

7 ECOLOGY AND ORNITHOLOGY

7.1 Introduction

7.1.1 This chapter of the Environmental Statement (ES) sets out the assessment of effects on ecology, ornithology and nature conservation. The assessment includes the following:

- sites designated for their nature conservation importance (international, national and local);
- habitats present; and
- protected or otherwise notable species.

7.1.2 The chapter considers the effects of the proposed development including land take, severance and/or fragmentation of habitats, disturbance of species, pollution from runoff, lighting, air pollutants and noise.

7.2 Assessment Methodology

Legislation and Planning Policy Context

7.2.1 The following section provides a summary of the relevant legislation and planning policy for ecological and ornithological receptors.

Legislation

7.2.2 The following relevant UK legislation has been considered within this assessment.

- Town & Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended);
- The Conservation of Habitats and Species Regulations 2010 (as amended);
- The Countryside and Rights of Way Act 2000;
- Wildlife and Countryside Act 1981 (as amended);
- The Natural Environment and Rural Communities (NERC) Act 2006;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;
- Eels (England and Wales) Regulations 2009
- Hedgerows Regulations 1997
- The Protection of Badgers Act 1992

7.2.3 EC Directives 2009/147/EC on the Conservation of Wild Birds (the Birds Directive) and 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) are also relevant. These are implemented in the UK principally through the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010.

7.2.4 The Government has particular responsibilities with respect to Sites of Special Scientific Interest (SSSIs) under section 28G of the Wildlife and Countryside Act 1981. An authority to which this section applies has the duty of exercising its functions to take reasonable steps, consistent with the proper exercise of those functions, to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is notified as being of special scientific interest.

- 7.2.5 All wild birds, their nests and eggs are protected under Part 1, Section 1 of the Wildlife and Countryside Act 1981. Birds listed in Schedule 1 of the Act are subject to special protection. Wild animals listed in Schedule 5 are protected under Section 9. Plants listed in Schedule 8 are protected under Section 13 of the Act.
- 7.2.6 The Birds Directive provides a framework for the conservation and management of, and human interactions with, all wild birds in Europe. Birds listed in Annex 1 are afforded special protection.
- 7.2.7 European sites (e.g. designated Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) fall within the scope of the Conservation of Habitats and Species Regulations 2010 (as amended). In addition, paragraph 176 of the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019a) requires that potential SPA, possible SAC, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential, possible or proposed SPAs, SACs and Ramsar sites be treated in the same way as classified sites.
- 7.2.8 Under Regulation 63 of the Conservation of Habitats and Species Regulations 2010 (as amended) an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site. Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process.
- 7.2.9 The main aim of the Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed in the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. Member States are required to take requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) and plant species in Annex IV (b).
- 7.2.10 Under Section 40 of the Natural Environment and Rural Communities Act 2006, the Government must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.
- 7.2.11 Section 41 of the Act requires the Government, in consultation with Natural England, to publish and keep under review and revise as appropriate, a list of the living organisms and types of habitat which in its opinion are of principal importance for the purpose of conserving biodiversity.
- 7.2.12 The Environment Bill, reintroduced to Parliament in January 2020, includes an expectation on public authorities to look strategically at their policies and operations at least every five years and assess what action they can take 'to further' the conservation and enhancement of biodiversity. They must also have regard to the relevant Local Nature Recovery Strategies (LNRs) as part of the consideration.
- 7.2.13 The Environment Bill includes a requirement for biodiversity net gain. The Bill will make it mandatory for housing and development to achieve at least a 10% net gain in value for biodiversity – a requirement that habitats for wildlife must be left in a measurably better state than before the development.
- 7.2.14 The nature and biodiversity Part of the Environment Bill (Part 6) and conservation covenants (Part 7) provide a framework of measures to support nature's recovery in line with the ambition set out in the 25 Year Environment Plan.

National Planning Policy

- 7.2.15 The revised NPPF (Ministry of Housing, Communities and Local Government, 2019a) sets out the Government's planning policies for England and how these are expected to be applied (paragraph 1) and that it is a material consideration in planning decisions (paragraph 2).
- 7.2.16 Paragraph 170 of the NPPF outlines how planning decisions should enhance the natural and local environment by, among other things:
- protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
 - minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
 - preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
 - remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.
- 7.2.17 In respect of Habitats and Biodiversity, paragraph 175 sets out that in determining planning applications the following principles should be applied:
- if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative Application Site with less harmful impacts) adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
 - development on land within or outside a SSSI, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the Application Site that make it of special scientific interest, and any broader impacts on the national network of SSSIs;
 - development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and
 - development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.
- 7.2.18 The National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities and Local Government, 2019b) supports the NPPF and provides guidance across a range of topic areas. These include climate change, EIA, flood risk and coastal change, the natural environment, water supply, wastewater and water quality.

Local Planning Policy

- 7.2.19 The Redcar and Cleveland Local Plan (RCLP)¹ was adopted in May 2018 and provides both the strategic and non-strategic policy objectives and requirements for the development and use of land within the Borough for the period until 2032.
- 7.2.20 It adopts a vision for the Borough which sets out that by the end of the plan period the need and aspirations of its community will be met through the delivery of sustainable development across the Borough.
- 7.2.21 Policy LS4 – South Tees Spatial Strategy – relates to land within the South Tees Development Corporation area and its aims include :

y. [protecting] *European sites, and safeguard and improve sites of biodiversity interest particularly along the River Tees and the estuary and encourage integrated habitat creation and management; and*

z. [enhancing] *the environmental quality of the River Tees and coastline;*

Policy N4 – Biodiversity and Geological Conservation seeks to protect the borough’s biodiversity resources and requires biodiversity to be considered at an early stage in the development process with appropriate protection and enhancement measures incorporated into the design of the development. Under the policy, priority is given to protect the internationally important sites of the borough, e.g. Teesmouth and Cleveland Coast SPA/Ramsar and requires that any development which is likely to have a significant effect be subject to an Appropriate Assessment. Development requiring Appropriate Assessment would only be allowed where the integrity of the designated site is not affected. Policy N4 also supports the protection of nationally and locally designated ecological sites (for further details see Chapter 5: Planning Policy).

Relevant Guidance

- 7.2.22 In addition to the legislation and policy documents set out in the previous sections above, the following relevant guidance has been considered during the assessment:
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition (CIEEM, 2018);
 - Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System; and
 - The Water Framework Directive (2000).

Study Area and Zone of Influence (Zoi)

- 7.2.23 To define the study area for this assessment, consideration has been given to the potential impact pathways and their extent from the construction and operation of the REC. The two impact pathways considered to have the greatest Zoi are considered here: they are air emissions and noise disturbance.
- 7.2.24 The impact of air emissions from the REC during construction would be limited to those receptors within 50 metres as per the guidance Air Quality Management Guidance (Holman et al.,2014). The

¹ Redcar and Cleveland Borough Council (2018) The Redcar and Cleveland Local Plan Adopted May 2018

impact of air emissions from the REC during operation would have the potential to extend over the greatest distance from the proposed development. The ZOI for this impact pathway has been designated as 10 km from the proposed development, based on guidance set out by the Environment Agency (EA)² in relation to air emissions from power stations. This indicates that SPAs, SACs and Ramsar sites should be considered as potential receptors within 15 km of an installation of this nature, or 10 km for large electric power station or refinery. Air Quality Impacts are considered in further detail within Chapter 11 and within the impact assessment section of this Chapter. Refer to Figure 7.1: Designated Sites with 15 km of the proposed development.

- 7.2.25 Noise disturbance from construction and operational activities is the second key potential impact of the proposed development. The exact level of construction noise and the penetration into the surrounding environment would depend on the construction methods adopted. A 'louder' noise source generating a sound pressure of 100 dBA³ at 10 metres from source would attenuate to approximately 55 dBA over mud flats or open fields at about 760 metres⁴. On a precautionary basis, only European Sites within a 1 km radius of the proposed development are considered in this Chapter in relation to the potential for noise disturbance.
- 7.2.26 Taking into account the ZOIs for air emissions (10 km), noise emissions (1 km) in addition to the all other recognised impact pathways, the study area for the desk assessment for the proposed development extended to 15 km for designated sites and 2 km for protected species and habitats.

Baseline Methodology

Desk Study

- 7.2.27 In accordance with the relevant guidance (CIEEM, 2018), an ecology desk study has been undertaken to identify records of designated sites and protected habitats or species based on the ZOIs identified above.
- 7.2.28 Ecological records within a 3 km radius of the site were requested from Environmental Records Information Centre North East (ERIC NE) biological records service (Technical Appendix 7.1, Figure A7). Data requests were limited to records for protected species recorded within the last ten years and sites of nature conservation interest. This included a review of existing statutory sites of nature conservation interest, such as Sites of Special Scientific Interest (SSSIs), SPAs, SACs and National Nature Reserves (NNRs), and non-statutory sites, such as Sites of Importance for Nature Conservation (SINCs) and Local Wildlife Sites (LWSs).
- 7.2.29 The British Trust for Ornithology (BTO) were consulted to obtain data from the Wetland Bird Survey (WeBs), a long-term monitoring scheme for non-breeding waterbirds across the UK. Data was requested for the two blocks, Bran Sands North (Sector: 52428) and Quarries and Lagoons (Sector: 52430), located to the north and east covering a period of five years (2014/2015 – 2018/2019). See Technical Appendix 7.1, Figure A7.3 for details of the sectors.

² DEFRA & Environment Agency (2016). Air Emissions Risk Assessment for Your Environmental Permit. How to complete an air emissions risk assessment, including how to calculate the impact of your emissions and the standards you must meet. Available at: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#screening-for-protected-conservation-areas>.

³ dBA - A-weighted decibels using a scale based on intensity and on how the human ear responds.

⁴ Xodus Group (2014). Review of Questions on Noise and Draft Technical Note on Noise disturbance and birds. Report to Natural England. Xodus Group Document Number L-400104-S00-TECH-001.

