



## **Thurrock Flexible Generation Plant**

**Preliminary Environmental Information Report  
Chapter 9: Ecology**

**Date:** September 2018

**Environmental Impact Assessment**  
**Preliminary Environmental Information Report**

**Volume 3**

**Chapter 9**

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## Summary

This document assesses impacts of the Thurrock Flexible Generation Plant on ecology for the Preliminary Environmental Information Report (PEIR).

## Qualifications

This document has been prepared by Matthew Fasham, a Chartered Environmentalist and full Member of the Chartered Institute of Ecology and Environmental Management, who has fifteen years' experience of environmental impact assessment.

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# 1. Introduction

## 1.1 Purpose of this chapter

- 1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the findings of Environmental Impact Assessment (EIA) work undertaken to date concerning potential impacts of Thurrock Flexible Generation Plant on ecology.
- 1.1.2 The PEIR is being published to inform pre-application consultation. Following consultation, comments on the PEIR will be reviewed and taken into account in preparation of the Environmental Statement (ES) that will accompany the application to the Planning Inspectorate (PINS) for development consent.
- 1.1.3 Specifically, this chapter considers the likely effects of Thurrock Flexible Generation Plant on ecological receptors during construction, operation and decommissioning.
- 1.1.4 Where Natura 2000 sites (i.e. internationally designated sites) are considered, this chapter summarises the assessments made on the interest features of internationally designated sites as described within Section 4 of this chapter. The full assessment of effects on the integrity of Natura 2000 sites is contained within the draft Habitat Regulations Assessment Report (HRAR) for Thurrock Flexible Generation Plant which accompanies the PEIR.
- 1.1.5 This chapter summarises information from ecological surveys contained within the technical report included at Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report.
- 1.1.6 The surveys summarised in Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report are:
- extended Phase 1 habitat survey;
  - additional vegetation survey of specific grassland types;
  - invertebrate scoping survey;
  - reptile survey;
  - breeding bird survey;
  - water vole survey; and
  - badger survey.
- 1.1.7 In particular, this PEIR chapter:
- presents the existing environmental baseline data established from desk studies, surveys and consultation to date;

- presents the potential environmental effects on ecology arising from the proposed Thurrock Flexible Generation Plant, based on the information gathered and the analysis and assessments undertaken to date;
- identifies any assumptions and limitations encountered in compiling the environmental information; and
- highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

## 1.2 Planning policy context

- 1.2.1 Planning policy for energy generation Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to ecology, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a).
- 1.2.2 NPS EN-1 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 1.1 below.

**Table 1.1: Summary of NPS EN-1 provisions relevant to this chapter.**

Summary of NPS EN-1 and NPS EN-2 provision	How and where considered in the PEIR
The development must be assessed with regard to whether or not the project would have a significant effect on a European site or any site which is provided the same protection as a matter of policy (NPS EN-1, paragraph 4.3.1).	Effects of the Thurrock Flexible Generation Plant on European sites are considered in this chapter (Section 4) and a full assessment of effects on integrity of European sites is provided in the draft HRAR which accompanies the PEIR.
The Environmental Statement should set out any effects on internationally, nationally, and locally designated sites of ecological conservation importance, on protected species and habitats and other species identified as being of principal importance for the conservation of biodiversity (NPS EN-1, paragraph 5.3.3).	Relevant baseline data have been collated to determine ecology features of concern, and inform the assessment of effects, which sets out effects on designated sites, protected species and habitats and other species identified as being of principal importance for the conservation of biodiversity (see Section 4).
The applicant should show how the project would take opportunities to conserve and enhance biodiversity conservation interests (NPS EN-1, paragraph 5.3.4).	Where practicable, opportunities to enhance the site for the benefit of biodiversity have been included in proposed development, and are summarised in the draft Outline Ecological Management Plan (OEMP) (Volume 6, Appendix 9.2). These have been informed by baseline surveys.
The likely effects on sites of regional and local biodiversity interest should be considered, although these sites would not be used in themselves to refuse development consent (NPS EN-1, paragraph 5.3.13).	Likely ecology and nature conservation effects on all known designated sites of ecology and nature conservation interest (including those of regional and local interest or value) have been assessed in Section 4.

Summary of NPS EN-1 and NPS EN-2 provision	How and where considered in the PEIR
Particular consideration should be given to the likely effects of on feeding and hunting grounds, migration corridors and breeding grounds (NPS EN-5, paragraph 2.7.2).	The likely effects of the Thurrock Flexible Generation Plant on all species considered in this chapter have been assessed with regard to the potential for loss, damage or disturbance of habitat of value for breeding or nesting, foraging or hunting, and commuting or migration (see Section 4).

1.2.3 NPS EN-1 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 1.2 below.

**Table 1.2: Summary of NPS EN-1 policy on decision making relevant to this chapter.**

Summary of NPS EN-1 policy on decision making (and mitigation)	How and where considered in the PEIR
The Secretary of State should have regard to the Government's biodiversity strategy, which includes aims to ensure a halting, and if possible a reversal, of declines in Priority Habitats and Species, with wild species and habitats as part of healthy, functioning ecosystems; and the general acceptance of biodiversity's essential role in enhancing the quality of life, with its conservation becoming a natural consideration in all relevant public, private and non-governmental decisions and policies. The Secretary of State should also take account of the challenge of climate change (paragraphs 5.3.5, 5.3.6).	Relevant baseline data have been collated (Section 3.7) in order to determine the presence and condition of ecology features of concern (habitats and species), and inform the mitigation strategies to help protect and, where practicable, restore Priority Habitats and Species and the conservation of biodiversity. The role of habitats and species in the ecosystem has been considered in the assessment of their value, where applicable (Section 3). Reference is made to the potential effects of climate change on biodiversity in Section 3.2.1.
The development should aim to avoid significant harm to biodiversity, including through mitigation and consideration of reasonable alternatives (paragraph 5.3.7)	The design of the Thurrock Flexible Generation Plant has taken into account the need to protect biodiversity and prevent significant harm. Mitigation measures described in this chapter include measures to protect and minimise the potential for adverse effects on biodiversity.
Appropriate weight should be given to designated sites, protected species, habitats and other species of principal biodiversity conservation value (paragraph 5.3.8)	The ecology and nature conservation values of sites, species and habitats identified within the study areas, have been assessed and are explained in this chapter. The value of each feature has informed the assessment of effects (Section 4).

Summary of NPS EN-1 policy on decision making (and mitigation)	How and where considered in the PEIR
Many individual wildlife species receive statutory protection under a range of legislative provisions. Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and thereby requiring conservation action. The Secretary of State should ensure that these species and habitats are protected from the adverse effects of development by using requirements or planning obligations. The Secretary of State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context, the Secretary of State should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which may result from a proposed development (paragraphs 5.3.16 - 5.3.17.)	Natural England have been consulted. Records of meetings and communications are provided in Table 1.4. A series of species and habitat surveys have been undertaken in order to inform this assessment of effects (Section 3). A mitigation strategy has been developed in order to minimise the potential for disturbance to species and habitats and provide long-term biodiversity benefit (Table 2.8 and as outlined in Volume 6, Appendix 9.2: Outline EMP).
Appropriate mitigation measures should be included as an integral part of the development: <ul style="list-style-type: none"> <li>during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;</li> <li>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;</li> <li>habitats will, where practicable, be restored after construction works have finished; and</li> <li>opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.</li> </ul> Where appropriate mitigation will be put in place the Secretary of State should consider what appropriate requirements should be attached to any consent and/or planning obligations (paragraphs 5.3.18-5.3.19).	Mitigation measures adopted to mitigate the ecology and nature conservation effects are described in this chapter (see Table 2.8) and are further developed in the OEMP (Volume 6, Appendix 9.2) (to be updated prior to construction as necessary following pre-commencement surveys). Measures include limiting the extent of works, following best practice guidelines, reinstating habitats after construction or installation and opportunities for enhancement/creation of habitats where practicable.
Mitigation measures agreed with Natural England and confirmation as to whether or not Natural England intends to grant or refuse any necessary licence applications will be taken into account during the processing of an application (paragraph 5.3.20).	Natural England has been consulted with regard to the ecological assessment. Pre-construction surveys will also be required in order to update survey findings and inform any future need for a licence or licences.

- 1.2.4 A number of other policies are relevant to this chapter including:
- National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2018);
  - Web-based National Planning Practice Guidance (NPPG) formulated by the Department for Communities and Local Government (DCLG, 2014);
  - UK Biodiversity Action Plan (UK BAP) (JNCC, 2011); and
  - Essex BAP (Essex Biodiversity Project, various).
- 1.2.5 Key provisions of the policies are set out in Table 1.3, along with details as to how these have been addressed within the assessment.

**Table 1.3: Summary of other relevant policies to ecology and nature conservation.**

Summary of other relevant policy provision	How and where considered in the Environmental Statement
<b>National Planning Policy Framework</b>	
The NPPF sets out the national planning policies for England and the Government's desire to enable sustainable development. One of the overall aims of the NPPF is that the planning system should aim to conserve and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible.	Identification and assessment of protected species have been included at Sections 3 and 4 of this chapter respectively.
<b>National Planning Practice Guidance</b>	
The guidance states that the planning system should protect, enhance and conserve the natural and local environment (paragraph 109, section 11 of the NPPG).	Identification and assessment of protected species have been included at Sections 3 and 4 of this chapter respectively.
<b>Essex BAP</b>	
The Essex Biodiversity Action Plan 2010-2020 identifies 19 'priority' habitat types within Essex. It has been superseded by the UK Post-2010 Biodiversity Framework but is relevant for assessing value of species and habitats of local importance.	Identification and assessment of habitats and protected species have been included at Sections 3 and 4 of this chapter respectively.

## 1.3 Legislation

### European legislation

- 1.3.1 Council Directive 92/43/EEC (the Habitats Directive) provides for protection of animals and plants throughout EU member states through both the designation/classification of European Sites as well as the protection of European Protected Species.
- 1.3.2 The Habitats Directive was first transposed into UK law through the Conservation (Natural Habitats, &c.) Regulations 1994. In England and Wales, these Regulations have been superseded by the Conservation of Habitats and Species Regulations 2017.
- 1.3.3 The Birds Directive is transposed into UK law through the Wildlife & Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 and provides a framework for the conservation and management of, and human interactions with, wild birds in Europe.
- 1.3.4 All of the above UK Regulations allow for the designation or classification of European Sites as specified under the Habitats Directive including Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites.

### National legislation

- 1.3.5 Sites of Special Scientific Interest (SSSIs) are designated under the Wildlife & Countryside Act 1981, as amended. Part II of the Act makes it an offence to damage any sites designated as SSSI. Any works which may potentially damage these sites require prior consultation with Natural England.
- 1.3.6 Local Nature Reserves (LNRs) are local authority designations under the National Parks and Access to the Countryside Act 1949. They are designated in consultation with relevant statutory nature conservation agencies and are managed for nature conservation and people.
- 1.3.7 The Conservation of Habitats and Species Regulations 2017 require that a plan or project that is not directly connected with or necessary for the management of a Natura 2000 site, but which has a likely significant effect on the site, either individually or in combination with other plans or projects, will require an appropriate assessment of the impact of that plan or project on the interests of the Natura 2000 site. An assessment of the potential impacts of the Thurrock Flexible Generation Plant on the qualifying interests of relevant SACs is presented in the HRAR, which accompanies the PEIR.

- 1.3.8 The Natural Environment and Rural Communities Act 2006 (NERC Act) provides that Natural England's general purpose is to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations. Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. Section 41 lists guidance to decision-makers, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act to have regard to biodiversity conservation in England when carrying out their functions.

## 1.4 Consultation

- 1.4.1 Key issues raised during scoping and consultation to date specific to ecology are listed in Table 1.4, together with how details of how these issues have been considered in the production of this PEIR and cross-references to where this information may be found.

Table 1.4: Key points raised during scoping and consultation to date.

Date	Consultee and type of response	Points raised	How and where addressed
19/02/18	<i>Site meeting with Jonathan Bustard of NE via DAS, Statera Energy and Cherryfield Ecology</i>	<p>Introduction to proposals, and discussion on potential ecological issues.</p> <p>NE raised:</p> <ul style="list-style-type: none"> <li>• Possibility of important invertebrate communities in the area due to the proximity to local wildlife sites with these present. A specialist entomologist should be employed to assess the site for important invertebrate communities.</li> <li>• Potential for water voles to be present</li> <li>• Bird surveys and potential for raptors to be present</li> <li>• Requirement for reptile mitigation</li> <li>• Overall aim to be delivery of net gain to biodiversity</li> </ul>	<p>Surveys of invertebrate potential, reptiles, water voles and breeding birds are summarised in Volume 6, Appendix 9.1 and Section 3, and impacts are assessed in Section 4.</p> <p>Mitigation strategy is summarised in Volume 6, Appendix 9.2.</p> <p>Overall the mitigation strategy is considered to present a minor beneficial impact on biodiversity due to the ecological mitigation and enhancement proposed.</p>
March 2018	<i>Jonathan Bustard of Natural England by email</i>	<p>Scope of ecological survey work outlined to NE, which NE considered to be broadly acceptable:</p> <ul style="list-style-type: none"> <li>• Phase 1 habitat survey</li> <li>• Invertebrate scoping</li> <li>• GCN eDNA</li> <li>• Reptiles</li> <li>• Breeding birds</li> <li>• Water Voles</li> <li>• Badgers</li> </ul>	Surveys are summarised in Volume 6, Appendix 9.1 and Section 3,
June-July 2018	<i>Jonathan Bustard of Natural England by phone and email</i>	Provided update on survey progress and mitigation proposals	Surveys are summarised in Volume 6, Appendix 9.1 and Section 3, Mitigation strategy is summarised in Volume 6, Appendix 9.2.
30th August 2018	<i>Meeting at Thurrock DC offices, in attendance: RPS, Statera Energy, Thurrock DC, Steve Plumb Associates (for Thurrock DC)</i>	RPS provided update on consultation with Natural England, baseline ecology surveys undertaken to date and gave outline of proposed habitat creation. SP noted importance of assessing cumulative effects with the nearby NSIP developments. Uncertainty re: Lower Thames Crossing route and its potential impacts on local wildlife sites discussed. General agreement that Thurrock FGP main site has been positioned in area of low ecological value/sensitivity relative to surrounding landscape	Surveys are summarised in Volume 6, Appendix 9.1 and Section 3, Mitigation strategy is summarised in Volume 6, Appendix 9.2.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINS Scoping Opinion	<p>The Applicant proposes to scope out wintering and passage bird surveys in respect of the arable farmland crossed by the gas connection and access road route corridors. The Inspectorate does not agree there is sufficient evidence to support scoping out surveys for wintering and passage birds on the arable farmland crossed by the gas connection and access road route corridors.</p> <p>The Inspectorate considers there is potential for impacts from disturbance/displacement to birds, from the proposed development alone and particularly cumulatively with other developments (including from use of the existing or new jetty)</p> <p>The Applicant should undertake further consultation with Natural England in effort to agree the approach and timing of specific surveys for wintering and passage birds.</p> <p>The ES must fully assess impacts on the designated sites and on functionally linked land utilised by qualifying features of these sites, both alone and cumulatively with other developments.</p>	<p>Surveys of wintering birds in areas potentially considered to be functionally linked land have commenced and will be reported in the ES, along with an assessment of effects (alone or cumulative) on wintering birds associated with the SPA if surveys indicate that birds are present in areas affected by the Thurrock Flexible Generation Plant. Natural England (NE) have been consulted on the scope of wintering bird surveys. As of the date of this report, a response is awaited.</p> <p>As the cooling water option is no longer being considered, cumulative effects associated with the use of the jetty and surrounding area are no longer relevant.</p>
September 2018	PINS Scoping Opinion	<p>The Inspectorate notes that the Phase 1 habitat survey and preliminary species surveys presented in Appendix D of the Scoping Report do not appear to have considered the area required for the potential cooling water pipeline. In the absence of this information (or confirmation that the cooling water option will not be pursued), the Inspectorate does not agree to scope out white clawed crayfish surveys.</p> <p>The Applicant should seek to agree the need for white clawed crayfish surveys with relevant consultation bodies. If there is potential for significant effects on white clawed crayfish, this should be assessed in the ES.</p>	<p>The ditches on site are not suitable habitat for white-clawed crayfish. The ditches were mostly dry at the latter end of the survey period, and it is therefore extremely unlikely that white-clawed crayfish could be present in those ditches that are affected by the proposed development. Further discussion will be undertaken prior to submission of the ES.</p>
September 2018	PINS - Scoping Opinion	<p>The Applicant proposes to scope out surveys for bats. Table 8.5 of the Scoping Report states that there are no potential bat roost sites in the 'main development site' and that the development is considered highly unlikely to result in fragmentation of foraging or commuting routes given the habitats present on site. This appears to contradict paragraph 8.89 of the Scoping Report, which states that these habitats may be of value to foraging and commuting bats.</p> <p>The Inspectorate also notes that the Phase 1 habitat survey and preliminary species surveys presented in Appendix D do not appear to have considered the area required for the potential cooling water pipeline. In the absence of this information (or confirmation that the cooling water option will not be pursued) and noting the potential suitability of habitats on the main development site for foraging and commuting bats, the Inspectorate does not agree to scope out the need for bat surveys.</p> <p>The Applicant should seek to agree the approach to and the need for bat surveys with relevant consultation bodies. If there is potential for significant effects on bats, this should be assessed in the ES.</p>	<p>Initial discussions with NE on proposed survey effort did not include bat surveys and it was considered that such surveys had been scoped out of the assessment.</p> <p>The development does not result in the severance of major linear habitat features such as hedgerows, tree lines or woodland and therefore there is very little potential for the proposed development to affect any existing commuting routes. While there will be some bat foraging on the main development site, it is considered that there would be little value in undertaking activity surveys given that the mitigation proposals allow for the provision of a greater area of grassland and associated ditch habitat and therefore there should be no decline in the availability of foraging habitat for bats. Bats have been included in the assessment for potential loss of foraging habitat (Section 4)</p> <p>NE have been consulted on this issue. As of the date of this report, a response is awaited.</p>

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINS - Scoping Opinion	<p>The Applicant proposes to scope out surveys for otter. Table 8.5 of the Scoping Report explains no otters are recorded within 2km of the 'main development site' and the loss of any ditches on site is not considered to have a detrimental impact on foraging otters.</p> <p>The Inspectorate also notes that the Phase 1 habitat survey and preliminary species surveys presented in Appendix D do not appear to have considered the area required for the potential cooling water pipeline. In the absence of this information (or confirmation that the cooling water option will not be pursued), the Inspectorate does not agree to scope out the need for otter surveys.</p>	<p>The cooling water option is no longer being pursued.</p> <p>Signs of otters, if present, would have been recorded during water vole surveys, and the PEIR clarifies that no signs indicating presence of otters were found.</p>
September 2018	PINS - Scoping Opinion	<p>The Inspectorate notes that Natural England's consultation response (see Appendix 2 of this Opinion) explains that the nationally significant invertebrate assemblage on the adjacent Tilbury2 site could be considered to be of sufficient quality to meet the designation requirements of a SSSI and that the site is being considered for notification. The ES should assess impacts on invertebrate assemblages both alone and cumulatively with other developments where significant effects are likely.</p>	<p>This has been undertaken in Section 4.</p>
September 2018	PINS - Scoping Opinion	<p>The Scoping Report states that there are two LWSs within 1km of the 'main development site'. However, Figure 2.1 (in Appendix D of the Scoping Report) identifies a number of other LWSs, including two within the application site. It also appears that the area required for the cooling water pipeline (not shown on Figure 2.1) would fall within a LWS.</p> <p>The Inspectorate is aware that a LWS review has been undertaken by Thurrock Council, which has resulted in amendments to LWS boundaries. The Applicant should take these amendments into account in the ES.</p>	<p>The cooling water option is no longer being progressed. Details of LWS are provided in Section 3 and Table 3.1.</p> <p>The review of LWSs has not yet resulted in amendments to LWS boundaries. It is noted that one of the proposed amendments includes designation of Walton Common (Zone A). Any future designation of this area as a LWS would not materially affect the significance of effects presented in this PEIR or the mitigation proposed for the loss of habitat in Zone A. In the event that boundaries are amended, this will be considered within the ES.</p>
September 2018	PINS - Scoping Opinion	<p>Ecological surveys used to inform the assessment must include the area required for the water cooling pipeline, if this option is pursued.</p>	<p>The cooling water option is no longer being progressed.</p>
September 2018	PINS - Scoping Opinion	<p>The ES should identify and quantify all temporary or permanent habitat losses by type (including loss of any functionally-linked land). This should cover the entirety of the application site; including the cooling water pipeline and gas pipeline corridors as well as the main development site.</p>	<p>Impacts of habitat loss are assessed in Section 4. Wintering bird surveys to determine whether birds from the SPA are present in areas considered to be potential functionally linked land are in progress and will be presented in the ES.</p>
September 2018	PINS - Scoping Opinion	<p>The Inspectorate notes the intention to assess impacts from operational air quality emissions on ecological receptors. The ES should include clear cross-reference between the Ecology chapter and other relevant aspect chapters e.g. air quality. The ES should assess impacts from modelled pollutant deposition levels against relevant critical loads provided in the UK Air Pollution Information System (APIS). Any likely significant effects to habitats and protected species should be assessed.</p>	<p>Impacts on air quality are considered in Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors and Section 4.</p>
September 2018	PINS - Scoping Opinion	<p>The Inspectorate considers that impacts from lighting on ecological receptors (including aquatic ecology, if the cooling water pipeline option is pursued) should be assessed where significant effects are likely.</p>	<p>Impacts of disturbance on species during construction are considered in Section 4. Operational lighting impacts are not considered likely as the access road will be unlit and the Thurrock Flexible Generation Plant site will be unmanned and therefore unlit except for motion-activated security lighting which will internal and directional.</p>

