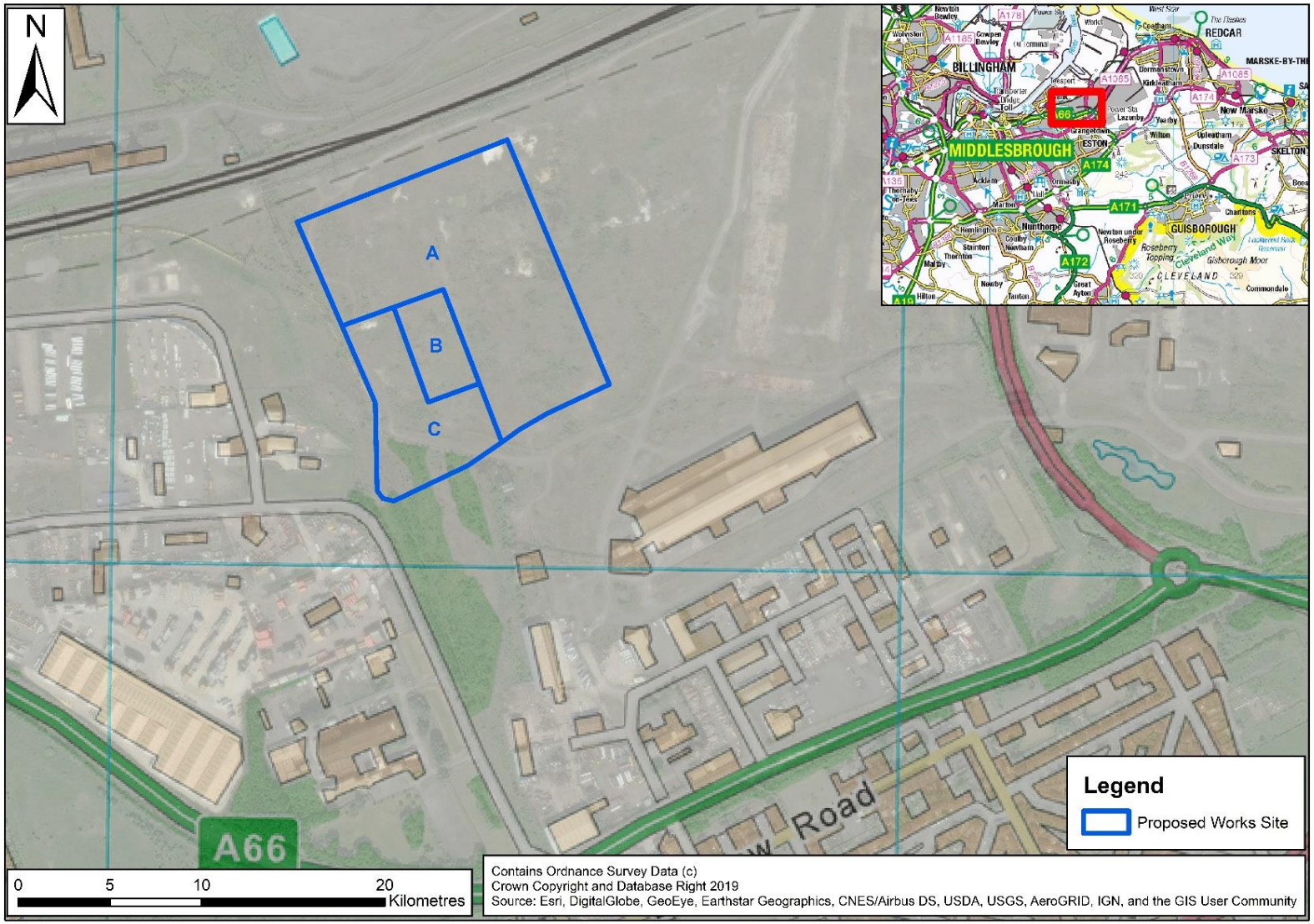
Site	Interest feature	Prevailing environmental conditions	Scale and seriousness of potential effect	Proposed mitigation and confidence in measures	Residual impacts on site integrity.
		the Teesmouth and Cleveland Coast exceed the critical level regardless of the emissions associated with the proposed development. Known threats and pressures on the SPA are 'Outdoor sports and leisure activities, recreational activities' (G01), 'Pollution to surface waters (limnic & terrestrial, marine & brackish)' (H01), 'Human induced changes in hydraulic conditions' (J02), 'Industrial or commercial areas' (E02) and 'Fishing and harvesting aquatic resources' (F02).	with the proposed development. • This baseline concentration for NH3 exceeds the AQAL without the operation of the Proposed Facility. • The nitrogen nutrient baseline deposition exceeds the minimum critical level (AQAL) of 8 kg/ha/yr regardless of the operation of the Proposed Facility. No condition survey is provided for the SSSI. No identified Condition Threats are identified on the Natural England website. **The proposed development is therefore considered unlikely to adversely affect the interest features.**		