- 7.2.30 In addition to the desk study, the other key component of a Preliminary Ecological Appraisal (PEA) (CIEEM, 2017) is a site walkover which typically consists of a Phase 1 Habitat Survey (JNCC, 2010) and an assessment of the potential for (or presence of) protected or notable habitats or species. The PEA results are presented in Appendix 7.2: Terrestrial Ecology Technical Appendix of this ES.
- 7.2.31 The Phase 1 Habitat Survey was undertaken on the 30 September 2019 and included the Application Site and a 100-metre buffer covering all areas of accessible land following the relevant survey methodology detailed in the Baseline Methodology Section.
- 7.2.32 All ornithology related field surveys were conducted within a 500 metre buffer surrounding the Application Site, covering all areas of accessible land following the relevant survey methodology detailed in the Baseline Methodology Section.

Field Study

- 7.2.33 Breeding bird surveys were conducted comprising of monthly visits completed between May – August 2019 following the BTO standard methodology (Bibby *et al.*, 2000). All points within the entire survey area were covered to within 100 metres where possible. During the survey all birds were recorded with their species code and notation detailing the behaviour observed. Any evidence of breeding (i.e. nest location) was also mapped.
- 7.2.34 Winter wetland bird surveys were conducted comprising of monthly visits completed between August 2019 - April 2020 (to incorporate Sandwich tern) following the BTO Wetland Bird Survey methodology. Surveys covered the site ownership boundary and a 500 metre buffer in accessible areas of suitable habitat. Monthly survey visits were alternated between high and low tide to capture the range of associated bird presence/distribution.
- 7.2.35 A full description of the ornithological methodologies and a breakdown of the survey dates and effort are presented in Technical Appendix 7.1, while survey areas are presented in Figure A7.3.
- 7.2.36 Appendix 7.2 provides the Ecology Technical Appendix, providing a detailed account of the survey methodologies and results generated to date for the REC.
- 7.2.37 The Phase 1 Habitat survey followed the standard methodology (JNCC, 2010), and as described in the Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017). In summary, this comprised walking over the survey area and recording the habitat types and boundary features present.
- 7.2.38 A protected species scoping survey was carried out in conjunction with the Phase 1 Habitat survey. The Application Site was assessed for its suitability to support protected species, in particular great crested newts, reptiles, birds, badgers, bats and other species that could pose a planning constraint such as Invasive Non-Native Species (INNS) subject to legal control.
- 7.2.39 A preliminary bat roost assessment of all structures and trees was completed during the visit. The assessment followed the methodology detailed in Collins⁵ (2016) and comprised an external ground level assessment to identify features likely to be used by roosting bats.

⁵ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London. ISBN-13 978-1-872845-96-1.

Consultation

7.2.40 A summary of all consultation with stakeholders or consultees is provided in the table below. Table 7.1 also provides the reference for where each consultation response is addressed within the Chapter or Technical Appendices.

Table 7.1: Consultation Responses Relevant to Ecology and Ornithology

Date	Consultee and Issues Raised	How/ Where Addressed
7 May 2020 (Pre-app telecon)	<p>Natural England’s Discretionary Advice Service.</p> <p>Telephone call to discuss potential implications of the proposed Redcar Energy Centre on neighbouring designated sites, including information required for draft Habitats Regulations Assessment (HRA), and follow up letter (dated 11 May 2020) to confirm advice provided if required.</p>	<p>The Impact Assessment Section of this Chapter, the Noise Chapter (Chapter 12) and the HRA (see Appendix 7.3), presents a thorough assessment of the potential impacts of the REC on designated sites during construction and operation.</p> <p>A thorough assessment of the potential impacts from emissions from the proposal on the habitats of South Gare Dunes (in terms of NOx deposition in particular) are presented in this Chapter and the Air Quality Chapter (Chapter 11) utilising the APIS website⁶.</p> <p>The landscape strategy (Figure 6.9) has been amended to include landscaping to reflect the wider ecology of the area and the plants would be locally sourced.</p> <p>Biodiversity Net Gain, whilst not currently required, would be delivered off-site following best practice.</p> <p>An HRA has been completed (see Appendix 7.3)</p>
15 May 2020 (Scoping response)	<p>Natural England</p> <p>Potential impacts from the development could arise during construction and operation, including noise disturbance to SPA and SSSI bird interests on Bran Sands, and to the dune habitats of the SSSI from emissions and deposition.</p> <p>The site layout drawings also show tree and shrub planting are part of the site landscaping. This is unlikely to be in keeping with the wider landscape and should be revisited. Any landscaping should be done using seeds of local provenance and designed to buffer the designated site habitats.</p> <p>A concern was raised about the location of the processing building on the Incinerator Bottom Ash (IBA) part of the REC because it was close to the northern boundary of the Application Site and therefore, the adjacent SSSI.</p> <p>The Environmental Statement should therefore include an assessment of the likely</p>	<p>An HRA has been completed (see Appendix 7.3).</p> <p>The landscape strategy (Figure 6.9) has been amended to include landscaping to reflect the wider ecology of the area and would be locally sourced.</p> <p>The building on the IBA part of the site would be used to process the IBA to remove metals before the material is left for maturation on the site. The processing activity would be enclosed but may generate some noise from the conveyor and machinery used to move the IBA. A decision was made post-consultation to move the processing building to the western boundary of the IBA area to increase the distance between the building and the SSSI as a means of reducing disturbance.</p> <p>Furthermore, a 5 metre wall around the IBA area and a standoff from the base</p>

⁶ ww.apis.ac.uk. Accessed June 2020

Date	Consultee and Issues Raised	How/ Where Addressed
	<p>impacts on the wildlife and geodiversity interests of [local wildlife] sites.</p> <p>The ES should assess the impact of all phases of the proposal on protected species.</p> <p>The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as ‘Habitats and Species of Principal Importance’ within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006.</p>	<p>of the existing bund would be provided. Full details can be found in Chapter 2: Project Description.</p>
<p>2 June 2020 (Scoping response)</p>	<p>South Tees Development Corporation (STDC)</p>	
	<p>The STDC concurs with the approach for assessing the impact on protected species.</p> <p>The proposed scope does not, however, include reference to an assessment of ecology within the River Tees or at the RBT wharf (intertidal surveys have been carried out but there is no information on their scope). The Scoping Report, however, makes clear that, where feasible, waste may also be brought to the site using the existing wharf. We would, therefore, welcome clarity as to the intentions regarding use of the wharf.</p>	<p>Noted</p> <p>Should waste be brought to the Application Site via the wharf, a separate assessment would be undertaken.</p>
<p>9 June 2020 (Scoping response)</p>	<p>Environment Agency</p>	
	<p>A Water Framework Directive (WFD) Assessment is required and should consider the likely impact of the development of water quality having regard to the WFD status of the nearby Tees Estuary. It is important that this includes assessment of impacts to water quality, and benthic invertebrates (of which the designated birds depend).</p> <p>Nearby mudflats also support a complex ecosystem of invertebrates, bird and fish. Improvements to the transitional habitats which border [the nearby mudflats] would be welcomed.</p> <p>Biodiversity net gain requires developers to ensure habitats for wildlife are enhanced and left in a measurably better state than they were pre-development. They must assess the type of habitat and its condition before submitting plans, and then demonstrate how they are improving biodiversity.</p> <p>Any detrimental impacts on the Teesmouth and Cleveland Coast SPA, SSSI and Ramsar sites or their designated features will require a Habitats Regulation Assessment.</p>	<p>A WFD Assessment has been completed and is appended to the EIA (Appendix 8.3).</p> <p>The landscape strategy (Figure 6.9) has been amended to include landscaping to reflect the wider ecology of the area and will be locally sourced.</p> <p>A small waterbody with shallow slopes and marginal reeds would be included within the landscape strategy to provide suitable habitat for invertebrates such as dragonfly and damselfly to complete their lifecycle.</p> <p>The Landscape Management Plan will include objectives to encourage wall butterfly into the site by creating suitable habitat such as broken turf and exposed stony areas incorporating the food plants of cock's-foot, bent grasses, wavy hair-grass and Yorkshire-fog for instance. Wall butterfly are a species of principal importance under the NERC Act in England (widespread but rapidly declining) Section 41 and there are records of their presence in proximity to the Site.</p> <p>An HRA has been completed and is included in Appendix 7.3.</p>

Assessment Criteria and Assignment of Significance

- 7.2.41 The assessment process follows the approach detailed in CIEEM (2018) which now places a greater emphasis on professional judgement of the reporting Ecologist rather than the table-based assessment commonly used prior to the 2018 guidance. The term Important Ecological Feature (IEF) is used for those species and habitats identified to be included in the assessment. Other 'important ecological features' may occur on or in the vicinity of the site of a proposed development but do not need to be considered because there is no potential for them to be affected significantly. For each impact with the potential to affect the relevant IEFs, the assessment considers the following parameters:
- whether the impact is positive or negative in its influence;
 - the extent of the impact;
 - the magnitude, duration and timing of the impact; and,
 - the impact's frequency and ease of reversibility.
- 7.2.42 The assessment similarly includes consideration of any proposed mitigation to avoid or minimise the effect of any potential impact to the relevant IEFs and identifies any potential cumulative impacts from surrounding developments prior to determining the significance of any effect, be this negligible, minor, moderate or major. Effects could be either beneficial or adverse.;
- 7.2.43 It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and would remain viable and sustainable. However, efforts should still be made to safeguard biodiversity in its entirety.
- 7.2.44 Definitions of the sensitivity/value and magnitude terms are provided in Tables 7.2 and 7.3 below.

Assessment of Effects

- 7.2.45 The assessment of effects includes the consideration of any proposed mitigation measures to avoid or minimise the effect of any potential impact to the relevant IEFs. The residual effect will take into account the likely success of the proposed mitigation measures to reduce the extent, magnitude and duration of any impact prior to determining the residual significance of any effect.

