Thurrock Flexible Generation Plant

Habitats Regulations Assessment Report

Document ref. A5.2
APFP Regulations ref. 5(2)(g)

Date: April 2020

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Summary

The objective of this report is to collate and provide sufficient information to enable the Secretary of State to undertake a Habitat Regulations Assessment (HRA) of the potential effects of the DCO application for Thurrock Flexible Generation Plant on the Natura 2000 network. It provides sufficient standalone information, with references to other more detailed sections where necessary, for the Secretary of State to be able to make an informed decision on the potential effects of the proposed development on Natura 2000 sites.

Qualifications

This document has been prepared by Mike Barker, a Fellow of the Chartered Institute of Ecology and Environmental Management and a Chartered Environmentalist, who has over twenty five years' experience of ecological impact assessment, and Hannah Knight, an Associate Member of the Chartered Institute of Ecology and Environmental Management with five years' experience of ecological impact assessment, including HRA.

Contributions on air quality were provided by Dr Nick Betson CEnv MCIEEM who has over 14 years' experience in the assessment of effects of air quality on terrestrial habitats.

Glossary

Term	Definition
Biodiversity Action Plan	The UK Government's response to the Convention on Biological Diversity, which the UK signed in 1992 in Rio de Janeiro and ratified in 1994. The Convention on Biological Diversity requires signatory countries to identify, develop and enforce action plans to conserve, protect and enhance biological diversity. The UK BAP addresses this requirement. Local BAPs have been produced by many counties, to detail measures to conserve, protect and enhance local/county biological diversity.
Birds Directive	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.
Enhancement	An ecological enhancement is the modification of a site which increases the site's capacity to support target plants or animals.
European Protected Species	The animal species listed in Annex IV(a) to the Habitats Directive and the plant species listed in Annex IV(b) to the Habitats Directive.
Environmental Quality Standard	The Environmental Quality Standard (EQS) is the threshold below which impacts due to changes in air quality do not occur according to current knowledge. Three different EQS are referred to: critical level (a concentration - used in relation to gaseous pollutants), a critical load (CL, nutrient nitrogen deposition rate used in relation to pollutants deposited on the ground) and a critical load function (CLF - a description of deposition of acidifying compounds).
Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
Habitats Regulations Assessment	The Habitats Regulations, and Offshore Marine Conservation Regulations where applicable, require competent authorities, before granting consent for a plan or project, to carry out an Appropriate Assessment (AA) in circumstances where the plan or project is likely to have a significant effect on a European site or a European Marine site (either alone or in combination with other plans or projects). Habitats Regulations Assessment (HRA) refers to the whole process of assessment, including the AA stage (where one is required). For Hornsea Three, a Report to Inform Appropriate Assessment (RIAA) has been prepared to accompany the application for development consent (document reference A5.2).
Local Biodiversity Action Plan	Local BAPs have been produced by many counties, to detail measures to conserve, protect and enhance local/county biological diversity.
Local Nature Reserve	A local authority designation under the National Parks and Access to the Countryside Act 1949 (as amended), and in consultation with relevant statutory nature conservation agencies.
Local Wildlife Site	Alternative title to Wildlife Site, as defined below. Defined in local and structure plans under the Town and Country Planning system. The designation is a material consideration when planning applications are being determined.
National Nature Reserve	Designated under the National Parks and Access to the Countryside Act 1949 (as amended) and Wildlife and Countryside Act 1981 (as amended). Support examples of some of the most important natural and semi-natural ecosystems in Great Britain. Managed to conserve habitats and species within them, and to provide scientific study opportunities.
Non-statutory designated sites	Non-statutory designated sites are sites which have been designated due to their nature conservation interest, typically through the local planning process, which are usually protected by planning policies but not legally protected.
Priority Habitats	UK Biodiversity Action Plan priority habitats are those identified as being the most threatened and requiring conservation action under the UK BAP.
Priority Species	UK Biodiversity Action Plan priority species were those that were identified as being the most threatened and requiring conservation action under the UK BAP.
Ramsar Convention	The Convention on Wetlands of International Importance especially as Waterfowl Habitat of 2 February 1971 (as amended) which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
Ramsar site	Wetlands of international importance, designated under the Ramsar Convention.
Site of Importance for Nature Conservation	Alternative title to Wildlife Site, as defined below. Defined in local and structure plans under the Town and Country Planning system. The designation is a material consideration when planning applications are being determined.
Site of Nature Conservation Importance	Alternative title to Wildlife Site, as defined below. Defined in local and structure plans under the Town and Country Planning system. The designation is a material consideration when planning applications are being determined.
Sites of Special Scientific Interest	Sites designated by Natural England under the Wildlife and Countryside Act 1981 (as amended) as areas of land of special interest by reason of any of their flora, fauna, or geological or physiographical features.
Special Areas of Conservation	A site of Community importance designated under Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated.
Special Protection Area	An area which has been identified as being of international importance and designated under Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds for the breeding, feeding, wintering or the migration of rare and vulnerable bird species found within European Union countries.
Statutory designated sites	Sites which have been designated under UK and in some cases European or international legislation which protects areas identified as being of special nature conservation importance.
Wildlife Site	Local authority designation for sites of local conservation interest. Designation criteria can vary between areas, as can titles which include Local Wildlife Site, Local Nature Conservation Site, Site of Importance for Nature Conservation or Site of Nature Conservation Importance. They are defined in local and structure plans under the Town and Country Planning system and are a material consideration when planning applications are being determined.

Term	Definition
Woodland	As described under the Phase 1 habitat survey guidelines (JNCC, 2010); vegetation dominated by trees more than 5 m high when mature, forming a distinct, although sometimes open, canopy. In Natural England's guidelines for Environmental Stewardship (Natural England, 2013, native woodland is defined as a group of trees with overlapping canopies covering at least 0.1 ha, at least half of which are native species.
Works areas	The areas within which all works associated with the construction, operation and decommissioning of the proposed Flexible Generation Plant are undertaken, including access, drainage and landscaping.

Acronyms

Unit	Description
AGI	Above ground installation
BAP	Biodiversity Action Plan
BEIS	Department for Business, Energy and Industrial Strategy
CEMP	Construction Environmental Management Plan
CL	Critical Load or Critical Level (as applicable)
CLF	Critical Load Function
CoCP	Code of Construction Practice
DCO	Development Consent Order
DECC	(former) Department of Energy and Climate Change
DMRB	Design Manual for Roads and Bridges
ECoW	Ecological Clerk of Works
EEA	European Economic Association
EIA	Environmental impact assessment
EMP	Ecological Management Plan
EPS	European Protected Species
EQS	Environmental Quality Standard
GCN	Great crested newt
HSI	Habitat Suitability Index
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LoWS	County Wildlife Site
LPA	Local Planning Authority
LTC	Lower Thames Crossing
NE	Natural England
NERC	Natural Environment and Rural Communities
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NTS	National Transmission System
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
rMCZ	recommended Marine Conservation Zone
SAC	Special Area of Conservation
SAC	Special Area of Conservation
SoCC	Statement of Community Consultation
SoS	Secretary of State
SPA	Special Protection Area
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TEC	Tilbury Energy Centre
VER	Valued Ecological Receptor
WCA 1981	The Wildlife and Countryside Act 1981 (as amended)
WSI	Written Scheme of Investigation

Units

Unit	Description
ha	Hectare (10,000 m^2)
km	Kilometre (distance)
m	Metre (distance)

1. Introduction

1.1 Background

1.1.1 This document is intended to provide sufficient information to enable the Secretary of State to undertake a Habitat Regulations Assessment (HRA) of the potential effects of the Development Consent Order (DCO) application for Thurrock Flexible Generation Plant on the Natura 2000 network.

1.1.2 This information applies to the proposed development described in full in Volume 2, Chapter 2: Project Description of the Environmental Statement (ES, application document A6).

1.1.3 The proposed development comprises the construction and operation of:

- reciprocating gas engines with rated electrical output totalling 600 MW;
- batteries with rated electrical output of 150 MW and storage capacity of up to 600 MWh;
- gas and electricity connections;
- creation of temporary and permanent private access routes for construction haul and access in operation, including a permanent causeway for the delivery of abnormal indivisible loads (AILs) by barge; and
- designation of exchange Common Land and habitat creation or enhancement for protected species translocation and biodiversity gain.

1.1 Purpose of this report

1.1.1 The need for an Appropriate Assessment is set out in Article 6(3) of the Habitats Directive and interpreted into British law by Regulation 48 of the Conservation of Species and Habitats Regulations (2017) (see Table 1).

Table 1: Legislative Basis for a Habitats Regulations Assessment.

The legislative basis for Habitat Regulations Assessment		
Habitats Directive	Article 6(3)	Any plan or project not directly connected with or necessary to the management of a Special Protection Area (SPA) or Special Area of Conservation (SAC) but likely to have a significant effect thereon, either individually or in-combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.
Habitats Regulations	Regulation 63	A competent authority, before deciding to give any consent for a plan or project which is likely to have a significant effect on a European site shall make an appropriate assessment of the implications for the site in view of that site's conservation objectives

1.1.2 The Habitats Directive applies the precautionary principle to relevant designated areas, in so much as plans and projects can only be permitted after having ascertained that there will be no adverse effect on the integrity of an SPA or SAC, collectively termed Natura 2000 sites.

1.1.3 It is Government policy (as outlined in Section 174 of the National Planning Policy Framework, 2019) for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to Natura 2000 sites. As such, information to inform an Appropriate Assessment needs to cover features of any relevant Ramsar site. Similarly, in accordance with Government advice, proposed SPAs (pSPA) should be treated as having protection under the Habitats Regulations. On this basis, therefore, the term Natura 2000 sites is used throughout the document as a collective term for all such sites.

1.1.4 In undertaking an assessment, competent authorities (in this case the appropriate Secretary of State) must have regard to both direct and indirect effects on an interest feature of the Natura 2000 site, as well as cumulative effects. This may include consideration of features and issues outside the boundary of a Natura 2000 site. The Department for Communities and Local Government and Planning Inspectorate guidance states that an assessment should be proportionate to the geographical scope of the plan or project and that it need not be done in any more detail, or using more resources, than is useful for its purpose (DCLG, 2006; Planning Inspectorate (PINS), 2016).

1.1.5 Plans and projects for which it is not possible to conclude that there would be no adverse effect on the integrity of Natura 2000 sites may still be permitted if there are no alternatives and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

1.1.6 A recent Court of Justice of the European Union (CJEU) judgment (Case C-323/17, known as People Over Wind) ruled that Article 6(3) of the Habitats Directive should be interpreted as meaning that mitigation/avoidance measures should only be considered within the framework of an appropriate assessment and not at a screening stage. This has been highlighted by a recent note by PINS (Note 05/2018) to their inspectors.

2. Scope and Objectives

2.1 Objectives

2.1.1 While it is the responsibility of the competent authority to determine whether it can be concluded there is no adverse effect, it is the responsibility of applicants to submit sufficient information to enable such a determination to be made.

2.1.2 The objective of this report is therefore to collate and provide sufficient information to enable the Secretary of State to undertake a Habitat Regulations Assessment (HRA) of the potential effects of the Thurrock Flexible Generation Plant, on the Natura 2000 network. It draws upon information within the Environmental Statement (application document A6), notably Volume 3, Chapter 9: Onshore Ecology, but purposely does not repeat the detail contained within the Environmental Statement. Instead, it provides sufficient standalone information, with references to other more detailed sections where necessary, for the Secretary of State to be able to make an informed decision on the potential effects of the proposed development on Natura 2000 sites.

2.2 Scope

2.2.1 All Natura 2000 sites shown to be linked to the proposed development through a known 'pathway' have been included in the scope of a Habitats Regulations Assessment.

2.2.2 No Natura 2000 sites or Ramsar sites lie wholly or partly within the boundary of the area covered by the application boundary. The locations of the Natura 2000 sites in relation to the application boundary can be seen in Figure 1.

2.2.3 Based on the nature of the proposed development, the findings of the technical chapters of the Environmental Statement, it has been decided that the following three Natura 2000 and Ramsar sites require consideration as to whether they could be affected:

- Thames Estuary and Marshes SPA;
- Thames Estuary and Marshes Ramsar;
- Medway Estuary and Marshes SPA;
- Medway Estuary and Marshes Ramsar;
- Benfleet and Southend Marshes SPA;
- Benfleet and Southend Marshes Ramsar;
- Peter's Pit SAC; and
- North Downs Woodland SAC.

2.2.4 Citation details for the above sites are provided in Appendix A.

2.2.5 Key activities in the development programme are:

- site preparation and enabling works;
- main construction;
- commissioning; and
- decommissioning.

2.2.6 Decommissioning will comprise the rendering inoperable of the Generating Plant and removal/demolition of key plant and equipment. An appropriate plan for the decommissioning of the Proposed Development to protect the environment will be developed as a requirement of the Environmental Permit to operate the site.

2.2.7 At this stage, the prediction of the nature of such effects is not possible. However, they could include a range of activities that would be similar to those undertaken during construction and would therefore be subject to any necessary mitigation/avoidance measures which may be similar to those identified in Section 6 below. On this basis, the activities of decommissioning and demolition of the Thurrock Flexible Generation Plant and effects that may arise from such activities are considered to be analogous to those arising in construction.

Figure 1: Natura 2000 sites within 15 km of the Thurrock Flexible Generation Plant main development site.

3. Methodology

3.1 Key principles

3.1.1 The key principles adopted during the collation and analysis of information are set out in Table 2.

Table 2: Key Principles Underpinning the Assessment Methodology.

Key Principles Underpinning the Assessment Methodology	
Principle	**Rationale**
Use of best available existing information	We will use best available existing information to inform the assessment. This will include ecological information gathered on behalf of Thurrock Power, information made available through production of the Environmental Statement and information from other sources, including Natural England, British Trust for Ornithology, and others.
Proportionality	We will ensure that the level of detail provided in the assessment reflects the level of detail in the application for development consent (i.e. that the assessment is proportionate).
Consultation	We will ensure continued consultation with Natural England and other stakeholders during production of the assessment and ensure that we take on board their comments.
Transparency in the assessment process	We will endeavour to keep the process as open, transparent and simple as possible while ensuring an objective and rigorous assessment in compliance with the Habitats Directive, Habitats Regulations and emerging best practice.
Audit trail	We will ensure that the process followed and the conclusions reached are clearly documented so there is a clear audit trail.

3.2 Process

3.2.1 The stages of HRA are described below, adapted from Government guidance. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations and any relevant changes to the plan until no significant adverse effects remain.

Stage 1 – Qualifying Interest Features

3.2.2 Collect information on identified Natura 2000 and Ramsar sites and their conservation objectives.

3.2.3 The qualifying interest features for the sites assessed in this report have been obtained via the citation details on the JNCC/Natural England websites. The conservation objectives provide the basis for determining what is currently causing, or may cause, a significant effect, and for informing the scope of appropriate assessments.

3.2.4 In addition to qualifying interest features, it is necessary to explore the environmental features and conditions required to maintain the integrity of the Natura 2000 sites, as well as both current condition and trends in environmental processes.

Stage 2 – Likely Significant Effect

3.2.5 The second stage is to determine whether there are any Likely Significant Effects (LSEs) on Natura 2000 sites as a result of the proposed development in the absence of mitigation/avoidance measures. This is essentially a risk assessment to decide whether a more detailed assessment is required and, if so, the scope of the issues and features to be addressed. This involves identifying the potential pathways through which the Development Consent Order (DCO) application could affect the interest features of relevant Natura 2000 sites, and then assessing in broad terms the magnitude of each impact to determine whether a significant effect is likely.

