



Thurrock Flexible Generation Plant

**Environmental Statement Volume 6
Appendix 9.1: Ecological Desk Study and Surveys**

Date: February 2020

Environmental Impact Assessment

Environmental Statement

Volume 6

Appendix 9.1

Report Number: OXF10872

Version: Final

Date: February 2020

This report is also downloadable from the Thurrock Flexible Generation Plant website at:
<http://www.thurrockpower.co.uk>

Thurrock Power Ltd

1st Floor

145 Kensington Church Street

London W8 7LP

Copyright © RPS

The material presented in this report is confidential. This report has been prepared for the exclusive use of Thurrock Power Ltd and shall not be distributed or made available to any other company or person without the knowledge and written consent of RPS.

Prepared by: Jacquelyn Kerr

Contributors: Matthew White, Matthew Fasham, Colin Plant Associates, Katie MacIntyre

Checked by: Matthew Fasham, Mike Barker

Table of Contents

1. Introduction	1
1.1 Background to the study	1
1.2 Application site and study area	1
1.3 Report structure	2
2. Methods	4
2.1 Desk study	4
2.2 Phase 1 habitat survey and ecological scoping survey	4
2.3 Plants	6
2.4 Invertebrates	6
2.5 Amphibians	6
2.6 Breeding birds	10
2.7 Water voles and otters	14
2.8 Badgers	16
2.9 Limitations	16
3. Results	17
3.1 Desk study	17
3.2 Protected and other notable species	21
3.3 Phase 1 habitat survey	26
3.4 Botanical survey	32
3.5 Invertebrate scoping survey	32
3.6 Amphibian survey	32
3.7 Reptile survey	32
3.8 Breeding bird survey	37
3.9 Wintering birds	46
3.10 Water vole and otter survey	53
3.11 Badger survey	60
4. Evaluation and summary	62
4.1 Designated sites	62
4.2 Habitats	62
4.3 Species	62
5. References	66
Annex A Relevant Legislation	67
Annex B Plant species recorded on semi-improved grassland	69
Annex C Reptile survey results (adults and juveniles)	71

List of Tables

Table 2.1: DOMIN abundance scale for National Vegetation Classification (NVC) analysis. ...	6
Table 2.2: Reptile survey dates and weather conditions.	8
Table 3.1: Statutory designated sites within 2 km of the Phase 1 survey area.	20
Table 3.2: Non-statutory designated sites within 2 km of the Phase 1 survey area.	20
Table 3.3: Summary of protected and notable plant species recorded within 2 km of the Phase 1 survey area.	21
Table 3.4: Summary of protected and notable invertebrate species recorded within 2 km of the Phase 1 survey area.	21
Table 3.5: Summary of protected and notable amphibian species recorded within 2 km of the Phase 1 survey area.	22
Table 3.6: Summary of protected and notable reptile species recorded within 2 km of the Phase 1 survey area.	23
Table 3.7: Summary of protected and notable bird species recorded within 2 km of the Phase 1 survey area.	23
Table 3.8: Summary of protected and notable mammal species recorded within 2 km of the Phase 1 survey area.	24
Table 3.9: Conservation status abbreviations used in Table 3.3 – Table 3.8.	25
Table 3.10: Reptile survey results Zones A-I.	35
Table 3.11: Maximum reptile counts by Zone.	36
Table 3.12: Breeding status of species recorded during the breeding bird survey at Tilbury, April-June 2018.	37
Table 3.13: Conservation status of confirmed breeding species recorded during the breeding bird survey at Tilbury, April-June 2018.	38
Table 3.14: Breeding bird assemblage diversity criteria.	39
Table 3.15: Terrestrial wintering bird survey summary.	47
Table 3.16: Conservation status of birds recorded during the wintering bird survey, September 2018-March 2019.	49
Table 3.17: Summary of peak winter bird counts from Bioscan surveys 2016-2017	49
Table 3.18: Summary of peak winter bird counts from RWE surveys 2017-2018	51
Table 3.19: Water vole survey results 2018.	53
Table 3.20: Water vole survey results per 100m of ditch surveyed 2018.	53
Table 3.21: Water vole survey results 2019.	54
Table 3.22: Water vole survey results per 100m of ditch surveyed 2019.	54

List of Figures

Figure 1.1: Development zones.	3
Figure 2.1: Phase 1 survey extent.	5
Figure 2.2: GCN, invertebrate and reptile survey extents.	9
Figure 2.3: Breeding bird survey extent.	12
Figure 2.4: Winter bird survey extent.	13
Figure 2.5: Water vole survey extent.	15
Figure 3.1: Designated sites within 2km.	18

Figure 3.2: Designated sites within 15 km of development Zone A.....	19
Figure 3.3: Phase 1 habitat map.....	29
Figure 3.4: Phase 1 habitat map.....	30
Figure 3.5: Phase 1 habitat map.....	31
Figure 3.6: Locations of reptiles recorded.....	34
Figure 3.7: Territories of amber listed breeding birds.....	40
Figure 3.8: Territories of amber listed breeding birds.....	41
Figure 3.9: Territories of red listed breeding birds.....	42
Figure 3.10: Territories of red listed breeding birds.....	43
Figure 3.11: Territories of schedule 1 breeding birds in 2018.....	44
Figure 3.12: Territories of red and schedule 1 listed breeding birds recorded during 2019 surveys.....	45
Figure 3.13: Extent of 2016/17 Bioscan and 2017/2018 RWE wintering bird survey area compartments.....	52
Figure 3.14: Presence of water vole signs in ditches surveyed May 2018.....	56
Figure 3.15: Presence of water vole signs in ditches surveyed July 2018.....	57
Figure 3.16: Presence of water vole signs in ditches surveyed June 2019.....	58
Figure 3.17: Presence of water vole signs in ditches surveyed September 2019.....	59
Figure 3.18: Badger signs recorded in May 2018.....	61

Summary

This document provides methods and results for desk studies and ecological surveys carried out to determine the baseline for the assessment of ecological effects for the Thurrock Flexible Generation Plant.

Qualifications

This document has been prepared by Jacquelyn Kerr with contributions from Matthew Fasham, Matthew White, Katie MacIntyre and Colin Plant Associates.

It has been checked by Matthew Fasham, a Chartered Environmentalist and full Member of the Chartered Institute of Ecology and Environmental Management, who has fifteen years' experience of ecological impact assessment and approved by Mike Barker, Director of Ecology at RPS.

1. Introduction

1.1 Background to the study

1.1.1 This appendix reports the results of a suite of ecological surveys undertaken to inform an Ecological Impact Assessment (EclA) (see Volume 3, Chapter 9: Onshore Ecology) of the proposed Thurrock Flexible Generation Plant at Tilbury, Essex.

1.1.2 An initial ecological scoping exercise was undertaken concurrently with the Phase 1 habitat survey to establish the requirement for detailed surveys. This was also informed by discussion with Jonathan Bustard of Natural England, undertaken via Natural England's Discretionary Advice Service.

1.1.3 The following surveys were undertaken in 2018:

- desk study;
- phase 1 habitat survey;
- botanical survey of Common Land in Zone A and between Zones E and F;
- invertebrate scoping survey of Zone A;
- great crested newt (GCN) eDNA surveys;
- reptile surveys;
- breeding bird surveys;
- water vole and otter surveys; and
- badger surveys.

1.1.4 The following surveys were undertaken in 2019:

- desk study;
- phase 1 habitat survey;
- reptile surveys;
- breeding bird surveys;
- wintering bird surveys; and
- water vole surveys.

1.1.5 The following surveys undertaken on behalf of RWE in 2017/18 are included in Volume 6, Appendix 9.2: Third Party Survey Reports, and are referred to in Sections 2, 3 and 4 of this report:

- GCN survey
- intertidal wintering bird survey
- water vole survey

1.2 Application site and study area

1.2.1 The application site has been divided into zones as shown on Figure 1.1. The zones are summarised below.

- Zone A: The Main Site for flexible generation plant construction. Currently comprises arable land and Walton Common, an area of semi-improved grassland currently managed by mowing.
- Zone B: The existing Tilbury substation where the electrical connection will be made.
- Zone C: Predominantly arable land corridor for access road, gas pipeline route, and construction laydown.
- Zone D: Arable field corridor for a gas pipeline route and National Grid gas connection compound and access.
- Zone E: Arable field which will serve as common land exchange.
- Zone F: Arable, improved, and semi-improved grassland fields – primary area for habitat creation.
- Zone G: Predominantly semi-improved grassland corridor for causeway and access road.
- Zone H: Access to public highway using existing roads.
- Zone I: Existing road along which existing Traffic Regulation Orders imposing weight limits will be temporarily lifted for construction access to Zone D.
- Zone J: Temporary right of way for diversion of footpath during gas pipeline construction.

1.2.2 Due to evolution of the development design over the course of the 2018 field season, some areas initially included within the potential red line have been removed from the boundary or reduced in extent, and other potential development zones have been added. Where amendments to the application boundary were made after the window for a particular survey had closed, full survey coverage for amended sections was not always possible, although a Phase 1 habitat and scoping survey has been undertaken across the whole of the current red line.

1.2.3 Study areas for the various surveys undertaken are shown in the following figures:

- Figure 1.1: Development zones.
- Figure 2.1: Phase 1 survey extent.
- Figure 2.2: GCN, invertebrate and reptile survey extents
- Figure 2.3: Breeding bird survey extent
- Figure 2.5: Water vole survey extent
- Figure 3.1: Designated sites within 2km

- Figure 3.2: Designated sites within 15 km of development Zone A
- Figure 3.3: Phase 1 habitat map
- Figure 3.4: Phase 1 habitat map
- Figure 3.5: Phase 1 habitat map
- Figure 3.6: Locations of reptiles recorded
- Figure 3.7: Territories of amber listed breeding birds
- Figure 3.8: Territories of amber listed breeding birds
- Figure 3.9: Territories of red listed breeding birds
- Figure 3.10: Territories of red listed breeding birds
- Figure 3.11: Territories of schedule 1 breeding birds in 2018.
- Figure 3.14: Presence of water vole signs in ditches surveyed May 2018
- Figure 3.15: Presence of water vole signs in ditches surveyed July 2018
- Figure 3.18: Badger signs recorded in May 2018

1.3 Report structure

1.3.1 This report comprises the following sections:

- Section 2: Methods;
- Section 3: Results; and
- Section 4: Evaluation and summary.

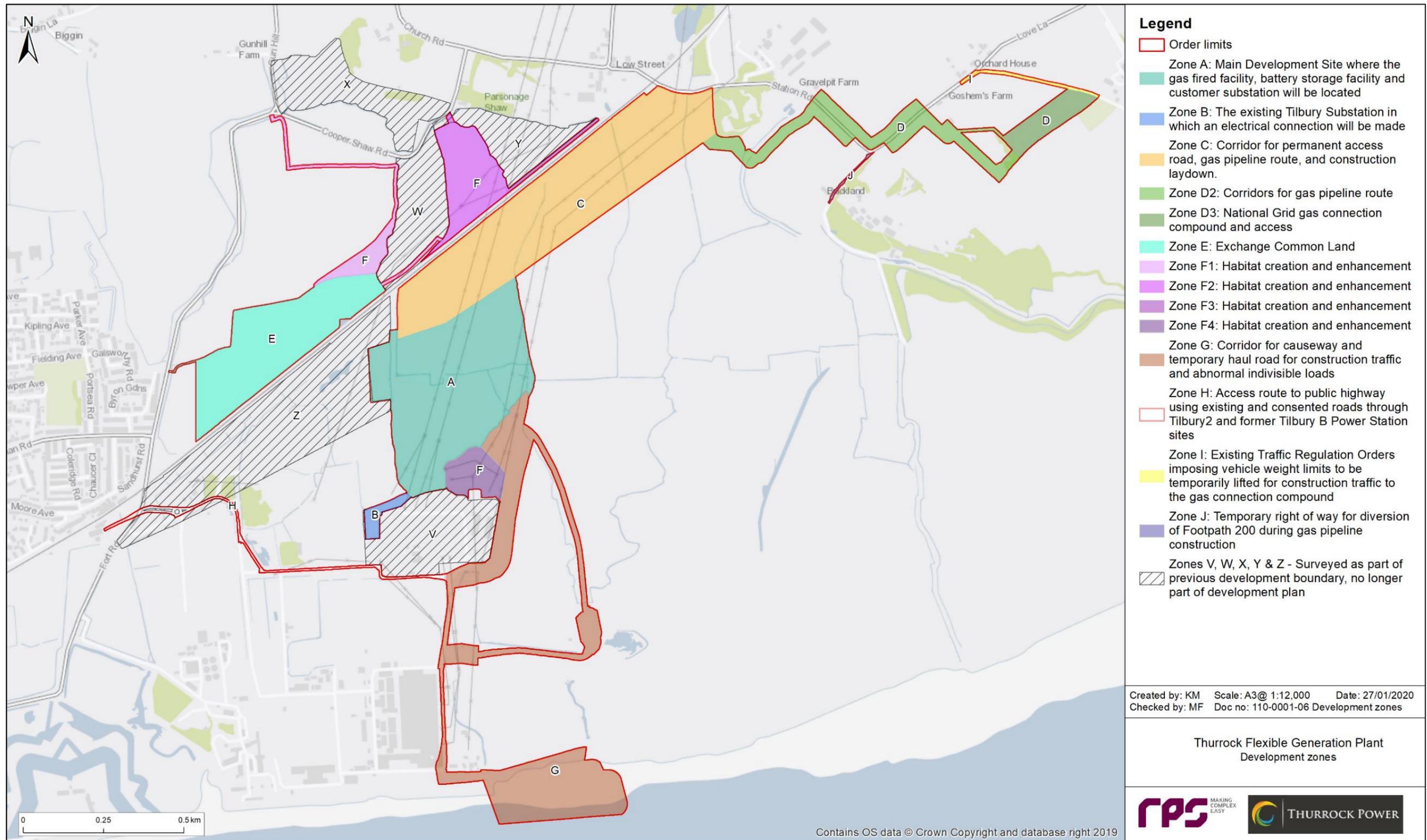


Figure 1.1: Development zones.

2. Methods

2.1 Desk study

Search area

- 2.1.1 Ecological records within a 2 km radius of Zones A-J (as shown on Figure 1.1) were requested from the Essex Wildlife Trust Biological Records Centre, the Kent and Medway Biological Records Centre, and the Essex Field Club. Data requests were limited to records for protected species recorded within the last ten years and sites of nature conservation interest within 2 km of the site. This included a review of existing statutory sites of nature conservation interest, such as Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and National Nature Reserves (NNRs), and non-statutory sites, such as Sites of Importance for Nature Conservation (SINCs) and Local Wildlife Sites (LWSs).
- 2.1.2 Locations of statutory designated sites were accessed via the government 'MAGIC' website (MagicMap, accessed 2019).
- 2.1.3 A 1:25,000 OS map was used to identify nearby features such as ponds or green corridors that could provide habitat or connectivity to other areas.

2.2 Phase 1 habitat survey and ecological scoping survey

- 2.2.1 The ecological appraisal consisted of two components: a Phase 1 habitat survey and a scoping survey for protected species and other species of conservation concern which could present a constraint to development.
- 2.2.2 The majority of the Thurrock Flexible Generation Plant site was surveyed on 23rd of May 2018. Zones added to the application boundary later in the field season were surveyed between June and September 2018.
- 2.2.3 The Phase 1 habitat surveys followed the standard methodology (Joint Nature Conservation Committee (JNCC), 2016 and as described in the Guidelines for Preliminary Ecological Assessment (Chartered Institute of Ecology and Environmental Management (CIEEM), 2017)). In summary, this comprised walking over the survey area and recording the habitat types and boundary features present. Intertidal habitats are dealt with in Volume 3, Chapter 17: Marine Environment.

2.2.4 A protected species scoping survey was carried out in conjunction with the Phase 1 habitat survey. The site was assessed for its suitability to support protected species, in particular Great Crested Newts *Triturus cristatus*, reptiles, birds, badgers *Meles meles*, bats, and other species of conservation importance that could pose a planning constraint. Areas of habitat considered suitable for protected species or those of conservation interest were recorded.

2.2.5 The survey extent of the Phase 1 habitat survey is shown in Figure 2.1.

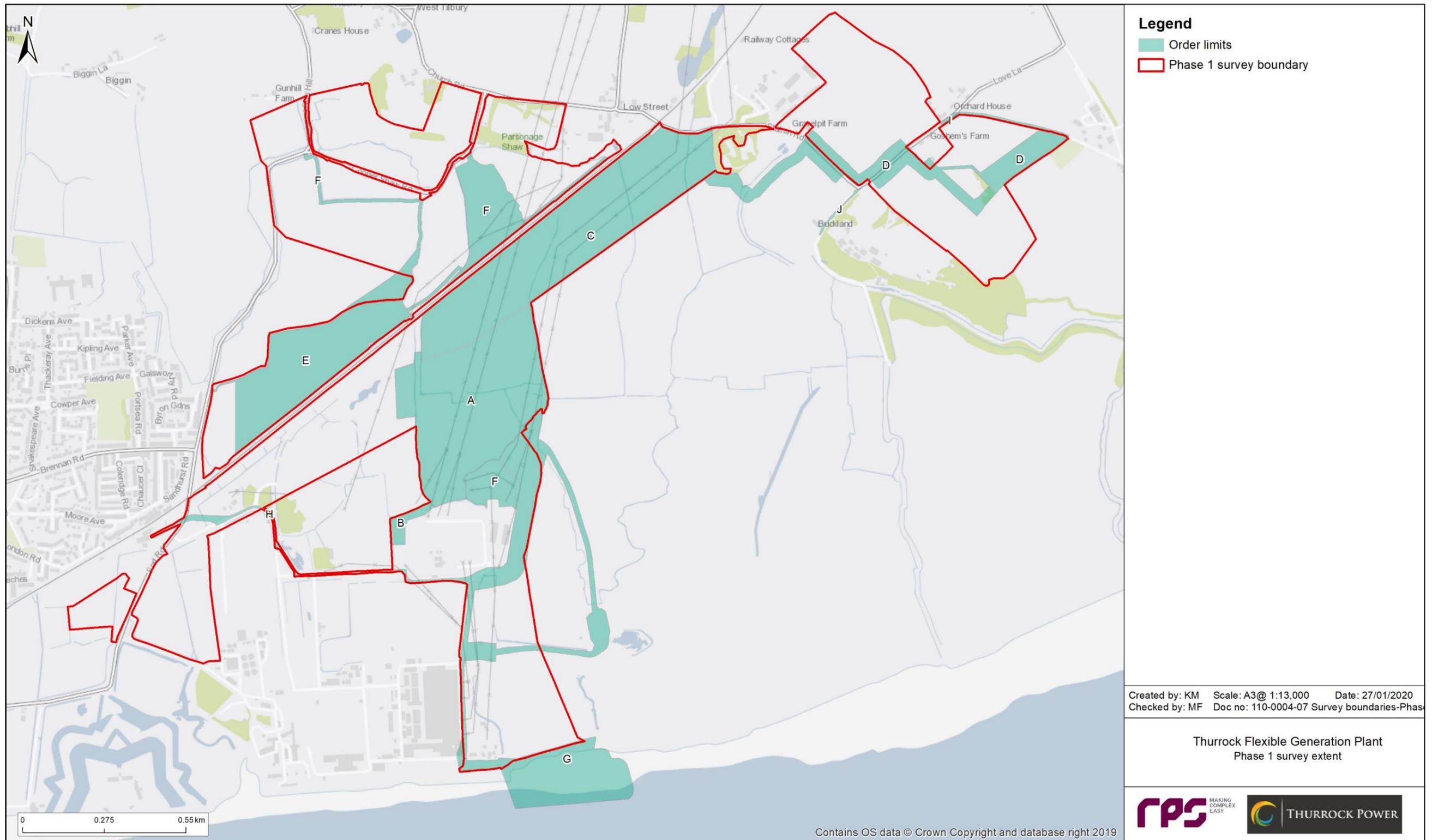


Figure 2.1: Phase 1 survey extent.

2.3 Plants

- 2.3.1 A more detailed botanical survey of grassland on site was undertaken in order to inform the habitat creation, so that an appropriate mix of locally occurring species can be included within the species lists for grassland creation when these are drawn up.
- 2.3.2 An appropriately experienced botanist visited the site on 15 June 2018. The intention was to collect data on plant species within the semi-improved grassland on Zone A. However, the field had been mown just before the date of the survey, and the cropped plant material was still lying on site, which meant that a full survey could not be undertaken, although species were recorded where possible.
- 2.3.3 Therefore, survey data were collected from an adjacent grassland field, which also comprised semi-neutral grassland.
- 2.3.4 A walkover survey was undertaken, comprising a walk across the grassland where all species seen were recorded together with an estimate of abundance using the based on the DAFOR scale:
- D: Dominant (75% cover);
 - A: Abundant (51% - 75% cover);
 - F: Frequent (26% - 50% cover);
 - O: Occasional (11% - 25% cover); and
 - R: Rare (1% - 10% cover).
- 2.3.5 In addition, six 2 m x 2 m quadrats were sampled from the grassland. In each quadrat, all plant species present were recorded along with their percentage cover which is then used to determine the abundance of each species based on the DOMIN scale (Table 2.1).