Criteria for Assessing Sensitivity of Receptors

- 7.2.46 The approach to the assessment of the sensitivity and value of an ecological receptor is first to consider its conservation status and the importance of the feature present on the site and then consider its capacity to accommodate change which reflects its ability to recover if it is affected.
- 7.2.47 All receptors exhibit a greater or lesser degree of sensitivity to the changes brought about by the proposed development and defining receptor 'sensitivity' as part of the definition of the baseline environment helps to ensure that the subsequent assessment is transparent and robust.
- 7.2.48 In order to define the sensitivity of a receptor, the guidelines presented in Table 7.2 have been adopted in this ES and the conclusions reached regarding the sensitivity of receptors has been presented in the baseline sections of each relevant environmental topic.

Table 7.2: Guidelines used in assigning receptor sensitivity

Typical Descriptors	
Sensitivity / Value	
High	Receptor has very limited or no capacity to accommodate physical or chemical changes or influences (Adverse). Alternatively, the receptor is capable of accommodating and will benefit from significant change (Beneficial)

Typical Descriptors	
Sensitivity / Value	
	Receptor possesses fundamental characteristics which contribute significantly to the distinctiveness, rarity and character of the resource, is of very high importance and rarity that is international in scale (e.g. designated sites such as SACs, SPAs, Ramsar Sites and Habitats Directive Annex II species).
Medium	Receptor has minor capacity to accommodate physical or chemical changes or influences (Adverse). Alternatively, the receptor is capable of accommodating and will benefit from a moderate amount of change (Beneficial).
	Receptor possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the resource, is of high importance and rarity that is national in scale (e.g. designated sites such as SSSIs, NNRs, UK Biodiversity Action Plan (BAP) habitats and species, etc.), and has limited potential for substitution / replacement.
Low	Receptor has moderate capacity to accommodate physical or chemical changes or influences (Adverse). Alternatively, the receptor is capable of accommodating and will benefit from minor changes (Beneficial).
	Receptor possesses key characteristics which contribute to the distinctiveness and character of the resource, is of medium importance and rarity that is regional in scale (e.g. designated sites such as County Wildlife Sites (CWSs), Local BAP, etc.), and has limited potential for substitution / replacement.
Negligible	Receptor has high capacity to accommodate physical or chemical changes or influences (Adverse). Alternatively, the receptor is capable of accommodating and will gain a very minor benefit from changes (Beneficial).
	Receptor characteristics do not make a significant contribution to local character or distinctiveness, and are of very low importance and rarity, are not designated, and are easily substituted /replaced.
No change	Receptor has full capacity to accommodate physical or chemical changes or influences but will gain no benefit from said changes.

Magnitude of Impact

7.2.49 The magnitude of an effect is typically defined by four factors:

- Extent – the area over which an effect occurs.
- Duration – the time for which the effect occurs.
- Frequency – how often the effect occurs.
- Severity – the degree of change relative to existing environmental conditions.

7.2.50 The criteria used for assessing the magnitude of effects on IEFs were as follows in Table 7.4.

Table 7.3: Definitions of Magnitude

Magnitude of Impact	Typical Descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).

Magnitude of Impact	Typical Descriptors
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse). Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse). Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

7.2.51 The duration of an effect is hard to quantify across all habitats and species due to inherent differences in life histories. Therefore, the duration of each effect on receptors has been assessed on an individual basis taking into account species and habitats ecological characteristics.

Significance of Effects

7.2.52 The significance of each effect upon each IEF has been assessed. An ecologically significant effect is defined as an impact on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species (CIEEM, 2018). The effect can be adverse, neutral or beneficial and is assessed within a specific geographic context i.e. at the scale at which the ecological feature was valued (e.g. local/ national/ international). The significance of effects is described as negligible, minor, moderate or major. Effects are considered to be significant under the 2017 EIA Regulations where the effect is classified as being of ‘major’, ‘moderate’, or ‘minor’ where:

- Major: effects which are likely to be important considerations at a regional or district scale but which, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision-making process;
- Moderate: effects which, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource; or,
- Minor: effects which may be raised as local issues, but which are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in the detailed design of the project.

7.2.53 Negligible effects are those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

7.2.54 Whilst CIEEM (2018) advise against the use of a matrix approach to assigning significance they recognise that this approach is typically taken to provide consistency across all the topics of the ES. The matrix approach has been taken here though a clear distinction is provided between evidence-based and value-based judgements so that decision makers and stakeholders are aware of the level of subjective evaluation that has been used as presented in Table 7.5.

Table 7.5: Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial

7.2.55 The final assessment of whether a significant effect is likely was completed by taking the mitigation measures into account, including the mitigation incorporated into the design of the proposed development. This requires an assessment on the likelihood of successful mitigation being achieved and the mitigation proposed needs to be qualified in terms of the probability of success. The assessment of mitigation success can be based on both professional judgement and experience of other mitigation schemes. In general, a precautionary approach has been adopted in determining the outcome. In relation to determining likely significant effects on European protected sites a precautionary approach is always adopted.

Limitations of the Assessment

7.2.56 The behaviour of birds recorded during the Wetland Bird Survey was limited to overall behavioural patterns on each visit with key areas of importance for roosting waterbirds identified on survey maps. The exact behaviour of each individual bird at the time of each record was not noted. However, based on the distribution of species and the information recorded during surveys the utilisation of habitats can be inferred. Furthermore, a precautionary approach has been taken when determining the significance of effect on bird species utilising the intertidal habitat where it has been assumed that the entire intertidal habitat may be utilised for feeding wading birds. As such, the limited information collected relating to individual bird behaviours is not considered to affect the robustness of the conclusions made in this document.

7.3 Baseline Environment

Desk Based Study

Designated Sites

7.3.1 There are four statutory designated sites for ornithology features within 15 km of the Application Site and one statutory designated site within 2 km of the site designated for ecological features; these are presented in the Table 7.6 below.

Table 7.6: Designated Sites within Zol

Designation	Name	Distance from site	Qualifying Interests
International Designations			
SPA / Ramsar	Teemouth and Cleveland Coast	80 metres	This site is designated under article 4 of the Birds Directive for supporting more than 1% of the GB population of the following Annex 1 species:

Designation	Name	Distance from site	Qualifying Interests
			<ul style="list-style-type: none"> • Pied avocet (18 pairs, 1.2% of the GB populations); • Sandwich tern (1,900 individuals, .3% of the GB population); • Common tern (399 pairs, 4.0% of the GB population); • Little tern (81 pairs, 4.3% of the GB population); and • Ruff (19 individuals, 2.4% of the GB population). <p>And supporting more than 1% of the biogeographical population of two regularly occurring migratory species not listed on Annex 1:</p> <ul style="list-style-type: none"> • Red knot (5,509 individuals, 1.6% of the NE Canada/Greenland/Iceland /UK population); and • Red shank (1,648 individuals, 1.1% of the East Atlantic population) <p>And it is regularly used by over 20,000 waterbirds/seabirds in any season:</p> <ul style="list-style-type: none"> • Waterbird assemblage (216,014 average number of individuals)
SPA	North York Moors	14 km	<p>This site is designated under article 4.1 of the Birds Directive for regularly supporting 1% or more of the GB population of the following Annex 1 species:</p> <ul style="list-style-type: none"> • Merlin (35 - 40 pairs, 2.7 - 3.1% of the GB population); and • Golden Plover (526 – 706 pairs, 2.3 – 3.1% of the GB population).
SPA / Ramsar	Northumbria Coast	15 km	<p>This site is designated under article 4 of the Birds Directive for regularly supporting more than 1% of the GB population of the following Annex 1 species:</p> <ul style="list-style-type: none"> • Artic tern (1,549 pairs, 2.92% of the GB population); and • Little tern (40 pairs, 1.7% of the GB population) <p>And regularly supporting more than 1% of the biogeographical populations of the following species not listed on Annex 1:</p> <ul style="list-style-type: none"> • Turnstone (1,739 individuals, 2.6% of the biogeographical population); and • Purple sandpiper (787 individuals, 1.6% of the biogeographical population).
National Designations			
SSSI	Teesmouth and Cleveland Coast	0 metres	<p>Nationally important features that occur within and are supported by the wider mosaic of coastal and freshwater habitats (and not listed as designated features of the SPAs above):</p> <ul style="list-style-type: none"> • Sand dunes; • Saltmarshes; • Breeding harbour seals; • A diverse assemblage of breeding birds of sand dunes, saltmarsh and lowland open waters and their margins; • Non-breeding ringed plover; and

Designation	Name	Distance from site	Qualifying Interests
			<ul style="list-style-type: none"> A diverse assemblage of invertebrates associated with sand dunes.

Teesmouth and Cleveland Coast SPA and RAMSAR

7.3.2 The nearest designated site to the proposed development is the Teesmouth and Cleveland Coast SPA and Ramsar site (Ref. No. 11068) (see Figure 7.1) classified on 15 August 1995 and subsequently extended on 31 March 2020. The boundary of the SPA is approximately 80 metres from the Application Site to the north at the foreshore of the North Sea. The boundary extends along the coast from Redcar to where it meets the Northumbria Coast SPA and Ramsar site. The site encompasses the underpinning Teesmouth and Cleveland Coast Site of Special Scientific Interest (SSSI) comprising of coastal wetland habitats.

North York Moors SPA and SAC

7.3.3 Located approximately 14 km south of the Application Site, and stretching to over 50 km away, the SPA is designated for breeding golden plover and merlin (both Annex I); while the SAC is designated for its blanket bog, European dry heath, and North Atlantic wet heath qualifying habitats.

Northumbria Coast SPA and Ramsar Site

7.3.4 Located approximately 15 km from the Application Site, the Northumbria Coast SPA and Ramsar site joins the Teesmouth and Cleveland Coast SPA and Ramsar site at its northern extent. This exclusively coastal site is designated for breeding little tern (Annex I), as well as purple sandpiper and turnstone (Annex 4.2 migratory species).

Environmental Records Information Centre NE

7.3.5 In order to simplify the results, only records of species from the last 10 years are assessed in the following paragraphs. In addition, only data with a 6-figure grid reference resolution or higher are provided, since locations given at a lower resolution do not allow accurate calculation of distance to the proposed development. Records which are confirmed or 'considered correct' by ERIC NE are included.

