The Sizewell C Project

6.8 Volume 7 Yoxford Roundabout and Other Highway Improvements

Chapter 7 Terrestrial Ecology and Ornithology

Revision: 1.0

Applicable Regulation: Regulation 5(2)(a)

PINS Reference Number: EN010012

May 2020

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

Contents

Tables

Plates

None provided.

Figures

All figures are found within Annex 7A.1 of Appendix 7A: Ecological Baseline for Yoxford roundabout

Appendices

7 Terrestrial Ecology & Ornithology

7.1 Introduction

7.1.1 This chapter of **Volume 7** of the **Environmental Statement** (**ES**) presents an assessment of the terrestrial ecology and ornithology effects arising from the construction and operation of the proposed Yoxford roundabout and other highway improvements (referred to throughout this volume as the 'proposed development').

7.1.2 The proposed improvement works are as follows:

- a roundabout at the junction between the A12 and B1122 in Yoxford (referred to throughout as 'Yoxford roundabout');
- improvements at the A1094 and B1069 junction south of Knodishall;
- improvements at the A12 and A144 junction south of Bramfield; and
- improvements at the A12 and B1119 junction at Saxmundham.

7.1.3 Road safety analysis has also identified potential highway safety issues at two sites (the B1078 and B1079 junction east of Easton and Otley College and the A140 and B1078 junction west of Coddenham). Highway safety measures at these sites will be secured by an obligation in the Section 106 Agreement (see the **Section 106 Heads of Terms** appended to the **Planning Statement** (Doc. Ref. 8.4). This chapter includes an assessment of these highway safety measures.

7.1.4 Detailed descriptions of the proposed development sites (referred to throughout this volume as the 'site' as relevant to the location of each of the works set out above), the proposed development and different construction and operation phases are provided in **Chapters 1** and **2** of this volume of the **ES**. A glossary of terms and list of abbreviations used in this chapter is provided in **Volume 1** of the **ES**.

7.1.5 This assessment has been informed by data from other assessments as following:

- **Volume 2, Chapter 10**: Transport;
- **Chapter 4** of this volume: Noise and vibration;

- **Chapter 5** of this volume: Air quality;
- **Chapter 6** of this volume: Landscape and visual
- **Chapter 10** of this volume: Soils and agriculture; and
- **Chapter 12** of this volume: Groundwater and surface water.

7.1.6 This assessment has been informed by data presented in the following technical appendices:

- **Appendix 7A** of this volume: Ecological Baseline for Yoxford roundabout. This appendix includes all figures (**Annex 7A.1**), desk-study (**Annex 7A.2**), primary data (**Annex 7A.3**), biodiversity net gain report (**Annex 7A.4**), and non-licensable method statements (**Annex 7A.5**).

7.2 Legislation, policy and guidance

7.2.1 **Volume 1, Appendix 6J** (Doc Ref. 6.2) identifies and describes legislation, policy and guidance of relevance to the assessment of the potential terrestrial ecology and ornithology impacts associated with the Sizewell C Project across all **ES** volumes.

7.2.2 This section provides an overview of the specific legislation, policy and guidance of relevance to the proposed development.

a) International

7.2.3 International legislation and policies relating to the terrestrial ecology and ornithology assessment include:

- Convention on Biological Diversity (Ref. 7.1);
- Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 (Ref. 7.2);
- Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (Birds Directive) (Ref. 7.3);
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) (Ref. 7.4);

- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) (Ref. 7.5); and
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (Ref. 7.6).

7.2.4 The requirements of these, as relevant to the terrestrial ecology and ornithology assessment, are set out in **Volume 1**, **Appendix 6J** (Doc Ref. 6.2).

b) National

7.2.5 National legislation and policies relating to the terrestrial ecology and ornithology assessment include:

- Wildlife and Countryside Act (Ref. 7.7);
- Conservation of Habitats and Species Regulations (Habitat Regulations) (Ref. 7.8);
- Countryside and Rights of Way Act (Ref. 7.9);
- Natural Environment and Rural Communities (NERC) Act (Ref. 7.10);
- Hedgerows Regulation (Ref. 7.11);
- Protection of Badgers Act (Ref. 7.12);
- UK Biodiversity Action Plan BAP (Ref. 7.13) (now superseded by the 'UK Post-2010 Biodiversity Framework' (Ref. 7.14));
- Planning Practice Guidance (Ref. 7.15);
- Government's 25 Year Environment Plan (Ref. 7.16);
- National Planning Policy Framework (NPPF) (Ref. 7.17); and
- National Policy Statements (NPS) for Energy Infrastructure (Ref. 7.18).

7.2.6 The requirements of these, as relevant to the terrestrial ecology and ornithology assessment, are set out in **Volume 1, Appendix 6J** (Doc Ref. 6.2).

7.2.7 The National Policy Statement (NPS) 2011 sets out the national policy for energy infrastructure. The overarching NPS for Energy (EN-1) (7.18) and NPS for Nuclear Power Generation (EN-6) (7.18) provide the primary policy framework within which the development will be considered. A summary of the relevant planning policy, together with consideration of how the advice has been taken into account is provided in **Volume 1, Appendix 6J**, with requirements specific to this site set out in **Table 7.1** and **Table 7.2**.

Table 7.1: Requirements of the National Policy Statement for Energy (EN-1)

Ref	NPS Topic Requirement	How The Requirement Has Been Addressed In Relation To Terrestrial Ecology And Ornithology
EN-1 4.3	*'Under the Habitats and Species Regulations consideration must be given to whether the project may have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects. In the event that an Appropriate Assessment is required, the applicant must provide information as may reasonably be required to enable the Appropriate Assessment to be conducted. This should include information on any mitigation measures that are proposed to minimise or avoid likely effects'*	A Habitat Regulations Assessment (HRA) Screening assessment is included in the **Shadow HRA Report** for the Sizewell C Project (Doc Ref. 5.10). The **Shadow HRA Report** (Doc Ref. 5.10) considers the possible pathways whereby the proposed development (in this case Yoxford roundabout and other highway improvements) could have a significant effect on a European site. It concludes that whilst possible pathways do exist, there is no potential for a significant effect.
EN-1 5.2.3	*'A particular effect of air emissions from some energy infrastructure may be eutrophication, which is the excessive enrichment of nutrients in the environment. Eutrophication from air pollution results mainly from emissions of NOx and ammonia. The main emissions from energy infrastructure are from generating stations. Eutrophication can affect plant growth and functioning, altering the competitive balance of species and thereby damaging biodiversity. In aquatic ecosystems it can cause changes to algal composition and lead to algal blooms, which remove oxygen from the water, adversely affecting plants and fish. The effects on ecosystems can be short term or irreversible, and can have a large impact on ecosystem services such as pollination, aesthetic services and water supply.'*	Air emissions have not been considered as a significant effect pathway due to the enforcement of the primary and tertiary mitigation and the low additional emissions predicted (negligible) which would suitably protect neighboring habitats. Consideration of the potential air quality effects on Roadside Nature Reserve 197 due to proximity of the proposed Yoxford roundabout site is reported in **section 7.4 c)** of this chapter, and no significant effect is identified. See **Chapter 5** of this volume for the air quality assessment.
EN-1 5.2.7	*'The ES should describe… any potential eutrophication impacts.'*	Please see response to EN-1 5.2.3 above.
EN-1 5.3.3	*'Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.'*	Designated sites relevant to the proposed Yoxford roundabout site have been detailed within **section 7.4a)**. **Table 7.11** details which have been scoped in to or out of the assessment, along with an appropriate justification.

Ref	NPS Topic Requirement	How The Requirement Has Been Addressed In Relation To Terrestrial Ecology And Ornithology
EN-1 5.3.18	*'The applicant should include appropriate mitigation measures as an integral part of the proposed development. In particular, the applicant should demonstrate that:* *during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;* *during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements;* *habitats will, where practicable, be restored after construction works have finished; and* *opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.'*	Primary and tertiary mitigation has been defined within **section 7.4b)** for the proposed Yoxford roundabout site.

Table 7.2: Requirements of the National Policy Statement for Nuclear Power Generation (EN-6)

Ref	NPS Topic Requirement	How The Requirement Has Been Addressed
EN-6 1.7.4	*'Possible adverse effects on nature conservation sites of European importance were identified by the Nuclear Habitats Regulations Assessment (HRA). Further studies will need to be carried out, as part of the project HRA and environmental impact assessment (EIA) processes for individual development consent applications, to determine the significance of the effects and the effectiveness of any mitigation measures.'* *'Possible significant adverse effects on nationally important nature conservation sites and designated landscapes were identified by the Nuclear AoS. Further studies will need to be carried out, as part of the project EIA process for individual development consent applications, to determine the significance of the effects and the effectiveness of any mitigation measures.'*	A HRA Screening assessment is included in the **Shadow HRA Report** for the Sizewell C Project (Doc Ref. 5.10). The **Shadow HRA Report** (Doc Ref. 5.10) considers the possible pathways whereby the proposed development (in this case Yoxford roundabout and other highway improvements) could have a significant effect on a European site. It concludes that whilst possible pathways do exist, there is no potential for a significant effect. Within this **ES**, the methodology to determine the ecological baseline and baseline for terrestrial ecology and ornithology is detailed within **section 7.3, section 7.4a)** and **Appendix 7A. Section 7.4a)** also identifies the IEFs, for which the impacts have been assessed within **section 7.4c)**.
EN-6 Annex A A.7.4	*'All project level Habitats Regulations Assessments must take account of the potential adverse effects and the proposed avoidance and mitigation measures identified through the strategic level assessment(s).'*	

EN-6 Annex C C.8.54	*'The Habitats Regulations Assessment on sites of international importance has proposed a suite of avoidance and mitigation measures to be considered as part of the project level Habitats Regulations Assessment. At this stage, it is assessed that the effective implementation of the proposed suite of avoidance and mitigation measures may help to address adverse effects on European Site integrity, but that more detailed project level Habitats Regulations Assessment is required to reach conclusions that are in accordance with the requirements of the Habitats Directive.'*	
EN-6 Annex C C.8.53	*'A precautionary approach suggests that the assessment at this strategic level cannot rule out the potential for adverse effects on the integrity of nine European Sites (Alde-Ore and Butley Estuaries Special Area of Conservation (SAC), Alde-Ore Estuary SPA / Ramsar, Minsmere to Walberswick Heaths and Marshes SAC, Minsmere to Walberswick SPA/ Ramsar, Orfordness-Shingle Street SAC, Sandlings SPA, Outer Thames Estuary SPA) through potential impacts on water resources and quality, habitat and species loss and fragmentation, and disturbance (noise, light and visual).'*	An assessment of statutory designated sites within 5 kilometres (km) of the proposed Yoxford roundabout site was carried out and is detailed in **section 7.4a)**, which includes Minsmere to Walberswick Heaths and Marshes SAC, Special Protection Area (SPA), Ramsar Site and Sites of Special Scientific Interest (SSSI), Dew's Ponds SAC and SSSI, and Potton Hall Fields Westleton SSSI. Most of the designated sites have been scoped out due to the distance of those sites from the proposed development and due to the primary and tertiary mitigation. This has been described within **Table 7.11**. The exception to this is Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site and SSSI which has been scoped into the assessment in **section 7.4c)**.
EN-6 Annex C C.8.60	*'Some responses focused on designated sites including Sizewell Marshes Site of Special Scientific Interest (SSSI) and Leiston-Aldeburgh SSSI, and potential effects on Minsmere-Walberswick Heaths and Marshes SSSI, from which the site boundary includes some land-take. Some responses questioned how direct land take could be mitigated'*	
EN-6 Annex C C.8.61	*'The Appraisal of Sustainability identified the potential for adverse effects on sites and species considered to be of national nature conservation importance means that significant strategic effects on biodiversity cannot be ruled out at this stage of the appraisal. The Appraisal of Sustainability identifies that there could be potential significant effects at the following SSSIs which are within 5km of the site: Sizewell Marshes SSSI; Minsmere-Walberswick Heaths and Marshes SSSI; Leiston-Aldeburgh SSSI; Alde-Ore Estuary SSSI.'*	

c) Regional

7.2.8 Regional policies relating to the terrestrial ecology and ornithology assessment include:

- Suffolk Nature Strategy (Ref. 7.19);
- Suffolk Local Biodiversity Action Plan (BAP) (Ref. 7.20); and
- Suffolk's Priority Species and Habitats list (Ref. 7.21).

7.2.9 The requirements of these, as relevant to the terrestrial ecology and ornithology assessment, are set out in **Volume 1, Appendix 6J** (Doc Ref. 6.2).

d) Local

7.2.10 Local policies relating to the terrestrial ecology and ornithology assessment include:

- Suffolk Coastal District Council Local Plan Core Strategy and Development Management Polices (Ref. 7.22); and
- Suffolk Coastal District Council Final Draft Local Plan (Ref. 7.23).