Table 2.1: DOMIN abundance scale for National Vegetation Classification (NVC) analysis.

Cover (%)	DOMIN scale
91-100	10
76-90	9
51-75	8
34-50	7
26-33	6
11-25	5
4-10	4

Cover (%)	DOMIN scale
< 4 (many individuals)	3
< 4 (several individuals)	2
< 4 (few individuals)	1

- 2.3.6 The quadrat data was used to determine the NVC community of the grassland (Rodwell, 1991 *et seq*) using the computer programme MATCH.

2.4 Invertebrates

- 2.4.1 An invertebrate scoping survey was undertaken to appraise the invertebrate habitats present on the Main Site (Zone A) and to assess whether the proposed development would have an impact on invertebrate ecology. Of particular concern was the potential for the site to support Species of Principal Importance in England, as defined within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, although species included in other conservation categories were also considered.
- 2.4.2 The survey comprised a walkover of Zone A and the part of Zone C to the north, conducted by two appropriately experienced invertebrate ecologists from Colin Plant Associates. The survey was conducted on 1 May 2018 in cool but bright conditions. All areas of the site were accessible and were examined.
- 2.4.3 The survey extent of the invertebrate scoping survey is shown in Figure 2.2.

2.5 Amphibians

- 2.5.1 Cherryfield Ecology undertook an eDNA survey of the large pond west of Zone A and of ditches on the boundary of Zone A in 2017.
- 2.5.2 The eDNA test was analysed by Fera, and it returned a negative result for the ditch system and an 'inconclusive' result for the offsite pond. The 'inconclusive' result was due to degradation of the sample, and hence although no GCN DNA was detected, this is not absolute evidence for determining the absence of the species in the sample provided. However, this pond was also surveyed in 2017 as part of the 'Tilbury 2' development project ecological baseline assessment, and as reported in the Environmental Statement for that development, a negative result was returned from the pond.

- 2.5.3 The offsite pond was created in 2011 as a mitigation and compensation area which was intended to provide advance compensatory habitat for water voles and reptiles that would have needed to be translocated from the Tilbury Centre LWS had a biomass power generation project for that site been pursued. When RPS commenced surveys in 2018, it was apparent that the Pond on land west of Zone C had been surrounded by exclusion fencing suitable for exclusion of GCN, water voles and / or reptiles.
- 2.5.4 Given the negative result obtained for the this pond, no further eDNA samples were taken in 2018. RPS undertook eDNA surveys of a small pond located north of the railway line, and additional samples were also taken from the ditch network around Zone A in 2018.
- 2.5.5 Environmental DNA (eDNA) sampling is used to assess the presence or absence of GCN DNA from a water sample. This methodology is approved by Natural England as providing evidence of presence / absence of GCN (Biggs *et al.*, 2014). Natural England has issued their standing advice, which includes the recommended protocol for eDNA analysis (Natural England, 2015). This requires water samples for eDNA to be taken between the 15 April and the 30 June.
- 2.5.6 The sampling was completed using a sample kit from the laboratory Surescreen Scientifics Limited who subsequently completed the laboratory analysis.
- 2.5.7 Water samples were taken from the pond east of Zone F2 on the 27 June 2018 and sent to the Surescreen Scientifics Limited Laboratory in Morley, Derbyshire the following day. Lead ecologists were registered to hold a Natural England Great Crested Newt survey Class 1 licence and had appropriate training for eDNA sampling surveys.
- 2.5.8 Field surveys followed a strict protocol to prevent contamination of the samples; this entailed the following.
- Gloves were worn at all times during the sampling process, and gloves were replaced between sample collection from the waterbody and pipetting into the sterile sub-sample tubes.
 - Samples were collected without entering the water, i.e. the surveyor stood only on the waterbody bank or muddy waterbody edges. This prevented disturbance of the substrate to limit cross-contamination.
- 2.5.9 The field sampling protocol consisted of the following steps.
- 20 samples were taken from each pond. The location of sub-samples was spaced as evenly as possible around the pond margin. Subsamples generally targeted areas with potential egg laying substrate (e.g. vegetation) and open water areas which newts may be using for displaying. Prior to sampling the water column was mixed by gently using a ladle to stir through the entire water column, whilst avoiding disturbing the sediment on the bed of the waterbody. Sampling of very shallow water was avoided where possible (less than 5-10 cm deep).
 - A new pair of gloves were put on to keep the next stage as uncontaminated as possible.
 - Using a clear plastic pipette c. 15ml of water was taken from the bag and pipetted into a sterile tube containing 35ml of ethanol to preserve the eDNA sample (i.e. the tube was filled to the 50 ml mark).
 - The tube was shaken vigorously for 10 seconds to mix the sample and preservative. This is essential to prevent DNA degradation and was also repeated for each of the six conical tubes. Before taking each sample, the water in the bag was shaken to homogenise the sample, as DNA material constantly sinks to the bottom.
 - The box of preserved sub-samples was kept in a fridge between 0-4°C, and then returned at ambient temperature for analysis.
- 2.5.10 For full details of the RWE GCN survey refer to Volume 6, Appendix 9.2: Third Party Survey Reports. This survey comprised eDNA analysis in 2017 and population size class analysis surveys in 2018 of a number of waterbodies including in Low Street Pit LWS adjacent to Zone D.
- 2.5.11 The locations of waterbodies covered by the GCN surveys are shown on Figure 2.2. Reptiles
- 2.5.12 Artificial refugia in the form of sheets of roofing felt and reptile tins, approximately 0.5 m² in size, were placed in likely basking spots (for example, un-shaded patches next to cover, in areas of long grass and next to potential hibernation sites such as piles of rubble, logs or disused rabbit burrows).
- 2.5.13 A total of 209 sheets were set out on site on the 18 April 2018, in the locations shown on Figure 2.2.
- 2.5.14 The site was visited on 7 days in May and June 2018 during suitable weather conditions. Reptile activity is greatly influenced by weather conditions, with reptiles most likely to use refugia in temperatures of between 10°C and 18°C (Froglife, 1999), in hazy or intermittent sunshine with light winds (Gent & Gibson, 1998).
- 2.5.15 The weather conditions and temperatures for each visit for surveys carried out in Zones other than Zone G are set out in Table 2.2 below. Zone G surveys were carried out in separately by Cherryfield Ecology in September 2018.

Table 2.2: Reptile survey dates and weather conditions.

Visit Number	Date	Temperature °C	Cloud Cover	Wind
1	17/05/18	12-16	4/8	Gentle breeze
2	20/05/18	12-16	4/8	Gentle breeze
3	22/05/18	13-17	4/8	Gentle breeze
4	25/05/18	14-17	8/8	Light breeze
5	01/06/18	16-18	4/8	Light breeze
6	04/06/18	16-17	8/8	Gentle breeze
7	07/06/18	14-17	8/8	Gentle breeze

2.5.16 Each visit involved walking slowly around the entire site, checking suitable reptile basking and refuge areas and checking all of the reptile sheets on site.

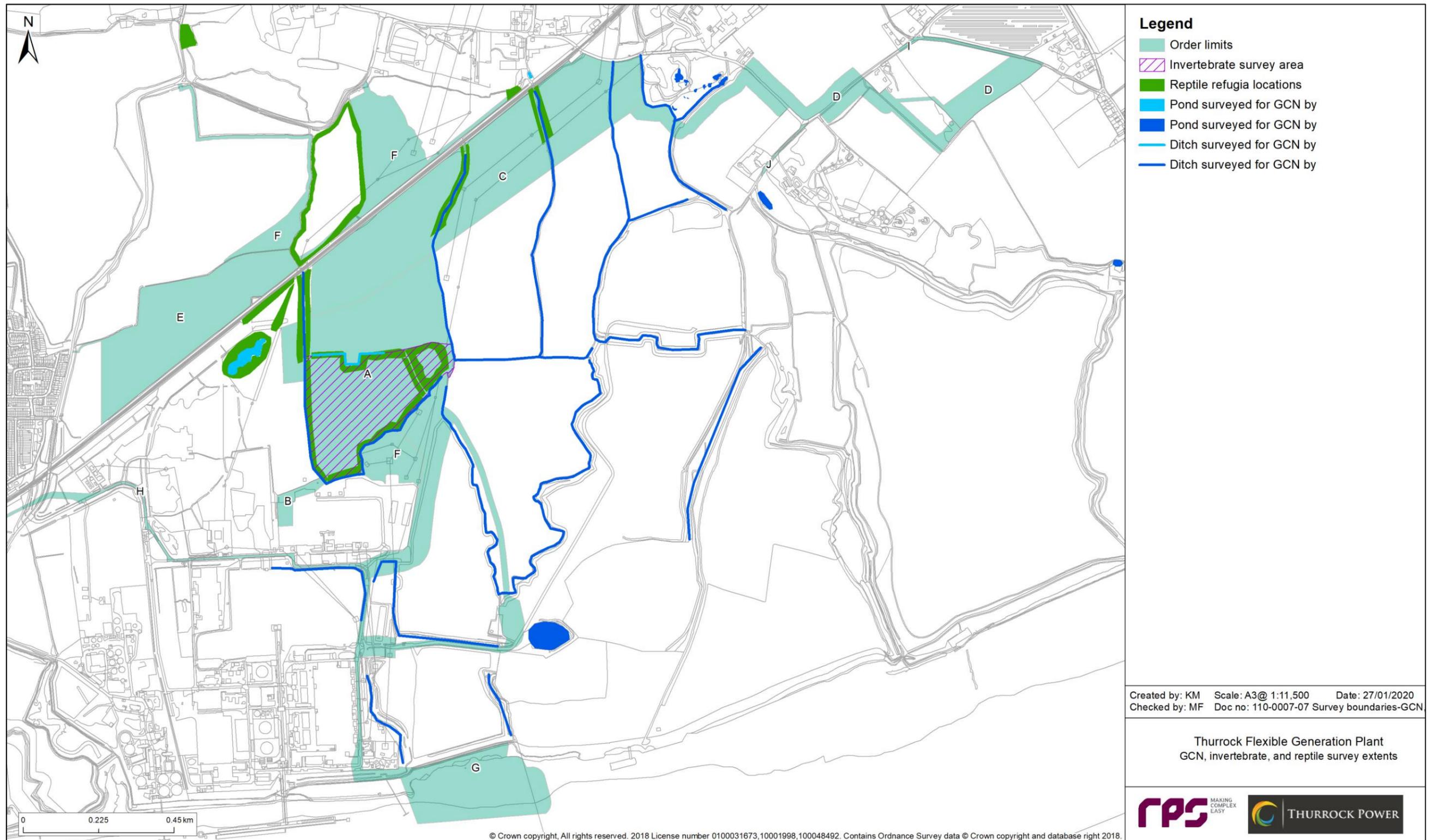


Figure 2.2: GCN, invertebrate and reptile survey extents.

2.6 Breeding birds

2018 survey

- 2.6.1 The breeding bird survey undertaken was based on a standard territory mapping methodology as outlined in Gilbert *et al.* (1998) and Bibby *et al.* (2000).
- 2.6.2 This method is based on the principle that many species during the breeding season are territorial. This is found particularly amongst passerines, where territories are often marked by conspicuous song, display and periodic disputes with neighbouring individuals.
- 2.6.3 All bird species were recorded and mapped across the study area shown in Figure 2.3.
- 2.6.4 The survey area was walked at a slow pace in order to locate and identify all individual birds. Visits were undertaken early in the morning, finishing before midday. The whole survey area was covered in each visit, using suitable optical equipment to observe bird behaviour and all areas of the site were approached to within 50-100 m, where possible. Survey routes were mapped, and the direction walked alternated on each visit, to ensure that all areas were covered at various times of day across the duration of the survey. All species encountered within the survey area were recorded and mapped.
- 2.6.5 Surveys for breeding birds were undertaken between April and June 2018 with a total of five survey visits taking place. The survey visits and ornithologists undertaking the survey were as follows:
- Visit 1: 12th & 13th April 2018; Matthew White;
 - Visit 2: 26th & 27th April 2018; Matthew White;
 - Visit 3: 10th & 11th May 2018; Matthew White;
 - Visit 4: 22nd & 23rd May 2018; Matthew White; and
 - Visit 5: 6th & 7th June 2018; Matthew White.
- 2.6.6 On each visit, registrations were recorded directly into ESRI Arcpad GIS software loaded onto handheld PDA devices, with a 1: 10,000 scale Ordnance Survey base map of the study area (and adjacent land). A fresh map was used for each survey. Registrations of birds were recorded using standard British Trust for Ornithology (BTO) two letter species codes. Specific codes were also used to denote singing, calling, movement between areas, flight, carrying food, nest building, aggressive encounters and other behaviour.
- 2.6.7 The expected outcome is that mapped registrations fall into clusters, approximately coinciding with territories. A cluster is generally a spatially distinct group of registrations that represent the activity of not more than one pair. Ideally, clusters include registrations of territorial behaviour across all visits and are clearly demarcated from adjacent clusters by simultaneous recording of neighbouring birds. Where a species exhibits high territory density, the mapping of simultaneously singing birds becomes essential. Territory boundaries are assumed to be between such birds.
- 2.6.8 Territory mapping methods produce analysis maps of non-overlapping ellipses encircling clusters of records thought to relate to separate pairs of breeding birds. These ellipses may not show the entire extent of the pairs' actual breeding territory which may be significantly larger; however, they are likely to show those areas in which the pair is most active.
- 2.6.9 On completion of the surveys, analysis maps were produced for each species, consisting of all registrations recorded during the survey. From these species maps, the number of territories was calculated by identifying the number of territories or clusters present.
- 2.6.10 Standard registration mapping techniques were also used to record non-breeding species.
- 2.6.11 The following definitions have been used to identify the breeding status of the species recorded.
- Confirmed Breeding: includes species for which territories were positively identified as a result of the number of registrations, the location of an active nest, and the presence of recently fledged young or downy young.
 - Probable Breeding: includes a pair observed in suitable nesting habitat in breeding season, or agitated behaviour / anxiety calls from adults suggesting probable presence of nest or young nearby. Behaviour was observed on insufficient occasions to confirm the presence of a territory.
 - Possible Breeding: includes species observed in breeding season in suitable nesting habitats or singing male present (or breeding calls heard) in breeding season in suitable breeding habitat.
 - Non-Breeding: fly-over species observed but suspected to be on migration, or species observed but suspected to be summering non-breeder.
- 2.6.12 Five two-day bird surveys were conducted from early April to June 2018 in optimal weather conditions and breeding season period. It is therefore considered that there are no significant limitations that might affect the quality of the survey results.

2019 survey

- 2.6.13 A short 3-visit breeding bird survey of two areas omitted from the 2019 survey (Zone E and part of Zone G) was carried out in June 2019.
- 2.6.14 Survey dates were:
- Visit 1: 19 & 20 May 2019; Matthew White;
 - Visit 2: 2 & 3 June 2019; Matthew White; and
 - Visit 3: 9 & 10 June 2019; Matthew White.
- 2.6.15 Methodology was as described above for the 2018 survey, comprising recording of birds and their behaviour. A three-visit survey is less robust when assessing territory numbers than a longer survey conducted over the full breeding season, but in terms of assessing the broad assemblage of species present it is considered that the survey was adequate for the purpose of assessing likely impacts on the bird assemblage in these areas.

Wintering bird survey

Terrestrial winter bird surveys of potential functionally linked land

- 2.6.16 Surveys of farmland within or adjacent to the development area were undertaken to determine whether any species associated with the Thames Estuary & Marshes SPA occurred (and hence whether any farmland should be considered as functionally linked land for the purpose of assessing impacts on the SPA).
- 2.6.17 Two surveys, one at low tide and one at high tide, were undertaken each month between September 2018 and March 2019. Survey dates were:
- Visit 1: 26 September 2018; Katy Thomas;
 - Visit 2: 27 September 2018; Katy Thomas;
 - Visit 3: 11 October 2018; Andrew Seth;
 - Visit 4: 22 October 2018; Andrew Seth;
 - Visit 5: 7 November 2018; Andrew Seth;
 - Visit 6: 26 November 2018; Andrew Seth;
 - Visit 7: 6 December 2018; Andrew Seth;
 - Visit 8: 18 December 2018; Andrew Seth;
 - Visit 9: 3 January 2019; Andrew Seth;
 - Visit 10: 18 January 2019; Andrew Seth;
 - Visit 11: 5 February 2019; Andrew Seth;
 - Visit 12: 18 February 2019; Andrew Seth;
 - Visit 13: 5 March 2019; Andrew Seth; and

- Visit 14: 22 March 2019.

- 2.6.18 The wintering bird survey was based on a transect method as detailed in Bibby et al. (2000). A transect route was selected to include field boundaries and visit all areas of the site to within, where possible, 50 metres of each point in order to locate and identify all individual birds.
- 2.6.19 Visits were undertaken early in the morning, finishing before midday.
- 2.6.20 On each visit the route was walked at a slow pace with start and finish times noted. All birds seen and heard were recorded directly onto an ArcGIS base map using ESRI software on hand-held PDA devices, with a 1:10,000 scale Ordnance Survey base map of the study area (and adjacent land). Registrations of birds were recorded using standard BTO two letter species codes.
- 2.6.21 All species were recorded and mapped across the whole windfarm site. To avoid bias associated with time of day, the starting point and direction walked on the survey route was varied on each visit. Where possible, survey visits avoided unfavourable weather, for example, heavy rain and strong winds.

Other intertidal and terrestrial winter bird surveys

- 2.6.22 RWE carried out surveys of the intertidal zone within and adjacent to Zone G between October 2017 – April 2018 as part of a wider survey of terrestrial and intertidal wintering birds extending from the Tlibury2 port development site to Coal House Fort. For full details refer to Volume 6, Appendix 9.2: Third Party Survey Reports.

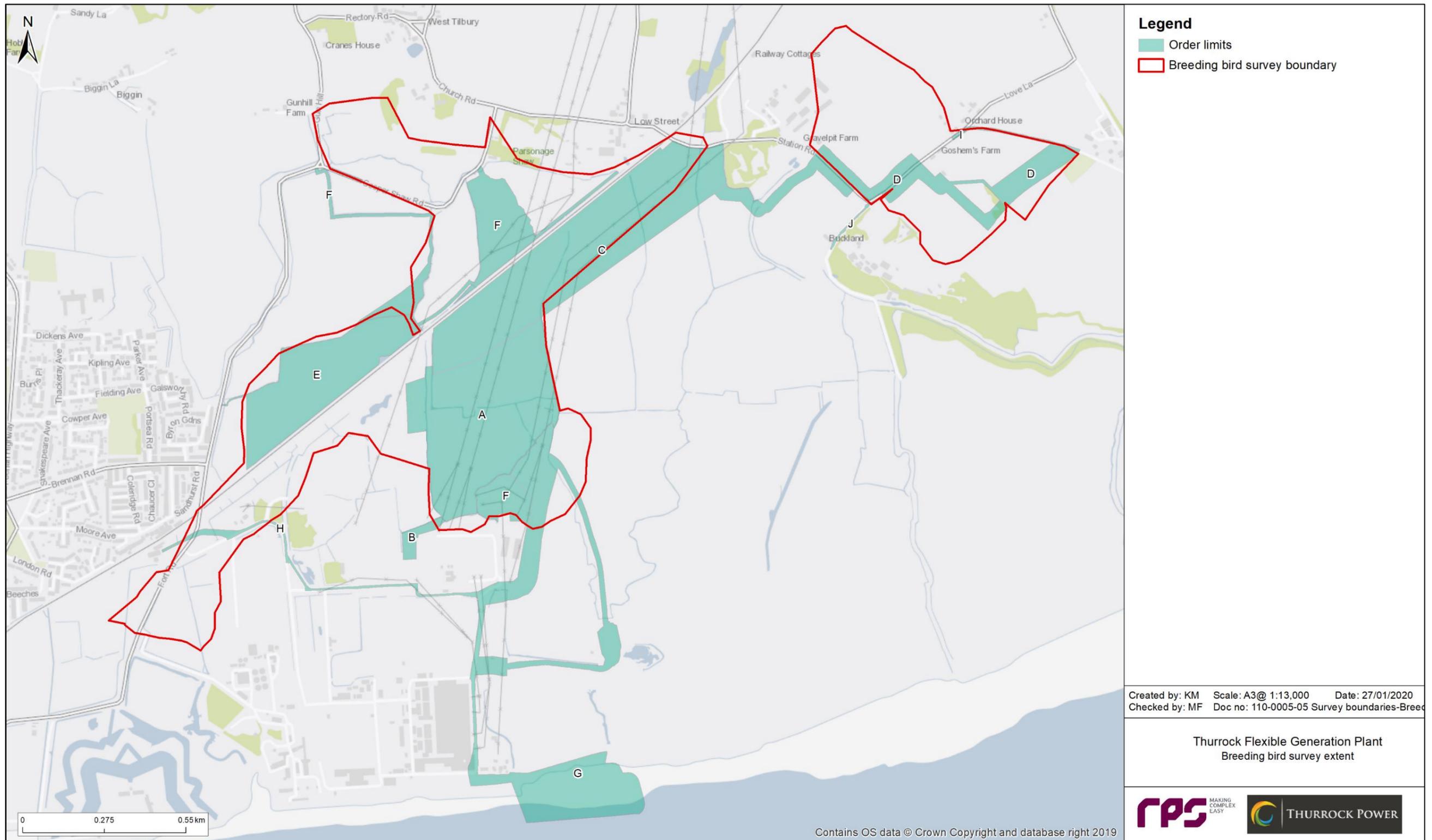


Figure 2.3: Breeding bird survey extent.

