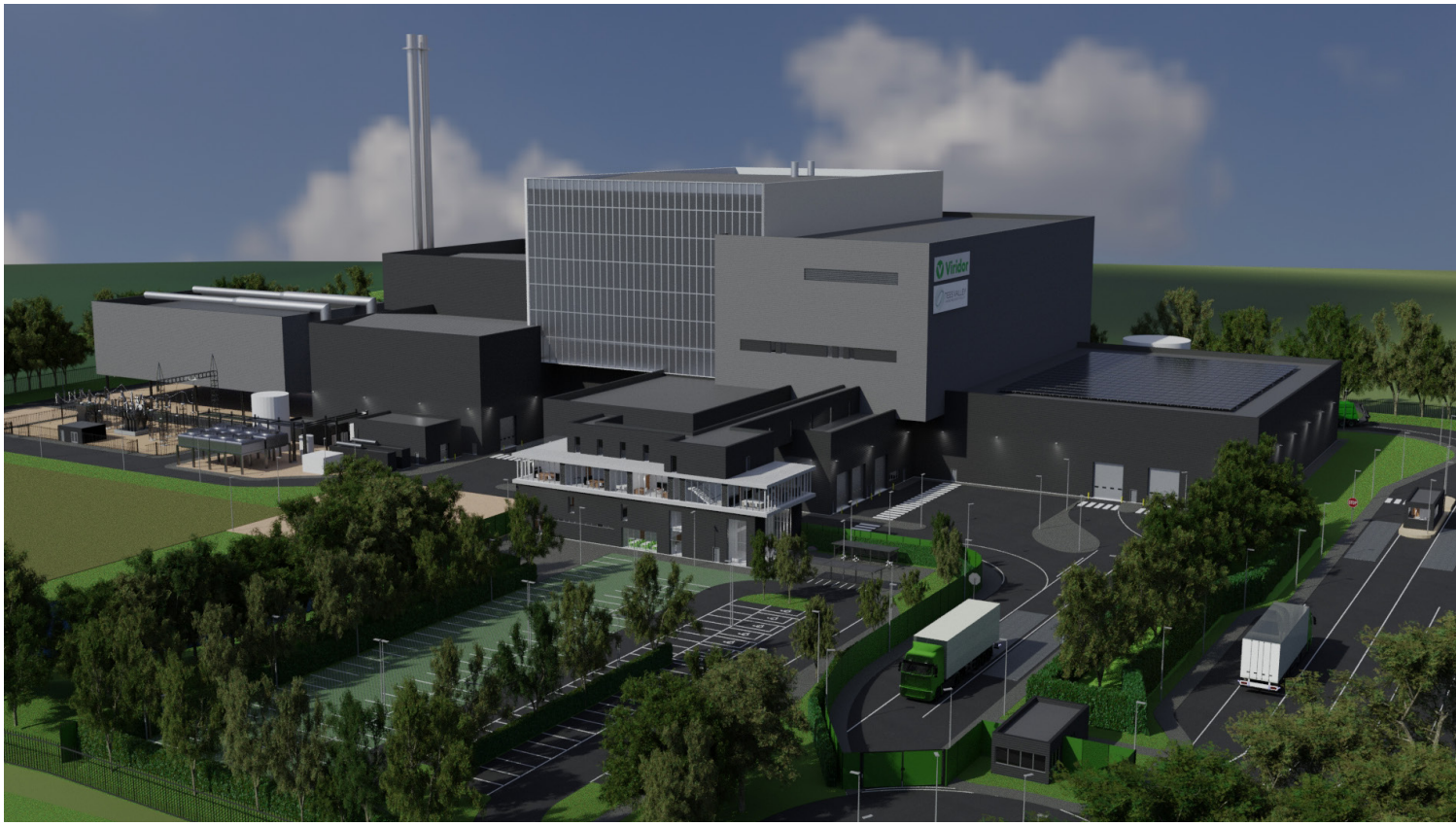

Shadow Habitat Regulations Assessment

Tees Valley Energy Recovery Facility
Grangetown Prairie, Dorman Point
Prepared on behalf of Viridor Tees Valley Limited
March 2023

TEES VALLEY ENERGY RECOVERY FACILITY
GRANGETOWN PRAIRIE, DORMAN POINT
SHADOW HABITAT REGULATIONS ASSESSMENT
VIRIDOR TEES VALLEY LIMITED
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TERENCE O'ROURKE

TEES VALLEY ENERGY RECOVERY FACILITY
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		Please return by	

LONDON
23 Heddon Street
London
W1B 4BQ

BIRMINGHAM
Enterprise House
115 Edmund Street
Birmingham
B3 2HJ

BOURNEMOUTH
Everdene House
Deansleigh Road
Bournemouth
BH7 7DU

TELEPHONE
020 3664 6755

www.torltd.co.uk

Terence O'Rourke Ltd. Reg. No.1935454. Registered office: Everdene House, Deansleigh Road, Bournemouth, Dorset, BH7 7DU. Registered in England and Wales. VAT No.905095727.

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1.0 Introduction

1.1 This report has been prepared in support of condition 3 of outline planning permission R/2019/0767/OOM for the construction of an energy recovery facility (ERF) and associated development at the Grangetown Prairie Land site, east of John Boyle Road and west of Tees Dock Road, Grangetown. Condition 3 of the permission requires an updated Habitat Regulations Assessment following approval of the detailed development established by the reserved matters submission.

1.2 The stack location lies within 10km of three statutory designated sites that form part of the National Site Network (NSN). These sites are Teesmouth and Cleveland Coast Special Protection Area (SPA) and Ramsar, North York Moors SPA and North York Moors Special Area of Conservation (SAC). The location of the ERF site relative to the NSN sites is shown in figure 1.

1.3 The NSN sites receive statutory protection under the Conservation of Habitats and Species 2017 (as amended), (the 'Habitats Regulations'). The Habitats Regulations afford a high level of protection to sites supporting habitats or rare species (other than birds) considered scarce or vulnerable at a European community level (SACs) and areas that hold significant populations of certain bird species (SPAs).

1.4 Under the Habitats Regulations, Redcar and Cleveland Borough Council (RCBC) is a competent authority, responsible for ensuring that development management decisions do not adversely affect the integrity of sites within the NSN. This document provides information for the Habitats Regulations Screening Assessment that RCBC will need to undertake to allow discharge of condition 3 of the outline planning permission. This document screens the proposed development for likely significant effects on the NSN sites both alone, and in combination with other plans and projects.

2.0 Legislative context and tests of the Habitat Regulations

2.1 Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) receive statutory protection under the Habitats Regulations. The most recent amendments to this legislation reflect the changes set out in the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019. The 2019 regulations detail the amendments required to the 2017 regulations following the end of the transition period in December 2020. The Habitats Regulations afford a high level of protection to sites classified as areas that hold significant populations of certain bird species (SPAs). They also afford the same level of high protection to tracts of land supporting habitats or rare species (other than birds) considered scarce or vulnerable at a European level (SACs).

2.2 SACs and SPAs form part of a network of nature protection areas within the UK known as the National Site Network (NSN). Prior to the UK leaving the European Union the NSN were known as Natura 2000 sites, and are protected in the determination of a planning application. Ramsar sites are designated as wetlands of international importance and are afforded similar legislative protection to SPAs and SACs. Government has issued policy statements relating to the special status of Ramsar sites. This extends the same protection to Ramsar sites as that afforded to SPAs and SACs through the Habitat Regulations.

2.3 Under Regulation 63 of the Habitats Regulations the competent authority is responsible for assessing whether land use plans or proposed developments could adversely affect a site(s) within the NSN. This requires a process known as a Habitat Regulations Assessment (HRA) encompassing two tests required under Regulation 63(1) of the Habitats Regulations.

2.4 **Test 1:** having ascertained that the plan is not directly connected to, or necessary for site management for nature conservation, the first test of the HRA, commonly referred to as a screening test, considers whether or not a plan or project is likely to have a significant effect on a site either alone or in combination with other plans or projects. A significant effect is any effect that would undermine the conservation objectives for the respective NSN site and may include physical loss and/or damage of a habitat, disturbance

effects, and changes to water availability, deposition of contaminants through changes in air quality etc.

2.5 **Test 2:** The second test of the HRA is relevant to those plans or projects that are screened as likely to have a significant effect alone or in combination with other plans or projects, and requires an appropriate assessment. The role of the appropriate assessment is to consider the implications of the plan or project for the conservation objectives of the NSN sites in question, and determine whether they will have an adverse effect on the integrity of the site. In carrying out an appropriate assessment, a local authority must have regard to the manner in which the project is proposed to be carried out, or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given.

2.6 The European Court Judgment (ECJ) People Over Wind and Sweetman v Coillte Teoranta (C-323/17) altered the process of screening for likely significant effects by overturning the 2008 Hart District Council vs. Secretary of State judgment (2008), known as Dilley Lane. This Dilley Lane judgment stated "*there is no legal requirement that a screening assessment…. must be carried out in the absence of any mitigation measures that form part of that plan or project*."

2.7 The People Over Wind and Sweetman ruling states that "*it is not appropriate, at the screening stage, to take account of measures intended to avoid or reduce the harmful effects of the plan or project on that site"*. This means that mitigation measures must be excluded from assessing whether a project is likely to have a significant effect, either alone or in combination with other plans and projects.

2.8 At the time of writing, it is understood that all courts in the UK, with the exception of the Supreme Court, will continue to be bound by judgements of the Court of Justice of the European Union handed down prior to the 31 December 2020.

2.9 A likely significant effect is any effect that is likely to undermine the site's conservation objectives, in light of the characteristics and specific environmental conditions of the SAC or SPA.

Conservation objectives

2.10 Conservation objectives are identified for all NSN sites and cover all features that qualify the site for classification or designation. The conservation objectives apply under the Habitats Regulations and must be considered during a Habitats Regulation Assessment, including an Appropriate Assessment.

3.0 Description of development

3.1 The 2019 ES (section 3.6) included a short process description and a list of buildings and structures that are required for the ERF process, including a tipping hall, boiler hall, turbine hall, flue gas treatment building, air cooled condenser, stack, fuel oil, fire fighting water tank, standby diesel generator, air cooled condenser building, incinerator bottom ash building, air pollution control residue silos, powdered activated carbon, lime tank, ammonia (NH_3) storage tank, administration building, workshop building and car parking.

3.2 The updated ERF site plan that accompanies the reserved matters submission is shown in Appendix 1 (drawing 20044-FRA-00-00-DR-90-0003 – Revision P13 Proposed Site Plan). The drawing also references the following: gatehouse and driver welfare facility, weighbridges, combined heat and power building, workshops, EDG, fin fan coolers, laboratory, shredder, sub-station / transformer, contractors' compound for use during shutdowns, and two areas of the ERF site to be reserved for the future provision of carbon capture storage equipment (or other such uses). The plan also indicates the areas of the ERF site proposed for landscape planting / ecological enhancement and a sustainable urban drainage system.

3.3 Further details of the scheme can be found in Chapter 3 of the Environmental Impact Assessment Statement of Conformity (EIA SoC).

3.4 At the time of writing condition 13 has not yet been discharged – the biodiversity improvement that was originally to be provided on-site is now to be provided by South Tees Development Corporation (STDC) off-site. There will be some (very limited) biodiversity improvement on the ERF site, as part of landscaping proposals. The provision of the biodiversity enhancements off-site has no implications for the HRA process.

3.5 The main access to the ERF site has been constructed in the south west corner of the site, adjacent to the new Teesworks Skills Academy.

3.6 No modifications or specific measures have been included in the design of the plant to reduce impacts on sites in the NSN. It should be noted that the ERF will include embedded mitigation measures to reduce the risk of dust and odour emissions. This mitigation includes only unloading waste within

the enclosed buildings, and keeping the tipping hall and bunker under negative pressure, with the air being used in the combustion process. This prevents the release of odours and dust from the building when the doors are opened for short periods for deliveries. As a result, the risk of dust and odour emissions from the operation of the ERF is small.

3.7 As highlighted in the air quality reports prepared by Fichtner Consulting Engineers Ltd, no additional mitigation measures have been embedded in the design beyond those required by legislation and regulated by the Environment Agency, under the Environmental Permit.

4.0 Description of the NSN sites

4.1 The following section sets out the location, designation criteria and conservation objectives of the NSN sites included in this HRA screening. The location of the NSN sites relative to the ERF application site is shown in figure 1. Consideration of the potential for land within or close to the site to act as functionally linked land to the SPA sites is detailed in section 5.

4.2 Teesmouth and Cleveland Coast SPA lies approximately 1.3km to the north of the ERF application site. The site qualifies under Article 4.1 by regularly supporting more than 1% of the GB breeding populations of the following Annex 1 species:

- Little tern: 81 breeding pairs representing at least 4.3% of the GB breeding population (2010-2014)
- Common tern: 399 breeding pairs representing at least 4% of the GB breeding population (2010-2014)
- Pied avocet: 18 breeding pairs representing at least 1.2% of the GB breeding population (2010-2014)

4.3 The site also regularly supports a passage population of sandwich tern of 1,900 individuals (1988-1992) representing at least 4.3% of the GB breeding population. The most recent average for this species is 149 individuals (2009/10-2013/14).

4.4 The site also regularly supports more than 1% of the GB non-breeding population of the following Annex 1 species:

- Ruff: mean of 19 overwintering individuals (2011/12-2015/16) representing at least 2.4% of the GB wintering population

4.5 The site qualifies under Article 4.2 by regularly supporting more than 1% of the biogeographic populations of two regularly occurring migratory species:

- Red knot: mean of 5,509 overwintering individuals representing at least 1.6% of the NE Canada/Greenland/Iceland/UK population (1991/92-1995/96)

- Common redshank: mean of 1,648 passage individuals representing at least 1.1% of the East Atlantic wintering population (1987-1991)

4.6 The SPA also qualifies under Article 4.3 by regularly supporting a waterbird assemblage of more than 20,000 individuals (site average 26,014 – 2011/12-2015/16) including gadwall, northern shoveler, sanderling, Eurasian wigeon, northern lapwing, herring gull and black-headed gull.

4.7 The SPA also encompasses the Teesmouth and Cleveland Coast Ramsar. The interest features of the Ramsar site are the same as the SPA. Between 2011/12 and 2015/16 the Ramsar site supported an average mean peak of 26,786 individual waterbirds. This includes mute swan and greylag goose, species not included in the SPA total given above.

4.8 The conservation objectives for the Teesmouth and Cleveland Coast SPA have been prepared by Natural England. With regard to the site and the individual species and assemblage of species for which the site has been classified (the 'qualifying features'), and subject to natural change; the conservation objectives aim to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Bird Directive, by maintaining or restoring**:**

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features
- The distribution of the qualifying features within the site

4.9 The SPA site covers 12,210.62 ha. Copies of the SPA and Ramsar citations are included in Appendix 1.

4.10 North York Moors SPA lies approximately 9.2km to the south of the application site. The site qualifies under Article 4.1 by regularly supporting 1% or more of the GB population of the following Annex 1 species (in any season):

- Merlin: mean 35-40 breeding pairs representing at least 2.7% of the breeding population in GB
- Golden plover: mean 526-706 breeding pairs representing at least 2.3% of the breeding population in GB

4.11 In addition, this site has the largest continuous tract of heather moorland in England, supports a rich upland breeding bird assemblage of short-eared owl, peregrine, hen harrier, common redshank, red grouse and curlew. The SPA site covers 44,087.68 ha. A copy of the SPA citation is included in Appendix 1.

4.12 The conservation objectives for the North York Moors SPA have been prepared by Natural England. With regard to the site and the individual species and/or assemblage of species for which the site has been classified (the 'qualifying features'), and subject to natural change; the conservation objectives aim to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Bird Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features
- The distribution of the qualifying features within the site

4.13 The North York Moors SAC covers 44,082.25ha and is the largest continuous tract of upland heather moorland in England. The SAC lies approximately 9.2km to the south of the application site. A copy of the SAC citation is included in Appendix 1. The site is designated for supporting the following Annex 1 habitats:

- Northern Atlantic wet heaths with Erica tetralix
- European dry heath
- Blanket bog

4.14 The wet heath is found predominantly in the eastern and northern moors with dry heath occurring mainly on the central, southern and western moors. Blanket bog occurs in small amounts along the main watershed of the high moors where deep peat has accumulated. The largest area of blanket bog occurs at the northern end of Bransdale.