7.2.11 The requirements of these, as relevant to the terrestrial ecology and ornithology assessment, are set out in **Volume 1, Appendix 6J** (Doc Ref. 6.2).

e) Guidance

7.2.12 This assessment has been undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (EcIA) (Ref. 7.24), to provide the determining body with clear and concise information about the likely significant ecological effects associated with the proposed development. In addition, the following guidance documents were considered during the survey and assessment process:

- Handbook for Phase 1 Habitat survey – a technique for environmental audit (Ref. 7.25);
- Bird Monitoring Methods: A Manual of Techniques for Key UK Species (Ref. 7.26);

- UK Birds of Conservation Concern (BoCC) (Ref. 7.27);
- Red Data Book (RDB) of British Invertebrates (Ref. 7.28);
- Hedgerows Regulations Guidelines (Ref. 7.11);
- Technical Information Note 102 – Reptile Mitigation Guidelines (Ref. 7.29);
- Great crested newt mitigation guidelines (Triturus cristatus) (Ref. 7.30);
- Evaluating the suitability of habitat for the great crested newt (Ref. 7.31);
- The Water Vole Mitigation Handbook (Ref. 7.32);
- Natural England. Standing advice for local planning authorities who need to assess the impacts of development on badgers (Ref. 7.33); and
- Bat Surveys: Good Practice Guidelines, 3rd edition (Ref. 7.34).

7.2.13 Further detail on these, as relevant to the terrestrial ecology and ornithology assessment, are set out in **Volume 1, Appendix 6J**.

7.3 Methodology

a) Scope of the assessment

7.3.1 The EIA methodology that has been applied for the Sizewell C Project is detailed in **Volume 1**, **Chapter 6** (Doc Ref. 6.2).

7.3.2 The full method of assessment for terrestrial ecology and ornithology that has been applied for the Sizewell C Project is included in **Volume 1, Appendix 6J**.

7.3.3 This section provides specific details of the terrestrial ecology and ornithology methodology applied to the assessment of the proposed development including the highway safety measures and a summary of the general approach to provide appropriate context for the assessment that follows. The scope of assessment considers the impacts of the construction and operation phases of the proposed development and the highway safety measures. Where the highway improvement work or safety measures proposed has the

potential for likely significant effects to arise, this has been assessed in further detail.

7.3.4 Under the CIEEM guidelines habitats and species considered sufficiently important (in nature conservation terms) to be a material consideration in the planning decision, as well as legally protected and/or controlled species for which there is a potential for a breach of their respective legislation as a result of the proposed development, are considered to be Important Ecological Features (IEFs). Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat/species rarity).

7.3.5 To comply with the CIEEM Guidelines for EcIA, this EcIA has also identified the IEFs that are of sufficient importance and likely to be sufficiently affected by the proposed development so as to be a material consideration in the planning decision and require a more detailed assessment. The same process also allowed for the identification of those IEFs that are not likely to be significantly affected and so do not require further assessment; that is, they can reasonably be scoped out of the EcIA. Where protected species are present and there is the potential for a breach of the legislation, those species are also considered to be IEFs to be included in the EcIA.

7.3.6 The scope of this assessment has been established through a formal EIA scoping process undertaken with the Planning Inspectorate. A request for an EIA Scoping Opinion was initially issued to the Planning Inspectorate in 2014, with an updated request issued in 2019, see **Volume 1, Appendix 6A** (Doc Ref. 6.2).

7.3.7 Comments raised in the EIA scoping opinion received in 2014 and 2019 have been taken into account in the development of the assessment methodology. These are detailed in **Volume 1, Appendices 6A** to **6C** (Doc Ref. 6.2)**.**

b) Consultation

7.3.8 The scope of the assessment has also been informed by ongoing consultation and engagement with statutory consultees throughout the design and assessment process. A summary of the comments raised and SZC Co's responses are detailed in **Table 7.3**.

Table 7.3: Summary of consultation responses that have informed the scope and methodology of the terrestrial ecology and ornithology assessment

Consultee	Date	Comment	SZC Co Response
Natural England (Letter - 202551)	2 February 2017	*"Natural England advises that surveys for protected species should be carried out to determine the impact and provide mitigation for the proposed scope of works along*	A full suite of ecology surveys were undertaken at the site and an assessment of the effects of the proposed development (for the proposed highway works

Consultee	Date	Comment	SZC Co Response
		B1122. The works, however, are relatively minor in their nature and we have no further comment to make at this stage."	screened in) on ecological receptors has been undertaken with appropriate primary and tertiary mitigation detailed in **section 7.4 b)**.
Suffolk County Council and Suffolk Coastal District Council	10 April 2019. Stage 3 Consultation.	*"It is assumed that there will be extensive removal of existing roadside hedgerows along the east of the A12"*	Mitigation measures for the proposed Yoxford roundabout are detailed in **section 7.4 b)**. Measures include: retaining existing trees and hedgerows adjoining the site boundary where possible, proposed hedgerow planting along the eastern edge of the realigned roads and around the proposed infiltration basin south of the new roundabout, as well as replacement planting would respect the new line of the A12.
Environment Agency	29 March 2019 Stage 3 Consultation.	*"Impacts to protected species have not been assessed."*	A full suite of ecology surveys were undertaken at the site and full assessment of the effects of the proposed development (for the proposed highway works screened in) on ecological receptors has been undertaken with appropriate primary and tertiary mitigation detailed in **section 7.4 b)**.
Environment Agency	29 March 2019 Stage 3 Consultation.	*"Location of the Roadside Nature Reserve 197 has the potential to be significantly affected if translocation of topsoil is required. Also, otters could be impacted considering records of otter using the Minsmere River, which is 50m from the site."*	Roadside Nature Reserve (RNR) 197 would be retained in its entirety and there would be no habitat loss to the RNR. Ecology surveys did not identify any signs of otter within or adjacent to the site boundary, although the River Yox was assessed as suitable habitat to support this species. The proposed Yoxford roundabout site would only be adjacent to the River Yox for a small section for road-tie in works, and would not include any direct impacts to the watercourse or river bank Pre-construction surveys would be conducted to confirm the absence/presence of any otter

Consultee	Date	Comment	SZC Co Response
			holt. Should an otter holt be identified that would be directly impacted by the proposed works, a licence from Natural England would be sought. Should breeding otter be recorded, then all works would cease until both adult and young otters have left the holt.
Natural England	9 April 2019 Stage 3 Consultation	*"We note that desk assessments only have been undertaken for this aspect of the project proposals to date. We are unable to provide further comment until full surveys for protected species are carried out and mitigation/compensation proposals provided for any identified impacts."*	A full suite of ecology surveys were undertaken at the proposed Yoxford roundabout site and an assessment of the effects of the proposed Yoxford roundabout on ecological receptors has been undertaken with appropriate primary and tertiary mitigation detailed in **section 7.4 b)**.
Natural England	9 April 2019 Stage 3 Consultation	*"We advise that this aspect of the proposals presents good opportunities for biodiversity creation through the planting up of landscaped areas with native species, particularly given that the intention is to retain the roundabout as a lasting legacy of the project following completion of the power station (Vol 1, para 16.5.12, pg. 373). This should therefore be taken into account when considering this aspect in terms of potential environmental net gain when assessed against the current baseline value of the site."*	The proposed Yoxford roundabout would include grassed areas and new tree and hedgerow planting along the eastern edge of the realigned roads and around the proposed infiltration basin south of the new roundabout. Replacement planting would respect the new line of the A12. A biodiversity net gain assessment has been undertaken and is presented in **Annex 7A.4**.
Suffolk Wildlife Trust	8 April 2019 Stage 3 Consultation	*"Volume 1, Chapter 16 sets out the highways improvements for the proposed Yoxford roundabout, the terrestrial ecology and ornithology PEI for this scheme is set out in Volume 2B, Chapter 11, Section 11.3. As with the other associated development sites, paragraph 11.3.25 recognises that the PEI is not informed by complete ecological survey and assessment. However, Table 11.3.1 identifies that there is potential for significant adverse impacts on bats and great crested newts to arise, even after embedded*	A full suite of ecology surveys were undertaken at the proposed Yoxford roundabout site and an assessment of the effects of the proposed Yoxford roundabout on ecological receptors has been undertaken with appropriate primary and tertiary mitigation detailed in **section 7.4 b)**.

Consultee	Date	Comment	SZC Co Response
		mitigation measures have been taken into account. However, it is then concluded that "potential mitigation measures under Natural England licence" will reduce residual effects to "not significant". Impacts on other ecological receptors, such as reptiles, breeding birds, and woodland and hedgerows are scoped out as embedded mitigation measures will form part of the proposal. However, without further surveys and assessment of the habitats and species present in the area we consider that it is not possible to be confident that mitigation can be achieved in this way."	
Suffolk Wildlife Trust	8 April 2019 Stage 3 Consultation	*"Also, we note that it is concluded that impacts on Roadside Nature Reserve (RNR) 197, which lies on the southern side of the B1122, will not be significant if design of the roundabout allows the RNR to be retained in situ (Table 11.3.1). If retention in situ is not possible the conclusion is that translocation of the species which the RNR supports is possible. However, no evidence is provided that such translocation is feasible, particularly as the RNR is designated for a protected species. We therefore do not consider that the residual effects of the development can be concluded to be "not significant" as it has not been demonstrated that the RNR can be protected"*	RNR 197 would be retained in its entirety and there would be no habitat loss to the RNR.
Environment Agency	27 September 2019 Stage 4 Consultation	*"Impacts to protected species have not been assessed."*	A full suite of ecology surveys were undertaken at the proposed Yoxford roundabout site and full assessment of the effects of the proposed Yoxford roundabout on ecological receptors has been undertaken with appropriate primary and tertiary mitigation detailed in **section 7.4 b)**.

Consultee	Date	Comment	SZC Co Response
Suffolk Wildlife Trust	23 September 2019 Stage 4 Consultation	*"we request that the infiltration pond is designed as sensitively as possible to maximise its wildlife value. Areas of grassland could be planted with wildflower meadow mixes to benefit pollinators with a late season cut."*	The proposed Yoxford roundabout would include grassed areas and new tree and hedgerow planting along the eastern edge of the realigned roads and around the proposed infiltration basin south of the new roundabout.
Suffolk Wildlife Trust	23 September 2019 Stage 4 Consultation	*"there will need to be a full consideration of protected species with surveys as appropriate to enable avoidance and mitigation strategies. We request, wherever possible, consideration of Net Gain is given."*	A full suite of ecology surveys were undertaken at the site and full assessment of the effects of the proposed development on ecological receptors has been undertaken with appropriate primary and tertiary mitigation detailed in **section 7.4 b)**. The proposed Yoxford roundabout would include grassed areas and new tree and hedgerow planting along the eastern edge of the realigned roads and around the proposed infiltration basin south of the new roundabout. Replacement planting would respect the new line of the A12. A biodiversity net gain assessment has been undertaken and is presented in **Annex 7A.4**.
Suffolk County Council and Suffolk Coastal District Council	26 September 2019 Stage 4 Consultation	*"The removal of Roadside Nature Reserve 197, location of the rare Sandy Stilt Puffball fungus, from the red line boundary is welcome, subject to clarification that the area shown in Figure 6.13 does fully incorporate the Roadside Nature Reserve and, if possible, a buffer area at either end. Any landscaping proposals in the area should allow for the creation of areas of habitat suitable for colonisation by species for which the Roadside Nature Reserve is designated."*	RNR 197 would be retained in its entirety and there would be no habitat loss to the RNR. The proposed Yoxford roundabout would include grassed areas and new tree and hedgerow planting along the eastern edge of the realigned roads and around the proposed infiltration basin south of the new roundabout

c) Environmental Screening

7.3.9 An environmental screening exercise has been undertaken to identify which of the four highway improvement works and two highway safety measures proposed may give rise to environmental effects that have the potential to be significant. The outcome of this environmental screening exercise concludes that the proposed works to the A12/B1122 junction east of Yoxford (Yoxford roundabout) should be taken forward to the assessment of likely effects on terrestrial ecology and ornithology.

7.3.10 The remaining three the highway improvement works and two highway safety measures have been screened out of the terrestrial ecology and ornithology assessment as they are not likely to give rise to significant environmental effects.

7.3.11 **Table 7.4** provides a summary of the environmental screening exercise.