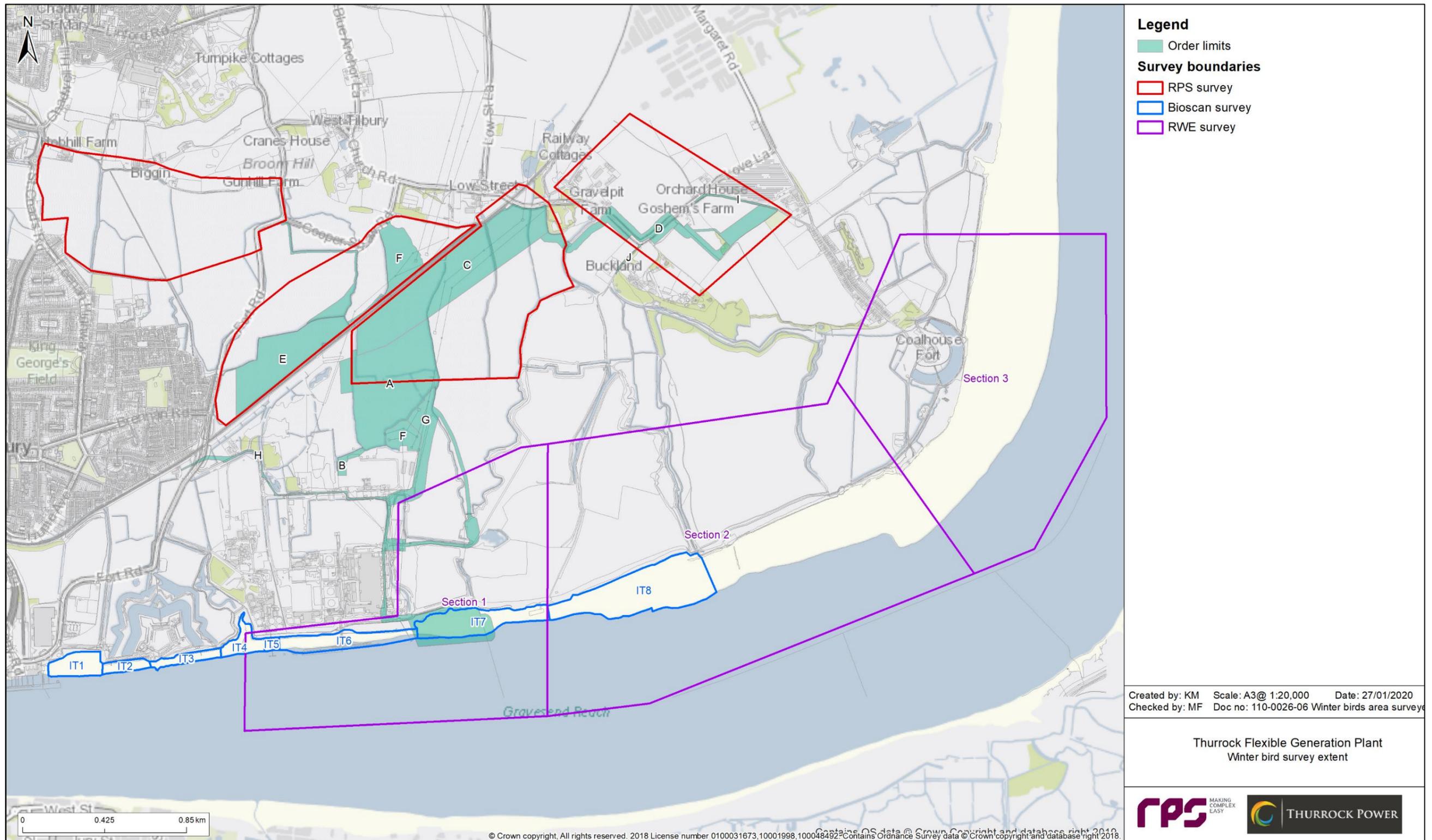


Figure 2.4: Winter bird survey extent.

2.7 Water voles and otters

- 2.7.1 Water voles typically inhabit slow-moving streams, ditches, dykes and rivers and feed mostly on waterside vegetation. They are active in daylight hours, and leave several indications of their presence, notably burrows, runs, feeding remains and latrines. Attention was paid to areas typically used for latrines, and other areas were searched for evidence such as feeding remains, lawns, burrows, runs and footprints.
- 2.7.2 The water vole survey was undertaken using the methodology as described in Strachan *et al.* (2011). Signs of otters were also searched for during the surveys.
- 2.7.3 The locations of ditches surveyed for water voles are shown on Figure 2.5. Surveys were carried out on two occasions, in May and July. On the May visit, 100 m of each ditch was surveyed. On the July visit, where many ditches were found to be dry, the entire length of each surveyed ditch was searched for water vole signs.
- 2.7.4 Ditches were searched for water vole field signs including visual sighting of animals, droppings, burrows, lawns, feeding stations, runs and footprints. Evidence for the presence or absence of mink, otter and brown rat was also noted if seen. Information on habitats was also recorded including habitat type, bank substrate and profile, bordering land use and vegetation cover.
- 2.7.5 Two surveys were undertaken each year in 2018 and 2019. Survey dates were:
- 29 May 2018; Andrew Seth & Katie Macintyre;
 - 17 July 2018; Peter Watson & Katie Macintyre;
 - 14 June 2019; Andrew Seth & Lara Bates-Prior; and
 - 18 & 19 September 2019; Sarah Downing & Katie Macintyre.
- 2.7.6 For full details of the RWE water vole and otter survey carried out in 2017/18, refer to Volume 6, Appendix 9.2: Third Party Survey Reports. The RWE survey covered some of the same ditches as the RPS survey but also included ditches in or adjacent to Zone G, as well as some ditches further east towards Coal House Fort which are not relevant to the Thurrock Flexible Generation Plant.

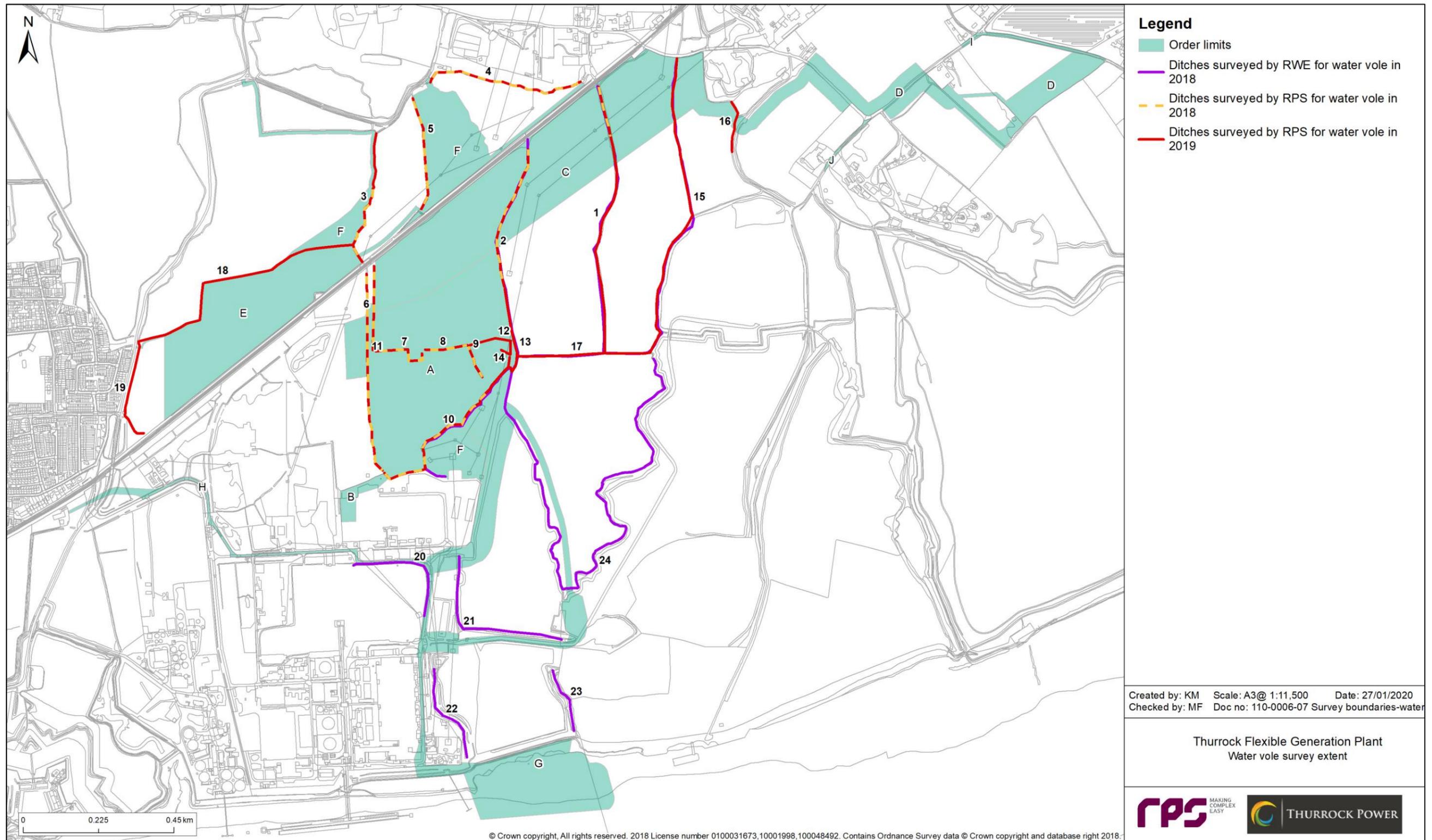


Figure 2.5: Water vole survey extent.

2.8 Badgers

- 2.8.1 Signs of badgers were searched on specific surveys carried out in April 2018 and were also noted by surveyors undertaking other surveys throughout the April – July survey period.
- 2.8.2 All field signs were recorded, and a detailed assessment was made of any setts, if found, noting the signs of activity levels and current status.

2.9 Limitations

- 2.9.1 The ecological appraisal does not assess the presence or absence of a species but is used to assess the potential for a habitat to support them. Where a species is seen, or there is clear and recent evidence of a species, this is reported.

3. Results

3.1 Desk study

3.1.1 In the following text and tables, the abbreviations used are:

- SAC: Special Area of Conservation;
- SPA: Special Protection Area;
- SSSI: Site of Special Scientific Interest;
- LNR: Local Nature Reserve; and
- LWS: Local Wildlife Site.

3.1.2 Locations of designated sites are shown on Figure 3.1 and Figure 3.2.

Statutory designated sites

3.1.3 There are four 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 D3. Mucking Flats & Marshes SSSI is located 0.77 km from Zone D3. Linford Wood LNR is located 1.55 km east of the site.

Non-statutory designated sites

3.1.4 Nine non-statutory Local Wildlife Sites (LWSs) are located within the 2 km search radius of the site (Table 3.2).

3.1.5 Two sites are located immediately adjacent to the Thurrock Flexible Generation Plant application boundary. Low Street Pit LWS is located adjacent to the proposed gas pipeline connection between Zones C and D, and Goshems Farm LWS is located adjacent to one of the options for the causeway access track in Zone G.

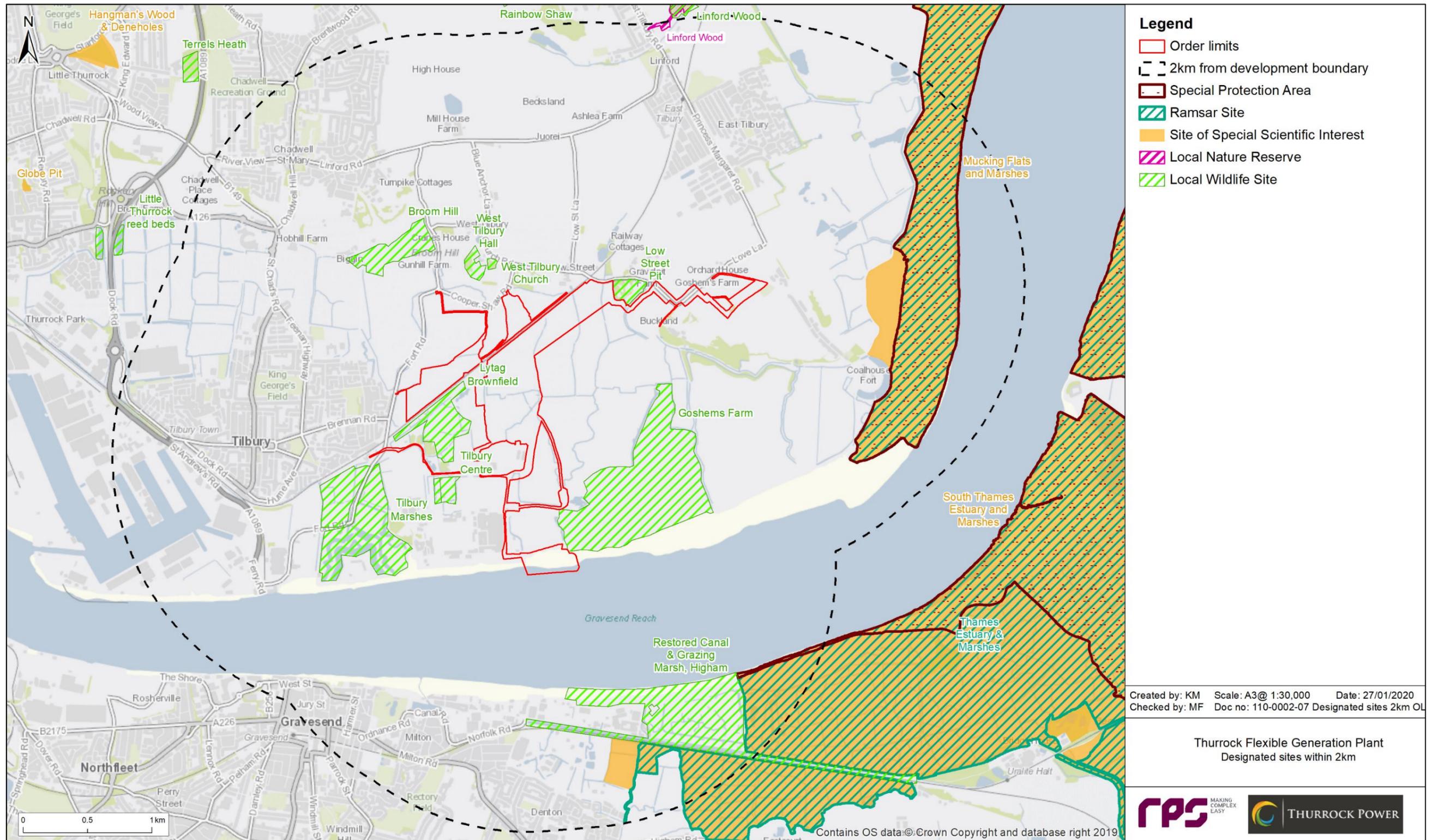


Figure 3.1: Designated sites within 2km.



Figure 3.2: Designated sites within 15 km of development Zone A.

Table 3.1: Statutory designated sites within 2 km of the Phase 1 survey area.

Site Name	Designation	Distance to Thurrock Flexible Generation Plant	Description
Thames Estuary and Marshes	Ramsar	0.77	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	1.02	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	1.02	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.
Linford Wood	LNR	1.95	The woodland provides habitat for birds, including refuge for migrant birds in spring and autumn.

Table 3.2: Non-statutory designated sites within 2 km of the Phase 1 survey area.

Site Name	Designation	Distance to Thurrock Flexible Generation Plant	Description
Low Street Pit	LWS	0.00	Site lies on regionally important Thames terrace gravels, and supports a diverse invertebrate fauna.
Goshems Farm	LWS	0.00	Site supports populations of Stinking Goosefoot (<i>Chenopodium vulvaria</i>), and UKBAP species Hornet Robberfly (<i>Asilus crabroniformis</i>)
Lyttag Brownfield	LWS	0.03	Site supports populations of all four Essex reptile species and an important invertebrate assemblage of up to national interest on open mosaic brownfield habitats.
Tilbury Centre	LWS	0.03	Site comprises a complex mosaic of habitats, supporting important invertebrates and BAP bumblebee <i>Bombus humilis</i> foraging habitat.
Tilbury Marshes	LWS	0.07	Grazing marsh supports a number of nationally scarce plants, area also includes important habitat for invertebrates.
West Tilbury Hall	LWS	0.19	Locally important grassland flora includes 2 locally rare species, and supports the nationally scarce bee <i>Osimia bicolor</i> .
West Tilbury Church	LWS	0.22	Area of ancient grassland supporting nationally restricted flora.
Broom Hill	LWS	0.31	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.
Restored Canal & Grazing Marsh, Higham	LWS	0.90	Recently established reedbeds and coastal grazing marsh.

3.2 Protected and other notable species

3.2.1 Protected or notable species refers to any species specially protected or listed under the following legislation or which is identified as being of nature conservation concern in the lists referred to below. A summary of legislation relevant to the species covered in this report is provided in Annex A.

Protected species

- The Conservation of Habitats and Species Regulations 2010 (Annex 4) (European Protected Species) (EPS);
- Council Directive 79/409/EEC on the Conservation of Wild Birds (“Birds Directive”) (BDIR) Annex 1;
- Wildlife and Countryside Act 1981 (as amended) (Schedules 1, 5 and 8) (WCA1/WCA5/WCA8); and
- The Protection of Badgers Act 1992 (PBA).

Other notable species

- The Natural Environment and Rural Communities (NERC) Act 2006. Section 41; Habitats and Species of Principal Importance in England (S41);
- RSPB UK Red or Amber listed birds (Red or Amber);
- Red listing based on IUCN guidelines – Critically Endangered (CE), Data deficient (DD), Endangered (EN), Extinct (EX), Least concern (LC), Near threatened (NT), Rare (R), Vulnerable (VU); and
- Rare and scarce species not based on IUCN criteria – Nationally Notable (N), Nationally Notable A (NA), Nationally Notable B (NB), Nationally Scarce (NS).

3.2.2 Records of protected and otherwise notable species are summarised in the sections below and in Table 3.3 – Table 3.8.

3.2.3 The conservation status abbreviations used in Table 3.3 – Table 3.8 are defined in Table 3.9.

Plants

3.2.4 Three protected or otherwise notable plant and lower plant species have been recorded within 2 km of the Phase 1 survey area.

Table 3.3: Summary of protected and notable plant species recorded within 2 km of the Phase 1 survey area.

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
Prickly Poppy	<i>Papaver argemone</i>	2.00	2011	RedList_Global_post2001_EN

Invertebrates

3.2.5 Several insect species with some rarity / conservation status have been recorded within 2 km of the Phase 1 survey area (Table 3.4). Species mainly include beetles, bees, butterflies, moths, true flies, and true bugs.

Table 3.4: Summary of protected and notable invertebrate species recorded within 2 km of the Phase 1 survey area.