3.2.6 The main purpose of this stage is to screen out those aspects of the proposal which would not be likely to give rise to significant effects, and to screen out features of each relevant Natura 2000 site that are not likely to be significantly affected. Judgements have been based on sound reasoning and within the context of best available knowledge on the various ways in which development of the nature proposed could impact on the interest features of the relevant Natura 2000 sites. Judgements are made in the absence of mitigation/avoidance measures, in line with the People over Wind ruling. If it cannot be concluded with confidence that adverse effects are unlikely, then under the precautionary principle, it is assumed that the issue requires more detailed consideration.

Stage 3 – Appropriate Assessment

3.2.7 The Appropriate Assessment will assess the likely significant effects of the proposed development on the conservation objectives of relevant Natura 2000 and Ramsar sites and determine whether no adverse effect can be concluded both alone and in-combination with other plans or projects.

3.2.8 When a plan or project cannot be ‘screened out’ as being unlikely to have a significant effect on a Natura 2000 site, it is necessary to explore whether there are any adverse effects and, if so, devise suitable avoidance and mitigation measures to be able to conclude no adverse effect. Experience suggests that the best approach to addressing this is on a site by site basis, with avoidance / mitigation measures focused on the environmental conditions needed to maintain site integrity.

Stage 4 – In-combination Assessment

3.2.9 The Habitats Regulations require that a decision to grant permission can only be made once the Competent Authority is satisfied that no adverse effects on the integrity of the Natura 2000 sites in question are likely, both alone and in-combination with other plans and projects. Therefore, Stage 4 of the HRA process requires the identification of other plans and projects that might affect the interest features of the relevant Natura 2000 sites in combination with the proposed development and decide whether there any adverse effects that might occur in-combination (collectively) that did not occur when considered alone.

4. Stage 1 – Qualifying Interest Features

Thames Estuary and Marshes SPA and Ramsar

4.1.1 The boundary of the Thames Estuary and Marshes SPA and Ramsar site lies just under 1.02 km from the area covered by the proposed development site.

4.1.2 The Thames Estuary and Marshes consists of an extensive mosaic of grazing marsh, saltmarsh, mudflats and shingle characteristic of the estuarine habitats of north Kent and south Essex. Freshwater pools and some areas of woodland provide additional variety and complement the estuarine habitats. Whilst the majority is situated in Kent along the south shore of the Thames estuary, additional areas are located along the north shore of the Thames Estuary in Essex.

4.1.3 The Thames Estuary and Marshes Ramsar site was designated in 2000. In addition to qualifying under Criterion 5 as it is used regularly by over 20,000 waterfowl in any season and under Criterion 6 as it is used regularly by 1% or more of the biogeographic populations of migratory species of waterfowl, it also qualifies under Criterion 2a of the Ramsar Convention by supporting a number of species of rare plants and animals (Table 3).

Table 3: Qualifying Plant and Invertebrate Species for the Thames Estuary and Marshes Ramsar Site.

Ramsar Criteria	Scientific Name	Species Name
Nationally rare plant species	*Chenopodium chenopodioides*	Saltmarsh Goosefoot
Nationally scarce plant species	*Alopecurus bulbosus*	Bulbous Foxtail
	Bupleurum tenuissimum	Slender Hare's-ear
	Carex divisa	Divided Sedge
	Hordeum marinum	Sea Barley
	Inula crithmoiodes	Golden Samphire
	Polypogon monspeliensis	Annual Beard Grass
	Puccinellia fasciculate	Borrer's Saltmarsh-grass
	Puccinellia rupestris	Stiff Saltmarsh-grass
	Salicornia pusilla	Glasswort
	Stratiotes aloides	Water Soldier
	Trifolium glomeratum	Clustered Clover
	Trifolium squamosum	Sea Clover
	Zostera angustifolia	Narrow-leaved Eelgrass
	Zostera noltii	Dwarf Eelgrass
Endangered invertebrate species	*Bagous longitarsis*	A weevil
Vulnerable invertebrate species	*Henestaris halophilus*	A groundbug
	Bagous cylindrus	A weevil
	Polystichus connexus	A ground beetle
	Erioptera bivittata	A cranefly
	Hybomitra expollicata	A horse fly
	Lejops vittata	A hoverfly
	Poecilobothrus ducalis	A dancefly
	Pteromicra leucopeza	A snail killing fly
	Philanthus triangulum	A solitary wasp
	Lestes dryas	A damselfly
Rare invertebrate species	*Cercyon bifenestratus*	A water beetle
	Hydrochus elongates	A water beetle
	H.ignicollis	A water beetle
	Ochthebius exaratus	A water beetle
	Hydrophilus piceus	A water beetle
	Malachius vulneratus	A beetle
	Philonthus punctus	A rove beetle
	Telmatophilus brevicollis	A fungus beetle
	Campsicnemus magius	A fly
	Haematopota bigoti	A horsefly
	Stratiomys longicornis	A soldier fly
	Baryphyma duffeyi.	A spider

4.1.4 The qualifying bird interest features listed in the SPA and Ramsar site citations, together with the criteria used for this assessment (in line with Natural England advice, this is whichever provides the strongest protection) are presented in Table 4.

Table 4: Qualifying Bird Species of the Thames Estuary and Marshes.

Species Name	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
Annex 1 Species Regularly Wintering in Numbers of European Importance				
Avocet	*Recurvirosta avosetta*	283 representing 28.3% of British wintering population	-	283
Hen Harrier	*Circus cyaneus*	7 representing 1.0% of the British wintering population	-	7

Species Name	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
Migratory species regularly occurring on passage				
Ringed Plover	*Charadrius hiaticula*	1,324 individuals - passage 2.6% Europe/ Northern Africa (win)	595 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9- 2002/3)	595
Migratory species regularly occurring over winter				
Grey Plover	*Pluvialis squatarola*	2,593 representing 1.7% of the East Atlantic wintering population	2,593 representing 1.7% of the East Atlantic wintering population	2,593
Knot	*Calidris canutus*	4,848 representing 1.4% of Northeast Canada/ Greenland/Iceland/ North West Europe population	4,848 representing 1.4% of Northeast Canada/ Greenland/Iceland/ North West Europe population	4,848
Dunlin	*Calidris alpina*	29,646 representing 2.1% of North Siberia/Europe/ West Africa population	29,646 representing 2.1% of North Siberia/Europe/ West Africa population	29,646
Black-tailed Godwit	*Limosa limosa*	1,699 representing 2.4% of the Iceland breeding population	1,699 representing 2.4% of the Iceland breeding population	1,699
Redshank	*Tringa totanus*	3,251 representing 28.3% of the Eastern Atlantic wintering population	3,251 representing 28.3% of the Eastern Atlantic wintering population	3,251
Assemblage regularly supporting over 20,000 waterfowl		75,019	75,019	75,019

4.1.5 The Conservation Objectives for the SPA (NE 2019a) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

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

Marine Component of the Thames Estuary and Marshes SPA

4.1.6 The three key supporting sub-features (habitats) are:

- mudflats;
- saltmarsh; and
- intertidal shingle.

4.1.7 Mudflats are a rich source of invertebrates and provide the main feeding ground for wintering species such as dunlin, knot and black-tailed godwit, which occur on the SPA in internationally important numbers, and the other nationally important waterfowl species which contribute to the waterfowl assemblage. In addition, mudflats do support plant life, including algae and some very limited eel-grass and algae. These can be valuable as food for wildfowl, especially when inland feeding sites are frozen. Mudflats also provide important roosting areas for internationally important assemblages of waterfowl and its qualifying species.

4.1.8 Saltmarsh is not extensive in the Thames Estuary and Marshes SPA, but nevertheless provides important high tide roost sites for the internationally important assemblage of waterfowl and its qualifying species. Upper saltmarsh in particular provides high tide roost sites. The vegetation varies because the plants at each level within its vertical profile are adapted to their particular degree of tidal exposure. Also in parts, the vegetation varies because of grazing by domestic livestock. Where the vegetation is kept short by grazing livestock, wildfowl which are themselves grazers, including teal, can feed. Where there is shallow water within the saltings, it is especially suitable for dabbling duck.

4.1.9 Small areas of intertidal shingle and cobble beaches on the south bank of the Thames provide important roost sites for wading birds displaced from the mudflats at high tide.

4.1.10 Subject to natural change, the conservation objective for these sub-features is to maintain them in favourable condition.

North Downs Woodland SAC

4.1.11 The boundary of the North Downs Woodland SAC site lies 9.54 km south of the application boundary.

4.1.12 The qualifying interest features include mature *Asperulo-Fagetum* beech forests and *Taxus baccata* woods of the British Isles, which are both Annex I Priority Habitats.

4.1.13 Also present (although not a primary reason for site selection) is the Annex I Priority Habitat semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (important orchid sites). This priority habitat type comprises calcareous grasslands containing an important assemblage of rare and scarce orchid species.

4.1.14 The conservation objectives for the site (NE 2019b) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the favourable conservation status of its qualifying features, by maintaining or restoring:

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

Benfleet and Southend Marshes SPA and RAMSAR

4.1.15 Located 12.94 km north west of the application boundary, the habitat in this SPA/Ramsar is similar to the Thames Estuary and Marshes. It is made up of several intertidal, subtidal and terrestrial habitat types that birds rely upon for loafing, roosting and foraging. In many locations the presence of a seawall separates the terrestrial parts of the site (such as freshwater and coastal grazing marsh) from the intertidal and marine zones (mixed and coarse sediments, saltmarsh, sand and mud flats, shell banks and seagrass beds).

Table 5: Qualifying bird features of the Benfleet and Southend Marshes

Species Name	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
Migratory species regularly occurring over winter				
Dark-bellied Brent geese	*Branta bernicla bernicla*	7,200+ representing 4% of the world population	7,200+ representing 4% of the world population	7,200
Grey Plover	*Pluvialis squatarola*	2,500 representing 1% of the East Atlantic wintering population	2,500 representing 1% of the East Atlantic wintering population	2,500
Knot	*Calidris canutus*	8,400 representing 2% East Atlantic Flyway population	8,400 representing 2% East Atlantic Flyway population	8,400
Dunlin	*Calidris alpina*	11,000 representing 3% of British	Nationally-important	11,000
Ringed Plover	*Charadrius hiaticula*	430 representing 2% of the British population	Nationally-important	430
Assemblage regularly supporting over 20,000 waterfowl		30,400	30,400	30,400

4.1.16 The conservation objectives for the site (NE 2019c) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

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

Medway Estuary and Marshes SPA and RAMSAR

4.1.17 The Medway Estuary (11.03 km to the south east of the application boundary) feeds into and lies on the south side of the outer Thames Estuary in Kent, south-east England. It forms a single tidal system with the Swale and joins the Thames Estuary between the Isle of Grain and Sheerness. It has a complex arrangement of tidal channels, which drain around large islands of saltmarsh and peninsulas of grazing marsh.

Table 6: Medway Estuary and Marshes Ramsar Qualifying Plant and Invertebrate species

Ramsar Criteria	Scientific Name	Species Name
Nationally scares plants	*Hordeum marinum*	Sea Barley
	Parapholis incurve	Curved hard-grass
	Polypogon monspeliensis,	Annual beard-grass
	Puccinellia fasciculata,	Borrer's saltmarsh-grass
	Bupleurum tenuissimum	Slender hare's-ear
	Trifolium squamosum,	Sea Clover
	Chenopodium chenopodioides	Saltmarsh goose-foot
	Inula crithmoides	Golden Samphire
	Sarcocornia perennis	Perennial glasswort
	Salicornia pusilla	One-flowered glasswort
Nationally scares invertebrates	*Polistichus connexus*	A ground beetle
	Cephalops perspicuous	A fly
	Poecilobothrus ducalis	A dancefly
	Anagnota collini	A fly
	Baris scolopacea	A weevil
	Berosus spinosus	A water beetle
	Malachius vulneratus	A beetle
	Philonthus punctus	A rove beetle
	Malacosoma castrensis	The ground lackey moth
	Atylotus latistriatuus	A horsefly
	Campsicnemus magius	A fly
	Cantharis fusca	A solider beetle
	Limonia danica	A cranefly

Table 7: Qualifying Bird Species of Medway Estuary and Marshes

	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
Annex 1 Species Regularly Breeding in Numbers of European Importance				
Avocet	*Recurvirosta avosetta*	28 pairs representing 7% of the breeding population in Britain	-	28 pairs
Little Tern	*Sterna albifrons*	24 pairs representing 1% of the breeding population in Britain	-	28 pairs
Annex 1 Species Regularly Wintering in Numbers of European Importance				
Avocet	*Recurvirosta avosetta*	70 representing 7% of the population in Britain	-	314
Annex 1 Species Regularly On Passage in Numbers of European Importance				
Grey Plover	*Pluvialis squatarola*	-	3103 individuals, representing an average of 1.2% of the population	1,337
Redshank	*Tringa totanus*	3709 individuals, representing an average of 1.4% of the population	3709 individuals, representing an average of 1.4% of the population	
Migratory Species Regularly Wintering in Numbers of European Importance				
Dark-bellied Brent Goose	*Branta bernicla bernicla*	4,130 representing 2.4% of the world population and 4.6% of British winter population	4,130 representing 2.4% of the world population and 4.6% of British winter population	4,130
Shelduck	*Tadorna tadorna*	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population	5,900 representing 2.3% of the North West European population and 7.9% of the British winter population	5,900
Pintail	*Anas acuta*	980 representing 1.4% of the North West European wintering and 3.9% of the British winter population	980 representing 1.4% of the North West European wintering and 3.9% of the British winter population	980
Ringed Plover	*Charadrius hiaticula*	740 representing 1.4% of the East Atlantic Flyway population and 3.2% of the British wintering population	740 representing 1.4% of the East Atlantic Flyway population and 3.2% of the British wintering population	768
Knot	*Calidris canutus*	3,690 representing 1.0% of the East Atlantic Flyway and 1.6% of the British wintering population	3,690 representing 1.0% of the East Atlantic Flyway and 1.6% of the British wintering population	3,690
Dunlin	*Calidris alpina*	22,900 representing 1.6% of the East Atlantic	22,900 representing 1.6% of the East	25,936

	Scientific Name	SPA Citation	Ramsar	Assessment Criteria
		Flyway and 5.3% of the British wintering population	Atlantic Flyway and 5.3% of the British wintering population	
Regularly supports in winter a diverse assemblage of wintering species	-	53,900	47,637	47,637
Diverse assemblage of breeding migratory waterfowl	-	-	-	-

4.1.18 The 1993 citation for the Medway Estuary and Marshes SPA (NE 2019d) lists 18 species of waterfowl within the over-wintering assemblage occurring in internationally- or nationally-important numbers:

- Dark-bellied brent geese;
- Shelduck;
- Pintail;
- Ringed plover;
- Grey plover;
- Knot;
- Dunlin;
- Redshank;
- Great crested grebe;
- Wigeon;
- Teal;
- Shoveler;
- Oystercatcher;
- Black-tailed godwit;
- Curlew;
- Spotted redshank;
- Greenshank; and
- Turnstone.

4.1.19 The Citation also lists 18 species comprising the diverse assemblage of wintering species:

- Red-throated Diver;
- Great Crested Grebe;
- Cormorant;
- Shelduck;
- Mallard;
- Teal;
- Shoveler;
- Pochard;
- Oystercatcher;
- Ringed Plover;
- Dunlin;
- Redshank;
- Bewick's Swan;
- Hen Harrier;
- Merlin;
- Golden Plover;
- Short-eared Owl; and
- Kingfisher.