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINS - Scoping Opinion	The Inspectorate notes the proximity of the Proposed Development to the Thames Estuary and Marshes IBA, which is not identified as a receptor in the Scoping Report. The ES should assess any likely significant effects to the Important Bird Area (IBA).	It is not standard practice to include IBAs as receptors in ESs. This will be reviewed prior to the production of the ES. Impacts on birds are assessed via impacts on the SPA/Ramsar, on breeding and wintering birds and within the draft HRAR.
September 2018	PINS - Scoping Opinion	There are a number of ditches present on and around the application site. The Applicant should ensure there is suitable effort to confirm whether these ditches contain ecological receptors e.g. fish and/ or eel populations. Any likely significant effects should be assessed in the ES.	Surveys for eels and other fish species have not been undertaken. The majority of the ditches that would be directly affected became dry during the 2018 field season (confirmed during water vole surveys) and are therefore not considered likely to hold significant populations of fish. Site design has retained connectivity of ditch habitat around Zone A so even if these ditches are occasionally used by eels, the movement of eels across the landscape would not be affected. As such, and given the evidence of the ditch conditions obtained during surveys for water voles, it is not considered that further surveys are required beyond the survey effort already undertaken to assess condition of ditches.
September 2018	PINS - Scoping Opinion	The Preliminary Ecological Appraisal (Appendix C of the Scoping Report) states that no invasive species have been found on the main development site. Surveys to identify the presence of invasive species should be undertaken for the whole application site and any necessary eradication/ control measures detailed in the ES.	Phase 1 surveys have been undertaken across the whole application site, and no invasive plant species were recorded.
September 2018	PINS - Scoping Opinion	The Applicant considers that there is no potential for impacts to saltmarsh, however no specific justification is provided in this regard. The Inspectorate does not agree that sufficient information has been provided in order to scope this matter out. In particular, the Inspectorate notes the potential for construction and operation of the cooling water pipeline to result in changes to coastal processes and sedimentation patterns, which could impact on the saltmarsh habitats.  The ES should describe the potential impacts to saltmarsh and any likely significant effects on this habitat should be assessed. This should include consideration of any cumulative effects, including with the consented new jetty, Tilbury2 and Tilbury Energy Centre.	As the cooling water option is no longer being progressed, impacts on saltmarsh would not occur and an assessment has been scoped out.
September 2018	PINS - Scoping Opinion	The scale of development proposed in the Tilbury area requires detailed consideration of both temporary and permanent cumulative effects; as such the Inspectorate recommends that the cumulative assessment is presented in a standalone aspect chapter. In particular the Inspectorate notes the shared land interests that exist within the Proposed Development site boundary, i.e. with the proposed Lower Thames Crossing, Tilbury2 and Tilbury Energy Centre NSIPs (as illustrated on Figure 16 of the Scoping Report). The cumulative assessment should include all phases and elements of the Proposed Development and the other developments; and all relevant aspect assessment chapters. Particular consideration should be given to the cumulative impacts resulting from disturbance (including noise, traffic and light) to bird species associated with the South Thames Estuary and Marshes SSSI and the Thames Estuary and Marsh SPA and Ramsar site.	The potential for in-combination effects on the Thames Estuary & Marshes SPA/Ramsar site is assessed in Section 5, Volume 6 Appendix 12.3: Air Quality Impacts on Ecological Receptors, the draft HRAR and in Section 5 of this chapter.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Environment Agency – Scoping Opinion	<p>The scoping report identifies a mosaic of habitats associated with the site. The main issues that should be considered are:</p> <ul style="list-style-type: none"> <li>•Impact on statutory designated sites (SSSIs, SPAs)</li> <li>•Impact on non-statutory sites (Local Wildlife Sites)</li> <li>•Protected species, particularly water voles and great crested newts</li> <li>•Water Framework Directive, particularly any effects on terrestrial watercourses/ditches</li> <li>•Impacts on fish and eels in ditches also need to be considered and surveys undertaken</li> <li>•Invasive species. If any are present then eradication measures will be required.</li> <li>•Invertebrate populations. The site is likely to have a significant assemblage of scarce brownfield invertebrates. This will need detailed surveys and adequate mitigation/compensation measures such as compensatory ditches and wetland</li> </ul>	<p>Impacts on statutory and non-statutory sites, habitats including ditches and protected species are assessed in Section 4 of this chapter and the HRAR. A high-level Water Framework Directive assessment is provided in Volume 3, Chapter 15: Hydrology and Flood Risk.</p> <p>Surveys for eels and other fish species have not been undertaken. The majority of the ditches that would be directly affected became dry during the 2018 field season (confirmed during water vole surveys) and are therefore not considered likely to hold significant populations of fish. Site design has retained connectivity of ditch habitat around Zone A so even if these ditches are occasionally used by eels, the movement of eels across the landscape would not be affected. As such, and given the evidence of the ditch conditions obtained during surveys for water voles, it is not considered that further surveys are required beyond the survey effort already undertaken to assess condition of ditches. The site does not contain brownfield habitat and an initial assessment of Zone A by an appropriately experienced consultancy specialising in invertebrates concluded that surveys for invertebrates were not required (Volume 6, Appendix 9.1: Ecological desk study and survey report). However, impacts on invertebrates have been considered and mitigation is proposed – see Section 4 and Volume 6, Appendix 9.2: OEMP.</p>
September 2018	Environment Agency – Scoping Opinion	<p>The developer should adequately incorporate mitigation measures to offset the impacts on receptors during construction and operation. Where mitigation is not possible, then significant compensation will be required, off-site if necessary. We would like to see incorporation of wildlife friendly sustainable drainage features and green roofs in the development where possible, as these offer an opportunity to provide net gains in regards to biodiversity.</p>	<p>Designed-in and additional mitigation is proposed to offset ecological effects and provide overall net gain.</p> <p>On-site options for sustainable drainage features are being explored and further detail will be provided in the final ES.</p>
September 2018	Environment Agency – Scoping Opinion	<p>Saltmarsh can only be scoped out on the understanding that no saltmarsh (including upper saltmarsh species) are present in the River Thames corridor. Rather than scoping out a particular habitat type, the assessment should just state that it will scope in all habitats within the zone of influence of the development.</p>	<p>Now that the cooling water option is no longer being progressed, impacts on saltmarsh are not considered likely.</p>
September 2018	Essex County Council – Scoping Opinion	<p>The EIA should thoroughly explore all reasonable options to enhance the development for Protected and Priority species and habitats, and others of significance at a local level</p>	<p>Mitigation and enhancement measures are summarised in Volume 6, Appendix 9.2: OEMP and Section 4.</p>
September 2018	Essex County Council – Scoping Opinion	<p>It is recommended that the HRA screening needs to identify which Impact Risk Zones (IRZs) the site falls within for Natura 2000 (N2K) sites identified by Natural England on MAGIC website for this type of development which may or may not be 10km. An assessment should also be made of SSSIs and LWS (within 2km) and recommended Marine Conservation Zones (rMCZs)</p>	<p>Impacts on statutory and non-statutory sites, habitats including ditches and protected species are assessed in Section 4 and the HRAR.</p> <p>The latest rMCZ site boundary revisions have resulted in the Thames Estuary rMCZ being split into smaller components and reduced in extent, with the result that there are now no rRMZs within 2 km of the Thurrock Flexible Generation Plant, and rMCZs are therefore no longer considered in the PEIR.</p>
September 2018	Essex County Council – Scoping Opinion	<p>The Shadow HRA needs to consider impact pathways for Likely Significant Effects (LSE) on the Thames Estuary and Marshes SPA/Ramsar and North Downs SAC from the development alone or in-combination with other plans and projects e.g. LTC, Tilbury2 and Tilbury Energy Centre – all NSIPs in the locality</p>	<p>The potential for in-combination effects on the Thames Estuary &amp; Marshes SPA/Ramsar site is assessed in Section 5, Volume 6 Appendix 12.3: Air Quality Impacts on Ecological Receptors and the draft HRAR.</p>

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Essex County Council – Scoping Opinion	Where further ecological field work is required will be undertaken to ensure that up to date information is used as a basis for assessment, these should be supplemented by data from Essex Field Club and Essex Wildlife Trust to inform the survey requirements and ensure that Priority and Protected Species are considered adequately.	Data have been obtained from Essex Wildlife Trust for the PEIR. Essex Field Club data will be obtained for the ES.
September 2018	Essex County Council – Scoping Opinion	Reference to LWS is limited to 1km from the main development site and states the presence of two such sites, but section 2.5 of the PEA in Appendix D shows that there are two LWS within the red line boundary, a further five adjacent to it and 11 more within 2km. Direct and indirect impacts to all of these sites should be considered within the ecological assessment. These sites should also be considered for enhancement should compensation be required.	Impacts on LWSs are assessed in Section 4.
September 2018	Essex County Council – Scoping Opinion	Figure 2 (Sheet1) - This figure gives the red line boundary for the development, which differs from the area covered by the PEA contained in Appendix D. Area K, as shown on this figure, crosses land known as Tilbury Ashfields, and will affect land already managed in mitigation for ecological impacts arising from an active planning consent there. Any cumulative impact on this site, which is of high significance for its invertebrate populations should be carefully assessed and substantial compensation for any impacts will be expected.	Area K is no longer part of the application and therefore no effects are anticipated.
September 2018	Essex County Council – Scoping Opinion	The evaluation of habitats plays down the status of some grassland areas as remnants of Coastal Grazing marsh, a Priority Habitat. Further detailed botanical survey is required to establish the plant communities present (Area K) and to properly evaluate its conservation value and potential for restoration or enhancement.	Area K is no longer part of the application and therefore no effects are anticipated.
September 2018	Essex County Council – Scoping Opinion	Although not subject to a national conservation designation, it should be noted that the breeding pair of Raven represents the only known breeding site in Essex at the present time, and is therefore of high County – level significance. Compensation for the loss of the nest site should be considered.	The nesting ravens were in Zone B which is the existing substation. The nest site would not therefore be directly affected by the Thurrock Flexible Generation Plant. Impacts on the breeding bird assemblage are assessed in Section 4.
September 2018	Gravesham Borough Council – Scoping Opinion	It is suggested that consideration be given as to whether the NSIP proposals for London Resort at Swanscombe Peninsula could result in cumulative impacts that need to be taken into consideration – particularly if water cooling is used or water transport used during the construction phase, given the proposed Marine Conservation Areas detailed in the Scoping Report.	Now that the cooling option is not being progressed, cumulative impacts with the London Resort are not considered likely and an assessment of such effects has been scoped out of the assessment.
September 2018	Gravesham Borough Council – Scoping Opinion	Whilst the Scoping Report covers the potential need for Appropriate Assessment under the Habitats Regulation, there doesn't appear to be mention of potential impact on Functionally Linked Habitat that supports the designated sites.	Surveys to assess whether birds that are designated features of the SPA / Ramsar are present in potential functionally linked land are ongoing and will be reported in the ES.
September 2018	Gravesham Borough Council – Scoping Opinion	The Council is mindful that the proposal is being brought forward in the context of a market for electricity supply whereby there may be environmentally preferable alternatives that could be delivered either by this developer or by others. This may have implications if Appropriate Assessment under the Habitats Regulations is required and a case needs to be made in terms of Imperative Reasons of Overriding Public Interest (IROPI).	The HRAR has not identified significant effects on European sites that would require a case to made in terms of IROPI.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Marine Management Organisation – Scoping Opinion	Visual / noise disturbance to local ornithological features should be considered in any final ensuing ES. The MMO draw your attention to the local Royal Society for the Protection of Birds (RSPB) Thames Estuary and Marshes Important Bird Area (IBA) which is within the direct vicinity of the proposed outfall, intake and jetty work area.	It is not standard practice to include IBAs as receptors in ESs. This will be reviewed for the ES. Impacts on birds are assessed via impacts on the SPA/Ramsar, on breeding and wintering birds and within the draft HRAR.
September 2018	Natural England – Scoping Opinion	We note that the proposal includes the loss of an area of common land known as Walton Common. We understand that there has been a consultation process with the local community regarding implications for Walton Common with respect to the proposal, and that a land exchange is under discussion. We advise that land being offered as replacement (“exchange land” in the EIA Scoping Report) should be of least equal value when compared to the land being replaced, in the context of (amongst other matters) the public interest. The EIA should consider the planned land management objectives for such mitigation land as there may be valuable opportunities to provide enhancement such as replacement meadow seeding to provide nectar for pollinators. The compatibility of common land mitigation and other ecological mitigation requirements should be carefully examined.	Details of potential ecological mitigation, including meadow creation, are provided in Volume 6, Appendix 9.2: OEMP.
September 2018	Natural England – Scoping Opinion	it is important that appropriate evidence and analysis is included in the ES to inform the assessment under the Habitats Regulations. Therefore, we advise that survey of wintering birds should include the other areas of development (such as farmland crossed by the gas connection pipe, and access routes) and not just the water cooling pipe vicinity, because these habitats may provide a functional linkage to the adjacent SPA and Ramsar site, and thus are relevant to the HRA and EIA. It is important that the EIA and Habitats Regulations Assessment consider impacts upon both the European site itself and on functionally linked land utilised by SPA birds.	Surveys to assess whether birds that are designated features of the SPA / Ramsar are present in potential functionally linked land are ongoing and will be reported in the ES.
September 2018	Natural England – Scoping Opinion	It is not clear to us whether the preliminary species surveys that are referenced in the EIA Scoping report include consideration of the cooling pipe option. Natural England advises that surveys should cover the whole area of development (i.e. including an appropriate corridor of the cooling pipeline option) or present compelling reasons why such surveys are not required. We also advise that the applicant should consult Natural England’s published guidance for protected species licencing.	The cooling option is no longer being progressed and therefore effects have been scoped out of this assessment.
September 2018	Natural England – Scoping Opinion	Currently the methodology of the surveys proposed (e.g. for passage and wintering birds) is not sufficiently detailed for Natural England to agree that these will be fit for the purpose of HRA and EIA assessments (with reference to table 8.4). We strongly recommend that our pre- application DAS service is used to agree evidence requirements for the project.	NE have been consulted on the scope of wintering bird surveys. As of the date of this report, a response is awaited.
September 2018	Natural England – Scoping Opinion	The summary statement in Table 8.7 is not sufficiently detailed to allow Natural England to agree that the impacts to saltmarsh habitat may be scoped out. There is potential that works to install a water cooling pipe would release sediments which could smother saltmarsh habitats, and therefore saltmarsh should be scoped in).	The cooling option is no longer being progressed and therefore effects have been scoped out of this assessment.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Natural England – Scoping Opinion	The nationally significant invertebrate assemblage on the adjacent Tilbury2 site could be considered to be of sufficient quality to meet the designation requirements of a Site of Special Scientific Interest ('SSSI'). Natural England is currently considering such a site for notification. We will be adding the site to our SSSI designations' pipeline in due course, consistent with the requirements of our designations' strategy. We will advise further as this progresses but consideration of impacts both alone and cumulative with other developments on these invertebrate assemblages will be necessary to meet the requirements of EIA.	Impacts on invertebrates have been assessed and mitigation including habitats for invertebrates is proposed. When considering cumulative effects, Tilbury2 would result in the loss of the majority of the Lytag Brownfield LWS, for which compensation is proposed offsite.
September 2018	Natural England – Scoping Opinion	The scale of development proposed in this area requires careful consideration of both temporary and permanent in-combination impacts. The EIA will need to consider impacts on existing environmental features, previous mitigation commitments of the land within and adjacent to the development and any mitigation and compensation schemes that are required enable the delivery of other development coming forward in this locality. We would advise that one approach would be the preparation of a co-ordinated mitigation strategy would be agreed between the applicants for this site and nearby developments which would safeguard and join up important environmental features and provide enhancement at the landscape scale.	The applicant is willing to explore opportunities for joint development of measures at the landscape scale, in conjunction with developers of other sites. However, as the other proposed developments are significantly larger, the applicant would expect others to lead any joint strategy.
September 2018	Port of Tilbury London Limited – Scoping Opinion	PoTLL has particular concerns regarding ecology, as the Thurrock Flexible Generation Plant proposals have the potential to interact with impacts from the Tilbury2 project mainly by virtue of geographical proximity and the interconnection between certain habitat and species receptors. In particular, the site proposed for the Thurrock Flexible Generation Plant itself is subject to a draft Local Wildlife Site designation (LWS) (although this does not appear to have been identified in the scoping report), and is known to support semi-improved coarse grassland and relict grazing marsh habitats of confirmed value for reptiles and (in the boundary ditches) water voles, and with likely value for ground nesting and scrub birds, badgers and species from the nationally significant invertebrate assemblage associated with the power station area generally, potentially including Priority species such as hornet robberfly. Thus, further impacts on such resources could arise from the Thurrock Flexible Generation Plant with additional consequences for local metapopulations over and above those arising from Tilbury2 alone and/or Tilbury2 cumulatively with the TEC and LTC	The review of LWSs has not yet resulted in amendments to LWS boundaries. It is noted that one of the proposed amendments includes designation of Walton Common (Zone A). Any future designation of this area as a LWS would not materially affect the significance of effects presented in this PEIR or the mitigation proposed for the loss of habitat in Zone A. Impacts on protected species are assessed in Section 4. Mitigation proposals are provided in Volume 6, Appendix 9.2: OEMP and include habitat creation for reptiles and water voles. Cumulative effects are considered in Section 5.
September 2018	Port of Tilbury London Limited – Scoping Opinion	Whilst the Lytag Brownfield Local Wildlife Site (LWS) and Tilbury Centre LWS have been identified (para 2.19, para 8.86), the presence of the Tilbury Power Station draft LWS, which forms part of the Thurrock Flexible Generation Plant 'main development site', appears to have been overlooked by the Applicant. Impacts on this designation should be considered, including impacts on this surviving grazing marsh fragment in the wider landscape-scale context of the Thurrock Thames Marshes. The permanent loss of the draft LWS and historic grazing marsh will also need to be weighed against the potential operational life of the proposed development being potentially limited to 35 years.	The review of LWSs has not yet resulted in amendments to LWS boundaries. It is noted that one of the proposed amendments includes designation of Walton Common (Zone A). Any future designation of this area as a LWS would not materially affect the significance of effects presented in this PEIR or the mitigation proposed for the loss of habitat in Zone A.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Port of Tilbury London Limited – Scoping Opinion	The Applicant has also failed to identify the Tilbury Marshes LWS within the Scoping Report as falling within the proposed development boundary, and at para 3.38 this land (area J) is identified as having potential 'community use' under a future s106 agreement. Area J encompasses the triangle of grassland adjacent to Fort Road (and within the Tilbury Marshes LWS) which originally formed part of the Tilbury2 Order Limits, but which was excluded in order to preserve this area of long-established grassland. Consideration will therefore need to be given to whether potential 'community use' would be compatible with maintaining the ecological interest of this area.	This area is no longer part of the application boundary and therefore effects have been scoped out of the assessment.
September 2018	Port of Tilbury London Limited – Scoping Opinion	An update habitat survey is documented at Appendix D. This describes Walton Common as 'semi-improved grassland' but does not consider whether it meets the definition of Priority coastal and floodplain grazing marsh habitat.	This is considered in Section 3.
September 2018	Port of Tilbury London Limited – Scoping Opinion	It is noted that the desk study documented at Chapter 2 of Appendix D does not include the comprehensive data available for the adjacent landholdings via the Tilbury2 Application and Examination submissions (which are readily accessible via the PINS website). Furthermore, records do not appear to have been sought from the Essex Field Club, which is likely to hold a far greater number of records relevant to the search area than the repositories contacted by Thurrock Flexible Generation Plant. The evaluation section which follows is therefore considered incomplete.	Documents associated with the Tilbury2 site have been reviewed where appropriate. Essex Field Club data will be obtained for the ES.
September 2018	Port of Tilbury London Limited – Scoping Opinion	A notable omission from the list of bird species recorded at Chapter 8 is nightingale (a red list species) which was regularly recorded by the proponents of the Tilbury2 scheme.	Nightingale was not recorded during the bird surveys undertaken in 2018. The 2017 Tilbury2 bird survey results indicated the presence of one territory in the part of the Lytag Brownfield LWS covered by the breeding bird survey in 2018. While it is possible that a nightingale territory might have been present in this area in 2018, it was considered that as there is no habitat for potential breeding nightingales (areas of dense scrub) within the Thurrock Flexible Generation Plant application boundary and therefore it was not considered necessary to undertake targeted surveys for nightingale.
September 2018	Port of Tilbury London Limited – Scoping Opinion	Chapter 10 of Appendix D concludes that badger activity is limited and assesses impacts on that basis. However the Thurrock Flexible Generation Plant proponents should be aware that an artificial sett has now been constructed within the adjacent parcel of land (under planning consent 18/00448/FUL) and the badger assessment provided within the EIA should be updated to reflect this.	Impacts on badgers are assessed in Section 4.
September 2018	Port of Tilbury London Limited – Scoping Opinion	The Tilbury2 ecology surveys identified bat activity within the Thurrock Flexible Generation Plant main development site. It is therefore considered inappropriate to scope bats out of the EIA process, given that there may be impacts associated with direct loss and illumination of features used by bats for foraging/commuting.	The development would not result in the severance of major linear habitat features such as hedgerows, tree lines or woodland and therefore there is very little potential for the proposed development to affect any existing commuting routes. While there will be some bat foraging on the main development site, it is considered that there would be little value in undertaking activity surveys given that the mitigation proposals allow for the provision of a greater area of grassland and associated ditch habitat and therefore there should be no decline in the availability of foraging habitat for bats. Bats have been included in the assessment for potential loss of foraging habitat (Section 4)

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	Port of Tilbury London Limited – Scoping Opinion	At para 3.37 and Figure 2 of the main scoping report, areas F and G are identified as offering replacement common land and could therefore be subject to heavy grazing. It is unclear how this would be compatible with establishing the reptile mitigation uses for this land as proposed at Chapter 7 of Appendix D, nor with the proposals for scrub planting for birds as described at Chapter 8 of Appendix D.	This issue will be considered further as the mitigation proposals are developed and will be addressed within the ES.
September 2018	Thurrock Council – Scoping Opinion	The land north of the railway identified as exchange land for the loss of Walton’s Common has the potential to provide important biodiversity mitigation with scope to incorporate additional invertebrate habitat features. It is hoped that there will be dialogue between representatives of the adjoining proposed developments to see if there can be improved linkages between the various onsite mitigation schemes to maximise their connectivity.	The applicant is willing to explore opportunities for joint development of measures across the various proposed developments, in conjunction with developers of other sites. However, as the other proposed developments are significantly larger, the applicant would expect others to lead any joint strategy.

## 2. Assessment Approach

### 2.1 Guidance and standards

2.1.1 The assessment of ecological value and determination of effect significance has been undertaken with reference to the following:

- CIEEM Guidelines for ecological impact assessment (2018).

### 2.2 Baseline studies

#### Desktop study

2.2.1 Information on ecology and nature conservation within the desk study search area was collected through a detailed desktop review of existing datasets.

2.2.2 The Natural England GIS dataset of statutory designated sites was consulted for boundary shapefile information on statutory designated sites within 2 km of the Thurrock Flexible Generation Plant. A search was made for details of Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar Sites, National Nature Reserves (NNRs), Sites of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs) and Marine Conservation Zones (MCZs / rMCZz).

2.2.3 The Joint Nature Conservation Committee (JNCC) website (<http://www.jncc.defra.gov.uk>) was consulted to obtain citations and information on designated features of SACs, SPAs and Ramsar Sites. SSSI citations were obtained from the Natural England website (<https://designatedsites.naturalengland.org.uk>).

2.2.4 Data sources contacted for information are summarised in Table 2.1 below.

2.2.5 For the designated sites desk study, the initial identification of sites that might be affected used a search area of 2 km from the Thurrock Flexible Generation Plant.

2.2.6 For the protected species data search, a search area of 2 km from the Thurrock Flexible Generation Plant was used for all species.

Table 2.1: Summary of key desktop sources.

Title	Month	Year	Summary of responses
Essex and Kent Biological Records Centres	September	2018	Essex & Kent BRCs provided data on protected species and LWSs within the search area.

#### Site specific surveys

2.2.7 In order to inform the assessment, the site-specific surveys listed in in Table 2.2 have been undertaken as agreed with Natural England and the local authority.

#### Species not included in the surveys

2.2.8 Based on information from the desk study, Phase 1 habitat survey, invertebrate scoping survey and consultations with Natural England, it was determined that no surveys were required for the following groups or species: invertebrates, wintering birds, fish/eels, white-clawed crayfish, dormouse and roosting or commuting bats.

**Table 2.2: Summary of site-specific surveys undertaken.**

Title	Extent of survey	Overview of survey	Survey provider	Year	Reference to further information
Phase 1 habitat survey	Thurrock Flexible Generation Plant site area and various other areas previously considered for inclusion in the site boundary but subsequently dropped (Figure 2.2)	A Phase 1 habitat survey to identify habitats present within the survey area and the potential value of these habitats for protected or otherwise notable species. Findings of the survey informed the need for more detailed surveys.	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Invasive plant species subject to legal control	Thurrock Flexible Generation Plant site area	During the various field surveys carried out, evidence of any invasive plant species subject to legal control was recorded.	RPS	2018	Invasive species protocol is summarised in the CoCP (Volume 5, Appendix 2.2).
Additional vegetation survey	Zone A	A more detailed assessment of plant communities present in Zone A and other similar grassland areas was undertaken in order to inform habitat creation proposals	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Invertebrate scoping survey	Zone A	A walkover survey to assess the potential of Zone A to support invertebrate communities of conservation interest	Colin Plant Associates	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Great Crested Newt (GCN) eDNA survey	Ponds and ditch as shown on Figure 2.3.	eDNA samples taken from ditches around Zone A, a pond adjacent to Zone A and another pond north east of Zone A.	RPS and Cherryfield Ecology	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Reptile survey	Zones A, C, G, I, J	Standard refugia survey comprising seven checks of refugia placed in areas of habitat considered suitable for reptiles within the survey area	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Breeding bird survey	Thurrock Flexible Generation Plant site area and various other areas previously considered for inclusion in the site boundary but subsequently dropped, and excluding Zones F and J which were added after the breeding bird season finished (Figure 2.4)	A five-visit territory mapping survey to map locations of territories of all bird species present in the survey area	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Water Vole/otter survey	Ditches as shown on Figure 2.5	Two survey visits to ditches within the survey area to map signs indicating presence of water voles and otters	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report
Badger survey	Thurrock Flexible Generation Plant site area and various other areas previously considered for inclusion in the site boundary but subsequently dropped	A walkover survey to map signs of badger presence including setts and latrines	RPS	2018	Volume 6, Appendix 9.1: Ecological desk study and survey report

## 2.3 Study area

- 2.3.1 For this chapter a study area of the Thurrock Flexible Generation Plant boundary (plus a 2 km buffer) was used for the data search. A study area of Zone A plus a 15 km buffer was used to assess sites for atmospheric emission effects (refer to Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors)
- 2.3.2 For field surveys, the evolving nature of the design during the 2018 survey season meant that some areas were included in surveys for some groups that are no longer part of the application boundary. Conversely, some areas added late in the assessment process that are within the application boundary were not covered by all of the detailed species surveys. The study areas for Phase 1 habitat and species surveys are shown on Figure 2.2 - Figure 2.5.