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
	<i>Alopecosa cuneata</i>	1.00	2018	NS-includes
	<i>Anobium inexpectatum</i>	1.60	2015	Notable-B
	<i>Anoscopus albifrons</i>	1.00	2014	Notable-B
	<i>Anotylus insecatus</i>	1.00	2014	Notable
	<i>Asaphidion flavipes</i>	1.00	2014	NS-includes
	<i>Asiraca clavicornis</i>	0.40	2018	Notable-B
	<i>Ballus chalybeius</i>	1.60	2010	NS-includes
	<i>Blaesoxipha plumicornis</i>	1.50	2009	Notable
	<i>Cheiracanthium virescens</i>	1.00	2018	NS-includes
	<i>Cordicollis instabilis</i>	1.00	2014	NS-includes
Cryptic Leatherbug	<i>Bathysolen nubilus</i>	2.00	2012	Notable-B
Dasytes plumbeus	<i>Dasytes plumbeus</i>	1.60	2015	NS-includes
	<i>Ero aphana</i>	1.60	2009	NS-includes
	<i>Eulamprotes immaculatella</i>	0.60	2018	Notable
Horehound Long-horn Moth	<i>Nemophora fasciella</i>	1.60	2015	BAP-2007, England_NERC_S.41
	<i>Hydrotaea parva</i>	1.50	2010	Notable
	<i>Hypomma fulvum</i>			NS-includes
	<i>lassus scutellaris</i>	1.60	2015	Notable-A

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
	<i>Lasiochaeta pubescens</i>	1.50	2009	Notable
Lesne's Earwig	<i>Forficula lesnei</i>	1.50	2010	NS-includes
	<i>Longitarsus ballotae</i>	1.50	2010	NS-includes, Notable-B
	<i>Longitarsus dorsalis</i>	1.00	2014	Notable-B
	<i>Longitarsus fowleri</i>	1.50	2010	NS-includes, Notable-A
	<i>Longitarsus nasturtii</i>	1.50	2010	NS-includes, Notable-B
	<i>Longitarsus parvulus</i>	1.00	2014	Notable-A
	<i>Macrosteles quadripunctulatus</i>	1.00	2014	Notable-A
Mallow Flea Beetle	<i>Podagrica fuscicornis</i>	1.50	2010	NS-includes
Mallow Flea Beetle	<i>Podagrica fuscipes</i>	1.50	2010	NS-includes
	<i>Megalonotus praetextatus</i>	1.00	2014	Notable-B
	<i>Melanobaris laticollis</i>	0.13	2014	Notable-A
	<i>Melieria picta</i>	1.60		Notable
	<i>Meligethes rotundicollis</i>	1.50	2010	Notable
	<i>Nomada fucata</i>	2.00	2010	Notable-A
	<i>Notiophilus quadripunctatus</i>	1.00	2014	NS-includes, Notable-B
	<i>Ophiola decumana</i>	1.00	2014	Notable-B
	<i>Oscinimorpha arcuata</i>	1.50	2010	Notable
	<i>Otiorhynchus (Otiorhynchus) raucus</i>	0.00	2014	Notable-B
	<i>Panamomops sulcifrons</i>	1.00	2018	NS-includes
Phoenix Fly	<i>Dorycera graminum</i>	0.40	2018	BAP-2007, England_NERC_S.41
	<i>Phyllotreta consobrina</i>	1.50	2010	NS-includes
	<i>Pseudostyphlus pillumus</i>	1.50	2010	Notable-A
	<i>Raglius alboacuminatus</i>	1.50	2015	Notable-B
Ruddy Darter	<i>Sympetrum sanguineum</i>	1.60	2009	RedList_Global_post2001_LC
	<i>Saprinus aeneus</i>	2.00	2010	NS-includes
Scarce Tortoise Shieldbug	<i>Eurygaster maura</i>	1.50	2010	NS-includes,
Scybalicus oblongiusculus	<i>Scybalicus oblongiusculus</i>	1.00	2014	NR-includes
Shaded Broad-bar	<i>Scotopteryx chenopodiata</i>	1.21	2015	BAP-2007, England_NERC_S.41
Small Heath	<i>Coenonympha pamphilus</i>	0.12	2018	BAP-2007, England_NERC_S.41
	<i>Sphecodes crassus</i>	1.50	2010	Notable-B

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
	<i>Sphecodes longulus</i>	1.60	2010	Notable-A
	<i>Sphecodes rubicundus</i>	0.60	2018	Notable-A
Stag Beetle	<i>Lucanus cervus</i>	1.14	2016	HabDir-A2*, BAP-2007, England_NERC_S.41, NS-includes, WACA-Sch5_sect9.5a
The Cinnabar	<i>Tyria jacobaeae</i>	0.03	2016	BAP-2007, England_NERC_S.41
	<i>Triglyphus primus</i>	1.60	2010	Notable,NS-excludes
Turnip Fly	<i>Phyllotreta cruciferae</i>			NS-includes
Wall	<i>Lasiommata megera</i>	0.04	2018	BAP-2007, England_NERC_S.41
White letter hairstreak	<i>Satyrium w-album</i>	1.60	2015	BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.5a
	<i>Zodarion italicum</i>	1.60	2010	NS-includes
	<i>Zophomyia temula</i>	1.50	2010	Notable

Amphibians

3.2.6 Two species of amphibian have been recorded within 2 km of the Thurrock Flexible Generation Plant site.

Table 3.5: Summary of protected and notable amphibian species recorded within 2 km of the Phase 1 survey area.

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
Great Crested Newt	<i>Triturus cristatus</i>	0.04	2018	HabDir-A2*,HabDir-A4, BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c, RedList_Global_post2001_LC
Smooth Newt	<i>Lissotriton vulgaris</i>	0.35	2017	WACA-Sch5_sect9.5a, RedList_Global_post2001_LC

Reptiles

3.2.7 All four common reptile species have been recorded within 2 km of the Thurrock Flexible Generation Plant site.

Table 3.6: Summary of protected and notable reptile species recorded within 2 km of the Phase 1 survey area.

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
Adder	<i>Vipera berus</i>	0.09	2016	BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.1(kill/injuring),WACA-Sch5_sect9.5a, RedList_Global_post2001_LC
Grass Snake	<i>Natrix helvetica</i>	0.09	2016	BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.1(kill/injuring),WACA-Sch5_sect9.5a, RedList_Global_post94-LC
Slow-Worm	<i>Anguis fragilis</i>	0.09	2016	BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.1(kill/injuring),WACA-Sch5_sect9.5a
Common Lizard	<i>Zootoca vivipara</i>	0.09	2016	BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.1(kill/injuring),WACA-Sch5_sect9.5a, RedList_Global_post2001_LC

Breeding Birds

3.2.8 A total of 35 protected or otherwise notable species of bird have been recorded within 2 km of the Thurrock Flexible Generation Plant site.

Table 3.7: Summary of protected and notable bird species recorded within 2 km of the Phase 1 survey area.

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
Black-Headed Gull	<i>Chroicocephalus ridibundus</i>	1.71	2016	BirdsDir-A2.2, CMS_AEWA-A2, Bird-Amber, RedList_Global_post2001_LC
Blue Tit	<i>Cyanistes caeruleus</i>	1.71	2012	RedList_Global_post2001_LC
Carrion / Hooded Crow	<i>Corvus corone</i>	1.95	2012	BirdsDir-A2.2, RedList_Global_post2001_LC
Cetti's Warbler	<i>Cettia cetti</i>	1.71	2016	WACA-Sch1_part1, RedList_Global_post2001_LC
Common Blackbird	<i>Turdus merula</i>	1.71	2016	BirdsDir-A2.2, RedList_Global_post2001_LC
Common Cuckoo	<i>Cuculus canorus</i>	0.53	2012	Bird-Red, BAP-2007, England_NERC_S.41, RedList_Global_post2001_LC
Coot	<i>Fulica atra</i>	1.71	2016	BirdsDir-A2.1, CMS_AEWA-A2, RedList_Global_post2001_LC
Eurasian Curlew	<i>Numenius arquata</i>	1.57	2016	BirdsDir-A2.2, CMS_A2,CMS_AEWA-A2, Bird-Red, BAP-2007, England_NERC_S.41, RedList_Global_post2001_NT
Gadwall	<i>Anas strepera</i>	1.71	2016	BirdsDir-A2.1, CMS_A2,CMS_AEWA-A2, Bird-Amber, RedList_Global_post2001_LC

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
Goldeneye	<i>Bucephala clangula</i>	1.71	2016	BirdsDir-A2.2, CMS_A2,CMS_AEWA-A2, Bird-Amber, WACA-Sch1_part2, RedList_Global_post2001_LC
Goldfinch	<i>Carduelis carduelis</i>	1.71	2016	RedList_Global_post2001_LC
Great Cormorant	<i>Phalacrocorax carbo</i>	1.71	2016	CMS_AEWA-A2, RedList_Global_post2001_LC
Great Crested Grebe	<i>Podiceps cristatus</i>	1.71	2016	CMS_AEWA-A2, RedList_Global_post2001_LC
Great Tit	<i>Parus major</i>	1.71	2016	RedList_Global_post2001_LC
Green Woodpecker	<i>Picus viridis</i>	1.71	2016	RedList_Global_post2001_LC
Greenfinch	<i>Chloris chloris</i>	1.71	2016	RedList_Global_post2001_LC
Hedge Accentor	<i>Prunella modularis</i>	1.71	2016	Bird-Amber, RedList_Global_post2001_LC
Jay	<i>Garrulus glandarius</i>	1.95	2012	BirdsDir-A2.2, RedList_Global_post2001_LC
Little Gull	<i>Hydrocoloeus minutus</i>	1.95	2015	BirdsDir-A1, CMS_AEWA-A2, WACA-Sch1_part1, RedList_Global_post2001_LC
Little Owl	<i>Athene noctua</i>	1.95	2012	RedList_Global_post2001_LC
Magpie	<i>Pica pica</i>	1.71	2016	BirdsDir-A2.2, RedList_Global_post2001_LC
Mallard	<i>Anas platyrhynchos</i>	1.71	2016	BirdsDir-A2.1, CMS_A2,CMS_AEWA-A2, Bird-Amber, RedList_Global_post2001_LC
Mew Gull	<i>Larus canus</i>	1.71	2016	BirdsDir-A2.2, CMS_AEWA-A2, Bird-Amber, RedList_Global_post2001_LC
Northern Gannet	<i>Morus bassanus</i>	0.68	2018	CMS_AEWA-A2, Bird-Amber, RedList_Global_post2001_LC
Pheasant	<i>Phasianus colchicus</i>	1.55	2018	BirdsDir-A2.1
Pochard	<i>Aythya ferina</i>	1.71	2016	BirdsDir-A2.1, CMS_A2,CMS_AEWA-A2, Bird-Red, RedList_Global_post2001_LC
Robin	<i>Erithacus rubecula</i>	1.71	2016	RedList_Global_post2001_LC
Rock Pipit	<i>Anthus petrosus</i>	1.95	2012	RedList_Global_post2001_LC
Scaup	<i>Aythya marila</i>	1.71	2016	BirdsDir-A2.2, CMS_A2,CMS_AEWA-A2, Bird-Red, BAP-2007, England_NERC_S.41, WACA-Sch1_part1, RedList_Global_post2001_LC
Shoveler	<i>Anas clypeata</i>	1.71	2016	BirdsDir-A2.1, CMS_A2,CMS_AEWA-A2, Bird-Amber, RedList_Global_post2001_LC
Stonechat	<i>Saxicola rubicola</i>	1.95	2012	RedList_Global_post2001_LC
Tufted Duck	<i>Aythya fuligula</i>	1.71	2016	BirdsDir-A2.1, CMS_A2,CMS_AEWA-A2, RedList_Global_post2001_LC
Turtle Dove	<i>Streptopelia turtur</i>	1.55	2018	BirdsDir-A2.2, Bird-Red, BAP-2007, England_NERC_S.41, RedList_Global_post2001_LC
White/Pied Wagtail	<i>Motacilla alba</i>	1.95	2012	RedList_Global_post2001_LC
Woodpigeon	<i>Columba palumbus</i>	1.95	2012	BirdsDir-A2.1, RedList_Global_post2001_LC
Wren	<i>Troglodytes troglodytes</i>	1.95	2012	RedList_Global_post2001_LC

Mammals

3.2.9 Nine terrestrial and three marine mammals have been recorded within 2 km of the Thurrock Flexible Generation Plant.

Table 3.8: Summary of protected and notable mammal species recorded within 2 km of the Phase 1 survey area.

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
Terrestrial mammals				
Brown Long-eared Bat	<i>Plecotus auritus</i>	1.09	2008	CMS_A2,CMS_EUROBATS-A1, HabDir-A4, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c
Dormouse	<i>Muscardinus avellanarius</i>	0.90	2009	HabDir-A4, BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c
Harvest Mouse	<i>Micromys minutus</i>	2.00	2014	BAP-2007, England_NERC_S.41
Natterer's Bat	<i>Myotis nattereri</i>	1.48	2015	CMS_A2,CMS_EUROBATS-A1, HabDir-A4, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c
Noctule	<i>Nyctalus noctula</i>	0.21	2012	CMS_A2,CMS_EUROBATS-A1, HabDir-A4, BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	0.21	2012	CMS_A2,CMS_EUROBATS-A1, HabDir-A4, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c, RedList_Global_post2001_LC
Long-eared bat	<i>Plecotus sp.</i>	1.48	2015	CMS_A2,CMS_EUROBATS-A1, HabDir-A4, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	1.04	2012	CMS_A2,CMS_EUROBATS-A1, HabDir-A4, BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c
Water vole	<i>Arvicola amphibius</i>	1.24	2018	BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.4.a,WACA-Sch5_sect9.4b,WACA-Sch5Sect9.4c
West European Hedgehog	<i>Erinaceus europaeus</i>	0.00	2016	BAP-2007, England_NERC_S.41
Marine mammals				
Grey Seal	<i>Halichoerus grypus</i>	0.68	2018	CMS_A2, HabDir-A2*,HabDir-A5, RedList_Global_post2001_LC
Harbour porpoise	<i>Phocoena phocoena</i>	0.68	2018	CMS_A2,CMS_ASCOBANS, HabDir-A2*,HabDir-A4, BAP-2007, England_NERC_S.41, WACA-Sch5_sect9.4A,WACA-Sch5_sect9.5a, RedList_Global_post2001_LC
Beluga Whale	<i>Delphinapterus leucas</i>	0.68	2018	CMS_A2, HabDir-A4, WACA-Sch5_sect9.1(kill/injuring),WACA-Sch5_sect9.1(taking),WACA-Sch5_sect9.4.a,WACA-Sch5_sect9.4A,WACA-

Common name	Scientific name	Nearest distance from site (km)	Year of most recent record	Conservation Status
				Sch5_sect9.4b,WACA-Sch5_sect9.5a,WACA-Sch5Sect9.4c

Table 3.9: Conservation status abbreviations used in Table 3.3 – Table 3.8.

Abbreviated Designation	Full designation	Description
Bird-Amber	Bird Population Status - amber	Species listed on the Birds of Conservation Concern (BoCC) Amber List.
BirdsDir-A1	Birds Directive Annex 1	Birds which are the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. As appropriate, Special Protection Areas to be established to assist conservation measures.
Bird-Red	Bird Population Status - red	Species listed on the Birds of Conservation Concern (BoCC) Red List.
CMS_A2	Convention on Migratory Species, Appendix 2	Migratory species having an unfavourable conservation status for which Range States are encouraged to conclude international agreements for their benefit.
CMS_EUROBATS-A1	Convention on Migratory Species, CMS_EUROBATS-A1 - ANex I	Protection and enhancement of species populations through legislation, education, conservation measures and international co-operation.
HabRegs-Sch2	The Conservation (Natural Habitats, &c.) Regulations 2010 (Schedule 2)	Schedule 2- European protected species of animals.
HabRegs-Sch4	The Conservation (Natural Habitats, &c.) Regulations 2010 (Schedule 4)	Schedule 4- Animals which may not be captured or killed in certain ways.
HabDir-A2*	Habitats Directive Annex 2 - non-priority species	Animal and plant species of Community interest (i.e. endangered, vulnerable, rare or endemic in the European Community) whose conservation requires the designation of special areas of conservation.
HabDir-A4	Habitats Directive Annex 4	Animal and plant species of Community interest (i.e. endangered, vulnerable, rare or endemic in the European Community) in need of strict protection. They are protected from killing, disturbance or the destruction of them or their habitat.
HabDir-A5	Habitats Directive Annex 5	Animal and plant species of Community interest whose taking in the wild and exploitation may be subject to management measures.
Notable	Nationally Notable	Species which are estimated to occur within the range of 16 to 100 10 km squares. (subdivision into Notable A and Notable B is not always possible because there may be insufficient information available).

Abbreviated Designation	Full designation	Description
Notable-A	Nationally Notable A	Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10 km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties.
Notable-B	Nationally Notable B	Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10 km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties.
NS-includes	Nationally scarce. Includes Red Listed taxa	Occurring in 15 or fewer hectads (10 km x 10 km squares) in Great Britain. Includes rare species qualifying under the main IUCN criteria.
RedList_Global_post2001_NT	IUCN (2001) - Lower risk - near threatened	Taxa which do not qualify for Lower Risk (conservation dependent), but which are close to qualifying for Vulnerable. In Britain, this category includes species which occur in 15 or fewer hectads (10 km x 10 km squares) but do not qualify as Critically Endangered, Endangered or Vulnerable.
RedList_Global_post2001_LC	IUCN (2001) - Lower risk - near threatened	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
England_NERC_S.41	Natural Environment and Rural Communities Act 2006 - Species of Principal Importance in England (sec	Species "of principal importance for the purpose of conserving biodiversity" covered under section 41 (England) of the NERC Act (2006) and therefore need to be taken into consideration by a public body when performing any of its functions.
BAP-2007	UK Biodiversity Action Plan priority species	The UK List of Priority Species and Habitats contains 1150 species and 65 habitats that have been listed as priorities for conservation action under the UK Biodiversity Action Plan (UK BAP).
WACA-Sch1_part1	Wildlife and Countryside Act 1981 (Schedule 1 Part 1)	Birds which are protected by special penalties at all times.
WACA-Sch5_sect9.1(kill/injuring)	Wildlife and Countryside Act 1981 (Schedule 5 Section 9.1 (killing/injuring))	Section 9.1. Animals which are protected from intentional killing or injuring.

Abbreviated Designation	Full designation	Description
WACA-Sch5_sect9.1(taking)	Wildlife and Countryside Act 1981 (Schedule 5 Section 9.1 (taking))	Section 9.1 Animals which are protected from taking.
WACA-Sch5_sect9.2	Wildlife and Countryside Act 1981 (Schedule 5 Section 9.2)	Section 9.2 Animals which are protected from being possessed or controlled (live or dead).
WACA-Sch5_sect9.4a	Wildlife and Countryside Act 1981 (Schedule 5 Section 9.4a)	Section 9.4 Animals which are protected from intentional damage or destruction to any structure or place used for shelter or protection.
WACA-Sch5_sect9.4b	Wildlife and Countryside Act 1981 (Schedule 5 Section 9.4b)	Section 9.4 Animals which are protected from intentional disturbance while occupying a structure or place used for shelter or protection.
WACA-Sch5_sect9.4c	Wildlife and Countryside Act 1981 (Schedule 5)	Animals which are protected from their access to any structure or place which they use for shelter or protection being obstructed.
WACA-Sch5_sect9.5a	Wildlife and Countryside Act 1981 (Schedule 5 Section 9.5a)	Section 9.5 Animals which are protected from being sold, offered for sale or being held or transported for sale either live or dead, whole or part.
WACA-Sch5_sect9.5b	Wildlife and Countryside Act 1981 (Schedule 5 Section 9.5b)	Section 9.5 Animals which are protected from being published or advertised as being for sale.
WACA-Sch8	Wildlife and Countryside Act 1981 (Schedule 8)	Plants which are protected from intentional picking, uprooting or destruction (Section 13 1a); selling, offering for sale, possessing or transporting for the purpose of sale (live or dead, part or derivative) (Section 13 2a); advertising (any of these) for sale.

3.3 Phase 1 habitat survey

- 3.3.1 The results of the phase 1 habitat surveys undertaken by RPS are shown in Figure 3.3 – Figure 3.5.
- 3.3.2 The majority of the site comprises arable land and improved grassland, with areas of scrub, semi-improved grassland and wet ditches. A railway line runs through the centre of the site and a single pond is located on site. Tilbury Substation is also located at the very south of the site.
- 3.3.3 Descriptions of the habitat types and boundary features are detailed below. Habitat descriptions are defined by broad habitat types (JNCC, 2016).

Zone A

- 3.3.4 Zone A (c.20.1 ha) comprises two sections.
- 3.3.5 The northern section comprises a field under arable cultivation (7.5 ha), comprising a crop of oilseed rape *Brassica napus* at the time of survey, an area of improved grassland (c1.1 ha) and tall ruderal (0.27 ha).
- 3.3.6 Field horsetail *Equisetum arvense* also occurred along the access road.
- 3.3.7 The southern section (c. 11.2 ha) is a uniform area of relict grazing marsh comprising semi-improved grassland bordered by hedgerows and ditches. Species present within this area include Yorkshire fog *Holcus lanatus*, rye brome *Bromus secalinus*, meadow foxtail *Alopecurus pratensis*, fescue *Festuca* sp., common bent *Agrostis capillaris*, grass vetchling *Lathyrus nissolia*, butterbur *Petasites hybridus*, hairy tare *Vicia hirsuta*, tare *Vicia* sp., blue field madder *Sherardia arvensis*, goatsbeard *Tragopogon* sp. and field pennycress *Thlaspi arvense*.
- 3.3.8 The hedgerows consist mainly of mature hawthorn *Crataegus monogyna* and bramble *Rubus fruticosus* agg. scrub.
- 3.3.9 The wet ditches are over 30 cm deep and are steep-sided. Very little emergent vegetation occurred although common reed *Phragmites australis* dominated the banks.
- 3.3.10 Tall ruderal vegetation including common nettle *Urtica dioica*, common mugwort *Artemisia vulgaris*, dock *Rumex* spp., Sowthistle *Sonchus* spp., greater burdock *Arctium lappa* and creeping thistle *Cirsium arvense* also occurred.