Marine Mammals

7.3.6 The desk assessment identified a record of a single common seal and three grey seals 1.1 km from the Application Site. These mammals are UK BAP and Local BAP species, respectively and are included on Schedule 4 of the Habitats Directive. Seals are sensitive to noise and the impact of noise generating activities, particularly during site clearance works. Consequently, potential effects to the species should be considered during this phase of the proposed development. Potential impacts to water quality are also a key consideration to these species and have been assessed in the ES.

Terrestrial Mammals

7.3.7 The desk assessment identified several records of brown hare 200 metres from the Application Site between 2010-16. They are a UK Biodiversity Action Plan species and are listed in Section 41 of the NERC Act considered of principle importance for the conservation of biodiversity in England. They are sensitive to disturbance and are frequently killed in collisions with moving vehicles or hunted illegally. They are not typically associated with the habitats found on the Application Site

being more typically found in grassland habitats. As such, the potential increase in noise during construction which would be temporary, and any change to the operation noise levels for the REC, are not considered to be detrimental for this species. The REC would be securely fenced to prevent mammals entering the facility. The only other notable terrestrial species records returned in the desk assessment are roe deer and weasel which are provided limited protection under the Bern Convention to prevent their exploitation. The species are free roaming and would utilise most habitats for foraging. The proposed development is not considered likely to increase their persecution or exploitation.

Invertebrates

- 7.3.8 The desk assessment identified records of small heath and wall butterfly within 700 metres and 1.3 km of the Application Site respectively. These are UK Biodiversity Action Plan species and are listed in Section 41 of the NERC Act considered of principle importance for the conservation of biodiversity in England. Small heath butterfly are associated with grassland where there are fine grasses, especially in dry, well-drained situations such as coastal dunes, but it is also found on road verges, moorland and in woodland rides. Wall butterfly are found in open grassland, on dunes and other coastal habitats, as well as disused quarries and derelict land. Of the two species, there is potential for wall butterfly to occur on the Application Site although there was little grass species (the food plant of the caterpillar) evident within the bare ground on site during the field surveys. As such, it is considered that the species is more likely to utilise the semi-improved habitat to the north of the Application Site.

Birds

- 7.3.9 The consultation data received from ERIC NE has been restricted to a five-year period between 2014 – 2019 for the purpose of ensuring relevance to the present state baseline.
- 7.3.10 The data identified that 69 bird species utilise the habitats within the 3 km search area, the majority of which are associated with the intertidal and nearshore coastal habitats of the Tees Estuary.
- 7.3.11 Five species are named features of the Teesmouth and Cleveland Coast SPA/Ramsar (common tern, knot, little tern, redshank and sandwich tern), while six form the main components of the waterbird assemblage feature (cormorant, lapwing, sanderling, shelduck, teal, and wigeon).
- 7.3.12 Arctic tern, barn owl, black tern, black-necked grebe, black-tailed godwit, dunlin, fieldfare, firecrest, golden plover, great northern diver, green sandpiper, kittiwake, little egret, lapwing, linnet, merlin, peregrine, purple sandpiper, red-throated diver, ringed-plover, Roseate tern, shag, short-eared owl, Slavonian grebe, Tiaga bean goose, whimbrel and woodcock are listed on Schedule 1 of the WCA 1981, Annex 1 of the Birds Directive and/or Red Birds of Conservation Concern (BoCC) (Eaton *et al.*, 2015) all of which are recorded infrequently and in low densities.

British Trust for Ornithology (WeBS) Data

- 7.3.13 British Trust for Ornithology (WeBS) data obtained from the BTO for the five-year period between 2014/15 – 2018/19 for Bran Sands and Quarries and Lagoons sectors. These data identify that the areas are utilised by an array of waterbirds, with 51 species recorded at the two areas combined (see Technical Appendix 7.1, Figure A7.3).
- 7.3.14 Of the 51 species recorded, five are named species of the Teesmouth and Cleveland Coast SPA/Ramsar and are listed below, with their peak average monthly abundance and percentage representation of the SPA population:
- Common tern – 20 (representing 5% of the SPA population);

- Little tern – 1 (representing 2.5% of the SPA population);
- Sandwich tern – 73 (representing 3.8% of the SPA population.);
- Knot – 125 (representing 2.3% of the SPA population); and
- Redshank 117 – (representing 7.1% of the SPA population).

- 7.3.15 Common tern is a breeding features of the SPA/Ramsar and the peak monthly average occurred in August. The peak in abundance is towards the end of the breeding season when flocks of birds gather in areas where food supply is plentiful to gain weight before migrating to overwintering grounds. Therefore, the high percentage of the SPA population recorded for this species does not reflect the breeding individuals.
- 7.3.16 Nine species constitute the primary components of the waterbird assemblage feature: black-headed gull, cormorant, gadwall, herring gull, lapwing, sanderling, shelduck, teal, and wigeon. Other notably abundant species at Bran Sands are dunlin, grey plover and oystercatcher.
- 7.3.17 Additional notable species include those listed on Annex 1 of the Birds Directive, Schedule 1.1 of the Wildlife and Countryside Act 1981 and/or Red Listed BoCC; bar-tailed godwit, black-necked grebe, common scoter, golden plover, great northern diver, little egret, purple sandpiper, Slavonian grebe, whimbrel, curlew and kittiwake all of which occur infrequently and in low abundances.
- 7.3.18 The greatest abundance of birds occurs annually through the overwintering period between November – February. The total peak monthly average counts for all waterbird species combined across the two sectors was 998 individuals in December, representing 3.8% of the waterbird assemblage feature of the Teesmouth and Cleveland Coast SPA/Ramsar.

Field Studies

Phase 1 Habitat Survey

- 7.3.19 The habitats on the Application Site are species poor and of low conservation value consisting of bare ground, scattered and introduced scrub (including planted Japanese rose – an Invasive None Native Species), semi-improved grassland and temporary ponds formed by pooling surface water. These ponds were mostly devoid of vegetation though one was observed to contain grasses and no typical aquatic vegetation was present. The semi-improved grassland comprising the bund on the northern boundary separates the Application Site from the dune and coastal habitats forming part of the Teesmouth and Cleveland Coast SSSI and is regularly disturbed by dog walkers and recreational users. The bund would be retained and protected during construction. The habitats on the Application Site are not of ecological importance, being common and abundant locally and are not considered a constraint to the development (Technical Appendix 7.2, Figure A7.7).

Protected Species Survey

- 7.3.20 No evidence of amphibians was noted on the Application Site, the ponds seen were temporary rain ponds and not suitable for supporting breeding amphibians and no records of amphibians were included in the desk assessment. No evidence of reptile presence was seen on the Application Site and no potential hibernacula noted. The bund on the northern edge of the Application Site boundary is too fine a material to be used as a hibernacula though the semi-improved grassland and coastal dunes provide foraging and basking potential for reptiles, such as common lizard however no records of reptiles were returned in the desk assessment.
- 7.3.21 The three buildings on the Application Site were not found to hold any potential to support roosting bats (Figure A7.8). No evidence of any other mammal species or the potential for them to be present was noted on the Application Site. Habitats within the buffer around the Application Site

provide potential for terrestrial mammal species such as hedgehog. No protected or notable terrestrial animals were recorded on site.

Breeding Bird Survey

- 7.3.22 Monthly breeding bird surveys were completed between May – August 2019 of the Application Site and surrounding buffer area as shown in Technical Appendix 7.1, Figure A7.3. Full details of the survey results are provided in Technical Appendix 7.1.
- 7.3.23 In total 42 species were recorded during the breeding bird surveys. Three species recorded are listed features of the Teesmouth and Cleveland Coast SPA/Ramsar: common tern, Sandwich tern and redshank. Three species are listed as primary components of the waterbird assemblage feature of the SPAs: black-headed gull, cormorant, and herring gull.
- 7.3.24 Additional notable species include dunlin and peregrine both of which are listed on Annex 1 of the Birds Directive and/or Schedule 1 of the Wildlife and Countryside Act 1981, and curlew, linnet, ringed plover, skylark, starling, and song thrush listed as Red status BoCC.
- 7.3.25 The only explicit evidence of breeding recorded was a single skylark nest located adjacent to the waterbody north east of the Application Site (Technical Appendix 7.1, Figure A7.4 and A7.5). Several small passerine species were recorded singing in scrub and sand dune habitats to the northwest and east of the Site indicating the use of this habitat type for breeding by such species.
- 7.3.26 Records of waterbirds are almost entirely restricted to the nearshore and intertidal habitats of Bran Sands. Great black-backed gull, herring gull, and ringed plover are the only species recorded utilising the area of bare-ground within the footprint of the proposed development and its surroundings.

Winter Wetland Bird Survey

- 7.3.27 Monthly winter wetland bird surveys were completed between August 2019 – April 2020. In total, 31 waterbird species were recorded. Full details of the survey results are provided in Technical Appendix 7.1 and presented in Figure A7.6.
- 7.3.28 The most abundant (i.e. peak count exceeding 100 individuals) and frequently occurring (i.e. recorded in at least seven of the survey months) species recorded over the survey period were bar-tailed godwit, black-headed gull, cormorant, curlew, dunlin, grey plover, knot, lapwing, oystercatcher, redshank and ringed plover.
- 7.3.29 Four species recorded are named features of the Teesmouth and Cleveland Coast SPA/Ramsar as breeding, passage or wintering listed below with peak counts and percentage representation of the SPA population;
- Common tern – 43 (10.8% of the SPA population);
 - Knot (275 (5% of the SPA population);
 - Redshank 94 (5.78% of the SPA population); and
 - Sandwich tern – 7 (0.5% of the SPA population).
- 7.3.30 One species recorded is a named feature of the Northumbria Coast SPA;
- Turnstone – 15 (0.9% of the SPA population).
- 7.3.31 Eight species recorded constitute primary components of the Teesmouth and Cleveland Coast SPA/Ramsar waterbird bird assemblage feature; black-headed gull, cormorant, gadwall, herring gull, lapwing, shelduck, teal and wigeon. Other notable abundant and/or frequently recorded

species over the survey period are bar-tailed godwit, dunlin, grey plover, and ringed plover, with smaller numbers of oystercatcher and sanderling.