4.1.20 With respect to the breeding assemblage, the Citation lists the following species:

- Oystercatcher;
- Lapwing;
- Ringed Plover;
- Redshank;
- Shelduck;
- Mallard;
- Teal;
- Shoveler; and
- Common Tern.

4.1.21 The Conservation Objectives for the SPA (NE 2019d) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

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

Peter's Pit SAC

4.1.22 Peter's Pit is an old chalk quarry situated in the North Downs in north Kent, with large ponds situated amongst grassland, scrub and woodland, 13.15 km south east of the application boundary. The ponds have widely fluctuating water levels and large great crested newt *Triturus cristatus* populations have been recorded breeding here.

4.1.23 The site is designated as it supports large breeding populations of great crested newt.

4.1.24 The conservation objectives for the site (NE 2019e) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features by maintaining or restoring:

- the extent and distribution of qualifying natural habitats;
- the structure and function of habitats of qualifying species;
- the supporting processes on which the habitats of qualifying species rely;
- the population of qualifying species; and
- the distribution of qualifying species within the site.

5. Stage 2 – Likely Significant Effect

5.1 Screening of Likely Significant effects

5.1.1 This section deals with the screening of likely significant negative effects on the qualifying feature and sub-features of the relevant Natura 2000 and Ramsar sites as a result of the construction, operation and decommissioning of the proposed development. The environmental pathways that could lead to a significant effect may be summarised as:

- direct loss or damage of habitats within a designated site or of nearby areas used by interest species, including functionally linked land;
- change in management regimes (e.g. grazing / mowing) of habitats within a designated site or of nearby areas used by interest species;
- urbanisation that results in over shadowing, reduction of sight lines or which hinders flight paths;
- changes in air quality;
- changes in water quality;
- other hydrological changes, including in the balance of saline and non-saline conditions;
- disturbance (activity, recreation, noise and lighting); and
- introduction or spread of non-native invasive species.

5.1.2 The possibility of the proposed development having a likely significant effect on any of the designated sites identified in Section 4 is discussed for each of these impact pathways in turn below.

5.1.3 Screening matrices for all the sites identified in Section 3 above are provided in Appendix B.

Direct loss or damage of habitats used by interest species

5.1.4 As the development is a minimum of 1.02 km away from closest designated site (the Thames Estuary and Marshes SPA / Ramsar) the proposed development will not result in any direct loss of any designated habitat within any of the designated sites.

5.1.5 There is no evidence that the terrestrial elements of the proposed development site regularly supports significant numbers of roosting wintering birds either of qualifying individual species or assemblages of The Thames Estuary and Marshes SPA / Ramsar. Surveys of terrestrial land potentially considered to be functionally linked land with respect to the Thames Estuary and Marshes SPA were undertaken. These surveys found no evidence that species associated with the SPA were present on fields within or adjacent to the site, and no significant populations of terrestrial wintering birds were identified.

5.1.6 There have been a series of surveys undertaken since 2007 which have been reviewed (Bioscan 2016/17; RWE 2017/18 [located in the Environmental Statement (application document A6) Volume 6, Appendix 9.2: Third Party Survey Reports]). The data from these sources indicates sporadic to occasional use by low numbers of SPA species in the intertidal area in the vicinity of the proposed causeway. Higher aggregations of waders and wildfowl were recorded outside and to the east of the survey area and further east within the SPA itself.

5.1.7 An updated survey of wintering birds within the intertidal zone has been undertaken covering the September 2019 to March 2020 period (Volume 6, Appendix 9.4: Foreshore Wintering Bird Surveys 2019-20). The assessment of the utilisation of habitat within and adjacent to the intertidal causeway in Zone G by wintering birds in the 2019-20 winter period (Volume 6, Appendix 9.4) determined that the area is not generally in use by significant numbers of most species of birds, although Avocets were recorded in or in the vicinity of the dredge pocket between November and March with peak counts of 44 and 42 birds obtained in November and December.

5.1.8 Assessment of the impacts of construction on habitats in the intertidal zone are provided in Environmental Statement Volume 3, Chapter 17: Marine Environment. There will be a temporary loss of up to 0.67 ha of intertidal mudflat for dredging for the vessel grounding pocket. This will recover following cessation of dredging, with infilling of the dredge pocket, with full recovery expected within two years. There will also be a permanent loss of c. 610m^2 of saltmarsh habitat and 0.47 ha of intertidal mudflat. To put this in context, 0.47 ha is approximately 0.01% of the size of the Thames Estuary and Marshes SPA while 0.67 ha is approximately 0.013%.

5.1.9 The peak count of 44 Avocet represents approximately 0.5% of the estimated UK winter population of 9,500, and approximately 1.4% of the current estimated winter population of Avocet of 3,255 in the Thames Estuary (five year mean 14/15-18/19).

5.1.10 Given the large amount of mudflat habitat available within and outside the SPA, and the relatively small area affected by temporary habitat loss, the small number of displaced birds would be able to find alternative foraging habitat reasonably close by in other parts of the estuary. There is therefore not predicted to be any decline in the wintering Avocet population associated with the SPA as a result of loss of a very small proportion of available mudflat.

5.1.11 Consequently, given the very small area of habitat loss (both permanent and temporary), it is concluded that the effects of direct habitat loss on qualifying features of any nearby designated sites can be screened out. In addition, impacts on breeding, passage and wintering birds of the Thames Estuary and Marshes SPA / Ramsar can be screened out, as no likely significant effects are anticipated.

Change in habitat management regimes

5.1.12 The majority of the existing land use immediately surrounding and in the vicinity of the proposed development site is agricultural land and inert landfilling to the east, a substation, former power station and industrial docks to the south and west, and agricultural land, railway and common land to the north.

5.1.13 The current management regimes for the SPA / Ramsar sites focus on maintaining the habitats for the qualifying breeding and waterbird assemblages (Natural England, 2019a), while the SACs' objectives focus on maintaining the Annex I habitats or habitats that support Annex II species.

5.1.14 Given the distance from the application boundary to any of the designated sites, the proposed development will result in no change to current management regimes of any sub-feature of an SPA, Ramsar site or SAC during either the construction or operation of the flexible generation plant.

5.1.15 Therefore, impacts occurring from a change in habitat management regimes can be screened out, as no likely significant effects are anticipated.

Loss of future space to allow for managed realignment

5.1.16 This potential effect is only relevant to the Thames Estuary sites. There is evidence that rising sea levels are causing intertidal habitats, notably saltmarsh and mudflats, to migrate landwards across all the designated sites under consideration. However, such landward migration can be rendered impossible due the presence of sea walls and other flood defences, resulting in a reduction in both the extent and quality of some sub-features through coastal squeeze. The removal or landward relocation of defences is seldom possible in existing built up areas and new development which takes place immediately behind sea walls and flood defences can result in it no longer being possible to move the defences landwards to accommodate replacement of eroded or drowned out intertidal habitats.

5.1.17 The proposed development site is located on a mixture of farmland and common land, which is predominantly low-lying. No area of the site is currently considered for future managed re-alignment as part of the current Thames Estuary 2100 Plan (EA 2012). If this were to change in the future, given that the application site is 1.02 km from the SPA / Ramsar site, there is considerable land between the application site and the designated site to accommodate further realignment.

5.1.18 On this basis, therefore, it can be concluded that impacts occurring from a loss of future space can be screened out, as no likely significant effects are anticipated on the Thames Estuary and Marshes SPA / Ramsar site.

Urbanisation

5.1.19 Industrial development has the potential to overshadow areas of habitat within designated sites, or areas used by the interest features of such sites, as well as to obstruct flight paths and lines of sight, reducing the appeal of the habitat or increasing the risk of fatalities through collisions.

5.1.20 The main development site is 2.62 km from the visible part of the intertidal area within the Thames Estuary and Marshes SPA / Ramsar site, which supports populations of waterbirds. There is therefore no potential for the development to overshadow any of the habitats for which the SPA / Ramsar site has been designated.

5.1.21 Surveys of land potentially considered to be functionally linked land with respect to the Thames Estuary and Marshes SPA have been undertaken. These surveys found no evidence that species associated with the SPA were present on fields within or adjacent to the site, and no significant populations of terrestrial wintering birds were identified.

5.1.22 As set out above in paragraphs 5.1.6 and 5.1.7, surveys for wintering birds within the intertidal zone indicate sporadic to occasional use by low numbers of SPA species in the intertidal area in the vicinity of the proposed causeway, with Avocets recorded in or in the vicinity of the dredge pocket between November and March, and higher aggregations of waders and wildfowl recorded outside and to the east of the survey area and further east within the SPA itself.

5.1.23 As such it is considered very unlikely that any flight paths of birds coming / going from the SPA will be blocked as a result of the development. This is strengthened by the fact that the Tilbury2 port development (under construction) is located immediately south and west of the proposed development, which is likely to deter bird species from using the immediate surrounds.

5.1.24 Therefore, any impacts occurring from increased urbanisation can be screened out, as no likely significant effects are anticipated upon the Thames Estuary and Marshes.

5.1.25 All other designated sites are a considerable distance from the site; as such, no likely significant effect is predicted due to increased urbanisation.

Air quality

5.1.26 The two air quality issues during construction are dust and increased traffic emissions, while those during operation are increased traffic and emissions from the gas engine exhaust stacks.

5.1.27 Levels of understanding of air quality effects on semi-natural habitats and qualifying interest species of Natura 2000 sites are relatively in their infancy. The Air Pollution Information System (APIS) is a publicly available support tool for UK conservation and regulatory agencies, industry and local authorities to help assess the potential effects of air pollutants on habitats and species. It aims to enable a consistent approach to air pollution assessment across the UK. This specifically includes informing assessments required under the Habitats Regulations. Consequently, reference has been made to the information contained within the APIS website where relevant.

Construction dust

5.1.28 The potential for dust release exists during the construction phase, with potential sources including site clearance, earthworks and vehicle movements.

5.1.29 For sensitive ecological receptors, the IAQM guidance (Holman *et al*., 2014) on the assessment of dust from demolition and construction (IAQM sets 50 m as the distance from the site boundary and from the site traffic route(s) within which there could potentially be nuisance dust and PM_{10} effects.

5.1.30 The boundary of the closest designated site (Thames Estuary and Marshes SPA and Ramsar) is over 1 km to the east of the proposed development site; therefore, there is no pathway for construction dust to reach any of the designated sites.

5.1.31 Therefore, the impact of construction dust on the designated sites can be screened out, as no likely significant effects are anticipated.

Traffic – Construction & Operation

5.1.32 The major impacts of air pollutants on coastal habitats and grasslands in the UK as a result of traffic are ozone, nitrogen deposition and acidification. According to the Department for Transport's Transport Analysis Guidance, the contribution of vehicle emissions from the roadside to local pollution levels is not significant beyond 200 metres from a road (HA 2007). This is therefore the distance that has been used to determine whether Natura 2000 and Ramsar sites are likely to be significantly affected by traffic emissions associated with the proposed development.

5.1.33 The roads to be used during both construction and operation of the proposed development are located over 200 m from the designated site boundary. Therefore, the issue of pollution from traffic is screened out from further assessment as it can be concluded that it will not have a likely significant effect on either of the designated sites.

Operational emissions

5.1.34 The principal source of operational emissions will be gases exhausted from the stacks of gas reciprocating engine generator sets.

5.1.35 The methods for screening of potential likely significant effects with respect to operational emissions are described in Volume 3, Chapter 12: Air Quality of the ES while the data relating to designated sites is presented in Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors of the ES.

5.1.36 For all pollutants (NO_x, nutrient nitrogen deposition and acid deposition), either the Predicted Environmental Concentration (PEC) did not exceed the Environmental Quality Standard (EQS) or the Process Contribution (PC) was <1% of the EQS for almost all of the ecological interest features of designated sites in the study area.

5.1.37 The one exception is nutrient nitrogen deposition and acid deposition for ringed plover within the Thames Estuary & Marshes SPA/Ramsar where the maximum PC is >1% of the EQS and the PEC would exceed the relevant CL/CLF. The CL/CLF used in the assessment is taken from the Site-Relevant Critical Load tool on APIS and is for acidic coastal stable dune grassland. This habitat type does not occur within the Thames Estuary and Marshes SPA/Ramsar; indeed the main associations of this species within the SPA are the grazing marsh and inter-tidal mudflats, in particular at Mucking Flats near east Tilbury and further east at Allhallows-on-Sea (Frost *et al*. 2016). Such habitats are not susceptible to either acid or nutrient nitrogen deposition on the basis that they are both high-nutrient systems (as demonstrated by a high critical load of 20-30 kgN.ha^{-1}.yr^{-1}) and brackish (or salt water) and therefore more alkaline.

5.1.38 On this basis, it is considered that the data on APIS are not directly relevant to the population of ringed plover using the SPA where a higher critical load/CLF would be more appropriate, given the habitat associations of this species in this geographic location. Therefore, there is no potential for a likely significant effect on ringed plover using the Thames Estuary and Marshes SPA as a result of emissions to air from the proposed facility.

5.1.39 Therefore, given that no effect is predicted on either of the Annex 1 species for The Thames Estuary and Marshes SPA (avocet or hen harrier) and no effect is predicted on the designated habitats or species within the SPA or the SAC, impacts occurring from operational air quality issues on all designated sites can be screened out, as no likely significant effects are anticipated.

5.1.40 Air quality data with respect to the Peter's Pit SAC, Medway Estuary & Marshes SPA/Ramsar and Benfleet and Southend Marshes SPA/Ramsar have not specifically been modelled. Given that the critical levels for NO_x, SO_2 and NH_3 are universal (i.e. the same for all vegetation) and no effect is predicted at sites closer to the proposed development, no effect from these gases is predicted at these more distant sites.

5.1.41 Peter's Pit comprises a matrix of woodland, scrub and grassland with large ponds supporting breeding great crested newts. APIS does not provide details of critical loads/critical load function for the fresh water habitats present. However, no effect is predicted on the much closer woodland habitats at the North Downs Woodland SAC and, as such, no effect on this site is predicted due to changes in nutrient nitrogen/acid deposition.

5.1.42 The habitats present within the Benfleet and Southend Marshes SPA/Ramsar and Medway Estuary & Marshes SPA/Ramsar are similar to those within the much closer Thames Estuary & Marshes SPA/Ramsar. Given that no effect is predicted at the Thames Estuary & Marshes SPA/Ramsar due to changes in nutrient nitrogen deposition or acid deposition, no effect is predicted at the Benfleet and Southend Marshes SPA/Ramsar.

Water quality

5.1.43 The quality of the water entering Natura 2000 and Ramsar sites is an important determinant of habitat condition and hence the species they support. Poor water quality can have a range of ecological impacts.

5.1.44 Given the proximity of the Thames Estuary and Marshes SPA / Ramsar site, likely significant effects from construction and operation of the flexible generation plant cannot be excluded, as the site is linked to the SPA / Ramsar site via a series of drainage ditches, which run from the land around the proposed development site to the River Thames.

5.1.45 Therefore, this will be taken through to Stage 3 (Appropriate Assessment) for the SPA / Ramsar site for all interest features.

5.1.46 All other sites considered here are a minimum of 10 km away from the application site and are not linked to the site via any hydrological or ecological pathways; therefore, no impacts upon the other sites are anticipated.

5.1.47 Effects on water quality due to dredging and mobilisation of sediment during construction of the causeway have been assessed in Volume 3, Chapter 17: Marine Environment and Volume 6, Appendices 17.2: Hydrodynamic Modelling and Sediment Assessment and 17.3: Water Framework Directive Assessment. These assessments have not predicted a deterioration in Thames Estuary water quality due to the proposed development and therefore no effect on the SPA / Ramsar site is likely.