Zone B

- 3.3.11 Zone B comprises a small area of hard standing within the existing Tilbury Substation. This area was not surveyed as it could not be accessed, however, no priority habitats or habitats suitable for protected species are considered to be present.

Zone C

- 3.3.12 This area (22.9 ha) is proposed as a potential access corridor for the site under discussion. At the time of survey it comprised arable fields of oilseed rape with wet ditches along field boundaries and an access track occurs along the northern boundary next to the railway line which became increasingly vegetated with improved grassland and arable weed species to the west. The plant assemblage in this area was limited and very unlikely to contain any species of high conservation value.

3.3.13 The field margins varied in width from 1 m to 5 m along the wet ditches. Species present within these areas include barren brome *Bromus sterilis*, creeping bent *Agrostis stolonifera*, cocksfoot *Dactylis glomerata*, meadow grass *Poa* spp. and false oat-grass *Arrhenatherum elatius*. Herb species include meadow buttercup *Ranunculus acris*, cut-leaved cranesbill *Geranium dissectum*, vetch, field speedwell *Veronica persica*, creeping cinquefoil *Potentilla reptans*, lesser trefoil *Trifolium dubium*, black medic *Medicago lupulina*, common storksbill *Erodium cicutarium* and occasionally field poppy *Papaver rhoeas*.

3.3.14 Some ditches did contain running water at the time of the survey, but flows were low. No aquatic macrophytes were visible in any of the ditches. As on other areas of the wider site, common reed dominated the marginal vegetation on the banks.

Zone D

3.3.15 This area is proposed as an option for a direct gas connection. Zone D2 comprises arable land (c 3.88 ha) and improved grassland (1.40 ha), and Zone D3 comprises improved grassland (2.28 ha), with mature native species hedgerows and trees around the field boundaries. Species present along the road include hornbeam *Carpinus betulus*, hawthorn with mature ash *Fraxinus excelsior* and oak *Quercus* sp. standards. The improved grassland comprises species indicative of enriched or partially enriched conditions. Species included ryegrass *Lolium* sp., cocksfoot, meadow foxtail, meadow grass, brome *Bromus* sp. and red fescue *Festuca rubra*.

3.3.16 An area of tall ruderal vegetation and scattered scrub dominated by common nettle and bramble occurs on the south eastern side of the site. Immediately south of this is an area of broadleaved plantation woodland. Species recorded within the woodland include hazel *Corylus avellana*, birch *Betula* sp., elm *Ulmus* sp. and sycamore, *Acer pseudoplatanus*. The ground cover comprises bare ground with species such as lords and ladies *Arum maculatum*, and dense continuous scrub and tall ruderal vegetation.

Zone E

3.3.17 Zone E is a field under arable cultivation with grassy margins. It is bordered by the railwayline to the south and a ditch to the north.

3.3.18 A wet ditch runs along the northern boundary of Zone E. This is dominated by common reed although yellow iris *Iris pseudacorus* is also present. Hemlock *Conium maculatum*, oil seed rape, black mustard *Brassica nigra* and common cleavers *Galium aparine* were recorded along the field boundary. A species rich hedgerow runs along the eastern boundary and comprises hazel, hornbeam, beech *Fagus sylvatica* and elder *Sambucus nigra*.

Zone F

3.3.19 Areas F1, F2, and F3 comprise mainly arable fields with boundary ditches.

3.3.20 Area F4 comprises an area of semi-improved grassland, with encroaching scrub and tall ruderal vegetation.

Zone G

3.3.21 Zone G comprises the access road from the causeway to be constructed on the foreshore to the main construction site in Zone A. It will be used to transport gas engines to the construction site and to provide one access route option during operation.

3.3.22 For a description of habitats south of the sea wall refer to Volume 3, Chapter 17: Marine Environment.

3.3.23 North of the sea wall the access road will cross an area of semi-improved grassland before following an existing tarmac road that is part of the RWE power station site. The road continues north for approximately 350m at which point two potential access options are included in the application boundary. (The choice of which option will be followed will be made pre-commencement.)

3.3.24 Option 1 follows the existing RWE road north for a further 230m before heading east and then north around the National Grid substation, between the substation and the land to the east that is currently being used for ground-raising for spoil imported from the Thames Tideway Tunnel project. Where the road route runs along the east side of the substation, habitats include semi-natural grassland, scrub and some wetter areas resulting from a blocked drainage ditch. It then crosses an area of semi-natural grassland with encroaching scrub and tall ruderal before crossing a ditch into Zone A.

3.3.25 Option 2 runs east along a bare ground track for approximately 450m and then turns north for c 160m across an area of grassland within the land-raising site. It crosses a ditch into an arable field and runs north within arable land for c600m before crossing a ditch into grassland with encroaching scrub and tall ruderal before crossing a ditch into Zone A.

Zone H

3.3.26 This area comprises a private road within the Tilbury2 development which is proposed as an access route for HGVs. The majority of the road is bordered by a narrow grass verge and mature native species hedgerows with arable land beyond. In places there is only a wooden fence or open areas of tall ruderal, poor semi-improved grassland and scrub.

3.3.27 The hedgerows are generally comprised of native species such as hawthorn, blackthorn *Prunus spinosa* and hazel. In many areas there are large gaps, or the hedgerows have been removed altogether. Management of hedgerows varied, with some being cut short (1-1.5 m height) and others more unmanaged and taller.

Zone I

3.3.28 This area comprises an existing public highway road which is proposed as an access route for construction traffic. The majority of the road is bordered by a narrow grass verge and mature native species hedgerows with improved grassland to the south, and a solar farm to the north.

Zone J

3.3.29 This zone is proposed as a temporary right of way for diversion of a footpath during construction works to the gas pipeline. This follows an existing hard standing track with a small area of broadleaf woodland to the south-east of the track.

Zone V

3.3.30 This zone comprised an area of hard standing and buildings within the existing Tilbury Substation which is no longer within the Thurrock Flexible Generation Plant application boundary.

Zone W

3.3.31 This area comprised an area common land not currently used for grazing livestock. Species were generally indicative of enriched or partially enriched conditions, with species including ryegrass *Lolium* sp., cocksfoot, meadow foxtail, meadow grass, brome *Bromus* sp. and red fescue *Festuca rubra*.

3.3.32 Zone W is a uniform area of improved grassland bordered by hedgerows and ditches. The high fertility of the grassland suggests a history of recent cultivation. The open ditches were similar to other parts of the site and are dominated by common reed. The ditch along the east and south boundaries of Zone W are heavily vegetated with dense blackthorn and hawthorn scrub.

3.3.33 Zone W is no longer within the Thurrock Flexible Generation Plant application boundary.

Zone X

3.3.34 This zone comprises an arable field which is no longer within the Thurrock Flexible Generation Plant application boundary.

Zone Y

3.3.35 This zone comprises an arable field with boundary ditches which is no longer within the Thurrock Flexible Generation Plant application boundary.

Zone Z

3.3.36 This zone was initially proposed as a potential access road link but is not now part of the development boundary. The survey of this zone is nevertheless reported here as it provides useful additional contextual survey information for the site.

3.3.37 It comprises a mosaic of brownfield open mosaic habitat, mature scrub, managed semi-improved grassland, and small areas of woodland, and includes the Lytag Brownfield LWS.

3.3.38 A large pond occurs in the eastern section. This pond is at present surrounded by temporary exclusion fencing. Emergent vegetation present includes common reed, bulrush *Typha* sp. and reed canary grass *Phalaris arundinacea*.

3.3.39 North of the pond a mature and unmanaged species-rich hedgerow occurs. This comprises guelder rose *Viburnum opulus*, dog rose *Rosa canina*, elm, hazel, hawthorn and blackthorn with ash, birch and goat willow *Salix caprea* trees.

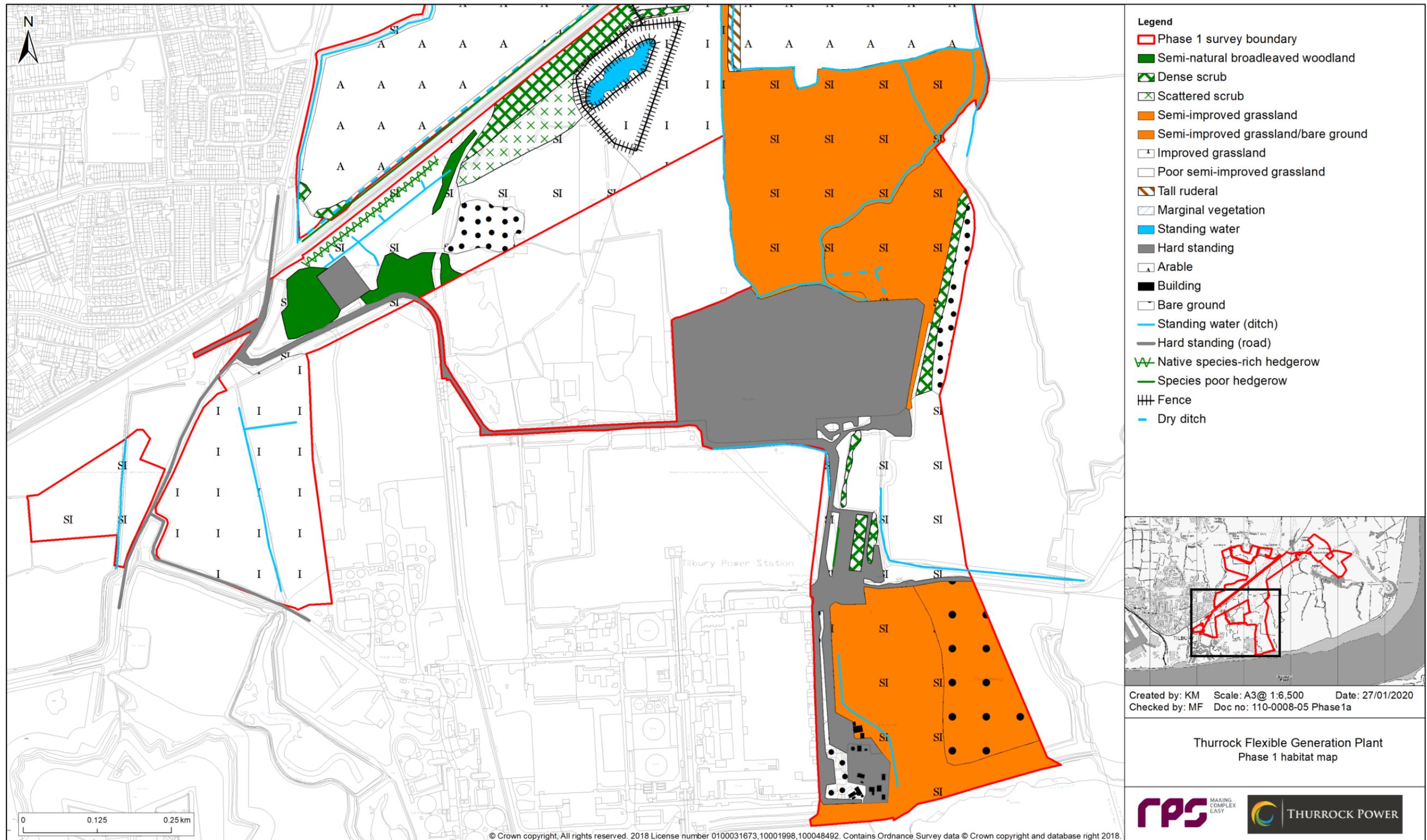


Figure 3.3: Phase 1 habitat map.

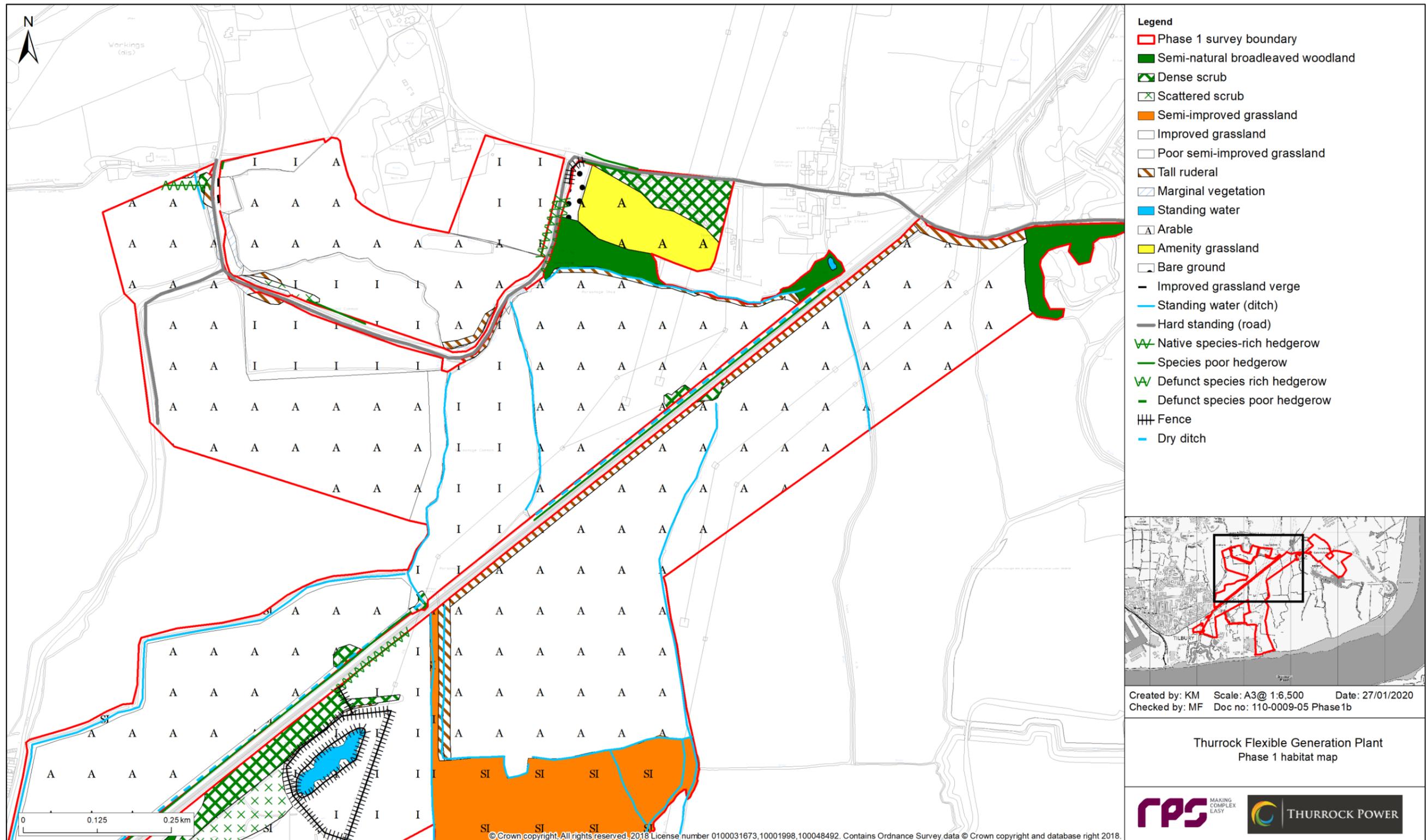


Figure 3.4: Phase 1 habitat map.

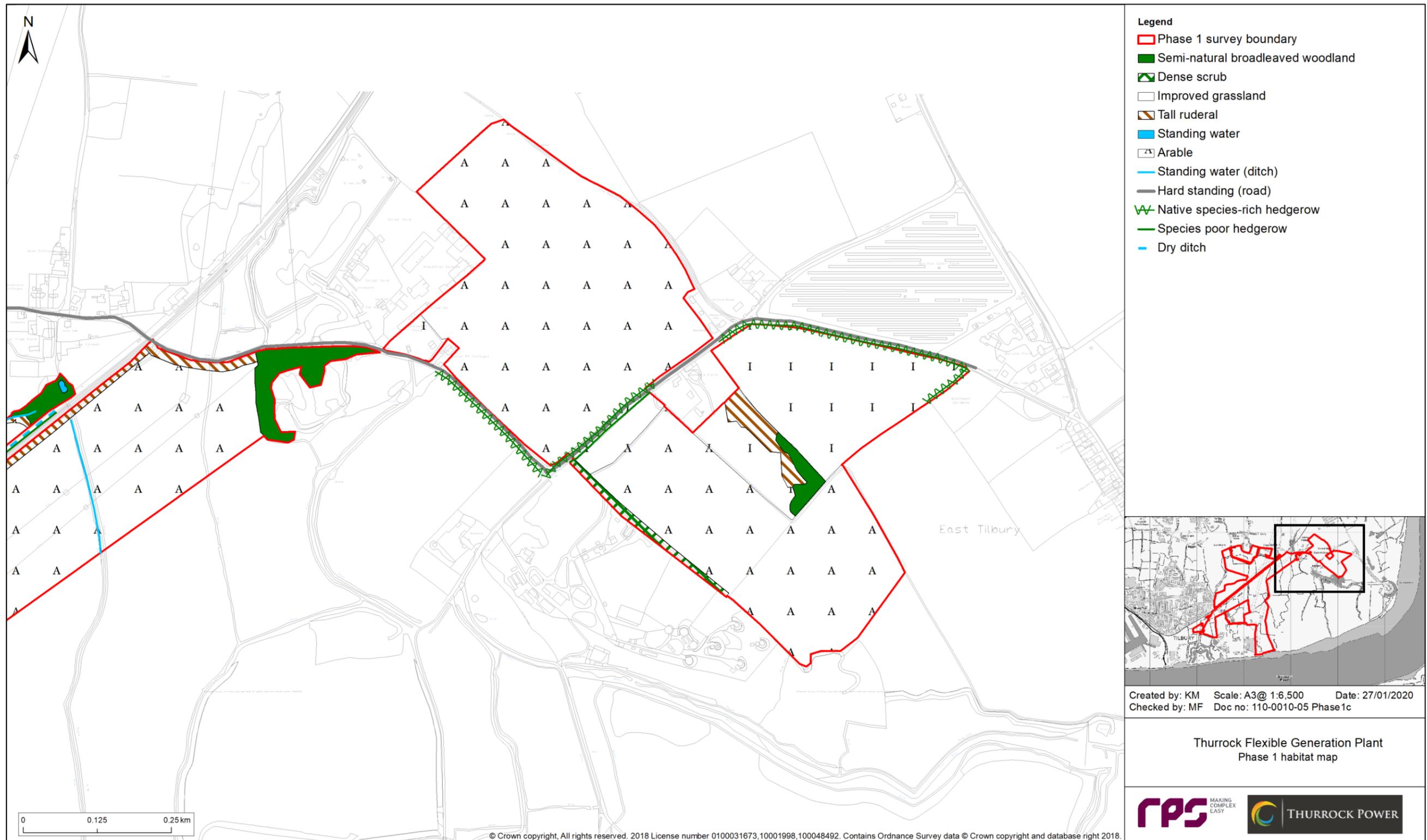


Figure 3.5: Phase 1 habitat map.

3.4 Botanical survey

- 3.4.1 The species lists from the walkover survey and the NVC quadrat recording are provided in Annex B.
- 3.4.2 No particularly rare or scarce plant species were identified. Analysis of the quadrat data found that the plant communities present were a mixture of two NVC communities:
- MG1b (*Arrhenatherum elatius* grassland, *Urtica dioica* sub-community); and
 - OV24b (*Urtica dioica-Gallium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* agg. sub-community).
- 3.4.3 MG1 grassland is a mesotrophic grassland community characteristic of semi-improved neutral soils. It is a very widespread community throughout the British lowlands of England, Wales and southern and eastern Scotland.
- 3.4.4 OV24 is a tall herb open habitat characteristic of more elevated nutrient levels, and which occurs widely throughout lowland Britain.

3.5 Invertebrate scoping survey

Zone A

- 3.5.1 Zone A (c.20.1 ha) can be split into two main parts for the purpose of categorising the habitats currently present, which are related to the land use history of the area as a whole.
- 3.5.2 The northern section comprises a field under arable cultivation (7.5 ha) and an area of improved grassland (1.08 ha). The expected invertebrate assemblage here is likely to be extremely limited and very unlikely to contain any species of high conservation value.
- 3.5.3 The southern section (c. 11.2 ha) is a uniform area of semi-improved grassland bordered by hedgerows and ditches to the north and east. The high fertility of the grassland suggests a history of recent cultivation and examination of Google Earth imagery confirms that this was the case as recently as 2013. The lack of structural variation within the grassland, combined with its low floristic diversity, predicts a species-poor invertebrate assemblage dominated by those with more generalist ecological requirements, which are usually of lower conservation value.

- 3.5.4 The hedgerows consist mainly of hawthorn and a narrow zone of bramble. Some of the hawthorns are becoming mature and these provide a large number of potential niches for invertebrates. The ditches are steep-sided and lacking in marginal vegetation with the exception of some common reed. They are likely to be subject to considerable fertiliser run-off and to support an impoverished invertebrate fauna.