Table 7.4: Summary of environmental screening exercise

Proposed Highways Improvement / safety measures	Summary Of Potential Effects	Screened In Or Out Of The Assessment
The A12/B1122 Yoxford roundabout.	There would be the potential loss and impact on hedgerows and other habitats within, and adjacent to the site during construction of the proposed Yoxford roundabout. Some of these habitats would be permanently lost as a result of the new roundabout. This site also has hydrological links with Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site, and SSSI, Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS though the adjacent River Yox.	Screened in.
Improvements at the A1094/B1069 junction south of Knodishall.	All construction works would be undertaken within the existing highway boundary. The proposed improvements include changes to the current speed limit on the existing carriageway with improvements of visibility splays and provisions of signage and road markings. Overall, it is considered there would be no impact upon terrestrial ecology or ornithology.	Due to the small scale, minor nature of the works this highway improvement is screened out.
Improvements at the A12/A144 junction south of Bramfield	The proposed works include the provision of central reservation island and waiting area. Works would involve the widening of the A12 from approximately 8m to approximately 10m and would result in the permanent loss	Due to the small scale, minor nature of the works, this highway improvement is screened out.

Proposed Highways Improvement / safety measures	Summary Of Potential Effects	Screened In Or Out Of The Assessment
	of 0.3ha of land. Minor vegetation clearance would be required; however, overall, it is considered there would be no significant effects upon terrestrial ecology or ornithology.	
Improvements at the A12/B1119 junction at Saxmundham	Works would include improvements of visibility splays, alteration of the B1119 at the junction with the A1 and provision of signage and road markings. All works would be undertaken within the existing highway boundary. Overall, it is considered there would be no impact upon terrestrial ecology or ornithology.	Due to the small scale, minor nature of the works, this highway improvement is be screened out.
Safety measures at the B1078/B1079 junction east of Easton and Otley College.	All construction works would be undertaken within the existing highway boundary. Minor improvements are proposed to this existing section of carriageway comprising improvements of visibility splays and provisions of signage and road markings. Overall, it is considered there would be no impact upon terrestrial ecology or ornithology.	Due to the small scale, minor nature of the works, this highway improvement is screened out.
Safety measures at the A140/B1078 junction west of Coddenham.	All construction works would be undertaken within the existing highway boundary. Minor improvements are proposed to this existing section of carriageway comprising improvements of visibility splays and provisions of signage and road markings. Overall, it is considered there would be no impact upon terrestrial ecology or ornithology.	Due to the small scale, minor nature of the works, this highway improvement is screened out.

d) Study area

7.3.12 The study area includes the land within the site boundary and Zone of Influence (ZOI) (defined below) for the proposed Yoxford roundabout. Due to the variable sensitivity of terrestrial ecology and ornithology receptors, the study area differed depending on the receptor considered.

7.3.13 The survey area for which baseline data was collected is defined as '*the geographical extent over which a particular field survey activity took place'*. The survey area differed depending on the receptor being surveyed.

7.3.14 Ecological features have been considered within areas of the site boundary and their immediate environs, taking into account their legislative protection, conservation status and their status/distribution in the vicinity of the site, as well as desk-study information and previous survey work. **Appendix 7A** provides the full ecological baseline for the site.

7.3.15 Areas and resources that may be affected by the identified activities arising from the whole lifespan of the proposed development were considered. These identify the ZOIs. The ZOI is defined as *'the area over which ecological features may be affected by potential biophysical changes caused by a proposed project and associated activities'*.

7.3.16 The ZOIs have been developed as species/species assemblage-appropriate distances from the site boundary, taking into account varying mobility.

7.3.17 **Table 7.5** defines the ZOI, study area and survey area for the considered ecological features for the proposed Yoxford roundabout site.

Table 7.5: Specific ZOI, study area and survey areas for ecological features

Ecological Feature		ZOI	Study Area	Survey Area
Designated Sites	Statutory designated	5km	5km	N/A
	Non-statutory designated	2km	2km	N/A
Plants and Habitats		2km	2km	Within the proposed Yoxford roundabout site boundary.
Invertebrates		2km	2km	Not surveyed as habitat suboptimal.
Reptile		2km	2km	Not surveyed as habitat largely suboptimal.
Amphibians		2km	2km	Within the proposed Yoxford roundabout site boundary and a 500m buffer area[1].
Birds		2km	2km	Not surveyed as no habitats of bird importance identified.
Bats		2km	2km	Within the proposed Yoxford roundabout site boundary (and a 10m buffer area for bat tree roost assessments).

[1] This is in accordance with standing advice from Natural England for assessing the impacts of developments on great crested newts (Natural England, 2015).

Ecological Feature	ZOI	Study Area	Survey Area
Terrestrial Mammals	2km	2km	Within the proposed Yoxford roundabout site boundary.

7.3.18 Additionally, a **Shadow HRA Report** (Doc Ref. 5.10) assessment has been undertaken for the site, and a project wide **Water Framework Directive (WFD) compliance assessment** (Doc Ref. 8.14) has been undertaken in conjunction with the environmental assessment.

e) Assessment scenarios

7.3.19 The assessment of effects on terrestrial ecology and ornithology is based on each of the construction and operation phases of the proposed development, rather than specific assessment years.

f) Assessment criteria

7.3.20 As described in **Volume 1, Chapter 6** (Doc Ref. 6.2), the EIA methodology considers whether impacts of the proposed Yoxford roundabout would have an effect on any resources or receptors. Assessments broadly consider the magnitude of impacts and value/sensitivity of resources/receptors that could be affected in order to classify effects.

7.3.21 A detailed description of the assessment methodology used to assess the potential effects on terrestrial ecology and ornithology arising from the proposed Yoxford roundabout is provided in **Volume 1, Appendix 6J** (Doc Ref. 6.2). A summary of the assessment criteria used in this assessment is presented in the following sub-sections.

g) Sensitivity

7.3.22 The definitions of value and sensitivity criteria used in this assessment are set out in **Table 7.6**. Value and sensitivity are assessed separately, as they are to an extent independent of each other.

Table 7.6: Assessment of the value or sensitivity of receptors for terrestrial ecology and ornithology

Importance/ Sensitivity	Description
High	**Value**: Feature/receptor possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site/receptor (for example designated features of international/national importance, such as SACs, SPAs, Ramsar sites and SSSI).

Importance/ Sensitivity	Description
	Sensitivity: Feature/receptor has a very low capacity to accommodate the proposed form of change.
Medium	**Value**: Feature/receptor possesses key characteristics which contribute significantly to the distinctiveness and character of the site/receptor (for example designated features of regional or county importance such as CWSs and local Biodiversity Action Plan (BAP) species). **Sensitivity**: Feature/receptor has a low capacity to accommodate the proposed form of change.
Low	**Value**: Feature/receptor only possesses characteristics which are locally significant. Feature/receptor not designated or only designated at a district or local level (for example Local Nature Reserves (LNRs)). **Sensitivity**: Feature/receptor has some tolerance to accommodate the proposed change.
Very Low	**Value**: Feature/receptor characteristics do not make a significant contribution to local character or distinctiveness. Feature/receptor not designated. **Sensitivity**: Feature/receptor is generally tolerant and can accommodate the proposed change.

7.3.23 The sensitivity of individual IEFs within the ZOI of the proposed Yoxford roundabout is determined in **section 7.4c)** where the potential impacts on IEFs are described. Different IEFs have different levels of sensitivity, depending upon the type of impact being described as well as the predicted duration, extent and magnitude of the impact. The sensitivity of individual IEFs has been qualified, where sufficient information exists. In the absence of detailed information, then professional judgement has been used to determine the sensitivity of individual IEFs.

7.3.24 In addition, in line with the CIEEM guidelines, the importance of an ecological feature, as determined with reference to legal, policy and/or nature conservation considerations, has been assessed within the following geographical context:

- International and European importance;
- National importance (i.e. England);
- Regional importance (i.e. the East of England);
- County importance (i.e. Suffolk); and

- Local importance, including assessment with a district or borough context, or within the ZOI of the site.

h) Magnitude

7.3.25 **Table 7.7** sets out the following thresholds that have been used in the definition of the different scales of magnitude of impact to act as a guide for the assessment.

Table 7.7: Assessment of magnitude of impact on for terrestrial ecology and ornithology

Magnitude	Criteria
High	Large-scale, permanent/irreversible changes over a large area; for example, loss of greater than 30% of designated site/habitat used by an ecological receptor or greater than 30% loss of a species population within the development area (where this can be determined).
Medium	Medium-scale, permanent/irreversible changes; for example, loss of between 5 and 30% of designated site/habitat used by an ecological receptor or loss of between 5 and 30% of a species population within the development area (where this can be determined).
Low	Noticeable but small-scale change over a partial area; for example, loss of between 1 and 5% of designated site/habitat used by a receptor or loss of a few individuals of a species population.
Very Low	Noticeable, but very small-scale change; for example, less than 1% of designated site/habitat used by an ecological receptor.

7.3.26 Where possible, magnitude of impact has been quantified taking account of not only the habitat or species resource within the site but also within the wider area, as appropriate. For example, for bats, consideration has been given to the Core Sustenance Zone (CSZ) for each species, but also habitat quality within the CSZ.

7.3.27 In compliance with the CIEEM guidelines impacts on biodiversity are assessed not only by magnitude, but are also characterised and described as positive/negative together with their extent, duration, reversibility, timing and frequency (figures for percentage loss in **Table 7.7** above are therefore indicative not absolute). **Table 7.8** provides impact criteria used in line with the CIEEM guidelines.

Table 7.8: Criteria for determining the impact on ecological features under CIEEM guidelines (7.24)

Characteristic	Criteria
Positive or Negative	Positive impact: a change that improves the quality of the environment. Positive impacts may also include halting or slowing an existing decline in the quality of the environment. Negative impact: a change that reduces the quality of the environment.
Extent	The spatial or geographic area over which the impact/effect may occur.
Magnitude	Refers to the size, amount, intensity and volume. It will be quantified if possible and expressed in absolute or relative terms.
Duration	Duration will be defined in relation to ecological characteristics (such as a species' lifecycle), as well as human timeframes. The duration of an activity may differ from the duration of the resulting effect caused by the activity. Effects may be described as short, medium or long-term and permanent or temporary. Where durations of short, medium, long-term and temporary are given in this assessment, they are defined in months/years, where possible, and often depend upon the IEF being assessed.
Frequency	The number of times an activity that will impact biodiversity will occur.
Timing	The timing of an activity or change caused by the project may result in an impact if this coincides with critical life-stages or seasons.
Reversibility	Irreversible: an effect from which recovery is not possible within a reasonable timescale or there is no reasonable change of action being taken to reverse it. Reversible: an effect from which spontaneous recovery is possible or which may be counteracted by mitigation.

7.3.28 Impacts can also be defined as being direct or indirect. A direct impact is defined as an impact resulting in the direct interaction of an activity with an environmental or ecological component. An indirect impact is defined as an impact on the environment which is not a direct result of a project or activity, often produced away from or as a result of a complex impact pathway.

i) Effect definitions

7.3.29 The definitions of effect for terrestrial ecology and ornithology are shown in **Table 7.9** in line with the EIA methodology set out within **Volume 1, Chapter 6** (Doc Ref. 6.2).

Table 7.9: Generic effect definitions

Effect	Description
Major	Effects, both adverse and beneficial, which are likely to be important considerations at a national to regional level because they contribute to achieving national/regional objectives, or, which are likely to result in exceedance of statutory objectives and/or breaches of legislation.

Effect	Description
Moderate	Effects that are likely to be important considerations at a regional or county level.
Minor	Effects that could be important considerations at a local level.
Negligible	An effect that is likely to have a negligible or neutral influence, irrespective of other effects.

7.3.30 Following the classification of an effect as presented in **Table 7.9**, a clear statement is made as to whether the effect is 'significant' or 'not significant'.

7.3.31 Under CIEEM guidelines, the significance of effect on the IEF(s) has been determined based on the analysis of the factors that characterise the impact (**Table 7.8**). A significant effect is defined as *'an effect that either supports or undermines biodiversity conservation objectives for the IEFs or for biodiversity in general'*.

7.3.32 Using CIEEM guidelines and approach, significance of effect has been qualified regarding an appropriate geographical scale, using the following terms:

- significant at the international level;
- significant at the national level;
- significant at the regional level;
- significant at the county level;
- significant at the local level; and
- not significant.

7.3.33 To allow a consistent approach across all disciplines, the standard levels of significance defined in the CIEEM guidelines are set out in **Table 7.10**, alongside the equivalent definitions of effect used elsewhere in this ES. Therefore, as a deviation from the standard EIA methodology, minor effects identified within this chapter have been classified as significant at a local level.