- 7.3.32 Overall the distribution of birds was almost entirely confined to the intertidal habitats beyond the coastal embankment along the perimeter of the shore within the Teesmouth and Cleveland Coast SPA/Ramsar boundary (Figure A7.6). Higher concentrations of records were present towards the western extent of the shoreline and within the small inlet fed from the Tees Mouth. Seaward the distribution was more diffuse with an area of concentrated activity along the sandbank to west of the intertidal area. Records of species utilising the industrial area within the Application Site were scarce, and were limited to great black-back gull and herring gull.

Disturbance Levels

- 7.3.33 Bran Sands is a popular site for recreational use by wind surfers and dog walkers, along with more commercial activities such as bait digging. Disturbance from these sources was recorded during each survey visit. There was disturbance recorded at the Application Site on every visit throughout the survey period at some point in the tidal cycle. Wind surfers were only recorded at mid, mid-high and high tidal states where birds were largely confined to nearshore habitats, although a record of wind surfers flushing birds was noted on one visit. Bait diggers were limited to the low-mid, low, and mid-low tidal states when the intertidal areas were accessible. Dog walkers were sporadic across all tidal states. In combination between all three disturbances sources the entire tidal cycle was effectively exposed to a degree of disturbance.

Important Ecological Features (IEFs)

- 7.3.34 In accordance with paragraphs 7.2.41, IEF's have been selected for detailed consideration from potential impacts of construction, operation and decommissioning of the proposed development (Table 7.4: Important Ecological Feature Selection). Ecological features scoped out from further assessment and therefore not selected as an IEF have been determined as they are sufficiently widespread, unthreatened and resilient to project impacts that they would remain viable and sustainable throughout each phase of the proposed development. For each Ecological Receptor the specific justification of their exclusion or inclusion from the assessment is provided as a qualification.

Table 7.4: Important Ecological Feature Selection

Receptor	Sensitivity	Scoped In / Out as an IEF	Qualification
Designated Sites			
Teesmouth and Cleveland Coast SPA/Ramsar	High	In	Internationally designated site the boundary of which is approximately 80 metres from the Application Site. This site is important for breeding, passage and wintering species of international importance and supports large numbers of waterbirds many of which occur in the nearshore and intertidal habitats adjacent to the proposed development. These habitats provide important feeding and roosting sites for the qualifying interests of this receptor.
Northumbria Coast SPA/Ramsar	High	Out	Internationally designated site the boundary of which is approximately 15 km from the Application Site that supports breeding arctic tern and little tern, and passage turnstone and purple sandpiper. However, no direct

Receptor	Sensitivity	Scoped In / Out as an IEF	Qualification
			impacts on this site are predicted due to its distance of separation from the proposed development. While little tern and turnstone do occur in proximity to the Application Site is in low abundance and frequency.
North York Moors SPA	High	Out	Internationally designated site the boundary of which is approximately 14 km from the Application Site that supports breeding golden plover and merlin. No direct impacts on this site are predicted due to its distance of separation from the proposed development and the ecology of the feature species.
Teesmouth and Cleveland Coast SSSI	High	In	Nationally designated site the boundary of which directly abuts the Application Site. Designated features include sand dune and saltmarsh habitats which are both listed as UKBAP priority habitats and could potentially be impacted by air quality impacts from the proposed development, which could have knock on effects on invertebrates. While harbour seals are a designated feature there is not likely to be any impact from the proposed development.
Habitats			
Saltmarshes Sand dunes	High	In	UKBAP priority habitats. There are no habitat loss impacts from the proposed development, however the deposition of air pollutants as a result of the operation phase has the potential to negatively alter these habitats.
Marine Mammals			
Common seals Grey seals Harbour seals	Medium	Out	Priority species known to be sensitive to noise and vibration. However, there is no in-water works proposed and the piling and other temporary noisy works are sufficiently in-land as to avoid any significant impact on these species.
Terrestrial Mammals			
Brown hare Roe deer Weasel	Medium	Out	Brown hare is a UK Biodiversity Action Plan species and a species of principle importance for the conservation of biodiversity in England. They are not typically associated with the habitat on the Application Site and the temporary and permanent change in noise/disturbance above the baseline is not considered significant for the species. No potential negative impact predicted on roe deer or weasel.
Invertebrates			
Wall butterfly Small heath butterfly	Medium	Out	These are UK Biodiversity Action Plan (for research only) species considered of principal importance for the conservation of biodiversity in England. Of the two species, there is limited potential for wall butterfly to

Receptor	Sensitivity	Scoped In / Out as an IEF	Qualification
			occur on the Application Site and they are known to be present locally. However, their habitats are not deemed particularly sensitive to air quality changes and they are locally common.
Birds			
Common Tern Little Tern	High	Out	Qualifying feature of the Teesmouth and Cleveland Coast SPA/Ramsar. Occurrence is infrequent and in low abundance for both species, with a peak average of 1 and 20 for little tern and common tern respectively. Peak common tern abundance occurs in August when most breeding is finished, and birds are preparing for migration.
Sandwich Tern Knot Redshank	High	In	Qualifying features of the Teesmouth and Cleveland SPA/Ramsar which were frequently recorded within the intertidal and nearshore habitats and the Bran Sands WeBS Sector.
Waterbird Assemblage Primary Component Species (cormorant, shelduck, teal, shoveler, sanderling, wigeon, gadwall, lapwing, herring gull, and black-headed gull)	High	In	Qualifying feature of the Teesmouth and Cleveland Coast SPA/Ramsar which were frequently recorded in abundances of greater than 1% of the respective SPA reference populations.
Bar-tailed Godwit Black-necked Grebe Black Tern Common Scoter Dunlin Golden Plover Great Northern Diver Green Sandpiper Little Egret Purple Sandpiper Red-throated Diver Roseate Tern Slavonian Grebe Whimbrel	High	Out	Protected species listed on Schedule 1 of the Wildlife and Countryside act (1981) and/or Annex 1 of the Birds Directive which were recorded infrequently and/or in low abundance (i.e. representing >1% of the GB population).
Barn Owl Merlin Peregrine Short-eared Owl	High	Out	Protected species listed on Schedule 1 of the Wildlife and Countryside act (1981) and/or Annex 1 of the Birds Directive which were recorded infrequently and/or in low abundance (i.e. representing >1% of the GB population).
Fieldfare Firecrest	High	Out	Protected species listed on Schedule 1 of the Wildlife and Countryside act (1981) and/or Annex 1 of the Birds Directive which were recorded infrequently and/or in low abundance (i.e. representing >1% of the GB population).

Receptor	Sensitivity	Scoped In / Out as an IEF	Qualification
Arctic Skua Black-tailed Godwit Curlew Kittiwake Ringed Plover Shag Skylark Taiga Bean Goose Twite	Medium	Out	Red listed BoCC which were recorded infrequently and/or in low abundance (i.e. representing >1% of the GB population).

Future Baseline Conditions

- 7.3.35 In the event that the proposed development does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.
- 7.3.36 The main change is considered to be an increased biodiversity on site resulting from a slow recolonization of the bare ground by vegetation. Changes in frequency and extremes of rainfall events, through the impacts of climate change, may result in more pooling of surface water on site. Equally it may result in less rainfall meaning that the temporary pools observed during the PEA would disappear.

7.4 Mitigation Measures Adopted as Part of the Project

- 7.4.1 In order to address the impacts listed above, as far as practicable, a number of mitigation strategies have been adopted as part of the proposed development. These strategies are factored into the impact assessment when assigning a significance of effect although not explicitly referenced in all cases.

Mitigation Measures Adopted for Construction

- 7.4.2 Early in the construction programme a 5 metre high wall would be constructed around the perimeter of the IBA recycling facility. This would delineate the construction site boundary; the semi-improved grassland to the north of the site (the bund) would be protected during construction using suitable fencing and a work-free buffer established. The wall would be retained throughout the operation of the REC. The wall serves additional functions in addition to being a key component of the IBA building. Importantly, it will avoid visual disturbance of birds utilising the intertidal habitats at Bran Sands and Saltholme Nature Reserves. The concrete perimeter wall will reduce the temporary noise disturbance to birds and other sensitive receptors during construction and reduce permanent noise disturbance during operation of the REC.
- 7.4.3 As detailed in Chapter 2: Project Description, a Code of Construction Practice would be prepared prior to the construction works and agreed with Redcar and Cleveland Borough Council. The CoCP would set out procedures to ensure all activities with potential to affect the environment are appropriately managed and would include, amongst other things, a Pollution Prevention Plan, Oil Spill Contingency Plan and Noise Management Plan.
- 7.4.4 Good construction practices, in accordance with Best Practicable Means, would be applied to minimise noise and vibration emissions during the construction of the REC. These construction practices would be set out in the Code of Construction Practice (CoCP) and agreed with the Local Planning Authority post consent. The measures would include:
- the use of quieter alternative methods, plant and equipment, where reasonably practicable;

- plant, ancillary plant, equipment, site offices, storage areas and worksites would be positioned away from existing noise sensitive receptors, where reasonably practicable;
- all construction plant and equipment would comply with EU noise emission limits;
- no plant or machinery engines would be left running unnecessarily; and
- all vehicles, plant and equipment would be maintained and operated in an appropriate manner, to ensure that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum.