7.5 Appropriate assessment of project impacts alone

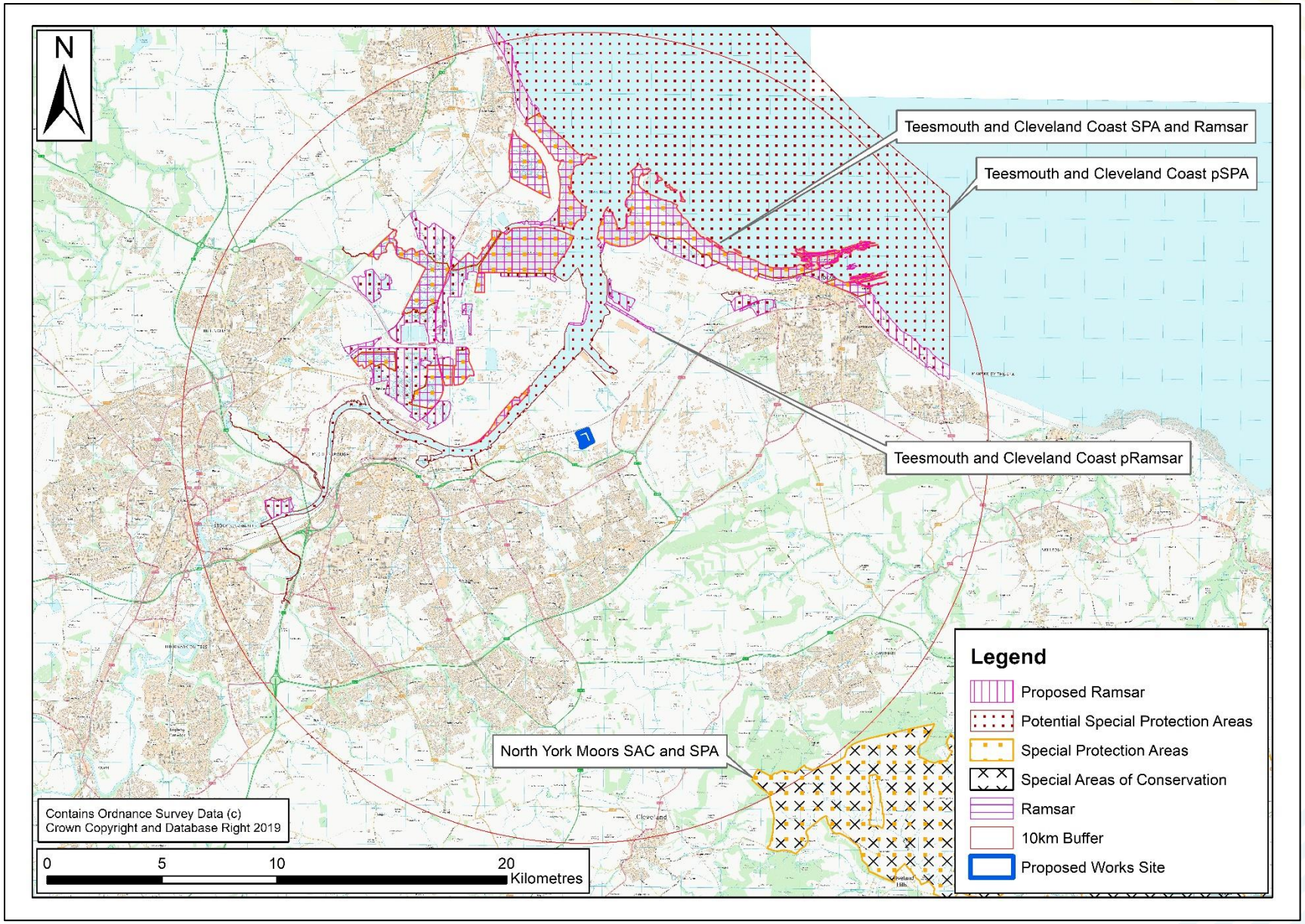
A number of operational, consented, or pending, schemes have been identified in the study area. However, given this is an outline planning application it is not practical at this stage nor possible to model emissions from these cumulative developments. Cumulative impacts have not been considered in the Air Quality assessment will be assessed within the detailed planning application and updated Appropriate Assessment.