4.15 The conservation objectives for the SAC have been prepared by Natural England. With regard to the site and the natural habitats for which the site has been designated (the 'qualifying features' listed below), and subject to natural change; the conservation objectives aim to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats
- The structure and function (including typical species) of qualifying natural habitats
- The supporting processes on which qualifying natural habitats rely

4.16 The supplementary advice on conserving and restoring site features, which accompanies the conservation objectives, sets an objective for air quality of: maintaining, as necessary, the concentrations and deposition of air pollutants to at, or below, the site-relevant critical loads or levels given on the Air Pollution Information System (APIS) website.

5.0 Impact Pathways assessment

Impact pathways which may impact on Teesmouth and Cleveland Coast SPA/Ramsar

5.1 The development of the ERF site may result in the loss of supporting habitat used by birds associated with the Teesmouth and Cleveland Coast SPA/Ramsar. The ERF site may be used for feeding, breeding or roosting. Previous bird surveys by INCA recorded mallard and common shelduck on ERF site during nesting bird checks. Both species will form part of the overall assemblage of the SPA/Ramsar but the numbers recorded were very small. Survey work has not identified any roosts of birds or regular feeding flocks that would indicate that a significant number of SPA/Ramsar birds use this ERF site on a regular basis.

5.2 The ERF site does not appear to be functionally linked to the SPA/Ramsar site and the development of the ERF site is not considered likely to have any adverse impact on the interest features of the Teesmouth and Cleveland Coast SPA/Ramsar.

5.3 Noise created by the operation of machinery and vehicles during construction stage has the potential to disturb birds, causing them to cease feeding or fly away from the source of disturbance. The occurrence of disturbance will depend on the type and nature of the noise, the strength of the noise at the source and the loss in strength of the noise as it spreads out to and reaches a receptor (in this case birds that may be using habitats around the ERF site). It is recognised that very loud and short duration noises that mimic gunshot sounds tend to have the greatest potential to cause disturbance to birds, although some birds have been shown to habituate to similar noises occurring at repeated intervals. The short, sharp precursive noises that can be associated with certain construction methods (e.g. hammering of metal piles) can cause disturbances to birds.

5.4 Such a disturbance event may cause the birds to take flight (either returning to the same location or dispersing), to cease their feeding or roosting activity and to temporarily abandon eggs or chicks, leaving them vulnerable to chilling/predation. Taking flight or ceasing to feed is unlikely to have immediate effects on the bird affected in terms of survival or productivity. Increased disturbance of feeding over an extended period could place

individual birds at risk during adverse weather or result in their being weakened prior to important life cycle stages such as migration and breeding season. The result could affect the survival or productivity of that bird and could become significant if a number of birds of a particular population are affected.

5.5 With regard to threshold figures, guidance has been provided within the Waterbird Disturbances Mitigation Toolkit, which has been produced by the Institute of Estuarine & Coastal Studies (IECS) University of Hull in 2013. In summary, the following absolute noise level guidance thresholds are provided in respect to assessing the potential noise impacts on wintering or passage birds:

- Low level noise disturbance – Noise levels of less than 55dB (at bird)
- Moderate noise disturbance – Sudden noise levels of 55-60 dB (at bird) or continuous/repetitive noise levels of 60-72dB (at bird)
- High noise disturbance – Sudden noise levels of over 60 dB (at bird) or continuous/repetitive noise levels of over 72dB (at bird)

5.6 Mudflats, other intertidal substrate and open water is present within the designated sites around 1.5km (intertidal habitat) and 1.3km (open water) north of the proposed development. These areas may be used by species such as common redshank, shelduck, cormorant and foraging terns. Known nesting locations for common tern and avocet are considerably further away (over 3km). Current noise modelling indicates that noise levels will not exceed 55dB at the boundary of the SPA/Ramsar.

5.7 The distance between the ERF site boundary and the SPA/Ramsar is sufficient to conclude that disturbance associated with vibrations created during construction or operation can be screened out.

5.8 With regard to guidance relating to visual disturbance, the Waterbird Disturbances Mitigation Toolkit, which has been produced by the Institute of Estuarine & Coastal Studies (IECS) University of Hull in 2013, provides the following descriptions of differing levels of visual disturbance. This has been used to assess the potential visual impacts on wintering or passage birds:

- Low level visual disturbance – This is stimuli that is unlikely to cause a response in birds using an adjacent wetland. Most works would not qualify as low-level impact unless they were out of sight of the birds and any disturbance would then be considered noise-related disturbance (there remain overflight issues for some species whereby flights to and from inland feeding and roost sites can mean that behind bank works have an effect). Long-term works including plant on a flood bank are also considered to be low impact. This type of work would initially qualify as moderate disturbance but with the absence of workers on the flood bank, birds would quickly become habituated. If workers were to appear alongside plant this would immediately increase the disturbance to moderate.
- Moderate visual disturbance – Typified as either high level disturbance which has occurred over long periods so that birds become habituated to it or less intrusive works which still cause a degree of disturbance. This describes visual stimuli such as works or third parties on the flood bank. Habituation occurs less with workers on the flood bank or foreshore working outside machinery. If a worker leaves plant it usually increases the disturbance level to high. There is a cross-over in the moderate and high level thresholds, although unless a species is particularly sensitive or it is a new activity then the lower band can be assumed.
- High visual disturbance – This is typified by regular reactions to visual stimuli with birds moving away from the works (source) to areas which are less disturbed. Most birds will show a degree of response to stimuli. Birds that remain in the affected area may not forage efficiently and if there are additional pressures on the birds (cold weather, extreme heat etc.) then this may impact upon the survival of individual birds or their ability to breed. Visual stimuli reaches high levels of disturbance extremely easily with workers operating outside of equipment, fast movement, large plant and close proximity to the birds (especially encroachment on mudflats); all factors contributing to this level of high visual disturbance.

5.9 Maximum alert distances given for roosting and feeding waders (set by the presence of the most sensitive species) can be as great as 300m from the point of visual disturbance. Some species of duck are even more sensitive in

certain circumstances, with maximum alert distances to visual disturbance of 500m for common shelduck and mallard recorded. The mudflats, open water and intertidal areas within the designated site are 1.3 to 1.5km away from the proposed development.

5.10 Given the distance of the ERF site from the SPA/Ramsar site, noise, visual disturbance and vibrations caused during construction, operation or decommissioning of the facility are not considered likely to have any adverse impact on the interest features of the Teesmouth and Cleveland Coast SPA/Ramsar.

5.11 The ERF process will result in two waste streams. The first, bottom ash (BA), is a recyclable non-hazardous waste material. Subject to the agreement of a contract it would be transported off-site to a facility where it would be used to make sustainable aggregates for the construction industry. The second waste stream is flue gas treatment (FGT) residue which is classed as hazardous waste due the elevated pH levels. This waste would be removed from the ERF site in enclosed tankers and taken to an appropriate licenced treatment and/or disposal site.

5.12 The HRA for the outline application identified changes in nutrient and/or organic loading from waste discharge as a potential impact pathway. Residues from the ERF facility will be removed from the ERF site and either treated in specialist facilities to enable reuse and/or disposed of at a suitable licensed landfill site. No realistic impact pathway for these waste streams to enter the SPA/Ramsar exists. Waste water from the facility will enter the main sewage network and will be treated in line with standard industry practices. Waste streams from the ERF site are not considered likely to impact on the SPA/Ramsar.

5.13 The HRA for the outline application highlighted the risk of the introduction of invasive non-native species to areas outside the ERF site during construction activity. Small-leaved cotoneaster has been recorded on the ERF site and it was considered the movement of traffic and people in and out of the ERF site and the works on the water courses could spread seeds of this plant to areas closer to the SPA/Ramsar.

5.14 Since the outline application was approved site remediation has taken place and has included the removal of small-leaved cotoneaster from the ERF site (Planning ref: R/2020/0318/FFM). This work has removed the risk of construction works associated with the facility spreading non-native species. Given that non-native invasive species have been removed from the ERF site it is concluded that no realistic impact pathway now exists that would be likely to impact on the interest features of the Teesmouth and Cleveland Coast SPA/Ramsar.

5.15 Works associated with construction have the potential to mobilise contaminants in the soils which could leach into watercourses on the ERF site. Spillages or run-off from activities could allow pollutants to enter watercourses on the ERF site (Holme Beck, Cross Connector culvert and/or Knitting Wife Beck culvert). These watercourses drain into the Teesmouth and Cleveland Coast SPA/Ramsar.

5.16 Pollutants entering the protected site could destroy or damage habitats used by birds within the SPA/Ramsar for foraging or roosting. The impact of any pollution event would depend on the scale and duration of the incident and the pollutants involved. The release of toxic compounds or liquids that could smother mudflats could result in the death of invertebrate species that are a foraging resource for the qualifying features.

5.17 Planning permission for the Eston Road Highway Scheme, which includes daylighting a 750m culverted section of Holme Beck, was granted in August 2020 (planning ref: R/2020/0270/FFM). A non-material amendment to the permission was approved in May 2021 (planning ref: R/2021/0296/NM) which includes details of the works to Holme Beck. At the time of writing (March 2023) the works to implement this permission have been completed.

5.18 Since the outline application was approved site remediation has been undertaken that includes the removal of contaminated soils and other material from the ERF site (Planning ref: R/2020/0318/FFM). This work has removed the risk of construction works associated with the facility mobilising toxic compounds in the soils. Given that remediation work has taken place on the ERF site it is concluded that no realistic impact pathway related to contaminated land now exists. The construction works would not mobilise

any toxic compounds in the soil that would be likely to impact on the interest features of the Teesmouth and Cleveland Coast SPA/Ramsar.

5.19 The potential for pollutants to enter surface watercourses on the ERF site during construction activity remains. Accidental fuel or chemical spills, leaks from machinery, run-off of silt or fines from concrete batching (if undertaken on site) could all result in impacts on the interest features of the Teesmouth and Cleveland Coast SPA/Ramsar.

5.20 Once the ERF site is operational surface water run-off from hard surfaces may contain oil or other hydrocarbons and pollutants from vehicles. Accidental fuel or chemical spills during operation could also cause pollution events This polluted water could enter the Holme Beck which discharges into the Teesmouth and Cleveland Coast SPA/Ramsar.

5.21 Air quality modelling based on a stack height of 80 metres has identified exceedance of 1% of the critical level for nitrogen oxides (NOx) and NH_3 within the SPA/Ramsar. Nitrogen deposition on sand dune habitats within the SPA/Ramsar also exceeds 1% of the lower end of the critical load range given for this habitat. Further assessment of the potential impacts of changes in air quality on the protected site is required (see sections 6 & 7 below). The air quality modelling is based on a NOx emission limit of 100 mg/Nm³.

5.22 Dust has been screened out as a potential impact on the NSN site in line with the methodology outlined within the 2016 Institute of Air Quality Management (IAQM) guidance document *Guidance on the assessment of dust from demolition and construction*. The intention of the IAQM guidance is that 500m is the distance from the area of muddy ground where dust could be deposited by vehicles leaving the ERF site and re-suspended by vehicles using the road network.

5.23 The SPA/Ramsar is over 1km from the ERF site boundary. Construction vehicles will access the ERF site from the A66 and use major roads to transit to and from the ERF site. As all the NSN sites considered in this assessment are well beyond 500m from the boundary of the application site, as is the 500m stretch of the A66 beyond the site boundary affected by vehicles

leaving the ERF site, no detailed assessment of impacts related to dust is required in line with the IAQM guidance.

5.24 Although the scheme includes embedded mitigation to contain dust and odour emission during operation (see para 3.6), this is not provided to mitigate impacts on the SPA/Ramsar. Due to the distance of the ERF site from the SPA/Ramsar site, dust associated with construction, operation or decommissioning of the facility is not considered likely to have any adverse impact on the interest features of the Teesmouth and Cleveland Coast SPA/Ramsar with or without the embedded mitigation.

Impact pathways which may impact on North York Moors SPA

5.25 The ERF site is not considered to provide suitable supporting habitat for breeding merlin or golden plover associated with the North York Moors SPA. The ERF site itself does not support any suitable habitat for breeding golden plover and merlin.

5.26 Breeding golden plover in the UK typically forage on enclosed agricultural fields close to nesting sites (within 4km of the nest and up to 2km from the moorland boundary). This occurs mainly during incubation with foraging reverting to moorland habitats once chicks hatch. Nesting sites are usually between 300-460m above sea level on unenclosed peatlands, or heath and moorland dominated by cottongrass (Whittingham *et al*, 2000).

5.27 Merlin breed in a variety of upland habitats occurring in particularly high densities in areas of heather moorland. They feed largely on abundant moorland passerines during the breeding season such as meadow pipits, skylark and northern wheatear. Most UK breeding birds move to low-lying coastal and inland areas during the winter (Ewing *et al*, 2011).

5.28 Studies of breeding merlin in south west Scotland have estimated a minimum of 20km^2 of grass and heather moorland within a mosaic of approximately 60% moorland and 40% forest within 4km of a nest is required for the territory to remain viable. In Wales it was estimated that a proportion of 70-80% moor adjacent to a nest was required to sustain merlin populations (Lusby *et al*, 2017).

5.29 Other species listed in the SPA classification document as typical species include red grouse; a species found exclusively on heather moorland. Peregrine do not hold exclusive home ranges, which may overlap with neighbouring pairs. Most large prey is taken within 2km of the eyrie with few birds captured beyond 6km (Hardey et al, 2007).

5.30 Short-eared owl are nomadic throughout the breeding range with nesting responding to localised peaks in vole densities. The ERF site does not provide suitable breeding habitat for this species. Hen harriers nest mainly on heather moorland and in forestry plantation in England. Radio-tracking studies on hen harrier in Scotland (Langholm, Orkney and Galloway) found that male hen harriers mostly hunted within 2km of their nest site, with females foraging within 1km of the nest (Arroyo *et al*, 2014).

5.31 Curlew are territorial during the breeding season, feeding on both moorland and neighbouring agricultural land (in-bye land), similar to golden plover. Breeding common redshank have similar foraging characteristics to curlew and golden plover during the breeding season.

5.32 It is considered that the application site is too distant from the North York Moors SPA to act as functionally linked land for the breeding bird assemblage listed in the SPA classification. The development of the ERF site will not impact on the interest features of the North York Moors SPA.

5.33 The habitats layer on Magic (https://magic.defra.gov.uk) was used to confirm that there is no blanket bog present in the parts of the SPA that fall within 10km of the development. The areas of the SPA within 10km are mapped as a mix of wet and dry heath. Due to the distance between the proposed development and blanket bog habitat present within the SPA, the likelihood of significant effects on this habitat can be screened out.

North York Moors SAC

5.34 The habitats layer on Magic (https://magic.defra.gov.uk) was used to confirm that there is no blanket bog present in the parts of the SAC that fall within 10km of the development. The areas of the SAC within 10km are mapped as a mix of wet and dry heath. Due to the distance between the proposed development and blanket bog habitat present within the SAC, the likelihood of significant effects on this habitat can be screened out. There is the

potential for increased levels of nitrogen or acid deposition to occur within the SAC as a result of the operation of the proposed development. The development could also lead to increases in concentrations of gaseous pollutants. There is a potential impact pathway resulting from changes in air quality affecting wet and dry heath habitats within the North York Moors SAC.

5.35 The HRA for the outline application highlighted the risk of the introduction of invasive non-native species to areas outside the ERF site during construction activity. As set out in paragraph 5.14, the site remediation work has been completed. As such it is concluded that no realistic impact pathway now exists that would be likely to result in impacts on the interest features of the North York Moors SAC.

6.0 Air quality modelling results and evaluation

6.1 Fichtner Consulting Engineers Ltd (Fichtner) were appointed to undertake an assessment of the impacts on air quality during the construction and operational phases of the proposed scheme. This section presents a brief summary of the assessment work where relevant to the NSN sites. Full details of this assessment process are detailed in the Fichtner report (Tees Valley ERF – Emission Modelling Report).

6.2 As part of the assessment process, Terence O'Rourke reviewed information on APIS and from other sources to determine the appropriate critical loads and levels that should be used for the assessment of air quality impacts on ecological receptors (see paragraphs 6.9 to 6.19).

6.3 Critical levels and critical loads are the ambient concentrations and deposition fluxes below which significant harmful effects to sensitive ecosystems are unlikely to occur. Critical levels of air pollution and critical loads of pollutants have been identified by the United Nations Economic Commission for Europe (UNECE).

6.4 Critical loads are defined as: "*a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified*

sensitive elements of the environment do not occur according to present knowledge".

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

6.6 It is important to distinguish between a critical load and a critical level. The critical load relates to the quantity of pollutant deposited from air to the ground, whereas the critical level is the gaseous concentration of a pollutant in the air.