7.4.5 Further mitigation measures are included in Chapter 12: Noise and Vibration.

Mitigation Measures Adopted for Operation Phase

- 7.4.6 The 5-metre-high wall around the IBA recycling facility would be retained during the operation of the REC to attenuate noise levels at the nearest ecologically sensitive area (the Teesmouth and Cleveland Coast SSSI, SPA and Ramsar), creating both a sound and visual barrier. The IBA building would contain the IBA processing equipment and would act as a further sound and visual barrier.
- 7.4.7 The landscape strategy (Figure 6.9) has been amended, post-consultation, to include landscaping to reflect the wider ecology of the area and plants would be of local provenance. At the request of Natural England, a small waterbody with shallow slopes and marginal reeds has been included within the landscape strategy to provide suitable habitat for invertebrates such as dragonfly and damselfly to complete their lifecycle to increase local biodiversity.
- 7.4.8 The landscape strategy would include objectives to encourage wall butterfly into the Application Site by creating suitable habitat such as broken turf and exposed stony areas incorporating the food plants of cock's-foot, bent grass species, wavy hair-grass and Yorkshire-fog for instance.
- 7.4.9 Surface water runoff during the operational phase would be managed in accordance with the outline drainage strategy (Appendix 8.2 of Chapter 8: Hydrology and Flood Risk) which would be approved by the Lead Local Flood Area prior to construction commencing.
- 7.4.10 For clean runoff, the outline drainage strategy includes the collection of surface water via traditional slot / channel drains before discharging via suitable oil interceptors to an attenuation pond and onward via an off-site gravity discharge to the River Tees at an uncontrolled rate. No surface water drainage from the IBA area would be discharged to the Tees Estuary via the uncontrolled discharge.
- 7.4.11 No process effluent or boiler water would be discharged to the clean water surface water system. A separate system to deal with this water would be provided. Any excess process water produced in planned outages of the proposed development would be directed to an onsite wastewater tank and any surplus would be tankered off site.
- 7.4.12 No process or 'dirty' water would be discharged into the River Tees. The Environmental Permit would incorporate a number of emergency procedures in the operational phase which would be used in the case of accidental spillage.
- 7.4.13 Further detail regarding how runoff would be managed is provided within Chapter 8: Hydrology and Flood Risk.

7.5 Assessment of Construction Effects

- 7.5.1 The land take associated with the construction of the proposed development would comprise an area of approximately 10.1 hectares of heavily industrialised land formerly used for the storage of

bulk materials such as coal scrapings. The land has negligible ecological value and the potential impacts of land take have been scoped out of the assessment accordingly.

Temporary Noise Disturbance

- 7.5.2 The construction of the REC would generate noise during the 32-month schedule. Piling would generate the greatest levels of noise with the potential of causing disturbance to birds utilising the nearshore and intertidal habitats closest to the Application Site.
- 7.5.3 The exact method of piling at the time of writing is unknown and depending on which method is used the noise levels generated will vary greatly. Details about the maximum noise levels predicted at the nearest IEF has been calculated in Chapter 12: Noise and Vibration which considers noise levels from impact piling and Continuous Flight Auger (CFA) piling. Noise levels and the potential for disturbance is greater from impact piling.
- 7.5.4 As summarised in the Baseline Environment (Section 7.3) the nearshore and intertidal habitats directly adjacent to the Application Site support foraging and roosting habitat for a wide variety of waterbirds. Five of the species recorded are named features of the Teesmouth and Cleveland Coast SPA/Ramsar.
- 7.5.5 The IECS (Institute of Estuarine and Coastal Studies) 2009 report (Cutts et al., 2009) defines disturbance in the general context as discrete events that disrupt ecosystem, community or population structures or in some way alter resource levels i.e. food and space. It may also influence the survival of individual birds and reduce the function of the site either for roosting or feeding. The report states that disturbance varies in its magnitude, frequency, predictability, spatial distribution and duration, and species vary greatly in their susceptibility to disturbance and this susceptibility is likely to vary with age, season, weather and the degree of previous exposure. The links between visual and audible stimuli are evident throughout the IECS report and it is clear that noise by itself is not necessarily a cause for disturbance if not accompanied by a perceived visual threat.
- 7.5.6 The IECS report reviews a 1999 study (also by IECS) into the disturbance of birds in response to flood defence works at Saltend on the Humber Estuary. In a series of reports by IECS to the Saltend Cogeneration Company into the effects of piling noise from different techniques on estuarine birds, the monitoring of noise related disturbance was carried out. Noise levels were predicted across the site and ranged between 55 – 84 dBA⁷
- 7.5.7 The IECS report also refers to observations made during the construction of the South Humber Power Station. The report states that despite consistent periods of piling activity on the pump house construction site on the landward side of the seawall, birds appeared indifferent to the noise of piling and during visits in February and March, the numbers and distribution of birds on the mudflats at low tide were similar during periods of piling and periods without piling. The report considered that the screening of the mudflats by the seawall was effective in minimising disturbance effects and that any disturbance caused by piling activity could have been attributed to the increased presence of people associated with such activities.
- 7.5.8 The IECS report goes on to give an illustrative overview of the effects of disturbance to waterbirds from different activities that may arise as a result of a construction project. Five levels of disturbance impact are defined for feeding and roosting:

⁷ These are A-weighted decibels. The A-weighted sound levels closely match the perception of loudness by the human ear.

• **Table 7.5: IECS noise impact criteria**

Level	Impact	Effect Level	dBA	Type of Noise
1	No impact	Low	Below 50	Regular construction noise
2	Behavioural changes (alarm calls, heads up, change in feeding/roosting activity)	Moderate	Equal to or below 70	Piling noise
3	Movement within zone	Moderate to high	Above 70	Piling noise
4	Movement out of zone but remaining on site	High	Above 85	Piling noise
5	Movement off site	High	Not defined	

7.5.9 Based on the IECS noise criteria detailed in Table 7.5 above, for impact piling a large part of the Bran Sands area has an effect level of moderate resulting in behavioural changes (see Chapter 12 Noise and Vibration, Figure 12.1). The impact of this would cause some disruption to the feeding/roosting activity of birds, especially those more susceptible to noise disturbance. In the area of nearshore habitat closest to the development the noise levels would have a moderate to high effect level resulting in movement out of the zone but remaining on the site.

7.5.10 Birds displaced from the nearshore habitat temporarily during impact piling are considered to have an abundance of alternative habitat within the Bran Sands bay that can support the temporarily displaced birds during impact piling works. As noted in the IECS (2009) report there is a clear in-combination impact when visual and noise disturbance occur simultaneously, amplifying the severity of the impact. In the case of the proposed REC construction visual disturbance would be largely screened from view by the pre-existing earth bund and concrete wall to be constructed around the IBA building and these structures would offer noise attenuation, reducing noise levels generated. Furthermore, the birds at Bran Sands would be habituated to noise disturbance due to the heavy industrialised setting and therefore, will be less sensitive to noise disturbance.

7.5.11 Therefore, impact piling would have a low magnitude of impact on the high sensitivity Teesmouth and Cleveland Coast SPA/Ramsar and associated species, resulting in a minor or moderate level of effect. The difference between the significance of effect being either minor or moderate will depend on the time of year impact piling is undertaken. During the breeding season birds have the ability to accommodate temporary displacement from foraging grounds provided there are suitable alternative areas available in the wider surroundings; whereas during the winter months birds are under greater pressure on their fitness due to reduced sunlight hours and adverse weather conditions reducing the ability to forage (Cutts et al., 2013). Therefore, should impact piling be undertaken in the breeding season the significance of effect would be minor adverse whereas if impact piling was to be undertaken during the non-breeding season in the absence of specific mitigation the level of effect would be moderate adverse, which is significant.

7.5.12 In contrast to impact piling, CFA piling generates significantly less noise. At the nearest IEF, the Teesmouth and Cleveland Coast SPA/Ramsar and associated species noise would be below 50 dB (see Chapter 12 Noise and Vibration, Figure 12.2) having an effect level of low and resulting in no impact based on the IECS criteria. Therefore, if this piling technique is used it would result in a negligible magnitude of impact on the high sensitivity Teesmouth and Cleveland SPA/Ramsar and associated species resulting in a level of effect of minor adverse, which is not significant.

Temporary Visual Disturbance

7.5.13 Construction personnel present on the Application Site would be largely screened out of view when working at ground level due to the construction of a 5-metre high concrete wall around the IBA facility and the existing earth bund (2 -3 metres high) that separates the proposed REC and

Bran Sands nearshore habitat. However, the construction of buildings above ground height (see Chapter 2: Project Description) have the potential to cause some visual disturbance to the Teesmouth and Cleveland Coast SPA/Ramsar and associated over-wintering and passage species.

- 7.5.14 Cutts *et al.* (2009) estimates that 300 metres is the distance at which visual disturbance could be expected to result in a response from a range of unhabituated wetland birds. The level of response ranges from changes in behaviour, such as heads up scanning resulting in reduced feeding, to the worst-case flight initiation and moving away from the area. The level of response is dependent on several factors, such as the level of habituation, size of the bird and nature of the visual stimuli.
- 7.5.15 The existing earth bund that lies along the boundary of the Application Site would screen the ground level construction work at the nearshore habitats eliminating the potential for severe visual disturbance responses from birds. Furthermore, the Tees Estuary is a busy industrial area and the birds that inhabit it are considered to be habituated to visual disturbance to some degree making the 300 metre distance estimated by Cutts *et al.* (2009) likely to be an over estimation for Bran Sands.
- 7.5.16 Throughout the field surveys conducted to inform this assessment a frequent presence of disturbance from recreational and commercial sources, such as bait diggers, wind surfers, and dog walkers was recorded. These disturbance sources were across all habitats at various tidal states depending on the activity. The baseline visual disturbance of birds utilising Bran Sands is therefore already high and birds are habituated to visual disturbance sources in closer proximity than the proposed development will create.
- 7.5.17 The potential impact of visual disturbance during construction will result in a temporary negative impact over a small extent of the Teesmouth and Cleveland SPA and its associated qualifying features.
- 7.5.18 Based on the high sensitivity of the Teesmouth and Cleveland Coast SPA/Ramsar and associated bird species and the low magnitude of impact the level of effect is considered to be minor adverse, which is not significant.