Zone C

- 3.5.5 This area is proposed as a potential access corridor for the site under discussion. It currently presents as fields under arable cultivation, again oilseed rape, with an access track along the northern boundary. The expected invertebrate assemblage here is likely to be extremely limited and very unlikely to contain any species of high conservation value.

3.6 Amphibian survey

RPS survey

- 3.6.1 The pond east of Zone F2 returned a negative result for GCN.
- 3.6.2 The Zone A ditches returned an 'inconclusive' result due to sample degradation but given that a negative result was obtained for these ditches in 2017 it is considered appropriate to conclude that GCN are absent.

RWE survey

- 3.6.3 The RWE survey concluded absence of GCN in the ditch network including boundary ditches of Zone A and ditches crossing Zones C and D.
- 3.6.4 A low population of GCN was identified in a network of nine ponds in Low Street Pit LWS, adjacent to Zone D. A moderate population was identified in a separate pond further south of Low Street Pit LWS.

3.7 Reptile survey

2018 survey

- 3.7.1 The location of the reptile sheets is shown in Figure 3.6. Reptile sightings (combined totals of juveniles and adults) on each survey visit are presented in Table 3.10 and the maximum counts for each species per zone are presented in Table 3.11. Results split into separate tables for adults and juveniles are provided in Annex C.

- 3.7.2 For surveys in 2018, across the whole survey area, a peak count of eight adders was recorded on the first (17/5/18) and fifth visit (1/6/18). A peak count of four grass snakes was recorded on the first visit (17/5/18). A peak count of seven common lizards was recorded on the third visit (22/5/18) and a peak count of 55 slow-worms was recorded on the fifth visit (1/6/18).
- 3.7.3 Slow-worm and adder were recorded on all seven survey visits. Grass snake was recorded on six out of seven visits and common lizard was recorded on five out of seven visits.
- 3.7.4 Zones A, C, and Z, south of the railway line, all supported an assemblage of four species (adder, common lizard, grass snake and slow-worm). Zones Y and X north of the railway line had an assemblage of grass snake and slow-worm, and Zone W had an assemblage of common lizard and slow-worm.
- 3.7.5 Zone A had the highest maximum counts of all four species (Table 3.11) although Zone Z also had the same maximum count for grass snake.

2019 survey

- 3.7.6 A reptile survey of grassland north of the sea wall in Zone G was undertaken by Cherryfield Ecology (Volume 6, Appendix 9.2: Third Party Survey Reports). This survey found populations of common lizard and slow-worm, with a maximum count of 12 and 2 respectively.

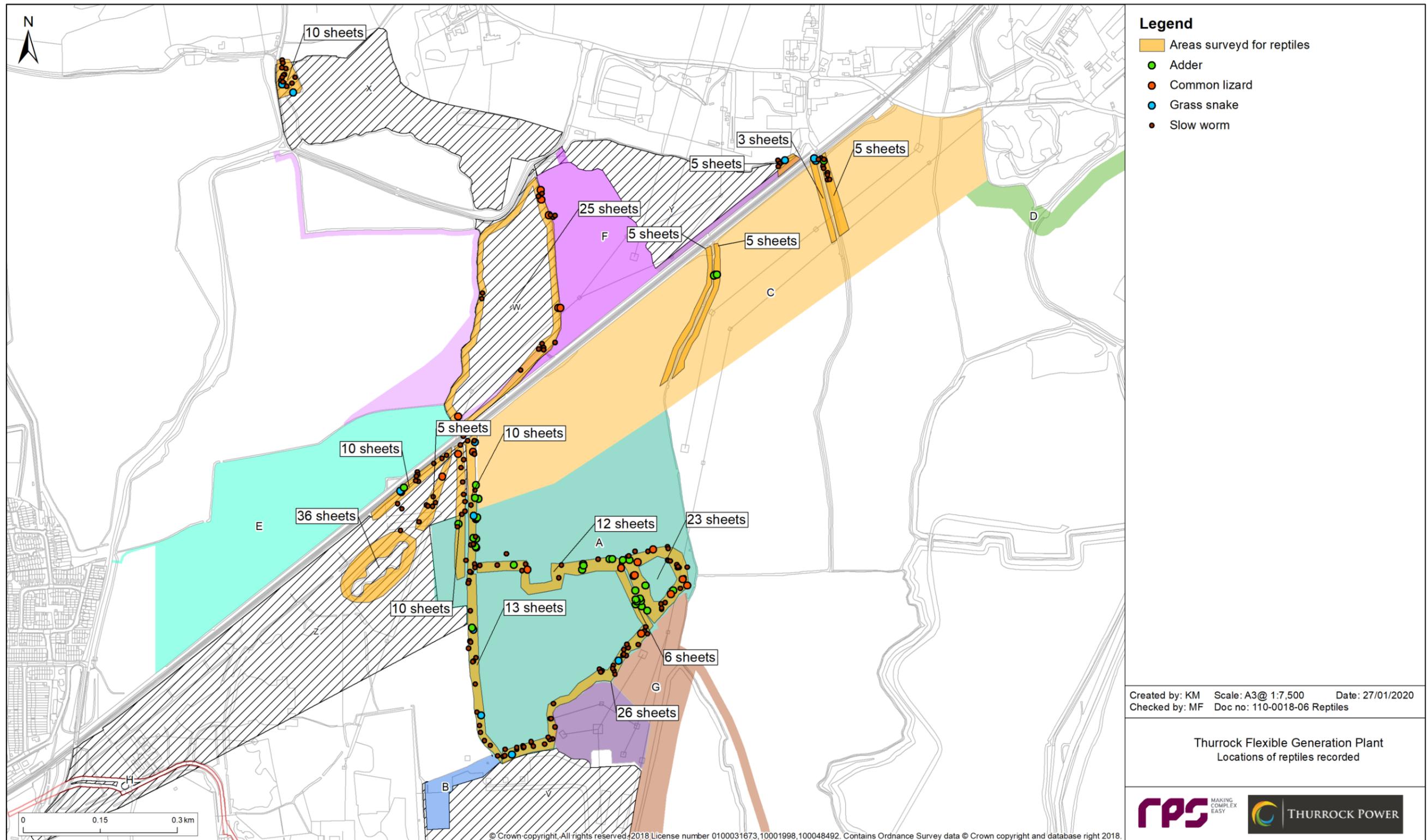


Figure 3.6: Locations of reptiles recorded.

Table 3.10: Reptile survey results Zones A-I.

Visit	Reptile counts																														
	Zone A				Zone C				Zone W				Zone X				Zone F				Zone Z				Whole survey area						
	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S
1	7		7		1				1	1	1			1	1						1	2	3		10	4	12				
2	3		18	1			2		1		1	3		1									3		4	1	24	4			
3	5	1	10	1					1			1			1					1	1		3	2	7	1	14	5			
4	2	1	18	2	3		2				7	5			7				5				3		5	1	42	7			
5	6	1	27	2		1	2	2	1		5				9			1	4		1		8		8	3	55	4			
6	4	1	24		2	1	7			1	5				1				2				6		6	3	45				
7	2		6	4	1		4				2				6				1				6		3		25	4			

A: Adder; G: Grass Snake; S: Slow-worm; C: Common Lizard

Table 3.11: Maximum reptile counts by Zone.

Species	Maximum count													
	Whole site		Zone A		Zone C		Zone F		Zone X		Zone W		Zone Z	
	Max. count	Visit no. ¹	Max. count	Visit no.										
Adder	8	1, 5	7	1, 5	2	6							1	1, 3, 5
Grass Snake	4	1	2	6	1	1, 5, 6	1	5	1	1, 2			2	1
Slow-worm	55	5	27	5	8	7	5	4	9	5	4	4, 6	9	5
Common Lizard	7	4	4	7	2	5	1	3			5	4	2	3

¹: Visit number is the survey visit when the maximum count was recorded

3.8 Breeding bird survey

3.8.1 A total of 49 species were recorded during the surveys of breeding birds within the survey area between April and June (2018 and 2019). Of these species, 28 were confirmed to be breeding and 15 species were considered to be probably / possibly breeding, resulting in a breeding bird assemblage of 43 species. Records relating to the remaining six species were considered to be of non-breeding individuals.

3.8.2 A summary of the breeding and conservation status of the 43 species recorded during the course of the survey, with the numbers of territories identified (or estimated in the case of probable and possible records) is provided in Table 3.12. The location of breeding birds, where recorded within the proposed development area in 2018, has also been included. The 2019 survey did not add species to the 2018 survey result but did record slight variations in territory distributions. The key species and territories are shown on Figure 3.12 and described in the species accounts.

Table 3.12: Breeding status of species recorded during the breeding bird survey at Tilbury, April-June 2018.

Species	Breeding status	Breeding territories in each Zone										
		Total	A	C	D	E	F	V	W	X	Y	Z
Blackbird	C	35	4	2	8		3		1	3	4	10
Blackcap	C	8			1		1			2	2	2
Blue Tit	C	14			3		1		1	4	1	4
Buzzard	NB											
Carrion Crow	Po											
Chiffchaff	C	5										5
Collared Dove	Pr	4			2							2
Chaffinch	C	17	1	1	4		2	1	1	2	2	3
Cuckoo	C	4	1				1					2
Coot	C	2										2
Coal Tit	Po											
Cetti's Warbler*	C	5	1			1						3
Dunnock	C	20	1	2	2		3		2	3	1	6
Green Woodpecker	Po	2									1	1

Species	Breeding status	Breeding territories in each Zone										
		Total	A	C	D	E	F	V	W	X	Y	Z
Goldfinch	C	12	1	3	1		1				1	5
Greenfinch	C	6	1		1							4
Great Spotted Woodpecker	Po	2		1							1	
Great Tit	C	10	1	1	3					1	1	3
House Martin	NB	1								1		
House Sparrow	C	15		1	7					1		6
Kestrel	Pr	1		1								
Red Kite	NB	2								2		
Linnet	Pr	11	2							1	1	5
Long-tailed Tit	C	8			2		1			2		3
Lesser Whitethroat	Pr	2										2
Mistle Thrush	Pr	1								1		
Mallard	C	3	1							1	1	
Magpie	C	8	1		1		1			2		3
Moorhen	C	2	1									1
Meadow Pipit	Po	1								1		
Marsh Harrier	NB											
Pheasant	Po											
Pied Wagtail	Po	1								1		
Robin	C	21			9		2			1	3	6
Reed Bunting	C	2		1			1					
Raven	C	1							1			
Reed Warbler	C	7	3	1			1			1		1
Skylark	C	5		1			1	1		1	1	

Species	Breeding status	Breeding territories in each Zone										
		Total	A	C	D	E	F	V	W	X	Y	Z
Stock Dove	Po	3								2	1	
Starling	C	4			1		1			2		
Swift	NB											
Swallow	NB	1								1		
Song Thrush	Pr	3	1	1						1		
Sedge Warbler	C	10	4	3					1	1	1	
Whitethroat	C	48	9	5	1		7	1	3	6	3	13
Woodpigeon	C	11	1	1	1					3		5
Wren	C	33	2	2	7		2	1	1	4	4	10
Yellowhammer	Pr	5	1	2			1					1
Yellow Wagtail	C	1			1							

C: Confirmed as breeding; **Pr:** Probably breeding; **Po:** Possibly breeding; **NB:** Non-breeding

3.8.3 A total of 28 species were confirmed as breeding within the survey area in 2018.

3.8.4 There were 15 species considered to be probably / possibly breeding within the survey area in 2018. Registrations for these species were not wholly indicative of behaviour that could allow confirmation of breeding on site.

3.8.5 One confirmed breeding species, Cetti's warbler, is listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), was recorded during the surveys in both 2018 and 2019. Two other Schedule 1 species, red kite and marsh harrier, were recorded but confirmed not to be breeding on site.

3.8.6 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 BoCC Red List and six species are included on the BoCC Amber List. These species and their relevant statutory protection or list of conservation importance are shown in Table 3.13.

Table 3.13: Conservation status of confirmed breeding species recorded during the breeding bird survey at Tilbury, April-June 2018.

Species	Conservation Status				
	UK BAP priority species	Species of Principal Importance	LBAP	Birds of Conservation Concern	Wildlife and Countryside act Schedule 1
Cuckoo	•	•		Red	
Cetti's Warbler					•
Dunnock	•	•		Amber	
House Martin				Amber	
House Sparrow	•	•		Red	
Kestrel				Amber	
Linnet	•	•		Red	
Mistle Thrush				Red	
Mallard				Amber	
Meadow Pipit				Amber	
Reed Bunting	•	•		Amber	
Skylark	•	•	•	Red	
Stock Dove				Amber	
Starling	•	•		Red	
Swift				Amber	
Song Thrush	•	•	•	Red	
Yellowhammer	•	•		Red	
Yellow wagtail	•	•		Red	

3.8.7 The locations of territories of species confirmed as breeding on site and listed as Schedule 1, UKBAP, NERC or BoCC Red or Amber List species are shown in Figure 3.7 to Figure 3.12.

Species accounts

3.8.8 The following species accounts relate to those species confirmed as breeding within the survey area in 2018 that are listed on Schedule 1 of the Wildlife & Countryside Act 1981, as a NERC Species of Principal Importance, the Birds of Conservation Concern Red List or as a UK BAP Priority Species. Therefore, these species are regarded as being of high conservation importance. Where the data are available, the number of territories recorded during survey is compared to the species regional and national status. National and regional status is derived from the reports of the Rare Breeding Birds Panel, where appropriate (Holling *et al.*, 2012).

3.8.9 Any breeding population identified within the survey area is considered to be of national importance if it exceeded 1% of the national population. No breeding population of any species within the survey area approaches the 1% level of the national population.

Specially protected species

3.8.10 Five Cetti's warbler confirmed territories were recorded on site in 2018 and six in 2019. Cetti's warbler is fully protected under Schedule 1 of the Wildlife and Countryside Act 1981. The species is also considered to be a locally common and increasing breeding resident (Smith, 2013).

3.8.11 The survey area is not considered suitable to support a breeding population of any specially protected bird species for which records were sourced as part of the desk top study (RPS, 2018) but which were not recorded during the surveys.

Other Species of Conservation Concern

3.8.12 Ten of the species recorded as breeding or probably breeding within the survey area in 2018/19 (cuckoo, dunnock, house sparrow, linnet, reed bunting, skylark, starling, song thrush, yellowhammer, yellow wagtail) are listed as priority species on the UKBAP.

3.8.13 Nine of the species recorded as breeding or probably breeding within the survey area in 2018/19 (dunnock, house sparrow, linnet, reed bunting, skylark, starling, song thrush, yellowhammer, yellow wagtail) are listed in Section 41 of the NERC Act 2006 as being of principal importance for the conservation of biodiversity in England.

3.8.14 Nine of the species recorded as breeding or probably/possibly breeding (cuckoo, house sparrow, linnet, mistle thrush, skylark, starling, song thrush, yellowhammer, yellow wagtail) are included on the BoCC Red List.

3.8.15 Six of the species recorded as breeding or probably/possibly breeding (dunnock, kestrel, mallard, meadow pipit, reed bunting, stock dove) are included on the BoCC Amber List. Reasons for Amber list status are given below:

Breeding assemblage

3.8.16 The number of species recorded in an area is a simple measure of diversity that can indicate its importance at each season of the year. Fuller (1980) gives the following breeding diversity criteria which are presented in Table 3.14.

Table 3.14: Breeding bird assemblage diversity criteria.

National	Regional	County	Local
85+	0-84	50-69	25-49

3.8.17 Based on Fuller's criteria, the breeding bird assemblage of the survey area in 2018 (43) is of higher local importance. However, it should be noted that Fuller's analysis was developed in the 1970's. Since then species diversity has declined significantly (Eaton *et al.*, 2015). As a result, Fuller's thresholds are too high for today's breeding bird populations. It is considered that the breeding bird assemblage across the whole survey area is of district importance.

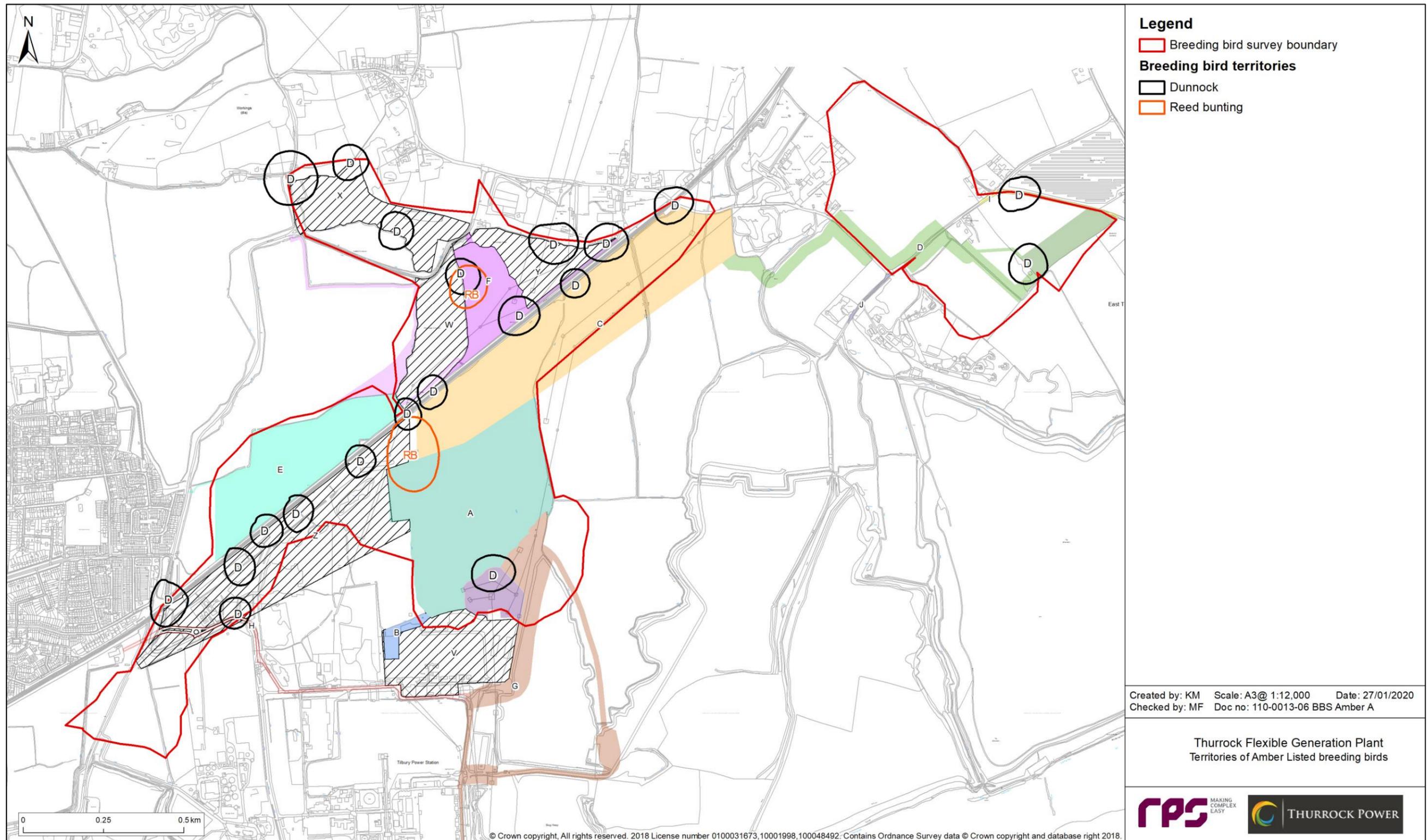


Figure 3.7: Territories of amber listed breeding birds.