Table 7.10: Summary and comparison of EIA and CIEEM based measures of significance of ecological effects

Significance Following The CIEEM Guidelines	Equivalent Significance Definitions Following The EIA Guidelines Volume 1, Chapter 6
Significant at the international level	Major (= significant)
Significant at the national level	Major (= significant)
Significant at the regional level	Moderate (= significant)
Significant at the county level	Moderate (= significant)
Significant at the local level	Minor (= not significant)
Not significant	Negligible (= not significant)

j) Assessment methodology

i. Establishing the baseline

Existing baseline

7.3.34 Baseline conditions for the proposed Yoxford roundabout site were determined through a combination of a desk-study and field surveys. Technical data has been assimilated from survey work undertaken in 2019. A review was also conducted to determine any European and nationally designated sites located within 5km of the site. Through this method, habitat and species of importance were identified and assessed. **Appendix 7A** contains the detailed methodology and results of this baseline study and is summarised below.

7.3.35 The desk-study exercise comprised the following steps:

- identification of designated sites (statutory and non-statutory) including SPAs, SACs, Ramsar sites, SSSIs and National Nature Reserve (NNR) within 5km, and LNRs and CWSs within 2km;
- review of Suffolk Biodiversity Information Service and Joint Nature Conservation Committee records;
- review of the Ancient Woodland Inventory information held on the Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref. 7.35); and
- a review of the Suffolk BAP, Suffolk's Priority Species and Habitats list, and listed under Section 41 of the NERC Act.

7.3.36 A full account of the desk-study conducted for this EcIA has been provided in **Appendix 7A**.

7.3.37 A detailed suite of ecological survey work was undertaken within the site and/or its immediate surrounds (i.e. within the ZOI) in 2019. The following surveys have been conducted:

- extended Phase 1 habitat and protected species walkover, including a hedgerow assessment and badger (*Meles meles*) survey;
- great crested newt (*Triturus cristatus*) Habitat Suitability Index (HSI)[2] and eDNA surveys; and
- bat tree roost assessments (ground-level assessment only).

7.3.38 **Appendix 7A** and its associated annexes contain the detailed methodologies and results of these surveys.

Future baseline

7.3.39 The future baseline considered any committed development(s) or forecasted changes (for example climate change) that would materially alter the baseline conditions during the construction and operation of the proposed Yoxford roundabout development. It also considered what the land use would be in the absence of the proposed Yoxford roundabout development.

ii. Assessment

7.3.40 The assessment of effects on terrestrial ecology and ornithology is based on the full construction period and operation of the proposed Yoxford roundabout and its associated activities rather than specific assessment years.

iii. Inter-relationships

7.3.41 A number of inter-relationships and their effects have been considered on the different receptors, where relevant. This has included consideration of:

- noise;

[2] HSI refers to the suitability of ponds for supporting great crested newts, a score of excellent indicates that the pond is suitable to support great crested newts.

- air quality;
- lighting; and
- groundwater and surface water.

k) Assumptions and limitations

7.3.42 The assessment is based on the prevailing ecological conditions which are not expected to change in the absence of the proposed Yoxford roundabout development.

7.3.43 All assessments consider development within the site parameters as set out in the description of development in **Chapter 2** of this volume of the **ES** and illustrated on the **Work Plans** provided in **Appendix 2B.**

7.3.44 The following limitations have been identified:

- Access to conduct great crested newt surveys within a 500m radius of the proposed Yoxford boundary site boundary was not granted for all ponds. Where access was not possible, an assessment of the likelihood of great crested newts being present/absent was completed by examining the surrounding habitat suitability, interconnectivity, and the survey results of the ponds where access was obtained.
- For the analysis of samples for the great crested newt eDNA surveys, there are the following limitations: (1) the results are based on analyses of the samples obtained during surveys and received by the laboratory; (2) any variation between the characteristics of the sample and a batch will depend on the sampling procedure used; (3) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of great crested newt DNA against a calibration curve; (4) a 'not detected' result does not exclude the presence at levels below the limit of detection.
- Access to conduct bat surveys across the full extent of the proposed Yoxford roundabout site was not granted. It is, however, considered that sufficient information was gathered across the remainder of the survey area to describe the bat assemblage.

7.4 Yoxford roundabout

a) Baseline environment

7.4.1 This section presents a description of the baseline environmental characteristics within the site and in the surrounding area in relation to terrestrial ecology and ornithology.

7.4.2 Further details can be found in **Appendix 7A**. Where a habitat or species is of conservation concern, this is stated, and the conservation status provided along with the appropriate legislation.

i. Current baseline

Designated sites

7.4.3 There are six statutory designated sites of conservation importance within 5km of the site. These are: Dew's Ponds SAC and SSSI (3km north) and Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site and SSSI (4km east).

7.4.4 The SAC, SPA and Ramsar sites support habitat and/or species of European importance listed under Annex I of the EC Birds Directive and Annex I and II of the EC Habitats Directive. These designated sites are therefore of international importance under the CIEEM guidelines and of high importance under the EIA-specific methodology. The SSSIs support habitats and species of national importance and are therefore considered to be of national importance under the CIEEM guidelines and of high importance under the EIA-specific methodology.

7.4.5 Six non-statutory designated sites are within 2km of the site. The first, Roadside Nature Reserve (RNR) 197, is located adjacent to the site boundary on the southern side of the B1122 (Middleton Road). It is designated on account of the presence of the Sandy Stilt Puffball fungus (*Battarraea phalloides*). Sandy Stilt Puffball is known to be present at approximately 30 sites in the UK, of which seven are in Suffolk (Ref. 7.36). RNR 197 is therefore considered to be of national importance under the CIEEM guidelines and of high importance under the EIA-specific methodology.

7.4.6 The remaining sites are: Minsmere Valley Reckford Bridge to Beveriche Manor County Wildlife Site (CWS) (320m east); and Yoxford Wood CWS (also an Ancient and Semi-Natural Woodland on the Ancient Woodland Inventory) (1.35km north-west), Darsham Marshes CWS (and SWT reserve) (1.76km east), and Suffolk Coastal 212 CWS (which is also RNR Number 102) (1.96km south). CWSs support habitat types listed on Section 41 of the

NERC Act and are targeted for action under the Suffolk BAP and Suffolk's Priority Species and Habitats list. These sites are therefore of county importance under the CIEEM guidelines and of medium importance under the EIA-specific methodology.

7.4.7 Full details of the reasons for designation are provided in **Appendix 7A**. The boundaries of statutory designated sites within 5km of the site and non-statutory designated sites within 2km are shown on **Figures 7.1** and **7.2** in **Appendix 7A** respectively.

7.4.8 None of these designated sites fall within the site boundary; however, RNR 197 is adjacent to it. In addition, the site is hydrologically linked to the Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site, and SSSI, Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS through the River Yox that runs adjacent to the northern boundary of the site. Therefore indirect impacts may be experienced by Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site, and SSSI, Minsmere Valley Reckford Bridge to Beveriche Manor CWS, Darsham Marshes CWS and RNR 197. These sites have also been scoped into the assessment.

7.4.9 Given the distance of the remaining designated sites from the site, that there would be no land take from the designated sites and that no clear impact pathways, the remaining designated sites have been scoped out from the assessment of the proposed Yoxford roundabout development.

Plants and habitats

7.4.10 **Figure 7.3** in **Appendix 7A** provides the extended Phase 1 habitat map for the Yoxford roundabout site, along with associated Target Notes (TNs) and Hedgerow numbers (H1 etc).

7.4.11 The site comprises predominantly poor semi-improved grassland as pasture fields and highway land. No botanically-rich field margins or notable plant species were recorded on the site. The fields are bounded by fences and hedgerows. Two hedgerows were recorded within the site boundary as shown in **Figure 7.3** in **Appendix 7A.** H1 is species-rich, while H2 is defunct and species-poor. Neither hedgerow is 'Important' when assessed against the Wildlife and Landscape Criteria of the Hedgerows Regulations. Hedgerows are a Suffolk BAP priority habitat and are listed under Section 41 of the NERC Act. The hedgerows on the site are of local importance under the CIEEM guidelines and of low importance under the EIA specific-methodology.

7.4.12 No ponds are within the site boundary. Eleven waterbodies (ponds) are present within 500m of the site boundary, two of which were scoped out from

further assessment due to separation from the site by the A12 and intensive agricultural land. Ponds are a habitat listed under Suffolk's Priority Species and Habitats list and Section 41 of the NERC Act. The networks of ponds within the ZOI are of local importance under the CIEEM guidelines and of very low importance under the EIA specific-methodology.

7.4.13 The River Yox flows to the north of the site and is adjacent to the site boundary. Rivers are a habitat listed under Suffolk's Priority Species and Habitats list and is listed under Section 41 of the NERC Act. The River Yox is of county importance under the CIEEM guidelines and of medium importance under the EIA-specific methodology

7.4.14 There is one desk-study record of Sandy Stilt Puffball from the RNR 197 (within the site boundary) which is designated due to the presence of this species. Whilst habitats on the site are suitable for this species, the presence of this species was not recorded during the survey, likely due to the time of year the Phase 1 habitat survey was conducted (April/May) as Sandy Stilt Puffball is only visible autumn when it fruits (Ref. 7.37). In addition, this species does not fruit every year. Sandy Stilt Puffball is on Schedule 8 of the Wildlife and Countryside Act, is listed under Section 41 of the NERC Act, and is also on Suffolk's Priority Species and Habitats list. As this species is associated with RNR 197, it has been assessed under this non-designated site rather than independently.

7.4.15 There was one record of Rough Hawk's-beard (*Crepis biennis*) from over 750m from the site. Rough Hawk's-beard is found in improved grassland, road verges, and brownfield habitats. Habitats on the site were considered suitable for Rough Hawk's-beard; however, this species was not recorded during the survey. This species is on Suffolk Rare Plant Register (Ref. 7.38). As this species was not recorded within the site, is it therefore considered of local importance under the CIEEM guidelines and of low importance under the EIA-specific methodology.

Invertebrates

7.4.16 Records of three invertebrate species within 2km of the site boundary were identified during the desk-study; a freshwater air-breathing snail (*Anisus spirorbis*), small heath butterfly (*Coenonympha pamphilus*), and wall butterfly (*Lasiommata megera*). The adjacent River Yox could support the freshwater air-breathing snail (*Anisus spirorbis*). None of the records were from within the site, and the habitats present within the site boundary were identified as being unsuitable for use by these three species and therefore they are considered unlikely to be present.

7.4.17 No habitat of particular value to invertebrates was identified within the site. Most of the site comprises species-poor semi-improved pasture, with one species-rich hedgerow, but with no other features of particular importance to invertebrate species. The invertebrate assemblage within the ZOI of the site is of local importance under the CIEEM guidelines and very low importance under the EIA-specific methodology.

Amphibians

7.4.18 Eleven ponds were confirmed present within 500m of the site boundary, shown on **Figure 7.4** in **Appendix 7A**. Two ponds (P073 and P074) were scoped out from further assessment as these are on the west side of the A12 which is considered a barrier to great crested newt movement. Nine ponds were identified as needing further survey; however, access was refused to eight of these ponds (P070, P071, P072, P075, P110, P111, P112, and P113). One farm pond (P084) located within 10m of the boundary of the site, was accessed and an HSI survey and eDNA survey were undertaken. This pond resulted in a 'poor' HSI score category (HSI = 0.49) when assessed for suitability for great crested newts. The eDNA survey result was inconclusive. Pond P084 is devoid of vegetation, had evidence of poaching and impacts from livestock, and had a high level of dirt and particulates, likely resulting in the inconclusive results. Due to the level of impact from livestock, it is considered highly likely that great crested newts are absent from this pond.

7.4.19 The aquatic and terrestrial habitats within the site boundary are of limited value to great crested newts, as well as being subject to a high level of disturbance. The terrestrial habitats (field margins, hedgerows, and woodland blocks) and network of ponds in the wider ZOI comprise suitable breeding and foraging habitat, and hibernation sites; however, connectivity to suitable breeding ponds is poor, and the site is isolated from these suitable habitats. It is, therefore, considered unlikely that great crested newt or other common amphibian species would be present on the site, and have been scoped out of the assessment.

Reptiles

7.4.20 There were no desk-study records of reptiles within 2km of the site. Within the site boundary, habitats comprise species-poor semi-improved grassland, hedgerows, scrub, and road verges; however, large areas of species-poor semi-improved grassland, disturbed by grazing animals, make up most of the site and the site does not provide the mosaic of varied habitat that is required by reptiles to bask, forage and shelter. The habitats onsite are, therefore, considered to be of limited value to reptiles.

7.4.21 All four common species of reptile (grass snake (*Natrix helvetica helvetica*), adder (*Vipera berus*), common lizard (*Zootoca vivipara*) and slow-worm (*Anguis fragilis*)) are listed under Suffolk's Priority Species and Habitats list and Section 41 of the NERC Act. However, given the limited potential for reptiles within the site, the reptile assemblage is of local importance under the CIEEM guidelines and of very low importance under the EIA-specific methodology.