Ground/Water Pollution

- 7.5.19 The use of construction machinery introduces the risk of fuel or chemical spillage incidents occurring within intertidal and nearshore habitats of the Tees Estuary, and hence the Teesmouth and Cleveland Coast SPA/Ramsar.
- 7.5.20 The ecological impact of pollution events vary in the severity of the pollution incident and are dependent on the scale of the spillage and the nature of the contaminants involved. A number of mitigation measures have been adopted to limit any potential for pollution events. There would be no construction works within the existing earth bund or within any of the sensitive habitats adjacent to the Application Site. The distance of separation between the main area of works and the Tees Mouth will largely reduce the potential for pollution events reaching water features to a minimum. The existing earth bund and proposed IBA perimeter concrete wall intersecting the proposed development from Bran Sands would form a buffer to any potential surface water pollution events reducing the potential impact on nearshore and intertidal habitats. Chapter 8: Hydrology and Flood Risk provides a full list of proposed pollution prevention measures to be incorporated in the CoCP.
- 7.5.21 The construction phase would include temporary drainage mitigation techniques including, but not limited to, run-off interceptor channels installed prior to the construction of the formal drainage to ensure that discharges from the proposed development are controlled in quality and volume during construction to avoid surface water and groundwater pollution. This may include the use of settling tanks and /or ponds to remove sediment, temporary interceptors and hydraulic brakes.

- 7.5.22 As detailed within the WFD Assessment (Appendix 8.3) the implementation of pre-construction phase mitigation measures, in particular site investigation and remediation (where required) to manage the risk to controlled waters receptors, the magnitude of this impact could be reduced to low. In addition, the site is not located in a Groundwater Source Protection Zone and is in an area of currently poor chemical groundwater quality (see Chapter 9: Geology, Hydrogeology and Contamination for further information). The groundwater on site is therefore considered to be low sensitivity and the potential for impact to the Tees Estuary is therefore low. The magnitude of any impact resulting from construction phase pollution is negligible on the high sensitivity Teesmouth and Cleveland Coast SPA/Ramsar and associated species, and therefore the level of effect is minor adverse, which is not significant.

Temporary Air Quality

- 7.5.23 Construction activities have the potential to cause air borne dust pollution within close proximity to the proposed development. The only receptor within the ZoI of impacts from dust pollution is the Teesmouth and Cleveland SSSI, and the saltmarsh and sand dune habitat features associated with the designated site. The impacts of dust pollution due to construction activities on these receptors has been assessed in Chapter 11: Air Quality. The magnitude of impact is low, the sensitivity of the receptor is high and the level of effect is considered minor adverse, which is not significant.

Further Mitigation

- 7.5.24 If impact piling is to be undertaken in the non-breeding season, there would be a potential requirement to use a soft-start technique on the commencement of piling each day or after a pause in piling throughout the day. This would give the birds opportunity to adapt to the temporary additional noise disturbance. A method statement would be prepared for the piling works setting out how the piling would be undertaken and the mitigation measures (e.g. soft-start techniques) that would be implemented. The method statement would be agreed with Natural England prior to construction.
- 7.5.25 .
- 7.5.26 The effect following implementation of this mitigation is deemed to reduce the level of effect to minor adverse, which is .

Future Monitoring

- 7.5.27 An independent Ecological Clerk of Work (ECoW) would be engaged to regularly attend the construction site to monitor the disturbance of birds associated with the SPA during works coinciding with the non-breeding bird season. If birds are observed to be disturbed to the extent of being excluded from a significant part of their foraging habitat without adapting to the temporary noise generating activities, the ECoW will advise on the need for additional mitigation measures to be adopted for the remainder of the noise generating activity. It is proposed that the ECoW should have experience of surveying intertidal habitats and at least 3 years ECoW experience

Accidents and/or Disasters

- 7.5.28 As with most construction sites, there is potential for a spillage of fuel, oil or concrete onsite during the construction phase of works. A Code of Construction Practice (CoCP) would be developed post consent recommending practicable onsite management strategies to mitigate any such incidence.

- 7.5.29 Potential direct effects on the adjacent habitats (from a catastrophic failure of fuel and oil storage or from structural failure of the IBA perimeter wall) during construction are limited as the proposed development, which incorporates interceptor channels, settlement pits and separators to mitigate any such event. As a result, any direct and/or indirect water quality effects associated with the proposed development are unlikely. Chapter 8: Hydrology and Flood Risk provides further assessment and detail.
- 7.5.30 On the above basis, in the event of an accident/disaster, the proposed development includes a number of features and measures to contain, treat and manage pollution risk. Overall, the risk to ecology and ornithology is not considered significant.

7.6 Assessment of Operational Effects

Noise Disturbance

- 7.6.1 Noise modelling was undertaken for the proposed development based on predicted sound levels for the operational facility (see Chapter 12: Noise and Vibration). The outcome of modelling predicts the maximum operational noise levels at the Teesmouth and Cleveland Coast SPA/Ramsar are less than 50 dB, with noise levels diminishing to well below this level for the majority of the SPA (Chapter 12 Noise and Vibration, Figure 12.3).
- 7.6.2 Based on the IECS (2009) criteria this would give an effect level of low and no impact. Therefore, the magnitude of noise disturbance from the operational phase has a negligible magnitude on the high sensitivity Teesmouth and Cleveland Coast SPA and associated species, resulting in a minor adverse effect, which is not significant.

Visual Disturbance

- 7.6.3 During the operational phase of the proposed REC visual disturbance would be predominantly restricted to ground level and therefore, the 5 metre wall would screen out of view of the proposed development from the majority of the Teesmouth and Cleveland Coast SPA/Ramsar and its associated species. Maintenance work required at heights above the screening provided by the wall would be occasional, of a temporary duration and affect only a small extent of the SPA.
- 7.6.4 The magnitude of visual disturbance impacts during the operational phase is therefore negligible on the highly sensitive Teesmouth and Cleveland Coast SPA and associated species resulting in a minor adverse effect, which is not significant.

Air Quality

- 7.6.5 Appendix 11.5 of Chapter 11 (Air Quality) provides an analysis of the effects of emissions to air of the proposed development on the features of interest of the surrounding designated sites along with their supporting habitats. Based on current Environment Agency guidelines⁸ and the Institute of Air Quality Management Position Statement⁹, for all pollutants considered (NO_x, NH₃, SO₂, nutrient nitrogen deposition and acid deposition), either the Predicted Environmental Concentration (PEC) did not exceed the Environmental Quality Standard (EQS) or the Process

⁸ <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#screening-for-protected-conservation-areas>

⁹ IAQM (2016) Use of a Criterion for the Determination of an Insignificant Effect of Air Quality Impacts on Sensitive Habitats.

Contribution (PC) was <1% of the EQS for the all interest features and supporting habitats of the designated sites.

- 7.6.6 The majority of habitats within the designated sites (comprising the intertidal muds/sands) are not sensitive to air pollution impacts; being inundated by the sea twice daily, their nutrient status is driven by the marine ecosystem. Therefore, the assessment of potential effects has focused on the dune complex within the South Gare and Coatham Dunes as both the most sensitive habitat and closest receptor. Using the lower critical load for this habitat ($10\text{kgN}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$ for calcareous dune grassland), the maximum process contribution predicted from the Proposed Development is $1.64\text{ kgN}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$ or 16% of the critical load. Ambient deposition data presented in Appendix 10.5 are average for the 5km grid squares covered by the site (from the Site-Relevant Critical Load Tool on APIS). For the further assessment of potential effects on the dunes, the exact ambient deposition rate of $10.22\text{ kgN}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$ for the 5km grid square within which the dunes sit (for grid reference 457500,527500), has been used, derived from the Search by Location tool on APIS. Therefore, the maximum PEC for this area would currently be circa $11.86\text{ kgN}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$, based on 2015-2018 average deposition data from APIS.
- 7.6.7 Dune habitats vary in their sensitivity to anthropogenic nitrogen inputs with acid dunes generally more sensitive than those derived from calcareous substrates¹⁰. The dunes at South Gare are primarily the latter, having developed on lime-rich tipped slag¹¹. Therefore, the critical load of 10-20 $\text{kgN}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$ has been used³. Using this value, the PEC exceeds the lower critical load (both with and without the maximum PC from the Proposed Development), but not the maximum.
- 7.6.8 Critical loads have been 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’. However, an exceedance of one of the critical loads (in this case, the lower), does not automatically imply a significant effect will occur. The ecological effect of such a change in deposition can also be described by examining the dose-response relationship between nutrient nitrogen deposition and various parameters (species richness, reduction in cover (or increase in grass cover) and resulting changes in broad habitat structure) for sand dunes. Caporn *et al.* (2016) undertook such an analysis, based on existing botanical data from surveys undertaken between 2002 and 2009. This work described a much more nuanced change in these parameters than the use of the more black-white critical load in isolation would suggest; habitats (including sand dune) displayed a curvilinear relationship with nitrogen dose so that the rate of change in the parameters for a given increase in nitrogen deposition was not constant over the range of depositions studied. For sand dunes, this change was only weakly correlated with nitrogen deposition with species richness more strongly correlated with pH and the extent of decalcification. However, using the data presented in Table 21 of Caporn *et al.* shows that, based on the sand dunes surveyed (for dunes with pH > 6.5), at a background nitrogen deposition rate of c. $10\text{ kgN}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$ species richness in sand dunes would not be expected to change by one species (since you cannot have 0.5 of a species), until a dose of c. $0.6\text{ kgN}\cdot\text{ha}^{-1}\cdot\text{yr}^{-1}$. As such, the predicted increase due to the proposed development might lead to a decrease of circa two species or a change of 2.6% (based on 77 species, the highest species richness presented in Caporn *et al.* for sand dunes) if all other factors allowed (such as pH, management etc.). Such a change, whilst being adverse, is unlikely to lead to changes in habitat type (i.e. a shift in successional stage) and is unlikely, therefore, to be significant. The dune system is important within the SPA for the breeding little terns that it supports. This species requires areas of sparsely-

¹⁰ <http://www.apis.ac.uk/node/972>

¹¹ <https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1000178.pdf>

vegetated sand to nest within. The change predicted above is unlikely to alter the functioning of the habitat with respect to its use by little terns.