## 2.4 Uncertainties and/or data limitations

- 2.4.1 Due to the evolving nature of the design during the 2018 survey season, not all site zones were surveyed in detail for all of the species groups listed in Table 2.2. In particular, no breeding bird information is available for Zones F and J, and no reptile survey information is available for Zone F.
- 2.4.2 This is not considered to materially affect the ability of the assessment process to quantify the effects of Thurrock Flexible Generation Plant, for the reasons outlined below.
- 2.4.3 For breeding birds, zones not covered comprise the haul road (Zone J) where the majority of the route follows existing tracks or runs across an arable field of little potential importance for breeding birds, and the mitigation area (Zone F) which is an arable field again of little potential value for breeding birds.
- 2.4.4 For reptiles and water voles, zones not covered comprise the mitigation area (Zone F). As noted above this is an arable field with no potential to support reptiles. Reptile potential exists in the ditches and field margins but these would not be directly affected by any common land exchange/habitat creation works. For the purposes of the habitat creation works it will be assumed that reptiles and water voles are present, and this will be checked by pre-commencement surveys prior to any works taking place that might affect water vole or reptiles.
- 2.4.5 The baseline ecological surveys are therefore considered to be appropriate to inform a robust impact assessment of the Thurrock Flexible Generation Plant. Any surveys needed to finalise details of mitigation proposals will be carried out prior to commencement.

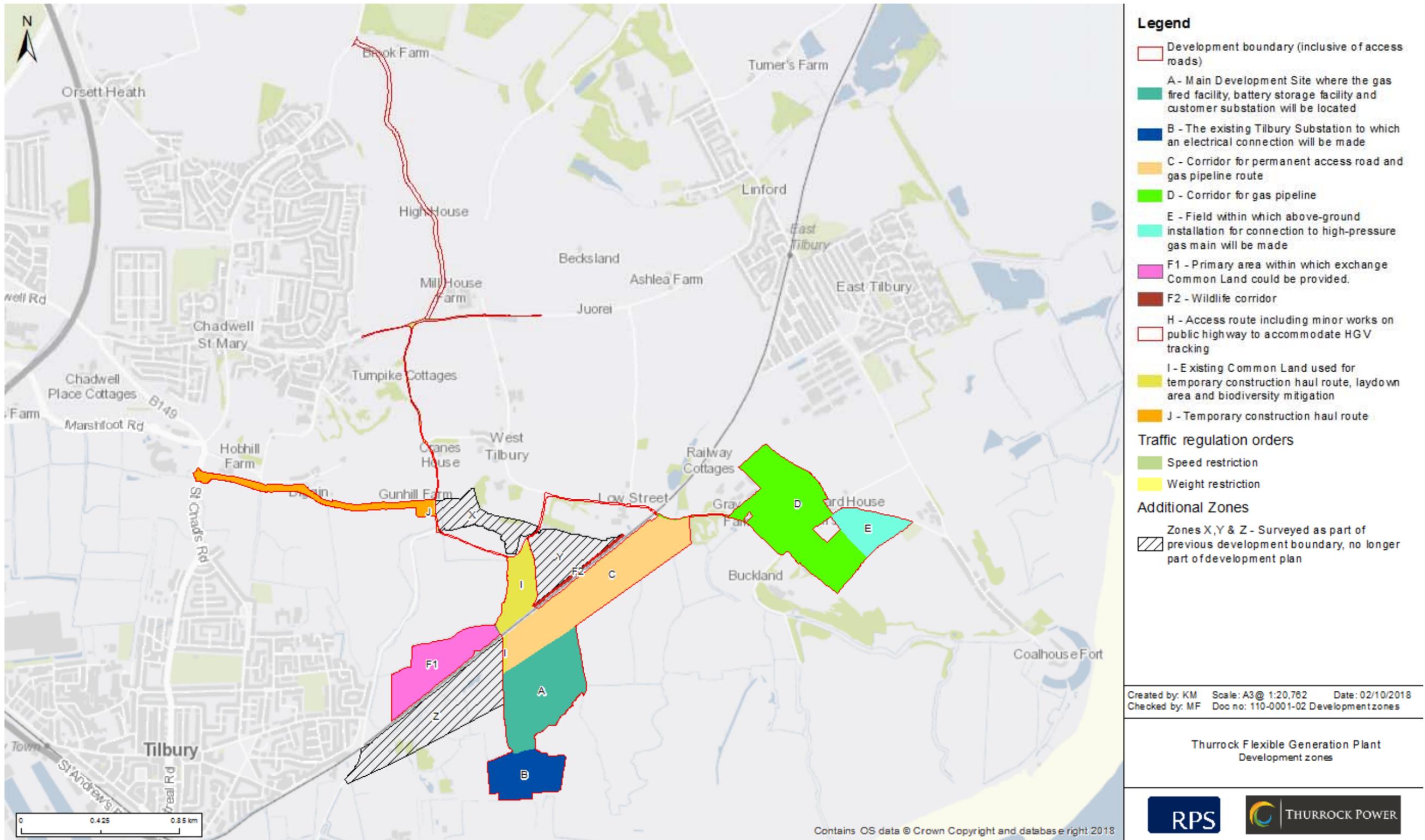


Figure 2.1: Thurrock Flexible Generation Plant Development Zones.

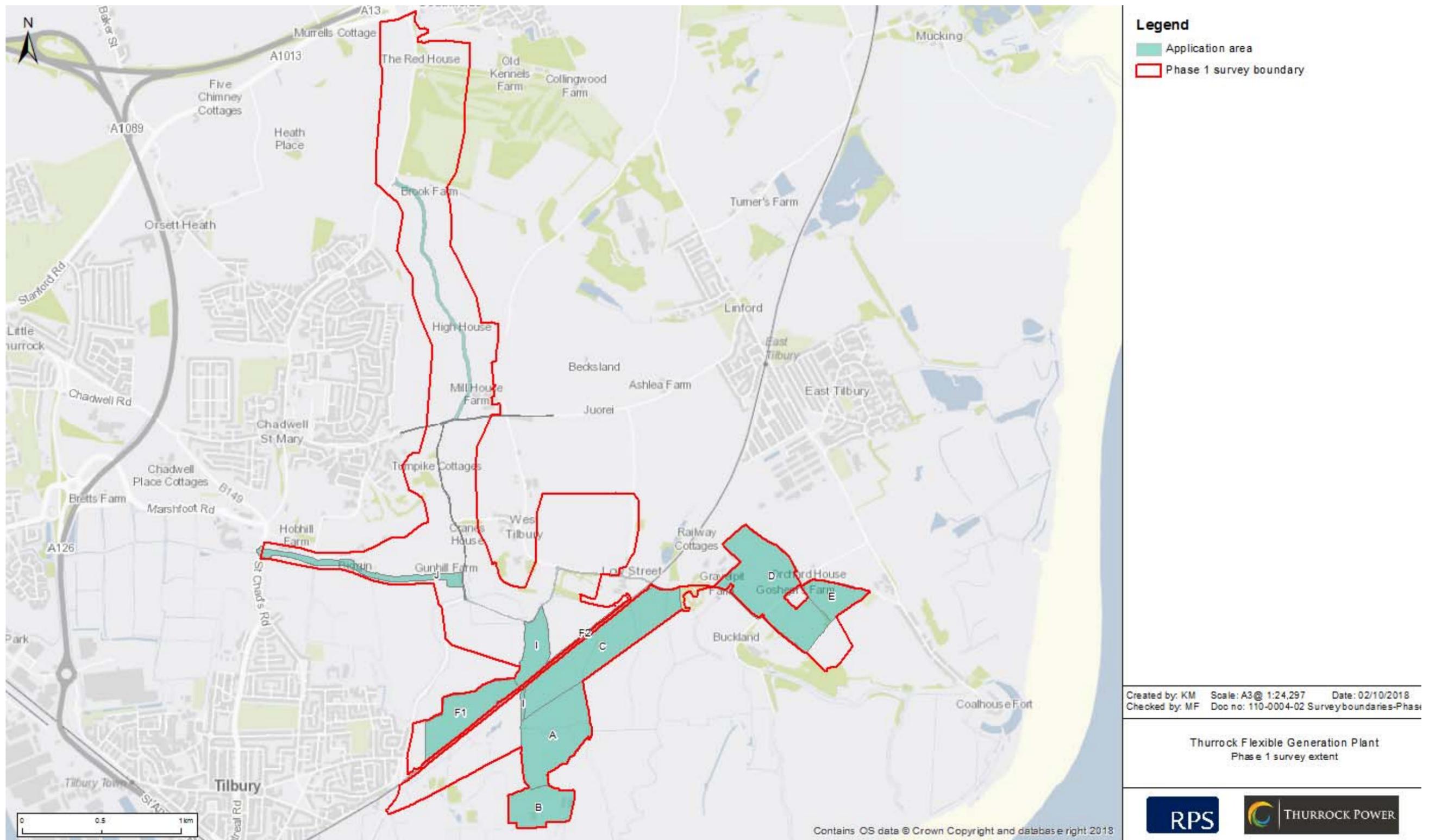


Figure 2.2: Phase 1 study area.

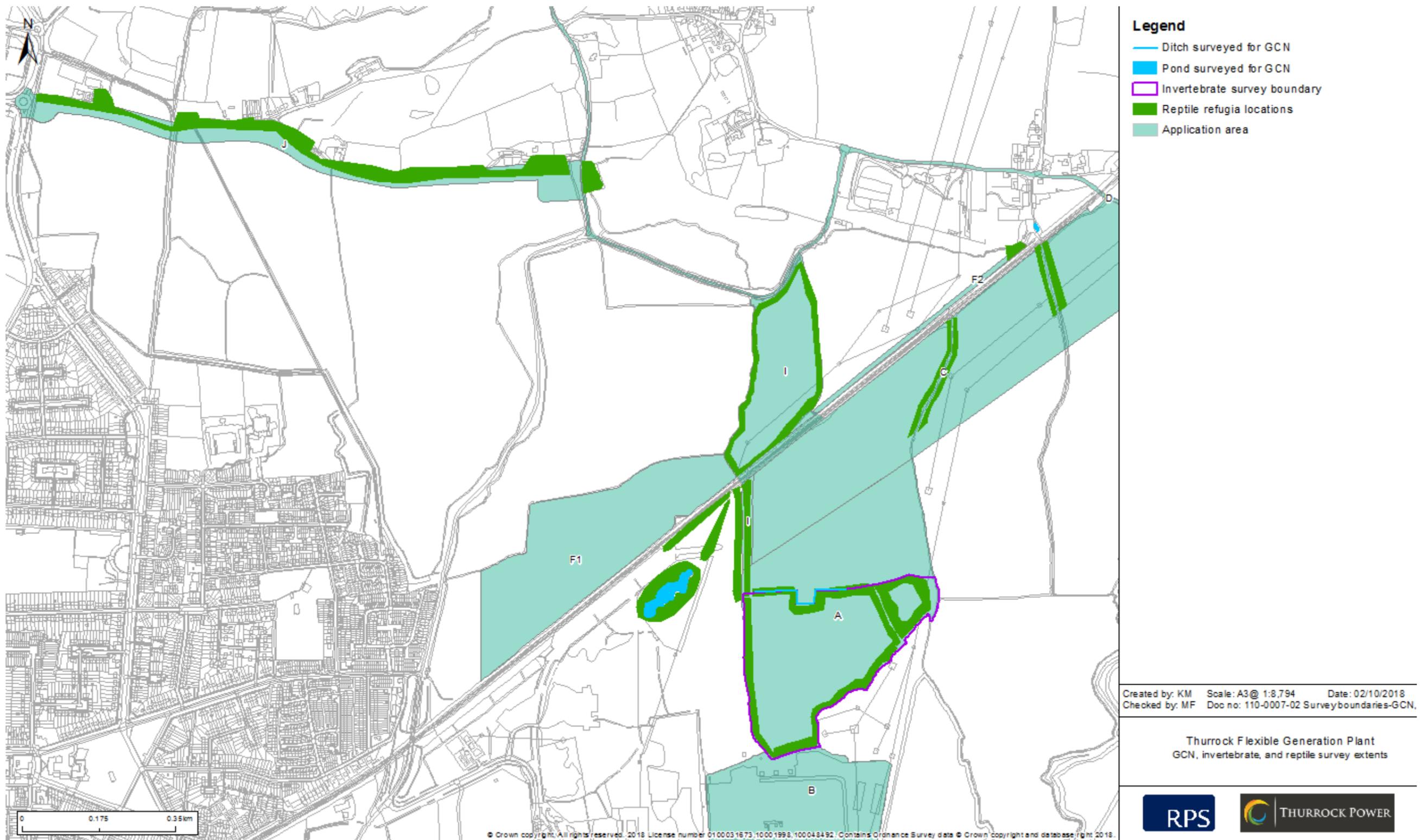


Figure 2.3: Invertebrate, great crested newt and reptile survey areas.

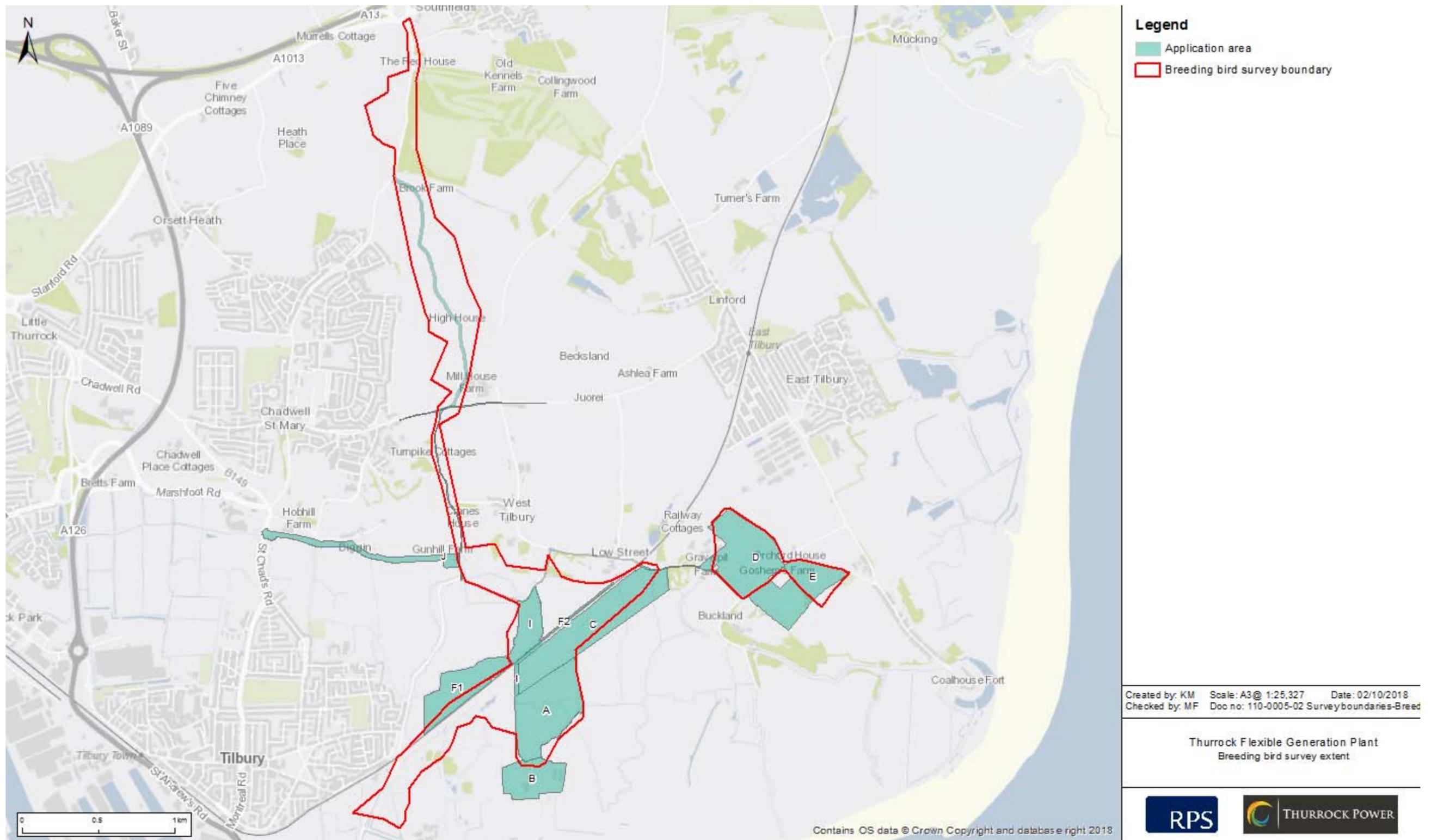


Figure 2.4: Breeding bird survey area.

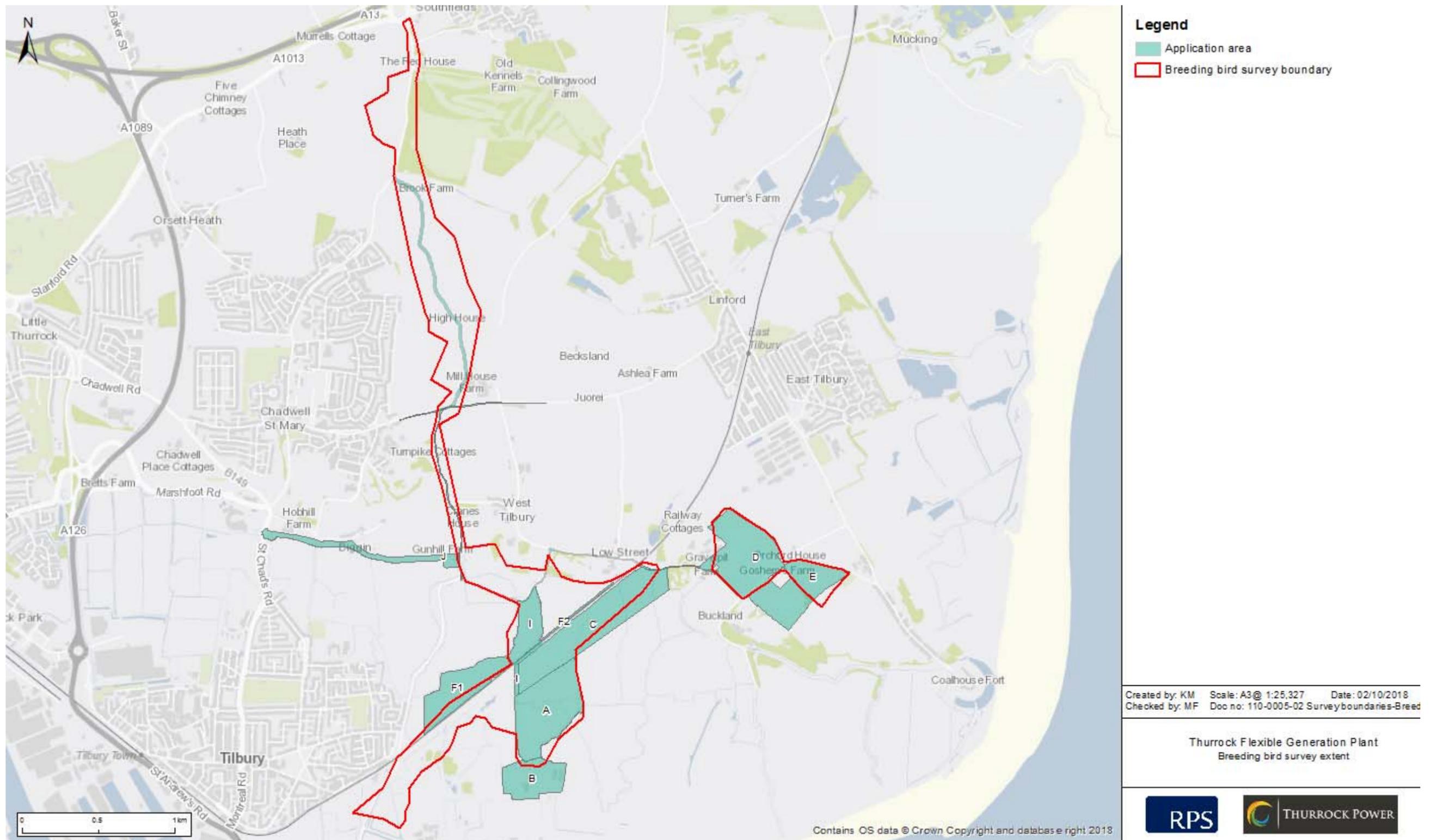


Figure 2.5: Water vole survey area.

## 2.5 Impact assessment criteria

2.5.1 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact. This section describes the criteria applied in this chapter to characterise the magnitude of potential impacts and sensitivity of receptors. The terms used to define magnitude and sensitivity are based on those used in the DMRB methodology, which is described in further detail in Volume 2, Chapter 4: Environmental Impact Assessment Methodology.

2.5.2 The likely impacts of the Thurrock Flexible Generation Plant are determined through understanding how each Important Ecological Feature (IEF) would be affected by all of the temporary and permanent elements that make up the full design of the Thurrock Flexible Generation Plant. In this assessment, the following have been taken into account:

- type of impact - positive or negative;
- extent or spatial scope of the impact;
- reversibility of impact - whether the impact is naturally reversible or reversible through mitigation measures;
- timing and frequency of the impact, in relation to ecological changes; and
- likely duration of the impact - short-term (< 1 year), medium-term (< 5 years) or long-term (5 or more years).

2.5.3 The criteria for defining impact magnitude in this chapter are outlined in Table 2.3. In this table, integrity' for sites is defined as the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the levels of populations of the species for which it is classified.

**Table 2.3: Criteria for magnitude of impact.**

Magnitude of impact	Definition used in this chapter
Major	The impact is likely to have an adverse effect on the integrity of a site IEF or the conservation status of a species or species assemblage IEF (adverse)
	The impact is likely to cause a large scale or major improvement, extensive restoration or enhancement, or a major improvement of the conservation status of a IEF (beneficial)
Moderate	The impact adversely affects a IEF but is unlikely to adversely affect its integrity or conservation status (adverse)
	The impact is likely to be of benefit to a IEF, or improve its conservation status (beneficial)
Minor	The impact adversely affects a IEF but would not adversely affect its integrity or conservation status (adverse)

Magnitude of impact	Definition used in this chapter
	The impact is likely to be of minor benefit to a IEF
Negligible	There would be minimal effect on the IEF (adverse)
	There would be minimal benefit to the IEF (beneficial)
No change	There would be no detectable change from the baseline condition of the IEF.

2.5.4 The criteria for defining receptor sensitivity in this chapter are outlined in Table 2.4.

2.5.5 Sensitivity takes into account the value of a IEF as well as vulnerability and recoverability. Therefore, while value is usually the primary consideration when determining sensitivity, professional judgment is also used to determine how sensitive a IEF may be to impacts when these other factors are considered.