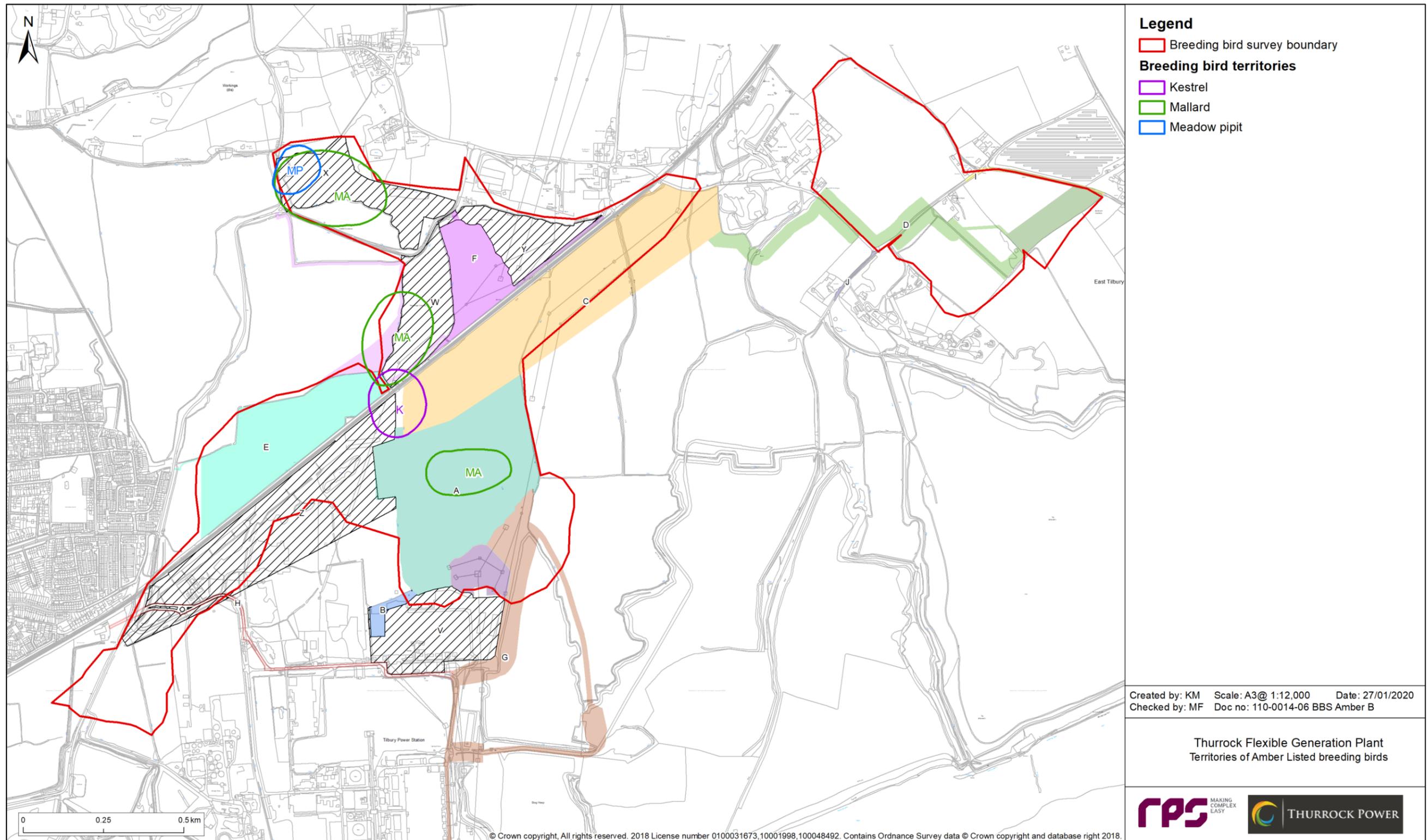


Figure 3.8: Territories of amber listed breeding birds.

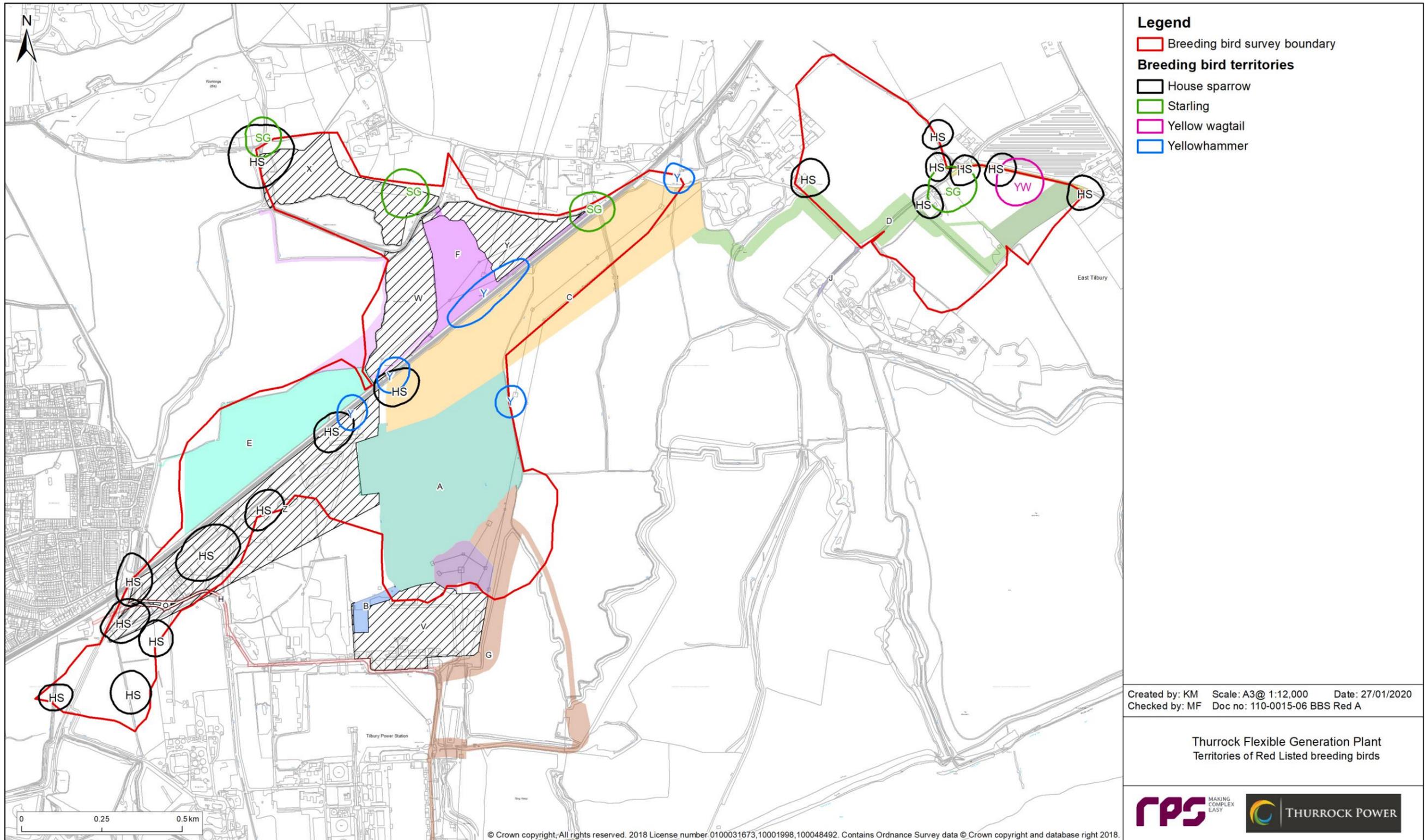


Figure 3.9: Territories of red listed breeding birds.

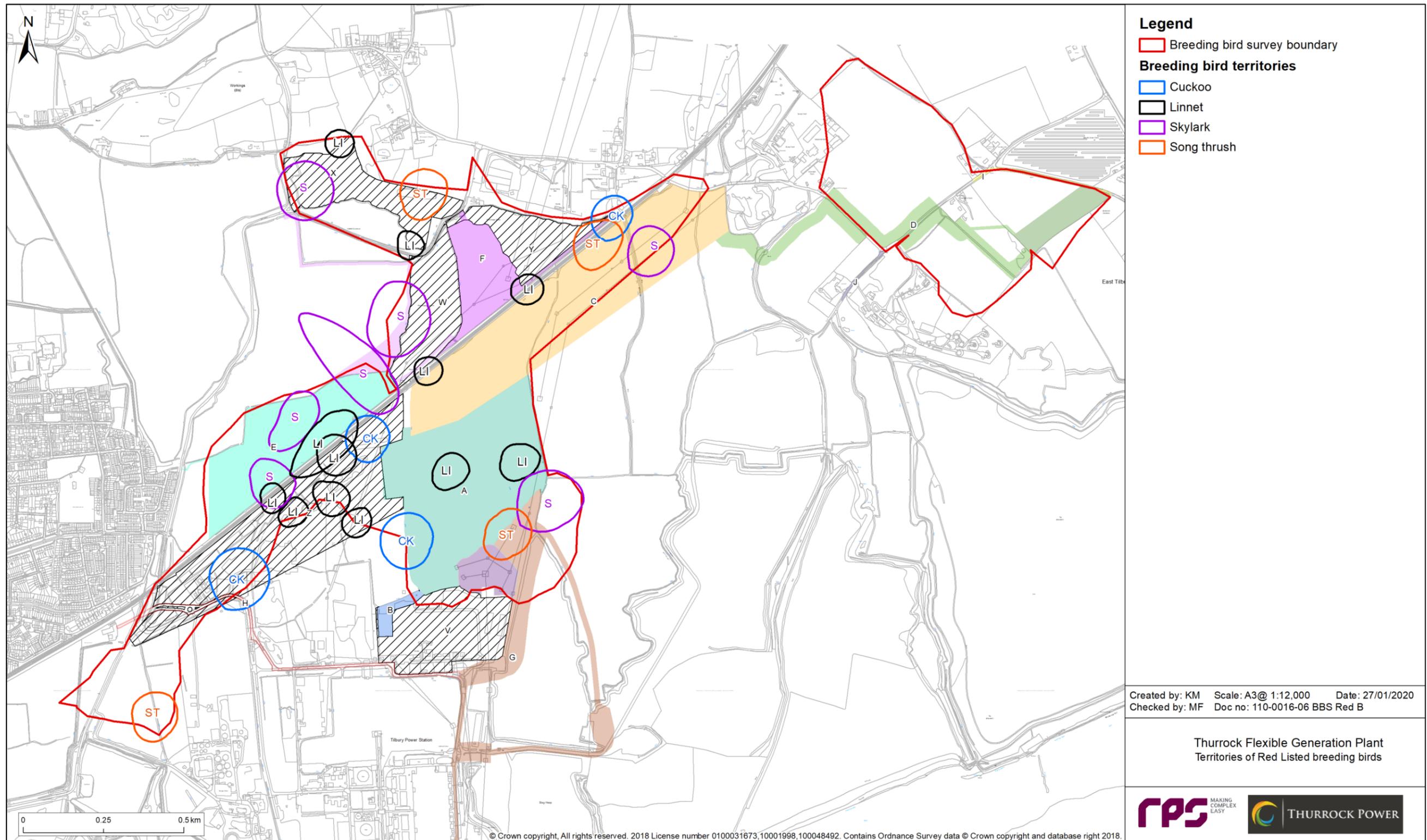


Figure 3.10: Territories of red listed breeding birds.

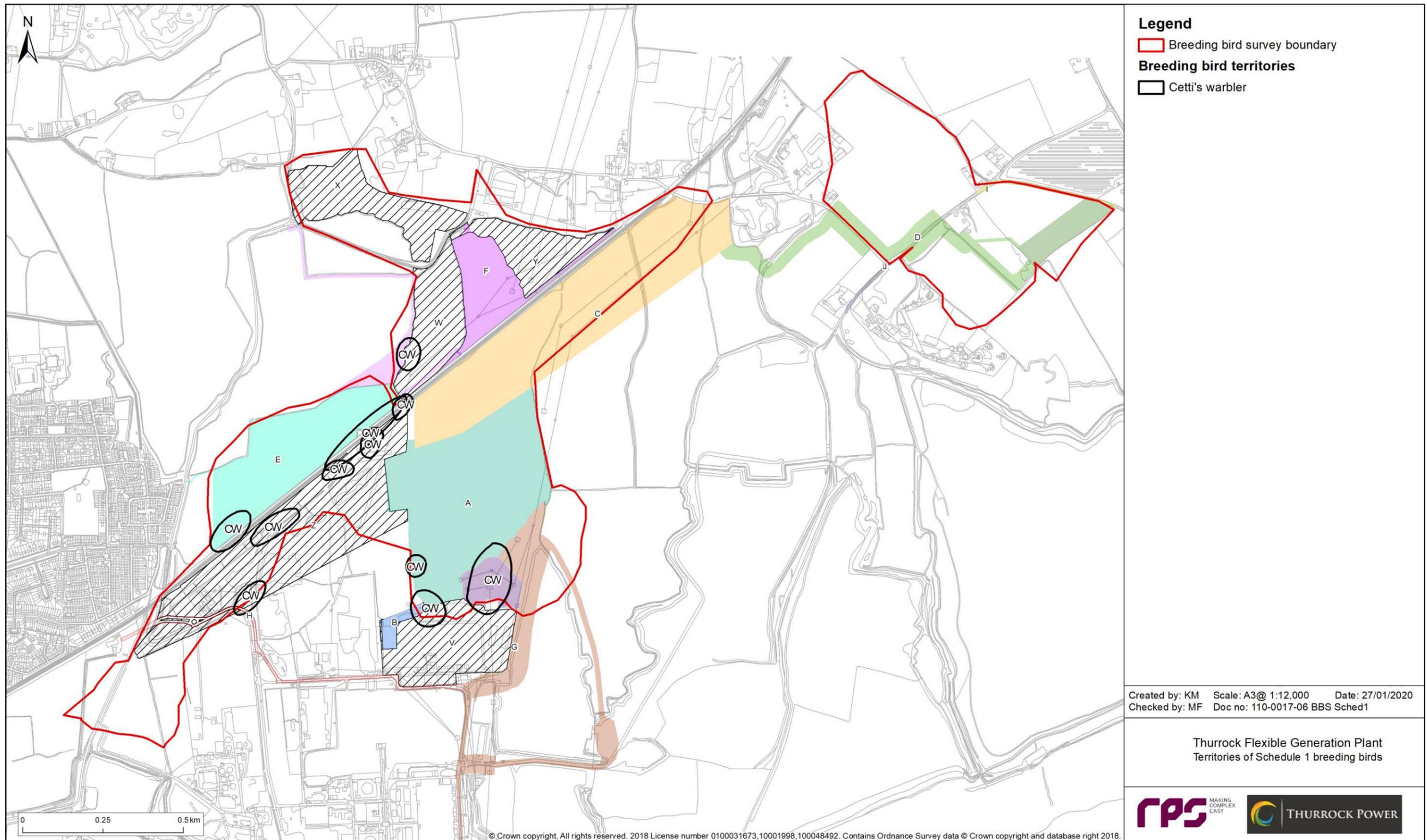


Figure 3.11: Territories of schedule 1 breeding birds in 2018.

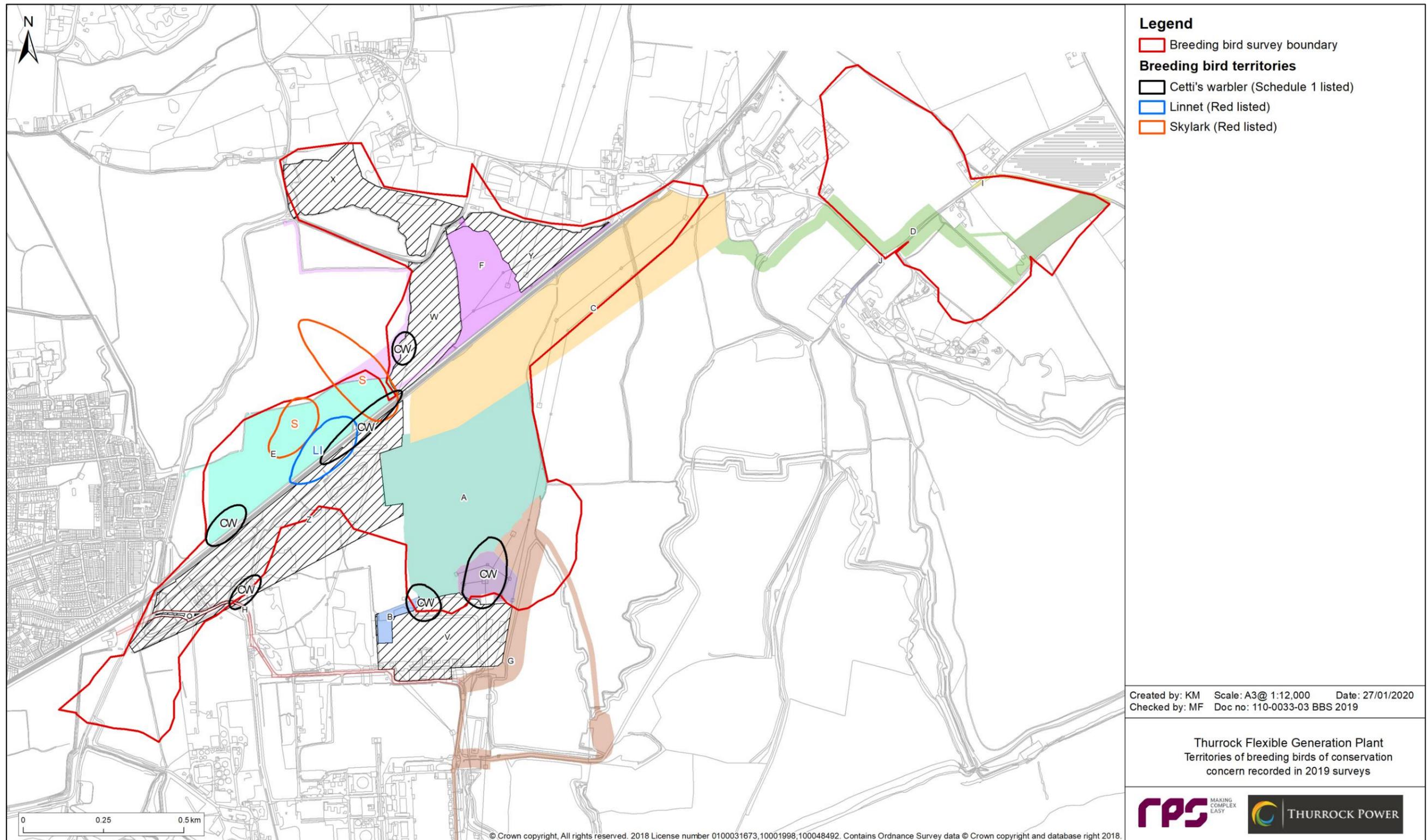


Figure 3.12: Territories of red and schedule 1 listed breeding birds recorded during 2019 surveys.

3.9 Wintering birds

Terrestrial winter bird survey

- 3.9.1 A total of 54 species of birds were recorded in the survey area over the course of the bird survey. A summary of the data is provided in Table 3.15. Of these species, 26 were of conservation interest. A summary of these species is provided in Table 3.16
- 3.9.2 No wildfowl or wader species associated with the SPA were recorded during the wintering bird surveys.

Table 3.15: Terrestrial wintering bird survey summary.

Species	26/09/18	27/09/18	11/10/18	22/10/18	07/11/18	26/11/18	06/12/18	18/12/18	03/01/19	18/01/19	05/02/19	18/02/19	05/03/19	22/03/19	Peak count	Date of peak
Blackbird			1	1		4	5	5	5	8	11	9	4	5	11	05/02/19
Bullfinch		1													1	27/09/18
Black-headed gull	7	16	9							1	19	2	1	25	25	22/03/19
Blue tit			1	3		2	6	2	7	11	6	8	2	8	11	18/01/19
Buzzard	6	2	4	2	1	3	1	3		2			5		6	26/09/18
Carrion crow	75	25	7	16	11	11	9	8	16	12	19	13	11	8	75	26/09/18
Chiffchaff		2		1											2	27/09/18
Collared dove	15								2		5	2	1	2	15	26/09/18
Chaffinch				3	1		1	1	4	1	8	2	5	6	8	05/02/19
Common gull	43	45									4				45	27/09/18
Coot		1													1	27/09/18
Cetti's warbler		1		1					1			1	2		2	05/03/19
Duncock				5				1	3	3	1	9	3	5	9	18/02/19
Feral pigeon	27	28	266												266	11/10/18
Fieldfare						101	93		19	112			4		112	18/01/19
Green woodpecker		1				1							1		1	27/09/18
Goldcrest												1			1	18/02/19
Green sandpiper								1	1						1	18/12/18
Grey wagtail						1						1			1	26/11/18
Goldfinch			2	1		46	8	1	4	12	7	26	4	4	46	26/11/18
Greenfinch		2				2	1	1		1				1	2	27/09/18
Great spotted woodpecker	2	2	1						1		1	2			2	26/09/18
Great tit				2			1	4		7	2	2	8	3	8	05/03/19
Herring gull	1	7							2						7	27/09/18
House martin	23														23	26/09/18
House sparrow	38	8	2	16		6		1	12	20	32	37	11	26	38	26/09/18
Hobby	4														4	26/09/18
Jackdaw	2	4	1	2											4	27/09/18
Kestrel	2	2	2			5	2		1		1	1		1	5	26/11/18
Lesser black-backed gull		11												1	11	27/09/18
Linnet	4	21										11			21	27/09/18
Long-tailed tit		11		2		2	4						4		11	27/09/18
Mistle thrush							1			1					1	06/12/18
Magpie	26	21	16	12	19	51	22	26	33	42	42	37	17	12	51	26/11/18

Species	26/09/18	27/09/18	11/10/18	22/10/18	07/11/18	26/11/18	06/12/18	18/12/18	03/01/19	18/01/19	05/02/19	18/02/19	05/03/19	22/03/19	Peak count	Date of peak
Moorhen				2			1		1	5	2		1		5	18/01/19
Merlin					1										1	18/12/18
Meadow pipit			1				1	1	1	13		1			13	18/01/19
Peregrine			1												1	11/10/18
Pied wagtail			1	1								1		1	1	11/10/18
Robin			3	5	1	5	1	2	7	10	7	15	5	8	15	18/02/19
Reed bunting				4		4	1	2	2	4		1	1		4	22/10/18
Redwing						3		1	24	17	18	11			24	03/01/19
Red-legged partridge													1		1	05/03/19
Raven			2				1								2	11/10/18
Skylark			8	7	1				3	1	7	14	3	8	14	18/02/19
Stonechat			2	3		2	1		2	2					3	22/10/18
Stock dove			563	21	9									8	563	11/10/18
Starling		43	30	96	70	51	19	18		41	1	2	41	28	96	22/10/18
Sparrowhawk			1					1			1				1	11/10/18
Swallow	56	5													56	26/09/18
Song thrush	1					2	2	1	9	6	3	6	3	1	9	03/01/19
Woodpigeon	180	97	826	11	3	97	22	40	30	255	397	264	137	161	826	11/10/18
Wren			1	1		5	1	1	2	5	3	8	4	11	11	22/03/19
Yellowhammer			1	4										4	4	22/10/18

Table 3.16: Conservation status of birds recorded during the wintering bird survey, September 2018-March 2019.