Birds

7.4.22 The desk- study identified an assemblage of birds typical of farmland habitats, such as grey partridge (*Perdix perdix*), lapwing (*Vanellus vanellus*), linnet (*Linaria cannabina*), turtle dove (*Streptopelia turtur*), and yellowhammer (*Emberiza citrinella*), as well as ground-nesting species such as skylark (*Alauda arvensis*), are likely to be present close-to or on the site. It is also possible that some bird species listed on Schedule 1 of the Wildlife and Countryside Act, such as woodlark (*Lullula arborea*), could use the site for breeding.

7.4.23 Whilst no targeted bird surveys have been undertaken on the site, the assumed presence of a farmland bird assemblage is supported by breeding bird surveys carried out in the area for other associated development sites; the northern park and ride and Sizewell link road (**Volume 3, Appendix 7A** and **Volume 6, Appendix 7A**). On this basis, it was concluded that a farmland bird assemblage is likely to be present. Farmland birds have been declining nationally since the 1970's (Ref. 7.39) and many species are included within Section 41 of the NERC Act as well as being listed on Suffolk's Priority Species and Habitats list. The assemblage is likely to be low in numbers and have poor species diversity considering the small size and low quality of the habitats. Intensively managed farmland habitat is widespread in Suffolk and it is not being managed specifically to benefit birds. The bird assemblage associated with the site is of local importance under the CIEEM guidelines and low importance under the EIA-specific methodology.

Bats

7.4.24 Two species of bat have been recorded historically within the study area, these being: soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared bat (*Plecotus auratus*). There is one record of a brown long-eared roost located approximately 460m north-west of the site. The other records of brown long-eared bat and soprano pipistrelle were distributed around the site between 270m and 580m from the site boundary.

7.4.25 All species of bats found in the UK are protected under Schedule 2 of the Conservation of Habitats and Species Regulations and Schedule 5 of the

Wildlife and Countryside Act. Certain species of bat; barbastelle (*Barbastella barbastellus*), Bechstein's bat (*Myotis bechsteinii*), noctule (*Nyctalus noctula*), soprano pipistrelle, brown long-eared bat, greater horseshoe bat (*Rhinolophus ferrumequinum*), and lesser horseshoe bat (*Rhinolophus hipposideros*); are listed under Section 41 of the NERC Act. In addition to the Section 41 species, serotine (*Eptesicus serotinus*), Brandts (*Myotis brandtii*), Daubenton's (*Myotis daubentonii*), whiskered bat (*Myotis mystacinus*), natterer's bat (*Myotis nattereri*), Leisler's bat (*Nyctalus leisleri*), nathusius' pipistrelle (*Pipistrellus nathusii*), and common pipistrelle (*Pipistrellus pipistrellus*) are also listed on Suffolk's Priority Species and Habitats list.

7.4.26 The Phase 1 habitat survey (**Figure 7.3**) identified the habitats present to be primarily agricultural fields of limited value to bats. Hedgerows and scattered mature trees are also present, which have potential to support roosting bats and provide limited foraging and commuting opportunities. The bat tree roost assessment survey identified two trees with the potential to support roosting bats within the site boundary (one moderate potential (T1); one low potential (T2)). The locations of these trees are illustrated on **Figure 7.5**.

7.4.27 External to the site, within the ZOI, are hedgerows, small to medium sized woodland blocks, wood-pasture and parkland, coastal and floodplain grazing marsh, marshland and purple moor-grass and rush pastures (associated with Minsmere Valley Reckford Bridge to Beveriche Manor CWS) which would provide ample, alternative foraging, commuting and roosting habitat for bats, that would not be affected by the proposed development. Bats would therefore not be dependent on the limited habitat available within the site boundary. The bat assemblage on the site is therefore considered to be of local importance under the CIEEM guidelines and of low importance under the EIA-specific methodology.

Other mammals

7.4.28 There were no desk-study records of water vole (*Arvicola amphibius*) and otter (*Lutra lutra*) within 2km of the site. The River Yox, adjacent to the northern boundary of the site (TN2, **Figure 7.3**), is suitable habitat to support water vole and otter. Water voles are protected under Schedule 5 of the Wildlife and Countryside Act and are also listed under Section 41 of the NERC Act and Suffolk's Priority Species and Habitats list. Otter are protected under Schedule 5 and 6 of the Wildlife and Countryside Act, and Schedule 2 of the Conservation of Habitats and Species Regulations and are included within Section 41 of the NERC Act and Suffolk's Priority Species and Habitats list. Otter and water vole is of local importance under the CIEEM guidelines and of low importance under the EIA-specific methodology.

7.4.29 There were two desk-study records of badger within the study area. No badger setts or signs of badgers were recorded during the extended Phase 1 habitat and protected species survey and the habitats on the site were assessed as being of limited value to foraging badgers. Badgers are considered to be absent from the site and are not considered further in this assessment.

7.4.30 There were no desk-study records of brown hare (*Lepus europaeus*) and the closest hedgehog desk-study record was 30m north-east of the site. Both species were not recorded during surveys. The habitat within the site is suitable for brown hare and hedgehog; however, the populations of brown hare and hedgehog using the site would not be a significant contribution to the wider population of these species. Brown hare and hedgehog are listed under Section 41 of the NERC Act and Suffolk's Priority Species and Habitats list. Both species within the ZOI are of local importance under the CIEEM guidelines and of very low importance under the EIA-specific methodology.

ii. Future baseline

7.4.31 There are no committed development(s) or forecasted changes (e.g. climate change) that would materially alter the baseline conditions relevant to this assessment during the construction and operation phases of the proposed Yoxford roundabout development.

iii. Important Ecological Features

7.4.32 Following a review of the known baseline information within the ZOI, **Table 7.11** lists the ecological features/receptors and details which have been carried forward into the detailed assessment. Further justification for these is also found within **Appendix 7A**. Those carried forward are IEFs of sufficient conservation value (local/low importance or above) with a potential to be affected by the proposed development, and therefore requiring further consideration within this chapter.

7.4.33 There are several ecological features that, while not of significant nature conservation value within the ZOI, do require some consideration because of the legislative protection afforded to them. While not taken forward for detailed assessment, these have been considered further within **section 7.4b)** where appropriate mitigation to ensure legislative compliance for their protection has been described.

Table 7.11: Determination of IEFs to be taken forward for detailed assessment

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope In/Out
Statutory designated sites – Dew Ponds SAC and SSSI	International/High	Dew's Ponds SAC and SSSI supports an Annex II species of European importance listed under the EC Habitats Directive (7.4). Given the distance of these sites from the proposed Yoxford roundabout (3km north), no direct land take of this site would occur, and no obvious impact pathways have been identified. Dew's Ponds SAC and SSSI have therefore been scoped out of the detailed assessment	Scoped out
Statutory designated sites – Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site, and SSSI	International/High	Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site, and SSSI support Annex I habitats of European importance listed under the EC Habitats Directive (7.4), supports Annex I species of European importance listed on Article 4 of the EC Birds Directive (7.3), is a wetland of international importance, and also support habitats of national importance. While there will be no land required from Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site, and SSSI, the site is hydrologically linked to this designated site through the River Yox which is directly adjacent to the site. Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site and SSSI is therefore scoped in to the detailed assessment.	IEF Scoped in
Non-statutory designated sites - Yoxford Wood CWS, and Suffolk Coastal 212 CWS and RNR 102	County/Medium	Yoxford Wood CWS and Suffolk Coastal 212 CWS support habitat types listed on Section 41 of the NERC Act (7.10) and that are targeted for action in the Suffolk BAP (7.20). RNR 102 is designated to conserve good examples of species-rich plant areas and plants of national or county importance. Given the distance of these sites from the site (the closest being 1.35km away), no direct land take of these sites will occur, and no obvious impact pathways have been identified Yoxford Wood CWS, and Suffolk Coastal 212 CWS and RNR 102 are, therefore, scoped out of the detailed assessment.	Scoped out
Non-statutory designated sites – RNR 197	National/High	RNR 197 is designated for Sandy Stilt Puffball, a fungi listed on Schedule 8 of the • Wildlife and Countryside Act (7.7). Sandy Stilt Puffball is also listed under Section 41 of the NERC Act (7.10), and on Suffolk's Priority Species and Habitats list (7.21). This species is known from approximately 30 sites in the UK, of which seven are in Suffolk (7.36). Whilst this non-statutory designated site is adjacent to the site boundary and would be retained in its entirety; however, it may experience indirect impacts.	IEF Scoped in

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope In/Out
		RNR 197 is, therefore, scoped in to the detailed assessment.	
Non-statutory designated sites – Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS	County/Medium	Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS support habitat types listed on Section 41 of the NERC Act (7.10) and that are targeted for action in the Suffolk BAP (7.20). While there will be no direct land take from these designated sites, the site is hydrologically linked to both designated sites through the River Yox which is directly adjacent to the site. Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS are, therefore, scoped in to the detailed assessment.	IEF Scoped in
River habitat (River Yox)	County/Medium	Rivers are included on Suffolk's Priority Species and Habitats list (7.21) and are also listed under Section 41 of the NERC Act (7.10) while the River Yox is outside the site boundary, it is adjacent to a small section; therefore, this is the possibility of indirect impacts. The River Yox has therefore been scoped in to the detailed assessment.	IEF Scoped in
Hedgerows	Local/Low	Hedgerows are a Suffolk BAP priority habitat (7.21) and are also listed under Section 41 of the NERC Act (7.10). Hedgerows are widespread in Suffolk and none of the hedgerows were classified as 'important' under the Hedgerows Regulations (7.11). Hedgerows have therefore been scoped out of the detailed assessment.	Scoped out
Semi-improved grassland	Local/Very Low	This habitat type within the site is species-poor and grazed by livestock. Species-poor semi-improved pasture is widespread in Suffolk, and no botanically-rich field margins or notable plant species were recorded on the site. Semi-improved grassland has therefore been scoped out of the detailed assessment.	Scoped out
Ponds	Local/Very Low	Given that no ponds were identified within the site boundary and none would be impacted by the proposed Yoxford roundabout; ponds have been scoped out of the detailed assessment.	Scoped out
Rough Hawk's-beard	Local/Low	While there are suitable habitats of this species within the site, and that it is listed on Suffolk Rare Plant Register (7.38), this species was not recorded during baseline surveys and the desk-study records the species as being over 750m from the site.	Scoped out

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope In/Out
		Rough Hawk's-beard has therefore been scoped out of the detailed assessment; however, mitigation measures to protect this species have been included within **section 7.4b)**.	
Invertebrate assemblage	Local/Very Low	No habitat of particular value to invertebrates was identified within the site. Most of the site comprises species-poor semi-improved pasture, with one species-rich hedgerow but with no other features of particular importance to invertebrate species. Therefore, invertebrates are scoped out of the detailed assessment.	Scoped out
Great crested newt and amphibian assemblage	Local/Low	Eleven ponds are present within 500m of the site boundary. Ponds P073 and P074 were scoped out from further assessment as these are on the west side of the A12 which is considered a barrier to great crested newt movement. Access was granted to only one pond (P084), within 10m of the boundary of the site. This pond resulted in a 'poor' HSI score category (HSI = 0.49), and an 'inconclusive' result was returned from the eDNA testing. Pond P084 is devoid of vegetation, had evidence of poaching and impacts from livestock, and had a high level of dirt and particulates, likely resulting in the inconclusive results. Due to the level of impact from livestock, it is considered highly likely that great crested newts are absent from this pond. The aquatic and terrestrial habitats within the site boundary are of limited value to great crested newt, as well as being subject to a high level of disturbance. The terrestrial habitats (field margins, hedgerows, and woodland blocks) and network of ponds in the wider ZOI comprise suitable breeding and foraging habitat, and hibernation sites; however, connectivity to suitable breeding ponds is poor, and the site is isolated from these suitable habitats. It is, therefore, considered unlikely that great crested newt or other common amphibian species would be present on the site. Great crested newt and other amphibians have therefore been scoped out of the detailed assessment.	Scoped out
Reptile assemblage	Local/Very low	Habitat within the site boundary is of little value to reptile species. Habitats comprise largely species-poor semi-improved grassland (disturbed by grazing animals), bounded by hedgerows, scrub, and road verges. The site does not provide the mosaic of varied habitat that is required by reptiles to bask, forage and shelter. Reptiles have therefore been scoped out of the detailed assessment. However, all four common reptile species (adder, common lizard, grass snake and slow-worm) are protected under Section 41 of the NERC Act (7.10) and a limited amount of habitat to be lost was identified as having	Scoped out