Appendices

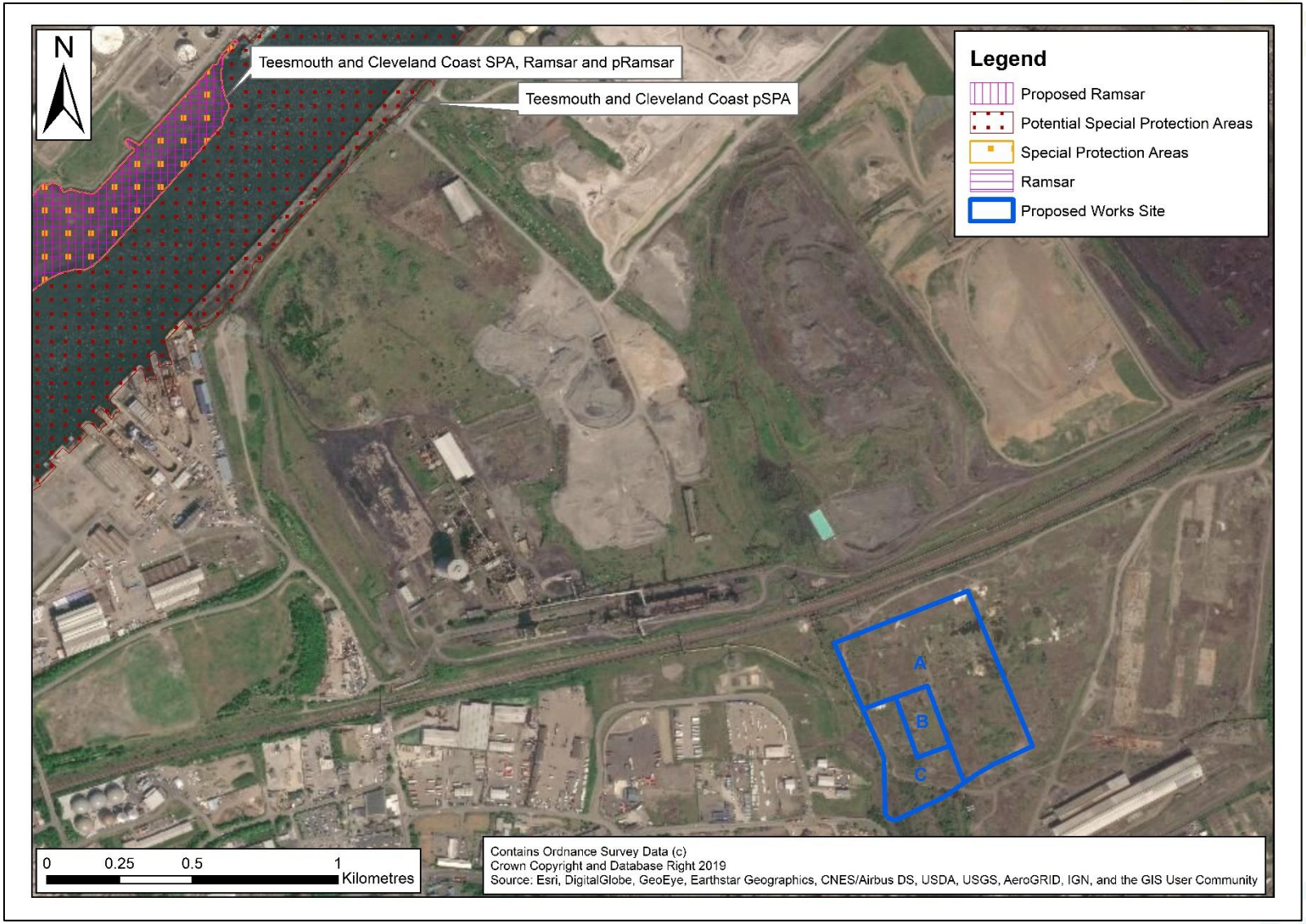
A Works Location Map



B Designated Sites Map (the extended areas have been highlighted for completeness)



C Habitats Aerial Map



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