6.7 The assessment of process emissions from the proposed ERF undertaken by Fichtner covered a range of pollutants that are known to have impacts on ecosystems above certain levels. The list of pollutant assessments and the critical levels used for the assessment are set out in table 1.

Pollutant	Concentration ($\mu g/m^3$)	Measured as
Nitrogen oxides (as nitrogen dioxide)	75	Daily mean
	30	Annual mean
Sulphur dioxide ($SO_{2)}$	10	Annual mean for sensitive lichen communities and bryophytes and ecosystems where lichens and bryophytes are an important part of the ecosystem's integrity
	20	Annual mean for all higher plants
Hydrogen fluoride (HF)	5	Daily mean
	0.5	Weekly mean
Ammonia (NH_3)	1	Annual mean for sensitive lichen communities and bryophytes and ecosystems where lichens and bryophytes are an important part of the ecosystem's integrity
	3	Annual mean for all higher plants

Table 1: Pollutants and relevant critical levels used for the ecological assessment.

6.8 The NH_3 level used in this assessment of the Teesmouth and Cleveland Coast SPA/Ramsar the is the annual mean set for all higher plants. APIS list an NH_3 critical level set for higher plants for the two key habitats, littoral sediment and standing open water and canals, present within the Teesmouth and Cleveland Coast SPA/Ramsar. NH_3 critical levels may also be relevant for

assessment purposes if they reach levels where they contribute significantly to nitrogen deposition (see below).

6.9 A review of the critical loads given for habitat and species occurring within the Teesmouth and Cleveland Coast SPA/Ramsar was undertaken by Terence O'Rourke to provide Fichtner with site appropriate critical load ranges to use in the air quality assessment. The rationale behind the selection of the critical loads used in the assessment is provided below.

6.10 The APIS website provides a critical load of 20-30kgN/ha/yr. for most habitat types occurring within the SPA/Ramsar including coastal floodplain and grazing marsh, mudflats and saltmarsh. This lower end of the critical load range for these habitats has been used for assessment purposes.

6.11 Habitat mapping on Magic shows that the RSPB reserve at Saltholme includes areas of saline lagoon. APIS does not give a critical load value for saline lagoons specifically for the Teesmouth and Cleveland Coast SPA/Ramsar.

6.12 As the waters within these lagoons will be brackish the critical load for coastal lagoons was reviewed to establish an appropriate figure to use for assessment purposes. In this case the critical load given for the coastal lagoons found within the Solent Maritime SAC was used. This site was considered to be a good proxy for Teesmouth and Cleveland Coast SPA/Ramsar as it contains a similar range of inter-tidal habitats, extensive grazing marsh and saline lagoons (with an overlapping SPA classification). The wintering, passage and breeding bird assemblage is also similar, including breeding pied avocet and little tern. The APIS gives a critical load range of 20-30kg/N/ha/yr. for coastal lagoons within the Solent Maritime SAC.

6.13 The Teesmouth and Cleveland Coast SPA/Ramsar includes areas of tidal waters best classed as estuary habitat. APIS does not give a critical load value for estuaries specifically for the Teesmouth and Cleveland Coast SPA/Ramsar. The critical load range for estuaries given on APIS was reviewed to establish an appropriate figure to use for assessment purposes. In this case the critical load given for estuaries found within the Solent Maritime SAC was used. This site was considered to be a good proxy for Teesmouth

and Cleveland Coast SPA/Ramsar as discussed in paragraph 6.12. The APIS gives a critical load range of 20-30kg/N/ha/yr. for estuaries within the Solent Maritime SAC.

6.14 No critical load value is given for the habitat type standing open water and canals on APIS, although the website highlights that mesotrophic and eutrophic waters are often phosphorus limited and such wetland systems are often subject to other sources of nitrogen such as discharges to water and diffuse agricultural pollution. It states "*nitrogen deposition is unlikely to be very harmful to eutrophic standing waters, even when close to sources*". A critical load range of 20-30kg/N/ha/yr. in line with the other main wetland habitats within the SPA/Ramsar is considered appropriate for assessment purposes.

6.15 APIS gives a range of values for coastal dune grasslands depending on whether they are stable or shifting systems. The critical load for stable acid dune grasslands is 8-15kg/N/ha/yr. Stable calcareous dune grasslands have a critical load range of 10-15kg/N/ha/yr. The range for shifting coastal dunes is 10-20 kg/N/ha/yr.

6.16 A study of the Coatham Dunes by Royal Haskoning DHV in 2018 found that the dune system has been influenced by the historic deposition of slag from local ironworks. The dune system is a mix of slag deposits, marine deposited and wind-blown sands. There is a historic landfill located in the dunes in the Majuba area. Accretion is evident along the whole of Coatham Sands but particularly at South Gare.

6.17 Away from South Gare the dune system remained largely unchanged between 1999 and 2017 except for areas of dune blowout or localised increases in areas of bare dunes. The dune system here has been assessed as a stable system for assessment purposes.

6.18 An Environmental Statement prepared by Envest Limited and Gair Consulting Limited for the Breagh Pipeline Project in February 2010 includes the results of a NVC survey undertaken on the Coatham Dunes by RSK. The ES chapter reports that the whole dune system is "*distinctly calciolous in its plant species and vegetation types, so that strongly calcifugous species are*

altogether lacking. Even species characteristic of marginally calcifugious grasslands are scarce".

6.19 Based on the evidence above it is considered appropriate to use the stable calcareous dune grassland critical load range of 10-15kg/N/ha/yr for assessment purposes.

Habitat	Critical load (kg/N/ha/yr)	Rationale for critical load	SPA/Ramsar species (main habitat associations)
Coastal floodplain and grazing marsh	20-30	Taken directly from APIS	Ruff, redshank, gadwall, shoveler, wigeon, lapwing and assemblage species.
Standing open water and canals	20-30	No value given on APIS, critical load selected based on values given on APIS for other wetland habitats within SPA/Ramsar.	Ruff, redshank, gadwall, shoveler, wigeon, lapwing and assemblage species.
Saline lagoons	20-30	Critical load selected based on values given on APIS for coastal lagoons in a SAC with similar bird assemblages.	Avocet and common tern.
Estuaries	20-30	Critical load selected based on values given on APIS for estuaries in a SPA with similar bird assemblages.	Common tern, little tern, sandwich tern, redshank, knot, sanderling, wigeon and assemblage species.
Saltmarsh	20-30	Taken directly from APIS	Wigeon, redshank, knot, lapwing and assemblage species.
Stable calcareous dune grassland	10-15	Values taken directly from APIS. Professional judgement applied to determine if dune system acidic or calcareous.	Little tern.

Table 2: Relevant critical loads used for the ecological assessment.

6.20 The Environment Agency's Operational Instruction documents explain how to assess atmospheric emissions from new or expanding Integrated Pollution Prevention and Control (IPPC) regulated industry applications, issued under the Environmental Permitting Regulations at ecologically sensitive sites. The process to follow to satisfy the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended) is outlined.

6.21 *Operational Instruction 67_12 Detailed assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation* sets out the screening criteria for ecological receptors, see table 3.

Threshold	European site
Y (% threshold long-term)	1%
Y (% threshold short-term*)	10%
Z (% threshold)	70%
*Short-term considers both daily and weekly	

Table 3: Screening criteria for ecological receptors

6.22 Where:

- Y is the long-term process contribution (PC) calculated as a percentage of the relevant critical level or load
- Z is the long term predicted environmental concentration (PEC) calculated as a percentage of the relevant critical level or load

6.23 Operational Instruction 67-12 states that if the PC is less than 1% critical level and load then emissions from the application are not significant, and if the PEC is less than 70% critical level and load it can be concluded 'no likely significant effect' (alone and in-combination).

6.24 AQTAG 17 - Guidance on in combination assessments for aerial emissions from EPR permits states that *"Where the maximum process contribution (PC) at the European site(s) is less than the Stage 2 de-minimis threshold of the relevant critical level or load [i.e. the criteria detailed in Table 2], the PC is considered to be inconsequential and there is no potential for an alone or in-combination effects with other plans and projects."*

Air quality modelling results for critical levels

6.25 The air quality modelling undertaken by Fichtner shows that the annual mean NOx PC is 0.55 μ g/m^3, 1.85 % of the critical level for the Teesmouth and Cleveland Coast SPA/Ramsar (see figure 2). Background levels across the NSN site vary between 45.9 μ g/m^3 (maximum) and 8 μ g/m^3 (minimum) with an average concentration of 20.56 μ g/m^3. The NOx daily (24 hour) PC is 4.51 μ g/m^3, 6.01% of the critical level for the SPA/Ramsar.

6.26 The air quality modelling shows that annual mean NOx concentrations are predicted to exceed 1% of the relevant critical level within part of the Teesmouth and Cleveland Coast SPA/Ramsar. The annual mean critical level for the protection of vegetation and ecosystems is set at 30 μ g/m^3. The NOx daily (24 hour) PEC at the same point is below the daily mean critical level of 75 µg/m^3 for the protection of vegetation and ecosystems. Further assessment of the potential impacts of increased annual concentrations of NOx on interest features of the SPA/Ramsar is required and this provided in Section 7.

6.27 The air quality modelling undertaken by Fichtner shows that the annual mean sulphur dioxide (SO_2) PC is 0.17 μ g/m^3, 0.83% of the critical level for the SPA/Ramsar. The annual mean NH_3 PC is 0.055 μ g/m^3, 1.8% of the relevant critical level for the SPA/Ramsar (see figure 3). The weekly and daily mean for hydrogen fluoride (HF) is 4.3% and 0.9% of the relevant critical level for the SPA/Ramsar. The annual mean PC for SO_2 combined with the baseline level is below the annual mean critical level of 20 µg/m^3 set for the protection of higher plants with the development in operation.

6.28 As the mean annual PC is below 1% of the relevant long-term and 10% of the relevant short-term critical levels for HF and SO_2 no further assessment is required.

6.29 The air quality modelling shows that annual mean concentrations of NH_3 are predicted to exceed 1% of the relevant critical load within part of the Teesmouth and Cleveland Coast SPA/Ramsar (0.055 μ g/m^3 which is 1.85% of the relevant critical level for the SPA/Ramsar). Further assessment of the potential impacts of increased concentrations of NH_3 on interest features of the SPA/Ramsar is required and this is provided in Section 7.

6.30 The air quality modelling shows that annual mean concentrations of NH_3 will not exceed 1% of the relevant critical load within the North York Moors SAC. However, APIS data shows that background concentrations of NH_3 already exceed the critical level set for the protection of sensitive lichen communities and bryophytes across this part of the SAC. Further assessment of the impacts of higher ammonia levels on the North York Moors SAC is required and this is provided in Section 7.

Air quality modelling results for critical loads

6.31 Across the Teesmouth and Cleveland Coast SPA/Ramsar the maximum rate of nitrogen deposition is 19.6kg/N/ha/yr. The minimum baseline rate of nitrogen deposition across the SPA/Ramsar is 15kg/N/ha/yr.

6.32 The deposition modelling undertaken by Fichtner shows a maximum rate of nitrogen deposition (PC) within the SPA/Ramsar is 0.34kg/N/ha/yr. This occurs along the River Tees and represents 1.7% of the lower end of the critical load given for estuaries and saltmarsh on APIS (see figure 4). Beyond the area of maximum deposition, the 0.1kg/N/ha/yr contour extends out to cover part of Seal Sands, part of North Gare Sands, all of Bran Sands and part of Coatham Marsh.

6.33 No standing open water falls with the 0.1kg/N/ha/yr. deposition contour modelled for the facility.

6.34 The deposition modelling undertaken by Fichtner shows a maximum rate of nitrogen deposition (PC) in the Coatham Sands area (and associated dunes) of 0.11kgN/ha/yr. within the SPA/Ramsar (see figure 4). This represents 1.21% of the lower end of the critical load given for stable calcareous dune grassland on APIS.

6.35 Further assessment of the potential impacts of increased rates of nitrogen deposition on habitats supporting interest features of the SPA/Ramsar is required and this is provided in Section 7.

6.36 The air quality modelling has demonstrated that nitrogen deposition (PC) on the North York Moors SAC is below 1% of the relevant critical load for European dry heaths. The predicted deposition of 0.03kg/N/ha/yr is 0.26% of the lower end of the critical load range for this habitat.

6.37 However, APIS data shows that background levels of nitrogen deposition exceeds the upper end of the critical load range given for these habitats in this part of the SPA and SAC. Further assessment of the impacts of nitrogen deposition on the North York Moors SPA and North York Moors SAC is required and this is provided in Section 7.

Dust

6.38 Dust was screened out as a potential impact on the NSN site in line with the methodology outlined within the 2016 Institute of Air Quality Management (IAQM) guidance document *Guidance on the assessment of dust from demolition and construction*. The intention of the IAQM guidance is that 500m is the distance from the area of muddy ground where dust could be deposited by vehicles leaving the ERF site and re-suspended by vehicles using the road network.

6.39 Dust generated during the operation of the plant was screened out as a potential impact on the NSN site due to distance. Although the scheme includes embedded mitigation to contain dust and odour during operation (see paragraph 3.6) it is not considered there is a realistic impact pathway, with or without the embedded mitigation, due to distance between the ERF and the NSN sites.

6.40 Table 4 below provides a summary of the impact pathway screening conducted for the three NSN sites and highlights where potential likely significant effects on the NSN sites have been identified. These impacts are assessed in detail in section 7.

Site	Receptor	Impact pathway	Assessment summary	LSE?
Teesmouth and Cleveland Coast SPA/Ramsar	Wintering/passage/ breeding birds	Loss of supporting habitat	ERF site does not provide supporting habitat for SPA/Ramsar species	No
	Wintering/passage/ breeding birds	Construction noise	Distance between ERF site and SPA/Ramsar sufficient to screen out potential disturbance.	No
	Wintering/passage/ breeding birds	Visual disturbance	Distance between ERF site and SPA/Ramsar sufficient to screen out potential disturbance.	No
	Wintering/passage/ breeding birds	Disturbance caused by vibration	Distance between ERF site and SPA/Ramsar sufficient to screen out potential disturbance.	No
	Wintering/passage/ breeding birds	Spread of invasive species	Site remediation works will address this issue prior to construction works commencing.	No

Site	Receptor	Impact pathway	Assessment summary	LSE?
	Wintering/passage/ breeding birds	Mobilisation of on-site contaminants	Contamination of surface water features draining into SPA/Ramsar could impact on interest features.	Yes
	Wintering/passage/ breeding birds	Increased levels of NOx within protected site	Potential impacts on estuary habitats.	Yes
	Wintering/passage/ breeding birds	Increased levels of NH_3 within protected site	Potential impacts on estuary habitats.	Yes
	Wintering and passage birds	Increased levels of N deposition within protected site (mudflats and open water)	Potential impacts on waders and ducks using estuary.	Yes
	Breeding birds	Increased levels of N deposition within protected site (sand dune habitat)	Potential impacts on habitat used by nesting terns.	Yes
	Wintering/passage/ breeding birds	Increased levels of SO_2 or HF and increased acid deposition,	Modelling shows levels remain below relevant critical levels or loads.	No
	Wintering/passage/ breeding birds	Dust	Distance between site and SPA/Ramsar sufficient to screen out potential impacts on vegetation.	No
North York Moors SPA	Breeding birds	Loss of breeding habitat	No breeding habitat on site.	No
	Breeding birds	Loss of supporting habitat	ERF site sufficiently distant from SPA to conclude it would not provide supporting habitat.	No
	Breeding birds	Changes in air quality	Changes in air quality across site predicted to be negligible.	Yes
North York Moors SAC	Annex 1 habitats	Changes in air quality	Changes in air quality across site predicted to be negligible.	Yes
	Annex 1 habitats	Spread of invasive species	Site remediation works will address this issue prior to construction works commencing.	No

Table 4: Summary of impact pathway assessment

7.0 Air Quality likely significant effect (LSE) test

7.1 The first test of Regulation 63 of the Habitats Regulations requires an assessment of whether the emissions from the scheme or any other activities, are likely to have a significant effect on the NSN site in question, either alone or in combination with other plans and projects.

7.2 As noted in section three no specific measures to reduce the impact on emissions on the NSN site have been included as part of the project. Therefore, this project can be screened for likely significant effects in line with the recent People Over Wind ruling.

Distribution of interest features within the Teesmouth and Cleveland Coast SPA/Ramsar

7.3 The distribution of wintering and breeding birds within the Teesmouth and Cleveland Coast is well documented and a range of published sources have identified the key areas used by wintering birds within the NSN site. The air quality modelling has shown that the main area of impact for emissions from the scheme covers the River Tees, parts of Seal Sands, North Gare Sands, all of Barn Sands and part of the sand dune system at Coatham Dunes (see figure 5).