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope In/Out
		the potential to support a small population of foraging and/or hibernating reptiles. Tertiary mitigation measures employed to protect reptiles have been detailed within **section 7.4 b)**.	
Bird assemblage	Local/Low	There is expected to be a farmland bird assemblage present within the site representative of the farmland habitats present. The assemblage is likely to be low in numbers and have poor species diversity considering the small size and low quality of the habitats. Intensively managed farmland habitat is widespread in Suffolk and it is not being managed specifically to benefit birds. It is not considered that any significant effects would occur on the bird populations as a result of the proposed Yoxford roundabout development. Birds have therefore been scoped out of the detailed assessment. However, breeding birds are protected under the Wildlife and Countryside Act (7.7) and there may be the potential for impacts on breeding birds, should works be undertaken during the breeding bird period (end of February to end of August inclusive). Tertiary mitigation measures employed to protect birds have been detailed within **section 7.4 b)**.	Scoped out
Bat assemblage	Local/Low	All bat species in the UK are protected under the Conservation of Habitats and Species Regulations (7.8). Additional relevant legislation includes the Wildlife and Countryside Act (7.7), and the NERC Act (7.10). There were no records of bats within the boundary of the site and most of the habitats within the site were of limited value to foraging and commuting bats. There were two trees within the site with moderate or low potential to support roosting bats. External to the site, within the ZOI, are hedgerows, small to medium sized woodland blocks, wood-pasture and parkland, coastal and floodplain grazing marsh, marshland and purple moor-grass and rush pastures (associated with Minsmere Valley Reckford Bridge to Beveriche Manor CWS) which would provide ample, alternative foraging, commuting and roosting habitat for bats, that would not be affected by the proposed development. Bats would therefore not be dependent on the limited habitat available within the site boundary. The site includes and is immediately adjacent to an existing highway and therefore it is highly unlikely to act as an important foraging, commuting or roosting habitat given existing levels of disturbance. In the unlikely event that bats are found to be roosting within the trees to be felled on site, then a license application to Natural England would be made to permit the destruction of the roosts.	Scoped out

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope In/Out
		In addition, details of tertiary mitigation measures employed to protect bats have been detailed within **section 7.4 b).** Bats have therefore been scoped out of the detailed assessment.	
Otters and water voles	Local/Low	Water voles are protected under Schedule 5 of the Wildlife and Countryside Act (7.7) and are also listed under Section 41 of the NERC Act (7.10) and Suffolk's Priority Species and Habitats list (7.21). Otter is on Suffolk's Priority Species and Habitats list (7.21) and Section 41 of the NERC Act (7.10) and are protected under Schedule 5 of the Wildlife and Countryside Act (7.7) and Schedule 2 of the Conservation of Habitats and Species Regulations (7.8); The site would only be adjacent to the River Yox for a short section and would not include any direct impacts to the watercourse or riverbank. The water vole and otter population would, therefore, not be affected, and any potential indirect impacts would be considered under the River Yox IEF (detailed above). Otter and water voles have therefore been scoped out of the detailed assessment.	Scoped out
Brown hare and hedgehog	Local/Very Low	The habitat within the site is suitable for brown hare and hedgehog; however, the populations of brown hare and hedgehog using the site would not be a significant contribution to the wider population of these species and effects are unlikely to be significant. Brown hare and hedgehog have therefore been scoped out of the detailed assessment. However, brown hare and hedgehog are listed on Suffolk's Priority Species and Habitats list (7.21) and Section 41 of the NERC Act (7.10). Details of tertiary mitigation measures that would be employed to protect these species have been detailed within **section 7.4 b)**.	Scoped out

7.4.34 In summary, the IEFs taken forward for a detailed assessment within **section 7.4 c)** are:

- IEF: Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site, and SSSI;
- IEF: RNR 197;
- IEF: Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS; and
- IEF: River Yox.

b) Environmental design and mitigation

7.4.35 As detailed in **Volume 1, Chapter 6**, a number of primary mitigation measures have been identified through the iterative EIA process and have been incorporated into the design and construction planning of the proposed Yoxford roundabout. Tertiary mitigation measures are legal requirements or are standard practices that would be implemented as part of the proposed Yoxford roundabout development.

7.4.36 The assessment of likely significant effects of the proposed Yoxford roundabout development assumes that primary and tertiary mitigation measures are in place. These measures are identified below, with a summary provided on how the measures contribute to the mitigation and management of potentially significant environmental effects.

i. Primary mitigation

7.4.37 Primary mitigation is often referred to as ‘embedded mitigation’ and includes modifications to the location or design to mitigate impacts, these measures become an inherent part of the proposed development.

7.4.38 A summary of the primary mitigation that has been incorporated into the design of the proposed development that will protect the existing habitats and species is provided below:

- RNR 197 would be retained in its entirety and there would be no habitat loss to the RNR.
- Existing trees and hedgerows adjoining the site boundary would be retained where possible. This includes the retention of a tree belt to the

north-west of the site, along the boundary of Satis House Hotel and hedgerow along the southern side of the B1122 (Middleton Road).

- The landscaping strategy for the site has been designed to minimise potential effects through the provision of planting, and will follow the design principles set out in the **Associated Development Design Principles** document (Doc Ref. 8.3). The proposed Yoxford roundabout would include grassed areas and new tree and hedgerow planting along the eastern edge of the realigned roads and around the proposed infiltration basin south of the new roundabout. Replacement planting would respect the new line of the A12.

- The drainage design would comprise channels, kerb drains or gullies that would remove surface water run-off in accordance with the **Drainage Strategy (Volume 2, Appendix 2A)**. Underground drains would convey the run-off to an infiltration basin located between the proposed roundabout and the proposed access road to the south. If required, runoff which does not infiltrate would discharge at a controlled flow rate lower than the current rate of run-off into Yoxford to the existing highway drainage network, the detailed design of which is to be agreed with the Highway Authority. Bypass separators and silt traps would be incorporated within the drainage design where considered necessary.

- Operational phase lighting would be designed to achieve a balance between providing lighting appropriate for all road users whilst seeking to minimise light-spill into adjacent habitats. Operational lighting design will be compliant with relevant highway standards and use light fittings chosen to limit stray light. Guidance within the latest Institution of Lighting Professionals (ILP) Guidance Note: Bats and artificial lighting in the UK (Ref. 7.40) would be followed as far as possible.

- A 5m buffer would be maintained between the proposed Yoxford roundabout and the adjacent River Yox to protect the integrity of the banks as well as the associated ecological features.

ii. Tertiary mitigation

7.4.39 Tertiary mitigation will be required regardless of any EIA assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral best practices.

7.4.40 Tertiary mitigation relevant to terrestrial ecology and ornithology would be detailed in the **Code of Construction Practice (CoCP)** (Doc Ref. 8.11). The

CoCP would establish the framework of arrangements required to manage environmental and ecological impacts, mitigate nuisance to the public and safeguard the environment during the enabling works, preliminary works, the main construction phase and site restoration phases.

7.4.41 Mitigation measures relevant to terrestrial ecology and ornithology that would be included in the **CoCP** would comprise:

- Construction work would take place during Monday to Saturday 07:00 to 19:00, and there may be a requirement for lighting at night in the winter or for safety and security. In addition, there may be the need for 24-hour working and therefore would require lighting. Where temporary construction lighting is required, it would be controlled to minimise light spill on surrounding habitats and minimise the visibility from sensitive receptors off-site, where reasonably practicable. This would minimise impacts on nocturnal species such as bats that may use the nearby tree lines or habitats for commuting, roosting or foraging.

- A temporary drainage strategy would be implemented early in the construction phase. Construction drainage would be contained within the site, with drainage to ground. Only if full infiltration is not possible would these systems discharge into the surface drainage network at greenfield runoff rates to minimise the potential for impact. This would preserve the hydrological regime of the adjacent River Yox and habitats and minimise the impacts to this feature.

- No storage of equipment or material would be stored within 5m of the River Yox. No materials would be stored in areas of high flood risk to avoid sediment loss during flooding.

- For trees and hedges to be retained within or immediately adjacent to the site boundary, tree and hedgerow root protection zones would be established. Tree protective fencing as described in section 6.2 of British Standard 5837:2012 (Ref. 7.41) would be erected, where required, prior to construction works commencing. If works need to be undertaken within the root protection zones, an arboricultural survey would be undertaken and the recommended measures would be implemented to support the long-term survival of the tree/hedgerow.

7.4.42 The proposed development includes the removal of two trees identified as having the potential to support roosting bats (T1 and T2, **Figure 7.5**). Therefore, tree inspections to determine evidence of use as roosts would be undertaken sufficiently in advance of tree-felling to enable licence

application(s) to be submitted to Natural England and develop an appropriate mitigation strategy, if required. Management measures are likely to include:

- A final inspection of these trees to be undertaken as close to the timing of felling as possible to account for the regular roost-switching behaviour displaced by tree-roosting bat species. Should bats (or evidence of use by bats) be identified, the mitigation strategies laid out in the licence application(s) would be implemented (for example, the fitting of exclusion devices).

- Felling would ideally be undertaken in September/October, to avoid the maternity and hibernation periods during which bats are more vulnerable to disturbance (this timing also avoids the bird-nesting season).

- To mitigate for the loss of the tree and potential roost resources, bat boxes would be installed on retained trees in suitable locations within the site boundary. For every tree with moderate or high bat roost potential that is due to be lost bat boxes would be installed in retained trees to maintain roosting resources within the site boundary. A variety of bat boxes would be used to support different species.

7.4.43 Prior to works taking place adjacent to the River Yox, a pre-construction survey would be conducted for otter and water voles:

- Otter: a pre-construction survey would be conducted to confirm the absence/presence of any otter holt. Should an otter holt be identified that would be directly impact by the proposed works, a licence from Natural England would be obtained. Should breeding otter be recorded, then all works would cease until both adult and young otter have left the holt.

- Water vole: a pre-construction survey would be undertaken the year prior to construction to determine if any water voles or features which indicate water vole are present within the footprint of the work or within 3m. If water voles are confirmed within the footprint of works or within 3m, to inform a licence application, detailed surveys would need to be conducted. The results of these surveys will inform a mitigation licence application to Natural England. Mitigation to displace water vole under licence can only take place between 15 February to 15 April. Surveys would be conducted in line with The Water Vole Mitigation Handbook.

7.4.44 Prior to any site clearance works, a pre-construction survey for Rough Hawk's-beard would be conducted in June/July. Should this species be identified within the site, any specimens as well as any mature seeds would be translocated / planted in an alternative, suitable habitat.

7.4.45 A small proportion of habitat within the site, primarily around the field margins, was identified as having some limited potential to support a small population of reptiles. All reptile species are protected from killing or injury under the Wildlife and Countryside Act. A draft Method Statement for reptiles has been prepared and included in **Annex 7A.5** of this volume, and includes the following measures that would be undertaken prior to the commencement of construction:

- An inspection would be undertaken by a suitably experienced ecologist of any potential reptile refugia, after which they should be removed.

- A phased vegetation clearance process would be undertaken to displace any reptiles from the site, under the supervision of a suitably experienced ecologist. Removal of vegetation and of places of shelter/hibernation features would be undertaken outside of the reptile (and amphibian) hibernating period (October to February inclusive), during periods of warm, dry weather (with due consideration of the seasonal constraints of clearance works during breeding bird season). If this is not possible, vegetation would be cut to the ground (to remove potential bird nesting habitat), but the roots would remain intact until hibernation is complete. The root system of vegetation would then be removed once the reptile hibernation season is over. Clearing of vegetation would be undertaken under the supervision of the suitably experienced ECoW.

7.4.46 The removal of vegetation, ground clearance and the commencement of construction activities have the potential to risk killing or injuring nesting birds, and to damage or destroy nests, including those of ground-nesting species, should works be undertaken during the breeding bird season (considered to be late February to August). Birds and their nests are protected under the Wildlife and Countryside Act and the removal of scrub and trees and ground clearance works would generally be undertaken outside of the breeding bird season. Measures could also be put in place to deter birds from nesting in any hedgerow to be removed (for example, cutting back vegetation and making the area less suitable); however, the ground would need to remain undisturbed during the reptile hibernation period, after which groundworks could commence. Where it is not possible to undertake these works outside of the breeding bird season, an inspection for nests would be undertaken by a suitably experienced ECoW prior to the removal of vegetation. If nesting

birds are identified during this process, works in the vicinity of the nest (estimated to be a 10m standoff) would cease until the young have fledged.

7.4.47 No evidence of badgers was recorded during the most recent surveys within the site and wider area, and the surrounding habitat is sub-optimal for this species; however, there is the potential for badgers to enter the site during construction. Therefore, the following measures would be undertaken during construction:

- Prior to construction works commencing, a pre-construction walkover of the site would be conducted in order to identify whether there are any signs of badgers and/or any newly established setts that may be impacted by the works. Should any setts be identified that would be disturbed by the construction works, or would require closure, then a licence from Natural England would be obtained. All licensable works would be undertaken between July to November (inclusive).