**Table 2.4: Criteria for receptor sensitivity.**

Sensitivity	Definition used in this chapter
Very High	Habitats or species that form part of the cited interest within an internationally protected site, such as those designated under the Habitats Directive (e.g. SACs) or other international convention (e.g. Ramsar site). A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in an international/national context, such that the site is likely to be designated as a site of European importance (e.g. SAC).
High	Habitats or species that form part of the cited interest within a nationally designated site, such as an SSSI or a NNR. A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in a national context for which the site could potentially be designated as a SSSI. Presence of UKBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.
Medium	A feature (e.g. habitat or population), which is either unique or sufficiently unusual to be considered as being of nature conservation value from a county to regional level. Habitats or species that form part of the cited interest of an LNR, or some local-level designated sites, such as a LWS, also referred to as a non-statutory Site of Importance for Nature Conservation or the equivalent, e.g. Ancient Woodland designation. Presence of LBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.

Sensitivity	Definition used in this chapter
Low	A feature of importance at district level. A feature (e.g. habitat or population) that is of nature conservation value in a local context only, with insufficient value to merit a formal nature conservation designation.
Negligible	A feature of importance at local level. Commonplace feature of little or no significance. Loss of such a feature would not be seen as detrimental to the ecology of the area.

2.5.6 The significance of the effect upon ecology is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 2.5. Where a range of significance of effect is presented in Table 2.5, the final assessment for each effect is based upon expert judgement.

2.5.7 For the purpose of this assessment, any effects with a significance level of minor or less are considered to be **not significant** in terms of the EIA Regulations.

**Table 2.5: Matrix used for the assessment of the significance of an effect.**

	Magnitude of impact					
		<i>No change</i>	<i>Negligible</i>	<i>Minor</i>	<i>Moderate</i>	<i>Major</i>
Sensitivity of receptor	<i>Negligible</i>	No change	Negligible	Negligible or minor	Negligible or minor	Minor
	<i>Low</i>	No change	Negligible or minor	Negligible or minor	Minor	Minor or moderate
	<i>Medium</i>	No change	Negligible or minor	Minor	Moderate	Moderate or major
	<i>High</i>	No change	Minor	Minor or moderate	Moderate or major	Major or substantial
	<i>Very high</i>	No change	Minor	Moderate or major	Major or substantial	Substantial
		No change				

## 2.6 Maximum design envelope parameters for assessment

2.6.1 The maximum design envelope parameters identified in Table 2.6 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These parameters have been identified based on the overview description of the development provided in Volume 2, Chapter 2: Project Description, including all potential development options where these are under consideration by the applicant.

2.6.2 Effects of greater adverse significance are not predicted to arise should any other development scenario within the project design envelope be taken forward in the final design scheme.

## 2.7 Impacts scoped out of the assessment

2.7.1 On the basis of the baseline environment and the project description outlined in Volume 2, Chapter 2: Project Description, a number of impacts are scoped out of the assessment for ecology and nature conservation. These impacts are outlined, together with a justification for scoping them out, in Table 2.7.

2.7.2 The impacts listed in Table 2.7 have either been scoped out of the assessment for ecology, or discussions regarding the potential to scope out impacts are ongoing at this stage.

Table 2.6: Maximum design envelope parameters assessed.

Potential impact	Maximum design scenario	Justification
<b>Construction</b>		
<p>Potential permanent loss of habitats:</p> <ul style="list-style-type: none"> <li>Semi-improved grassland;</li> <li>ditches; and</li> <li>hedgerows</li> </ul> <p>Potential permanent loss of habitats for:</p> <ul style="list-style-type: none"> <li>invertebrates;</li> <li>reptiles;</li> <li>breeding birds;</li> <li>wintering birds;</li> <li>badgers;</li> <li>bats; and</li> <li>water voles</li> </ul>	<p>Main development site (zone A) loss of habitats up to 18.5 ha in total</p> <p>Above ground installation for NTS connection (zone E) loss of habitats up to 0.25 ha in total</p> <p>Permanent access road (within zone C) loss of habitats up to 1 ha in total</p>	<p>The dimensions of the permanent construction works listed represent the upper limit of potential permanent habitat loss.</p>
<p>Potential temporary loss of habitats:</p> <ul style="list-style-type: none"> <li>Semi-improved grassland;</li> <li>ditches; and</li> <li>hedgerows</li> </ul> <p>Potential temporary loss of habitat or disturbance due to construction works for:</p> <ul style="list-style-type: none"> <li>reptiles;</li> <li>breeding birds;</li> <li>wintering birds (on functionally linked land);</li> <li>bats; and</li> <li>water voles</li> </ul>	<p>Gas pipeline construction: 20 m wide working corridor; pipeline crosses all fields of 'zone D'; total length up to 3 km</p> <p>Access road(s) for construction: 20 m wide working corridor(s); route(s) not shared with gas pipe</p> <p>Up to 1 acre within zone I used for laydown and tower crane; up to 2 ha used for laydown or temporary construction compounds in other areas within the application boundary outside the main development site (zone A)</p> <p>Piling may be required for foundations on the main development site (Zone A), and may use impact/driven or vibratory techniques, to be defined following further design</p>	<p>The dimensions of the temporary works listed represent the maximum amount of temporary habitat loss.</p> <p>Impact piling for foundations on Zone A represent the maximum amount of disturbance from noise and vibration during construction.</p>
	<p>Construction programme up to six years total including potential construction and use of haul roads in winter or summer periods</p>	<p>The construction programme represents the maximum design scenario as it is the longest period over which impacts from construction could occur and would have the greatest potential for impact to wintering or breeding birds.</p>
<p>Potential for airborne pollutants due to construction works to adversely impact designated sites and habitats</p>	<p>Construction dust risk and construction traffic air pollutant impact maximum design scenario as specified in Volume 3, Chapter 12: Air Quality</p>	<p>The maximum design scenario parameters for air pollutant emissions have been specified for that assessment</p>
<p>Potential for runoff pollutants due to construction works to adversely impact designated sites and habitats, water voles or reptiles</p>	<p>Construction drainage and water quality impact maximum design scenario as specified in Volume 3, Chapter 15: Hydrology and Flood Risk</p>	<p>The maximum design scenario parameters for water pollutant emissions have been specified for that assessment</p>
<b>Operation and maintenance</b>		
<p>Potential for air pollutant emissions to adversely impact designated sites and habitats</p>	<p>Gas engines' air pollutant impact maximum design scenario as specified in Volume 3, Chapter 12: Air Quality</p>	<p>The maximum design scenario parameters for air pollutant emissions have been specified for that assessment</p>
<p>Potential for surface runoff pollutants to adversely impact designated sites and habitats</p>	<p>Permanent drainage and water quality impact maximum design scenario as specified in Volume 3, Chapter 15: Hydrology and Flood Risk</p>	<p>The maximum design scenario parameters for air pollutant emissions have been specified for that assessment</p>

Potential impact	Maximum design scenario	Justification
Potential for operational activity to cause disturbance to breeding and wintering birds	Operational noise and maintenance access impact maximum design scenarios as specified in Volume 3, Chapter 11: Noise and Vibration and Chapter 10: Traffic and Transport respectively.	The maximum design scenario parameters for operational noise and traffic have been specified for those assessments
<b>Decommissioning</b>		
Permanent loss of habitat and potential impact of air pollutant, water pollutant or noise emissions on designated sites, habitats or species	Ongoing operation of all or part of Thurrock Flexible Generation Plant after 35 years	Greatest long-term impact on these receptors
Temporary loss of habitat. Potential for air or water pollutant emissions or disturbance to impact species or designated sites	Decommissioning and deconstruction of Thurrock Flexible Generation Plant with works no greater than specified for construction period No temporary loss of habitat due to removal of gas pipe	Reasonable maximum scenario for decommissioning impacts. It is not expected that buried pipeline assets would be removed.

Table 2.7: Impacts not covered in the assessment for PEIR.

Potential impact	Justification
<b>Construction phase</b>	
Land take within designated sites	The development does not involve loss of any habitat within any currently designated sites. Walton Common (Zone A) is being considered for designation as a LWS but it is not considered that this designation, if it occurred, would materially affect the significance of the conclusions presented in the PEIR or the proposed mitigation for habitat loss in Zone A.
All impacts on white-clawed crayfish	Ditches on site were not considered suitable for this species. Discussions regarding requirement for survey are ongoing.
All impacts on GCN	Surveys and desk study have confirmed GCN are not present within the study area. Discussions regarding requirement for survey are ongoing.
All impacts on fish	Ditches on site were not considered suitable for significant fish populations or movements. Designed-in mitigation ensures potential fish passage through the drainage network, if it occurs, would not be impeded. Discussions regarding requirement for survey are ongoing.
All impacts on Dormouse	Dormouse are not present within the study area
All impacts on Otter	Surveys and desk study have confirmed GCN are not present within the study area
<b>Operation phase</b>	
Habitat loss within designated sites	Operation will not involve works within designated sites.
Habitat loss for species IEFs	Operation will not involve loss of habitat used by species IEFs.
Habitat fragmentation for species IEFs	Operation will not involve loss of habitat used by species IEFs and hence no fragmentation effects would occur.
Any impacts from habitat loss	All permanent and temporary habitat losses occur during construction. Impacts of habitat loss (including impacts of species arising from habitat loss) are assessed in the construction phase. No additional impacts from habitat loss will occur during operation.
<b>Decommissioning phase</b>	
Habitat loss within designated sites	Decommissioning will not involve works within designated sites.

## **2.8 Measures adopted as part of Thurrock Flexible Generation Plant**

- 2.8.1 A number of measures have been designed in to the Thurrock Flexible Generation Plant to reduce the potential for impacts on ecology. These are listed in Table 2.8 below. Note that proposed areas for provision of habitat as mitigation are indicative at this stage and will be finalised for the PEIR.

**Table 2.8: Designed-in measures.**

Measures adopted as part of Thurrock Flexible Generation Plant	Justification
<b>Design measures</b>	
The Thurrock Flexible Generation Plant has been developed to avoid designated sites and other ecologically sensitive habitats wherever practicable.	To minimise loss of habitats of conservation interest.
Other IEF features such as watercourses (ditches) have been retained (e.g. around the Main Site in Zone A) where it has been practicable to do so.	
Where practicable, areas identified as containing protected species have been protected by providing an appropriate buffer from construction and operation works. The width of these buffer zones will be developed in accordance with standard industry requirement and best practice guidance and are expected to be applied for nesting birds and water vole colonies.	To reduce impacts on protected or otherwise notable species.
<b>Pre-construction measures</b>	
Pre-construction surveys, informed by existing data for protected species, will be carried out to identify potential changes in baseline conditions. These surveys will be undertaken within 12 months prior to the commencement of construction works. Surveys may need to be undertaken over several months in order to collate sufficient data to inform a licence application and any associated mitigation strategy. Should the 12-month survey/activity period lapse between pre-construction surveys and the commencement of works, the need to repeat surveys will be assessed by an appropriately experienced ecologist. Should surveys confirm a change in baseline conditions, which result in the need for a protected species licence, a licence will be obtained prior to the commencement of licensable works.	To provide up to date information to ensure compliance with legal requirements and, where relevant, trigger the implementation of mitigation measures set out in the CoCP (Volume 5, Appendix 2.2) and OEMP (Volume 6, Appendix 9.2)
Where reptile habitat is required to be cleared for construction, a detailed method statement will be developed in order to help ensure the protection of these species. The method statement will include detailed pre-construction measures designed to ensure that impacts on reptiles are minimised, through relocation of animals from the works corridor and an adjacent buffer zone and post-construction habitat reinstatement. The method statement will include post-construction habitat restoration and management requirements.	To help ensure the protection of reptiles.
Where trees, hedgerows or scrub, of potential value to nesting birds, are required to be cleared for construction, clearance will be undertaken outside of the bird breeding season (14 February to 31 August inclusive) to prevent disturbance to nesting birds where possible. However, if this is not practicable, habitat will be surveyed prior to clearance. No habitat containing an active nest will be removed or disturbed, and measures will be set in place to protect the nest until young have fully fledged and left the nest. Measures may include the establishment of 5 m wide buffer zones in which heavy vehicles will not be tracked and the storage of vehicles, equipment, machinery and soil storage will be prohibited. Works in the buffer zone will be delayed until the Ecological Clerk of Works (ECoW) has confirmed young have fully fledged and left the nest.	To help ensure the protection of breeding birds and their young.
A pre-construction badger survey of the works area and 30 m buffer zone will be undertaken in order to locate any potential new active setts that could cause a constraint to construction. If mitigation cannot be carried out to protect any setts as required under legislation, then a Natural England licence to close or disturb the sett may be required and will be obtained prior to the commencement of works as necessary.	To help ensure the protection of badgers.
<b>Construction measures</b>	
All relevant mitigation measures will be implemented through the CoCP (Volume 5, Appendix 2.2)	To minimise the likely impacts on ecology and nature conservation features of interest, including biosecurity measures to prevent spread of invasive species.
Site induction and toolbox talks will include mitigation requirements included in this chapter and in Volume 6, Appendix 9.2: OEMP.	To help ensure adherence to the ecology mitigation strategy and protection of habitats and species of nature conservation interest.
All works will be carried out taking full account of legislative requirements and EA guidance.	To minimise the likely impacts on ecology and nature conservation features of interest.
Appropriate and adequate measures will be set in place to ensure appropriate levels of dust control to ensure, as far as practicable, that no significant off-site dust effects will occur.	
Night working will be avoided where practicable. However, it may be necessary to carry out works during night time hours and where night working is unavoidable, light fixtures will be directed away from habitat of value to protected or otherwise notable species, in order to minimise likely disturbance effects of light spillage. Lighting will be kept to an absolute practicable minimum where located nearby to any active badger setts.	To minimise the disturbance impacts of light spill on protected or otherwise notable species.

Measures adopted as part of Thurrock Flexible Generation Plant	Justification
<p>An ECoW will be present on site to oversee enabling works and construction where necessary. The ECoW will be a suitably experienced professional ecologist. The ECoW will review results of protected species surveys prior to the commencement of works and will contribute to all relevant construction method statements.</p>	<p>To ensure works are carried out in accordance with the CoCP and comply with international and national legislation.</p>
<p>Further details of measures relating to pollution prevention are set out in Volume 3, Chapter 15: Hydrology and Flood Risk and are described in the CoCP (Volume 5, Appendix 2.2). Measures will include the provision of a pollution incident response plan and a drainage management plan to minimise potential pollution effects.</p>	<p>To minimise the potential for pollution incidents to affect habitats.</p>
<p>Progressive and careful habitat clearance works such as the gradual strimming of above-ground vegetation such as brambles, rough grass and scrub, will be undertaken in select areas prior to construction, to deter reptiles from the working area where alternative habitat is available to them. Uprooting of vegetation of potential value to hibernating reptiles will be undertaken prior to the commencement of the hibernation period (November to March) to deter reptiles from hibernating in the area.</p>	<p>To minimise the potential impacts on reptiles.</p>
<p>A biosecurity protocol will be implemented to minimise risk of spreading invasive species. The main risks are associated with transfer of aquatic plants or animals (including vectors for disease) between watercourses or waterbodies. Where working in or near water, control measures will be implemented. These are documented in the CoCP (Volume 5, Appendix 2.2) and include:</p> <ul style="list-style-type: none"> <li>• ensuring vehicle tyres and wheel arches are cleared of mud, plants and other organic material before moving from one watercourse to another;</li> <li>• leaving removed material on site; and</li> <li>• cleaning boots and disinfecting (away from waterbodies to prevent potential pollutant incidents) all equipment that might come into contact with water.</li> </ul> <p>Appropriate measures will also be adopted when working in the vicinity of invasive terrestrial plants, if any are found. Where necessary, works will be supervised by the ECoW. Known locations of invasive plant species will be marked on site and vehicle movements restricted in the vicinity of these locations. Any spoil containing or likely to contain invasive plant material to be stored separately from non-contaminated spoil, and treated as appropriate, with control measures adopted.</p>	<p>To minimise the potential risk of spreading disease and invasive species.</p>
<p>Taking into account the mobile nature of water voles, pre-construction surveys will be undertaken to confirm the presence/absence of water voles along all watercourses of potential value to water voles. A Natural England licence would be obtained for works that affect water vole habitat. Method statements will include pre-construction measures to deter water voles from the working corridor and an adequate buffer zone (i.e. up to 15 m where favourable habitat is present). Measures could potentially include:</p> <ul style="list-style-type: none"> <li>• removal of vegetation from channel and bank-side vegetative cover, up to a minimum of 1.5 m inland from the top of the bank between mid-February and early April;</li> <li>• the potential capture and translocation of water voles from working areas by an appropriately qualified and experienced ecologist;</li> <li>• a destructive search of water vole burrows within the working corridor under the watching brief of an appropriately qualified and experienced ecologist; and</li> <li>• measures to protect sections of watercourses which will not be directly impacted.</li> </ul> <p>Works will be conducted in accordance with Natural England guidance, which states that “for summer works, vegetation removal should be carried out for a two-week period prior to development. Winter works should either carry out the mitigation in September and maintain unsuitable habitat until the works commence, or in the event of an emergency, trapping and vole proof fencing may have to be employed” (Arnott, 2001). Works will also take into account best practice guidelines published in Strachan <i>et al.</i> (2011).</p>	<p>To minimise the potential impacts on water voles.</p>
<p>In addition to the above-mentioned measures, the following would be undertaken.</p> <ul style="list-style-type: none"> <li>• No construction works will be carried out within minimum distances of an active sett entrance. Works within 30 m of a badger sett entrance may require a Natural England licence for badgers. Protection zones will be marked out on site, such as with high-visibility fencing or coloured tape.</li> <li>• Areas of high badger activity, if identified, will be cordoned off to ensure these are kept fully intact and with minimal interference from construction.</li> <li>• Excavations more than 0.5 m deep will be fenced or covered overnight where practicable, or if this is not practicable, a method of escape (e.g. a plank to act as a ladder) will be provided.</li> <li>• Large diameter pipes will be capped at the end of each working day to reduce the potential for badgers and other animals to enter them and become trapped.</li> </ul>	<p>To minimise the potential impacts on badgers.</p>

Measures adopted as part of Thurrock Flexible Generation Plant	Justification
If work within minimum distances of a sett and, therefore, sett closure or disturbance cannot be avoided, sett closures will need to be carried out outside the badger breeding season (defined as 30 November to 1 <sup>st</sup> July) and in accordance with a Natural England approved method statement and, where relevant, a Natural England licence for badgers.	To minimise the potential impacts on badgers.
<b>Post-construction measures</b>	
Reinstatement of temporarily damaged or cleared terrestrial habitat will be carried out as soon as practicable. Habitat reinstatement will involve the replacement of stripped soils and the planting of native hedgerows, shrubs and trees, typical of the local area and of local provenance where possible. Habitat reinstatement will be undertaken in accordance with a pre-approved Landscape Management Plan. The scheme will include the retention and/or replacement of habitats of nature conservation value wherever practicable.	To minimise the period of time that habitats and species will be affected.
<b>Operation and maintenance measures</b>	
Thurrock Flexible Generation Plant access road to be unlit, and the Thurrock Flexible Generation Plant itself to be unlit when unmanned except for motion-sensitive security lighting which will be directional to minimise light spillage.	To minimise disturbance impacts on species
The measures to be adopted for the avoidance of pollution of the environment during the operation of the scheme infrastructure are set out in Volume 3, Chapter 15: Hydrology and Flood Risk.	To protect retained habitats and species.
Habitats will be managed in accordance with Volume 6, Appendix 9.2: OEMP.	To ensure the success of habitat/landscaping proposals.
<b>Decommissioning measures</b>	
Measures to be adopted during decommissioning will be similar to those adopted during construction and will incorporate best practice guidance available at that time. These will be implemented through a decommissioning plan.	To minimise likely impacts on habitats and species of ecological or conservation interest.

### 3. Baseline environment

#### 3.1 Current baseline

3.1.1 The sections below describe the current baseline as derived from the desk study and surveys undertaken in 2018. It is not considered likely that the baseline would change significantly between 2018 and the start of construction (2021) or operation (2022, or later) in terms of the broad spread of habitats and species present on site.

3.1.2 However, it is possible that the distribution of mobile species such as breeding birds, reptiles, water voles and badgers may change between those dates, and therefore additional pre-commencement surveys would be undertaken to assess any changes in distribution. The proposed mitigation plans as set out in Volume 6, Appendix 9.2: OEMP would be amended accordingly, but the nature of the mitigation measures required is unlikely to change.

#### Designated sites

3.1.3 There are six statutory designated sites for nature conservation value within 2 km of the Thurrock Flexible Generation Plant application boundary (Table 3.1). The Thames Estuary and Marshes SPA / Ramsar is located 1.03 km from Zone E. Mucking Flats & Marshes SSSI is located 0.77 km from Zone E. Hangman's Wood and Deneholes SSSI is located 1.85 west of Zone J. Globe Pit SSSI is located 1.94 km west of Zone J. Linford Wood LNR is located 1.55 km east of the site.

3.1.4 For the purposes of the assessment of air quality impacts on internationally designated sites, the search area was extended to 15 km from Zone A. Refer to Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors for full details of the assessment of atmospheric emissions on designated sites.

3.1.5 Nineteen non-statutory Local Wildlife Sites (LWSs) are located within the 2 km search radius of the site (Table 3.1).

3.1.6 Three sites are located immediately adjacent to the Thurrock Flexible Generation Plant application boundary. These are Broom Hill LWS, located adjacent to a section of Zone J haul road and Zone H alternative access road; Mucking Heath LWS, located adjacent to the Zone H alternative access road, and Low Street Pit LWS, located adjacent to the proposed gas pipeline connection between Zones C and D.

Table 3.1: Designated sites within 2 km of the Thurrock Flexible Generation Plant.

Site Name	Designation	Distance to Thurrock Flexible Generation Plant	Description
Thames Estuary and Marshes	Ramsar	1.03	The site supports internationally important numbers of wintering waterfowl, on a complex of mudflats, lagoons and saltmarshes. The saltmarsh areas comprise internationally important diverse assemblages of wetland plants and invertebrates. The site is also noted for its hydrological functions, including shoreline stabilisation.
Thames Estuary and Marshes	SPA	1.03	The estuary and adjacent grazing marsh support important assemblages of wintering water birds and is also important in spring and autumn migration periods.
Mucking Flats and Marshes	SSSI	0.77	Nationally and internationally important numbers of wintering wildfowl and waders occur on an extensive stretch of mudflats, saltmarsh, and sea wall grassland. Saltmarshes provide important high tide roosts and have a high invertebrate interest. The site's value is enhanced by its proximity to two SSSI sites across the Thames in Kent.
Hangman's Wood and Deneholes	SSSI	1.85	The remains of underground chalk mines provide the most important underground hibernation site for bats in Essex. The woodland is a relict fragment of ancient woodland in which bats feed.
Globe Pit	SSSI	1.94	The site is important for the interrelationship of archaeology with geology, and exposures will be of considerable importance for future research.
Linford Wood	LNR	1.55	The woodland provides habitat for birds, including refuge for migrant birds in spring and autumn.
Broom Hill	LWS	0.00	Site is of interest for ancient acid-grassland flora, and invertebrate fauna is of exceptional importance. Seven nationally rare and 39 nationally scarce species have been recorded.
Mucking Heath	LWS	0.00	Relict acid-grassland/heath is of interest for flora and invertebrates. Insect fauna includes 4 nationally rare and 50 nationally scarce species.
Low Street Pit	LWS	0.00	Site lies on regionally important Thames terrace gravels, supports diverse invertebrate fauna.
Lytag Brownfield	LWS	0.03	Site supports populations of all four Essex reptile species.