7.4 The sand dune system at Coatham Dunes has the potential to support breeding little tern. The main little tern colony is located at Crimdon Denemouth north of Hartlepool, although in 2019 this colony relocated south to Seaton Carew. The little tern colony has bred at Crimdon Denemouth since 2005. Previously birds nested at Coatham Sands but this site was effectively abandoned in 1996 due to predation and disturbance. Occasional nesting attempts have been recorded at South Gare between 2015 and 2019.

7.5 Passage sandwich tern are known to form significant post-breeding aggregations at Coatham Sands, Seal Sands, North Gare Sands/Seaton Sands and Bran Sands.

7.6 Common tern breed primarily at the RSPB reserve at Saltholme on islands, on the saline lagoon (No4 Brinefield) south of Greatham Creek and on

artificial rafts at Cowpen Marsh. In 2014 breeding was also recorded at Portrack Marsh.

7.7 Pied avocet breed primarily at Saltholme RSPB reserve on islands, on the saline lagoon (No4 Brinefield) south of Greatham Creek and Greenabella Marsh.

7.8 Ruff are mostly recorded from RSPB Saltholme.

7.9 Knot use a number of areas within the SPA/Ramsar including Seal Sands, Seaton Sands, North Gare Sands, Seaton Snook and Coatham Sands. Recently lower numbers have been recorded using Seal Sands, with birds increasing feeding on Coatham Sands, Redcar Rocks and around Hartlepool Headland.

7.10 Common redshank tend to favour Seal Sands, North Tees Mudflat, Bran Sands, Hartlepool Bay, Greatham Creek opposite Cowpen Marsh and the rocky shores at Hartlepool Headland, Redcar and Coatham for feeding. Coatham dunes is used by roosting birds.

7.11 Sanderling feed on wide sandy beaches where they forage at the water edge. Redcar Sands, Seaton Sands, North Gare Sands, Seaton Snook and Coatham Sands support most of the wintering sanderling.

7.12 The most significant numbers of Eurasian wigeon occur at Saltholme RSPB, Seaton Common and Greatham Creek. Large numbers of gadwall and northern shoveler frequent North Tees Marshes. The largest flocks of northern lapwing tend to occur at Saltholme RSPB, Cowpen Marsh, Greatham Creek and Seaton Common.

Identification of thresholds for critical loads and levels

7.13 The APIS website was consulted to determine the appropriate critical loads and levels for use in the assessment of likely significant effects. Where critical loads or levels were not provided professional judgement was used by the project ecologist to determine an appropriate level or load for assessment purposes. Fichtner used this information when undertaking the modelling work. This process is explained in section six along with an evaluation of the air quality modelling results.

Screening for air quality LSE

Teesmouth and Cleveland Coast SPA/Ramsar

7.14 The air quality modelling shows that the areas where NOx concentrations exceed 1% of the relevant critical level are along the River Tees (west of Seal Sands). The affected area is a mix of intertidal areas (gravels, mud and gravel and mudflats) and open water. The maximum background level of NOx in this area is 44.2 μ g/m^3.

7.15 A review of bird data indicates that the area of the SPA/Ramsar where NOx concentrations are predicted to increase as a result of the proposal does not support significant populations of wintering birds. The extent of intertidal habitat along this stretch of the River Tees is limited, with the majority of the area being open water.

7.16 The intertidal areas will be covered by water during each tidal cycle and the fine sediments do not typically support higher plants if subject to continual, regular inundation. The lack of early successional salt marsh vegetation with the area where NOx levels are predicted to increase means that no impacts on vegetation are predicted, as the areas affected are open water or unconsolidated sediments. The modelled increase in concentrations of NOx in this part of the SPA/Ramsar are therefore not considered likely to result in a likely significant effect on the interest features of the NSN site.

7.17 The air quality modelling shows that the areas where NH_3 concentrations exceed 1% of the relevant critical level are along the River Tees (west of Seal Sands). The affected area is a mix of intertidal areas (gravels, mud and gravel and mudflats) and open water. Maximum background levels of NH_3 in this area are 2 μ g/m^3.

7.18 A review of bird data indicates that the area of the SPA/Ramsar where NH_3 concentrations are predicted to increase as a result of the proposal does not support significant populations of wintering birds. The extent of intertidal habitat along this stretch of the River Tees is limited, with the majority of the area being open water.

7.19 The intertidal areas will be covered by water during each tidal cycle and the fine sediments do not typically support higher plants if subject to continual,

regular inundation. The lack of early successional salt marsh vegetation with the area where NH_3 levels are predicted to increase means that no impacts on vegetation are predicted, as the areas affected are open water or unconsolidated sediments.

7.20 The annual mean PC for NH_3 combined with the baseline level is below the annual mean critical level of 3 µg/m^3 for the protection of higher plants with the development in operation. When the maximum PC is included, the PEC remains less than 70% of the critical level (66.7%). The modelled increase in concentrations of NH_3 in this part of the SPA/Ramsar are therefore not considered likely to result in a likely significant effect on the interest features of the NSN site.

7.21 The deposition modelling undertaken by Fichtner shows a maximum rate of nitrogen deposition (PC) within the SPA/Ramsar of 0.34kg/N/ha/yr. This deposition contour covers the Tees Dock, the River Tees and the mudflats around the Seal Sands Chemical Works. This rate of deposition represents 1.72% of the lower end of the critical load given for estuaries and saltmarsh on APIS. Beyond the area of maximum deposition, the 0.1kg/N/ha/yr contour extends out to cover part of Seal Sands, part of North Gare Sands, all of Bran Sands and part of Coatham Marsh.

7.22 A review of bird data indicates that the area of the SPA/Ramsar where nitrogen deposition is predicted to exceed 1% of the relevant critical load as a result of the proposal does not support significant populations of wintering birds. The extent of intertidal habitat along this stretch of the River Tees is limited, with the majority of the area being open water.

7.23 Further out the increase in nitrogen deposition in areas of Seal Sands, North Gare Sands, Bran Sands and Coatham Marsh has the potential to impact on aggregations of passage sandwich tern and wintering knot, common redshank and sanderling.

7.24 The background rates of nitrogen deposition across the SPA/Ramsar range between 19.6kg/N/ha/yr (maximum) and 15kg/N/ha/yr (minimum). Where the highest levels of nitrogen deposition are predicted to occur the background rate of nitrogen deposition is 16.8kg/N/ha/yr. At this point with

the PC added the lower end of the critical load range for estuary and saltmarsh habitats is not exceeded.

7.25 The modelled increase in nitrogen deposition within the SPA/Ramsar is therefore not considered likely to result in a likely significant effect on the wintering and passage interest features of the NSN site.

7.26 The sand dune habitat that provides suitable breeding habitat for little tern (and potentially common tern) has a lower critical load range than estuary and saltmarsh habitats. The deposition modelling undertaken by Fichtner shows a maximum rate of nitrogen deposition (PC) in the Coatham Sands (and associated dunes) area of the SPA/Ramsar of 0.11kgN/ha/yr. This represents 1.21% of the lower end of the critical load given for stable calcareous dune grassland on APIS. The background level of nitrogen deposition in this area is above the upper end of the critical load range (10-15kg/N/ha/yr.) at 16kg/N/ha/yr.

7.27 The area of the dune system where nitrogen deposition is modelled to increase is part of the mature dune system which is not known to support breeding little tern. The colony usually settles at Crimdon Denemouth or Seaton Carew, both areas are located at least 10km north of the proposed development and well outside the predicted area of impact.

7.28 Occasional nesting attempts by little tern have been recorded at South Gare since 2015. Little tern typically nest just above the high water mark on unconsolidated sands or shingle. Nesting in areas with high levels of vegetation coverage is rare (Cabot and Nisbet, 2013). Studies of the coastline have shown accretion is occurring at South Gare, creating suitable nesting habitat for little tern.

7.29 As the open sand and shingle habitats required by nesting little tern, notably those around the South Gare breakwater are outside the 0.1kg/N/ha/yr contour, changes in habitat related to increases in nitrogen deposition are unlikely to occur. This area is currently only sporadically used by little tern and the main colony is located much further north.

7.30 A field visit undertaken in August 2021 found that the majority of the dune system is a stable community dominated by grasses and vascular plants (see

photos 1 and 2). Loosely aggregated sand occurs in a narrow zone between the foot of the established dune system and the high tide mark (see photos 3 and 4). The site visit found the area around South Gare to be subject to high levels of disturbance with walkers, dog-walkers, horse riders and fisherman all observed using this zone. Evidence of use of the beach by motorised vehicles was also observed (see photo 5).

7.31 Vehicular access to South Gare breakwater is possible from Redcar along a road leading past the former Warrenby Steelworks. With current levels of recreational pressure and the limited extent of suitable habitat available it is considered unlikely little tern would breed in this area unless access was restricted and the nests wardened as occurs at many other little tern colonies.

7.32 The modelled increase in nitrogen deposition within the SPA/Ramsar is therefore not considered likely to result in a likely significant effect on breeding little tern within the NSN site.

7.33 Common tern could potentially breed in open areas with sparse vegetation within the mature dune system at Coatham. These open areas would be created through natural processes such as blow-outs or recreational pressure and be relatively transitory in nature. Common terns are unlikely to breed successfully in areas with high levels of public access unless colonies are wardened.

7.34 There are no recent records of common tern breeding within the Coatham dunes complex. Nitrogen deposition associated with the proposed development would not prevent the formation of areas of suitable habitat within this area. All current known breeding colonies of common tern within the SPA/Ramsar fall outside the area of increased nitrogen deposition.

7.35 The modelled increase in nitrogen deposition within the SPA/Ramsar is therefore not considered to result in a likely significant effect on breeding common tern within the NSN site.

7.36 The scheme includes two emergency diesel generators (EDG). The stacks of the EDGs will be low (i.e., less than 10 m) as is appropriate for this type of development. Therefore, any air quality effects resulting from the operation

of the EDG will be very local to the EDG stack, and will occur for a very limited number of hours per year for testing of the EDG and in any emergencies. Emissions from the EDG will include NOx and nitrogen.

7.37 Due to the distance between the EDG stack and the SPA Ramsar the air quality consultants have advised that emissions from the EDG do not have the potential for a likely significant effect on the NSN sites. The limited operational hours and low stack height mean that is not considered that the emissions from the EDG would result in a likely significant effect on bird species within the SPA/Ramsar.

7.38 Construction traffic entering and exiting the ERF site will be routed along the A66. Except at very discrete points the SPA/Ramsar lies over 200m from the A66. No impacts related to emissions from traffic associated with the construction phase are anticipated. Construction traffic will use other major roads in the local area. However, the increase in flows on any one road will be minimal and short-term. It is not considered likely that these minor changes in traffic flows during the construction period will result in any likely significant effects on the interest features of the SPA/Ramsar north of the River Tees.

7.39 Air quality modelling by Fichtner has shown that NOx emissions from peak construction traffic flows will be 47% of the level predicted for operational phase emissions in the air quality assessment undertaken for the outline application. Construction traffic flows are significantly lower than those predicted during the operational phase of the ERF. Operation impacts (both alone and in-combination) have concluded no likely significant effect on the interest features of the SPA/Ramsar (see paras 7.38-7.40 and 9.6-9.10).

7.40 HGVs associated with the operation of the ERF will not cross the River Tees using the Tees Transporter Bridge due to weight restrictions in place on this crossing. Any HGVs travelling north and south across the Tees would be routed along the A19. Those vehicles travelling to the Burn Road Transfer Station in Hartlepool would use the A19 and A689 for transit. At no point along the route are these major roads within 200m of the SPA/Ramsar. Emissions from road traffic associated with the movement of waste to the ERF are not considered to result in any likely significant effects on the interest features of the SPA/Ramsar north of the River Tees.

7.41 Traffic emissions and emission from the ERF have the potential to impact on the interest features of the SPA/Ramsar south of the River Tees. A narrow corridor running alongside the A1085 in and around Redcar is potentially impacted by the project (see figure 6).

7.42 However, the background levels of NOx in the areas affected are low, below the critical level of 30 μ g/m^3 set for the protection of habitats and ecosystems. The background level for Coatham Marsh is between 18.6 and 19 μ g/m^3 and for Redcar beach is 11.9 and 16 μ g/m^3. The contribution of NOx from traffic associated with the scheme will not increase NOx levels to a point where the critical level is exceeded. No impact from road traffic associated with the scheme alone will occur in this part of the SPA/Ramsar. An in-combination assessment of the impacts of traffic emissions is included in Section 9.

7.43 Nitrogen deposition, of which NOx emissions from traffic are a contributor, is considered in the in-combination assessment.

7.44 The modelling undertaken by Fichtner shows that for the process contribution from ERF is below 1% of the relevant critical level for NOx (annual and daily mean), SO_2 (annual mean), HF (annual and daily mean) and NH_3 (annual mean) for the North York Moors SAC. The lower annual mean critical levels of 10 µg/m^3 for SO_2 and 1 µg/m^3 for NH_3 for the protection of lichens and bryophytes have been applied at the North York Moors SAC.

7.45 The air quality modelling demonstrates the process contribution from the ERF is below 1% of the relevant critical level for NH_3. However, background levels of NH_3 in this part of the SAC already exceed the critical level. It is not considered the small increase in ammonia on a small part of the SAC is likely to have a significant impact on the lower plant communities in this area. The current land uses (managed grouse moor) will also mean that lichen and bryophytes in this area will largely comprise adaptable species that can quickly recolonise areas post-burning.

7.46 The air quality modelling also shows that the process contribution from the ERF is below 1% of the relevant critical load for nitrogen and acid deposition for the dry and wet heath habitats within the North York Moors SAC. It should be noted that background levels of acid deposition for both wet and

dry heathland within the SAC already exceed the lower end of the critical load range for these habitats. The upper end of the critical load range for nitrogen deposition on wet and dry heath is exceeded in this part of the SAC.

7.47 The process contribution from the ERF is below 1% of the relevant critical levels and loads for dry and wet heathland communities within the North York Moors SAC. Very small additions of nitrogen are unlikely to have a significant impact on the vegetation of this part of the SAC.

7.48 The moors south of Guisborough are managed as grouse moor with regular cyclical burning of heather to provide a patchwork of different ages to benefit red grouse populations. The burning or cutting of heather assist with the removal of nitrogen and other nutrients within the plants and soils and helps maintain a low nutrient environment that favours heather.

7.49 It is considered that the current land management practices are sufficient to maintain a healthy cover of heather dominated moorland in these areas and the small additions of nitrogen are unlikely to accumulate to a sufficient level where they impact on plant health. The removal of nitrogen through burning will also help reduce the impacts associated with an increase in acidity as nitrogen is the major contributor to acid deposition in this part of the SAC.

7.50 It is not considered that the increase in levels of $NH_{3,}$ or increased nitrogen and acid deposition associated with the development alone would be sufficient to result in a likely significant effect on the dry and wet moorland habitat along the northern edge of the SAC.

8.0 Water quality appropriate assessment

8.1 Chapter 8 of the EIA SoC identifies that construction of the proposed development will be carried out in line with a CEMP which will include best practice measures to manage potential effects associated with ground conditions and the water environment. The measures will include the preparation of a pollutants, water and sediment management protocol to inform construction works, which will set out measures such as the following:

- Minimise storage of hazardous chemicals on site and, where storage is necessary, use anti-pollution measures such as bunded trays or leak-proof containers
- Use designated refuelling sites, located away from open water
- Any cleaning materials or chemicals used during the construction phase are not to be hazardous to the water environment
- No storage of potentially contaminating materials in areas liable to water inundation
- Use of electrical power, rather than diesel, where possible
- Design of construction methods to minimise disturbance to, and mobilisation of, sediment
- Controlled washing down of plant while on site
- Implementation of piling design with tight quality assurance / quality controls
- Oil spill kits to be kept on site, and site staff trained in their use
- Minimisation of dewatering requirements by programming excavation works to be as short as possible. The need for an environmental permit to undertake dewatering will be established and the necessary applications made as required

8.2 The implementation of the CEMP is considered to be mitigation for the potential impacts on the Teesmouth and Cleveland Coast SPA/Ramsar identified in paragraph 5.19. To ensure the proposed development will not

adversely affect the integrity of the site during construction the approved CEMP must be implemented in full.

8.3 The ERF development will give rise to surface water run-off from the roads within the ERF site, buildings, vehicle parking areas and other hardstanding areas. At ground level it is proposed that surface water runoff is collected via external hardstanding areas. The runoff will be passed through oil interceptors and then directed via gravity into the attenuation pond or tank situated towards the western part of the ERF site.