- If any excavations made during construction cannot be closed at night, a means of egress (i.e. a wooden plank) would be provided to ensure that any badgers that may access these excavations have a means of escape.

7.4.48 The phased approach to site clearance and topsoil stripping (as described above to safeguard reptiles) would discourage brown hare and hedgehogs away from the site of activity and into the surrounding suitable habitat.

7.4.49 Further details of tertiary mitigation measures taken into account for the proposed Yoxford roundabout to minimise noise and vibration impacts, dust pollution and air quality changes and to protect water quality are outlined in **Chapters 4, 5** and **12** of this volume respectively.

c) Assessment

i. Introduction

7.4.50 This section presents the findings of the terrestrial ecology and ornithology assessment for the construction and operation of the proposed Yoxford roundabout. It brings together the information presented in the preceding sections to consider the specific impacts likely to be experienced by the IEFs within the ZOI of the proposed development. Using the criteria set out within the CIEEM guidelines, the sensitivity of the IEFs, and all of the potential impacts related to each IEF have been characterised.

7.4.51 This section identifies any likely significant effects that are predicted to occur and **section 7.4 d)** then outlines any secondary mitigation and monitoring measures that are proposed to minimise any adverse significant effects (if required).

ii. Construction

7.4.52 Potential impact pathways that could be associated with the construction phase of the works are:

- habitat loss (land take);
- habitat fragmentation (including connectivity);
- incidental mortality of species;
- disturbance effects (comprising light, noise and visual effects);
- changes in water quality;
- alteration of local hydrology and hydrogeology; and
- changes in air quality.

7.4.53 Impact pathways with the potential for significant impacts on IEFs have been taken forward within the assessment. To assess each impact pathway, the first four elements of the CIEEM assessment process are addressed here, namely:

- activity, duration of activity, biophysical change and relevance to IEF in terms of ecosystem structure and function;
- characterisation of impact on the feature (taking into consideration the embedded primary and tertiary mitigation, as detailed in **section 7.4d)**);
- rationale for prediction of effect on integrity (of a site or ecosystem) or conservation status (of a habitat or population); and
- effect without further (i.e. secondary) mitigation.

7.4.54 The remaining elements of the CIEEM assessment process, mitigation and significance of effects of residual impacts after mitigation, are discussed in **sections 7.4 b)** and **d)** respectively.

IEF: Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site and SSSI

7.4.55 During construction, the impact pathways to the Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site and SSSI would be associated with changes in water quality. The characterisation of this impact is described in detail below.

Changes in water quality

7.4.56 While the Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site and SSSI is located 4km from the site, this designated site is hydrologically linked to the area surrounding the site as the River Yox is located close to the site boundary (adjacent to the site boundary at its closest point). As described in **section 7.4b)**, all construction works would be conducted in compliance with the **CoCP** (Doc Ref. 8.11), which defines measures for pollution prevention and control across the site. In addition, a 5m buffer area with the River Yox would be enforced, within which no storage of equipment or material would be allowed. No materials would be stored in areas of high flood risk to avoid sediment loss during flooding. With the design measures of the proposed Yoxford roundabout and management measures as described in **section 7.4b)** implemented there would be no significant effect on water quality.

7.4.57 The impact to the Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar site and SSSI would be of very low magnitude resulting in a negligible effect, which is considered to be **not significant**.

IEF: RNR 197

7.4.58 During construction, the impact pathways that RNR 197 would be affected by would be associated with:

- changes in water quality;
- alteration of local hydrology and hydrogeology; and
- changes in air quality.

7.4.59 The characterisation of these impacts is described in detail below.

Changes in water quality

7.4.60 As described in **section 7.4b)**, all construction works would be conducted in compliance with the **CoCP** (Doc Ref. 8.11), which manages pollution prevention and control across the site. A temporary drainage strategy would be implemented early in the construction phase that would intercept surface run-off, sediment and contaminants. With these primary and tertiary mitigation measures, no significant effect on water quality is anticipated.

7.4.61 The impact to the RNR 197 would be of very low magnitude resulting in a negligible effect, which is considered to be **not significant**.

Alteration of local hydrology and hydrogeology

7.4.62 As described in **section 7.4 b)**, all construction works would be conducted in compliance with the **CoCP** (Doc Ref. 8.11). A temporary drainage strategy would be implemented early in the construction phase that would intercept surface run-off, sediment and contaminants and incorporate sustainable drainage measures such as swales, filter drains, detention basins and soakaways to promote infiltration. Construction drainage would be contained within the site, with infiltration to ground. Any surface water would be returned to ground through the drainage system at green field rates. With these primary and tertiary mitigation measures in place, no significant effect on the local hydrology and hydrogeology is anticipated.

7.4.63 The impact to the RNR 197 would be of very low magnitude resulting in a negligible effect, which is considered to be **not significant**.

Changes in air quality

7.4.64 As described in **section 7.4 b)**, all construction works would be conducted in compliance with the **CoCP** (Doc Ref. 8.11) which would enforce mitigation measures to minimise air quality impacts. Such measures would include a Dust Management Plan (see **Chapter 5** for further detail). The proposed Yoxford roundabout development is estimated to take up to nine months to construct, and during its peak of construction, is anticipated to be served by ten Heavy Goods Vehicles (HGVs) per day.

7.4.65 The predicted total nitrogen deposition during construction is 21.1 kgN/ha/Yr. This would be an increase by 0.3 kgN/ha/Yr for the 2023 compared to without the development (see **Chapter 5** of this volume). However, as the change in concentration relative to air quality objectives is less than 1%, the impact to the RNR 197 would be of imperceptible magnitude resulting in a negligible effect, which is considered to be **not significant**.

IEF: Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS

7.4.66 During construction, the impact pathways that the Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS would be affected by would be associated with changes in water quality. The characterisation of this impact is described in detail below.

Changes in water quality

7.4.67 While the Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS is located 320m and 1.76km from the site respectively, these CWSs are hydrologically linked to the area surrounding the site as the River Yox is adjacent to the site boundary. As described in **section 7.4 b)**, all construction works would be conducted in compliance with the **CoCP** (Doc Ref. 8.11), which would manage pollution prevention and control across the site. In addition, a 5m buffer area with the River Yox would be enforced, within which no storage of equipment or material would be allowed. No materials would, also, be stored in areas of high flood risk to avoid sediment loss during flooding. With the design measures of the proposed Yoxford roundabout and management measures as described in **section 7.4 b)** implemented would no significant effect on water quality is anticipated.

7.4.68 The impact to the Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS would be of very low magnitude resulting in a negligible effect, which is considered to be **not significant**.

IEF: River Yox

7.4.69 During construction, the impact pathways that the River Yox would be affected by would be associated with:

- changes in water quality; and
- alteration of local hydrology and hydrogeology.

7.4.70 The characterisation of these impacts is described in detail below.

Changes in water quality

7.4.71 As described in **section 7.4 b)**, all construction works would be conducted in compliance with the **CoCP** (Doc Ref. 8.11), all construction works would be conducted in compliance with the CoCP, which would manage pollution prevention and control across the site. A temporary drainage strategy would

be implemented early in the construction phase that would intercept surface run-off, sediment and contaminants. These mitigation measures would minimise the effect on water quality, and no significant effect is anticipated.

7.4.72 The impact to the River Yox would be of very low magnitude resulting in a negligible effect, which is considered to be **not significant**.

Alteration of local hydrology and hydrogeology

7.4.73 As described in **section 7.4 b)**, all construction works would be conducted in compliance with the **CoCP** (Doc Ref. 8.11), all construction works would be conducted in compliance with the **CoCP.** A temporary drainage strategy would be implemented early in the construction phase that would intercept surface run-off, sediment and contaminants and incorporate sustainable drainage measures such as swales, filter drains, detention basins and soakaways to promote infiltration. Construction drainage would be contained within the site, with drainage to ground. Any surface would be returned to ground through the drainage system at green field rates. These mitigation measures would minimise the effect on the local hydrology and hydrogeology, and no significant effect is anticipated.

7.4.74 The impact to the River Yox would be of very low magnitude resulting in a negligible effect, which is considered to be **not significant**.

Inter-relationship effects

7.4.75 The potential construction impacts of air and water on IEFs are inherently considered within this assessment and therefore no inter-relationship with other topics are considered further.

7.4.76 This section provides a description of the identified inter-relationship effects that are anticipated to occur on terrestrial ecology and ornithology receptors between the individual environmental effects arising from construction of the proposed Yoxford roundabout development.

7.4.77 The potential impacts on the IEFs above have been assessed as not significant, and even in combination would not be expected to have a significant effect.

iii. Operation

7.4.78 During the operational phase, the impact pathways could be associated with:

- habitat fragmentation (including connectivity);

- incidental mortality of species;
- disturbance effects (comprising light, noise and visual effects);
- changes in air quality; and
- changes in water quality.

IEF: Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site, and SSSI

7.4.79 During operation, the impact pathways that the Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site, and SSSI would be affected by would be associated with changes in water quality. The characterisation of this impact is described in detail below.

Changes in water quality

7.4.80 The drainage design for the proposed Yoxford roundabout would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising. Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary. As such, there would be limit diffuse pollution reaching the River Yox, and therefore, there would be very low risk of water quality impacts to this hydrologically linked designated site.

7.4.81 The impact to the Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site, and SSSI would result in no effect.

IEF: RNR 197

7.4.82 During operation, the impact pathways that RNR 197 would be affected by would be associated with:

- changes in water quality;
- alteration of local hydrology and hydrogeology; and
- changes in air quality.

7.4.83 The characterisation of these impacts is described in detail below.

Changes in water quality and local hydrology and hydrogeology

7.4.84 The drainage design for the proposed Yoxford roundabout would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising. Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary. The infiltration pond would attenuate surface water runoff at a rate not exceeding existing green field run-off rates. As such, there would be no effect on water quality or local hydrology and hydrogeology for this site.

7.4.85 The impact to the RNR 197 would result in a negligible adverse effect, which is considered to be **not significant**.

Changes in air quality

7.4.86 Once operational, the roundabout would be used by members of the public and Sizewell C construction traffic. During the early years of construction, there would be an increase in traffic volumes. However, once the Sizewell link road is operational, Sizewell C construction traffic to the main development from the south would access the main development site from the Sizewell link road, and ones from the north would turn off onto the B1122 (see **Chapter 2** of this volume for further information on traffic flows at the proposed Yoxford roundabout).

7.4.87 RNR 197 would be susceptible to increases in operational air emissions from the roads, namely Nitrogen Oxides (NOx) concentrations and nitrogen deposition. The impact of NOx on fungi is poorly understood. Sandy Stilt Puffball is associated with dry, nutrient poor, sandy soils. Deposition of pollutants derived from NOx emissions can contribute to acidification and/or eutrophication of sensitive habitats leading to loss of biodiversity. Eutrophication associated with emissions would favour the growth of grass to the likely detriment to this fungus.

7.4.88 The predicted total nitrogen deposition during peak construction of the main development site would be 20.0 kgN/ha/Yr, a decrease of 0.4 kgN/ha/Yr when compared to without the development. In addition, the predicted total nitrogen deposition during the operational phase of Sizewell C would be 19.9 kgN/ha/Yr, a further decrease of 0.1 kgN/ha/Yr when compared to without the development (see **Chapter 5** of this volume).

7.4.89 Given the primary mitigation detailed within **Volume 7**, **Chapter 5** (Doc Ref. 6.8) and the change in concentration relative to air quality objectives being less than 1%, the impact to the RNR 197 would be of very low magnitude resulting in a negligible effect, which is considered to be **not significant**.

IEF: Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS

7.4.90 During operation, the impact pathways that the Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS would be affected by would be associated with changes in water quality. The characterisation of this impact is described in detail below.

Changes in water quality

7.4.91 The drainage design includes SuDS infrastructure would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising. Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary. As such, there would be no diffuse pollution reaching the River Yox, and therefore, there would be very low risk of water quality impacts to this hydrologically linked designated site.

7.4.92 The impact to the Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS would result in no effect.

IEF: River Yox

7.4.93 During operation, the impact pathways that the River Yox would be affected by would be associated with:

- changes in water quality; and
- alteration of local hydrology and hydrogeology.

7.4.94 The characterisation of these impacts is described in detail below.

Changes in water quality and local hydrology and hydrogeology

7.4.95 The drainage design of the proposed Yoxford roundabout would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising. Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary. The infiltration pond would attenuate surface water runoff at a rate not exceeding existing green field run-off rates. As such, there would be negligible effects on water quality, and no effect on the local hydrology and hydrogeology.

7.4.96 The impact to the River Yox would result in a negligible adverse effect, which is considered to be **not significant**.

Inter-relationship effects

7.4.97 The potential operation impacts of air and water on IEFs are inherently considered within the assessment and therefore no inter-relationship with other topics are considered further.