Site Name	Designation	Distance to Thurrock Flexible Generation Plant	Description
West Tilbury Hall	LWS	0.04	Locally important grassland flora includes 2 locally rare species, and supports the nationally scarce bee <i>Osimia bicolor</i>
Tilbury Centre	LWS	0.14	Site comprises a complex mosaic of habitats, supporting important invertebrates and BAP bumblebee <i>Bombus humilis</i> foraging habitat.
West Tilbury Church	LWS	0.18	Area of ancient grassland supporting nationally restricted flora.
Tilbury Marshes	LWS	0.27	Grazing marsh supports a number of nationally scarce plants, area also includes important habitat for invertebrates
Goshems Farm	LWS	0.42	Site supports populations of Stinking Goosefoot ( <i>Chenopodium vulvaria</i> ), and UKBAP species Hornet Robberfly ( <i>Asilus crabroniformis</i> )
Orsett Camp Quarry	LWS	0.47	Acid grassland supports important invertebrate populations, including 6 nationally rare, 16 nationally scarce and 3 UKBAP species. The site also supports populations of reptiles, and nationally scarce plant species.
Rainbow Shaw	LWS	0.70	Small ancient woodland fragment supporting populations of Glow-worm, and Bluebell.
Linford Pit	LWS	0.95	Site supports important invertebrate fauna and lies within significant cluster of similar sites.
Little Thurrock Reed Beds	LWS	1.17	Site comprises two reedbeds providing good conditions for reed dependent insects and birds, including Cetti's warbler.
Terrels Heath	LWS	1.44	Area of ancient woodland dominated by Pendunculate Oak ( <i>Quercus robur</i> ).
Linford Wood	LWS	1.65	Part of LNR, woodland contains a pond and interesting tall herb fen.
Buckingham Hill	LWS	1.67	Large extent of unimproved acid grassland developing, including foraging habitat for <i>Bombus humilis</i>
Restored Canal & Grazing Marsh, Higham	LWS	1.73	Recently established reedbeds and coastal grazing marsh.
Gobions Lake	LWS	1.79	Mosaic of habitats with diverse flora and fauna. Peripheral woodland contains a rookery.

Site Name	Designation	Distance to Thurrock Flexible Generation Plant	Description
Blackshots Nature Area	LWS	1.99	Large area of rough grassland supporting an important invertebrate population and nesting birds.

3.1.7 Of the designated sites in Table 3.1, it is not considered that the operation or construction of the proposed development would generally have adverse impacts on LWS sites more than 200 m away. IAQM guidance suggests that impacts of dust on ecological receptors during construction are unlikely beyond 50 m from the source (IAQM, 2014), and lighting and noise effects are not considered likely to be significant beyond 200 m based on the assessments undertaken for the PEIR.

3.1.8 Hangman's Wood and Deneholes SSSI is 1.85 km from the site and therefore would not be affected by noise, lighting or visual disturbance during construction or operation. It is designated for hibernating bats and therefore not affected by atmospheric emissions. This site is therefore scoped out of further assessment.

3.1.9 Globe Pit SSSI is designated for geological features and is therefore scoped out for further assessment in this chapter.

3.1.10 For operational effects, air quality assessments have been carried out on all international and nationally important statutory sites within 15 km and all LWS within 2 km which support habitats considered potentially susceptible to impacts from atmospheric emissions (refer to Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors for full details of the assessment of atmospheric emissions on designated sites). Sites with a downstream hydrological connection have been assessed for potential impacts from surface water run-off during construction and operation.

### Habitats

3.1.11 Full descriptions of the Phase 1 survey results are provided in Volume 6, Appendix 9.1: Ecological desk study and survey report. A table showing areas of the habitat types present in each zone is provided in Table 3.2. A table showing lengths of linear habitats present in each zone is provided in Table 3.3.

3.1.12 A brief summary is provided below:

- Zone A: The northern section comprises approximately 7.18 ha of arable land of no particular conservation interest. The southern section comprises 11.13 ha of semi-improved grassland which is relict grazing marsh that does not meet the criteria for the Priority Habitat Coastal & Floodplain Grazing Marsh due to its relatively degraded nature and lack of botanical and breeding wetland bird interest in the associated ditches. The site is currently managed by mowing and no grazing is undertaken. Zone A has approximately 1.4 km of boundary ditches (which are retained) and 475 m of internal ditches (which are not retained).
- Zone B: This is the existing Tilbury substation and as such predominantly comprises buildings and hard standing.
- Zone C: Predominantly arable land (22 ha) crossed in three places by north-south ditches with strips of associated tall ruderal riparian habitat.
- Zone D: This predominantly comprises arable (21.4 ha) and improved grassland (2.52 ha) which are not considered to be of particular conservation interest. Hedgerows of length 400 m are present on field boundaries.
- Zone E: An improved grassland field 5.87 ha in size.
- Zone F: 10.72 ha of arable and 1.12 ha of poor semi-improved grassland north of the railway line with approximately 1.4 km of boundary ditches and associated grassland and tall ruderal habitat.
- Zone H: The proposed access road is along an existing road with associated margins comprising field boundaries and hedgerows. Very limited road improvements are proposed to enable access by construction plant which comprise 0.007 ha in total of bare ground, tall ruderal, poor semi-improved grassland and approximately 40 m of hedgerow.
- Zone I: 5.91 ha of poor semi-improved grassland with approximately 1 km of boundary ditches and associated tall ruderal and grassland habitat
- Zone J: The proposed haul route comprises arable, tall ruderal and poor semi-improved grassland, with 0.39 km of ditch and 0.62 km of hedgerow.
- Zone X: Arable originally considered as possible mitigation land but no longer included in the application boundary.
- Zone Y: An arable field with ditches along the boundaries, included in surveys as an initial candidate for mitigation land but subsequently dropped.
- Zone Z: Mixed habitats including the Lytag Brownfield LWS, comprising scrub, grassland and open mosaic brownfield habitat. This land is outside the proposed development boundary but was included in the original bird survey. A large pond is present here which was constructed as part of a mitigation package for another development which did not proceed.

3.1.13 In terms of habitats of value that are included as IEFs for the purposes of impact assessment, the following habitats are considered to have value at greater than site level.

- Semi-improved and poor semi-improved grassland (Zones A and I). These grassland areas are not considered to have particularly high intrinsic value. Although the Zone A grassland is relict grazing marsh it is not considered to meet the criteria for that UK Biodiversity Action Plan (BAP) habitat type, and is therefore considered to be of district value. The Zone I grassland is less diverse than Zone A and this grassland is considered to be of parish value.
- Ditches. Drainage ditches are present within or on the boundaries of the majority of Zones described above. The ditches are considered to be of district value, for the protected and other species they support, and for the ecological habitat connectivity they provide.
- Hedgerows: The hedgerow network within the Thurrock Flexible Generation Plant site are patchy and there is little connectivity between hedgerows. The railway line forms an obvious disconnect between the areas of the site north and south of the line, and overall the hedgerows are not considered to be of more than district value although they are UKBAP habitat.

3.1.14 No other habitat types are considered to be of importance at more than the site level.

Table 3.2 Approximate areas of habitat types within the Thurrock Flexible Generation Plant application site.

Habitat type	Development Zone (ha)									Total	
	A	B	C	D	E	F	H	I	J		
Semi-natural broadleaved woodland			0.07	0.37		0.04	0.001				<b>0.48</b>
Dense scrub			0.07	0.20		0.15	0.12	0.02	0.04		<b>0.60</b>
Scattered scrub							0.004		0.08		<b>0.08</b>
Neutral semi-improved grassland	11.13	0.14						0.25			<b>11.52</b>
Improved grassland	0.02			2.52	5.87	0.001	0.04	5.91			<b>14.36</b>
Poor semi-improved grassland						1.12	0.006	0.006	0.81		<b>1.94</b>
Tall ruderal	0.14		1.44	0.57	0.001	0.001	0.31	0.26	0.89		<b>3.61</b>
Marginal vegetation (reed bed)							0.03	0.02	0.02		<b>0.07</b>
Hard standing		8.90					0.005				<b>8.91</b>
Arable	7.18		22.21	21.44		10.72	0.88	0.08	3.38		<b>65.89</b>
Bare ground							0.002				<b>0.002</b>
<b>Total</b>	<b>18.47</b>	<b>9.04</b>	<b>23.79</b>	<b>25.1</b>	<b>5.871</b>	<b>12.032</b>	<b>1.398</b>	<b>6.546</b>	<b>5.22</b>		<b>107.47</b>

Table 3.3 Linear habitat features within the Thurrock Flexible Generation Plant application site.

Habitat type	Development Zone (lengths in km)									Total
	A	B	C	D	E	F	H	I	J	
Wet ditch	1.88	0.15	0.55			0.69	0.04	1.02	0.38	<b>4.71</b>
Dry ditch						0.71				<b>0.71</b>
Hardstanding (road)				1.09			4.24			<b>5.33</b>
Intact species rich hedgerow				0.23	0.11		0.14		0.6	<b>1.08</b>
Intact species poor hedgerow				0.18		0.4	0.1			<b>0.68</b>
Defunct species rich hedgerow							0.57			<b>0.57</b>
Fence							0.17			<b>0.17</b>
Scattered tree line							0.38			<b>0.38</b>
Improved grassland verge							1.33			<b>1.33</b>
<b>Total</b>	<b>1.88</b>	<b>0.15</b>	<b>0.55</b>	<b>1.5</b>	<b>0.11</b>	<b>1.8</b>	<b>6.97</b>	<b>1.02</b>	<b>0.98</b>	<b>14.96</b>
Wet ditch (km)	1.88	0.15	0.55			0.69		1.02	0.39	<b>4.68</b>
Dry ditch (km)						0.71				<b>0.71</b>
Hardstanding (road) (km)				1.09			0.03			<b>1.12</b>
Intact species rich hedgerow (km)				0.23	0.11				0.62	<b>0.96</b>
Intact species poor hedgerow (km)				0.18		0.4				<b>0.58</b>
Fence (km)							0.01			<b>0.01</b>
<b>Total</b>	<b>1.88</b>	<b>0.15</b>	<b>0.55</b>	<b>1.5</b>	<b>0.11</b>	<b>1.8</b>	<b>0.04</b>	<b>1.02</b>	<b>1.01</b>	

## Species

- 3.1.15 For full information on baseline ecological surveys, refer to Volume 6, Appendix 9.1: Ecological desk study and survey report. The sections below summarise the key species groups taken forward for impact assessment.
- 3.1.16 **Invertebrates:** an invertebrate scoping assessment of the grassland within Zone A where most permanent habitat loss occurs concluded that the site is unlikely to support an invertebrate assemblage of particular significance although it is acknowledged that its presence close to the adjacent Lytag Brownfield LWS (which is known to be of considerable importance for invertebrate populations) means that it is likely to contribute to the overall diversity of invertebrate populations in the surrounding area. The invertebrate population of Zone A itself is considered to be of no more than district importance but has been included in the impact assessment because of its potential contribution to the maintenance of invertebrate assemblages in the surrounding offsite area which are considered to be of regional national importance by Natural England.
- 3.1.17 **Reptiles:** The site as a whole supports populations of adder, grass snake, common lizard and slow-worm. All four species were present in Zone A. Populations in other areas where direct impacts would occur from habitat loss are Zone C and Zone J, although habitat loss in these areas is relatively small. All four reptile species are UKBAP listed, and given the presence of four species, the reptile assemblage is considered to be of county importance.
- 3.1.18 **Breeding birds:** A total of 28 species were confirmed as breeding within the survey area in 2018. A further 15 species were considered to be probably / possibly breeding within the survey area in 2018 – records for these species were not wholly indicative of behaviour that could allow confirmation of breeding on site.
- 3.1.19 One confirmed breeding species, Cetti's warbler, is listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Five pairs of this species were recorded, four on Zone Z (outside the FPGP project area) and one in Zone A.
- 3.1.20 Of the 43 species considered to be breeding or possibly breeding on site, 18 had some status as species of conservation concern. Ten species are listed as a priority species in the UK BAP, nine species are listed as Species of Principal Importance under Section 41 of the NERC Act, two species are listed on the Local BAP, nine species are included on the Birds of Conservation Concern (BoCC) Red List and six species are included on the BoCC Amber List.
- 3.1.21 The breeding bird assemblage is considered to be of district importance.
- 3.1.22 **Wintering birds:** Surveys to determine whether any significant wintering bird interest is present are currently ongoing and will be reported in the ES.
- 3.1.23 **Water Voles:** Water voles were recorded in numerous ditches across the site including in areas where water vole habitat will be affected in Zones A and C. Water Voles are a protected and UKBAP species, and the water vole population on site is considered to be of county importance.
- 3.1.24 **Bats:** Surveys for bats have not been undertaken because there are no potential roost sites that would be affected or major linear habitat features likely to represent significant flightlines in the areas affected by habitat loss. However, it is considered likely that the site will be used by some foraging bats and therefore potential impacts on bats have been assessed on the assumption that foraging bats are of parish importance.
- 3.1.25 **Badgers:** Occasional signs indicating presence of badgers were observed during surveys but no active setts are currently known to occur within 30 m of the site. One disused sett was recorded in Zone H (alternative access road) but results suggest that the site is not well-used by badgers. An artificial badger sett has been recently constructed with Zone Z, outside the red line, since the original surveys were undertaken, but there is little evidence of badger activity within the application boundary. Badgers are therefore considered to be of parish importance.

## Important Ecological Features

- 3.1.26 Important Ecological Features (IEFs) are sites, habitats and species of ecological or nature conservation importance that could be significantly affected by a project. Sites, habitats or species identified during the desk study or survey work that are not considered likely to be affected are not considered further in this chapter.
- 3.1.27 In assigning a level of importance to a site, habitat or species population or assemblage, its distribution and status (including a consideration of trends based on available historical records) have been considered. Rarity is considered because of its relationship with threat and vulnerability, and the need to conserve representative areas of habitats and genetic diversity of species populations, although rarity in itself is not necessarily an indicator of value. A species that is rare and declining is assigned a higher level of importance than one that is rare but known to be stable.
- 3.1.28 The valuation of sites also takes full account of existing value systems such as SSSI and LWS designations.

- 3.1.29 In accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) guidelines the value of habitats takes into account published selection criteria, these include:
- size (extent);
  - diversity;
  - naturalness;
  - rarity;
  - fragility;
  - typicalness, and recorded history;
  - position in an ecological or geographical unit;
  - current condition; and
  - potential importance.
- 3.1.30 Criteria for the valuation of habitats and plant communities include Annex III of the Habitats Directive, guidelines for the selection of biological SSSIs and criteria used by local planning authorities and the Wildlife Trusts for the selection of local sites.
- 3.1.31 Populations of species are valued on the basis of their size, recognised status (such as recognised through published lists of species of conservation concern, and designation of BAP status) and legal protection status. For example, bird populations exceeding 1% of published information on biogeographic populations are considered to be of international importance, those exceeding 1% of published data for national populations are considered to be of national importance, etc.
- 3.1.32 In assigning values to species populations, it is important to take into account the status of the species in terms of any legal protection to which it is subject. However, it is also important to consider other factors such as its distribution, rarity, population trends, and the size of the population which would be affected. Thus, for example, whilst the great crested newt is protected under the Habitats Directive, and therefore conservation of the species is of significance at the international level, this does not mean that every population of great crested newt is internationally important and thus of very high value. It is important to consider the particular population in its context. Thus, in assigning values to species the geographic scale at which they are important has been considered. The assessments of value rely on the professional opinion and judgement of experienced ecologists.

- 3.1.33 Due regard has also been paid to the legal protection afforded to such species in the development of mitigation and compensation measures to be implemented during construction and operation of the Thurrock Flexible Generation Plant. For European Protected Species (EPS) there is a requirement that the scheme should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range, i.e. to maintain favourable conservation status, the scheme should not affect the long-term availability of sufficient habitat required by the population, the long-term viability of the population, or the long-term natural range of the species.
- 3.1.34 Various criteria can be used to evaluate the importance of species assemblages, such as SSSI selection criteria.
- 3.1.35 Assessing feature values requires consideration of both existing and future predicted baseline conditions, and therefore the description and valuation of ecological features takes account of any likely changes. This includes known trends in the population size or distribution of species, likely changes to the extent of habitats, and the effects of other proposed developments or land use changes.
- 3.1.36 A summary of the IEFs which are taken forward to the impact assessment in Section 4 is provided in Table 3.4 below.
- 3.1.37 Locations of key ecological constraints are shown on Figure 3.1.

**Table 3.4: Summary of IEFs identified for assessment.**

IEF	Covering legislation and guidance	Level of Importance
Thames Estuary and Marshes SPA	Conservation Regulations 2017. This site supports breeding and wintering bird populations of European importance of the several species listed on Annex I of the Directive. The area qualifies under Article 4.2 of the Directive by regularly supporting at least 20,000 waterfowl.	International
Thames Estuary and Marshes Ramsar	Conservation Regulations 2017. The site meets four criteria of Ramsar (criterion 1, 2, 5 and 6).	International
Mucking Flats & Marshes SSSI	Wildlife & Countryside Act 1981 (and as amended). Supports UKBAP Priority habitats and species.	National
Broom Hill LWS	Considered in local authority policies under the domestic planning regime with applications made to local authorities.	County
Mucking Heath LWS		
Low Street Pit LWS		
Lyttag Brownfield LWS		
West Tilbury Hall LWS		

IEF	Covering legislation and guidance	Level of Importance
Semi-improved grassland	Included primarily because of presence of reptiles	District (Zone A) Parish (Zone I)
Ditches	Included primarily because of presence of water voles	District
Hedgerows	The Hedgerow Regulations 1997 protect "important" hedgerows from removal. Native species hedgerows are a Priority Habitat of the UKBAP.	Parish
Invertebrate assemblage	Considered in local authority policies under the domestic planning regime with applications made to local authorities.	District
Reptiles	All common UK reptile species (adder, grass snake, common lizard and slow-worm) are protected through part of Section 9 (1 and 5) of the Wildlife & Countryside Act 1981 (as amended) and are UKBAP species.	County
Breeding birds	Several breeding bird species recorded during the surveys are protected under the Habitats Regulations and/or are Priority Species of the UK BAP and are listed in the Norfolk LBAP (i.e. grey partridge, skylark, tree sparrow and song thrush).	District
Wintering birds	To be completed following surveys	To be assessed following surveys
Water Voles	Water voles are protected under Schedule 5 of the WCA 1981. The species is also a listed on the UKBAP and Essex BAP.	County
Bats	All bat species are protected through inclusion in the Conservation Regulations 2017. Noctule, soprano pipistrelle and brown long-eared bats are UK BAP Priority Species.	Parish
Badgers	Protection of Badgers Act 1992	Parish

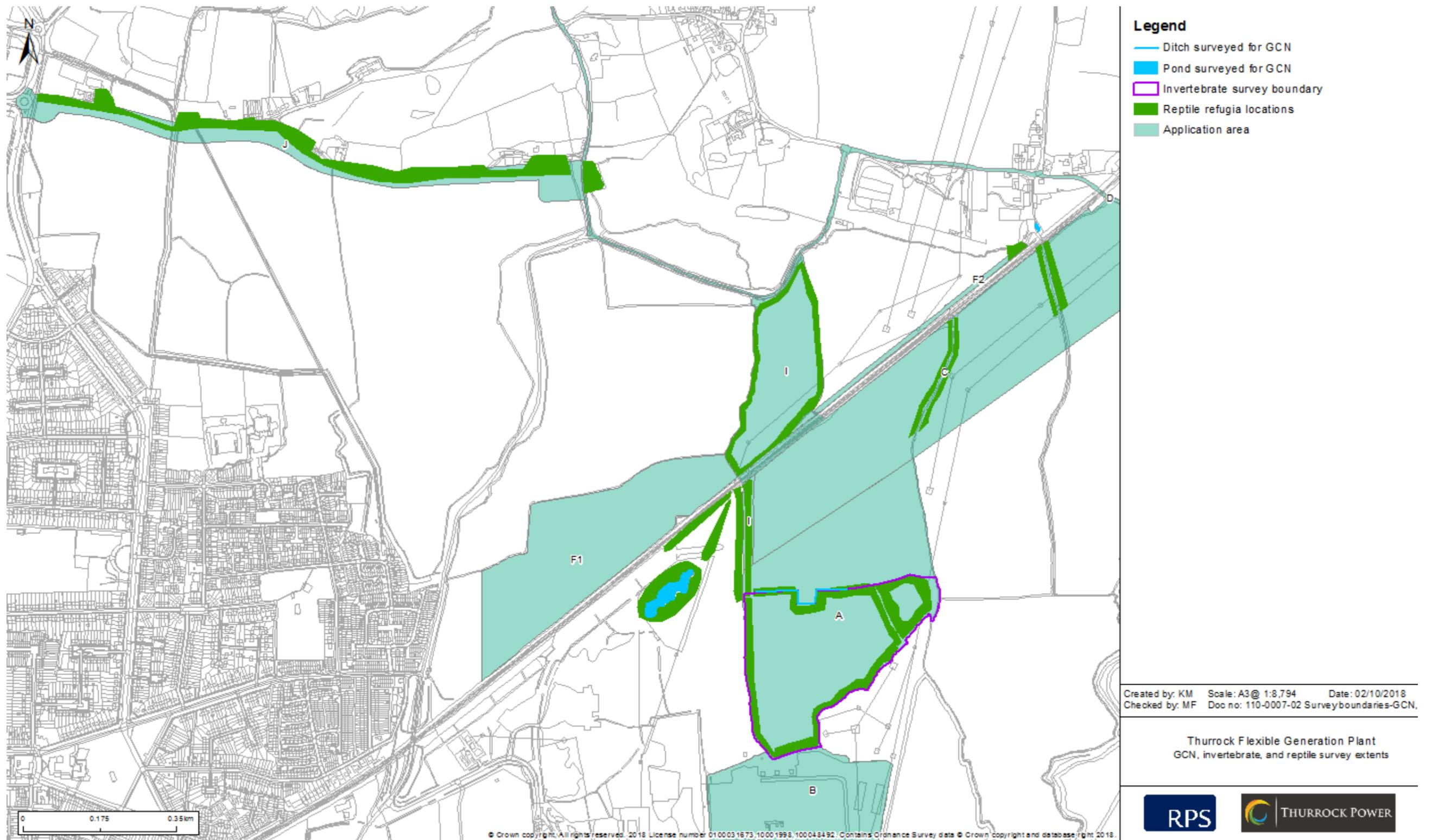


Figure 3.1: Ecological constraints.

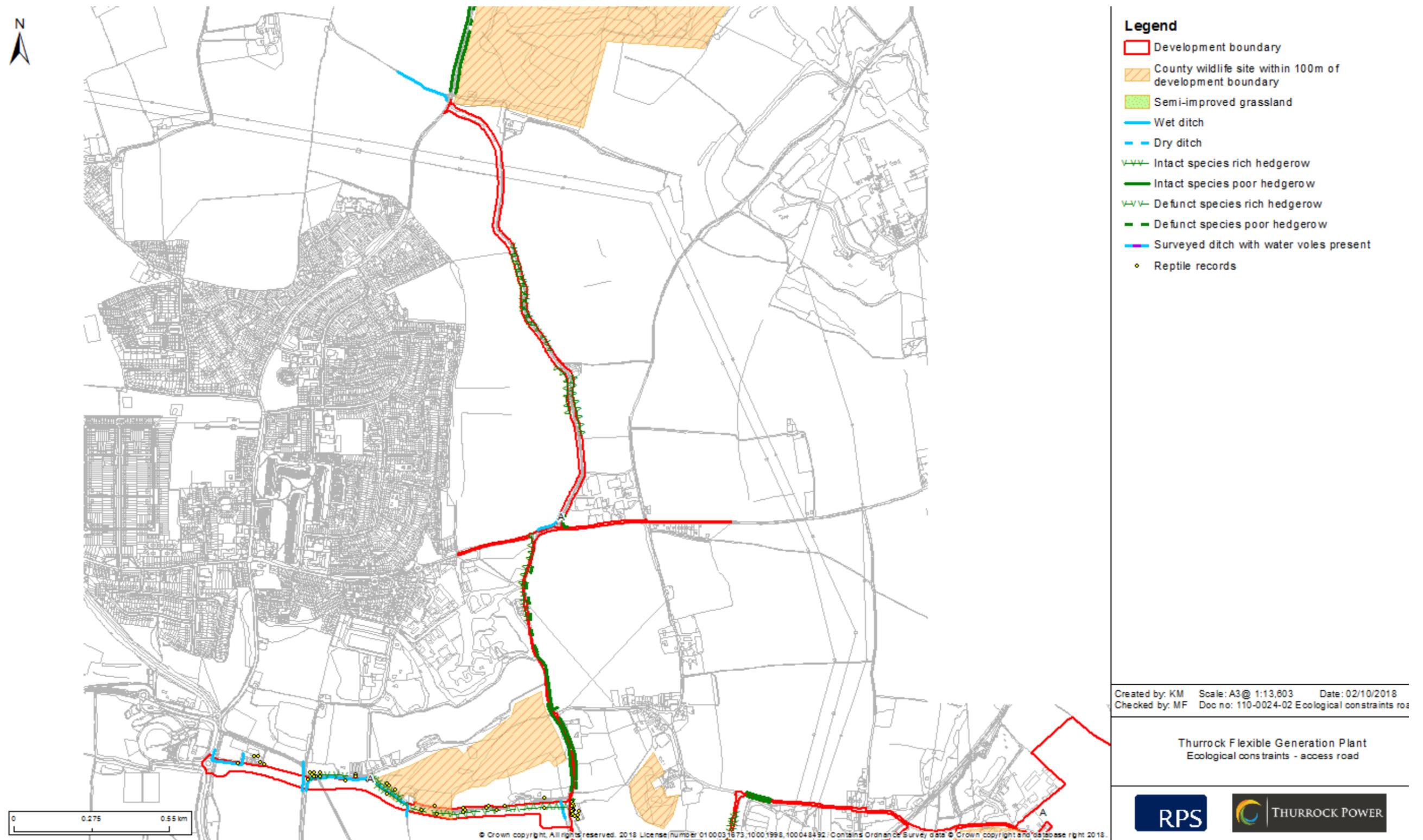


Figure 3.1: Ecological constraints.