8.4 The surface water runoff will be treated via an oil interceptor and polishing filter and be discharged at greenfield runoff rates into Holme Beck to the west of the ERF site. Due to the anticipated depth of the upstream network and attenuation tank it will, however, be necessary to pump the discharge from the attenuation tank. In addition, the pond will also serve as attenuation. Surface run off will be passed through an oil interceptor prior to discharge into the pond, before also discharging into Holme Beck culvert.

8.5 A more detailed description of the surface water drainage arrangements for the ERF site and flood risk is included within the Surface Water Drainage Strategy and Flood Risk Assessment which are submitted as part of the reserved matters application.

8.6 The implementation of the surface water drainage strategy is considered to be mitigation for the potential operational impacts on the Teesmouth and Cleveland Coast SPA/Ramsar identified in paragraph 5.20. To ensure the proposed development will not adversely affect the integrity of the NSN site during construction the approved surface water drainage strategy must be implemented in full.

9.0 In-combination assessment (air quality)

Teesmouth and Cleveland Coast SPA/Ramsar

9.1 For the purposes of identifying projects for the in-combination assessment it has been assumed that negligible traffic from the ERF will travel along the A178 north of the River Tees. This is because the route across the River Tees on the A178 requires the use of the Tees Transporter Bridge, which has a maximum weight limit per vehicle of 3 tonnes.

9.2 As outlined in section 7, HGV vehicles travelling north from the ERF would use the A19 and A689 for transit. At no point along the route are these major roads within 200m of the SPA/Ramsar. As such there is no potential for in-combination effects from HGV traffic north of the River Tees. Traffic emissions on the A1085 south of the Tees do have the potential to act in-combination with other plans and projects to increase nitrogen deposition on some parts of the SPA/Ramsar.

9.3 Coatham Marshes is located adjacent to the A1085. The site is a mix of grassland, scrub, reedbed and open water habitat (see photo 6). Magic identifies a significant part of the site as being the priority habitat coastal floodplain and grazing marsh. APIS provides a critical load range of 20-30kg/N/ha/yr for coastal floodplain and grazing marsh. It does not provide a critical load for eutrophic standing waters noting that deposition of NH_3, nitrate and other forms of nitrogen deposition from the atmosphere is unlikely to be the largest source of eutrophic standing water. The website states that, in general, nitrogen deposition is unlikely to be very harmful to eutrophic standing waters, even when close to sources.

9.4 Natural England (2018) guidance document *Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations* explains that it is widely accepted that imperceptible impacts are those which are less than 1% of the critical level or load, which is considered to be roughly equivalent to 1,000 AADT for cars and 200 AADT for HGVs. This was based on the Design Manual for Roads and Bridges (DMRB) screening tool using Department for Transport data to calculate whether the NOx output could result in a change of more than 1% of the critical level/load.

9.5 Research produced by Air Quality Consultants (AQC) has highlighted the need to also consider the NH_3 released from vehicles when assessing the impact on nitrogen sensitive habitats (*Ammonia Emissions from Roads for Assessing Impacts on Nitrogen-sensitive Habitats,* AQC (2020). This is especially important for future years as reductions in NOx emissions have outpaced reductions in NH_3 emissions. Both NOx and NH_3 contribute to nitrogen deposition and the positive effect of reduced levels of NOx in exhaust gases (reducing nitrogen deposition) is offset for ecological receptors by the elevated levels of NH_3.

9.6 The APIS website provides background rates for nitrogen deposition of 15.7 to 15.9kg/N/ha/yr. at Coatham Marsh. The background level of NOx is 18.6 to 19 μ g/m^3. Source apportionment analysis on APIS shows that currently road traffic accounts for 1.82kg/N/ha/yr. of total N deposition onto the NSN site each year (long and short-range sources). Based on current rates of deposition, even if traffic flows along this stretch of road doubled as a result of the developments in the area (compared to the current baseline) nitrogen deposition would still fall below the lower end of the critical load range given for coastal floodplain and grazing marsh.

9.7 Increases in levels of NOx and rates of nitrogen deposition will be highest at edge of carriageway and levels and rates will decline as distance from the source increases. At the closest point the open water habitat likely to be used by SPA birds is 50 m from the A1085. The reedbed extends to the boundary with the A1085 at one point (see photo 7) but is largely screened from the road by banking and hedgerows (see photo 8).

9.8 The catchment for feedstock for the ERF covers the local authority areas of Darlington, Durham, Hartlepool, Middlesborough, Newcastle, Redcar and Cleveland and Stockton. With the exception of Redcar and Cleveland deliveries to and from the ERF site will not use the A1085. Traffic flows along the A1085 related to kerbside waste collection in Redcar and the surrounding area are unlikely to change significantly as a result of the ERF becoming operational.

9.9 Deliveries to the ERF within the Redcar and Cleveland local authority area beyond the Redcar/Marske-by-the-Sea conurbation are most likely to access the ERF site via the A174 and A1053. Baseline traffic flows related to the

collection of waste from various sources in the Redcar/Marske-by-the-Sea area is not predicted to increase significantly as a result of this development becoming operational.

9.10 Given that traffic flows are not predicted to increase significantly along the A1085 as a result of the project, the relatively low background rates of nitrogen deposition and low levels of NOx in the Coatham Marshes area and the fact recommended critical loads and levels are not currently exceeded and the limited zone of impact related to traffic emissions, no in-combination effects relating to increases in traffic flows along the A1085 adversely affecting Coatham Marsh are anticipated.

9.11 The following projects have been identified as having the potential to act in-combination with the proposal as all will release emissions resulting from combustion into the atmosphere:

- Tees REP Biomass Plant R/2008/0671/EA (traffic and stack emissions)
- Teesside Combined Cycle Power Plant R/2017/0119/DCO (traffic and stack emissions)
- Grangetown Peaking Plant R/2018/0098/FF (stack emissions)
- Peak African Minerals Resources Refinery R/2017/0876/FFM (traffic and stack emissions)
- PMAC Redcar Bulk Terminal - construction of the Redcar energy centre (REC) consisting of a material recovery facility incorporating a bulk storage facility; an energy recovery facility; and an incinerator bottom ash recycling facility along with ancillary infrastructure and landscaping R/2020/0411/FFM (traffic and stack emissions)
- Land at former South Bank Works, Grangetown Prairie; British Steel and Warrenby area - demolition of structures and engineering operations associated with ground preparation and temporary storage of soils and its final use in the remediation and preparation of land for regeneration and development R/2019/0427/FFM (traffic)
- Construction of 550 dwellings and associated access, landscaping and open space R/2016/0663/OOM (traffic)

- Land at Low Grange Farm, South Bank – outline application for up to 1250 dwellings R/2014/0372/OOM (traffic)
- Offshore wind farm and onshore infrastructure R/2018/0364/NID (traffic)
- Container terminal R/2006/0433/OO (traffic and emissions from shipping).
- Facility for export of polyhalite bulk fertiliser R/2015/0218/DCO (traffic and emissions from shipping).
- New mine development by York Potash Ltd (traffic).
- Highways improvement schemes (traffic).
- Outline planning application for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class b2) and storage or distribution facilities (use class b8) with office accommodation (use class b1), HGV and car parking and associated infrastructure works all matters reserved other than access. 174 ha site. R/2020/0357/OOM (traffic).
- Overhead conveyor and associated storage facilities in connection with the York Potash Project R/2017/0906/OOM (traffic).
- New plant, new buildings and extensions to existing buildings. Works to include warehouse D extension, boiler house structure, amenities and workshop building, drum storage workshop extension, amenities extension, 2 no. warehouse buildings, contractor's cabins, gate house and weighbridge, receivers, driers, extension to existing tank farm, tanker offloading stations, process and control buildings, installation of new and replacement cooling towers and industrial apparatus, pipe bridge, swale and the demolition of old plant and buildings 19/2161/FUL.
- Land north of Woodcock Wood and west of Flatts Lane, Normanby - 400 dwelling houses. R/2019/0443/RMM and R/2016/0326/OOM.
- Land at and adjoining Eston Road, including gateway junction of A66 to Middlesbrough Road, East Grangetown - engineering operations including widening of Eston Road, formation of new roundabout and internal access roads, works to enhance Holme Beck and associated hard and soft landscaping works. R/2020/0270/FFM.

- Various locations along existing approved cable route from Marske Beach to Lackenby - installation of underground high voltage electrical cables and ancillary works within five areas to connect existing approved Dogger Bank C and Sofia offshore wind farms. R/2020/0355/FFM
- Land at metals recovery area, north west of PD Ports; north east of Sembcorp pipeline corridor and Tees Dock Road, south east of former Slem waste management facility and south west of Highfield environmental facility, South Bank – demolition of existing buildings/structures and engineering operations associated with ground remediation and preparation of land for development. R/2020/0465/FFM.
- Land at Prairie Site, Grangetown - engineering operations associated with ground remediation and preparation, including removal of former railway embankment and works to Holme Beck and Knitting Wife Beck. R/2020/0318/FFM.

9.12 Previous in-combination assessment work undertaken for the approved Redcar energy centre (R/2020/0411/FFM) considered the in-combination air quality impacts of the approved scheme along with the Tees Renewable Energy Plant (R/2008/0671/EA), the Teesside Combined Cycle Power Plant (R/2017/0119/DCO) and the current scheme (as per the outline application). Although these schemes results in a PEC above the lower end of the critical load range for sand dune habitats it was concluded (and accepted by Natural England in September 2020) that this would not result in adverse impacts on the integrity of the SPA/Ramsar.

9.13 It should be noted that the in-combination impacts at the Teesmouth and Cleveland Coast SPA/Ramsar are lower than those accepted by Natural England for the Redcar Energy Centre (REC) cumulative assessment. This is because the ecological assessment for the REC conservatively assumed the REC would operate at the emission limits prescribed in the Industrial Emissions Directive (IED), whereas it (the REC) will actually be permitted to operate at the lower limits prescribed in the Waste Incineration BREF. The approach adopted for the REC ecological assessment is in line with precautionary principle.

9.14 The stack emissions from the Grangetown Peaking Plant R/2018/0098/FF, the Peak African Minerals Resources Refinery R/2017/0876/FFM and emissions

from shipping associated with the container terminal R/2006/0433/OO and the facility for export of polyhalite bulk fertiliser R/2015/0218/DCO were not considered in the in-combination assessment undertaken for the Redcar energy centre. A recent planning application (R/2023/0080/ESM) for a renewable gas production facility on Plot 6, Dorman Point, Teesworks has also been considered as it has the potential for future in-combination effects. Scenario 2 described in the Fichtner report is used for this in-combination assessment.

9.15 The in-combination assessment undertaken by Fichtner for this project includes the projects listed in paragraphs 9.12 and 9.14. The maximum baseline concentration of SO_2 within the Teesmouth and Cleveland Coast SPA/Ramsar is 4.10 µg/m³, or 20.5% of the Critical Level. In the first instance it has been assumed that this is the baseline concentration at the point of maximum in-combination impact. When the maximum in-combination PC of 1.37 µg/m³ is added, the PEC is 5.47µg/m³ which is 27.3% of the Critical Level

9.16 According to APIS, the highest baseline concentration of ammonia in the area of interest for in-combination impacts is 2.0 µg/m³. Conservatively assuming this to be the baseline concentration at the point of maximum in-combination impact and adding the worst-case in combination PC of 0.225 µg/m³, the PEC is 2.235 µg/m³ which is 74.5% of the critical level.

9.17 The in-combination PECs for SO_2 at the Teesmouth and Cleveland Coast SPA/Ramsar is less than 70% of the relevant critical level for SO_2 and can be screened out as 'not significant'.

9.18 The PEC for NH_3 (background plus in-combination PC) is 74.5% of the relevant critical level set for the protection of higher plants. However the area where ammonia concentrations are over 70% of the relevant critical level is open water or inter-tidal habitats. The total concentration of ammonia will still be below the critical level set for the protection of higher plants. As such no adverse impacts on the interest features of the NSN site are predicted.

9.19 The highest in-combination PEC for NOx at the Teesmouth and Cleveland Coast SPA/Ramsar is 3.7 µg/m^3, which represents 12.34% of the critical level.

APIS shows that the annual mean critical level is exceeded at the mouth of the River Tees in the area directly around the Conoco Phillips Oil Refinery and the Corus Steel Works (45.9-26.1 µg/m^3). NOx levels are much lower in the Bran Sands and South Gare breakwater area (33.6-21.5 µg/m^3). Habitat mapping on Magic shows that the area of the SPA/Ramsar affected by the highest background NOx levels are inter-tidal habitats or open water. There is also a small area of saltmarsh along the eastern edge of Seal Sands.

9.20 Information on APIS shows that the species within the SPA using the broad habitat type littoral sediment are not considered to be sensitive to increased levels of NOx. Littoral sediment includes habitats of shingle (mobile cobbles and pebbles), gravel, sand and mud or any combination of these which occur in the intertidal zone.

9.21 Saltmarsh habitat is not considered to be particularly sensitive to nitrogen additions in the form of gaseous NOx. This is mainly due to the aerial deposition of nitrogen on these systems being dwarfed by the nutrient loads from rivers and tidal inputs.

9.22 Increases in NOx levels across the sand dune habitat at South Gare will occur. However, the most significant contributors to this increase are other plans and projects, with a maximum in-combination contribution of 3.7 µg/m^3. Across all the 1km grid squares covering this habitat the overall concentration of NOx remains below the 30 µg/m^3 set for the protection of vegetation. It is not considered that the in-combination effects, resulting in increased levels of NOx will result in adverse impacts on sand dune habitat, potentially suitable for breeding terns within this part of the SPA.

9.23 The maximum in-combination rate of nitrogen deposition within the Teesmouth and Cleveland Coast SPA/Ramsar is 15.93% of the lower end of the critical load for coastal sand dune habitats (1.59kg/N/ha/yr). The contribution from the ERF at this in-combination point of maximum impact is a small proportion of the total, at only 1.02% of the critical load (0.1kg/N/ha/yr). The majority of the in-combination impact is due to emissions from the REC which is located within a few hundred metres of the sand dune habitats.

9.24 The REC has been approved and the in-combination impacts of nitrogen deposition on the sand dune habitat potentially suitable for nesting terns has already been assessed. The dunes in the area around the former steelworks are a stable vegetated system that provide very limited areas of suitable habitat for nesting terns. The most suitable areas for nesting terns are found at the foot of the dunes and the high-water mark, a strip of unconsolidated sands that would not be directly impacted by increased nitrogen deposition. It is not considered that the in-combination effects, resulting in increased levels of nitrogen deposition will result in adverse impacts on sand dune habitat, potentially suitable for breeding terns within this part of the SPA.

North York Moors SAC

9.25 The total in-combination acid deposition contribution on heathland habitat within the North York Moors SAC is 0.56% of the critical load. The contribution from the ERF is only 0.09% of the critical load. Modelled data shows the primary contributor to acid deposition is nitrogen at 1.45 keq/ha/yr compared to a deposition rate of 0.16 keq/ha/yr for sulphur (PEC where ERF is added to background rates). The in-combination modelling shows the contribution to acid deposition from nitrogen increasing to 1.46 keq/ha/yr and the deposition rate of sulphur increasing to 0.18 keq/ha/yr. An increase in deposition rates of at least 2.5 keq/ha/yr of either sulphur or nitrogen would be required to exceed the upper end of the critical load range. The lower end of the critical load range is already exceeded.

9.26 The moors south of Guisborough are managed as grouse moor with regular cyclical burning of heather to provide a patchwork of different ages to benefit red grouse populations. The burning or cutting of heather assist with the removal of nitrogen and other nutrients within the plants and soils and helps maintain a low nutrient environment that favours heather.

9.27 It is considered that the current land management practices are sufficient to maintain a healthy cover of heather dominated moorland in these areas and nitrogen levels are unlikely to be able to build up to a sufficient level where acidity levels impact on plant health. It is not considered that the in-combination effects, resulting in increased levels of acid deposition will result in adverse impacts on dry heathland within this part of the SAC.

10 Conclusion

10.1 This document has identified a number of potential impacts pathways on interest features of the Teesmouth and Cleveland Coast SPA / Ramsar from the development alone relating to changes in air quality.

10.2 These impact pathways related to changes in concentrations of NH_3 and NOx associated with the operation of the plant potentially impacting on habitats used by wintering and passage waders, terns and ducks. The impact of increases in rates of nitrogen deposition on habitats used by wintering and passage wader, terns and ducks, along with habitat used by breeding little tern was also considered.