Hydrological changes

5.1.48 The proposed development site will be suitably drained via a surface water management plan, which will utilise the existing drainage ditches in the surrounding area. These ditches will ultimately reach the SPA / Ramsar site, and the River Thames, and therefore, likely significant effects on the site cannot be ruled out.

5.1.49 Therefore, this will be taken through to Stage 3 (Appropriate Assessment) for the SPA / Ramsar site for all interest features.

5.1.50 Potential changes to the hydrology of the Thames (and therefore associated designated sites) could occur due to the construction of the causeway. However, as set out in the marine environment assessment of the Environmental Statement (particularly Volume 6, Appendices 17.2: Hydrodynamic Modelling and Sediment Assessment and 17.3: Water Framework Directive Assessment), no such changes are predicted. As such, effects due to changes in hydrology from the construction of the causeway can be screened out.

5.1.51 All other sites considered here are a minimum of 10 km away from the application site and are not linked to the site via any hydrological or ecological pathways; therefore, no impacts upon the other sites are anticipated.

Disturbance

5.1.52 Disturbance can be caused by noise (both during operation and construction) activity, recreation, and lighting. The application site is 1.02 km from the closest designated site boundary; therefore, impacts from construction or operation of the main Zone A development such as lighting, recreation and activity can be screened out, due to the separation distance between their boundaries and the designated sites.

Noise and visual disturbance – Construction (main site)

5.1.53 The Thames Estuary and Marshes SPA / Ramsar cited bird species have the potential to be impacted during the construction stage via ground clearance, vehicle movements and piling. Very loud noise and percussive noises have the potential to disturb birds, increasing time spent alert and in flight, reducing the available time to feed and increasing mortality.

5.1.54 The construction activity that would give rise to the largest potential noise effect is percussive piling, if employed for the main development site of the flexible generation plant or the construction of the causeway. All other construction activities would generate noise at a lower magnitude.

5.1.55 A review of studies on impacts of piling noise on birds (e.g. Cutts *et al*. 2009; Cutts *et al*. 2013; Owens, 1997; Postlethwaite & Stephenson 2012; Smit & Visser 1993; Wright *et al* 2010) provides a range of thresholds for varying magnitude of impacts (Table 7).

Table 8: Piling noise criteria for birds.

Noise Level Range, dB L_{Amax} F	Magnitude of impact
≤ 65	Negligible
> 65 to ≤ 75	Minor
> 75 to ≤ 85	Moderate
> 85	Major

5.1.56 Noise contour modelling for percussive piling has been assessed in Volume 3, Chapter 11: Noise and Vibration of the ES and the impacts on birds are considered in Chapter 9: Ecology of the ES; this indicates that noise levels from piling would reduce to approximately 65 dB L_{Amax} at around 650 m from the source of piling noise, taken to be the main development site boundary. No piling would be required for construction of the causeway. There would therefore be no significant increase in noise levels at the Thames Estuary and Marshes SPA / Ramsar site.

5.1.57 It is not therefore considered that there would be significant effects from construction noise on this designated site or any birds within it.

5.1.58 The southern tip of the main development site is approximately 900 m from the sea wall at the shortest distance (immediately south). There would therefore be no impact on the low numbers of wintering birds that are designated features of the SPA which occasionally forage in the intertidal zone outside of the SPA boundary from piling. Surveys confirmed that the arable lands within the potential piling noise impact zone are not used by wintering birds associated with the SPA.

5.1.59 It is not therefore considered that there would be significant effects from construction noise on Thames Estuary and Marshes SPA / Ramsar site or any breeding or wintering birds within it or that are using the foreshore.

5.1.60 Given the distance to the other designated sites considered here, any noise impacts can be screened out, due to the separation distance between the boundary and the designated sites.

Noise and visual disturbance – Construction (Zone G causeway)

5.1.61 Construction of the causeway and its subsequent use for deliveries of the gas engines to the Zone A construction site could result in noise and disturbance effects on wintering birds using the intertidal zone in the vicinity of the Zone G causeway.

5.1.62 The assessment of the utilisation of the foreshore in the vicinity of the causeway area by wintering birds in the 2019-20 winter period (Volume 6, Appendix 9.4) determined that the area is not generally in use by significant numbers of most species of birds, although Avocets were recorded in or in the vicinity of the barge docking area between November and March with peak counts of 44 and 42 birds obtained in November and December.

5.1.63 If construction of the causeway occurs during the November to March period, there is potential for disturbance to the Avocets recorded in its vicinity.

5.1.64 During use of the causeway for the flexible generation plant construction period, barge deliveries may occur in one phase or in two separate phases of 30 deliveries each. Based on the winter months when Avocets were present during the survey, the worst case scenario to consider in terms of concentrated disturbance events would be for each set of 30 movements to occur in two consecutive November – March periods.

5.1.65 The potential for disturbance effects from causeway construction and use on Avocet as a qualifying feature of the Thames Estuary & Marshes SPA will therefore be taken through to Stage 3 (Appropriate Assessment).

Noise and visual disturbance – Operational

5.1.66 Under normal operating conditions, the Flexible Generation Plant will produce a low hum, rather than any loud, sudden noises that might elicit a disturbance response from interest-feature birds using the intertidal areas of the SPA/Ramsar sites in the surrounding area. Noise modelling for the operational phase of the proposed development indicates that predicted noise level from the proposed development in operation at the boundary of the SPA/Ramsar site will be <35 dB $L_{Ar,\ Tr}$ (Volume 4, Chapter 11: Noise and Vibration of the ES), well below any threshold for disturbance (Cutts *et al*. 2013).

5.1.67 Given the circa 900m distance of the Flexible Generation Plant from the foreshore and fact there is no movement associated with its operation aside from 4-6 shift staff and occasional reagent deliveries, there is no potential for visual disturbance.

5.1.68 Therefore, the issue of operational noise and visual disturbance from the flexible generation plant can therefore be screened out from further assessment as it can be concluded that it will not be likely to have a likely significant effect on either of the designated sites.

5.1.69 The causeway could be used during the facility's operational phase for a barge delivery in the exceptional circumstance where a large plant item needed to be replaced due to failure. There is potential for disturbance to wintering birds if this were to occur while they are present in the vicinity of the causeway. However, in light of the low numbers of wintering birds recorded and the fact that such disturbance would be an exceptional or one-off event, not a routine or sustained use of the causeway, there is judged to be no likely significant effect.

Introduction or spread of non-native invasive species

5.1.70 The movement of people and traffic, as well as importation of material and plants to a site, can result in the introduction of non-native species to a site. No non-native species are currently known to be present on site.

5.1.71 Given this, the issue of introducing and spread of non-native species is therefore screened out from further consideration in this assessment on the grounds of not likely to have a significant effect on any of the designated sites.

6. Stage 3 – Appropriate Assessment

6.1 Summary of the outcomes from Stage 2

6.1.1 A summary of the outcomes of Stage 2 is presented in Table 9, and Appropriate Assessment for the relevant impact pathways provided below this. Mitigation (Stage 4) is also included where appropriate. Integrity matrices are provided in Appendix B.

Table 9: Summary of Stage 2 Conclusions.

Impact Pathway	Screening Outcome	Designated Site	Feature
Direct loss of habitats	No Likely Significant Effect		
Change in management regimes	No Likely Significant Effect		
Loss of future space for managed realignment	No Likely Significant Effect		
Urbanisation	No Likely Significant Effect		
Air quality (construction dust)	No Likely Significant Effect		
Air quality (operational emissions)	No Likely Significant Effect		
Water quality	Significant effect cannot be excluded	The Thames Estuary and Marshes SPA / Ramsar	All
Hydrological changes	Significant effect cannot be excluded	The Thames Estuary and Marshes SPA / Ramsar	All
Disturbance (all forms) from construction and operation of the main development	No Likely Significant Effect		
Disturbance (noise and visual) from use of the Zone G causeway during construction	Significant effect cannot be excluded	The Thames Estuary and Marshes SPA / Ramsar	Avocet
Introduction or spread of non-native invasives	No Likely Significant Effect		

6.2 Water quality

6.2.1 Poor water quality can result in a range of impacts. At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour. Some industrial chemicals are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

6.2.2 Eutrophication, the enrichment of plant nutrients in water, increases plant growth with high levels of macroalgal growth potentially smothering the mudflats used as feeding areas by qualifying bird species. The decomposition of organic matter that often accompanies eutrophication can deoxygenate water. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.

6.2.3 Because the surface water drainage links to the existing ditch system associated with the adjacent agricultural land and which leads to the Thames Estuary and Marshes SPA / Ramsar site, measures are required to prevent the release of contaminated water into the SPA, directly or otherwise.

6.2.4 Measures will be adopted during the construction phase to minimise the risk of contaminated runoff, silt and pollutants reaching watercourses. Further details of pollution control measures are provided in Volume 3, Chapter 15: Hydrology and Flood Risk of the ES and in the Code of Construction Practice (CoCP, application document A8.6). Impacts are assessed in Volume 3, Chapter 9: Onshore Ecology of the ES.

6.2.5 A site-wide surface water pollution prevention system will be developed to prevent the discharge of any contaminated surface water from the flexible generation plant in operation. The key measures to prevent water pollution are as follows:

- the surface water drainage, including the primary gravity drainage channels and associated systems around the boundary of the site will connect to the existing drainage channels via a sustainable drainage balancing and containment feature;
- appropriate treatment (e.g. settlement) and pollution prevention measures (e.g. interceptors) will be provided to prevent polluted flows from being discharged into any of the designated sites (SPA / Ramsar); and
- any chemical storage on site will be suitably bunded and emergency containment features will be incorporated within the sustainable drainage design to allow and spills to be controlled and dealt with on-site.

6.2.6 The overall philosophy for the design of the surface water pollution prevention system for the site is to manage surface water sustainably and to ensure that discharged waters do not constitute a pollution risk. This is described in the Conceptual Drainage Strategy, application document A7.3. Discharges to water and environmental management of the flexible generation plant, including safe storage of potentially polluting substances and spillage response procedures, will be regulated through the Environmental Permit for the facility in operation.

6.2.7 Implementation of these measures during both the construction and operational phases of the proposed development limits the risk of a significant pollution incident. Following implementation of mitigation measures, no adverse effect on site integrity of the Thames Estuary and Marshes SPA/Ramsar site is anticipated as a result of the proposed development.

6.3 Hydrological changes

6.3.1 As set out in the Conceptual Drainage Strategy (application document A7.3), drainage ditches removed by the proposed development will be replaced with a reconfigured ditch network that will not alter the hydrological regime overall outside the main development site itself. Runoff from the flexible generation plant will be suitably managed via an attenuation system such that the greenfield runoff rate is not exceeded.

6.3.2 With implementation of mitigation measures, no adverse effect on site integrity of the Thames Estuary and Marshes SPA/Ramsar site is anticipated as a result of the proposed development.

6.4 Disturbance (noise and visual) of Avocet

6.4.1 The assessment of the utilisation of the foreshore in the vicinity of the causeway area by wintering birds in the 2019-20 winter period (Volume 6, Appendix 9.4) determined that the area is not generally in use by significant numbers of most species of birds, although Avocets were recorded in or in the vicinity of the barge docking area between November and March with peak counts of 44 and 42 birds obtained in November and December.

6.4.2 The number of Avocet from the SPA citation was 283 birds (five year mean peak count 93/94-98/99). This was defined on the SPA citation as being 28.3% of the total wintering GB population, i.e. the total GB population of Avocet at the time of designation was estimated at 1,000 birds.

6.4.3 Numbers of Avocets have increased significantly over a 25 year period: a 25 year trend percentage increase of 718% between 1989/90 and 2014/15 is reported in Hayhow et al (2017). The GB total wintering Avocet population from 2004/05–08/09 was estimated at 7,500 birds (Musgrove et al, 2011), and the GB total population is now estimated at 9,420 (obtained from BTO Wetland Bird Survey (WeBS) data, accessed online via https://app.bto.org/webs-reporting/).

6.4.4 The peak count of 44 Avocet represents approximately 0.5% of the estimated UK winter population of 9,500, and approximately 1.4% of the current estimated winter population of Avocet of 3,255 in the Thames Estuary (five year mean 14/15-18/19).

6.4.5 The distribution of Avocets during the 2019-20 survey season is shown on Figure 6.1.

Construction of the causeway

6.4.6 Numbers of wintering birds recorded in the vicinity of the causeway in September and October were generally lower than the November – March period, with the exception of Mallard, which is a species not considered particularly susceptible to disturbance, and Curlew, neither of which are qualifying features of the SPA/Ramsar site and which are not present in numbers high enough to represent a significant proportion of the overall waterbird assemblage.

6.4.7 It is therefore judged that there would be no significant disturbance impacts on wintering birds from construction of the causeway and dredge pocket during time periods other than November – March inclusive.

6.4.8 Construction of the causeway and dredge pocket in the intertidal zone is not proposed between November to March inclusive unless further evidence supports a conclusion that potentially significant effects on the SPA integrity due to construction during this period would not occur.

6.4.9 The Applicant considers that there may be alternative mitigation measures (such as visual screening) or further evidence from wider wintering bird surveys in the area (such as those understood to be being undertaken for Tilbury2) and intends to explore this further in discussion with Natural England.

Use of the causeway during flexible generation plant construction

6.4.10 A total of up to sixty barge deliveries for gas engines and other large components use the causeway. This will result in a total of 120 barge movements to and from the causeway. The barges will dock on the causeway at high tide, when the mudflats are covered and hence no Avocets will be present. The barges will also depart at high tide and therefore again no disturbance impacts would occur as a result of the barge movements.

6.4.11 Any disturbance events will therefore occur at low tide when the engines are unloaded. The sequence of events for each unloading will comprise:

1) A crane will lift out a section of the sea wall and, depending on barge model, may also move down to the causeway to lower the barge unloading ramp.

2) The loaded self-propelled transporter vehicle from the barge will move the engine to beyond the sea wall and up to the main development site. An empty transporter will move down the causeway onto the barge.

3) The barge front will be closed and the mobile crane will then move back up the causeway and replace the sea wall gate.

6.4.12 These operations will take approximately 1-2 hours to complete. This is the period within which disturbance impacts on Avocets might occur; birds would be displaced, probably moving eastwards to mudflats closer to the SPA.

6.4.13 The barge deliveries may occur in one phase or in two separate phases of 30 deliveries each. Based on the winter months when Avocets were present during the survey, the worst case scenario to consider in terms of concentrated disturbance events would be for each set of 30 movements to occur in two consecutive November – March periods.

6.4.14 It is expected that the deliveries would be between 1-3 days apart, and therefore each phase of 30 deliveries could last for 1-3 months. Therefore disturbance events are of relatively short duration and intermittent with up to two days between each event. Even if deliveries are one day apart, that only directly affects every other tidal cycle, and Avocets would have the opportunity to feed on the mudflats at night.

6.4.15 Clearly, if timing allows, deliveries could be undertaken outside of the period when Avocets are present (November – March inclusive), in which case no disturbance events would occur. However, this would be a highly onerous restriction on use of the causeway, as the delivery period depends on the charter availability of a suitable ro-ro barge, port facilities for the abnormal load trans-shipment, and the applicant's construction programme.

6.4.16 If deliveries occur inside that period, some displacement of birds to areas of alternative habitat will be expected. Over the course of a 6 hour period (3 hours each side of low tide), disturbance events would occur for 1-2 hours, i.e. between 17-30% of a tidal cycle. Birds could return to feed when the disturbance events have ceased.