## 3.2 Future baseline

3.2.1 The following sections consider known trends in distribution or abundance in species present in the study area for the Thurrock Flexible Generation Plant. It is considered that land use and management are likely to be the key predictors of species distributions over the lifetime of the scheme, given that the majority of habitats affected by the works are arable and grassland farmland habitats.

- Reptiles: Most common species of reptile (grass snake, slow worm and common lizard) are widespread across England but considered to be in decline as a result of habitat loss and the effects of habitat fragmentation. Adder is less widespread due to its more restricted habitat requirements but is also decreasing.
- Breeding farmland birds: the British Trust for Ornithology (BTO) breeding farmland bird index has declined by 56% since 1970. This pattern of long-term decline has been apparent for many years. The rate of decline in recent years is not as steep as previously, but in general farmland birds remain in decline across the UK.
- Water voles: Water vole populations are in major decline; the species used to be found in nearly every waterway in England, Scotland and Wales but are now thought to have been lost in up to 90% of these sites. Threats include habitat loss and fragmentation, water pollution and predation by American mink in the last 30 years.
- Badgers: Estimates suggest that badger populations nationally are increasing. The potential impact of the badger cull for TB control may reduce populations in areas where the cull is implemented.

### Climate change

3.2.2 Climate change affects biodiversity in many ways. Impacts on species include changes in distribution and abundance, the timing of seasonal events and habitat use and, as a consequence, there are likely to be changes in the composition of plant and animal communities. Habitats and ecosystems are also likely to change in character.

3.2.3 Assessing the impacts of climate change on terrestrial and freshwater biodiversity is difficult as plants and animals are influenced by other pressures, such as atmospheric pollution and land use, and different factors can work in combination to bring about change. However, changes are beginning to be observed across a range of species and habitats in the UK that have been related to climate change. Moorcroft & Speakman (2015) summarise 17 technical papers produced by leading experts on the impacts of climate change on habitats and species in the UK. They conclude that there is strong evidence that climate change is affecting UK biodiversity. Impacts are expected to increase as the magnitude of climate change increases.

3.2.4 The distributions of many species are shifting northwards, including some species which have colonised the UK from mainland Europe. There are also examples of species distributions shifting to higher altitudes. Observed changes in distributions differ between species, and some of this difference is likely to be explained by effects of habitat fragmentation on dispersal ability for some species more than others.

3.2.5 Species populations and habitats have been affected by variations in rainfall and extreme weather events, particularly drought. Projected changes in these variables as a result of climate change could have a major impact on biodiversity and ecosystems. Some habitats are particularly sensitive to climate change, with the habitats most likely to be affected being montane habitats (from temperature rises), wetlands (from changes in hydrological processes and availability of water) and coastal habitats (from sea-level rise).

3.2.6 While the responses of species and habitats can be hard to predict with any great degree of certainty as there is much that is not known about habitats, their response to changing conditions and interactions between climate change and changes in management, some qualitative observations of potential climate change impacts on habitats and species that occur in the vicinity of the Thurrock Flexible Generation Plant are outlined below, summarised from Moorcroft & Speakman (2015):

- Wetlands: Reduction in summer rainfall would adversely affect many wetland habitats. Lowland fens are particularly likely to be under increasing threat in south east England. Human-induced impacts from drainage and use of fertilisers have had a greater impact than climate change on freshwater ecology to date.
- Grasslands: Some grasslands are likely to be very sensitive to changes in rainfall, particularly those that are associated with waterlogged conditions for part or all of the year. An increase in summer droughts could lead to a decline in distinctive wet grassland communities, including water meadows and rush pastures.
- Reptiles: Common lizards, smooth newts and adders are projected to lose suitable climatic conditions across England under many climate change scenarios, but may expand their range in Scotland.
- Wintering birds: a number of wintering wildfowl and wader species have declined significantly in their abundance in the UK as they migrate shorter distances in the non-breeding season and many have shifted north-eastwards to new feeding grounds.
- Mammals: Reduced water flow in watercourses would adversely affect water voles. Milder winters could result in increasing populations of some species such as badgers as a result of increasing food availability and an earlier onset of spring.

- 3.2.7 Whilst there may be some changes in the longer term, land management is likely to have a greater influence on biodiversity over much of the study area within the timescale of Thurrock Flexible Generation Plant construction, which is when the majority of effects from the project would occur. The IEF most likely to be affected by climate change over the operational lifetime of the project is water vole, if climate change results in longer dry periods leading to reduction of habitat availability if watercourses and ditches dry up more often.

## 4. Assessment of Effects

### 4.1 Construction phase

#### Permanent loss of grassland

##### *Magnitude of impact*

4.1.1 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of 11.13 ha of semi-improved grassland. Within the study area as a whole, this comprises the overwhelming majority of the resource of this habitat type.

4.1.2 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

##### *Sensitivity of the receptor*

4.1.3 The semi-natural grassland is considered to be of district value. It is relatively homogenous and therefore not of particularly high quality in terms of overall species diversity.

4.1.4 The receptor is therefore considered to be of medium vulnerability, high recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

##### *Significance of effect*

4.1.5 Overall, it is predicted that the **major** impact on the **medium** sensitivity receptor would result in a **moderate** adverse effect, which is significant in EIA terms.

##### *Further mitigation or enhancement*

4.1.6 In order to mitigate the effect on semi-natural grassland, mitigation comprising creation of replacement habitat is proposed.

4.1.7 The proposed mitigation comprises grassland creation. This is currently being considered for Zone F. The area of grassland created would be approximately 12 ha, which equals the area of permanent loss in Zone A and the temporary loss in Zone I (assessed later in this section). Therefore, once the temporary loss of Zone I grassland is restored post-construction, there will be a greater area of semi-natural grassland on site compared to the current baseline situation. In addition, the grassland will be designed and managed to provide a more heterogenous grassland habitat than currently occurs (refer to Volume 6, Appendix 9.2: OEMP for outline habitat creation proposals and Figure 4.1).

##### *Residual effect*

4.1.8 The residual impact following further mitigation is predicted to be minor beneficial, leading to a **minor** beneficial significance of effect, which is not significant in EIA terms.

#### Permanent loss of ditches

##### *Magnitude of impact*

4.1.9 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 476 m of ditch habitat. Approximately 1.4 km of ditch on the boundaries of Zone A are retained. Losses in Zone A therefore comprise approximately 24% of the total Zone A ditch resource. In addition, the construction of the site access road in Zone C will cross three ditches and would result in the loss of 20 m sections of each ditch for construction, of which approximately 10 m would be permanent loss. Within the application area as a whole, this is 9.4 % of the resource of this habitat type.

4.1.10 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

##### *Sensitivity of the receptor*

4.1.11 Ditch habitat is considered to be of district value. It is a habitat type that is relatively straightforward to create in a relatively short period of time.

4.1.12 The receptor is therefore considered to be of low vulnerability, high recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

##### *Significance of effect*

4.1.13 Overall, it is predicted that the **major** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

##### *Further mitigation or enhancement*

4.1.14 Although the effect on ditches is not significant in EIA terms, mitigation for loss of ditches is proposed primarily because of impacts on water voles that are present (assessed later in this section).

4.1.15 The proposed mitigation comprises ditch creation, currently anticipated to be in Zone F and Zone A. The length of proposed ditch in Zone F is approximately 510 m, which equals the length of permanent losses in Zone A and Zone C. Therefore, there will be no net loss of ditch habitat. Refer to Volume 6, Appendix 9.2: OEMP for outline habitat creation proposals and Figure 4.1.

**Residual effect**

4.1.16 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

**Permanent loss of hedgerows**

4.1.17 Precise estimates of hedgerow loss will be assessed once the design of haul roads, access roads and gas connection options is further advanced. Losses are not considered likely to be significant as there are limited locations where significant lengths of hedgerow are present within the application boundary.

**Permanent loss of invertebrate habitat**

**Magnitude of impact**

4.1.18 The main area of permanent habitat with potential to affect invertebrate populations is within Zone A where approximately 11.13 ha of semi-improved grassland and approximately 475 m of ditch would be lost. While approximately 1.4 km of boundary ditches would be retained, the capacity of Zone A to support invertebrate populations would be reduced.

4.1.19 The Zone A habitat itself is not considered likely to be of significant invertebrate interest in isolation but it is recognised that its proximity to the adjacent Lytag Brownfield LWS, which supports a nationally important invertebrate assemblage, means that Zone A may contribute to the maintenance of these assemblages by providing additional habitat particularly for flying insects including bees and wasps.

4.1.20 The impact on the invertebrate community present in Zone A is predicted to be of district spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

**Sensitivity of the receptor**

4.1.21 While Zone A is unlikely to independently support an invertebrate assemblage of more than district interest, the proximity of the Lytag Brownfield LWS is a consideration. The receptor is considered to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **medium**.

**Significance of effect**

4.1.22 Overall, it is predicted that the **major** impact on the **medium** sensitivity receptor would result in a **moderate** adverse effect, which is significant in EIA terms.

**Further mitigation or enhancement**

4.1.23 In order to mitigate for the effect on reptiles, mitigation is proposed that would comprise trapping and translocation of reptiles in Zone A and habitat creation, currently considered for Zone F. Zone F comprises approximately 12 ha of habitat adjacent to Zone I (where reptiles are also present) and also includes a 10 m strip north of the railway line east of Zone I which will provide habitat connectivity for reptiles along the railway line and therefore provide additional robustness by ensuring that populations are less susceptible to fragmentation effects.

4.1.24 Zone F habitat creation includes provision of grassland to mitigate for temporary loss of grassland in Zone I (assessed later in the chapter). Therefore, post-construction there will be a net gain in the area of reptile habitat present.

4.1.25 Furthermore, additional habitat features for reptiles such as log piles, rubble mounds and hibernacula will be provided in Zone F and the grassland and scrub habitat provided will be more heterogenous than the existing Zone A grassland and managed in a more sympathetic manner for reptiles (see Volume 6, Appendix 9.2: OEMP for outline proposals and Figure 4.1), and the overall impact on reptiles is therefore considered to be **minor** beneficial.

**Residual effect**

4.1.26 The residual impact following further mitigation is predicted to be minor beneficial, leading to a **minor** beneficial significance of effect, which is not significant in EIA terms.

**Permanent loss of reptile habitat**

**Magnitude of impact**

4.1.27 Some reptile habitat would be affected by access road construction in Zone C. This area is predominantly arable land of no value to reptiles, but reptiles were recorded in vegetation associated with two ditches that cross the field. Adders and common lizards were recorded in these locations.

4.1.28 The main area of permanent habitat loss is within Zone A, and while boundary ditches and hedges will be retained, the ditch and associated vegetation on the north boundary of Walton Common runs through the centre of Zone A and would be lost, along with the existing grassland.

4.1.29 It is likely that reptile populations in Zone A are concentrated in the margins and ditches where management by mowing is not carried out, but they are likely to use the entirety of the Zone A grassland to some extent. Therefore, the loss of grassland and ditch habitat within Zone A represents a substantial loss of habitat for reptile populations.

4.1.30 The impact is predicted to be of district spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

**Sensitivity of the receptor**

4.1.31 Four reptile species are present in Zones A and J, and two were recorded in Zone C. Clearance of habitat in the absence of mitigation would likely cause death or injury to reptiles and would significantly reduce the distribution and abundance of reptiles in the study area.

4.1.32 The receptor is therefore considered to be of medium vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

**Significance of effect**

4.1.33 Overall, it is predicted that the **major** impact on the **medium** sensitivity receptor would result in a **moderate** adverse effect, which is significant in EIA terms.

**Further mitigation or enhancement**

4.1.34 In order to mitigate for the effect on reptiles, mitigation is proposed that would comprise trapping and translocation of reptiles in Zone A and habitat creation, currently anticipated to be in Zone F. Zone F comprises approximately 12 ha of habitat adjacent to Zone I (where reptiles are also present) and also includes a 10 m strip north of the railway line east of Zone I which will provide habitat connectivity for reptiles along the railway line and therefore provide additional robustness by ensuring that populations are less susceptible to fragmentation effects.

4.1.35 Zone F habitat creation would include provision of grassland to mitigate for temporary loss of grassland in Zone I (assessed later in the chapter). Therefore, post-construction there will be a net gain in the area of reptile habitat present.

4.1.36 Furthermore, additional habitat features for reptiles such as log piles, rubble mounds and hibernacula will be provided in Zone F and the grassland and scrub habitat provided will be more heterogenous than the existing Zone A grassland and managed in a more sympathetic manner for reptiles (see Volume 6, Appendix 9.2: OEMP for outline proposals and Figure 4.1).

**Residual effect**

4.1.37 The residual impact following further mitigation is predicted to be minor beneficial, leading to a **minor** beneficial significance of effect, which is not significant in EIA terms.

**Permanent loss of breeding bird habitat**

**Magnitude of impact**

4.1.38 Minor permanent losses of breeding bird habitat will occur in Zone C for access road construction. This area is predominantly arable land of low value for breeding birds. The main area of permanent habitat loss is within Zone A where approximately 7 ha of arable land and 11 ha of grassland will be lost. The habitat creation proposals for Zone F would result in the loss of approximately 12 ha of arable land but there would be a net benefit to breeding birds overall in Zone F and hence the loss of arable land is not in itself considered to be significant.

4.1.39 A total of 40 breeding territories were recorded in Zone A, including Cetti's warbler and the BoCC red listed species cuckoo, house sparrow, linnet, skylark, song thrush, yellowhammer and yellow wagtail. Habitat for species associated with the boundary hedgerows, including one Cetti's warbler territory, will be retained but the development of Zone A would result in a decline in the number of territories within the study area. In the context of the breeding bird survey area, 40 territories represents 11% of the 353 territories recorded during the survey. There were no species recorded in Zone A that were not also recorded elsewhere in the survey area and therefore the loss of territories within Zone A is not likely to result in the loss of species to the overall breeding bird assemblage in the survey area.

4.1.40 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

**Sensitivity of the receptor**

4.1.41 It is likely that some breeding species would remain in and on the margins of Zone A, and potential breeding habitat in the form of sustainable drainage features would be present within Zone A as part of the designed-in measures for the Thurrock Flexible Generation Plant.

4.1.42 The receptor is therefore considered to be of low vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

**Significance of effect**

4.1.43 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

#### **Further mitigation or enhancement**

- 4.1.44 Although the effect on breeding birds is not significant in EIA terms, mitigation for loss of habitat is proposed primarily because of impacts on other species present within Zone A, such as reptiles and water voles.
- 4.1.45 The proposed mitigation comprises grassland and scrub creation in Zone F. The area of grassland created would be approximately 11.5 ha, which equals the area of permanent loss in Zone A and the temporary loss in Zone I (assessed later in this section). Therefore, once the temporary loss of Zone I grassland is restored post-construction, there will be a greater area of semi-natural grassland on site compared to the current baseline. In addition, the grassland will be designed and managed to provide a more heterogenous grassland habitat than currently occurs.
- 4.1.46 Furthermore, a 10 m strip of scrub and grassland habitat will be provided north of the railway line east of Zone I, adjacent to an existing ditch.
- 4.1.47 Taken together, the above measures are considered likely to provide an overall net gain for breeding birds, and in particular for Cetti's warbler which nests in scrubby habitats near water. The habitat creation proposals should provide for a significant increase in the number of Cetti's warbler territories within the study area which could have an impact of **moderate** beneficial magnitude on the conservation status of this species in particular in the local area and an impact of **minor** beneficial magnitude on the breeding bird assemblage as a whole (refer to Volume 6, Appendix 9.2: OEMP for outline habitat creation proposals and Figure 4.1).

#### **Residual effect**

- 4.1.48 The residual effect following further mitigation is predicted to be **minor** beneficial for the overall breeding bird assemblage, which is not significant in EIA terms.

#### **Permanent loss of wintering bird habitat**

- 4.1.49 Impacts of loss of wintering bird habitat will be assessed at the ES stage following surveys to assess level of usage of the habitat on and adjacent to the Thurrock Flexible Generation Plant application boundary.

#### **Permanent loss of water vole habitat**

##### **Magnitude of impact**

- 4.1.50 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 476 m of ditch habitat which is known to support water voles. Approximately 1.5 km of ditch on the boundaries of Zone A would be retained. Losses in Zone A therefore comprise approximately 24% of the total Zone A ditch resource. In addition, the construction of the site access road in Zone C will cross three ditches and would result in the loss of 20 m sections of each ditch for construction, of which c 10 m would be permanent loss, and water voles have been recorded in two of these ditches.
- 4.1.51 The impact is predicted to be of district spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **major**.

##### **Sensitivity of the receptor**

- 4.1.52 Water voles are considered to be of county value. Water voles are known to be declining on a national level due to habitat loss and predation from mink.
- 4.1.53 The receptor is therefore considered to be of high vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

##### **Significance of effect**

- 4.1.54 Overall, it is predicted that the **major** impact on the **medium** sensitivity receptor would result in a **moderate** adverse effect, which is significant in EIA terms.

##### **Further mitigation or enhancement**

- 4.1.55 In order to mitigate for the loss of water vole habitat, proposed mitigation comprises trapping and translocation of water voles from Zone A and relocation by phased vegetation clearance within Zone C, and ditch creation in Zone F to provide replacement habitat. The length of proposed ditch is approximately 500 m, which equals the length of permanent losses in Zone A and Zone C. Therefore, there will be no net loss of water vole habitat. Refer to Volume 6, Appendix 9.2: OEMP for outline habitat creation proposals and Figure 4.1.

##### **Residual effect**

- 4.1.56 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

## Permanent loss of bat habitat

### Magnitude of impact

4.1.57 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 11.1 ha of grassland, which is likely to be used as foraging habitat for bats. As the boundary features of Zone A are retained it is not considered that the ability of bats to commute across the site would be significantly affected. Elsewhere there will be losses of arable land in Zone C and Zone J which is not likely to be used by foraging bats.

4.1.58 The impact is predicted to be of local spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore considered to be **minor**.

### Sensitivity of the receptor

4.1.59 The receptor is considered to be of medium vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **medium**.

### Significance of effect

4.1.60 Overall, it is predicted that the **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

### Further mitigation or enhancement

4.1.61 Although the effect on breeding birds is not significant in EIA terms, mitigation for loss of habitat is proposed primarily because of impacts on other species present within Zone A, such as reptiles and water voles.

4.1.62 The proposed mitigation comprises grassland and scrub creation in Zone F. The area of grassland created would be approximately 11.5 ha, which equals the area of permanent loss in Zone A and the temporary loss in Zone I (assessed later in this section). Therefore, once the temporary loss of Zone I grassland is restored post-construction, there will be a greater area of semi-natural grassland on site compared to the current baseline. In addition, the grassland will be designed and managed to provide a more heterogenous grassland habitat than currently occurs and this will provide increased foraging opportunities for bats compared to the existing conditions.

4.1.63 Furthermore, a 10 m strip of scrub and grassland habitat will be provided north of the railway line east of Zone I, adjacent to an existing ditch, which will ensure connectivity of habitat for foraging or commuting bats in this area.

4.1.64 Taken together, the above measures are considered likely to provide an overall net gain for foraging bats of **minor** beneficial magnitude (refer to Volume 6, Appendix 9.2: OEMP for outline habitat creation proposals and Figure 4.1).

### Residual effect

4.1.65 The residual impact and effect following further mitigation is predicted to be **minor** beneficial, which is not significant in EIA terms.

## Permanent loss of badger habitat

### Magnitude of impact

4.1.66 Construction of the Thurrock Flexible Generation Plant in Zone A would result in the loss of approximately 11.1 ha of grassland which, although currently not used to a great extent by foraging badgers, may become of more importance in the future if badgers establish in an artificial sett constructed west of the site. The majority of potential badger foraging habitat within the Thurrock Flexible Generation Plant application boundary is not permanently affected.

4.1.67 The impact is predicted to be of district spatial extent, long term (permanent) duration, continuous and irreversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore considered to be **minor**.

### Sensitivity of the receptor

4.1.68 The receptor is considered to be of low vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **low**.

### Significance of effect

4.1.69 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

## Temporary loss of grassland

### Magnitude of impact

4.1.70 Construction of the Thurrock Flexible Generation Plant would involve temporary loss of approximately 0.25 ha of grassland within Zone I, for laydown areas and other construction activities. The maximum construction programme length is up to six years.

4.1.71 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

### *Sensitivity of the receptor*

- 4.1.72 The semi-natural grassland in Zone I is considered to be of parish value. It is relatively homogenous and therefore not of particularly high quality in terms of overall species diversity, and is a habitat type that is relatively straightforward to create in a relatively short period of time, and restoration would be undertaken following the end of the construction period.
- 4.1.73 The receptor is therefore considered to be of low vulnerability, high recoverability and parish value. The sensitivity of the receptor is therefore, considered to be **low**.

### *Significance of effect*

- 4.1.74 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

### *Further mitigation or enhancement*

- 4.1.75 Although the effect on semi-natural grassland is not significant in EIA terms, mitigation for temporary loss of grassland is proposed primarily because of impacts on species present within the grassland such as reptiles.
- 4.1.76 The proposed mitigation comprises grassland creation in Zone F. The area of grassland created would be approximately 11.5 ha, which equals the area of permanent loss in Zone A and the temporary loss in Zone I. Therefore, once the temporary loss of Zone I grassland is restored post-construction, there will be a greater area of semi-natural grassland on site compared to the current baseline. In addition, the grassland will be designed and managed to provide a more heterogenous and species-rich grassland habitat than currently occurs (refer to Volume 6, Appendix 9.2: OEMP for outline habitat creation proposals and Figure 4.1).

### *Residual effect*

- 4.1.77 The residual impact and effect following further mitigation is predicted to be **minor** beneficial, which is not significant in EIA terms.

### *Temporary loss of ditches*

#### *Magnitude of impact*

- 4.1.78 Although HDD will be considered for installation of the gas pipeline underneath ditches across Zone C, the working width and hence maximum temporary loss per ditch crossed would be 20 m. A further 20 m working width of ditch per crossing would be required for the construction of the access road, approximately 10 m of which would be temporary. A similar amount of habitat would be lost in Zone J for construction of the haul road. The total temporary loss therefore estimated at approximately 120 m. Within the study area as a whole, this is 2.27 % of the resource of this habitat type.
- 4.1.79 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

#### *Sensitivity of the receptor*

- 4.1.80 Ditch habitat is considered to be of district value. It is a habitat type that is relatively straightforward to create in a relatively short period of time.
- 4.1.81 The receptor is therefore considered to be of low vulnerability, high recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

#### *Significance of effect*

- 4.1.82 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

#### *Further mitigation or enhancement*

- 4.1.83 Although the temporary effect on ditches is not significant in EIA terms, mitigation for temporary loss of ditches is proposed primarily because of impacts on water voles that are present.
- 4.1.84 The proposed mitigation comprises ditch restoration following construction. Ditches will be restored to their previous condition and either planted with appropriate native species or allowed to develop by natural colonisation. Therefore, there will be no additional net loss of ditch habitat beyond that already assessed for permanent loss. Refer to Volume 6, Appendix 9.2: OEMP for outline habitat restoration proposals.