10.3 It has been concluded that the impacts related to changes in air quality related to this scheme would not result in any likely significant effects on the interest features of the Teesmouth and Cleveland Coast SPA / Ramsar when considered alone. No impact pathways relating to the North York Moors SAC and SPA have been identified from the proposed scheme when considered alone. The need for appropriate assessment relating to impacts from air quality has been screened out.

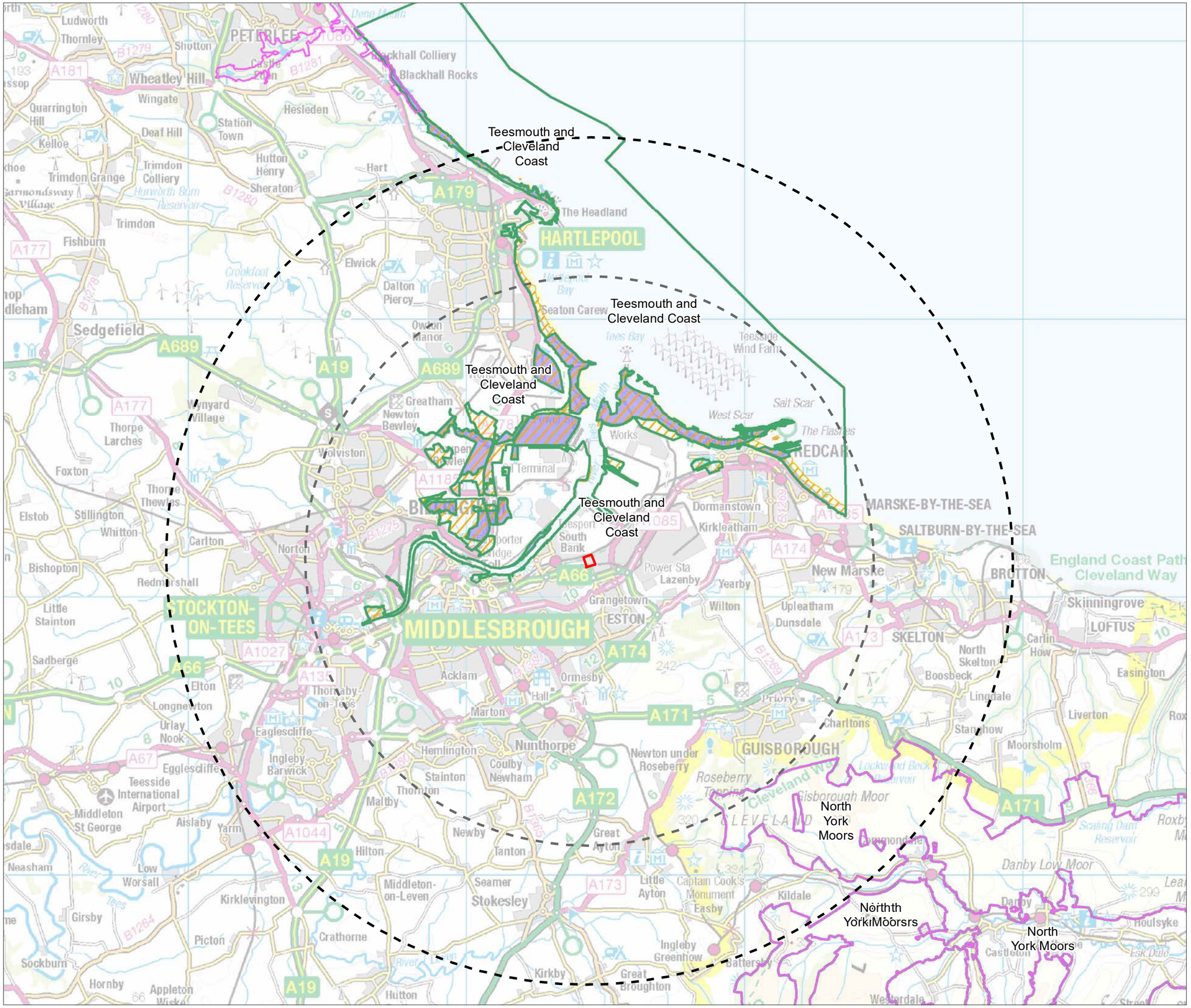
10.4 The proposals include the requirement for a CEMP to be produced to safeguard surface water quality during construction. This is mitigation and therefore an appropriate assessment of the potential impacts of the scheme on waterbodies that ultimately drain into the Teesmouth and Cleveland Coast SPA/Ramsar has been undertaken. This has concluded that with the appropriate mitigation in place the proposals will not adversely affect the integrity on this NSN site.

10.5 This document also considers the potential for other plans and projects to act in-combination with the scheme. Potential impacts pathways relating to changes in rates of nitrogen deposition on the North York Moors SAC / SPA have been identified alongside changes in air quality within parts of the Teesmouth and Cleveland Coast SPA / Ramsar.

10.6 The potential for likely significant effects on habitat used by breeding terns within the Teesmouth and Cleveland Coast SPA / Ramsar related to increased rates of nitrogen deposition has been screened out at the in-

combination stage. Similarly increases in rates of nitrogen deposition within the North York Moors SAC / SPA have been assessed and it has been concluded that these in-combination effects will not result in likely significant effects on the interest features of these NSN sites.

10.7 As the competent authority, RCBC is required to undertake its own independent appropriate assessment. The council can choose to adopt this document, following professional scrutiny to evaluate the evidence presented and examine the conclusions reached; or it can undertake its own appropriate assessment using the material provided as part of the planning application and any other relevant material from the applicant requested under Regulation 63.



Site boundary

10km study area

15km study area

Special Area of Conservation

Special Protection Area

Ramsar site

Proposed Ramsar site

Tee Valley
Viridor Energy Limited

0 3,100 m

N

Figure 1: 10km and 15km search area around application site

Dwg no/227707/02	Revision
Status	30 July 2021
Scale: 1:130,000 @A3	Drawn by: JC / Checked by: JP

LONDON
23 Heddon Street
London W1B 4BQ

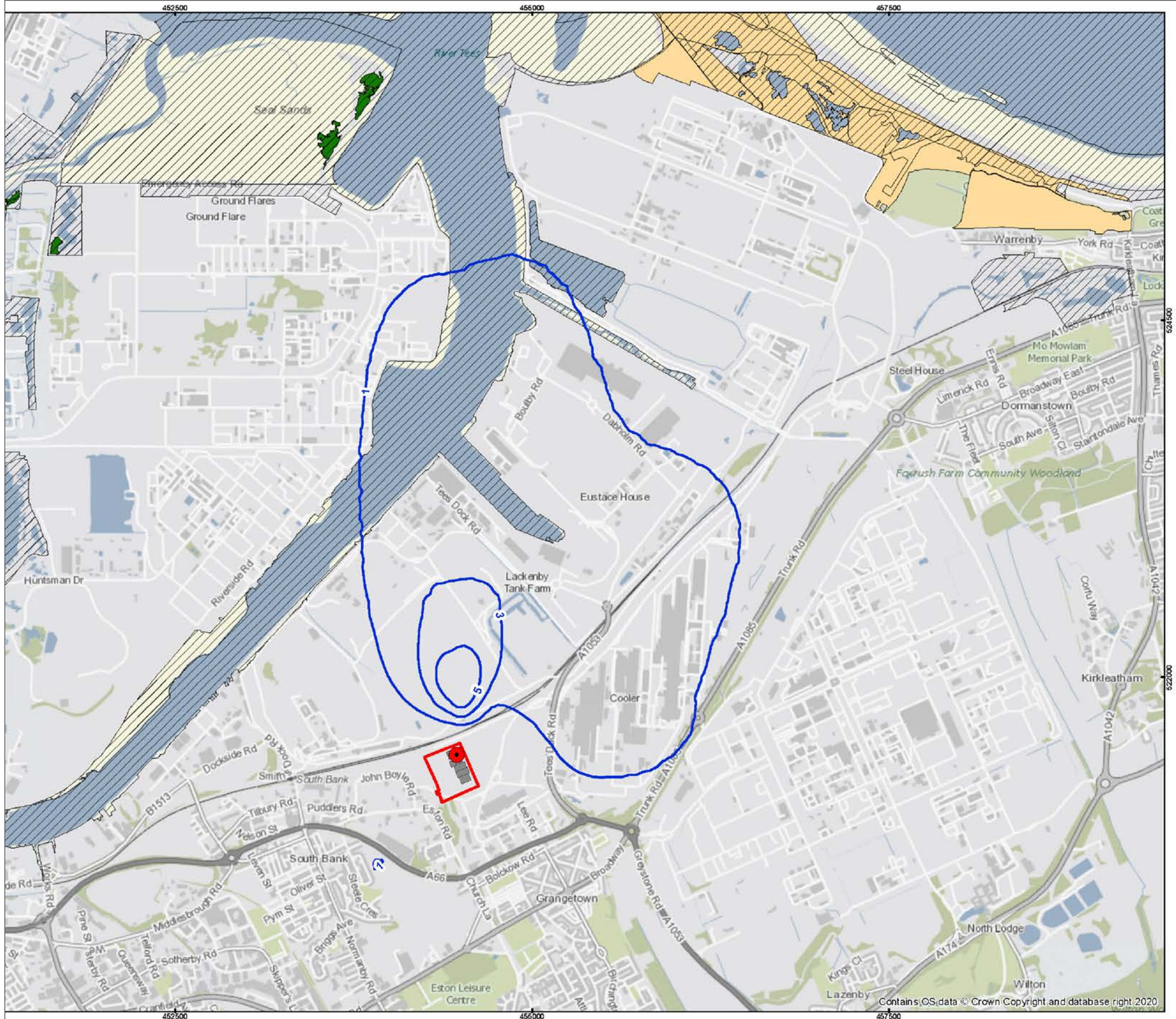
BIRMINGHAM
Enterprise House 115 Edmund Street
Birmingham B3 2HJ

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

TERENCE O'ROURKE

TELEPHONE
020 3664 6755

www.torltd.co.uk



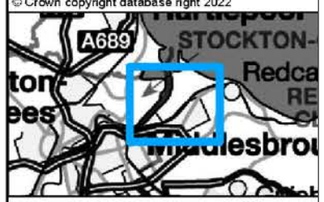
Legend

- Stack
- Area of proposed development
- Buildings
- Teesmouth and Cleveland Coast

Habitats

- Coastal saltmarsh
- Coastal sand dunes
- Annual Mean NOx as % of Critical Level

Client:	Viridor
Site:	Tees Valley ERF
Project:	Air Quality Assessment



0 0.25 0.5 1 km

Scale: 1:25,000

N

FICHTNER
Consulting Engineers Limited

Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

Tee Valley
Viridor Energy Limited

Figure 2: Process contribution of oxides of nitrogen as % of critical level of 3 µg/m3 (annual mean).

TERENCE O'ROURKE

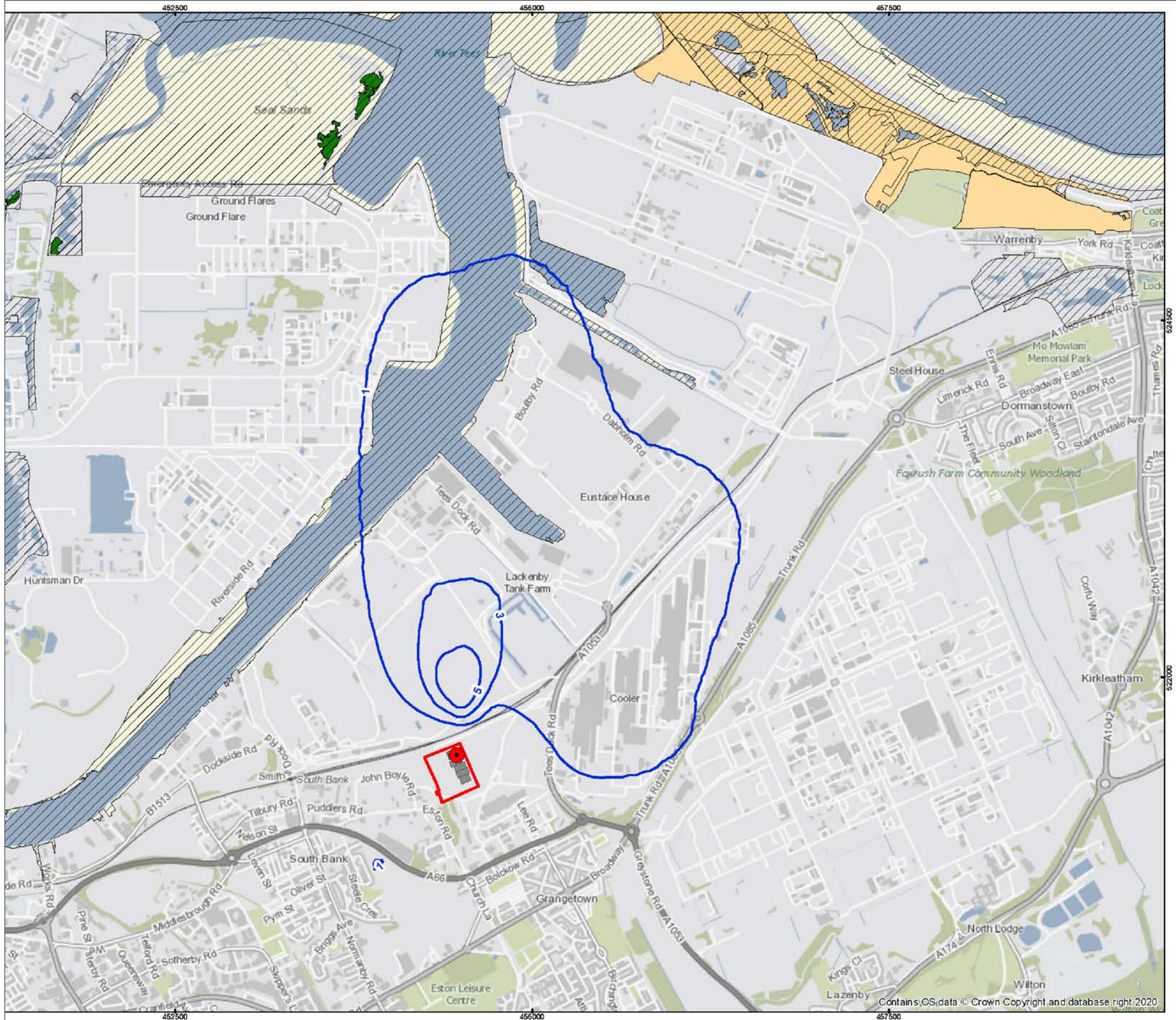
LONDON
23 Heddon Street
London W1B 4BQ

BIRMINGHAM
3 Edmund Gardens 117 Edmund Street
Birmingham B3 2HJ

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

TELEPHONE
020 3664 6755

www.torltd.co.uk



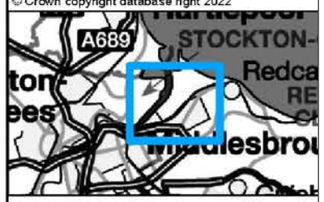
Legend

- Stack
- Area of proposed development
- Buildings
- Teesmouth and Cleveland Coast

Habitats

- Coastal saltmarsh
- Coastal sand dunes
- Annual Mean Ammonia as % of Critical Level of 3 µg/m³

Client:	Viridor
Site:	Tees Valley ERF
Project:	Air Quality Assessment
Drawn by: SMN	Date: 08/02/202



0 0.25 0.5 1 km

Scale: 1:25,000

N

FICHTNER
Consulting Engineers Limited
Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

Tee Valley
Viridor Energy Limited

Figure 3: Process contribution of ammonia as % of critical level of 3 µg/m3 (annual mean)