6.4.17 Given the large amount of mudflat habitat available within and outside the SPA, and the relatively small area likely to be affected by disturbance, it is considered that the small number of displaced birds would be able to find alternative foraging habitat reasonably close by in other parts of the estuary.

6.4.18 There is therefore not predicted to be any decline in the wintering Avocet population associated with the SPA as a result of loss of a very small proportion of available mudflat.

6.4.19 As noted above, with reference to the SPA citation population, numbers of Avocets in the Thames Estuary have increased significantly since the population estimates underpinning the SPA citation were made. Therefore, regardless of the potential effect on a small number of birds from disturbance, it is not considered that this would have any significant effect on the integrity of the Avocet population associated with the SPA.

6.5 Conclusion

6.5.1 Following the Appropriate Assessment provided above, and provision of mitigation measures as appropriate, it is concluded that the Thurrock Flexible Generation Plant will not compromise the conservation objectives of Natura 2000 sites, and there will be no adverse effect on site integrity.

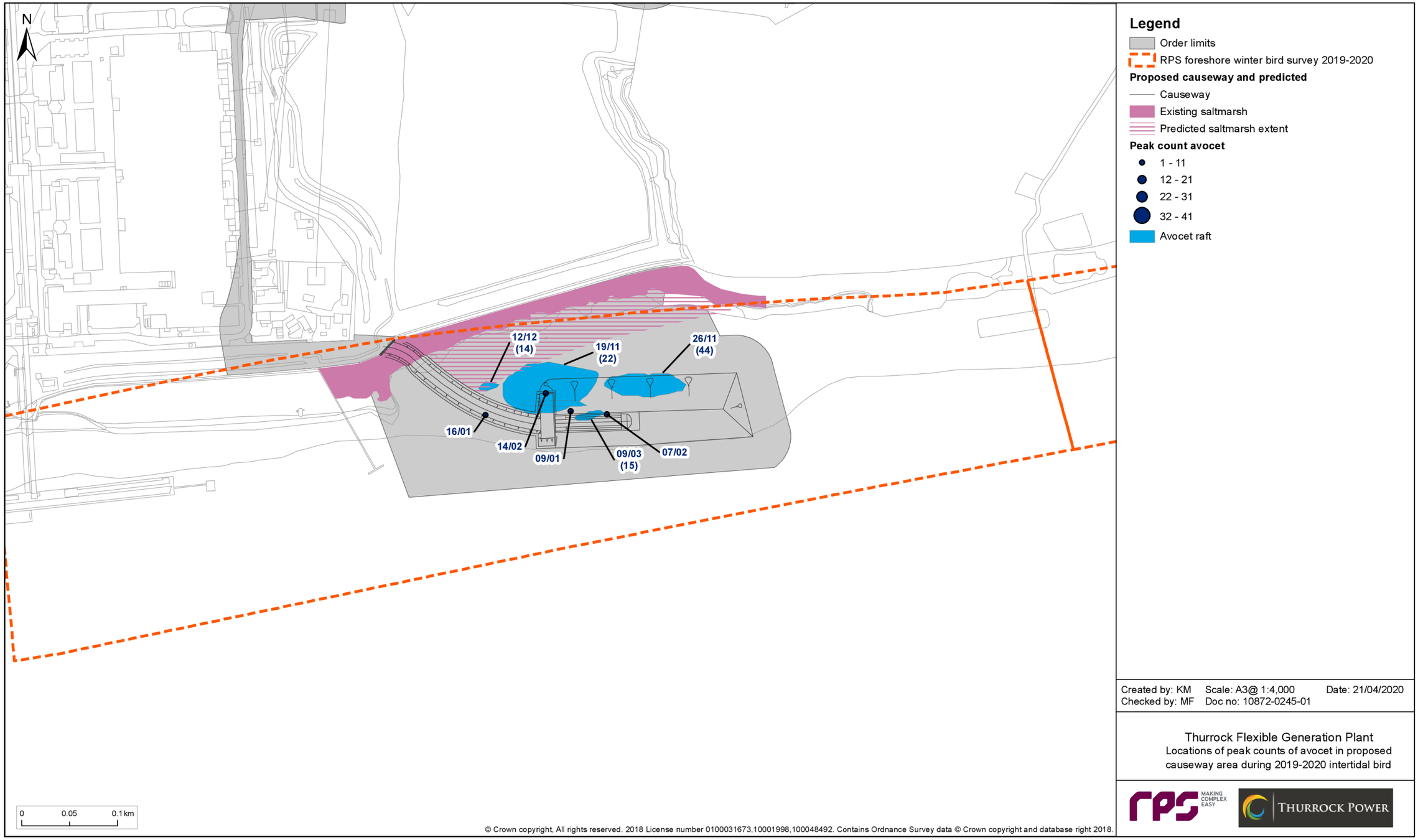

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Figure 6.1. Avocet distribution near Zone G causeway

7. In-combination assessment

7.1 Introduction

7.1.1 Article 6(3) of the Habitats Directive requires that, prior to granting consent, a competent authority has to be satisfied that a plan or project will not have a significant adverse effect on the integrity of Natura 2000 sites either alone or in combination with other plans or projects. Therefore, this section of the HRA provides the consideration of the potential for such in combination effects with other plans or projects in the area.

7.1.2 Cumulative effects of the proposed development with other proposed developments near the site that are currently in the planning process or have been approved but are not yet constructed have been reviewed for relevance with respect to European designated sites.

7.1.3 The process of identifying other consented or proposed developments and screening to create a shortlist of those having potential for cumulative effects with Thurrock Flexible Generation Plant is described in Volume 2, Chapter 4: Environmental Impact Assessment Methodology and Volume 4, Chapter 18: Cumulative Effects Assessment Introduction and Screening of the ES. Chapter 18 lists the shortlisted cumulative developments and the tier they have been assigned (guiding the weight that the decision-maker may place on each development's likelihood of being realised) in accordance with PINS Guidance Note 17.

7.1.4 Two Nationally Significant Infrastructure Projects (NSIPs) are on land adjacent to and in some places overlapping with the Thurrock Flexible Generation Plant application boundary. The consented Tilbury2 port expansion adjacent to the west is under construction. The Lower Thames Crossing (LTC) motorway and link road to the east and north is in the process of EIA and public consultation.

7.1.5 Outline planning permission has been granted for several residential and mixed-use developments expanding Linford and East Tilbury in the direction of Thurrock Flexible Generation Plant. However, these are generally further than 500m from the Flexible Generation Plant site and so are unlikely to have direct cumulative effects on habitats or most species groups. These non-NSIP projects are also in-land, so avoid disturbance effects on the inter-tidal habitats and wintering birds and also do not affect the costal grassland strip which is of value to the invertebrate assemblage

7.1.6 Should all of these developments proceed, Thurrock Flexible Generation Plant's main development site would be close to temporary or permanent works for the two NSIPs. Its gas connection point to Feeder 18 could be adjacent to the expanded outskirts of East Tilbury and the pipeline route and accesses could cross land to be developed for the LTC.

7.1.7 An assessment of the cumulative ecological impacts of the Thurrock Flexible Generation Plant is set out in Volume 4, Chapter 21: Onshore Ecology of the ES. A list of other projects and plans (with planning application reference) considered within the CEA is provided in that chapter but most of these developments do not have potential direct or indirect effects on the Natura 2000 designated sites. Where they do, they are assessed here, in-combination with the Thurrock Flexible Generation Plant.

7.2 In-combination construction effects

Impacts on designated sites

7.2.1 There is potential for greater disturbance and displacement effects on mobile species, particularly breeding and wintering birds, that could occur if construction for the other NSIPs overlaps with that of the proposed development, or for these effects to last for a greater duration if construction is sequential.

7.2.2 In terms of potential additional effects for overlapping construction, the assessment of noise levels indicates that even in the maximum design scenario of percussive piling for Thurrock Flexible Generation Plant construction, noise levels from this activity would not give rise to significantly elevated noise levels at the Thames Estuary and Marshes SPA. Even if piling were to occur for all developments simultaneously (i.e. a doubling of maximum noise), given the distance involved, the resulting noise levels at the SPA would only increase by circa 3 dB L_{Amax}, given the logarithmic nature of noise propagation.

7.2.3 Therefore, impacts occurring from cumulative noise effects can be screened out, as no likely significant effects are anticipated on the Thames Estuary and Marshes SPA / Ramsar site.

7.2.4 Surveys of terrestrial land potentially considered to be functionally linked land with respect to the Thames Estuary and Marshes SPA have been undertaken. These surveys found no evidence that species associated with the SPA were present on fields within or adjacent to the proposed development boundary, and no significant populations of terrestrial wintering birds were identified. As such, no cumulative effects are possible on terrestrial wintering birds.

7.2.5 The PEIR and Environmental Impacts Update for the Lower Thames Crossing indicates that a jetty for deliveries of material to the LTC construction site might be constructed on the north side of the Thames within Area 1 of the bird survey compartments surveyed by RPS in 2019-20 (Volume 6, Appendix 9.4) and therefore close to the Zone G causeway. Construction and use of this jetty could potentially result in an in-combination effect if it overlaps with construction and use of the Zone G causeway.

7.2.6 As numbers of wintering birds in the vicinity of the Zone G causeway are generally low, it is not considered that there would be in-combination effects on the majority of species. As a potential LSE on Avocet was identified, the potential for an in-combination effect on this species has been given further consideration.

7.2.7 As previously noted, construction of the Zone G causeway would be undertaken outside of the November – March period and would not therefore give rise to in-combination effects on Avocet with the construction and use of the LTC jetty.

7.2.8 It is possible that the use of the Zone G causeway for gas engine deliveries, as outlined in Section 6.4 above, could overlap with the construction or use of the LTC jetty. If this occurs, given that the jetty and the causeway would be in close proximity, the result would be the displacement of the same number of birds as would result from the Zone G causeway being in use on its own, and hence no additional in-combination effect would occur.

7.2.9 If the construction and use of the LTC jetty occurs after the Zone G causeway has ceased being in use, the result would be the same number of birds being displaced for a longer period.

7.2.10 However, given the large amount of mudflat habitat available within and outside the SPA, and the relatively small area likely to be affected by disturbance even if the periods of use of the jetty and causeway are contiguous, it remains the case that the small number of displaced birds would be able to find alternative foraging habitat reasonably close by in other parts of the estuary.

7.2.11 On this basis it is considered that there is no potential for in-combination construction effects on birds associated with the SPA including Avocet.

7.3 Cumulative operational effects

7.3.1 There is potential for cumulative air quality impacts resulting from the additional traffic generated by other developments and from air pollutant emissions of other combustion and power generation development proposals. The results from the modelling of these potential impacts are presented in ES Volume 4, Chapter 25: Air Quality cumulative assessment.

7.3.2 These data show that, for the majority of interest features, either the cumulative PCis <1% of the EQS or the PEC is <EQS and, as such, no significant effects are predicted.

7.3.3 The only exceptions to this are for the following features:

- Thames Estuary and Marshes SPA - *Charadrius hiaticula* (Europe/Northern Africa – wintering) Ringed plover (A137) (both nutrient nitrogen and acid deposition); and
- North Downs Woodlands SAC – *Taxus baccata* woods of the British Isles (H91J0) (nutrient nitrogen deposition).

7.3.4 As described above, the CL/CLF used in the assessment for Ringed Plover is taken from the Site-Relevant Critical Load tool on APIS and is for acidic coastal stable dune grassland. This habitat type does not occur within the Thames Estuary and Marshes SPA; indeed the main associations of this species within the SPA are the grazing marsh and inter-tidal mudflats, in particular at Mucking Flats near east Tilbury and further east at Allhallows-on-Sea (Frost *et al.*, 2016). Such habitats are not highly susceptible to either acid or nutrient nitrogen deposition on the basis that they are both high nutrient systems (as demonstrated by a high critical load of 20-30 kgN.ha^{-1}.yr^{-1}) and brackish (or salt water) and therefore more alkaline.

7.3.5 On this basis, it is considered that the data on APIS is not directly relevant to the population of Ringed Plover using the SPA where a higher critical load/critical load function would be more appropriate, given the habitat associations of this species in this geographic location. Therefore, there is no potential for a likely significant effect on Ringed Plover using the Thames Estuary and Marshes SPA as a result of cumulative emissions to air.

7.3.6 With respect to the interest feature at the North Downs Woodland SAC, the critical load used in the assessment (5 kgN.ha^{-1}.yr^{-1}) is the lowest found on APIS for any habitat type and represents coniferous woodland on the very poorest soils with strong lichen/free-living algal communities. APIS notes that unless such lichen communities are present within the site, then 10 kgN.ha^{-1}.yr^{-1} is a more appropriate critical load for coniferous woodland in the UK (APIS 2019). Using this value, the cumulative PC becomes 1% of the critical load and, as such, insignificant.

7.3.7 Thurrock Flexible Generation Plant will result in permanent loss of arable land and grazing land. There is therefore the potential for cumulative losses of these habitat types, which could include losses of arable land considered to be functionally linked land for birds associated with the Thames Estuary and Marshes SPA/Ramsar. Surveys to assess this have not identified any bird interest features using this land. As such, no cumulative effects are predicted.

7.4 Decommissioning effects

7.4.1 Decommissioning of Thurrock Flexible Generation Plant, if that were to occur after its expected initial 35 years of operation, may overlap with the operational phases of other developments, most significantly the NSIPs Tilbury2 and the Lower Thames Crossing (as these developments do not have an estimated lifetime in that it is expected they would remain permanently operational).

7.4.2 In that situation, there may be some limited potential for additional disturbance to species in the local area from decommissioning works combined with disturbance from traffic and other operations associated with both developments. However, it is not considered that this would give rise to effects of a magnitude or significance greater than that assessed for Thurrock Flexible Generation Plant alone and no likely significant effects are therefore predicted.