#### *Residual effect*

- 4.1.85 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

### Temporary loss of hedgerows

- 4.1.86 Precise estimates of hedgerow loss will be assessed once the design of haul roads, access roads and gas connection options is further advanced. Losses are not considered likely to be significant as there are limited locations where significant lengths of hedgerow are present within the application boundary.

### Temporary loss of reptile habitat

#### *Magnitude of impact*

- 4.1.87 The extent of temporary habitat loss of reptiles will be quantified in more detail at the ES stage when the design of components such as the access road and haul road are further advanced. However, it is known that approximately 0.25 ha of semi-improved grassland habitat in Zone I will be required for temporary laydown areas.
- 4.1.88 Losses may also occur in locations where the gas pipe and access road cross field boundaries in Zone C and Zone J. The working width and hence maximum temporary loss per ditch crossed would be 20 m. A further 20 m working width per crossing would be required for the construction of the access road, approximately 10 m of which would be temporary. A similar amount of habitat would be lost in Zone J for construction of the haul road. The total temporary loss therefore estimated at approximately 120 m linear length.
- 4.1.89 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

#### *Sensitivity of the receptor*

- 4.1.90 Four reptile species are present in Zones A and J, and two were recorded in Zone C. Clearance of habitat in the absence of mitigation would likely cause death or injury to reptiles.
- 4.1.91 The receptor is therefore considered to be of medium vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

#### *Significance of effect*

- 4.1.92 Overall, it is predicted that a **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

### *Further mitigation or enhancement*

- 4.1.93 Although not significant in EIA terms, mitigation comprising relocation of reptiles from the construction area and restoration of habitat following construction is proposed. See Volume 6, Appendix 9.2: OEMP for outline proposals.

### *Residual effect*

- 4.1.94 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

### Temporary loss of breeding bird habitat

#### *Magnitude of impact*

- 4.1.95 Minor losses of breeding bird habitat would occur in Zone C for access road and gas pipeline construction, Zone I for temporary laydown and Zone J for haul road construction. Overall, the area of habitat affected by temporary works is limited and it is considered that there is sufficient habitat in the wider area to accommodate birds displaced from temporary construction areas.
- 4.1.96 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

#### *Sensitivity of the receptor*

- 4.1.97 It is likely that some breeding species would remain in and on the margins of Zone A, and potential breeding habitat in the form of sustainable drainage features would be present within Zone A as part of the designed-in measures for the Thurrock Flexible Generation Plant.
- 4.1.98 The receptor is therefore considered to be of low vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be **low**.

#### *Significance of effect*

- 4.1.99 Overall, it is predicted that the **minor** impact on the **low** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

## Temporary loss of water vole habitat

### Magnitude of impact

4.1.100 Although HDD will be considered for installation of the gas pipeline underneath ditches across Zone C, the working width and hence maximum temporary loss per ditch crossed would be 20 m. A further 20 m working width of ditch per crossing would be required for the construction of the access road, approximately 10 m of which would be temporary. A similar amount of habitat would be lost in Zone J for construction of the haul road. The total temporary loss therefore estimated at approximately 120 m. Within the study area as a whole, this is 2.27% of the resource of this habitat type.

4.1.101 The impact is predicted to be of local spatial extent, medium term duration, continuous and reversible. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

### Sensitivity of the receptor

4.1.102 Water voles are considered to be of county value. Water voles are known to be declining on a national level due to habitat loss and predation from mink.

4.1.103 The receptor is therefore considered to be of high vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

### Significance of effect

4.1.104 Overall, it is predicted that the **minor** impact on the **medium** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

### Further mitigation or enhancement

4.1.105 Although the temporary effect on water vole habitat is not significant in EIA terms, mitigation for temporary loss of ditches is proposed primarily because of the potential for impacts on water voles that are present.

4.1.106 The proposed mitigation comprises ditch restoration following construction. Ditches will be restored to their previous condition and either planted with appropriate native species or allowed to develop by natural colonisation. Therefore, there will be no additional net loss of ditch habitat beyond that already assessed for permanent loss. Refer to Volume 6, Appendix 9.2: OEMP for outline habitat restoration proposals.

### Residual effect

4.1.107 The residual impact and effect following further mitigation is predicted to be **no change**, which is not significant in EIA terms.

## Airborne pollutant effects on designated sites

### Magnitude of impact

4.1.108 Construction could have some impact on sensitive habitats within designated sites in the vicinity of the works area as a result of potential airborne pollutants, primarily dust generation. IAQM guidance suggests that impacts of dust on ecological receptors are unlikely beyond 50 m from the source (IAQM, 2014). Potential air quality impacts, particularly from dust deposition, are therefore most likely to occur on designated sites within 50 m of activities likely to give rise to dust generation, although effective dust control measures will reduce this distance.

4.1.109 Designated sites within 50 m of any of the works area are:

- Broom Hill LWS: situated adjacent to a section of Zone J haul road;
- Lytag Brownfield LWS: south of Zone F (habitat creation land) on the other side of the railway line;
- Mucking Heath LWS: situated adjacent to the alternative construction access route (Zone H);
- West Tilbury Hall LWS: adjacent to Zone I (alternative habitat creation land but no works currently proposed for this Zone); and
- Low Street Pit LWS: between Zones C and D adjacent to the gas pipe connection corridor.

4.1.110 As set out in Volume 3, Chapter 12: Air Quality and Table 2.8, measures will be implemented through the CoCP to control pollutants in order to minimise the potential for, and likely impacts of, airborne pollutants on sensitive habitats within designated sites. The IAQM guidance states that with good dust management and mitigation practices implemented, the residual effects will normally be reduced to a level that is "not significant".

4.1.111 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is, therefore, considered to be **negligible**.

### Sensitivity of receptor

4.1.112 LWS sites are considered to be medium vulnerability, moderate recoverability and county value. The sensitivity of the receptor is, therefore, considered to be **medium**.

### Significance of the effects

4.1.113 Overall, it is predicted that the **negligible** impact on the **medium** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

### Airborne pollutant effects on habitats

#### Magnitude of impact

- 4.1.114 Construction could have some impact on sensitive habitats in the vicinity of the works area as a result of potential airborne pollutants, primarily dust generation. The main potentially sensitive habitats are hedgerows, semi-improved grassland and ditches.
- 4.1.115 As set out in Volume 3, Chapter 12: Air Quality, measures will be implemented through the CoCP to control pollutants and limit works areas in order to minimise the potential for and likely impacts of airborne pollutants on sensitive habitats.
- 4.1.116 These will include the establishment of a buffer zone between the works area and adjacent habitats. IAQM guidance suggests that impacts of dust on ecological receptors in the absence of mitigation are unlikely beyond 50 m from the source. However, smaller buffer areas are appropriate where effective dust control measures are in place, as would be the case given the controls set out in the CoCP. The IAQM guidance states that with good dust management and mitigation practices implemented, the residual effects will normally be reduced to a level that is "not significant".
- 4.1.117 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is, therefore, considered to be **negligible**.

#### Sensitivity of receptor

- 4.1.118 Habitats are deemed to be of medium vulnerability, moderate recoverability and up to district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

#### Significance of the effects

- 4.1.119 Overall, it is predicted that the **negligible** impact on the **medium** sensitivity receptor would result in a **negligible** adverse effect, which is not significant in EIA terms.

### Runoff pollutant effects on designated sites during construction

#### Magnitude of impact

- 4.1.120 Construction activities could have some impact on sensitive habitats within designated sites in the vicinity of the works area as a result of potential runoff of pollutants, particularly silt or other pollutant deposition into ditches watercourses where there is a hydrological connection to designated sites.

- 4.1.121 Construction works that directly affect or are close to ditches would occur in Zone A (main construction site), and in Zone C and Zone J (where ditch crossings will be required for gas pipeline, access road and haul road construction). Habitat creation works will also be undertaken in Zone F although boundary ditches will not be directly affected apart from where new ditches will be created that tie in to the existing ditch network.

- 4.1.122 Many of the ditches in these areas were observed to be dry in the latter period of the 2018 survey season, although this may be an unusual occurrence given the dry weather that occurred in spring / summer of this year. It is expected that surface water entering the ditch network ultimately runs south and into the River Thames, although the length of the ditch network prior to the Thames is such that any silt reaching the ditch network would be likely to settle out prior to entering the river where dilution effects would greatly reduce any remaining runoff before reaching the Thames Estuary and Marshes SPA/Ramsar.

- 4.1.123 Measures will be adopted to minimise the risk of runoff reaching watercourses. Further details of pollution control measures are provided in Volume 3, Chapter 15: Hydrology and Flood Risk and in the CoCP.

- 4.1.124 Therefore, the risk of surface water runoff having any significant effect on designated sites is considered to be low.

- 4.1.125 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. Given the control measures proposed, the magnitude is considered to be **negligible**.

#### Sensitivity of receptor

- 4.1.126 The receptor is considered to be of medium vulnerability, medium recoverability and international value. The sensitivity of the receptor is therefore, considered to be **high**.

#### Significance of effect

- 4.1.127 Overall, it is predicted that the **negligible** impact on the **high** sensitivity receptor would result in a **minor** adverse effect, which is not significant in EIA terms.

### Runoff pollutant effects on habitats during construction

#### Magnitude of impact

- 4.1.128 Construction could have some impact on sensitive habitats in the vicinity of the works area as a result of potential runoff of pollutants, particularly silt or other pollutant deposition into ditches.

4.1.129 The main potentially sensitive habitats are hedgerows, semi-improved grassland and ditches.

4.1.130 Measures will be implemented through the CoCP to control pollutants in order to minimise the potential for, and likely impacts of, runoff of pollutants on sensitive habitats.

4.1.131 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. Given the control measures in place, the magnitude is considered to be **negligible**.

**Sensitivity of receptor**

4.1.132 Habitats are deemed to be of up to medium vulnerability, moderate recoverability and up to district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

**Significance of the effects**

4.1.133 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** significance, which is not significant in EIA terms.

**Noise, lighting and visual disturbance effects on breeding birds during construction**

4.1.134 Some noise, lighting and visual disturbance will result from construction traffic access along Zone J (haul road) and alternative access route Zone H (if used), in Zone C (construction of access road and gas pipeline) and Zones D/E (construction of gas pipeline), but the main area where construction activities are concentrated would be Zone A and this is where impacts from noise are likely to be highest.

4.1.135 The construction activity that would give rise to the largest potential noise effect is percussive piling, if employed in Zone A.

4.1.136 A review of studies on impacts of piling noise on birds (e.g. Cutts *et al.* 2009; Cutts *et al.* 2013; Owens, 1997; Postlethwaite & Stephenson 2012; Smit & Visser 1993; Wright *et al.* 2010) has resulted in the following thresholds for assessment of impact magnitude:

**Table 4.1: Piling noise criteria for birds.**

Noise Level Range, dB LAmax F	Magnitude of impact
≤ 65	Negligible
> 65 to ≤ 75	Minor
> 75 to ≤ 85	Moderate
> 85	Major

4.1.137 Noise contour modelling for percussive piling has been carried out (Volume 3, Chapter 11: Noise and Vibration), and this indicates that noise levels from piling would reduce to approximately 65 dBA at around 650 m from the source of piling noise, taken to be the Zone A boundary. There would therefore be no significant increase in noise levels at the Thames Estuary and Marshes SPA / Ramsar site.

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

4.1.139 If percussive piling is carried out during the breeding season, it is likely to cause some disturbance to birds within the local area. Predicted noise contours for piling suggest that noise levels would be above 85 dBA (major impact) up to approximately 87 m from the piling operations, between 85-75 dBA (moderate impact) from 87 m to 305 m and between 65-75 dBA (minor impact) around 652 m from the piling source. A major impact in the context of impacts on birds constitutes a startle response that involves flying out of the impact area. Depending on the duration of the piling operations, there is likely to be some disturbance and potentially temporary reduction in breeding numbers in the vicinity of the piling operations, and this could occur in three out of six years assuming a six year three phase construction programme. No impact would occur if piling operations are undertaken outside of the breeding season. In the context of the breeding populations in the wider area, it is not considered that this would affect the overall breeding assemblage. Noise and disturbance from other construction activities including lighting would have a smaller effect radius.

4.1.140 The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **minor**.

**Sensitivity of receptor**

4.1.141 Breeding birds are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

**Significance of the effects**

4.1.142 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be minor. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

**Lighting effects on bats during construction**

4.1.143 Some lighting disturbance will result from construction traffic access along Zone J (haul road) and alternative access route Zone H (if used), in Zone C (construction of access road and gas pipeline) and Zones D/E (construction of gas pipeline), but the main area where construction activities would be concentrated would be Zone A.

4.1.144 Measures adopted as part of the project would include the use of directional lighting during construction, in areas where construction lighting is required, to minimise the level of disturbance from light spillage on foraging bats. These measures are set out in the CoCP (Volume 5, Appendix 2.2).

4.1.145 The impact is predicted to be of local spatial extent, medium term duration, intermittent and reversible. It is predicted that the impact will affect the receptor indirectly. The magnitude is therefore considered to be **negligible**.

**Sensitivity of receptor**

4.1.146 The receptor is considered to be of medium vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **medium**.

**Significance of the effects**

4.1.147 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible** adverse significance, which is not significant in EIA terms.

**Noise and visual disturbance effects on wintering birds during construction**

4.1.148 As noted above, piling and other construction activities would not generate significantly elevated noise levels with the Thames Estuary and Marshes SPA / Ramsar site, and no impacts on these sites from construction noise are therefore expected.

4.1.149 Surveys are ongoing to assess whether SPA species are present in significant numbers in fields outside the SPA that might constitute functionally linked land, and an assessment of impact significance will be presented in the ES.

**Future monitoring**

4.1.150 Table 4.2 below outlines the proposed monitoring commitments for ecology and nature conservation during construction. These will be implemented through the CoCP and the OEMP.

**Table 4.2: Construction phase monitoring commitments.**

Environmental effect	Monitoring commitment
Loss of habitats	As outlined in the OEMP (Volume 6, Appendix 9.2), an assessment of success of creation and restoration of habitats, comprising visits in years 1, 3 and 5 after creation, will be undertaken to identify any planting failures that require reinstatement or other remedial works.
Potential disturbance to protected species	As outlined in the OEMP (Volume 6, Appendix 9.2) and CoCP (Volume 5, Appendix 2.2), pre-construction surveys will be undertaken for protected species. The aim of the surveys is to provide up to date species data (particularly relevant for “mobile” species such as badgers) and to confirm the details of the mitigation measures to be implemented.
Impacts on protected species	Monitoring will be undertaken to assess the success of habitat creation and translocation mitigation measures and will comprise a schedule of surveys for protected species over a five-year period following translocation.

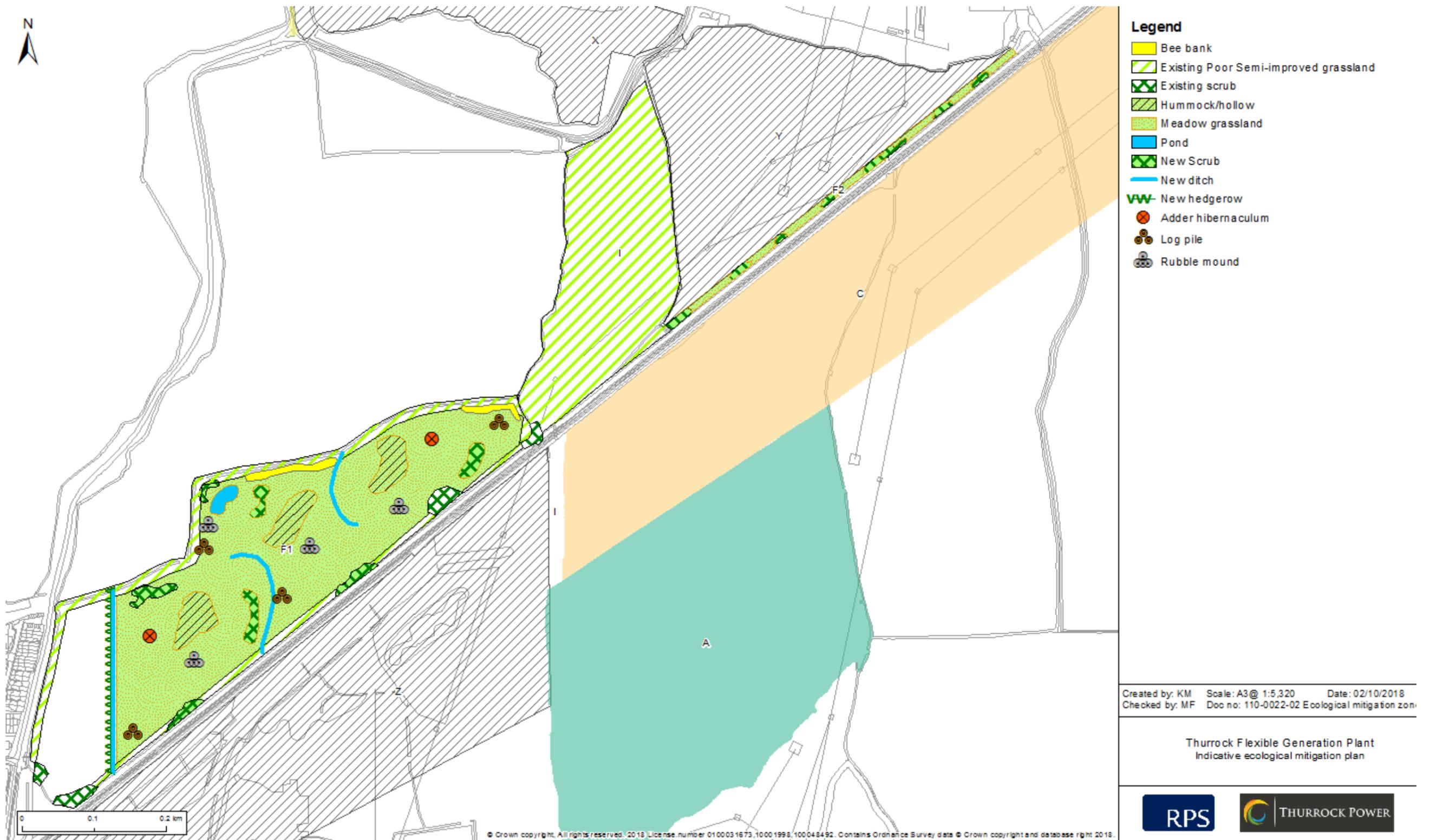


Figure 4.1: Indicative ecological mitigation proposals.

## 4.2 Operational and maintenance phase

### Effects of atmospheric emissions on designated sites

#### *Magnitude of impact*

4.2.1 Modelling of atmospheric emissions at designated sites up to 15 km from Zone A has been carried out, and the likely effects on habitats and species within these designated sites have been assessed and are reported in Volume 3, Chapter 12: Air Quality and Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors.

4.2.2 This assessment concluded that significant impacts on designated sites from aerial emissions are not predicted to occur.

4.2.3 The impact is predicted to be of up to county spatial extent, long term duration, continuous and irreversible. Given the results of the assessment of potential impacts, the magnitude is considered to be **negligible**.

#### *Sensitivity of receptor*

4.2.4 Sites and habitats are deemed to be of up to high vulnerability, low recoverability and up to international value. The sensitivity of the receptor is, therefore, considered to be up to **very high**.

#### *Significance of the effects*

4.2.5 Overall, the sensitivity of the receptor is considered to be up to very high and the magnitude is deemed to be negligible. The effect will, therefore, be **negligible to minor adverse** significance, which is not significant in EIA terms.

### Surface water effects on designated sites and habitats during operation

#### *Magnitude of impact*

4.2.6 The surface water drainage design for the site will involve discharge of surface water into the ditch network following progress through on-site sustainable drainage features. Designed-in mitigation includes the use of oil interceptors to ensure that any accidental discharges of pollutants are captured on site.

4.2.7 Surface water would therefore be discharged to the drainage network within water quality parameters that would not result in adverse impacts on downstream sites or habitats.

4.2.8 The impact is predicted to be of local spatial extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptors directly. Given the control measures in place, the magnitude is considered to be **no change**.

#### *Sensitivity of receptor*

4.2.9 Sites and habitats are deemed to be of up to high vulnerability, moderate recoverability and up to international value. The sensitivity of the receptor is, therefore, considered to be **high**.

#### *Significance of the effects*

4.2.10 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be **no change**, which is not significant in EIA terms.

### Noise and lighting effects on breeding birds during operation

#### *Magnitude of impact*

4.2.11 Noise modelling for the operational phase of the proposed development indicates that predicted noise levels at the boundary of Zone A will be in range of 45-50 dBA. This is below the threshold of a minor impact as per the definitions in

Table 4.1. Given that the noise source will be continuous it is considered likely that birds adjacent to the site would habituate to the noise in any case.

4.2.12 There is no permanent lighting proposed for the access road, and the Thurrock Flexible Generation Plant will be unlit at night except for motion-sensitive security lighting. There should therefore be little effect from lighting on birds in the surrounding area.

4.2.13 Therefore, the impact is predicted to be of local spatial extent, long term duration, continuous and irreversible. It is predicted that the impact will affect the receptors directly. The magnitude is considered to be **negligible**.

#### **Sensitivity of receptor**

4.2.14 Breeding birds are deemed to be of medium vulnerability, moderate recoverability and district value. The sensitivity of the receptor is, therefore, considered to be **medium**.

#### **Significance of the effects**

4.2.15 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be **negligible adverse** significance, which is not significant in EIA terms.

#### **Noise and lighting effects on wintering birds during operation**

4.2.16 As noted above, piling and other construction activities would not generate significantly elevated noise levels with the Thames Estuary and Marshes SPA / Ramsar site, and no impacts on these sites from construction noise are therefore expected.

4.2.17 There is no permanent lighting proposed for the access road, and the Thurrock Flexible Generation Plant will be unlit at night except for motion-sensitive security lighting. There should therefore be little effect from lighting on birds in the surrounding area.

4.2.18 Surveys are ongoing to assess whether SPA species are present in significant numbers in fields outside the SPA that might constitute functionally linked land, and an assessment of effects will be presented in the final ES.

4.2.19 However, given the assessment of potential operational noise outlined above, it is considered unlikely that significant effects on wintering birds would occur.

#### **Noise and lighting effects on bats during operation**

#### **Magnitude of impact**

4.2.20 There is no permanent lighting proposed for the access road, and the Thurrock Flexible Generation Plant will be unlit at night except for motion-sensitive security lighting. There should therefore be little effect from lighting on bats in the surrounding area.

4.2.21 Therefore, the impact is predicted to be of local spatial extent, long term duration, continuous and irreversible. It is predicted that the impact will affect the receptors directly. The magnitude is considered to be **negligible**.

#### **Sensitivity of receptor**

4.2.22 The receptor is considered to be of medium vulnerability, high recoverability and parish value. The sensitivity of the receptor is, therefore, considered to be **medium**.

#### **Significance of the effects**

4.2.23 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be **negligible adverse** significance, which is not significant in EIA terms.

#### **Future monitoring**

4.2.24 No ecology and nature conservation monitoring to test the predictions made within the operation and maintenance phase is considered necessary.

### **4.3 Decommissioning phase**

4.3.1 Taking into account the time delay between construction and decommissioning and the commitment to reinstatement of habitats temporarily lost due to construction, for the purpose of this assessment it is assumed that ecological baseline conditions during decommissioning will be similar to those assessed for construction in terms of the species likely to be present and the ecological value of those populations or assemblages. Species distributions and numbers may change due to natural population fluctuations, but any changes in distribution would need to be determined by surveys prior to decommissioning.