TERENCE O'ROURKE

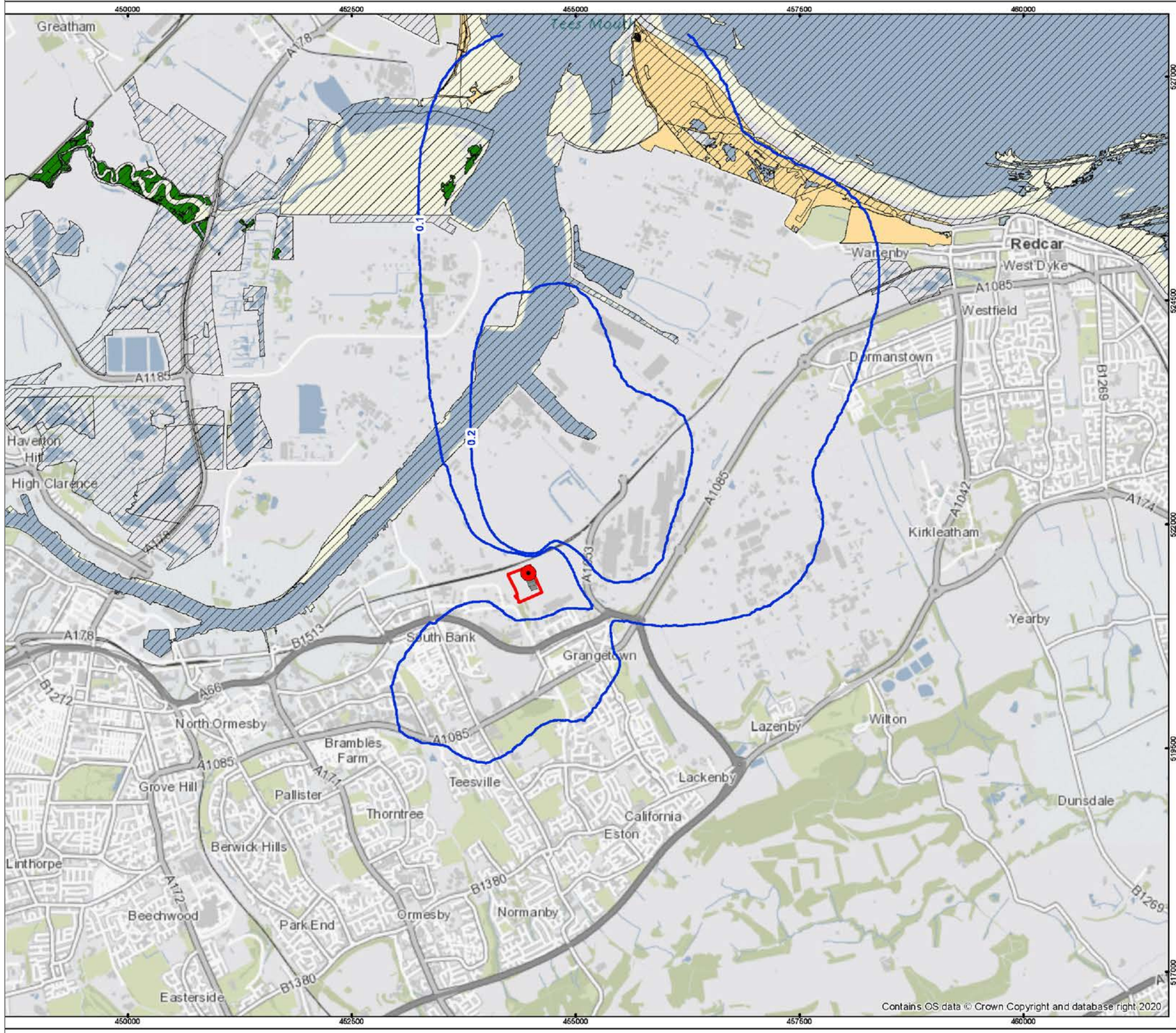
LONDON
23 Heddon Street
London W1B 4BQ

BIRMINGHAM
3 Edmund Gardens 117 Edmund Street
Birmingham B3 2HJ

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

TELEPHONE
020 3664 6755

www.torltd.co.uk



Legend

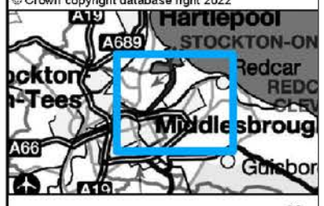
- Area of proposed development
- Stack
- Buildings
- Teesmouth and Cleveland Coast

Habitats

- Coastal saltmarsh
- Coastal sand dunes
- Nitrogen deposition (kgN/ha/yr)

Client:	Viridor
Site:	Tees Valley ERF
Project:	Air Quality Assessment

Drawn by: HKL	Date: 04/01/202



0 0.4 0.8 1.6 km

Scale: 1:40,000

N

FICHTNER
Consulting Engineers Limited

Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

Tee Valley
Viridor Energy Limited

Figure 4: Nitrogen deposition (process contribution) as kg/N/ha/yr. (annual mean)

TERENCE O'ROURKE

LONDON
23 Heddon Street
London W1B 4BQ

BIRMINGHAM
3 Edmund Gardens 117 Edmund Street
Birmingham B3 2HJ

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

TELEPHONE
020 3664 6755

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Tee Valley
Viridor Energy Limited

0 860 m

N

Figure 5: Location of SPA/Ramsar interest features within predicted zone of impact

Dwg no/227707/02	Revision	
Status	01 July 2021	
Scale: 1:34,390 @A3	Drawn by: JC	Checked by: JP

LONDON
23 Heddon Street
London W1B 4BQ

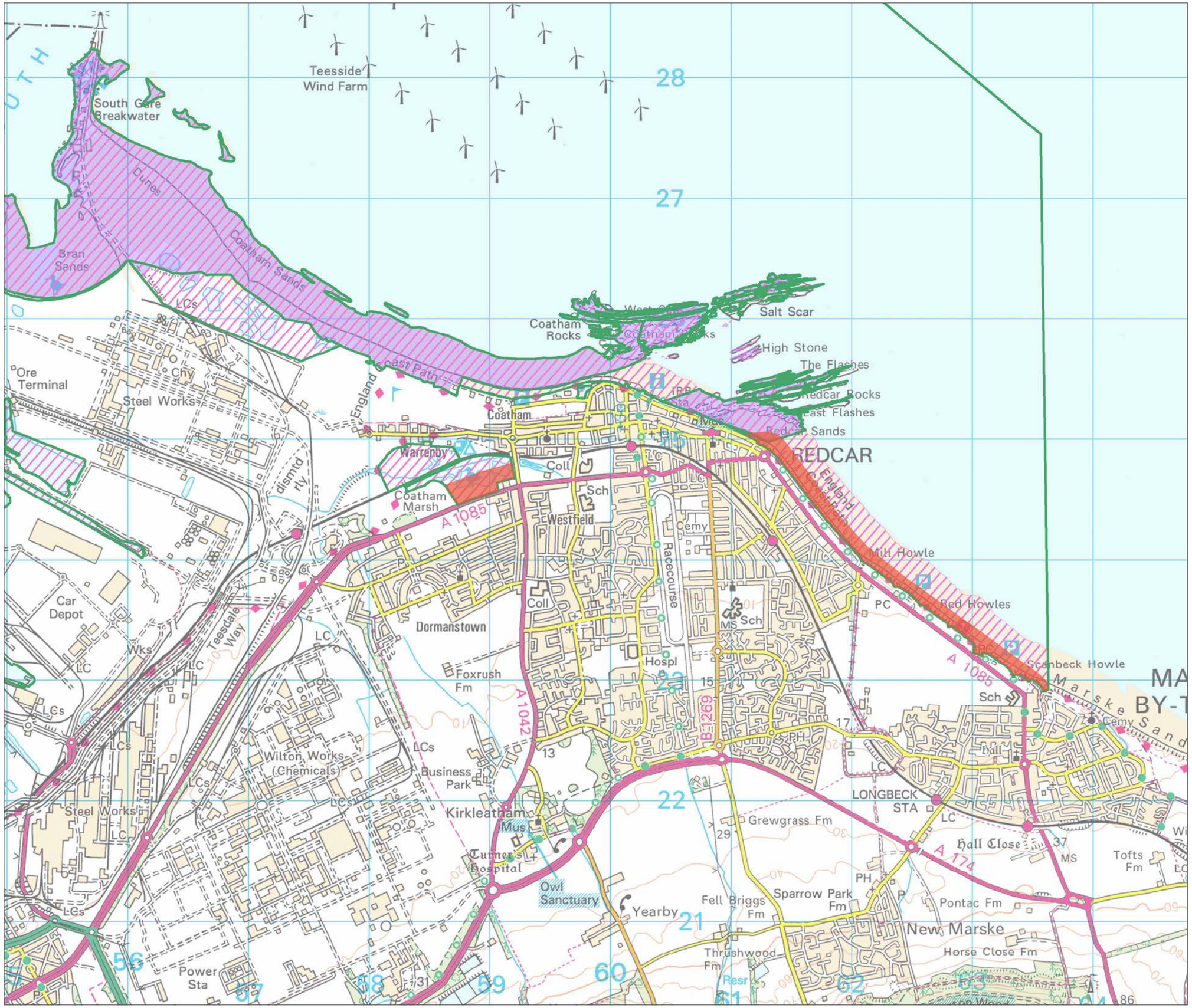
BIRMINGHAM
Enterprise House 115 Edmund Street
Birmingham B3 2HJ

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

TERENCE O'ROURKE

TELEPHONE
020 3664 6755

www.torltd.co.uk



Tee Valley
Viridor Energy Limited

0 750 m

N

Figure 6: Area of Teesmouth and Cleveland Coast SPA and Ramsar falling within 200m of the A1085

Dwg no/227707/02	Revision
Status	01 July 2021
Scale: 1:30,000 @A3	Drawn by: JC / Checked by: JP

TERENCE O'ROURKE

LONDON
23 Heddon Street
London W1B 4BQ

BIRMINGHAM
Enterprise House 115 Edmund Street
Birmingham B3 2HJ

BOURNEMOUTH
Everdene House Deansleigh Road
Bournemouth BH7 7DU

TELEPHONE
020 3664 6755

www.torltd.co.uk

Photos

Photo 1: Looking south from South Gare across dune system where nitrogen deposition will exceed 1% of critical load.

Photo 2: Established dune system south of viewpoint on South Gare breakwater.

Photo 3: Zone between high tide mark and stable dune system potentially suitable for nesting little tern (looking north towards South Gare breakwater).

Photo 4: Zone between high tide mark and stable dune system potentially suitable for nesting little tern at western end of South Gare breakwater.

Photo 5: Example of recreation use of zone between high tide mark and stable dune system potentially suitable for nesting little tern.

Photo 6: Looking east across Coatham Marsh from bank running parallel to A1085.

Photo 7: Area of Coatham Marsh where reedbed extends west towards A1085.

Photo 8: Bank in Coatham Marsh that runs north along A1085.

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www.bto.org/our-science/projects/wetland-bird-survey

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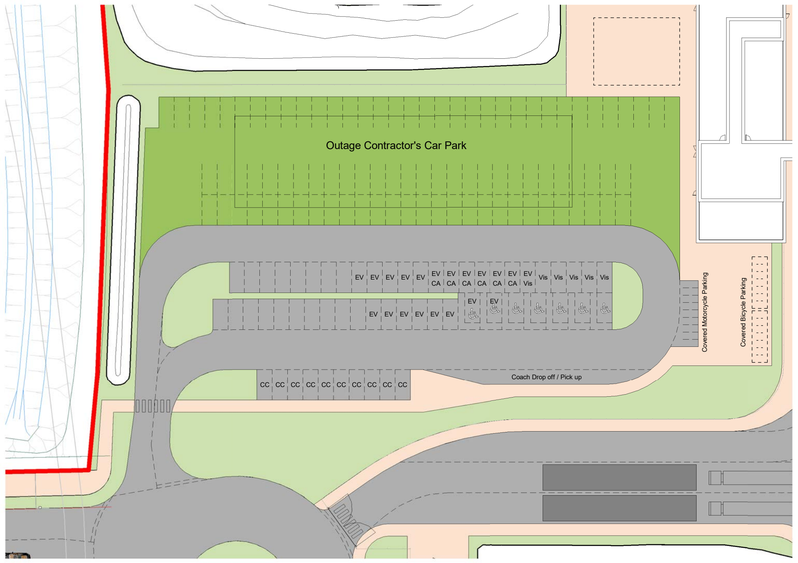
https://www.yumpu.com/en/document/view/9537628/breagh-pipeline-project-environmental-statement-rwecom

Appendix 1



Staff & Visitor Car Park

1 : 500

Common Legend

1. Electrical & Workshop
2. Tipping Hall
3. Fuel Storage Bunker
4. Boiler House
5. Flue Gas Treatment (FGT) Hall
6. Stack
7. Lime Storage Silos / Dosing *
8. Fire Water Tank & Pumphouse
9. Emergency Diesel Generator (EDG)
10. Vehicle Queuing Bays
11. Air Polution Control residues (APCr) Storage & Loadout
12. Admin Block - Reception, Offices and Visitors
13. Bottom Ash Storage Hall
14. Air Cooled Condensors (ACC)
15. Turbine Hall
16. CCUS Future Expansion Area A
17. CCUS Future Expansion Area B (or other future provision)
18. Contractors compound for shutdown
19. Combined Heat & Power (CHP) Building
20. Substation/Transformer
21. Demin Water Tank
22. Landscape & Ecology
23. SuDS/Wetland Area
24. Security Control & Driver & Crew Welfare Facility
25. Weighbridge (3 In & 2 Out)
26. Waste Reception Area For Quarantined Waste and Contaminants
27. Staff & Visitor Car Parking
28. Rainwater Pit (roofs)
29. Generator Step-up Transformers
30. Diesel & Ammonia Bund
31. Fin Fan Coolers
32. Laboratory *
33. In/Over Bunker Shredder *
34. Effluent Treatment Pit
35. Recycled Water Tank *
36. Chemical Dosing Skid *
37. Water Treatment Plant
38. Compressed Air Station *
39. Weighbridge Offices / Traffic Control
40. Switchgear Transformer *
41. Feedwater Pumps *
42. CEMS
43. Hot Load Bay
44. Backload Area / Crane Maintenance *
45. Raw water pumps and tank *
46. Oil Tank
47. Crew Parking Bays
48. Outside Staff Area
49. Quarantine Bay *
50. Emergency Access

EV Electric Vehicle Charging Parking Space
CA Contract Authority Parking Space
CC Car Club Parking Space
Vis Visitor Car Parking

Reserved Matters Boundary
Outline Planning Boundary

Gravel
Grass
Grasscrete
Tarmac
Concrete
Paved Footpath

Site Area: 88,180m2 / (21.79 acres)
CCUS Area: 12,000m2 / (2.97 acres)
Landscaping Area: 20,000m2 / (4.94 acres)

0 10m 25m 50m
1:1000

Note - Items marked * are internal elements, refer to drawing 20-0006 Proposed GA Plan Level 00 for locations

Site Plan

1 : 1000

General Notes

Do not scale from this drawing. Only work to written dimensions.

All site dimensions shall be verified by the Contractor on site prior to commencing any works.

Map bases were provided to Viridor Tees Valley Limited by the Tees Valley Energy Recovery Facility Contract Authority (comprising Darlington, Hartlepool, Middlesbrough, Redcar & Cleveland, and Stockton Unitary Authorities and Durham County Council and Newcastle City Council) in 2020.

Rev.	Description	Date	ISS	APP
P13	Amendments to suit client comments	24.02.2023	JDC	RT
P12	Additional EV provision indicated	22.02.2023	JDC	RT
P11	General Amendments	21.02.2023	JDC	RT
P10	Amendments to legend	14.02.2023	JDC	RT
P9	Amendments to suit client comments	07.02.2023	JDC	RT
P8	Planning / Bid Issue	31.01.2023	JDC	RT
P7	General Updates	27.01.2023	JDC	RT
P6	General Updates	10.01.2023	JDC	RT
P5	General note added for copyright purposes	04.04.2022	JDC	RT
P4	Drawing updated to client comments	28.03.2022	JDC	RT
P3	Planning pack update	10.02.2022	JDC	RT
P2	Planning pack issue	09.02.2022	JDC	RT
P1	Planning pack updated to reflect Acciona comments	09.12.2021	JDC	RT
P0	Planning pack first issue	16.10.2021	JDC	RT

Scale	**As indicated @ A1**
Status	**S2 Information**
Drawn By	**JDC**
Checked By	**RT**
Date	**04.04.2022**

Client:
VIRIDOR

Project:
TEES VALLEY ERF

Sheet Name:
Proposed Site Plan

Project No. Orig. Zone Level Type Role Cls Dwg No. Rev
20044-FRA-00-00-DR-A -90-0003 P13

fletcher|rae
Architects | Master Planners | Designers
Hill Quays, 5 Jordan Street, Manchester, M15 4PY

t +44 (0) 161 242 1140
f +44 (0) 161 242 1141
w www.fletcher-rae.com
e info@fletcher-rae.com

EC Directive 79/409 on the Conservation of Wild Birds
Special Protection Area (SPA)

Name: Teesmouth and Cleveland Coast SPA

Unitary Authority/County: Durham County Council, Hartlepool Borough Council, Redcar & Cleveland Borough Council, Stockton-on-Tees Borough Council.