7.4.98 The potential impacts on all terrestrial ecology and ornithology IEFs identified in **section 7.4c** above, have been assessed as **not significant**, and even in combination with other impacts arising from the construction and operation of the proposed Yoxford roundabout would not be expected to have a significant effect.

d) Mitigation and monitoring

i. Introduction

7.4.99 Primary and tertiary mitigation measures which have been incorporated within the design of the proposed development and considered during the assessment are summarised in **section 7.4c)**. This includes vegetation clearance conducted under the supervision of a suitably experienced ECoW, who would monitor for breeding bird, reptile, and small mammal constraints. A suitably experienced ECoW would also oversee all ground-breaking activities.

7.4.100 Where other mitigation is required to reduce or avoid an adverse significant effect, this is referred to as secondary mitigation. As no significant adverse effects are predicted, no further mitigation measures for terrestrial ecology and ornithology assessment are proposed to reduce or avoid any such effect. However further monitoring would be required.

ii. Monitoring

7.4.101 The section describes the monitoring required of specific receptors/resources or for the effectiveness of a mitigation measure. The requirements, scope, frequency and duration of a given monitoring regime are set out, as far as possible.

Construction

7.4.102 During construction, there would be regular checks of the perimeter fence to check these remain intact, and that there is no encroachment of construction activities beyond the boundary or within the buffer areas.

7.4.103 There would be regular checks of construction lighting to monitor and correct for any excessive light spill into the surrounding habitats and particularly into the adjacent woodland and watercourses.

Operation

7.4.104 There would be regular operational checks of lighting to monitor and correct for any excessive light spill into the surrounding habitats and in particular into the adjacent woodland and watercourses.

7.4.105 If required, bat boxes would be monitored post-construction to confirm the presence/absence of bats and use of the bat boxes. If bat boxes have not been occupied by year 5 following installation, consideration would be given to moving them to alternative sites nearby, to be determined by a licensed bat ecologist.

7.5 Other highway improvements

7.5.1 As identified in **section 7.3 c)**, the other highway improvements and safety measures are considered not likely to result in significant environmental effects during their construction or operation. These have therefore been scoped out of the detailed assessment and not considered further within this chapter.

7.6 Residual Effects

7.6.1 The following tables (**Table 7.12** and **Table 7.13**) present a summary of the terrestrial ecology and ornithology assessment. They identify the receptor/s likely to be impacted, the level of effect and, where the effect is deemed to be significant, the tables include the mitigation proposed and the resulting residual effect.

Table 7.12: Terrestrial ecology and ornithology summary of effects arising during construction of the proposed development

Receptor	Impact	Primary or Tertiary mitigation	Classification of effect	Additional Mitigation	Residual Effect
Yoxford roundabout					
Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site, and SSSI	Changes in water quality	All construction works would be conducted in compliance with the CoCP which would enforce pollution prevention and control across the site. Early installation of temporary drainage strategy. 5m buffer area with the River Yox would be enforced, where feasible. No materials would be stored in areas of high flood risk.	Negligible adverse	None required	Negligible adverse (**not significant**)
RNR 197	Changes in water quality	All construction works would be conducted in compliance with the CoCP which would enforce pollution prevention and control across the site. Early installation of temporary drainage strategy. Any surface or extracted water would be returned to ground through the drainage system at green field rates.	Negligible adverse	None required	Negligible adverse (**not significant**)
	Alteration of local hydrology and hydrogeology		Negligible adverse	None required	Negligible adverse (**not significant**)
	Changes in air quality	All construction works would be conducted in compliance with the CoCP which would enforce pollution prevention and control across the site. Dust Management Plan	Negligible adverse	None required	Negligible adverse (**not significant**)
Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS	Changes in water quality	All construction works would be conducted in compliance with the CoCP which would enforce pollution prevention and control across the site.	Negligible adverse	None required	Negligible adverse

Receptor	Impact	Primary or Tertiary mitigation	Classification of effect	Additional Mitigation	Residual Effect
		Early installation of temporary drainage strategy. 5m buffer area with the River Yox would be enforced, where feasible. No materials would, also, be stored in areas of high flood risk to avoid sediment loss during flooding.			(**not significant**)
River Yox	Changes in water quality	All construction works would be conducted in compliance with the CoCP which would enforce pollution prevention and control across the site. Early installation of temporary drainage strategy. 5m buffer area with the River Yox would be enforced, where feasible. No materials would, also, be stored in areas of high flood risk to avoid sediment loss during flooding. Any surface or extracted water would be returned to ground through the drainage system at green field rates.	Negligible adverse	None required	Negligible adverse (**not significant**)
	Alteration of local hydrology and hydrogeology		Negligible adverse	None required	Negligible adverse (**not significant**)

Table 7.13: Terrestrial ecology and ornithology summary of effects arising during operation of the proposed development

Receptor	Impact	Primary or Tertiary mitigation	Classification of effect	Additional Mitigation	Residual Effect
Yoxford roundabout					
Minsmere to Walberswick Heaths and Marshes SPA, SAC, Ramsar Site, and SSSI RNR 197	Changes in water quality	Drainage infrastructure would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising.	No effect	None required	No effect

Receptor	Impact	Primary or Tertiary mitigation	Classification of effect	Additional Mitigation	Residual Effect
		Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary.			
RNR 197	Changes in water quality	Drainage infrastructure would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising. Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary. The infiltration pond would attenuate surface water runoff at a rate not exceeding existing green field run-off rate.	Negligible adverse	None required	Negligible adverse (**not significant**)
	Changes in local hydrology and hydrogeology		Negligible adverse	None required	Negligible adverse (**not significant**)
	Changes in air quality	There are negligible changes in air quality during operation.	Negligible adverse	None required	Negligible adverse (**not significant**)
Minsmere Valley Reckford Bridge to Beveriche Manor CWS and Darsham Marshes CWS	Changes in water quality	Drainage infrastructure would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising. Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary.	No effect	None required	No effect
River Yox	Changes in water quality	Drainage infrastructure would minimise surface water run-off and prevent diffuse pollution from sediment and other pollutants arising.	Negligible adverse	None required	Negligible adverse (**not significant**)

Receptor	Impact	Primary or Tertiary mitigation	Classification of effect	Additional Mitigation	Residual Effect
	Changes in local hydrology and hydrogeology	Petrol/oil interceptors and silt traps would be incorporated within the drainage design where considered necessary. The infiltration pond would attenuate surface water runoff at a rate not exceeding existing green field run-off rate.	Negligible adverse	None required	Negligible adverse (**not significant**)

References

7.1 United Nations. 1992. Convention of Biological Diversity.

7.2 UNESCO. 1971. The Convention on Wetlands of International Importance (Ramsar Convention).

7.3 European Parliament and of the Council. Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Bird Directive). Official Journal of the European Union. 2009.

7.4 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). Official Journal of the European Communities. 1992.

7.5 European Council. 1979. The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).

7.6 United Nations Environment Programme. 1979. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

7.7 Wildlife and Countryside Act, as amended. 1981. (Online) Available from http://www.legislation.gov.uk/ukpga/1981/69 (Accessed 1 March 2019).

7.8 Statutory Instruments 2017 No. 1012. The Conservation of Habitats and Species Regulations 2017.

7.9 Countryside and Rights of Way Act. 2000. (Online) Available from http://www.legislation.gov.uk/ukpga/2000/37/contents (Accessed 1 March 2019).

7.10 Natural Environment and Rural Communities Act. 2006. (Online). Available from: http://www.legislation.gov.uk/ukpga/2006/16/contents (Accessed 1 March 2019).

7.11 The Hedgerows Regulations. 1997. (Online) Available from: http://www.legislation.gov.uk/uksi/1997/1160/contents/made (Accessed 18 February 2019).

7.12 Protection of Badgers Act. 1992. (Online) Available from: http://www.legislation.gov.uk/ukpga/1992/51/contents (Accessed 1 March 2019).

7.13 Joint Nature Conservation Committee records and Defra. 1994. UK Biodiversity Action Plan.

7.14 Joint Nature Conservation Committee records and Defra. 2012. UK Post-2010 Biodiversity Framework.

7.15 Ministry of Housing, Communities & Local Government. Planning Practice Guidance. The National Planning Policy Framework and relevant planning guidance. 22 October 2018. (Online). Available from: https://www.gov.uk/government/collections/planning-practice-guidance (Accessed 7 February 2019).

7.16 HM Government. A Green Future: Our 25 Year Plan to Improvement the Environment. 2018.

7.17 Department for Communities and Local Government. 2018. National Planning Policy Framework. February 2019.

7.18 National Policy Statements for energy infrastructure: National Policy Statement for Energy (EN-1) and National Policy Statement for Nuclear Power Generation (EN-6). July 2011. Available from: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure (Accessed 7 February 2019)

7.19 Suffolk County Council. 2015. Suffolk's Nature Strategy.

7.20 Suffolk Biodiversity Partnership. Suffolk Local Biodiversity Action Plan. May 2012. (Online). Available from: https://www.suffolkbis.org.uk/sites/default/files/biodiversity/priorityspecieshabitats/actionplans/Planning_BAP_Final%2018%20May%202012.pdf (Accessed 7 February 2019).

7.21 Suffolk Biodiversity Information Service. Priority Species and Habitats. 2015 (Online) Available from: https://www.suffolkbis.org.uk/biodiversity/speciesandhabitats (Accessed 1 February 2019).

7.22 Suffolk Coastal District. 2013. Suffolk Coastal District Local Plan. Core Strategy and Development Management Policies.

7.23 East Suffolk. Suffolk Coastal and Waveney Councils. Suffolk Coastal Local Plan (in Draft). January 2019. (Online). Available from: https://www.eastsuffolk.gov.uk/planning/local-plans/suffolk-coastal-local-plan/local-plan-review/final-draft-local-plan/ (Accessed 7 February 2019).

7.24 Chartered Institute of Ecology and Environmental Management. 2018. Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. Terrestrial, Freshwater, Coastal and Marine. Winchester: CIEEM.

7.25 Joint Nature Conservation Committee records. 2010. Handbook for Phase 1 habitat survey: a technique for environmental audit. Joint Nature Conservation Committee records.

7.26 G. Gilbert, D.W. Gibbons, & J. Evans. 1998. Bird Monitoring Methods. RSPB: Sandy.

7.27 M. A. Eaton, et al. 2015. Birds of Conservation Concern 4: Population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds, 2015, 94:452-504.

7.28 Bratton, J.H. 1991. British red data books: part 3: invertebrates other than insects. Peterborough. Joint Nature Conservation Committee records.

7.29 Natural England. 2011. Natural England Technical Information Note TIN102: Reptile Mitigation Guidelines. Natural England.

7.30 English Nature. 2001. Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

7.31 R.S. Oldham, J. Keeble, M.J.S. Swan & M. Jeffcote. 2000. Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal, 10(4), 143-155.

7.32 Dean, M., Strachan, R. Gow, D. & Andrews, R. 2016. The Water Vole Mitigation Handbook. The Mammal Society Mitigation Guidance Series. The Mammal Society.

7.33 Natural England. 2015. Standing advice for local planning authorities who need to assess the impacts of development on badgers. Natural England, (Online) Available from: https://www.gov.uk/guidance/badgers-surveys-and-mitigation-for-development-projects (Accessed 7 February 2019).

7.34 J. Collins (ed.). 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition. London: The Bat Conservation Trust.

7.35 Natural England. Ancient Woodlands (England) Inventory. MAGIC, 2019. (Online) Available from: https://data.gov.uk/dataset/9461f463-c363-4309-ae77-fdcd7e9df7d3/ancient-woodlands-england

7.36 Suffolk Biodiversity Information Service. 2003. Sandy Stilt Puffball Action Plan. (Online). Available from: https://www.suffolkbis.org.uk/sites/default/files/biodiversity/priorityspecieshabitats/actionplans/sandystiltpuffball000.pdf (Accessed 14 August 2019).

7.37 Natural England. Fungal species of conservation concern (SoCC): taxonomic relationships (Online) Available at: publications.naturalengland.org.uk/file/113018 (Accessed 22 August 2019)

7.38 Suffolk Biodiversity Information Service. 2005. Suffolk Rare Plant Register. (online). Available from: http://www.suffolkbis.org.uk/sites/default/files/rpr.PDF (Accessed 18 July 2019).

7.39 DEFRA. 2018. Wild Bird Populations in England, 1970 to 2017. (PDF) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/754532/England_Wild_Birds_1970-2017_FINAL__002_.pdf (Accessed 22 July 2019).

7.40 Institution of Lighting Professionals. 2018. Bats and artificial lighting in the UK. Guidance Note 08/2018. ILP/BCT.

7.41 British Standards Institute - British Standard for Trees in relation to design, demolition and construction (BS 5837:2012). British Standards Institute. 2012.