4.3.2 It is assumed that consultation would be undertaken with Natural England and the local planning authority prior to the commencement of decommissioning, to determine the exact nature of the decommissioning plan, and applicable regulations would be followed to minimise environmental effects. It is presumed that no additional hedgerow or tree clearance will be required.

4.3.3 Works will be undertaken in accordance with best practice guidelines and legislative requirements which apply at the time.

### Potential for decommissioning to affect designated sites

#### Magnitude of impact

- 4.3.4 Impacts from decommissioning would be concentrated on Zone A and associated access roads in Zone C. The gas pipeline would remain *in situ* but the above ground structure in Zone E would be removed.
- 4.3.5 There is therefore little potential for direct or indirect impacts on designated sites but what impacts may occur would be from airborne or runoff pollution during decommissioning works.
- 4.3.6 A decommissioning plan will be produced to set out measures to be taken to minimise impacts prior to the commencement of works.
- 4.3.7 The impact is predicted to be of local spatial extent, short term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. With pollution control measures in place, the magnitude is considered to be **negligible**.

#### Sensitivity of receptor

- 4.3.8 Designated sites within the vicinity of the decommissioning works are deemed to be of up to medium vulnerability, medium recoverability and county value. The sensitivity of the receptor is therefore, considered to be **medium**.

#### Significance of the effects

- 4.3.9 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

### Decommissioning effects on habitats

#### Magnitude of impact

- 4.3.10 It is assumed that no additional hedgerow or ditch loss on the boundaries of or outside Zone A would be required for decommissioning works. However, there is potential for some impacts from airborne or runoff pollution during decommissioning works to affect habitats in the vicinity of the works area.
- 4.3.11 A decommissioning plan will be produced to set out measures to be taken to minimise impacts prior to the commencement of works.

- 4.3.12 The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. With pollution control measures in place, the magnitude is considered to be negligible adverse.

#### Sensitivity of receptor

- 4.3.13 Habitats are deemed to be of medium vulnerability, medium recoverability and district value. The sensitivity of the receptor is therefore, considered to be medium.

#### Significance of the effects

- 4.3.14 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

### Potential for decommissioning to affect species

#### Magnitude of impact

- 4.3.15 Decommissioning has the potential to affect species, primarily through disturbance in adjacent areas, but measures may also need to be put in place to protect water voles, reptiles and breeding birds if they have colonised soft landscape features such as sustainable drainage features in Zone A.
- 4.3.16 A decommissioning plan will be produced to set out measures to be taken to minimise impacts prior to the commencement of works. This would include a survey of the Thurrock Flexible Generation Plant site to determine whether any protected species have colonised them, and mitigation strategies would be developed accordingly if this proves to the case.
- 4.3.17 It is highly unlikely that populations of protected species would occur at levels of significance above their current value, which for species recorded in the vicinity of Zone A is district to county level.

- 4.3.18 Impacts from decommissioning are predicted to be of local spatial extent, short term duration, and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be minor.

#### Sensitivity of receptor

- 4.3.19 Species are deemed to be of medium vulnerability, medium recoverability and district or county value. The sensitivity of the receptor is therefore, considered to be medium.

### **Significance of the effects**

- 4.3.20 Overall, the sensitivity of the receptor is considered to be medium and the magnitude is deemed to be negligible. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.
- 4.3.21 Overall, impacts from decommissioning would be considerably lower than impacts from construction.

### **Future monitoring**

- 4.3.22 No ecology and nature conservation monitoring to test the predictions made within the decommissioning phase impact assessment is considered necessary other than the species surveys that would be undertaken to inform the decommissioning plan and any subsequent follow-up monitoring if translocations of protected species are required.

## **4.4 Transboundary effects**

- 4.4.1 A screening of the potential for transboundary impacts has been carried out and is presented in Volume 5, Appendix 4.2: Transboundary Impacts Screening Note. This screening exercise identified that there is no potential for significant transboundary effects with regard to ecology from Thurrock Flexible Generation Plant upon the interests of other EEA States.

## **4.5 Inter-related effects**

- 4.5.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the construction, operation or decommissioning of Thurrock Flexible Generation Plant on the same receptor. The following assessments have been made and a description of the likely inter-related effects on ecology is provided in Volume 4, Chapter 17: Summary of Inter-Related Effects.

### **Project lifetime effects**

- 4.5.2 It is not considered that the effects that occur during more than one stage of the development's lifetime (construction, operation or decommissioning) would interact such that they would create a more significant effect on an ecological receptor than when assessed in isolation for each stage.

### **Receptor-led effects**

- 4.5.3 It is not considered that there is potential for effects via multiple environmental or social pathways to interact, spatially and temporally, to create a greater inter-related effect on an ecological receptor than is predicted for each pathway.

## 5. Cumulative Effects Assessment

### 5.1 Introduction

- 5.1.1 The process of identifying other consented or proposed developments and screening to create a shortlist of those having potential for cumulative effects with Thurrock Flexible Generation Plant is described in Volume 5, Appendix 4.1: Cumulative Developments and Screening. Appendix 4.1 lists the shortlisted cumulative developments and the tier they have been assigned (guiding the weight that the decision-maker may place on each development's likelihood of being realised) in accordance with PINS Guidance Note 17.
- 5.1.2 Cumulative developments shortlisted are those that have potential to contribute to impacts affecting receptors also affected by the proposed development (for example, contributing significant additional traffic to the same road links), or that introduce additional sensitive receptors (for example, new residences or a school closer to the proposed development than existing), or both.
- 5.1.3 The cumulative effects assessment for ecology has been undertaken in two stages, reported as follows. In the first stage, cumulative effects of the proposed development have been considered in an overall scenario where the land surrounding the proposed development could be largely transformed by three adjacent NSIP developments and the possible expansion of nearby residential and employment uses to the east. This is referred to as the 'max development' scenario.
- 5.1.4 In the second stage, cumulative effects with specific individual development projects have been assessed where these would affect a particular environmental pathway or receptor for ecology. Shortlisted developments with potential cumulative effects specific to ecology are assessed in this chapter and are summarised in Table 5.1.

Table 5.1: List of other projects and plans (with planning application reference) considered within the CEA.

Tier	Planning reference	Description	Address	Distance to main site (Zone A)	Potential for cumulative ecological effects
1	18/00664/CONDC	Redevelopment of an area of previously developed land towards the southern boundary of Thames Industrial Estate to provide 50 dwellings	One Big Self Store Ltd Trafalgar House Thames Industrial Park Princess Margaret Road East Tilbury Essex	1,818	Potential cumulative effects for species such as breeding / wintering birds from habitat loss
1	18/00458/FUL	The construction of a temporary load out and storage area and access to Station Road to enable removal of Pulverised Fuel Ash	Goshems Farm Station Road East Tilbury Essex	416	Potential cumulative disturbance effects during construction
1	16/00186/DMI	Demolition of Tilbury B power station and all associated buildings and structures (including remaining structures from Tilbury A power station).	National Power PLC Tilbury Power Station Fort Road Tilbury Essex	192	Potential cumulative disturbance effects during construction
1	TR030003	Tilbury 2: A new port facility acting alongside the existing Port of Tilbury. This will involve the extension of existing jetty facilities and land works and facilities for: a "Roll-On / Roll-Off" (Ro-Ro) terminal for importing and exporting containers on road trailers; a facility for importing and processing bulk construction materials; and areas of external storage for a variety of goods such as imported cars. The project also involves the construction of road and rail links to the site from adjacent networks.	Site of Tilbury B Power Station, East Tilbury	0	Tilbury2 results in loss of majority of Lytag Brownfield LWS, for which compensatory habitat is proposed offsite. Impacts on invertebrate communities on site is therefore likely to be high but Thurrock Flexible Generation Plant does not significantly add to this given the mitigation proposals for Zone F. Tilbury 2 On-site habitat creation proposals are adjacent to Zone A and close to Zone F some additive benefit therefore possible from this. Potential for cumulative disturbance effects if construction phases overlap. Potential for cumulative effects on air quality.
2	16/01475/SCR	Request for Environmental Impact Assessment (EIA) Screening Opinion: Proposed development of up to 200 dwellings with associated access and open space	Gothards Field Rear Of The George And Dragon East Tilbury Road Linford Essex	2,404	Potential cumulative effects for species such as breeding / wintering birds from habitat loss
2	16/01232/OUT	Application for outline planning permission of up to 1,000 dwellings and associated infrastructure	Land For Development Muckingford Road Linford Essex	1,268	Potential cumulative effects for species such as breeding / wintering birds from habitat loss
2	16/00412/OUT	Outline application for proposed residential redevelopment up to 203 dwellings)	Star Industrial Estate Linford Road Chadwell St Mary Essex	1,671	Potential cumulative effects for species such as breeding / wintering birds from habitat loss
2	15/00379/OUT	Outline application for up to 43 dwellings	Land Adjacent 39 And 41 And To The South Of St Johns Road Chadwell St Mary Essex	1,986	Potential cumulative effects for species such as breeding / wintering birds from habitat loss
2	EN010089	Tilbury Energy Centre. DCO for a new Combined Cycle Gas Power Station with a generating capacity up to 2500 megawatts (MW), Open Cycle Gas Turbines with a generating capacity up to 300MW and an energy storage facility, all on the Tilbury Power Station site	Site of Tilbury B Power Station, East Tilbury	0	Potential for cumulative disturbance effects if construction phases overlap. Potential for cumulative effects on air quality.
3	TR010032	Lower Thames Crossing: a new road crossing connecting Essex and Kent. Located east of Gravesend and Tilbury.	East of Gravesend and Tilbury	0	Potential cumulative effects for species such as breeding / wintering birds from habitat loss or fragmentation. Potential for cumulative disturbance effects if construction phases overlap. Potential for cumulative effects on air quality.

## 5.2 Cumulative effects in 'max development' scenario

- 5.2.1 Three NSIP developments are proposed on land adjacent to and in some cases overlapping with the Thurrock Flexible Generation Plant application boundary. The Tilbury2 port expansion adjacent to the west is at examination stage (Tier 1). The Tilbury Energy Centre (TEC) power station to the south and Lower Thames Crossing (LTC) motorway and link road to the east and north are both at EIA scoping stage (Tier 2).
- 5.2.2 Outline planning permission has been granted for several residential and mixed-use developments expanding Linford and East Tilbury in the direction of Thurrock Flexible Generation Plant (Tier 1).
- 5.2.3 Should all of these developments proceed, Thurrock Flexible Generation Plant's main development site would be closely surrounded on all sides by the temporary or permanent works areas of the NSIPs. Its gas connection point to Feeder 18 could be adjacent to the expanded outskirts of East Tilbury and also potentially to the TEC gas connection, and the pipeline route could cross land to be developed for the LTC.
- 5.2.4 The Thurrock Core Strategy (2015) allocates land for possible strategic employment provision and sustainable economic growth to the west of the proposed development and to the east where there is existing industry at East Tilbury. Thurrock Borough Council is drafting a new Local Plan to replace the Core Strategy. The Issues and Options (Stage 2) consultation document proposals map of July 2018 (withdrawn temporarily due to recent NPPF changes) suggested possible zones for residential and commercial/employment development in areas east of the proposed development, where this would be facilitated by the Lower Thames Crossing project. However, these Tier 3 development possibilities are afforded only limited weight due to the early stage of this local plan development process.
- 5.2.5 In the 'max development' scenario set out in paragraphs 5.2.1 to 5.2.3 above, the ecological cumulative effects of Thurrock Flexible Generation Plant are considered below.

### Cumulative construction effects

#### Impacts on designated sites

- 5.2.6 Tilbury2 would result in the loss of the majority of the Lytag Brownfield LWS. The LTC feeder road that runs east-west north of Thurrock Flexible Generation Plant Zone A would result in the loss of the remainder of the LWS and some of the proposed Tilbury2 mitigation land adjacent to the west boundary of Thurrock Flexible Generation Plant Zone A. The cumulative impact on the LWS is entirely due to these two developments, and hence the Thurrock Flexible Generation Plant would not contribute to the cumulative effect in the 'max development' scenario.
- 5.2.7 There is potential for greater disturbance and displacement effects on mobile species particularly breeding and wintering birds that could occur if construction phases for the NSIPs overlap, or for these effects to last for a greater duration if construction is sequential.
- 5.2.8 In terms of potential additional effects for overlapping construction, the assessment of noise levels indicates that even in the maximum design scenario of percussive piling for Thurrock Flexible Generation Plant construction, noise levels from this activity would not give rise to significantly elevated noise levels at the Thames Estuary and Marshes SPA. Cumulative impacts on wintering birds on functionally linked land will be assessed following surveys of wintering birds that are currently ongoing.

#### Impacts on habitats

- 5.2.9 Given that the mitigation proposals for Thurrock Flexible Generation Plant include creation of grassland and ditch habitat that more than equals permanent losses from construction within Zone A, it is not considered that there is potential for cumulative effects on these habitat types in the max development or other scenarios.
- 5.2.10 The Thurrock Flexible Generation Plant will result in permanent loss of arable land and there is therefore the potential for cumulative losses of this habitat type in the max development scenario. However, the arable land itself is not considered to be of significant intrinsic conservation value and therefore no cumulative effects on habitats that are significant in EIA terms are expected.

#### Impacts on protected and other species

- 5.2.11 Given that the mitigation proposals for Thurrock Flexible Generation Plant include creation of grassland and ditch habitat that more than equals permanent losses from construction within Zone A of habitats that support reptiles, water voles, invertebrates and breeding birds, it is not considered that there is potential for cumulative effects on these species in the max development or other scenarios from habitat loss.

- 5.2.12 The maximum development scenario would result in greater fragmentation of populations of protected species on the north and south sides of the railway line given that a feeder road for the LTC is proposed that runs north of Zone A between the Thurrock Flexible Generation Plant and the railway line. It is assumed that the LTC proposals would include some measure of connectivity for aquatic species in the form of culverted channels for ditches affected by the LTC feeder road, but in this scenario populations of water voles and reptiles in particular might experience additional fragmentation effects. This effect would be entirely due to the presence of the LTC feeder road and the Thurrock Flexible Generation Plant would not contribute additional fragmentation effects.
- 5.2.13 Thurrock Flexible Generation Plant will result in permanent loss of arable land and there is therefore the potential for cumulative losses of this habitat type which could include losses of arable land considered to be functionally linked land for birds associated with the Thames Estuary and Marshes SPA/Ramsar. Surveys to assess whether arable land affected by Thurrock Flexible Generation Plant support birds from the SPA are ongoing and will be reported at the ES stage.

#### **Cumulative operational effects**

- 5.2.14 The potential for cumulative air quality impacts in the max development scenario, resulting from the additional traffic generated by developments and aerial emissions from the RWE power station proposal, has been assessed in Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors.
- 5.2.15 No cumulative adverse impacts on designated sites in the max development scenario were identified.

#### **Cumulative decommissioning effects**

- 5.2.16 In the max development scenario, decommissioning of Thurrock Flexible Generation Plant will overlap with the operational phases of Tilbury2 and LTC (as these developments do not have an estimated lifetime in that it is expected they would remain permanently operational). In that situation, there may be some limited potential for additional disturbance to species in the local area from decommissioning works combined with disturbance from traffic and other operations associated with both developments. However, it is not considered that this would give rise to effects of a magnitude or significance greater than that assessed for Thurrock Flexible Generation Plant alone.

## **5.3 Cumulative effects with specific developments**

- 5.3.1 Habitat creation proposals for Tilbury2 include ponds, ditches, reptile and invertebrate habitat on land immediately adjacent to the west of Zone A and south of Zone F. Therefore, the habitat creation proposals for both schemes appears complementary in that taken together the mitigation areas will provide for a greater area of habitat for species such as reptiles and water voles than currently exists in this area at present. Set against that is the impacts on species arising from Tilbury2 in particular the loss of invertebrate habitat which is provided for in an offsite location. Tilbury2 would result in a higher impact on invertebrates in the local area due to the loss of the majority of the Lytag Brownfield LWS for which offsite compensation is proposed, but it is not considered that this impact is increased by the construction of Thurrock Flexible Generation Plant given the mitigation proposed in Zone F that provides an overall greater area of invertebrate grassland habitat than is lost within Zone A.
- 5.3.2 Construction of the LTC would result in greater fragmentation of populations of protected species on the north and south sides of the railway line given that a feeder road for the LTC is proposed that runs north of Zone A between the Thurrock Flexible Generation Plant and the railway line. It is assumed that the LTC proposals would include some measure of connectivity for aquatic species in the form of culverted channels for ditches affected by the LTC feeder road, but in this scenario populations of water voles and reptiles in particular might experience additional fragmentation effects. This effect would be entirely due to the presence of the LTC feeder road and the Thurrock Flexible Generation Plant would not contribute additional fragmentation effects.
- 5.3.3 Thurrock Flexible Generation Plant and LTC combined will result in a larger amount of permanent loss of arable land and there is therefore the potential for cumulative losses of this habitat type to include losses of arable land considered to be functionally linked land for birds associated with the Thames Estuary and Marshes SPA/Ramsar. Surveys to assess whether arable land affected by Thurrock Flexible Generation Plant support birds from the SPA are ongoing and will be reported at the ES stage.
- 5.3.4 Given that no cumulative adverse impacts on designated sites in the max development scenario were identified (Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors), there is no potential for cumulative effects with any of the other projects considered individually.

## 6. Conclusion and summary

6.1.1 A summary of the effects assessed in this chapter is provided in Table 6.1.

6.1.2 Effects of the construction, operation and decommissioning of the Thurrock Flexible Generation Plant have been assessed. Most adverse effects occur during the construction phase and are associated with the loss of grassland and ditch habitat in Zone A for construction of the main site, and on the species which use this grassland namely invertebrates, reptiles, breeding birds and water voles. Effects of habitat loss in the absence of further mitigation were assessed as moderate adverse for grassland, invertebrates, reptiles and water voles. Additional mitigation is therefore provided, comprising translocation of animals and habitat creation within Zone F which provides an overall net gain in grassland and no net loss of ditches, in a location which also maintains habitat connectivity north of the railway line north of Zone A. Once the mitigation measures are taken into account, the Thurrock Flexible Generation Plant should have an overall minor benefit for ecology.

6.1.3 Other impacts include temporary disturbance of species during construction and operation and temporary habitat losses associated with construction of construction access tracks and gas pipeline but these are not considered likely to be significant.

6.1.4 Atmospheric emissions during operation on designated sites have been assessed and found not to be significant. Cumulative assessment data will be considered in the ES.

6.1.5 Cumulative effects in the maximum development scenario could occur in that available habitat for species would be further restricted by nearby development such as Tilbury2, LTC, Tilbury Power Centre and various residential and other developments proposed in the surrounding area. However, as Thurrock Flexible Generation Plant itself is able to ensure a minimum of no net loss of habitats for the majority of protected species, cumulative effects are not considered likely to be significant. Possible effects on wintering birds will be assessed at the ES stage.

## 6.2 Next Steps

6.2.1 Next steps prior to submission of the ES include:

- design refinement to fully quantify extent of works area in Zones C, D, E and J;
- refinement of surface water drainage design in Zone A;
- consultation and refinement of ecological and common land mitigation strategy;
- and

- continuation of wintering bird surveys to assess potential effects on wintering SPA birds.

Table 6.1: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
<b>Construction</b>							
Permanent loss of grassland	Minimising grassland loss where practicable	Major	Medium	Moderate adverse	Grassland creation in Zone F to provide greater area than permanently lost	Minor beneficial	Vegetation monitoring to assess success of habitat creation
Permanent loss of ditches	Retention of ditches where practicable e.g. Zone A boundaries	Major	Low	Minor adverse	Ditch creation in Zone F to provide no net loss	No change	None
Permanent loss of hedgerows	Retention of hedgerows where practicable	To be assessed at ES stage	Low	To be assessed at ES stage			
Permanent loss of invertebrate habitat	Minimising grassland loss where practicable	Major	Medium	Moderate adverse	Invertebrate habitat creation in Zone F to provide greater area than permanently lost	Minor beneficial	Habitat condition monitoring to assess success of habitat creation
Permanent loss of reptile habitat	Minimising habitat loss where practicable	Major	Medium	Moderate adverse	Reptile habitat creation in Zone F to provide greater area than permanently lost, translocation from works area	Minor beneficial	Reptile population monitoring
Permanent loss of breeding bird habitat	Minimising habitat loss where practicable	Minor	Low	Minor adverse	Habitat creation in Zone F to provide greater area than permanently lost, particularly for Cetti's warbler	Minor beneficial	Bird population monitoring
Permanent loss of wintering bird habitat	Minimising habitat loss where practicable	To be assessed at ES stage	To be assessed at ES stage	To be assessed at ES stage			
Permanent loss of water vole habitat	Minimising habitat loss where practicable	Major	Medium	Moderate adverse	Water vole habitat creation in Zone F to provide no net loss, translocation from works area	No change	Water vole population monitoring
Permanent loss of bat foraging habitat	Minimising habitat loss where practicable	Minor	Medium	Minor adverse	Habitat creation in Zone F to provide greater area than permanently lost,	Minor beneficial	
Permanent loss of badger habitat	Minimising habitat loss where practicable	Minor	Low	Negligible adverse			
Temporary loss of grassland	Minimising habitat loss where practicable	Minor	Low	Negligible adverse	Grassland creation in Zone F to provide overall net gain in area	Minor beneficial	

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Temporary loss of ditches	Minimising habitat loss where practicable	Minor	Low	Minor adverse		No change	
Temporary loss of hedgerows	Retention of hedgerows where practicable	To be assessed within ES	Low	To be assessed within ES			
Temporary loss of reptile habitat	Minimising habitat loss where practicable	Minor	Medium	Minor adverse	Translocation of reptiles and habitat restoration	No change	
Temporary loss of breeding bird habitat	Minimising habitat loss where practicable	Minor	Low	Minor adverse			
Temporary loss of water vole habitat	Minimising habitat loss where practicable	Minor	Medium	Minor adverse	Habitat restoration post-construction	No change	
Airborne pollutant effects on designated sites	Measures to reduce dust generation and other emissions during construction as set out in CoCP	Negligible	Medium	Negligible adverse			
Airborne pollutant effects on habitat sites	Measures to reduce dust generation and other emissions during construction as set out in CoCP	Negligible	Medium	Negligible adverse			
Runoff pollutant effects on designated sites	Measures to manage discharges to surface water as set out in CoCP	Negligible	High	Minor adverse			
Runoff pollutant effects on habitats	Measures to manage discharges to surface water as set out in CoCP	Negligible	Medium	Negligible adverse			
Noise, lighting and visual disturbance effects on breeding birds	Measures to minimise noise and lighting as set out in CoCP	Minor	Medium	Minor adverse			
Noise, lighting and visual disturbance effects on wintering birds	Measures to minimise noise and lighting as set out in CoCP	To be assessed within ES	To be assessed within ES	To be assessed within ES			
Lighting effects on foraging bats	Measures to minimise lighting as set out in CoCP	Negligible	Medium	Negligible adverse			
<b>Operation</b>							
Aerial emissions on designated sites during operation	Refer to Volume 3 Chapter 12: Air quality	Negligible	Medium – Very high	Negligible – Minor adverse			
Surface water effects on designated sites and habitats during operation	Refer to Volume 3 Chapter 15: Hydrology and flood risk	No change	High	No change			

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Noise and lighting effects on breeding birds during operation	Access road unlit. Use of directional security lighting to minimise light spillage	Negligible	Medium	Negligible adverse			
Noise and lighting effects on wintering birds during operation	Access road unlit. Use of directional security lighting to minimise light spillage	To be assessed within ES	To be assessed within ES	To be assessed within ES			
Lighting effects on bats during operation	Access road unlit. Use of directional security lighting to minimise light spillage	Negligible	Medium	Negligible adverse			
<b>Decommissioning</b>							
Impacts on designated sites	To be provided in Decommissioning Plan	Negligible	Medium	Negligible adverse			
Impacts on habitats	To be provided in Decommissioning Plan	Negligible	Medium	Negligible adverse			
Impacts on species	To be provided in Decommissioning Plan	Minor	Medium	Minor adverse			

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