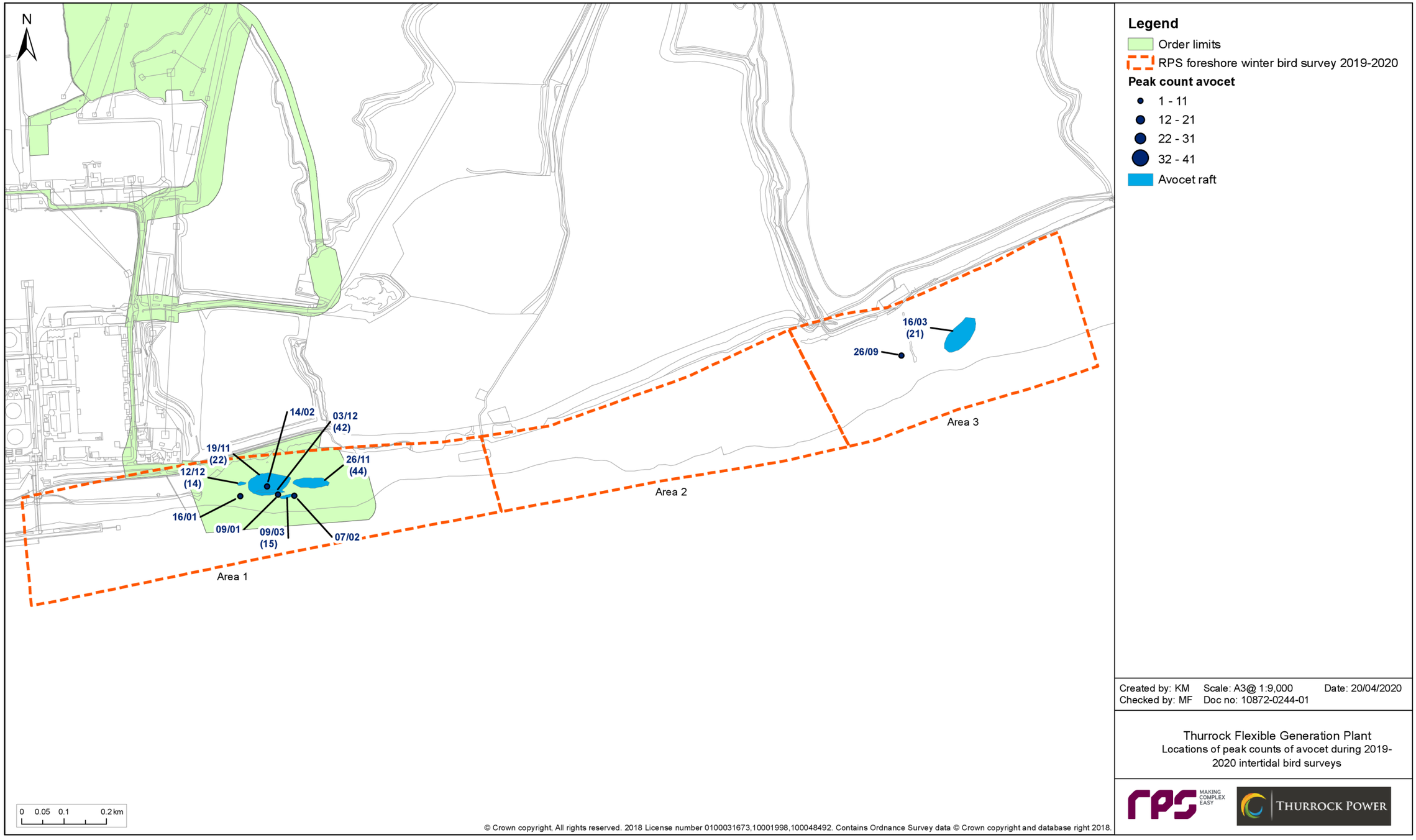

Figure 7.1: Avocet distribution during 2019-2020 winter bird surveys.

8. Conclusion

8.1.1 Information to enable an Appropriate Assessment of the Thurrock Flexible Generation Plant development has been provided.

8.1.2 The screening stage identified no Likely Significant Effects on Natura 2000 sites in the absence of mitigation with the exception of water quality and hydrological impacts on the Thames Estuary and Marshes SPA.

8.1.3 These potential effects were taken forward to Appropriate Assessment stage where appropriate mitigation was identified to address the risk of significant effects occurring.

8.1.4 The proposed mitigation in the form of surface water management features and pollution control safeguards will together ensure that there will be no significant adverse effect on the integrity of the Thames Estuary and Marshes SPA.

9. References

APIS (2019) Nitrogen Deposition: Saltmarsh http://www.apis.ac.uk/node/968 [accessed 12/12/19]

Bioscan (2018) Habitats Regulations Assessment (HRA) Stage 2 Report Appendix 9: Proposed port terminal at former Tilbury Power Station: Tilbury2 note on winter bird use of the intertidal area. [Online] Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR030003/TR030003-000995-Port%20of%20Tilbury%20London%20-%20Habitats%20Regulations%20Stage%202%20report%20-%20Clean.pdf [Accessed 02 December 2019]

Cutts, N., A. Phelps, and D. Burdon. (2009) Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance, Report to Humber INCA. ZBB710-F-2009. Institute of Estuarine and Coastal Studies University of Hull.

Cutts, N., Hemingway, K. & Spencer, J. (2013) Waterbird disturbance mitigation toolkit. Institute of Estuarine and Coastal Studies, University of Hull.

DCLG (2006) Planning for the Protection of European Sites: Appropriate Assessment. Department for Communities and Local Government.

Environment Agency (2012) Thames Estuary 2100 Plan. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/322061/LIT7540_43858f.pdf [accessed 12/12/19]

Frost, T. M., Austin, G. E., Calbrade, N. A., Holt, C. A., Mellan, H. J., Hearn, R. D., Stroud, D. A., Wotton, S. R. and Balmer, D. E. (2016) Waterbirds in the UK 2014/15: The Wetland Bird Survey Thetford: BTO, RSPB and JNCC, in association with WWT.

Hayhow, D.B., Ausden, M.A., Bradbury, R.B., Burnell, D., Copeland, A.I., Crick, H.Q.P., Eaton, M.A., Frost, T., Grice, P.V., Hall, C., Harris, S.J., Morecroft, M.D., Noble, D.G., Pearce-Higgins, J.W., Watts, O. & Williams, J.M. *The state of the UK's birds 2017*. RSPB, BTO, WWT, DAERA, JNCC, NE and NRW, Sandy.

Highways Agency (2007) Design Manual for Roads and Bridges, HA 207/07, Vol. 11, Section 3, Part 1 Air Quality.

Holman *et al*. (2014) Guidance on the assessment of dust from demolition and construction. https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf [accessed 12/12/19]

Musgrove, A.J., Austin, G.E., Hearn, R.D., Holt, C.A., Stroud, D.A. & Wotton, S.R. (2011). Overwinter population estimates of British waterbirds. *British Birds,* 104, 364-397.

Natural England (2019a) Thames Estuary & Marshes SPA Conservation Objectives http://publications.naturalengland.org.uk/publication/4698344811134976 [accessed 12/12/19]

Natural England (2019b) North Downs Woodlands SAC Conservation Objectives http://publications.naturalengland.org.uk/publication/5717001544663040 [accessed 12/12/19]

Natural England (2019c) Benfleet and Southend Marshes SPA Conservation Objectives http://publications.naturalengland.org.uk/publication/5954477588742144 [accessed 12/12/19]

Natural England (2019d) Medway Estuary & Marshes SPA Citation http://publications.naturalengland.org.uk/publication/6672791487119360 [accessed 12/12/19]

Natural England (2019e) Peters Pit SAC Conservation Objectives http://publications.naturalengland.org.uk/publication/4817478370721792 [accessed 12/12/19]

Owens, N. W. (1997) Responses of Wintering Brent Geese to Human Disturbance. Wildfowl 28 (28):10.

PINS (2018) Consideration of avoidance and reduction measures in Habitats Regulations Assessment: People over Wind, Peter Sweetman v Coillte. PINS NOTE 05/2018. The Planning Inspectorate, Bristol.

Postlethwaite, B. & Stephenson, S. (2012) Grimsby River Terminal Construction – Pile Noise Monitoring and Bird Behaviour Observations. L-30062-S02-REPT-001. Xodus Group.

Smit, C.J. & Visser, G.J. (1993) Effects of disturbance on shorebirds: a summary of existing knowledge from the Dutch Wadden Sea and Delta. Wader Study Group Bulletin, numéro special, 68, pp.6-19.

Wright, M.D. Goodman, P. & Cameron, T.C. (2010) Exploring behavioural responses of shorebirds to impulsive noise. Journal: Wildfowl (2010) 60: pp 150 -167. Wildfowl and Wetlands Trust.

Appendix A Natura 2000 site citations

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

Name: Thames Estuary and Marshes

Unitary Authority/County: Essex County Council, Gravesham Borough Council, Kent County Council, Medway Council, and Thurrock Borough Council.

Consultation proposal: Mucking Flats and Marshes SSSI and South Thames Estuary and Marshes SSSIs have been recommended as a Special Protection Area because of the site's European ornithological interest.

The Thames Estuary and Marshes Special Protection Area is a wetland of European importance comprising a mosaic of intertidal habitats, saltmarsh, coastal grazing marshes, saline lagoons and chalk pits. The site provides wintering and breeding habitats for important assemblages of wetland bird species, particularly wildfowl and waders as well as supporting migratory birds on passage. The site forms part of the wider Thames Estuary together with other classified SPAs in both Essex and Kent.

Boundary of SPA: The SPA boundary is within or coincident with the above SSSI boundaries. See SPA map for further detail.

Size of SPA: The SPA covers an area of 4,838.94 ha.

European ornithological importance of the SPA: Thames Estuary and Marshes 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 1993/94 - 1997/98	% GB population
Avocet *Recurvirostra avosetta*	283 individuals - wintering	28.3% GB
Hen Harrier *Circus cyaneus*	7 individuals - wintering	1.0% GB

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:

Species	5 year peak mean 1993/94 - 1997/98	% of population
Ringed Plover *Charadrius hiaticula*	1,324 individuals - passage	2.6% Europe/ Northern Africa (win)
Grey Plover *Pluvialis squatarola*	2,593 individuals - wintering	1.7% Eastern Atlantic (wintering)
Dunlin *Calidris alpina alpina*	29,646 individuals - wintering	2.1% N Siberia/Europe/ W Africa
Knot *Calidris canutus islandica*	4,848 individuals - wintering	1.4% NE Can/Grl/ Iceland/NW Eur
Black-tailed Godwit *Limosa limosa islandica*	1,699 individuals - wintering	2.4% Iceland (breeding)
Redshank *Tringa totanus totanus*	3,251 individuals - wintering	2.2% 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
1993/94 - 1997/98	Wintering	75,019

Non-qualifying species of interest
Other Annex 1 species which regularly occur on the site in non-qualifying numbers are breeding Common Tern *Sterna hirundo*, and passage and wintering Bewick's Swan *Cygnus columbianus bewickii*, Golden Plover *Pluvialis apricaria*, Ruff *Philomachus pugnax*, Short-eared Owl *Asio flammeus* and Kingfisher *Alcedo atthis*.

The site also supports nationally important populations of Shelduck *Tadorna tadorna,* Teal *Anas crecca*, Pintail *Anas acuta*, Gadwall *Anas strepera*, Shoveler *Anas clypeata*, Tufted Duck *Aythya fuligula* and Pochard *Aythya ferina*.

Status of SPA
The Thames Estuary and Marshes SPA was classified on 31 March 2000.

JNCC is a statutory adviser to UK Government and devolved administrations

Joint Nature Conservation Committee

Home > UK > UK Protected Sites > Special Protection Areas > SPA Reviews > Second Review > SPA Review site accounts

SPA description

(information as published 2001)

Thames Estuary and Marshes

Country	England
Unitary Authority	Medway, Thurrock, Kent
SPA status	Classified 31/03/2000
Latitude	51 29 08 N
Longitude	00 35 47 E
SPA EU code	UK9012021
Area (ha)	4838.94
Component SSSI/ASSIs	Mucking Flats and Marshes South Thames Estuary and Marshes

The Thames Estuary and Marshes SPA is located on the south side of the Thames Estuary in southern England. The marshes extend for about 15 km along the south side of the estuary and also include intertidal areas on the north side of the estuary. To the south of the river, much of the area is brackish grazing marsh, although some of this has been converted to arable use. At Cliffe, there are flooded clay and chalk pits, some of which have been infilled with dredgings. Outside the sea wall, there is a small extent of saltmarsh and broad intertidal mud-flats. The estuary and adjacent grazing marsh areas support an important assemblage of wintering waterbirds including grebes, geese, ducks and waders. The site is also important in spring and autumn migration periods.

Qualifying species

For individual species accounts visit the Species Accounts section

This site qualifies under **Article 4.1** of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

Over winter;

Avocet *Recurvirostra avosetta*, 276 individuals representing at least 21.7% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

Hen Harrier *Circus cyaneus*, 7 individuals representing at least 0.9% of the wintering population in Great Britain (5 year mean 93/4-97/8)

This site also qualifies under **Article 4.2** of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

On passage;

Ringed Plover *Charadrius hiaticula*, 559 individuals representing at least 1.1% of the Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Over winter;

Ringed Plover *Charadrius hiaticula*, 541 individuals representing at least 1.1% of the wintering Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Assemblage qualification: A wetland of international importance.

The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl

Over winter, the area regularly supports 33,433 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Redshank *Tringa totanus*, Black-tailed Godwit *Limosa limosa islandica*, Dunlin *Calidris alpina alpina*, Lapwing *Vanellus vanellus*, Grey Plover *Pluvialis squatarola*, Shoveler *Anas clypeata*, Pintail *Anas acuta*, Gadwall *Anas strepera*, Shelduck *Tadorna tadorna*, White-fronted Goose *Anser albifrons albifrons*, Little Grebe *Tachybaptus ruficollis*, Ringed Plover *Charadrius hiaticula*, Avocet *Recurvirostra avosetta*, Whimbrel *Numenius phaeopus*.

Note:

Many designated sites are on private land: the listing of a site in these pages does not imply any right of public access.

Note that sites selected for waterbird species on the basis of their occurrence in the breeding, passage or winter periods also provide legal protection for these species when they occur at other times of the year.

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European Site Conservation Objectives for Thames Estuary and Marshes Special Protection Area Site Code: UK9012021

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A082 *Circus cyaneus*; Hen harrier (Non-breeding)
A132 *Recurvirostra avosetta*; Pied avocet (Non-breeding)
A137 *Charadrius hiaticula*; Ringed plover (Non-breeding)
A141 *Pluvialis squatarola*; Grey plover (Non-breeding)
A143 *Calidris canutus*; Red knot (Non-breeding)
A149 *Calidris alpina alpina*; Dunlin (Non-breeding)
A156 *Limosa limosa islandica*; Black-tailed godwit (Non-breeding)
A162 *Tringa totanus*; Common redshank (Non-breeding)
Waterbird assemblage

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This is a European Marine Site

This SPA is a part of the Thames Estuary and Marshes European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Regulation 35 Conservation Advice document for the EMS. For further details about this please visit the Natural England website at: http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx or contact Natural England's enquiry service at enquiries@naturalengland.org.uk or by phone on 0845 600 3078.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where this is available) will also provide a framework to inform the management of the European Site under the provisions of Articles 4(1) and 4(2) of the Wild Birds Directive, and the prevention of deterioration of habitats and significant disturbance of its qualifying features required under Article 6(2) of the Habitats Directive.

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 30 June 2014 (Version 2). This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014. Previous references to additional features identified in the 2001 UK SPA Review have also been removed.

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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: 31 March 2000

3. Country:
UK (England)

4. Name of the Ramsar site:
Thames Estuary and Marshes

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):
51 29 08 N 00 35 47 E

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: Gravesend

Contains part of the north coast of Kent and part of the southern coast of Essex, straddling the Thames estuary.

Administrative region: Essex; Kent; Medway; Thurrock

10. Elevation (average and/or max. & min.) (metres): **11. Area** (hectares): 5588.59
Min. -2
Max. 20
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.

A complex of brackish, floodplain grazing marsh ditches, saline lagoons and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

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).

2, 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 2

The site supports one endangered plant species and at least 14 nationally scarce plants of wetland habitats. The site also supports more than 20 British Red Data Book invertebrates.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
45118 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:

Ringed plover , *Charadrius hiaticula*, Europe/Northwest Africa	595 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1640 individuals, representing an average of 4.6% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Grey plover , *Pluvialis squatarola*, E Atlantic/W Africa -wintering	1643 individuals, representing an average of 3.1% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , *Calidris canutus islandica*, W & Southern Africa (wintering)	7279 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	15171 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)
Common redshank , *Tringa totanus totanus*,	1178 individuals, representing an average of 1% 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	alluvium, mud, shingle
Geomorphology and landscape	coastal, floodplain, intertidal sediments (including sandflat/mudflat), estuary
Nutrient status	eutrophic
pH	no information
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Annual averages (Greenwich, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/greenwich.html) Max. daily temperature: 14.8° C Min. daily temperature: 7.2° C Days of air frost: 29.1 Rainfall: 583.6 mm Hrs. of sunshine: 1461.0

General description of the Physical Features:

The marshes extend for about 15 km along the south side of the Thames estuary and also include intertidal areas on the north side of the estuary. To the south of the river, much of the area is brackish grazing marsh, although some of this has been converted to arable use. At Cliffe, there are flooded clay and chalk pits, some of which have been infilled with dredgings. Outside the sea-wall, there is a small extent of saltmarsh and broad intertidal mudflats.

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).

The marshes extend for about 15 km along the south side of the Thames estuary and also include intertidal areas on the north side of the estuary. To the south of the river, much of the area is brackish grazing marsh, although some of this has been converted to arable use. At Cliffe, there are flooded clay and chalk pits, some of which have been infilled with dredgings. Outside the sea-wall, there is a small extent of saltmarsh and broad intertidal mudflats.

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, Sediment trapping, Flood water storage / desynchronisation of flood peaks, Maintenance of water quality (removal of nutrients)

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
G	Tidal flats	49.6
4	Seasonally flooded agricultural land	38.6
Q	Saline / brackish lakes: permanent	4.2
Ss	Saline / brackish marshes: seasonal / intermittent	3.2
Other	Other	1.6
H	Salt marshes	1.3
E	Sand / shingle shores (including dune systems)	0.8
O	Freshwater lakes: permanent	0.7

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.

The intertidal flats are mostly fine, silty sediment, though in parts they are sandy. The saltmarsh shows a transition from pioneer communities containing *Zostera* to saltmarsh dominated by, for example, *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites communis* and *Bolboschoenus maritimus*. The saline lagoons have a diverse molluscan and crustacean fauna. Dominant plants in the lagoons include *Ulva* and *Chaetomorpha*.

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:

The site supports a population of the endangered least lettuce *Lactuca saligna*, and also supports several nationally scarce plants, including bulbous foxtail *Alopecurus bulbosus*, slender hare's-ear *Bupleurum tenuissimum*, divided sedge *Carex divisa*, saltmarsh goosefoot *Chenopodium chenopodioides*, sea barley *Hordeum marinum*, golden samphire *Inula crithmoides*, annual beard grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, stiff saltmarsh-grass *P. rupestris*, one-flowered glasswort *Salicornia pusilla*, clustered clover *Trifolium glomeratum*, sea clover *T. squamosum*, narrow-leaved eelgrass *Zostera angustifolia* and dwarf eelgrass *Z. noltei*.

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 with peak counts in spring/autumn:

Little grebe , *Tachybaptus ruficollis ruficollis*, Europe to E Urals, NW Africa	251 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Little egret , *Egretta garzetta*, West Mediterranean	54 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , *Philomachus pugnax*, Europe/W Africa	23 individuals, representing an average of 3.2% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , *Tringa nebularia*, Europe/W Africa	38 individuals, representing an average of 6.3% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Common shelduck , *Tadorna tadorna*, NW Europe	1238 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)
Gadwall , *Anas strepera strepera*, NW Europe	359 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , *Anas clypeata*, NW & C Europe	288 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9-2002/3)
Water rail , *Ralhus aquaticus*, Europe	6 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , *Recurvirostra avosetta*, Europe/Northwest Africa	607 individuals, representing an average of 17.8% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , *Tringa erythropus*, Europe/W Africa	6 individuals, representing an average of 4.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site:

Invertebrates:

The endangered species *Bagous longitarsis* occurs on the site.

The following vulnerable species occur on the site: a groundbug *Henestaris halophilus*, a weevil *Bagous cylindrus*, a ground beetle *Polystichus connexus*, a cranefly *Erioptera bivittata*, a cranefly *Limnophila pictipennis*, a horse fly *Hybomitra expollicata*, a hoverfly *Lejops vittata*, a dancefly *Poecilobothrus ducalis*, a snail-killing fly *Pteromicra leucopeza*, a solitary wasp *Philanthus triangulum* and a damselfly *Lestes dryas*.

The following rare species occur on the site: a ground beetle *Anisodactylus poeciloides*, the water beetles *Aulacochthebius exaratus, Berosus fulvus, Cercyon bifenestratus, Hydrochus elongatus, H. ignicollis, Ochthebius exaratus* and *Hydrophilus piceus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, a fungus beetle *Telmatophilus brevicollis*, a fly *Campsicnemus magius*, a horsefly *Haematopota bigoti*, a soldier fly *Stratiomys longicornis* and a spider *Baryphyma duffeyi*.

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.

Aesthetic
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation
Scientific research
Sport fishing
Sport hunting
Tourism
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.	+	+
Private	+	+
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Fishing: commercial	+	
Fishing: recreational/sport	+	
Gathering of shellfish	+	
Bait collection	+	
Arable agriculture (unspecified)		+
Permanent arable agriculture		+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Permanent pastoral agriculture	+	+
Hunting: recreational/sport	+	
Industrial water supply		+
Industry		+
Sewage treatment/disposal	+	+
Harbour/port	+	+
Flood control	+	
Transport route	+	+
Urban development		+
Military activities	+	

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?
Dredging	1		+	+	+
Erosion	2		+		+
Eutrophication	2	Studies by the Environment Agency indicate that the waters in the Thames estuary are hyper-nutrified for nitrogen and phosphorus.	+	+	+
General disturbance from human activities	1		+		+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Erosion - The North Kent Coastal Habitat Management Plan (CHaMP) has been produced. The Environment Agency is producing a Flood Defence Strategy for the Thames (Thames 2100) and decisions on future flood risk management will need to take into account the effects on features within the designated sites.
Studies of sediment transport and hydrodynamics within Thames estuary. Investigation of beneficial use of dredgings for mudflat recharge and creation of compensatory habitat.

Eutrophication - Water quality and sources of nutrient inputs are subject to further investigation by the Environment Agency as part of the Agency's review of consents under the Habitats Regulations. Stage 3 of the Review of Consents (appropriate assessment) is scheduled for completion by March 2006, at which point any consented discharges having an adverse effect on site integrity will be identified.

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)	+	
Special Protection Area (SPA)	+	

Land owned by a non-governmental organisation for nature conservation	+	+
Management agreement	+	
Site management statement/plan implemented	+	
Environmentally Sensitive Area (ESA)	+	+

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.
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 and Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Numbers of breeding waders have been monitored through the BTO/RSPB/English Nature/Defra survey Breeding Waders of Wet Meadows (2002).
Botanical surveys of vegetation of sea wall embankments and grazing marsh ditches have been carried out.
The distribution and extent of saltmarsh habitat has been mapped - North Kent Marshes Saltmarsh Survey (2002) (Blair-Myres 2003)
The RSPB monitors various species groups on its reserves within the site

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 RSPB manages a network of reserves within and adjacent to the site, which are promoted locally through existing community initiatives, and more widely through publications and via the internet. The site forms part of proposals for a north Kent 'Regional Park', being promoted to balance development in Kent Thameside (part of the Thames Gateway growth area). The Management Guidance for the Thames Estuary aims to increase awareness of conservation and is promoted by the Thames Estuary Partnership. The Thames Estuary Partnership has also produced the Tidal Thames Habitat Action Plan to raise awareness of and address biodiversity issues.

31. Current recreation and tourism:
State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.
Yachting, angling, wildfowling, jet-skiing, water-skiing and birdwatching. Bird watching occurs throughout the year and wildfowling is restricted to the period September to February. The remaining activities occur year-round but are more prevalent in the summer months. Disturbance from these activities is a current issue but is being addressed through further research, negotiation and information dissemination.

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

Appendix B Screening and integrity matrices

Evidence for likely significant effects on their qualifying features is detailed within the footnotes to the screening matrices below.

Matrix Key:

✓ = Likely significant effect cannot be excluded until further studies carried out

× = Likely significant effect can be excluded

C = construction

O = operation

Where effects are not applicable to a particular feature they are greyed out. Note that decommissioning effects are only likely if the functionally linked land supports birds from the Thames Estuary and Marshes SPA, which is not considered to be the case.

Matrix 1 – Screening of Likely Significant Effects: The Thames Estuary and Marshes SPA

Name of European Site	**The Thames Estuary and Marshes Special Protection Area**																			
EU Code	**UK9012021**																			
Distance to Proposal site	**1.02 km**																			
European site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance - noise		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Annex 1 Species Regularly Wintering in Numbers of European Importance - Avocet	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Annex 1 Species Regularly Wintering in Numbers of European Importance – Hen Harrier	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory species regularly occurring on passage – Ringed plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Wintering species regularly occurring in internationally-important numbers over winter –Grey Plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Dunlin	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Name of European Site	**The Thames Estuary and Marshes Special Protection Area**																		
EU Code	**UK9012021**																		
Distance to Proposal site	**1.02 km**																		
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Knot	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Black-tailed Godwit	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Redshank	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Regularly supporting over 20,000 waterfowl over winter	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is over 1 km from the designated area boundary (para 5.1.4)..
b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction or operation (para 5.1.12 - 5.1.15).
c.	The site is set back inland and is considered to be an area benefiting from defences (EA, 2018). It is over 1 km from the Thames Estuary & Marshes SPA. No loss of land for managed realignment is therefore anticipated (para 5.1.16 - 5.1.23).

Code in Matrix above	Evidence supporting conclusions
d.	The built development (the main buildings) is 2.62 km from the visible part of the intertidal area within the Thames Estuary and Marshes SPA which supports populations of waterbirds. There is therefore no potential for the development to overshadow any of the habitats for which the SPA has been designated. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (para 5.1.20)
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have a LSE. The boundary of the SPA site is 1 km to the east of the proposal site and therefore no likely significant effect is predicted on any interest feature (para 5.1.28 - 5.1.31).
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.34 - 5.1.39).
g.	The proposal site is currently drained via a series of ditches which will need to be modified and areas of hardstanding and buildings introduced. Therefore, without mitigation hydrological changes to the ditches that feed eventually into the SPA or areas which supports SPA species cannot be discounted at the screening stage (para 5.1.48 - 5.1.50).
h.	The proposal site is currently drained via a series of ditches, which ultimately drain into the Thames Estuary and Marshes SPA & Ramsar Therefore, without mitigation, water quality changes to the ditches that feed eventually into the SPA or areas which supports SPA species cannot be discounted at the screening stage (para 5.1.43 - 5.1.45).
i.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.53 - 5.1.68).
j.	There are no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 2 – Screening of Likely Significant Effects: The Thames Estuary and Marshes Ramsar

Name of European Site	**The Thames Estuary and Marshes Ramsar Site**																			
Ramsar Code:	**UK11069**																			
Distance to Proposal site	**1.02 km**																			
Ramsar site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance - noise		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Ramsar Criterion 2 - Nationally rare and scarce plant species	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 2 - Red Data Book invertebrates	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 5 – Overwinter assemblage of international importance	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Ringed Plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Knot	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Name of European Site	**The Thames Estuary and Marshes Ramsar Site**																		
Ramsar Code:	**UK11069**																		
Distance to Proposal site	**1.02 km**																		
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Dunlin	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Ringed plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Dark-bellied brent goose	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Shelduck	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly occurring on passage in Numbers of International Importance – Grey plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Name of European Site	**The Thames Estuary and Marshes Ramsar Site**																		
Ramsar Code:	**UK11069**																		
Distance to Proposal site	**1.02 km**																		
Ramsar Criterion 6 - Species Regularly occurring on passage in Numbers of International Importance – Redshank	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is over 1km from the designated area boundary. (para 5.1.4 - 5.1.9).
b.	Given the distance from the Ramsar, the DCO application will result in no change to current management regimes of any supporting habitat of the Ramsar site during either the construction or operation (para 5.1.12 - 5.1.15).
c.	The site is set back inland and is considered to be an area benefiting from defences (EA, 2018). It is over 1km from the Thames Estuary & Marshes Ramsar. No loss of land for managed realignment is therefore anticipated (para 5.1.17 - 5.1.18).
d.	The proposed building is 2.62 km from the visible part of the intertidal area within the Thames Estuary and Marshes Ramsar site which supports populations of waterbirds. There is therefore no potential for the development to overshadow any of the habitats for which the Ramsar has been designated. No likely significant effect on any interest feature from increased urbanisation is therefore predicted (para 5.1.20 - 5.1.24).
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have an LSE. The boundary of the Ramsar site is 1 km to the east of the Proposal Site and therefore no likely significant effect is predicted on any interest feature (para 5.1.28 -5.1.31).
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.34 - 5.1.39).
g.	The Proposal site is currently drained via a series of ditches which will need to be modified and areas of hardstanding and buildings introduced. Therefore, without mitigation hydrological changes to the ditches that feed eventually into the Ramsar or areas which supports Ramsar species cannot be discounted at the screening stage (para 5.1.48 - 5.1.49).
h.	The Proposal site is currently drained via a series of ditches. Therefore, without mitigation water quality changes to the ditches that feed eventually into the Ramsar site or areas which supports Ramsar species cannot be discounted at the screening stage (para 5.1.43 - 5.1.45).
i.	Given the distance between the proposal site and the Ramsar site, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.53 - 5.1.68).
j.	The no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 3 – Screening Matrix Screening of Likely Significant Effects: Medway Estuary and Marshes SPA

Name of European Site	**Medway Estuary and Marshes SPA**																			
EU Code	UK9012031																			
Distance to Proposal site	**11.5 km south-east**																			
European site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance - noise		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Regularly supporting more than 1% of the GB breeding population of an Annex 1 species in summer – **Avocet**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Regularly supporting more than 1% of the GB breeding population of an Annex 1 species in summer – **Little tern**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Annex 1 Species Regularly Wintering in Numbers of European Importance - **Avocet**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Annex 1 Species Regularly on Passage in Numbers of European Importance – **Grey Plover**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Annex 1 Species Regularly on Passage in Numbers of European Importance – **Common Redshank**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Name of European Site	**Medway Estuary and Marshes SPA**																			
EU Code	UK9012031																			
Distance to Proposal site	**11.5 km south-east**																			
Migratory Species Regularly Wintering in Numbers of European Importance - **Dark-bellied Brent Goose**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Species Regularly Wintering in Numbers of European Importance - **Shelduck**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Species Regularly Wintering in Numbers of European Importance - **Pintail**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Species Regularly Wintering in Numbers of European Importance - **Ringed plover**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Species Regularly Wintering in Numbers of European Importance - **Knot**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Species Regularly Wintering in Numbers of European Importance - **Dunlin**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Regularly supports in winter a diverse assemblage of wintering species	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Regularly supports over 20,000 waterfowl	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Diverse assemblage of breeding migratory waterfowl	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is 11.5km from the designated area boundary. (para 5.1.4 - 5.1.5).
b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction or operation (para 5.1.14).
c.	The SPA is 11.5 km from the application boundary, and therefore, no LSE arising from managed realignment are considered (para 5.1.17 - 5.1.18).
d.	The SPA is at a considerable distance from the DCO application site, and therefore, no LSE are predicted from increased urbanisation (para 5.1.25).
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have an LSE. The boundary of the SPA is 11.5 km to the south of the Proposal Site and therefore no likely significant effect is predicted on any interest feature (para 5.1.28 - 5.1.31).
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.40).
g.	The SPA is a minimum of 11.5 km from the DCO application boundary and is not linked to the site via any ecological or hydrological pathways; therefore, no impacts are anticipated (para 5.1.51).
h.	The SPA is a minimum of 11.5 km from the DCO application boundary and is not linked to the site via any ecological or hydrological pathways; therefore, no changes to water quality are anticipated (para 5.1.46).
i.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.60, 5.1.68).
j.	There are no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 4 – Screening Matrix Screening of Likely Significant Effects: Medway Estuary and marshes RAMSAR

Name of European Site	**Medway Estuary and Marshes RAMSAR**																			
Ramsar Code:	**UK11040**																			
Distance to Proposal site	**11.5 km south-east**																			
Ramsar site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance - noise		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Ramsar Criterion 2 - **Nationally rare and scarce plant species**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 2 - **Red Data Book invertebrates**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 5 – **Overwinter assemblage of international importance**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Regularly on Passage in Numbers of International Importance – **Grey Plover**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly on Passage in Numbers of International Importance – **Common Redshank**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Name of European Site	**Medway Estuary and Marshes RAMSAR**																		
Ramsar Code:	**UK11040**																		
Distance to Proposal site	**11.5 km south-east**																		
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Dark-bellied Brent Goose**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Shelduck**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance – **Pintail**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Ringed plover**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Knot**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Regularly Wintering in Numbers of International Importance - **Dunlin**	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is 11.5km from the designated area boundary. (para 5.1.4).

b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction or operation (para 5.1.14).
c.	The SPA is 11.5 km from the application boundary, and therefore, no LSE arising from managed realignment are considered (para 5.1.16).
d.	The SPA is at a considerable distance from the DCO application site, and therefore, no LSE are predicted from increased urbanisation (para 5.1.25).
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have an LSE. The boundary of the SPA is 11.5 km to the south of the Proposal Site and therefore no likely significant effect is predicted on any interest feature (para 5.1.31).
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.40).
g.	The SPA is a minimum of 11.5 km from the DCO application boundary and is not linked to the site via any ecological or hydrological pathways; therefore, no impacts are anticipated (para 5.1.51).
h.	The SPA is a minimum of 11.5 km from the DCO application boundary and is not linked to the site via any ecological or hydrological pathways; therefore, no changes to water quality are anticipated (para 5.1.46).
i.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.60, 5.1.68).
j.	There are no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 5 – Screening of Likely Significant Effects: North Downs Woodland SAC

Name of European Site	**North Downs Woodland Special Area of Conservation**																			
EU Code	**UK0030225**																			
Distance to Proposal site	**10.35 km**																			
European site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality - dust		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	N/A	O	C	O	C	O	C	O	C	O
Annex 1 habitats qualifying feature: *Asperulo-Fagetum* beech forests	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Annex 1 habitats qualifying feature: *Taxus baccata* woods of the British Isles (priority feature)	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Annex 1 habitats qualifying feature: Semi-natural dry grasslands & scrubland facies on calcareous substrates (*Festuo-Brometalia*) – important orchid sites	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is over 10 km from the designated area boundary. (para 5.1.4).
b.	Given the distance from the SAC, the DCO application will result in no change to current management regimes of any supporting habitat of the SAC site during either the construction or operation (para 5.1.14).
c.	The SAC is 10.4 km from the application boundary, and therefore, no LSE arising from managed realignment are considered (para 5.1.16).
d.	The SAC is at a considerable distance from the DCO application site, and therefore, no LSE are predicted from increased urbanisation (para 5.1.25).
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have an LSE. The boundary of the SAC site is 10.4 km to the south of the Proposal Site and therefore no likely significant effect is predicted on any interest feature (para 5.1.31).
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.40).
g.	The SAC is a minimum of 10km from the DCO application boundary, and is not linked to the site via any ecological or hydrological pathways; therefore, no impacts are anticipated (para 5.1.51)
h.	The SAC is a minimum of 10km from the DCO application boundary, and is not linked to the site via any ecological or hydrological pathways; therefore, no changes to water quality are anticipated (para 5.1.46)
i.	Given the distance between the proposal site and the SAC, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.60, 5.1.68).
j.	The no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 6 – Screening Matrix Screening of Likely Significant Effects: Benfleet and Southend Marshes SPA

Name of European Site	**Benfleet and Southend Marshes Special Protection Area**																			
EU Code	**UK9009171**																			
Distance to Proposal site	**14.9km north-east**																			
European site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance - noise		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Migratory species regularly occurring on passage – Ringed plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Wintering species regularly occurring in internationally-important numbers over winter –Grey Plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Dunlin	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Knot	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Regularly supporting over 20,000 waterfowl over winter	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is 14.9km from the designated area boundary. (para 5.1.4).
b.	Given the distance from the SPA, the DCO application will result in no change to current management regimes of any supporting habitat of the SPA during either the construction or operation (para 5.1.14).
c.	The SPA is 14.9 km from the application boundary, and therefore, no LSE arising from managed realignment are considered (para 5.1.16)
d.	The SPA is at a considerable distance from the DCO application site, and therefore, no LSE are predicted from increased urbanisation (para 5.1.25).
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have an LSE. The boundary of the SPA site is 14.9 km to the south of the Proposal Site and therefore no likely significant effect is predicted on any interest feature (para 5.1.31)
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.42).
g.	The SPA is a minimum of 14.9 km from the DCO application boundary, and is not linked to the site via any ecological or hydrological pathways; therefore, no impacts are anticipated (para 5.1.51)
h.	The SPA is a minimum of 14.9 km from the DCO application boundary, and is not linked to the site via any ecological or hydrological pathways; therefore, no changes to water quality are anticipated (para 5.1.46)
i.	Given the distance between the proposal site and the SPA, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.60, 5.1.68).
j.	The no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 7 – Screening Matrix Screening of Likely Significant Effects: Benfleet and Southend Marshes RAMSAR

Name of European Site	**Benfleet and Southend Marshes RAMSAR**																			
Ramsar Code:	**UK11006**																			
Distance to Proposal site	**14.9 km north-east**																			
Ramsar site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance - noise		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Ramsar Criterion 2 - Red Data Book invertebrates	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Name of European Site	**Benfleet and Southend Marshes RAMSAR**																		
Ramsar Code:	**UK11006**																		
Distance to Proposal site	**14.9 km north-east**																		
Ramsar Criterion 5 – Overwinter assemblage of international importance	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Dunlin	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Dark-bellied brent goose	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly occurring on passage in Numbers of International Importance – Grey plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j
Ramsar Criterion 6 - Species Regularly occurring on passage in Numbers of International Importance – Redknot	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is 14.9km from the designated area boundary. (para 5.1.4).
b.	Given the distance from the Ramsar, the DCO application will result in no change to current management regimes of any supporting habitat of the Ramsar during either the construction or operation (para 5.1.14).
c.	The Ramsar is 14.9 km from the application boundary, and therefore, no LSE arising from managed realignment are considered (para 5.1.16).
d.	The Ramsar is at a considerable distance from the DCO application site, and therefore, no LSE are predicted from increased urbanisation (para 5.1.25).
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have an LSE. The boundary of the Ramsar site is 14.9 km to the south of the Proposal Site and therefore no likely significant effect is predicted on any interest feature (para 5.1.31).
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.42).
g.	The Ramsar is a minimum of 14.9 km from the DCO application boundary and is not linked to the site via any ecological or hydrological pathways; therefore, no impacts are anticipated (para 5.1.51).
h.	The Ramsar is a minimum of 14.9 km from the DCO application boundary, and is not linked to the site via any ecological or hydrological pathways; therefore, no changes to water quality are anticipated (para 5.1.46).
i.	Given the distance between the proposal site and the Ramsar site, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.60, 5.1.68).
j.	The no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 8 – Screening Matrix Screening of Likely Significant Effects: Peter's Pit SAC

Name of European Site	**Peter's Pit Special Area of Conservation**																			
EU Code	**UK0030237**																			
Distance to Proposal site	**14.7 km south**																			
European site features	Direct loss or damage of habitats used by interest species		Change in Habitat Management Regime		Loss of future space to allow for managed realignment		Urbanisation		Air quality - dust		Air quality – operational emissions		Hydrological Changes		Water quality		Disturbance		Introduction or spread of non-native invasive species	
	C	O	C	O	C	O	C	O	C	O	N/A	O	C	O	C	O	C	O	C	O
Annex II species that are a primary reason for site	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	N/A	×f	✓g	✓g	✓h	✓h	×i	×i	×j	×j

selection: 1166 Great crested Newt																			

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	No likely significant effect from direct loss of habitat on any interest feature. The Proposal Site is 14.7 km from the designated area boundary. (para 5.1.4).
b.	Given the distance from the SAC, the DCO application will result in no change to current management regimes of any supporting habitat of the SAC during either the construction or operation (para 5.1.14).
c.	The SAC is 14.7 km from the application boundary, and therefore, no LSE arising from managed realignment are considered (para 5.1.16).
d.	The SAC is at a considerable distance from the DCO application site, and therefore, no LSE are predicted from increased urbanisation (para 5.1.25).
e.	It is anticipated that the majority of dust generated during construction would be deposited in the area immediately surrounding the source (up to 50 metres away) and that construction and operational traffic are far enough away from the designated site not to have an LSE. The boundary of the SAC is 14.7 km to the south of the Proposal Site and therefore no likely significant effect is predicted on any interest feature (para 5.1.31).
f.	No likely significant effects from operational emissions are predicted on any interest feature or supporting habitat as all process contributions are <1% and/or the predicted environmental concentration is less than the Environmental Quality Standard (para 5.1.41).
g.	The SAC is a minimum of 14.7 km from the DCO application boundary and is not linked to the site via any ecological or hydrological pathways; therefore, no impacts are anticipated (para 5.1.51)
h.	The SAC is a minimum of 14.7 km from the DCO application boundary, and is not linked to the site via any ecological or hydrological pathways; therefore, no changes to water quality are anticipated (para 5.1.46).
i.	Given the distance between the proposal site and the SAC, no likely significant effect on any interest feature is predicted from disturbance, construction noise or operational noise (para 5.1.60, 5.1.68).
j.	The no non-native invasive species currently known to be in the area. No final planting is proposed that could inadvertently import non-native invasive to site, as such no likely significant effect is predicted (para 5.1.70 - 5.1.71).

Matrix 9 – Integrity matrices: The Thames Estuary and Marshes SPA

Name of European Site	**The Thames Estuary and Marshes Special Protection Area**						
EU Code	**UK9012021**						
Distance to Proposal site	**1.02 km**						
European site features	Hydrological Changes		Water quality		Decommissioning	In-combination effects	
	C	O	C	O		C	O
Annex 1 Species Regularly Wintering in Numbers of European Importance - Avocet	×a	×a	×b	×b	×c	×c	×d

Name of European Site	**The Thames Estuary and Marshes Special Protection Area**						
EU Code	**UK9012021**						
Distance to Proposal site	**1.02 km**						
Annex 1 Species Regularly Wintering in Numbers of European Importance – Hen Harrier	×a	×a	×b	×b	×c	×d	×d
Migratory species regularly occurring on passage – Ringed plover	×a	×a	×b	×b	×c	×d	×d
Migratory Wintering species regularly occurring in internationally-important numbers over winter –Grey Plover	×a	×a	×b	×b	×c	×d	×d
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Dunlin	×a	×a	×b	×b	×c	×d	×d
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Knot	×a	×a	×b	×b	×c	×d	×d
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Black-tailed Godwit	×a	×a	×b	×b	×c	×d	×d
Migratory Wintering species regularly occurring in internationally-important numbers over winter – Redshank	×a	×a	×b	×b	×c	×d	×d
Regularly supporting over 20,000 waterfowl over winter	×a	×a	×b	×b	×c	×d	×d

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	A site-wide surface water management system will be developed to balance water flows and prevent the discharge beyond existing green field rates from the site. The overall philosophy for the design of the surface water system for the site is to manage surface water sustainably and to ensure that discharged waters do not constitute a flood risk. The volume of water discharged will not be any higher than the levels of that which currently exist. Therefore, a conclusion of no adverse effect on integrity can be reached, once this mitigation is included (para 6.3.2).
b.	A site-wide surface water pollution prevention system will be developed to prevent the discharge of any contaminated surface water from the site. The overall philosophy for the design of the surface water pollution prevention system for the site is to manage surface water sustainably and to ensure that discharged waters do not constitute a pollution risk. Therefore, a conclusion of no adverse effect on integrity can be reached, once this mitigation is included (para 6.2.3 - 6.2.7)
c.	Decommissioning of TFGP will overlap with the operational phases of Tilbury2 and LTC. In that situation, there may be some limited potential for additional disturbance to species in the local area from decommissioning works combined with disturbance from traffic and other operations associated with both developments. However, it is not considered that this would give rise to effects of a magnitude or significance greater than that assessed for TFGP alone and no likely significant effects are therefore predicted.
d.	In terms of potential additional effects for overlapping construction, the assessment of noise levels indicate that even in the maximum design scenario of percussive piling for TFGP construction, noise levels from this activity would not give rise to significantly elevated noise levels at the Thames Estuary and Marshes SPA. Therefore, impacts occurring from cumulative noise effects can be screened out, as no likely significant effects are anticipated on the Thames Estuary and Marshes SPA. There is potential for cumulative air quality impacts in the max development scenario, resulting from the additional traffic generated by developments and aerial emissions from the RWE power station proposal. This will be assessed in the final HRAR.

Matrix 10 – Integrity matrices: The Thames Estuary and Marshes Ramsar Site

Name of European Site	**The Thames Estuary and Marshes Ramsar Site**						
Ramsar Code:	**UK11069**						
Distance to Proposal site	**1.02km**						
European site features	Hydrological Changes		Water quality		Decommissioning	In-combination effects	
	O	O	O	C		O	C
Ramsar Criterion 2 - Nationally rare and scarce plant species	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 2 - Red Data Book invertebrates	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 5 – Overwinter assemblage of international importance	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Ringed Plover	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Knot	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Dunlin	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Ringed plover	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Dark-bellied brent goose	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly Wintering in Numbers of International Importance - Shelduck	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly occurring on passage in Numbers of International Importance – Grey plover	×a	×a	×b	×b	×c	×d	×d
Ramsar Criterion 6 - Species Regularly occurring on passage in Numbers of International Importance – Redshank	×a	×a	×b	×b	×c	×d	×d

Evidence supporting conclusions

Code in Matrix above	Evidence supporting conclusions
a.	A site-wide surface water management system will be developed to balance water flows and prevent the discharge beyond existing green field rates from the site. The overall philosophy for the design of the surface water system for the site is to manage surface water sustainably and to ensure that discharged waters do not constitute a flood risk. The volume of water discharged will not be any higher than the levels of that which currently exist. Therefore, a conclusion of no adverse effect on integrity can be reached, once this mitigation is included (para 6.3.2).

b.	A site-wide surface water pollution prevention system will be developed to prevent the discharge of any contaminated surface water from the site. The overall philosophy for the design of the surface water pollution prevention system for the site is to manage surface water sustainably and to ensure that discharged waters do not constitute a pollution risk. Therefore, a conclusion of no adverse effect on integrity can be reached, once this mitigation is included (para 6.2.3 - 6.2.7).
c.	Decommissioning of TFGP will overlap with the operational phases of Tilbury2 and LTC. In that situation, there may be some limited potential for additional disturbance to species in the local area from decommissioning works combined with disturbance from traffic and other operations associated with both developments. However, it is not considered that this would give rise to effects of a magnitude or significance greater than that assessed for TFGP alone and no likely significant effects are therefore predicted.
d.	In terms of potential additional effects for overlapping construction, the assessment of noise levels indicate that even in the maximum design scenario of percussive piling for TFGP construction, noise levels from this activity would not give rise to significantly elevated noise levels at the Thames Estuary and Marshes SPA. Therefore, impacts occurring from cumulative noise effects can be screened out, as no likely significant effects are anticipated on the Thames Estuary and Marshes SPA. There is potential for cumulative air quality impacts in the max development scenario, resulting from the additional traffic generated by developments and aerial emissions from the RWE power station proposal. This will be assessed in the final HRAR