- 7.6.9 Further, this is based on the maximum predicted PC; the majority of the dune system at South Gare would be subject to considerably less with a correspondingly smaller change in species richness/increase in grass cover.
- 7.6.10 This conclusion is supported by the historic setting of the sand dunes, having established downwind of the Teesside Steelworks, including the former Redcar Blast Furnace (the second largest in Europe). Although historic nitrogen deposition data are not available and emissions of nitrogen-containing chemical from such furnaces are relatively small, the length of time over which the area has been heavily industrialised (since at least 1875) means that historic deposition rates are likely to have been substantially higher than they are currently.
- 7.6.11 The magnitude of impact from changes in air quality on the highly sensitive Teesmouth and Cleveland Coast SPA/Ramsar are negligible and the level of effect is predicted to be minor adverse, which is not significant. The impact of air quality changes on the saltmarsh and dune habitat and the Teesmouth and Cleveland Coast SSSI (both highly sensitive receptors) will be of low magnitude and the level of effect is predicted to be minor adverse, which is not significant.

Accidents/Disasters

- 7.6.12 Potential direct effects on adjacent habitats (from a catastrophic failure of fuel and oil storage or from structural failure of the IBA perimeter wall) during the operation of the REC are limited as the proposed development incorporates interceptor channels, settlement pits and separators to mitigate any such event. As a result, any direct and/or indirect water quality effects associated with the operation of the proposed development are unlikely. Chapter 8: Hydrology and Flood Risk provides further assessment and detail.

Further Mitigation

- 7.6.13 Based on the assessment outcome there are no significant effects predicted for the proposed development, and therefore there are no requirements for future mitigation.

Future Monitoring

- 7.6.14 The close proximity of the proposed REC to two BTO WeBS sectors would provide ongoing monitoring of waterbird populations at Bran Sands and the scrub land to the north are carried out on a monthly basis. Therefore, no further monitoring is proposed.

7.7 Assessment of Decommissioning Effects

- 7.7.1 In many cases, the effects of decommissioning would be similar to those during the construction phase. The potential impacts are limited to temporary noise and visual disturbance associated with the demolition and decommissioning of the REC. The magnitude of impacts and therefore significance of effects are therefore similar to those of the construction phase. One difference is that it is assumed that the demolition of the REC by explosives or particularly noisy measures would be scheduled to avoid the non-breeding bird season thereby avoiding the disturbance of birds associated with the neighbouring SPAs. The potential for ground and water pollution impacts would be equal to those identified during the construction phase, as are the mitigation measures.

7.8 Assessment of Cumulative Effects

7.8.1 This ES has given due consideration to the potential for different impacts to have a combined impact on key sensitive receptors. The objective is to identify where the accumulation of impacts on a single receptor, and the relationship between those impacts, potentially gives rise to a need for additional mitigation. Table 7.8 below presents the other developments which have been considered in combination with the REC in the assessment of effects on ecology and ornithology.

Table 7.6: Cumulative Developments considered in the Assessment of Effects on Ecology and Ornithology

Cumulative development	Distance from the site	Potential effects
R/2006/0433/OO Northern Gateway Container Terminal Construction of a deep-sea container terminal Granted 04/10/07	1.29 km	Increased shipping activity was assessed as negligible in terms of noise and visual disturbance. The noise disturbance impact associated with the Proposed Development will be temporary during the construction phase, and therefore there is no cumulative impact associated with the developments and it is discounted from further assessment.
R/2019/0427/FFM Ground preparation works for Soil for Storage at various locations across the Tees area (Tier 1) Granted 27/09/19	1.96 km	No detailed ecological impact assessment undertaken. An ecology report assessing the impact of the work at a high level predicted no noise or visual disturbance impacts. Therefore, there is no cumulative impact associated with the developments and it is discounted from further assessment.
R/2008/0671/EA/CDTees Renewable Energy Plant Proposed construction of a 300 Mw biomass fired renewable energy power station. Granted 29/06/12	2.62 km	Potential additive air quality impacts could cumulatively cause a significant effect when combined with the Proposed Development. Assessed further below.
R/2019/0767/OOM Grangetown Prairie Energy Recovery Facility Construction of an energy recovery facility capable to handling 450'000 tonnes of waste per annum. Application Submitted 19/12/19	4.34 km	Potential additive air quality impacts could cumulatively cause a significant effect when combined with the Proposed Development. Assessed further below.
H/2019/0275 Graythorp Energy Centre Energy from waste facility and associated infrastructure. Decision Pending	4.36 km	Potential additive air quality impacts could cumulatively cause a significant effect when combined with the Proposed Development. Assessed further below.
R/2017/0876/FFM Peak African Minerals Ltd. Construction and operation of a rare earth mineral processing and refining facility comprising storage and processing tanks and facilities. Granted 16/01/18	4.78 km	Potential additive air quality impacts could cumulatively cause a significant effect when combined with the Proposed Development. Assessed further below.
R/2018/0364/NID Teesside Combined Cycle Power Plant Teesside Combined Cycle Power Plant (Tier 1)	5.18 km	Detailed impact assessment not available, cumulative impact cannot be assessed.

Cumulative development

Distance from the site

Potential effects

DCO made 05/04/19

Cumulative Effects on Protected Habitats

- 7.8.2 The subject of the potential for cumulative effects from changes to air quality was discussed extensively during the Examination of the Teesmouth CCPP Development Consent Order. In granting Development Consent for that project, the Secretary of State (SoS) concluded that there would be no in-combination effect on the SPA/Ramsar due to air quality¹², despite that project predicting a small increase in nutrient nitrogen deposition on the site. In reaching this conclusion, on the advice of Natural England, the SoS cited evidence provided by the application of the continued improvement to air quality both nationally (as a result of the implementation of various policy measures) and locally (due to the expected continued decline in background levels from pollution sources no longer in operation) meaning that there can be confidence that the small changes in air quality due to the Teesmouth CCPP ‘would not make a significant difference to the features for which the sites were designated’. Although the max PC of the Proposed Development at the SPA/Ramsar is larger than that of the Teesmouth CCPP, the same principal will apply, given the historic setting of the sand dunes, having established downwind of the Teesside Steelworks, including the former Redcar Blast Furnace (the second largest in Europe). Although historic nitrogen deposition data are not available and emissions of nitrogen-containing chemical species from such furnaces are relatively small, the length of time over which the area has been heavily industrialised (since at least 1875) means that historic deposition rates are likely to have been substantially higher than they are currently.
- 7.8.3 No other cumulative impacts or associated effects have been identified in combination with the REC and the developments summarised in Table 7.8, above.

7.9 Inter-relationships

- 7.9.1 Inter-relationships have been identified between this Chapter and the following Chapters with references included as required:
- Chapter 7 Hydrology and Flood Risk
 - Chapter 10 Air Quality
 - Chapter 11 Noise and Vibration

7.10 Summary of Effects

- 7.10.1 A detailed ecological assessment predicting the potential effects of the construction, operation and decommission of the proposed development has been undertaken.
- 7.10.2 The predicted impacts have been categorised as temporary noise and visual disturbance, ground/water pollution and temporary air pollution during construction and decommission. During operation the potential impacts which have been assessed are noise and visual disturbance and air quality changes.

¹² <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010082/EN010082-000651-Tees%20CCPP%20HRA%20FINAL%20April%202019.pdf>

- 7.10.3 The embedded mitigation of the retention of the existing earth bund along the boundary of the Application Site, the construction of a new 5-metre-high concrete wall around the perimeter of the IBA facility and the implementation construction management measures would avoid a significant adverse effect on the Teesmouth and Cleveland SPA/Ramsar, SSSI and associated named features.
- 7.10.4 Overall, the effects of the proposed development, both separately and cumulatively, are not considered to be significant for ecological and ornithological features.
- 7.10.5 Table 7.9 provides a summary for the residual effects to IEFs identified from the proposed development.

Table 7.7: Summary of Likely Environmental Effects on Ecology and Ornithology

Receptor	Sensitivity of receptor	Description of impact	Mitigation measure	Magnitude of impact	Significance of effect	Significant / Not significant
Construction						
Teesmouth and Cleveland Coast SPA/Ramsar, associated named features and waterbird assemblage feature	High	Noise Disturbance (impact piling)	Piling sheath to reduce impact piling noise if work is to be undertaken during the non-breeding season for waterbirds when sensitivity to noise disturbance is at its highest	Low	Minor Adverse	Not Significant
		Noise Disturbance (CFA piling)	Not required	Low	Minor Adverse	Not Significant
		Visual Disturbance	Construction of a 5 m high concrete wall around the IBA building where the site borders the SPA will provide visual screening for ground level works; construction workers prohibited from sitting on the earth bank during breaks	Low	Minor Adverse	Not Significant
		Pollution	Embedded best practice construction methods detailed in the CoCP	Negligible	Minor Adverse	Not Significant
		Dust Pollution	CoCP to be prepared post consent	Low	Minor Adverse	Not Significant
Operation and maintenance						
Teesmouth and Cleveland Coast SPA/Ramsar, associated named features and waterbird assemblage feature	High	Noise Disturbance	Not Required	Negligible	Minor Adverse	Not Significant
		Visual Disturbance	Not Required	Negligible	Minor Adverse	Not Significant
		Air Pollution (N deposition)	Not required	Negligible	Minor Adverse	Not Significant
Saltmarsh and Dune Habitats	High	Air Pollution (N deposition)	Not required	Low	Minor Adverse	Not Significant
Teesmouth and Cleveland Coast SSSI and associated habitat features	High	Air Pollution (N deposition)	Not required	Low	Minor Adverse	Not Significant

Receptor	Sensitivity of receptor	Description of impact	Mitigation measure	Magnitude of impact	Significance of effect	Significant / Not significant
Decommissioning						
Teesmouth and Cleveland Coast SPA/Ramsar, associated named features and waterbird assemblage feature	High	Noise Disturbance (demolition)	Demolition by explosives to be avoided during the non-breeding season for waterbirds when sensitivity to noise disturbance is at its highest	Negligible	Minor Adverse	Not Significant
		Visual Disturbance	As for construction	Low	Minor Adverse	Not Significant
		Pollution	As for construction	Negligible	Minor Adverse	Not Significant

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