Consultation proposal: The existing Teesmouth and Cleveland Coast SPA was classified on 15 August 1995; an extension to that area has been recommended to enlarge the area within the Tees Estuary and along part of the foreshore to the north because of the site's European ornithological interest.

The Teesmouth and Cleveland Coast Special Protection Area is a wetland of European importance, comprising intertidal sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes. Large numbers of waterbirds feed and roost on the site in winter and during passage periods; in summer Little Terns breed on the sandy beaches within the site.

Boundary of SPA: The original SPA includes all or parts of Seal Sands SSSI; Seaton Dunes and Common SSSI; Cowpen Marsh SSSI; Redcar Rocks SSSI; and South Gare and Coatham Sands SSSI. The extended area is within or coincident with the above SSSI boundaries and will also include parts of Durham Coast SSSI and all of Tees and Hartlepool Foreshore and Wetlands SSSI. For boundary of extended SPA see map.

Size of SPA: The extension covers an area of 304.75 ha, giving a revised SPA area of 1247.31 ha.

European ornithological importance of SPA: The extended SPA is of European importance because:

a) the site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the GB populations of the following species listed on Annex I, in any season:

Annex I species	5 year peak mean	% of GB population
Little Tern *Sterna albifrons*	40 pairs – breeding (1995 - 1998)	1.7%
Sandwich Tern *Sterna sandvicensis*	1,900 individuals – passage (1988 - 1992)	6.8%

b) the site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed on Annex I), in any season:

Migratory species	5 year peak mean	% of population
Knot *Calidris canutus islandica*	5,509 individuals - wintering (1991/92 - 1995/96)	1.6% NE Can/Grl/Iceland/UK
Redshank *Tringa totanus totanus*	1,648 individuals - passage (1987 - 1991)	1.1% Eastern Atlantic (wintering)

c) the site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterfowl in any season:

Period	Season	Population
1991/92 - 1995/96	Wintering	21,312 individuals

d) The wintering waterfowl assemblage qualifying under **article 4.2** includes the wintering species of European importance, as well as the following species in numbers of national importance:

Species	5 year peak mean	% GB population
Cormorant *Phalacrocorax carbo*	140 individuals – wintering (1993/94 - 1997/98)	1.1%
Shelduck *Tadorna tadorna*	1,030 individuals - wintering (1993/94 - 1997/98)	1.4%
Teal *Anas crecca*	1,265 individuals - wintering (1987/88 - 1991/92)	1.3%
Shoveler *Anas clypeata*	129 individuals - wintering (1991/92 - 1995/96)	1.3%
Sanderling *Calidris alba*	601 individuals - wintering (1993/94 - 1997/98)	2.6%

Non-qualifying species of interest: Marsh Harrier *Circus aeruginosus* (Annex I species) occurs on passage in small numbers and once bred (1996).

Status of SPA:

1) Teesmouth and Cleveland Coast was classified as a Special Protection Area on 15 August 1995.
2) Consultations commenced on the proposal to extend the site on 29 September 1999.
3) The extended area of Teesmouth and Cleveland Coast SPA was classified on 31 March 2000.

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 15 August 1995

3. Country:

UK (England)

4. Name of the Ramsar site:

Teesmouth and Cleveland Coast

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

54 37 50 N 01 07 07 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Middlesborough

Teesmouth and Cleveland Coast lies 48 km south-east of the city of Newcastle-upon-Tyne on the north-east coast of England.

Administrative region: Cleveland; Durham; Hartlepool; Redcar and Cleveland; Stockton-on-Tees

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 1247.31

Min. -1
Max. 4
Mean 1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Medium-large site encompassing a range of habitats (sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes) on and around an estuary which has been much-modified by human activities. Together these habitats support internationally important numbers of waterbirds.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

5, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

9528 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Common redshank , *Tringa totanus totanus*,	883 individuals, representing an average of 0.7% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	2579 individuals, representing an average of 0.9% of the GB population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
Details of bird species occuring at levels of National importance are given in Section 22

---

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:
Atlantic

b) biogeographic regionalisation scheme (include reference citation):
Council Directive 92/43/EEC

---

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	basic, neutral, shingle, sand, mud, clay, alluvium, peat, sedimentary, sandstone, sandstone/mudstone, boulder
Geomorphology and landscape	lowland, coastal, floodplain, subtidal sediments (including sandbank/mudbank), intertidal sediments (including sandflat/mudflat), open coast (including bay), enclosed coast (including embayment), estuary, lagoon, pools, intertidal rock
Nutrient status	eutrophic, mesotrophic
pH	circumneutral
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent

Summary of main climatic features	Annual averages (Durham, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/durham.html) Max. daily temperature: 12.5° C Min. daily temperature: 5.2° C Days of air frost: 52.0 Rainfall: 643.3 mm Hrs. of sunshine: 1374.6

General description of the Physical Features:

Teesmouth and Cleveland Coast includes a range of coastal habitats – sand- and mud-flats, rocky shore, saltmarsh, freshwater marsh and sand dunes – on and around an estuary which has been considerably modified by human activities.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Teesmouth and Cleveland Coast includes a range of coastal habitats – sand- and mud-flats, rocky shore, saltmarsh, freshwater marsh and sand dunes – on and around an estuary which has been considerably modified by human activities.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces

19. Wetland types:

Inland wetland, Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	45
Tp	Freshwater marshes / pools: permanent	20
E	Sand / shingle shores (including dune systems)	14
H	Salt marshes	7
D	Rocky shores	7
K	Coastal fresh lagoons	3
F	Estuarine waters	2
M	Rivers / streams / creeks: permanent	1
J	Coastal brackish / saline lagoons	1

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Teesmouth and Cleveland Coast comprises intertidal sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes. The Tees Estuary has been much-modified by such activities as land-claim, construction of breakwaters and training walls, and deep dredging. The remaining intertidal areas within the estuary are composed of mud and sand, with some *Enteromorpha* beds in sheltered areas. Outside the estuary mouth, sandflats predominate, but with significant rocky foreshores and reefs at both Redcar and Hartlepool and anthropogenic boulder beds at South Gare. Moderately extensive sand dune systems flank the estuary mouth, while a smaller dune system lies north of Hartlepool; foredunes are dominated by *Ammophila*, *Elytrigia juncea* and *Leymus* communities, fixed dunes by *Festuca rubra* communities. Surviving saltmarsh is very limited in

extent, and is largely typified by *Puccinellia*. Behind the dunes and sea-defences a number of significant areas of grazing marsh are found, where *Festuca rubra* saltmarsh persists alongside inundation grassland, a range of swamp communities and several shallow water bodies.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site
Higher Plants:
Festuca arenaria, Puccinellia rupestris, Ranunculus baudotii (all Nationally Scarce)

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Little tern , *Sterna albifrons albifrons*, W Europe	40 pairs, representing an average of 2% of the GB population (Five year mean for 1995 to 1998)

Species with peak counts in spring/autumn:

Northern shoveler , *Anas clypeata*, NW & C Europe	7 individuals, representing an average of 0% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	7 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site
Invertebrates:
Pherbellia grisescens, Thereva valida, Longitarsus nigerrimus, Dryops nitidulus, Macroplea mutica, Philonthus dimidiatipennis, Trichohydnobius suturalis (all RDB)

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	
Local authority, municipality etc.	+	+
National/Crown Estate	+	+
Private	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Recreation	+	+
Current scientific research	+	+
Collection of non-timber natural products: (unspecified)	+	
Fishing: commercial		+
Fishing: recreational/sport	+	+
Bait collection	+	
Arable agriculture (unspecified)		+
Permanent pastoral agriculture	+	+
Hunting: recreational/sport	+	+
Industrial water supply		+
Industry		+
Sewage treatment/disposal		+
Harbour/port	+	+
Flood control	+	+
Irrigation (incl. agricultural water supply)		+
Transport route	+	+
Urban development		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Eutrophication	2			+	+

For category 2 factors only. What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors? Eutrophication - Under Asset Management Plan AMP4 Northumbrian Water is obliged to introduce tertiary treatment to its Billingham Sewage Treatment Works, and to undertake a major investigation into the occurrence and spread of *Enteromorpha* algal mats and water/sediment quality issues.
Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	+
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Site management statement/plan implemented	+	
Other	+	+

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna:

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Waterfowl monitoring: Durham University Dept of Biological Sciences as part of the above contract
Ringing programmes: Tees Ringing Group.

Habitat:

Monitoring of the effects of Northumbrian Water sewage inputs (NWL, EA, EN).
Breeding bird surveys of Teesmouth NNR (EN) and Cowpen Marsh SSSI (Industry Nature Conservation Association).
Annual monitoring of breeding Little Terns (INCA).
Monitoring of seal usage of site and breeding success (INCA).

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The Teesmouth Field Centre approximately 3000 schoolchildren annually on a variety of study programmes. There are three public hides and several interpretive panels. English Nature, Hartlepool Countryside Wardens and Tees Valley Wildlife Trust undertake regular guided walks and events. British Energy and Huntsman Tioxide have provided hides which are available during guided visits.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality

Land based recreation:

The main activities are walking (especially dog walking), beach recreation, golf, and birdwatching, which take place year-round (though with a pronounced summer peak). The South Gare area has beach huts, car parks and a caravan site. Car parks are also located at North Gare and Seaton Carew. Seaton Carew and Cleveland Golf Clubs have courses adjacent to and impinging slightly on the site. Use is mainly April to September, but golf is played year-round.

Illegal use of motorcycles, quad-bikes and 4WD vehicles is particularly prevalent at South Gare, but is also increasing at Seaton Sands.

Wildfowling is confined to small areas of Cowpen Marsh and Saltholme Pools(1 September to 31 January).

Water based recreation:

In summer, power-boating, jet-skiing, dinghy-sailing and windsurfing all occur but at a low intensity (apart from Coatham Sands, where 'extreme sports' such as kite-surfing are increasing), and primarily on the open coast. Angling is largely confined to breakwaters (year-round), while bait-gathering in intertidal areas can be locally intensive, especially on Bran Sands (adjacent to the South Gare Breakwater).

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Barne, JH, Robson, CF, Kaznowska, SS, Doody, JP & Davidson, NC (eds.) (1995) *Coasts and Seas of the United Kingdom. Region 5 North-east England: Berwick-upon-Tweed to Filey Bay*. Joint Nature Conservation Committee, Peterborough (Coastal Directories Series)

Batten, LA, Bibby, CJ, Clement, P, Elliot, GD & Porter, RF (1990) *Red Data Birds in Britain. Action for rare, threatened and important species*. Poyser, London, for Nature Conservancy Council and Royal Society for the Protection of Birds

Bennett, TL & Foster-Smith, JL (1998) Chapter 5. South-east Scotland and north-east England (Dunbar to Bridlington) (MNCR Sector 4). In: *Benthic marine ecosystems of Great Britain and the north-east Atlantic*, ed. by K. Hiscock, 123-154. Joint Nature Conservation Committee, Peterborough. (Coasts and Seas of the United Kingdom. MNCR series)

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Davidson, NC, Laffoley, D d'A, Doody, JP, Way, LS, Gordon, J, Key, R, Pienkowski, MW, Mitchell, R & Duff, KL (1991) *Nature conservation and estuaries in Great Britain*. Nature Conservancy Council, Peterborough

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Lacey *et al*. (1997) *Tees estuary management plan*. INCA, Billingham

Musgrove, AJ, Langston, RHW, Baker, H & Ward, RM (eds.) (2003) *Estuarine waterbirds at low tide. The WeBS Low Tide Counts 1992–93 to 1998–99*. WSG/BTO/WWT/RSPB/JNCC, Thetford (International Wader Studies, No. 16)

Musgrove, AJ, Pollitt, MS, Hall, C, Hearn, RD, Holloway, SJ, Marshall, PE, Robinson, JA & Cranswick, PA (2001) *The Wetland Bird Survey 1999–2000: wildfowl and wader counts*. British Trust for Ornithology, Wildfowl and Wetlands Trust, Royal Society for the Protection of Birds & Joint Nature Conservation Committee, Slimbridge. www.wwt.org.uk/publications/default.asp?PubID=14

Ratcliffe, DA (ed.) (1977) *A Nature Conservation Review. The selection of biological sites of national importance to nature conservation in Britain*. Cambridge University Press (for the Natural Environment Research Council and the Nature Conservancy Council), Cambridge (2 vols.)

Stroud, DA, Chambers, D, Cook, S, Buxton, N, Fraser, B, Clement, P, Lewis, P, McLean, I, Baker, H & Whitehead, S (eds.) (2001) *The UK SPA network: its scope and content. Volume 3: Site accounts*. Joint Nature Conservation Committee, Peterborough www.jncc.gov.uk/UKSPA/default.htm

Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**

Telephone**: +41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

EC Directive 79/409 on the Conservation of Wild Birds: Special Protection Area (SPA)

Name: North York Moors

Unitary Authority/County: North Yorkshire County and Redcar & Cleveland Unitary Authority

Consultation proposal: North York Moors Site of Special Scientific Interest (SSSI) (which includes the renotification of Tripsdale SSSI, Fylingdales Moor SSSI and May Moss SSSI) has been recommended has a Special Protection Area because of the site's European Ornithological importance.

The North York Moors SPA contains the largest continuous tract of heather moorland in England. The site displays a wide range of high quality dry heathland and blanket bog vegetation types dominated by *Calluna.* The transition from dry heathland to blanket bog is complemented by a diverse mosaic of wet heath and flush communities.

Boundary of SPA: The SPA boundary is coincident with North York Moors SSSI. See SPA map for detail of boundary.

Size of SPA: The SPA covers an area of 44,087.68 ha.

European ornithological importance of the SPA: North York Moors SPA is of European importance because:

The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain population of two species listed in Annex I in any season:

Annex I species	Estimated breeding population 1996	% GB population
Merlin *Falco columbarius*	35 - 40 pairs	2.7 - 3.1 % GB
Golden Plover *Pluvialis apricaria*	526 -706 pairs	2.3- 3.1 % GB

Data sources:

Charlton, T. & Archer, R (1996). *North York Moors National Park breeding wader survey 1996.* RSPB.
Nattrass, M. & Downing, R. (1991) *Survey of merlins breeding in the North York Moors National Park, 1991.* RSPB.
Rebecca, G. & Bainbridge, I (In press) The status of breeding merlin *Falco columbarius* in Britain in 1993-94. *Bird study.*
Stone, B.H., Sears, J.E., Cranswick, P.A., Gregory, R.D., Gibbons, D.W., Rehfisch, M.M., Aebischer, N.J. & Reid, J.B. (1997) Population estimates of birds in Britain and the United Kingdom. *British Birds* **90:**1-22.

Non-qualifying species of interest

In addition, the site supports a rich upland breeding bird assemblage which includes Short-eared Owl *Asio flammeus*, Peregrine *Falco peregrinus* and Hen Harrier *Circus cyaneus* (all Annex I species), together with Redshank *Tringa totanus*, Red Grouse *Lagopus lagopus scoticus* and a nationally important population of Curlew *Numenius arquata*.

Status of SPA:

North York Moors was classified as a Special Protection Area on 12 May 2000.

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	North York Moors
Unitary Authority/County:	North Yorkshire, Redcar and Cleveland
SAC status:	Designated on 1 April 2005
Grid reference:	NZ711021
SAC EU code:	UK0030228
Area (ha):	44082.25
Component SSSI:	North York Moors SSSI

Site description:
This site in north-east Yorkshire within the North York Moors National Park contains the largest continuous tract of upland heather moorland in England. Dry heath covers over half the site and forms the main vegetation type on the western, southern and central moors where the soil is free-draining and has only a thin peat layer. The principal type present is heather – wavy hair-grass (*Calluna vulgaris – Deschampsia flexuosa*) heath, with some heather – bell heather *Erica cinerea* heath on well-drained areas throughout the site, and large areas of heather – bilberry *Vaccinium myrtillus* heath on steeper slopes.

Cross-leaved heath – bog-moss (*Erica tetralix – Sphagnum compactum*) wet heath is the second most extensive vegetation type on the site and is predominantly found on the eastern and northern moors where the soil is less free-draining. Purple moor-grass *Molinia caerulea* and heath rush *Juncus squarrosus* are also common within this community. In the wettest stands bog-mosses, including *Sphagnum tenellum*, occur, and the nationally scarce creeping forget-me-not *Myosotis stolonifera* can be found in acid moorland streams and shallow pools.

Blanket mire occurs in small amounts along the main watershed of the high moors where deep peat has accumulated. These areas are dominated by heather and cross-leaved heath with frequent hare's-tail cottongrass *Eriophorum vaginatum* and common cottongrass *E. angustifolium*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Blanket bogs*
- European dry heaths
- Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath)

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030228
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs