

The Lake Lothing (Lowestoft) Third Crossing Order 201[*]



Lake Lothing
**THIRD
CROSSING**

Document SCC/LLTC/EX/26: Environmental Statement Chapter 11 - Clean Revision 1

Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure)
Regulations 2009

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11 Nature Conservation

11.1 Scope of the Assessments

Introduction

11.1.1 This updated chapter 11 of the Environmental Statement describes the assessment of the likely significant effects of the Scheme on biodiversity and nature conservation during the construction and operational. It is supported by Figures 11.1 to 11.7 (APP-150) and Appendices 11A to 11G (APP-183 to APP-189).

11.1.2 The assessment of this topic area considers potential impacts relating to the following aspects:

- Statutory and non-statutory designated sites;
- Important or protected habitats; and
- Legally protected species and/or species of conservation importance.

11.1.3 The assessment has incorporated the comments of the Secretary of State (SoS) presented in the Scoping Opinion included in Appendix 6B, as well as those received during the S42 consultation. The assessment should be read in conjunction with Chapter 8: Air Quality; Chapter 12: Geology and Soils, Chapter 13: Noise and Vibration, Chapter 17: Road Drainage and the Water Environment and Chapter 19: Traffic and Transport.

11.1.4 This chapter been updated to respond to comments made by the Marine Management Organisation (MMO) in their Relevant Representation and Section 51 advice from the Planning Inspectorate.

Study area

11.1.5 The study area for the assessment has been defined at the following three different levels to capture information that is pertinent to different aspects of the assessment. They have been informed by legislation and guidance (see Section 11.2 below);

- **Main Study Area**– 500m from the Order limits. This study area has been used for assessing habitats and suitability for protected species that could be significantly impacted by the Scheme. The extent of this study area has been defined following surveys of the Order limits and surrounding land carried out as part of the PEA and following the recommendations of that PEA (Figure 11.1);
- **Broad Study Area**– 2km from the Order limits. This study area has been used for biological records from data searches. A larger study area than the Main Study Area is appropriate to capture further baseline data to determine if further assessment on species is appropriate (Figure 11.1); and
- **Extended Study Area**– 30km from the Order limits, in order to take into account internationally important sites of interest. The extent of this study area is informed by guidance within the DMRB for what is an appropriate distance to consider the effects upon internationally important sites (Figure 11.2).

11.1.6 The survey areas that have been used, along with sampling sites for surveys targeting particular species are shown in Figures 11.3 to 11.6. It should be noted that survey areas for particular species are specific to that species and is limited to the suitable habitat that is present further to the findings of the PEA.

11.2 Directives, Statutes and Relevant Policy

11.2.1 Ecological features receive protection through legislation and planning policy. Legislation and planning policy relevant to the Scheme have been identified following a determination of ecological receptors relevant to the Scheme following completion of the surveys that have been carried out.

11.2.2 The assessment has been compiled with reference to the following relevant nature conservation legislation, planning policy and the UK Biodiversity Framework from which the protection of sites, habitats and species is derived in England.

The Conservation of Habitats and Species Regulations (Habitats Regulations) 2010 (as amended)

11.2.3 The EC Habitats Directive and EC Birds Directive are transposed into UK law via the Conservation of Habitats and Species Regulations 2010 (as amended), referred to as the Habitats Regulations. All species listed under Annex IV of the Habitats Directive require strict protection and are known as European Protected Species (EPS). Certain EPS are also listed under Annex II of the Habitats Directive and are afforded protection by the establishment of core areas of habitat known as Special Areas of Conservation (SAC). This means these species are a relevant consideration in a Habitats Regulations Assessment (HRA).

11.2.4 The Birds Directive seeks to maintain populations of all wild bird species across their natural range (Article 2). All bird species listed under Annex I of the Birds Directive are rare or vulnerable and afforded protection by the classification of Special Protection Areas (SPAs), these are also designated under all regularly occurring migratory species, with regard to the protection of wetlands of international importance (Article 4). This means these bird species and communities are a relevant consideration in HRA. Impacts on these sites are considered separately in the updated HRA Report Revision 2 (document reference SCC/LLTC/EX/43).

The Wildlife and Countryside Act (WCA) 1981 (as amended)

11.2.5 Under the WCA (England and Wales) all birds, their nests and eggs (with exception of species listed under Schedule 2) are protected by the WCA. It is an offence to intentionally kill, injure, or take any wild bird, their eggs or to damage or destroy the nest of any wild bird (whilst being built, or in use).

11.2.6 Species listed on Schedule 5 of the WCA, which includes species of reptile native to the UK, gives either full or partial protection against the killing, injuring or taking, the possession or control of individuals (live or dead) and the damage, destruction, disturbance or obstruction of places of shelter or protection.

11.2.7 Schedule 9 of the WCA also makes provision for the control of invasive species and makes it illegal to cause such plants to grow in the wild.

11.2.8 In addition the WCA makes it an offence (subject to exceptions) to pick, uproot, trade in, or possess (for the purposes of trade) any wild plant listed in Schedule 8, and prohibits the unauthorised intentional uprooting of such plants.

Countryside Rights of Way (CRoW) Act 2000

11.2.9 The CRoW Act has amended the WCA in England and Wales strengthening the protection afforded to Sites of Special Scientific Interest (SSSI) and the legal protection for threatened species. It adds the word 'reckless' to the wording of the offences listed under Section 9(4) of the WCA. This alteration makes it an offence to recklessly commit an offence, where previously an offence had to be intentional to result in a breach of legislation.

The Natural Environment and Rural Communities (NERC) Act 2006

11.2.10 Species and Habitats of Principal Importance in England and Wales are listed under Section 41 and Section 42 respectively of the NERC Act. The Section 41 and 42 lists detail species that are of principal importance for the conservation of biodiversity in England and Wales, and should be used to guide decision-makers such as local and regional authorities when implementing their duty to have regard for the conservation of biodiversity in the exercise of their functions.

The Wild Mammals (Protection) Act 1996

11.2.11 The Wild Mammals Act is an anti-cruelty legislation which makes it an offence to intent to inflict unnecessary suffering on a wild mammal through such acts as mutilation, beating or drowning.

The UK Post-2010 Biodiversity Framework (2011-2020) (JNCC and DEFRA, 2012)

11.2.12 This Framework lists the UK's most threatened species and habitats and sets out targets and objectives for their management and recovery. The UK Biodiversity Action Plan (BAP) process is delivered nationally, regionally and locally and should be used as a guide for decision-makers to have regard for the targets set by the framework and the goals they aim to achieve. The UK BAP has now been replaced by the UK Post-2010 Biodiversity Framework, however, it contains useful information on how to characterise important species assemblages and habitats which is still relevant (UK Post-2010 Biodiversity Framework, 2012).

Biodiversity 2020: A strategy for England's wildlife and ecosystem services (DEFRA, 2011)

11.2.13 This document provides a strategy on the implementation of international legislation and provides a strategic plan for biodiversity policy for terrestrial, aquatic and marine habitats.

The National Policy Statement for National Networks

11.2.14 The National Policy Statement for National Networks (NNNPS) sets out the need for, and Government's policies to deliver, development of nationally significant infrastructure projects on the national road and rail networks in England. It provides the basis for the examination by the Examining Authority and for the primary decision making process by the Secretary of State.

11.2.15 The NNNPS requires an ES to clearly set out likely significant effects on ecological receptors and to show how a project has taken advantages of opportunities to

conserve and enhance biodiversity, referring to the measures set out in the Biodiversity 2020 Strategy (see Paragraph 11.2.13).

11.2.16 Paragraph 5.23 of the NNNPS also states that an applicant should demonstrate how an application has taken the opportunity to conserve and enhance biodiversity. Paragraph 5.25 of the NNNPS also requires applicants for development consent to, as a general principle, avoid significant harm to biodiversity in the construction and operation of a Nationally Significant Infrastructure Project.

National Policy Statement for Ports

11.2.17 The National Policy Statement for Ports (PNPS) sets out the Government's strategy for new port infrastructure to meet current and future needs. It determines the approach planning decision-makers should take with respect to ports and port infrastructure proposals.

11.2.18 The PNPS requires an ES to investigate the effects of the project on marine ecology, biodiversity and protected sites, and to take into account discharges to water and physical modifications of the water environment that may affect ecological resources. Consideration should be made of the effects of noise on sensitive marine resources and the Environment Agency, Natural England and the Marine Management Organisation should be consulted as necessary.

11.2.19 In Paragraph 5.1.22 the PNPS states that capital dredging requirements will need to be subject to assessment within the ES.

East Inshore and East Offshore Marine Plan

11.2.20 This Marine Plan includes policies that are relevant to the consideration of the effects of a project upon the marine environment.

11.2.21 Policy BIO1 states that "Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole..."

The National Planning Policy Framework (NPPF) 2012 (DCLG, 2012)

11.2.22 National planning policy on the protection of biodiversity is set out in the NPPF. The NPPF requires that impacts on biodiversity are minimised and projects provide net gains in biodiversity where possible and opportunities to incorporate biodiversity in and around developments should be encouraged.

UK Biodiversity Action Plan (UKBAP)³³

11.2.23 The UKBAP detailed the important species and habitats of the UK and provided implementable plans for the conservation of those resources which aimed to conserve and where necessary, aid in their recovery.

Suffolk Biodiversity Action Plan (2012)

11.2.24 The Suffolk Biodiversity Action Plan identifies objectives and targets to promote and protect biodiversity within the county during the development planning process.

³³ The UK BAP has now been replaced by the UK Post-2010 Biodiversity Framework, however, it contains useful information on how to characterise important species assemblages and habitats which is still relevant.

11.3 Methods of Assessment

11.3.1 The assessments have been based on the methods outlined in the following guidance:

- The DMRB Volume 11, Section 3, Part 4 Ecology and Nature Conservation;
- IAN 130/10 – Ecology and Nature Conservation: Criteria for Impact Assessment, Highways Agency (2010);
- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland published by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2016); and
- Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal published by Chartered Institute of Ecology and Environmental Management (CIEEM) (2010).

11.3.2 Establishment of the baseline environment for nature conservation has involved a review of the existing information relating to designated and non-designated sites, habitats and fauna and consultation with Suffolk County Council (SCC) and Natural England including discussion of which ecologically important sites are to be included within the assessment.

11.3.3 During the course of the Preliminary Ecological Appraisal (PEA) (see Appendix 11A) which included a repeat Phase 1 Survey that was carried out for the Scoping Report (Appendix 6A), assessments were made of the suitability of habitats within the Main Study Area for species that are protected by law or otherwise of particular nature conservation importance. Following the findings of these surveys further surveys have been carried out as shown in Table 11-4 to further inform the assessment. These are:

- Bat surveys;
- Reptile surveys;
- Breeding bird surveys;
- Black redstart breeding surveys;
- Wintering bird surveys;
- Terrestrial invertebrate survey;
- Benthic ecology survey; and
- Fish trawl survey.

11.3.4 The above surveys were discussed with Natural England and SCC on the 14th September 2016 and additional representation was made in the Scoping Opinion (Appendix 6B). Phase 2 National Vegetation Classification (NVC) surveys were recommended through the scoping process, but following the PEA and further liaison with Natural England, it was agreed that the information obtained from the original Phase 1 Habitat survey was sufficient due to the lack of priority habitats within the survey area. Impacts from the Scheme can be adequately addressed with the information presently gathered. Habitats that have greater importance due to supporting protected species will be assessed in terms of those species present.

- 11.3.5 A further meeting and site visit to discuss scope and progress with an SCC Ecologist from the Natural Environment Team occurred on the 19 June 2017. The purpose of this meeting was to discuss the Scheme and the surveys to date with a different SCC Ecologist to that who prepared the response to the Scoping Report (Appendix 6A). Additional bat and reptile surveys to those proposed in the Scoping Report were recommended as a result of this meeting. It was considered that all other ecological surveys that had already been undertaken, or were scheduled, was sufficient for the ES.
- 11.3.6 With regard to the marine surveys (benthic ecology survey and fish trawl survey) the scope and design of these were shared with the MMO and the EA prior to the survey taking place. Feedback and comments were incorporated into an amended methodology that was undertaken and is presented in Appendix 11F.
- 11.3.7 Assessment of the significance of impacts on sites, habitats and species is based on the guidance provided in the Guidelines for Ecological Impact Assessment. This defines the ecological value of identified assets based on their geographic influence, which ranges in definition from sites of international importance down to those within the local and immediate zone of influence of the Scheme. Only those assets with a geographic value at the local level or above have been subject to detailed assessment other than where receptors of lesser value are subject to some form of legal protection or can act in combination to lead to a cumulative impact. To that end, the determination of whether a significant effect is likely is a matter of professional judgement having considered a number of factors as to how the Scheme will interact with the baseline ecological environment.
- 11.3.8 Criteria relating to confidence, magnitude, extent, duration, reversibility and timing have been considered in combination with value to define impact significance. The Guidelines for Ecological Impact Assessment define a significant effect as '*an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features'*'. The assessments have accordingly using professional judgement and taken into account the composition and status of sites, habitats and species under consideration, including their importance relative to the geographical context and nature of the predicted impact to enable an evaluation of significance to be made.

Value

- 11.3.9 The value of ecological resources has been determined in accordance with guidance within IAN 130/10. This approach, with additions relevant to the Scheme is summarised in Table 11-1. In line with the advice provided by IAN 130/10, assigning value to an ecological resource relies on professional judgement by individuals with sufficient relevant experience.

Table 11-1 - Value of ecological resources

Value	Description
International or European Value	Natura 2000 sites including: Sites of Community Importance (SCIs); SPAs; potential SPAs (pSPAs); SACs; candidate or possible SACs (cSACs or pSACs); and Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves.

Value	Description
	<p>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.</p> <p>Resident, or regularly occurring, populations of species which may be considered at an International or European level where:</p> <ul style="list-style-type: none"> • The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • The population forms a critical part of a wider population at this scale; or • The species is at a critical phase of its life cycle at this scale.
UK or National Value	<p>Designated sites including: SSSIs; Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNRs).</p> <p>Areas which meet the published selection criteria eg JNCC (1998) for those sites listed above but which are not themselves designated as such.</p> <p>Areas of key/priority habitats identified in the UK BAP, including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity.</p> <p>Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory.</p> <p>Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:</p> <ul style="list-style-type: none"> • The loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • The population forms a critical part of a wider population at this scale; or • The species is at a critical phase of its life cycle at this scale.
Regional Value	<p>Areas of key/priority habitats identified in the Regional BAP (where available); areas of key/priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats (for example, South West Nature Map); and areas of key/priority habitat listed within the Highways Agency's BAP.</p> <p>Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within the HABAP where:</p> <ul style="list-style-type: none"> • The loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • The population forms a critical part of a wider population; or • The species is at a critical phase of its life cycle.
County or Unitary Authority Area Value	<p>Designated sites including: Sites of Nature Conservation Importance (SNCl)s; County Wildlife Sites (CWSs); and Local Nature Reserves (LNRs) designated in the county or unitary authority area context.</p> <p>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent). Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:</p> <ul style="list-style-type: none"> • The loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area; or • The population forms a critical part of a wider population; or • The species is at a critical phase of its life cycle.
Local Value	<p>Designated sites including: LNRs designated in the local context.</p> <p>Trees that are protected by Tree Preservation Orders (TPOs).</p>

Value	Description
	Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.
Negligible	Features or habitats that do not have an appreciable ecological value.

11.3.10 Table 11-2 shows the magnitude ratings that have been used in the assessment which is derived from IAN 130/10.

Table 11-2 –Magnitude of ecological impacts

Magnitude Category	Typical Descriptors of Impact (Nature conservation)
Very Large	A permanent and irreversible impact that will adversely impact on one or more receptor(s) of International, European, UK or National Value
Large	A permanent adverse or beneficial impact on one or more receptor(s) of Regional Value.
Moderate	A temporary or permanent adverse or beneficial impact on one or more receptor(s) of County or Unitary Authority Area Value.
Slight	A temporary or permanent adverse or beneficial impact on one or more receptor(s) of Local Value.
Neutral	No significant impacts on key nature conservation receptors.

11.3.11 Whether a potential impact or effect is 'significant' or not at the given geographical level that the receptor is valued at, is determined by quantifying the magnitude of effect on each of the receptors identified.

11.3.12 Thus for receptors of national or international value and high sensitivity, negative effects measured at high or very high magnitude are likely to represent a significant impact at that geographical scale. In development control terms, such impacts are very likely to conflict with planning policy. At the other end of the scale, minor magnitude effects on receptors of low sensitivity and only immediate local value are likely to be below significance thresholds, and to merit relatively low weight in planning decisions. Substantial effects on high value receptors that are of low sensitivity may fall either side of the significance threshold - in such cases further avoidance or mitigation may be able to be employed to ameliorate effects.

11.3.13 A key consideration is whether the 'integrity' of a site or ecosystem (e.g. the coherence of its structure and function) and/or the 'conservation status' of a species or habitat (e.g. the ability of a population/habitat to maintain itself at pre-development levels/quality) will be compromised.

11.3.14 Based on the findings of the assessments further mitigation relating to avoidance, reduction or compensation of impact have been identified prior to an evaluation of the consequent significant effects. For the purposes of the 2009 Regulations, a significant effect is deemed to be a moderate effect or greater.

11.4 Baseline Environment

11.4.1 A desk study, a Phase 1 Habitat survey, a PEA and surveys of particular species have been undertaken to identify changes to known biodiversity resources and include both designated and non-designated sites. Reports describing surveys of particular species are included in the following appendices:

- Desk study and Phase 1 Habitat survey; included in Appendix 6A as an annex to the scoping report;
- PEA; included in Appendix 11A;
- Bats; Appendix 11B;
- Wintering birds; Appendix 11D;
- Reptiles; Appendix 11E;
- Benthic ecology; Appendix 11F; and
- Terrestrial invertebrates; Appendix 11G.

11.4.2 The surveys have been undertaken with reference to the following guidance:

- TAG Unit A3 Chapters 5 and 9 (which also references DMRB Volume 11 Section 3 Part 4);
- 'Guidelines for Ecological Impact Assessment in the UK' (Chartered Institute for Ecological and Environmental Management (CIEEM), 2016);
- DMRB Volume 11 Section 4 Assessment of the Implications (of Highways and/or Road Projects) on European Sites (including Appropriate Assessment); and
- Bibby C., N. Burgess, D. Hill & S. Mustoe (2000). *Bird Census Techniques: 2nd edition*. Academic Press.

Desk-Based Studies

Nationally and Locally Designated Sites

11.4.3 The suite of desk-based studies undertaken to inform this assessment identified that there is one nationally designated site within the Broad Study Area of the Scheme. This is the Leathes Ham Local Nature Reserve (LNR) (Figure 4.2 and 11.1).

11.4.4 In the Scoping report (Appendix 6A) the following designated sites were identified as requiring consideration:

- The Broads SAC;
- Broadland SPA;
- Broadland Ramsar;
- Southern North Sea cSAC; and
- Outer Thames Estuary SPA and pSPA Extension.

11.4.5 In the Scoping Opinion (Appendix 6B) the following were also identified as worthy of consideration and this has informed the area of the Extended Study Area. These are

shown on Figure 11.2 alongside other internationally designated sites that are in closer proximity to the Scheme but have been agreed with Natural England as being out with the scope of the assessment.

- Alde-Ore Estuary SPA;
- Benacre to Easton Bavents SPA;
- Barnby Broad and Marshes SSSI;
- Sprat's Water and Marshes SSSI; and
- Carlton Colville SSSI.

11.4.6 LNRs are sites of local or district-wide importance, designated for the enjoyment, study or conservation of wildlife, geological features and landforms. Leathes Ham LNR is a freshwater lake with a mix of wooded and grassland habitat that is home to many bird species.

11.4.7 Gunton Warren LNR (shown on Figure 4.2) is a site displaying a range of coastal habitats from mobile shingle, to sand dunes and vegetated cliff slope, to lowland heath. Gunton Warren was originally excluded from the scope of the ecological assessment, due to the distance between it and the Scheme. However, the Air Quality assessment in Chapter 8 has identified likely significant effects upon this LNR and hence it has been included within this assessment.

11.4.8 Three County Wildlife Sites (CWS) exist within the Broad Study Area, namely:

- Brooke Yachts and Jeld Wen Mosaic County Wildlife Site;
- Kirkley Ham County Wildlife Site; and
- Outer Harbour County Wildlife Site.

11.4.9 Gunton Warren LNR Leathes Ham LNR and the three CWSs are identified on Figure 11.1.

Species Records

11.4.10 The review of existing records of species within the Broad Study Area of the Scheme has established records of brown long-eared bat *Plecotus auritus*, pipistrelle *Pipistrellus* sp., water vole *Arvicola amphibius*, grey seal *Halichoerus grypus* and common lizard *Zootoca vivipara* exist in the Broad Study Area.

11.4.11 Approximately 150 species of birds have been recorded within the Broad Study Area, including notable species such as barn owl *Tyto alba*, black redstart *Phoenicurus ochruros*, green sandpiper *Tringa ochropus*, hen harrier *Circus cyaneus*, kingfisher *Alcedo atthis*, little tern *Sternula albifrons*, peregrine *Falco peregrinus* and red throated diver *Gavia stellata*.

11.4.12 Biological records show several priority species (S41 NERC Act as amended) that have been recorded within the Broad Study Area. Species recorded include hedgehog *Erinaceus europaeus*, common toad *Bufo bufo*, common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris*. These species are afforded no formal protection within the UK but preservation of their biodiversity value is a relevant consideration in the planning phase.

The Suffolk County Biodiversity Action Plan

11.4.13 Appendix 11C contains a list of the Biodiversity Action Plan (BAP) species that have been considered and informed the surveys of particular species that have been undertaken.

Field Studies

Habitats

11.4.14 The types and extent of habitats identified within the Main Study Area are described in Table 11-3 and shown in the Lake Lothing Third Crossing PEA report (Appendix 11A) and Figure 11.2.

Table 11-3 – Habitats present in the Main Study Area

Habitat	Description
Amenity Grassland	There is an area of amenity grassland on the corner of Rotterdam Road and Denmark Road comprising a playing field and recreational area. This habitat is of Negligible ecological value.
Hard Standing	Several areas of old hard standing are present, containing numerous cracks within which vegetation has become established. Species present include buddleia <i>Buddleja davidii</i> , gorse, willow herb and several species of grasses. This habitat is of Negligible ecological value,
Tall Ruderal	Small isolated areas of this habitat were present to the north of the railway line adjacent to Denmark Road. These areas were dominated by bramble, with willow herb, common nettle, ragwort <i>Senecio jacobaea</i> , common hogweed <i>Heracleum sphondylium</i> , ivy, bindweed <i>Convolvulus arvensis</i> , broom <i>Cytisus scoparius</i> and dog rose <i>Rosa canina</i> . This habitat is of low ecological value.
Unimproved Neutral Grassland	Small areas of grasses were interspersed within the tall ruderal, and these consisted of perennial rye grass <i>Lolium perenne</i> , timothy-grass <i>Phleum pratense</i> , false oat grass <i>Arrhenatherum elatius</i> and willow herb. There were also some woody species within the tall ruderal, including elm, hawthorn and sycamore. This habitat is found throughout the UK and is of low ecological value.
Standing / Tidal Water	Lake Lothing is a saltwater lake, which at the western extent is connected to Oulton Broad and the River Waveney. The lake is tidal and exposes mudflats at some locations at low water. There is no emergent vegetation and the lake is subject to considerable disturbance through its use as a port. Mudflats and saline lagoons are both priority habitats, however Lake Lothing is a poor example of these habitats and hence is of low ecological value.
Benthic	Water in Lake Lothing is of poor ecological quality (see Water Framework Directive Assessment, Appendix 17A). Lake Lothing contains silty sediments with highly turbid water. These habitats support an impoverished invertebrate community and low numbers of typical fish species. Other than eel <i>Anguilla anguilla</i> no migratory fish species were shown to be present.

11.4.15 No groundwater dependent terrestrial ecosystems have been identified within the Main Study Area which is the area of groundwater that is reasonably likely to be impacted by any change as a result of the Scheme, and as identified in Chapter 17, impacts upon these habitats are scoped out of the assessment.

Species

11.4.16 A summary of the results of surveys undertaken for the species identified in Paragraph 11.4.1 is provided in Table 11-4.

Table 11-4 – Survey Findings for Species

Species	Description
Bats	<p>Assessment of the suitability of structures to support roosting bats were carried out and locations for walked transect surveys determined in August 2016.</p> <p>Five structures (labelled B1 to B5 on Figure 11.3) and no trees within the Main Study Area were confirmed as suitable for use as bat roosts. Bat roost surveys were undertaken at each of these structures. Sites B1, B3 and B4 were surveyed in summer 2016, B2 in early summer 2017 and B5 in early autumn 2017. No evidence of roosting bats was found during any survey. Surveys undertaken at structure B1 recorded a single Nathusius' pipistrelle <i>Pipistrellus nathusii</i>, a species which is widespread but rare within the UK.</p> <p>A hibernation survey was undertaken at structure B1 during winter 2016/2017 (it being the only structure suitable for hibernation). No bat hibernation behaviour was recorded.</p> <p>Walked transect surveys were undertaken during late summer 2016 and late summer 2017. Bat activity was consistently low, typically with just a single bat pass recorded. Nathusius' pipistrelle was not recorded during these surveys.</p> <p>Detailed findings of the bat survey are included in Appendix 11B.</p>
Badgers	<p>During the PEA, no field signs of badger <i>Meles meles</i> were found. Suitable habitat is available for this species adjacent to the railway line, however, there is little connectivity to the wider area and it is unlikely that this species is present. A suspected badger sett was identified by the Applicant at [REDACTED], although an assessment of this during the PEA subsequently showed it to be a fox den.</p>
Otters and Water Voles	<p>The PEA found that Lake Lothing provides poor quality habitat for otters and water voles. No evidence of these species was found during any of the surveys, and it is therefore concluded that these species are absent and no further survey is appropriate.</p>
Birds	<p>Trees and woody vegetation within the Main Study Area provide suitable habitat for breeding birds. The former industrial sites on the south side of Lake Lothing are suitable foraging and nesting habitat for black redstart.</p> <p>Surveys for this species undertaken in 2017 showed that black redstart was not breeding within the survey area shown in Figure 11.5.</p> <p>Peregrine falcons are known to have nested on the grain silo building to the north of Lake Lothing and sightings of this species were confirmed during surveys in 2017.</p> <p>25 species of birds in low numbers, predominately comprising gulls and waders, were recorded within Lake Lothing during winter. The majority of Lake Lothing is open water, large proportions of the banks of which have wooden or concrete-clad vertical faces. A small area (Jeld Wen) contains areas of sand, gravel and mud at the edge of the water. Lake Lothing is of local value to wintering birds.</p> <p>The findings of the wintering bird survey are provided in Appendix 11D.</p> <p>The locations of breeding and wintering bird surveys within the Main Study Area are shown in Figure 11.5.</p>

Species	Description
Reptiles	Tall ruderal vegetation, grassland and hard standing within the Main Study Area provide suitable habitat for reptiles. Reptile surveys undertaken in spring and autumn 2017 within areas of suitable habitat adjacent to the East Suffolk Line to the north side of Lake Lothing recorded a small population of common lizard. In addition, a single common lizard was recorded on two occasions in September 2017 during the PEA (Appendix 11A) on the south side of Lake Lothing. These areas are shown on Figure 11.4 and additional information is provided in the reptile survey report (Appendix 11E).
Terrestrial Invertebrates	<p>An area of rough grassland centred on grid reference TM538925 is a dedicated wildlife area for the five-banded weevil wasp <i>Cerceris quinquefasciata</i>, a nationally rare and UK BAP Priority Species of sand-burrowing insect. Habitat suitable for use by this species includes the sandy substrate associated with amenity planting on the south side of Lake Lothing.</p> <p>Invertebrate surveys were undertaken on an area shown in Figure 11.6 on the 26th of May 2017, 22nd of June 2017, and 31st July 2017 using a range of techniques as described in Appendix 11G.</p> <p>A total of 207 species were identified including the five-banded weevil-wasp and the UK BAP Priority Species small heath <i>Coenonympha pamphilus</i>.</p>
Marine invertebrates	Lake Lothing supports an impoverished community of marine invertebrates which is likely to be a result of the existing drainage regime. Further information is included in Appendix 11F.
Fish	Fish trawls have showed low numbers of typical fish species to be present in Lake Lothing. These include eels but no other migratory species. Further information is included in Appendix 11F.
Other Species	Habitats within the Main Study Area were confirmed during the Phase 1 Survey to be suitable to support UK and Suffolk BAP Priority Species including hedgehog <i>Erinaceus europaeus</i> .
Schedule 9: Invasive Species	<p>The data search returned records of species listed on Schedule 9, including wakame <i>Undaria pinnatifida</i>, montbretia <i>Crocsmia pottsii</i> x <i>aurea</i>, three-cornered garlic <i>Allium triquetrum</i>, New Zealand pigweed <i>Crassula helmsii</i>, Virginia-creeper <i>Parthenocissus quinquefolia</i>, wall cotoneaster <i>Cotoneaster horizontalis</i>, Japanese rose <i>Rosa rugosa</i>, yellow archangel <i>Lamium galeobdolon</i> ssp. <i>argentatum</i>, Indian balsam <i>Impatiens glandulifera</i> and Japanese knotweed <i>Fallopia japonica</i>.</p> <p>Three stands of Japanese knotweed were found within the Order limits during the Phase 1 survey undertaken to inform the PEA (Appendix 11A) at TM53770 93019, TM53976 92398 and TM53906 92409. A single stand of Japanese rose was found at TM538929.</p>

11.5 Predicted Impacts before mitigation

Statutory Designated and Non-Statutory Protected Sites

- 11.5.1 A screening study, or threshold assessment, to inform a Habitats Regulations Assessment of the effects of the Scheme on Internationally Designated sites identified in Section 11.4.4 is presented in the updated HRA Report Revision 2 (document reference SCC/LLTC/EX/43). This concludes that there are no likely significant adverse effects on any Natura 2000 site or its qualifying features or conservation objectives as a result of the Scheme. The Scheme will therefore not give rise to adverse effects on sites protected at an International level of importance.
- 11.5.2 No land take will take place for the Scheme from any SSSI, LNR or CWS. Effects on other designated sites will therefore be neutral during both the construction and operational phase.
- 11.5.3 It is possible that contaminated material might be present within the sediment of Lake Lothing. Sediment modelling has, however, shown that there is no difference in the movement of sediment around Lake Lothing whether the Scheme is present or absent. As there will be no change in sediment transport, changes in sediment movements will have no significant effect on ecological resources as a result of the Scheme. The movement of sediments is considered further in Chapter 17 and the Sediment Transport Assessment (Appendix 17C).

Air Quality

- 11.5.4 Chapter 8 considers the likely significant effects of the Scheme upon air quality and this includes in Appendix 8G an assessment of the effects of road traffic emissions upon ecologically designated sites due to increased NO_x levels and increased nitrogen deposition (N-deposition).
- 11.5.5 As presented in Appendix 8G, five designated and non-designated sites have been included within the assessment:
- Gunton Warren LNR;
 - Leathes Ham LNR;
 - Brooke Yachts and Jeld Wen CWS;
 - Kirkley Ham CWS; and
 - Barnby Broad and Marshes SSSI.
- 11.5.6 The assessment in Appendix 8G has identified that there are no likely significant effects upon Gunton Warren LNR, Brooke Yachts and Jeld Wen CWS or Barnby Broad and Marshes SSSI and the impacts of air quality upon these sites is not considered further in this assessment.
- 11.5.7 Leathes Ham LNR, as shown on Figure 11.1, lies to the west of Peto Way which will experience an increase in traffic flow during the operational phase of the Scheme (see Figure 19.4 which shows the modelled Annual Average Daily Traffic (AADT) along this route). The air quality modelling has identified that N-deposition as a result of the Scheme will be above 1% of the critical load (see Appendix 8G for a full definition) at

a distance up to 75.5m from the road edge but as the modelled annual deposition in the opening year remains below the total critical load ($15\text{kg N ha}^{-1} \text{y}^{-1}$), there will be no impact upon this designated site and there will be no significant effect.

11.5.8 Kirkley Ham CWS is located to the south east of the Order limits and lies either side of the A12 Tom Crisp Way (see Figure 4.1 and Figure 11.1). As shown on Figure 19.4, the AADT on Tom Crisp Way is modelled to increase from 16,409 to 25,044 in the opening year.

11.5.9 The air quality modelling has identified that N-deposition will be above 1% of the critical load for acid grassland across the entire CWS in the opening year (DS scenario) and the critical load for acid grassland of $5\text{kg N ha}^{-1} \text{y}^{-1}$ is exceeded across the CWS in both the DM and DS scenarios.

11.5.10 Using the criteria identified in Table 11-2, the increase in N-deposition above the critical load is considered to be a moderate impact due to the permanent impact upon a site of County value. Having applied professional judgement and applying the precautionary principle, this is a significant adverse effect upon this CWS.

11.5.11 Mitigation for these significant effects upon Kirkley Ham CWS have been discounted due to their unfeasible and un-proportional nature. Three mitigation measures have been discounted for the following reasons:

- Reducing traffic upon Tom Crisp Way; this would be contrary to the objectives of the Scheme;
- Realignment of Tom Crisp Way; this would not reduce the significant effect as the effect is experienced across the entire site; and
- Barriers; barriers are presently being trialled on much busier roads than Tom Crisp way (such as the M25) and their effectiveness is uncertain and may even be counterproductive. It is also not considered that a barrier along Tom Crisp Way, from a visual perspective, would be a suitable mitigation measure.

11.5.12 With regard to construction dust emissions, the assessment within Chapter 8, and the results shown in Figure 8.2 identify that the effects of construction dust are likely to be as a worst case restricted to within 50m of the Order limits and therefore will not adversely affect any designated sites.

Noise

11.5.13 The assessment within Chapter 13 has considered the effects of noise upon noise sensitive receptors in the operational phase of the Scheme and identified designated ecological sites in **Error! Reference source not found.** The modelled change in traffic noise at these designated sites is no greater an increase than 4dB and will not adversely or beneficially affect the species and habitats for which the site is designated.

11.5.14 The terrestrial species that have been identified through surveys (and presented in Table 11-4) are not considered to be sensitive to the order of increase in noise that is likely to result during the construction or operational phase of the Scheme and no significant adverse effects will therefore result.

11.5.15 With regard to underwater noise the marine survey has identified the presence of eel

Anguilla, which is a noise sensitive species. The Environment Agency has been consulted upon the scope of the assessment with regard to the effects of noise upon marine ecological resources, and have not raised any issues of concern. However, as stated in the updated HRA Report Revision 2 (document reference SCC/LLTC/EX/43) the contractor for the construction phase of the Scheme will undertake their works with due regard to best practice measures with regard to harbour porpoise.

Habitats

11.5.16 The site is largely urban, interspersed with areas of improved grassland, scattered trees, scrub and standing water. These habitats are of no greater than low biodiversity value.

11.5.17 Marine habitat within Lake Lothing supports an impoverished invertebrate fauna and low numbers of typical fish species as shown in Appendix 11F. These habitats are of no greater than low biodiversity value.

Species

11.5.18 The effects of the Scheme on particular species are described in Table 11-5.

11.5.19 Sources of impacts upon these species could arise from:

- the loss of suitable habitats during both construction and operation;
- disturbance during construction in the form of light, dust or noise;
- discharge of pollutants into watercourses;
- mobilisation of contaminated materials; and
- permanent or temporary severance of a route travelled by protected species.

Table 11-5 - Effects of the Scheme

Species	Effects of the Scheme	Significance	
		Construction	Operation
Bats (Local value)	<p>The Scheme would not give rise to adverse effects on trees or structures that are known to support roosting bats.</p> <p>Bats have been demonstrated through the surveys to use vegetation along the banks of Lake Lothing and the East Suffolk Line as routes for foraging and commuting. The Scheme may disturb foraging bats during construction through vegetation clearance lighting of the construction compound and lifting of the construction works. During the operational phase, however, the Scheme would not be a barrier to bat movements because of the clearance and permeability of the structures provided by the Scheme Bascule Bridge and the bridge over the East Suffolk Line.</p> <p>Lighting of the completed Scheme (see Paragraph Error! Reference source not found.) will be provided for the carriageway (Figure 5.7) as well as feature lighting of the Scheme Bascule Bridge counterweights. As there will be no additional lighting of the bat commuting corridor along the East Suffolk line and as Scheme lighting will be elevated on the Scheme that is out with the existing foraging/commuting</p>	Slight adverse	Neutral

Species	Effects of the Scheme	Significance	
		Construction	Operation
	area, there will be no effects on bats from lighting of the Scheme.		
Breeding Birds (general) (local value)	All trees and hedges that would be removed by the Scheme are likely to be suitable for use by breeding birds.	Slight adverse	Neutral
Black redstart (local value)	Black redstart was not found to be breeding within the survey area (Figure 11.5, but evidence in the form of mimic calls from other species from within the survey area suggests that this species is present within the wider area and could colonise the area of the Scheme prior to construction commencing.	Neutral	Neutral
Peregrine (local value)	Peregrines are known to nest close to the Scheme. Anecdotal evidence indicates that nesting sites are on the opposite side of the grain silo to the Scheme (on the north side of the grain silo). This feature would not be affected by the Scheme.	Neutral	Neutral
Wintering Birds (local value)	<p>Small numbers of birds use Lake Lothing during the winter period (see Appendix 11D).</p> <p>Construction and operation of the Scheme would give rise to increased noise and artificial light which may increase current levels of disturbance of wintering birds. However, current levels of noise and lighting within this area are already elevated.</p> <p>Birds habituate to constant levels of noise and lighting and those currently using Lake Lothing are therefore unlikely to be further affected by such an increase in background levels.</p> <p>Given the low numbers of birds concerned and their habituation to current high levels of disturbance, effects of additional noise and lighting are not considered to be significant.</p>	Neutral	Neutral
Reptiles (local value)	A small population of reptiles has been identified on land to the north of Lake Lothing (Appendix 11E) and a single reptile was recorded in the south. Without mitigation these animals are at risk of being disturbed and displaced by construction works.	Slight adverse	Neutral
Terrestrial invertebrates (local value)	The Scheme will require both temporary and permanent land take (see Figure 1.3) from an area of supporting habitat for the five-banded weevil-wasp <i>Cerceris quinquefasciata</i> (see Appendix 11G) although burrowing habitat for this species will not be disturbed as a result of the Scheme.	Slight adverse	Slight adverse

Species	Effects of the Scheme	Significance	
		Construction	Operation
Marine invertebrates (negligible value)	<p>Lake Lothing supports an impoverished community of marine macroinvertebrates (see Appendix 11F for further information), which is likely to be a result of its existing drainage regime. No species of particular nature conservation value were identified during surveys, although the following non-native species could be spread during the construction phase:</p> <ul style="list-style-type: none"> • <i>Theora lubrica</i>; • <i>Austrominius modestus</i>; • <i>Hydroides ezoensis</i>; • <i>Bugula neritina</i>; • <i>Asciidiella aspersa</i>. <p>Dredging of Lake Lothing will therefore not have an effect upon any species of conservation value.</p>	Slight adverse	Neutral
Fish (general) (negligible value)	<p>Fish trawl surveys (see Appendix 11F) indicate that the habitat in Lake Lothing is of limited value to fish. Eel <i>Anguilla</i> was confirmed to be present in low numbers, but no other species of particular nature conservation interest were present. Although temporary disturbance may occur during the construction period, any effects on fish would be negligible (see 11.5.15). During the operational phase the Scheme would have no effects on fish.</p>	Neutral	Neutral
Migratory fish (negligible value)	<p>No migratory fish species other than eel were found during surveys and the Scheme will have no effect upon migratory fish.</p>	Neutral	Neutral
Eels (local value)	<p>The habitats within Lake Lothing provide suitable habitat for eels, of which a solitary specimen was found during the fish trawl surveys (Appendix 11F). Although temporary disturbance may occur during the construction period, any effects on eels would be negligible because, in accordance with the DML, if percussive drilling is undertaken, soft start procedures will be used to ensure incremental increase in power to encourage noise sensitive species to move away from the area. Furthermore, the navigation channel will remain open when the cofferdams are in place, and hence a 32m wide passage is in place. During the operational phase the Scheme would have no effects on eels as it will not impede their passage through Lake Lothing due to the piles and piers not forming a significant barrier to the passage of eels.</p>	Neutral	Neutral

Species	Effects of the Scheme	Significance	
		Construction	Operation
Marine mammals including harbour porpoise (local value)	Open water within Lake Lothing could be used by marine mammals, including harbour porpoise, which are present within the North Sea. However, no marine mammals were identified within biological records or during the PEA (Appendix 11A), and no anecdotal evidence of sightings within Lake Lothing were identified. It is therefore highly unlikely that marine mammals would be affected by the Scheme. Effects of the noise from piling activities during construction on Harbour Porpoise within the Southern North Sea cSAC are discussed in greater detail in the updated HRA Report Revision 2 (document reference SCC/LLTC/EX/43).	Neutral	Neutral
Hedgehogs (negligible value)	The habitats within the site, and the surrounding residential gardens, are suitable to support hedgehogs.	Neutral	Neutral
Schedule 9 Invasive Species (negligible)	It is an offence to carry out activities that would cause the growth of a Schedule 9 Wildlife and Countryside Act 1981 species in the wild. The Schedule 9 species Japanese knotweed and wakame are present within the vicinity of the works. Measures are required by law to control the spread of these species.	Moderate adverse	Neutral

11.5.20 Table 11-6 describes mitigation measures that are included to mitigate the effects identified in Table 11-5 above as well as identifying further pre-construction surveys to be undertaken to ensure that the status of particular species has not changed between application and construction (for example, pre-construction checks of structures and trees that are suitable for use by roosting bats).

11.5.21 Mitigation measures described in Table 11-6 are included within the interim CoCP (Appendix 5A) and will be developed in detailed design by the contract through the full CoCP which will be approved by the county planning authority.

11.5.22 To facilitate these measures, an Ecological Clerk of Works, specialist ecologist, or similarly competent person (referred to as ECoW in table 11-8) must be appointed to be responsible for overseeing on-site ecological mitigation.

Table 11-6 – Mitigation measures and pre-construction surveys

Species	Mitigation measures	Significance after mitigation	
		Construction	Operation
Bats	There is a risk that bats may colonise structures suitable for roosting prior to construction and therefore pre-construction checks of structures B1 to B5 (see Figure 11.3) will be required. Pre-construction surveys will be undertaken on any building that is suitable to support roosting bats and which would be likely to be disturbed during construction. Surveys would seek to confirm that bats have not taken occupation in these	Neutral	Neutral

Species	Mitigation measures	Significance after mitigation	
		Construction	Operation
	<p>structures since the surveys that have informed this ES then the Ecological Clerk of Works (EcoW) will advise as to the most appropriate course of action to ensure legislative compliance.</p> <p>To minimise the risk of effects on foraging and commuting bats, the use of artificial lighting during construction will be kept to a minimum. Where temporary artificial lighting is used, only the immediate area of works shall be illuminated by using as sharp an angle of lighting as possible and avoid light being directed at, or close to adjacent vegetation. Shields or hoods shall be used to control or restrict the area to be lit. The ECoW shall advise on all temporary lighting proposals prior to installation.</p>		
Breeding birds	<p>In order to minimise the risk of disturbing breeding birds, the removal of trees and hedges should be undertaken outside of the typical bird breeding season (March to July inclusive). If tree and vegetation removal has to take place during this period, the vegetation shall be checked prior to removal for the presence of nests by the ECoW. If nests that are in use are present, it may be necessary to delay work in immediate proximity the nest until the young have fledged.</p>	Neutral	Neutral
Black redstart	<p>A watching brief for the presence of this species will be maintained as appropriate during the construction period by the ECoW. Should black redstart be present and being disturbed by the construction of the Scheme, the ECoW will advise appropriate action in the interests of its protection.</p>	Neutral	Neutral
Peregrine	<p>Peregrines are known to alter their nest locations and it is possible that at the time of construction peregrines may be nesting closer to the Scheme.</p> <p>The extent to which peregrines are sensitive to noise disturbance, however, is unlikely to be a concern given their nesting location adjacent to the port operations which are inherently noisy themselves. Impacts upon peregrines are therefore more likely should there be a disruption to their food source (predominantly pigeons, but also other birds including kittiwake, of which there is a population at Outer Lowestoft Harbour). The Scheme is unlikely to affect the population of these prey species due to the very small amount of land take of the Scheme relative to the wider suitable habitat that is present.</p> <p>Peregrine are a day-flying species that readily acclimatise to, and are to an extent dependent on, human activities in urban areas. Lighting of the Scheme would not give rise to adverse effects on this species.</p> <p>Although the risks of causing disturbance of this species are minimal, the ECoW will maintain a watching brief as appropriate to ensure that no adverse effects occur to peregrine.</p>	Neutral	Neutral

Species	Mitigation measures	Significance after mitigation	
		Construction	Operation
Reptiles	<p>During the construction phase, vegetation clearance of all habitat suitable for reptiles will be undertaken as follows:</p> <ul style="list-style-type: none"> • Reptiles shall be excluded from the proposed works area through habitat manipulation and natural refugia removal; • Habitat manipulation shall involve strimming the vegetation within the works area prior to commencement of works to reduce the vegetation to a sward height that would encourage reptiles to move offsite and into adjacent areas. This shall be undertaken when reptiles are active, i.e. between mid-April to mid-October when the temperature is at least 12°C; • The strimming shall cut vegetation to a height of approximately 150mm to avoid affecting reptiles that may be present. Strimming shall be completed in phases. All clearance works shall be carried out using hand tools; and • These works shall all be supervised by the ECoW. <p>Areas of habitat creation for reptiles will be provided within land as shown on the Landscaping Plans (document reference 2.8). This will include artificial hibernation sites (hibernacula) created using site won materials, such as felled timber, brash, tree roots and inert rubble. These materials may be covered in soil and grass so as not conflict with the aesthetics of landscaping proposals. Hibernacula will be located away from the footpath/cycle lane so as to minimise risk of disturbance.</p> <p>Areas of exposed substrate shall be included within the landscape design of the Scheme for the benefit of reptiles. In combination with provision of a structurally varied vegetation, this will help to provide a mosaic of habitats suitable for use by reptiles. Given the small area of land suitable for reptiles that would be lost, this would be a slight beneficial effect of the Scheme.</p>	Neutral	Slight beneficial
Terrestrial invertebrates	Approximately half of the land take required from supporting habitat for the five-banded weevil-wasp will be reinstated post-construction to be suitable for use by this species.	Slight adverse	Slight Adverse
Marine invertebrates	Control measures shall be implemented through an Invasive Species Management Plan to prevent the spread of the non-native mollusc <i>Theora lubrica</i> as well as the non-native tubeworm <i>Hydroides ezoensis</i> , the bryozoan <i>bugula neritina</i> , the cryptogenic ascidian <i>Ascidella aspersa</i> and the barnacle <i>austrominius modestus</i> .	Neutral	Neutral

Species	Mitigation measures	Significance after mitigation	
		Construction	Operation
Marine mammals including harbour porpoise	The contractor will follow the Statutory Nature Conservation Agency protocol (a document produced by Natural England, The Countryside Council for Wales and the JNCC) for minimising the risk of injury to marine mammals from piling noise as a best practice measure ³⁴ , secured through the CoCP.	Neutral	Neutral
Hedgehogs	The ECoW will maintain a watching brief during vegetation clearance to protect individual hedgehogs should they be present.	Neutral	Neutral
Schedule 9: Invasive Species	The interim CoCP includes measures to control Japanese knotweed within the Order limits and measures to minimise the risk of its spread, in line with the guidance recommended by the Environment Agency. Details of the specific measures to be implemented would be specified in an Invasive Species Management Plan as required by the interim CoCP. Measures to restrict the spread of wakame during the construction of the Scheme will be included within the full CoCP.	Moderate beneficial	Moderate beneficial

11.6 Conclusions and Residual Effects

- 11.6.1 The effects of the Scheme on ecological resources has been informed by desk studies collating available information and original surveys undertaken in connection with the Scheme.
- 11.6.2 With respect to the consideration of sites of international ecological importance, a screening, or threshold assessment, informing Habitats Regulation Assessment has been undertaken (document reference 6.5) and this has concluded that no significant effects would occur as a result of the Scheme. This was confirmed by Natural England in their S42 consultation response.
- 11.6.3 No sites statutorily designated for their ecological value are present within the Main Study Area and no ecologically designated sites outside the Main Study Area would be adversely affected by the proposals.
- 11.6.4 Habitats present within the Main Study Area are common and widespread throughout the UK. None of these receive specific protection by law or are of particular nature conservation value. However, some are suitable to support species that are protected by law or otherwise of particular nature conservation importance.
- 11.6.5 The assessment has identified that there is a significant effect upon Kirkley Ham CWS that cannot be mitigated.
- 11.6.6 The Main Study Area contains five structures that are suitable for use by roosting bats.

³⁴ http://jncc.defra.gov.uk/pdf/jncc_guidelines_piling%20protocol_august%202010.pdf (accessed 8th January 2018)

Surveys undertaken in 2016 and 2017 found no evidence of roosting or hibernating bats at any of these locations. Walked transect surveys showed low numbers of bats foraging and commuting within the Main Study Area. The Scheme will not sever existing commuting routes or foraging habitats and will not adversely affect roosting bats. To avoid possible effects during construction, mitigation measures have been included within the interim CoCP. Pre-construction checks for roosting bats will also be undertaken to confirm that bats have not occupied suitable roosting sites since the production of this ES. With these measures in place the Scheme will not give rise to significant effects upon bats.

- 11.6.7 Breeding bird surveys showed that the bird assemblage identified is typical of an urban-industrial location. Vegetation present in the Main Study Area is likely to be used by common breeding birds and accordingly the ECoW will undertake checks of vegetation prior to its removal to ensure that breeding birds are not affected and with these mitigation measures in place, there would be no residual adverse effects on breeding birds. No effects on the protected species black redstart or peregrine are anticipated.
- 11.6.8 Wintering bird surveys showed that small numbers of birds use Lake Lothing in winter and that these would not be significantly affected by the Scheme.
- 11.6.9 Surveys confirmed that a small population of reptiles is present in habitat along the East Suffolk line to the north of Lake Lothing, and a single common lizard was recorded on the south side. Measures to minimise the risk of adverse effects occurring on reptiles during construction are proposed. During the operational phase the creation of suitable habitat will result in a slight beneficial effect upon reptiles, although this does not constitute a significant effect.
- 11.6.10 The Scheme will affect supporting habitat used by the five-banded weevil-wasp as a result of temporary and permanent land take. Areas of temporary land take will be reinstated to be suitable for use by this species, but a small part of the supporting habitat will be permanently lost. This will result in a slight adverse but not significant residual effect.
- 11.6.11 The Scheme would have no adverse effects on marine invertebrates or fish. Changes in sediment movements occurring as a result of construction of the Scheme will also have no effect on ecological resources (see Chapter 17 and the Updated Sediment Transport Assessment (SCC/LLTC/EX/37)).

The assessment has also considered the synergistic effects upon ecological resources (i.e. those where other environmental aspects may have an effect such as noise or air quality).

Table 11-7- Synergistic effects

- 11.6.12 shows the ecological aspects that have been considered in this chapter and whether there is an interaction with the other environmental aspects considered in the ES. Where a potential interaction exists, then a reference to further information is provided.

Table 11-7- Synergistic effects

Receptors	Air Quality	Noise & Vibration	Visual Intrusion (including light)	Cultural Heritage	Townscape & Visual Impact	Nature Conservation	Geology, Soils & Contamination	Materials	Private Assets	Socio-economics including Recreation	Road Drainage & Water Environment	Flood Risk	Traffic & Transport	Notes
Habitats														
Amenity Grassland	N	N	N	N	N	N/A	N	N	N	N	N	N	N	
Hard Standing	N	N	N	N	N	N/A	N	N	N	N	N	N	N	
Tall Ruderal	N	N	N	N	N	N/A	N	N	N	N	N	N	N	
Unimproved Neutral Grassland	N	N	N	N	N	N/A	N	N	N	N	N	N	N	
Marine habitats	N	Y	Y	N	N	N/A	N	N	N	N	Y	N	N	Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified

Receptors	Air Quality	Noise & Vibration	Visual Intrusion (including light)	Cultural Heritage	Townscape & Visual Impact	Nature Conservation	Geology, Soils & Contamination	Materials	Private Assets	Socio-economics including Recreation	Road Drainage & Water Environment	Flood Risk	Traffic & Transport	Notes
														<p>any effect between lighting and marine habitats and therefore no mitigation measures are necessary.</p> <p>The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p> <p>The effects of the Scheme upon marine habitats in the context of the potential effect on the water environment in which they live is considered in Chapter 17 – this concludes that no likely significant effects are predicted to arise from the Scheme following the application of mitigation measures.</p>
Species														
Bats	N	Y	Y	N	N	N/A	N	N	N	N	N	N	N	<p>Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary.</p> <p>The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p>
Badgers	N	Y	Y	N	N	N/A	N	N	N	N	N	N	N	<p>Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and</p>

Receptors	Air Quality	Noise & Vibration	Visual Intrusion (including light)	Cultural Heritage	Townscape & Visual Impact	Nature Conservation	Geology, Soils & Contamination	Materials	Private Assets	Socio-economics including Recreation	Road Drainage & Water Environment	Flood Risk	Traffic & Transport	Notes
														5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary. The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.
Otters and Water Voles	N	Y	Y	N	N	N/A	N	N	N	N	Y	N	N	Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary. The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15. The effects of the Scheme upon marine habitats in the context of the potential effect on the water environment in which they live is considered in Chapter 17 – this concludes that no likely significant effects are predicted to arise from the Scheme following the application of mitigation measures.
Birds	N	Y	Y	N	N	N/A	N	N	N	N	N	N	N	Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in

Receptors	Air Quality	Noise & Vibration	Visual Intrusion (including light)	Cultural Heritage	Townscape & Visual Impact	Nature Conservation	Geology, Soils & Contamination	Materials	Private Assets	Socio-economics including Recreation	Road Drainage & Water Environment	Flood Risk	Traffic & Transport	Notes
														<p>this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary. The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p>
Reptiles	N	Y	Y	N	N	N/A	N	N	N	N	N	N	N	<p>Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary. The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p>
Terrestrial Invertebrates	N	Y	Y	N	N	N/A	N	N	N	N	N	N	N	<p>Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary. The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p>

Receptors	Air Quality	Noise & Vibration	Visual Intrusion (including light)	Cultural Heritage	Townscape & Visual Impact	Nature Conservation	Geology, Soils & Contamination	Materials	Private Assets	Socio-economics Including Recreation	Road Drainage & Water Environment	Flood Risk	Traffic & Transport	Notes
Marine Invertebrates	N	Y	Y	N	N	N/A	N	N	N	N	Y	N	N	<p>Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary.</p> <p>The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p> <p>The effects of the Scheme upon marine habitats in the context of the potential effect on the water environment in which they live is considered in Chapter 17 – this concludes that no likely significant effects are predicted to arise from the Scheme following the application of mitigation measures.</p>
Fish	N	Y	Y	N	N	N/A	N	N	N	N	Y	N	N	<p>Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary.</p> <p>The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p>

Receptors	Air Quality	Noise & Vibration	Visual Intrusion (including light)	Cultural Heritage	Townscape & Visual Impact	Nature Conservation	Geology, Soils & Contamination	Materials	Private Assets	Socio-economics including Recreation	Road Drainage & Water Environment	Flood Risk	Traffic & Transport	Notes
														The effects of the Scheme upon marine habitats in the context of the potential effect on the water environment in which they live is considered in Chapter 17 – this concludes that no likely significant effects are predicted to arise from the Scheme following the application of mitigation measures.
Other Species	N	Y	Y	N	N	N/A	N	N	N	N	Y	N	N	<p>Effects of lighting of the Scheme have been included within the assessment by virtue of the lighting design having been included within the Scheme that has been assessed (see 5.5.1 and 5.5.2) and the consideration of lighting for bats in this chapter). The assessment has not identified any effect between lighting and species and therefore no mitigation measures are necessary.</p> <p>The effects of noise and vibration have been included within this updated Chapter 11 in paragraphs 11.5.13 to 11.5.15.</p> <p>The effects of the Scheme upon marine habitats in the context of the potential effect on the water environment in which they live is considered in Chapter 17 – this concludes that no likely significant effects are predicted to arise from the Scheme following the application of mitigation measures.</p>
Schedule 9: Invasive Species	N	N	N	N	N	N/A	N	N	N	N	N	N	N	

- 11.6.13 Further to Table 11-7 as each assessment has concluded that there are no adverse significant effects after the imposition of mitigation measures, there are no synergistic significant effects when both assessments are combined. The Applicant has also considered whether the effect to two not significant effects on this receptor would, combined, create a significant synergistic effect and considers that as the result of each assessment is either neutral, negligible or slight; this does not occur.
- 11.6.14 Measures would be implemented within the full CoCP for the Scheme to ensure that appropriate attention is given to ecological resources during the construction period. These measures include pre-construction surveys for bats to ensure that suitable sites have not become colonised as bat roosts since submission of the ES, advance measures to minimise the risk of affecting individual reptiles, and watching briefs for other ecological resources including breeding birds and hedgehogs to ensure that adverse effects on individual animals that may be present are avoided. These measures would be implemented under the supervision of the Scheme's ECoW.
- 11.6.15 Measures would also be implemented within the full CoCP to control and prevent the spread of Schedule 9 invasive plant species in accordance with best practice and the recommendations of the Environment Agency, as well as further control measures to prevent the spread of non-native species. It is concluded that the control and removal of Japanese knotweed from within the Order limits would constitute a significant beneficial effect.