Species	Conservation Status	
	Birds of Conservation Concern	Wildlife and Countryside act Schedule 1
Black-headed gull	Amber	
Bullfinch	Amber	
Cetti's warbler		•
Common gull	Amber	
Duncock	Amber	
Fieldfare	Red	•
Green sandpiper	Amber	•
Grey wagtail	Red	
Herring gull	Red	
Hobby		•
House martin	Amber	
House sparrow	Red	
Kestrel	Amber	
Lesser black-backed gull	Amber	
Linnet	Red	
Meadow pipit	Amber	
Merlin	Red	•
Mistle thrush	Red	
Peregrine		•
Redwing	Red	•
Reed bunting	Amber	
Skylark	Red	
Song thrush	Red	
Starling	Red	
Stock dove	Amber	
Yellowhammer	Red	

Intertidal wintering birds survey – analysis of third-party data

- 3.9.3 There have been wintering bird surveys on the site since 2007 when RPS conducted intertidal and terrestrial waterfowl surveys. During these surveys 22 species of waterfowl were recorded between November-December 2007 with the highest densities in the Eastern half of the survey area, some distance from the Thurrock Flexible Generation Plant project area).
- 3.9.4 In 2017/18 surveys were conducted on behalf of RWE Generation UK plc and by Bioscan.
- 3.9.5 RWE generation UK plc conducted surveys between 11 October 2017 – 28 April 2018, with additional surveys undertaken in September 2018 (Volume 6, Appendix 9.2: Third Party Survey Reports). A summary of the maximum counts of winter birds recorded during the RWE surveys is provided in Table 3.18, and the locations of the survey boundaries referred to in Table 3.18 are shown on Figure 3.13
- 3.9.6 Wintering bird surveys were also carried out by Bioscan for the Tilbury2 development (Bioscan, 2018), on the intertidal area between Tilbury Cruise Terminal (grid reference TQ 64516 75191) to a ditch outfall (TQ 6785275750) approximately 1.1km south-west of Coalhouse Point (known in this report as the Bioscan survey area). The survey encompasses a 3.4 km stretch of coastline. Figure 3.13 shows the extent of these survey areas. Table 3.17 shows the data from the Bioscan report.
- 3.9.7 The wintering bird surveys of the intertidal areas around Tilbury by RPS, RWE Generation UK plc and Bioscan all show broadly consistent results. Higher aggregations of waders and wildfowl are recorded outside and to the east of the survey area, and outside of the likely area of influence for the construction of the causeway.
- 3.9.8 A review of intertidal data carried out by Bioscan and incorporated into the revised HRAR for Tilbury2 (Bioscan, 2018), submitted during the Tilbury2 Examination, concluded that multiple surveys indicated sporadic to occasional use by low numbers of SPA species between London International Cruise Terminal and Coalhouse Point, with numbers generally lower at the west end of the survey area closest to the proposed causeway.

Table 3.17. Summary of peak winter bird counts from Bioscan surveys 2016-2017

Species	Peak Count	Section (Figure 3.13) where peak count was recorded	% of total found in peak section
Avocet	12	IT4	91

Species	Peak Count	Section (Figure 3.13) where peak count was recorded	% of total found in peak section
Black Headed Gull	473	IT7	14.8
Common Sandpiper	1	IT6	100
Cormorant	1	IT5/7	100
Curlew	32	IT8	87.55
Dunlin	58	IT1	66.7
Gadwall	54	IT4	42.6
Grey Heron	2	IT8	50
Grey Plover	8	IT8	100
Herring Gull	2	IT5	50
Lapwing	13	IT2	100
Lesser-black backed Gull	1	IT1	100
Little Gull	1	IT6	100
Mallard	134	IT5	53.7
Mute Swan	4	IT1	75
Oystercatcher	3	IT1	75
Redshank	21	IT5/4	33.3 (each section)
Ringed plover	5	IT8	100
Teal	138	IT4	73.2
Turnstone	8	IT2/3	50 (each section)

Table 3.18. Summary of peak winter bird counts from RWE surveys 2017-2018

Month	Section (Figure 3.13)	Avocet	Black-tailed Godwit	Curlew	Dunlin	Gadwall	Grey Plover	Lapwing	Little Egret	Little Grebe	Redshank	Ringed Plover	Shelduck	Shoveler	Teal
Oct 17	1		1										4		
	2											23	11		
	3	119	9		200		10					60	15		
Nov 17	1										1				
	2		1		87						5		2		
	3		2		216			27		16	4	3	5		
Dec 17	1							4			1		1		
	2		1		220		2			1	12		8		
	3	57	5		350		4			8	2		6		
Jan 18	1	2											4		
	2	1	1		53						6		30		
	3	50	1		1600		25	2		1	16	3	10		
Feb 18	1	8													
	2	10	50		10		2				13	5	27		
	3	3			400		30			2	16		12		
Mar 18	1	3				20							3		
	2	6	721		3						5	4	20		
	3	200	220		2000		60			1	100		16		
Apr 18	1			1	1								5		
	2										2	1	3	2	100
	3	8	1	1	17						1		1	2	
Sep 18	1										2				
	2	2	38		30		1		1		7	2	16		
	3	550	7						1		1	2	30		

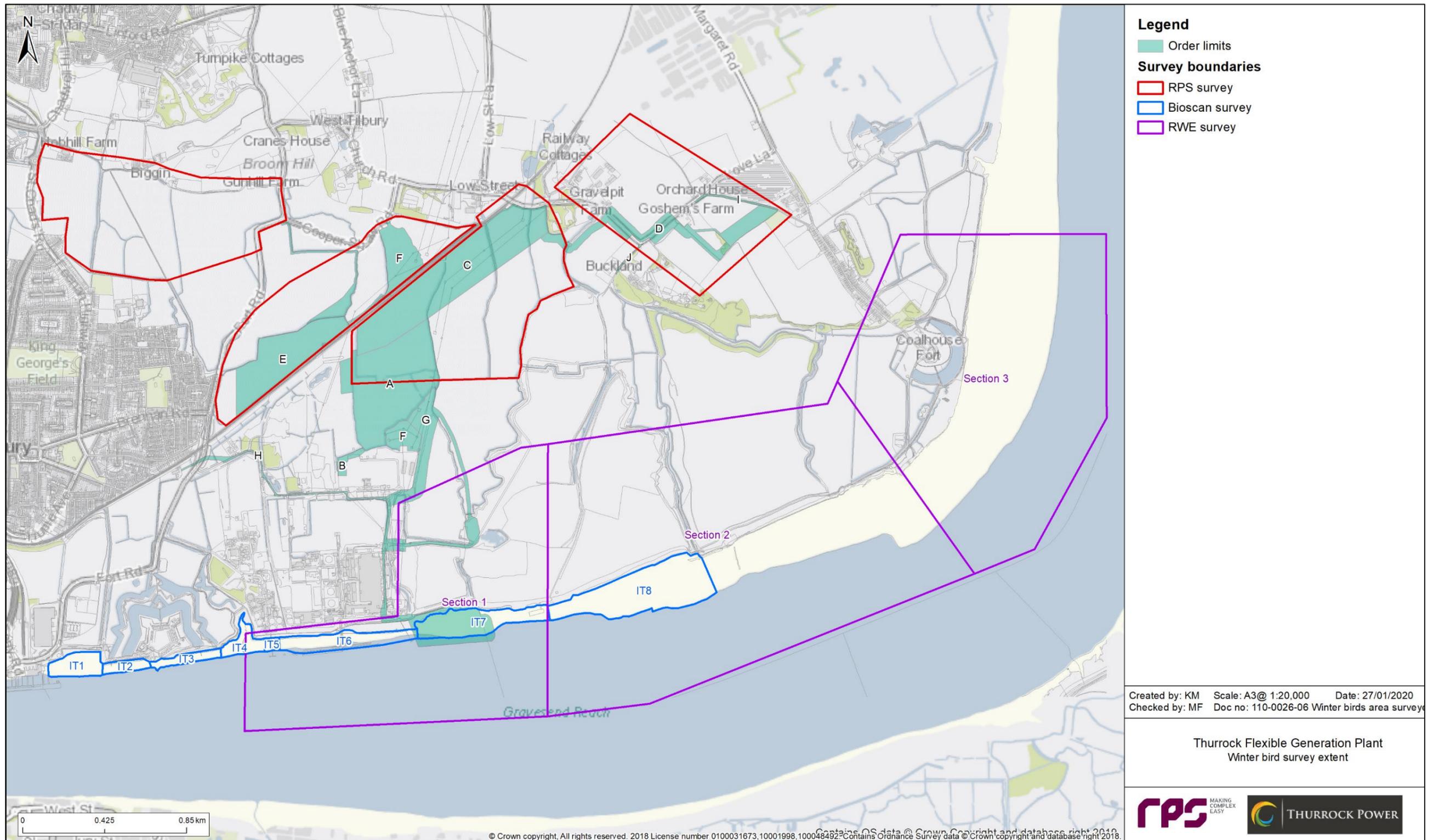


Figure 3.13: Extent of 2016/17 Bioscan and 2017/2018 RWE wintering bird survey area compartments.

3.10 Water vole and otter survey

RPS surveys

2018 survey

- 3.10.1 No signs of otters were identified during the surveys.
- 3.10.2 Water voles were recorded in seven of the 11 ditches surveyed in May. They were present in five of the ditches on or adjacent to the Main Site in Zone A, and were also present in two ditches that cross Zone C. Water voles were absent from ditches adjacent to Zone Y.
- 3.10.3 In the July survey, ditches north of the railway line were not surveyed. Of the 8 ditches south of the railway line, four were found to be dry with no water vole signs observed. Three of the ditches had signs of water voles during the July visit. In Zone A, ditch 7 had much higher numbers of water vole signs than in the May visit, and ditch 8 also had signs of water vole presence in July despite there being no signs in this ditch in May.
- 3.10.4 A summary of the results is provided in Table 3.19 and Table 3.20, and on Figure 3.14 and Figure 3.15.

Table 3.19: Water vole survey results 2018.

Ditch number	Ditch Zone	Visit 1			Visit 2		
		Burrows	Latrines	Feeding remains	Burrows	Latrines	Feeding remains
1	C	2	3	Present	Dry	Dry	Dry
2	A/C	0	1	Present	2	2	Present
3	W	3	8	Present	N/S	N/S	N/S
4	Y	0	0	Absent	N/S	N/S	N/S
5	Y	0	0	Absent	N/S	N/S	N/S
6	A/C	1	2	Present	1	0	Absent
7	A	2	0	Present	14	8	Present
8	A	0	0	Absent	14	16	Present
9	A	0	0	Absent	Dry	Dry	Dry
10	A	0	2	Absent	Dry	Dry	Dry
11	A/C	0	1	Absent	Dry	Dry	Dry

N/S: Not surveyed

Table 3.20: Water vole survey results per 100m of ditch surveyed 2018.

Ditch number	Ditch Zone	Visit 1		Visit 2	
		Latrines per 100m	Relative population density*	Latrines per 100m	Relative population density*
1	C	3	Medium	Dry	Dry
2	A/C	1	Low	0.46	Low
3	W	8	Medium	N/S	N/S
4	E	Absent		N/S	N/S
5	E	Absent		N/S	N/S
6	A/C	2	2	0	Low (burrow present)
7	A	0	Low (burrow present)	4.20	Low
8	A	Absent		12.74	Medium
9	A	Absent		Dry	Dry
10	A	2	Low	Dry	Dry

Ditch number	Ditch Zone	Visit 1		Visit 2	
		Latrines per 100m	Relative population density*	Latrines per 100m	Relative population density*
11	A/C	1	Low	Dry	Dry

N/S: Not surveyed

*Relative population density as defined in Dean *et al* (2016).

3.10.5 During the May survey, low numbers of water voles were found in ditches around and within Zone A, in a ditch west of Zone W and two ditches in Zone C. In July, water vole signs had increased considerably in central Zone A ditches 7 and 8, with Ditch 8 now supporting a medium population, and the boundary ditches of Zone A were dry.

2019 survey

3.10.6 No signs of otters were identified during the surveys.

3.10.7 Water voles were recorded in 6 of the 9 ditches surveyed in June. They were present in 4 of the ditches on or adjacent to the Main Site in Zone A

3.10.8 Sixteen of the ditches surveyed in September were dry or inaccessible due to dense bankside vegetation and scrub. Only two of the 18 surveyed ditches had signs of water voles during the September visit, one of which ran perpendicular to the eastern boundary of Zone A. All signs of water voles in this ditch appeared old and the ditch was almost dry at the time of survey.

3.10.9 A summary of the results is provided in Table 3.21 and Table 3.22, and on Figure 3.16 and Figure 3.17.

RWE survey

3.10.10 For full results refer to Volume 6, Appendix 9.2: Third Party Survey Reports. Additional results of ditches surveyed that were not covered by the RPS surveys were water vole presence recorded in a ditch adjacent to the Zone G access road option 1, south of the substation, and water vole absence in two ditches that would be crossed by the Zone G access road option 2.

Table 3.21: Water vole survey results 2019.

Ditch number	Ditch Zone	Visit 1			Visit 2		
		Burrows	Latrines	Feeding remains	Burrows	Latrines	Feeding remains
1	C	1	4	Present	Dry	Dry	Dry

Ditch number	Ditch Zone	Visit 1			Visit 2		
		Burrows	Latrines	Feeding remains	Burrows	Latrines	Feeding remains
2	A/C	4	11	Present	Dry	Dry	Dry
3	W	N/S	N/S	N/S	Dry	Dry	Dry
4	Y	N/S	N/S	N/S	Dry	Dry	Dry
5	Y	N/S	N/S	N/S	Dry	Dry	Dry
6	A/C	N/S	N/S	N/S	Dry	Dry	Dry
7	A	2	0	Present	Dry	Dry	Dry
8	A	5	1	Present	Dry	Dry	Dry
9	A	Dry	Dry	Dry	Dry	Dry	Dry
10	A	N/S	N/S	N/S	Dry	Dry	Dry
11	A/C	N/S	N/S	N/S	Dry	Dry	Dry
12	A	0	0	Present	Dry	Dry	Dry
13	A	0	2	Present	Dry	Dry	Dry
14	A	N/S	N/S	N/S	Dry	Dry	Dry
15	C	5	12	Present	Dry	Dry	Dry
16	D	Dry	Dry	Dry	Dry	Dry	Dry
17	A (Adjacent)	N/S	N/S	N/S	4	0	Present
18	E	N/S	N/S	N/S	Dry	Dry	Dry
19	E	N/S	N/S	N/S	4	12	Present

N/S: Not surveyed

Table 3.22: Water vole survey results per 100m of ditch surveyed 2019.

Ditch number	Ditch zone	Visit 1		Visit 2	
		Latrines per 100m	Relative population density*	Latrines per 100m	Relative population density*
1	C	2.63	Medium	Dry	Dry
2	A/C	4.55	Medium	Dry	Dry
3	W	N/S	N/S	Dry	Dry
4	Y	N/S	N/S	Dry	Dry
5	Y	N/S	N/S	Dry	Dry

Ditch number	Ditch zone	Visit 1		Visit 2	
		Latrines per 100m	Relative population density*	Latrines per 100m	Relative population density*
6	A/C	N/S	N/S	Dry	Dry
7	A	0	Low (burrows & feeding remains present)	Dry	Dry
8	A	0.79	Low	Dry	Dry
9	A	Dry	Dry	Dry	Dry
10	A	N/S	N/S	Dry	Dry
11	A/C	N/S	N/S	Dry	Dry
12	A	0	Low (feeding remains present)	Dry	Dry
13	A	4.03	Low	Dry	Dry
14	A	N/S	N/S	Dry	Dry
15	C	8.63	Medium	Dry	Dry
16	D	Dry	Dry	Dry	Dry
17	A (Adjacent)	N/S	N/S	0	Low (burrows & feeding remains present)
18	E	N/S	N/S	Dry	Dry
19	E	N/S	N/S	3.8	Low

N/S: Not surveyed; *Relative population density as defined in Dean et al (2016).

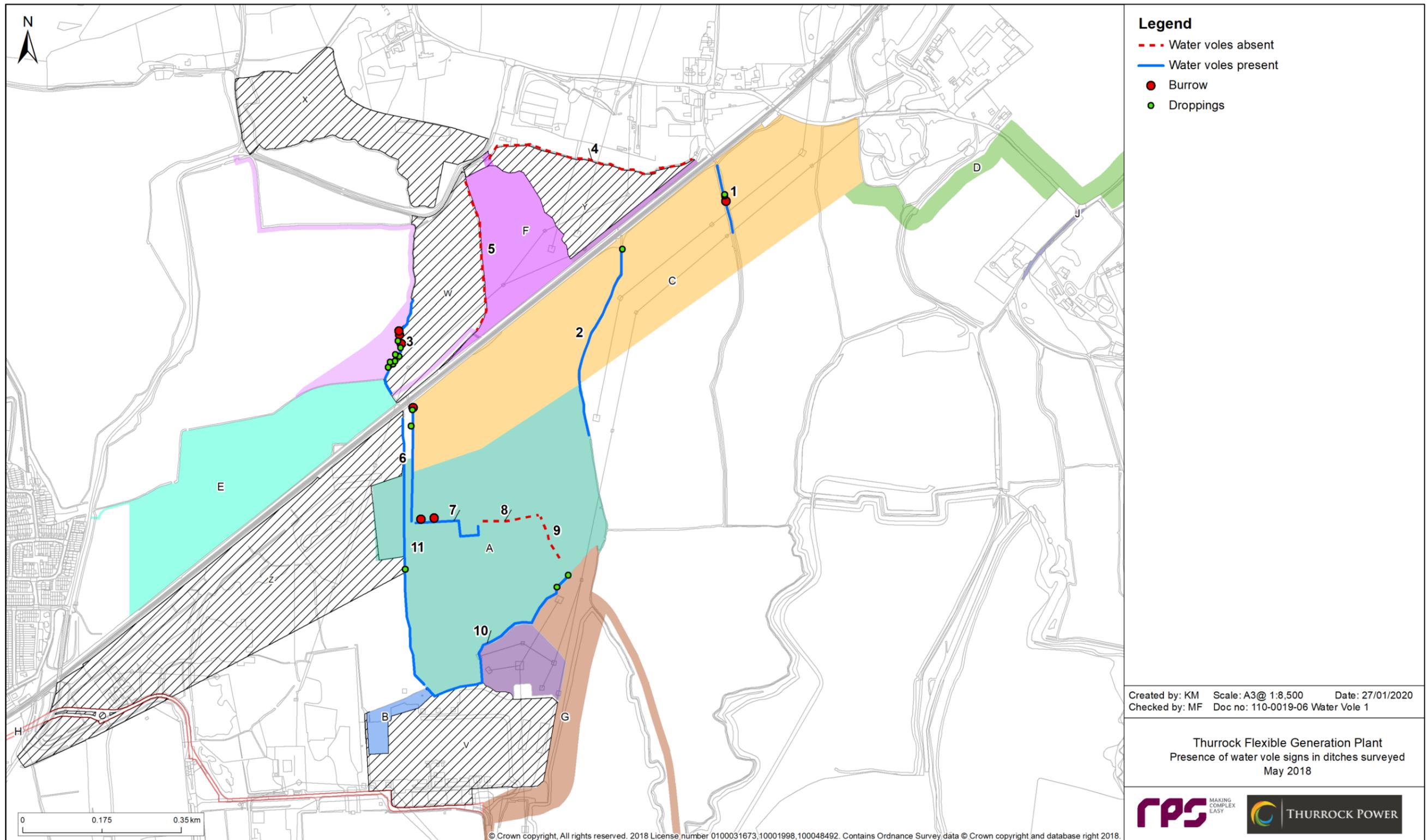


Figure 3.14: Presence of water vole signs in ditches surveyed May 2018.

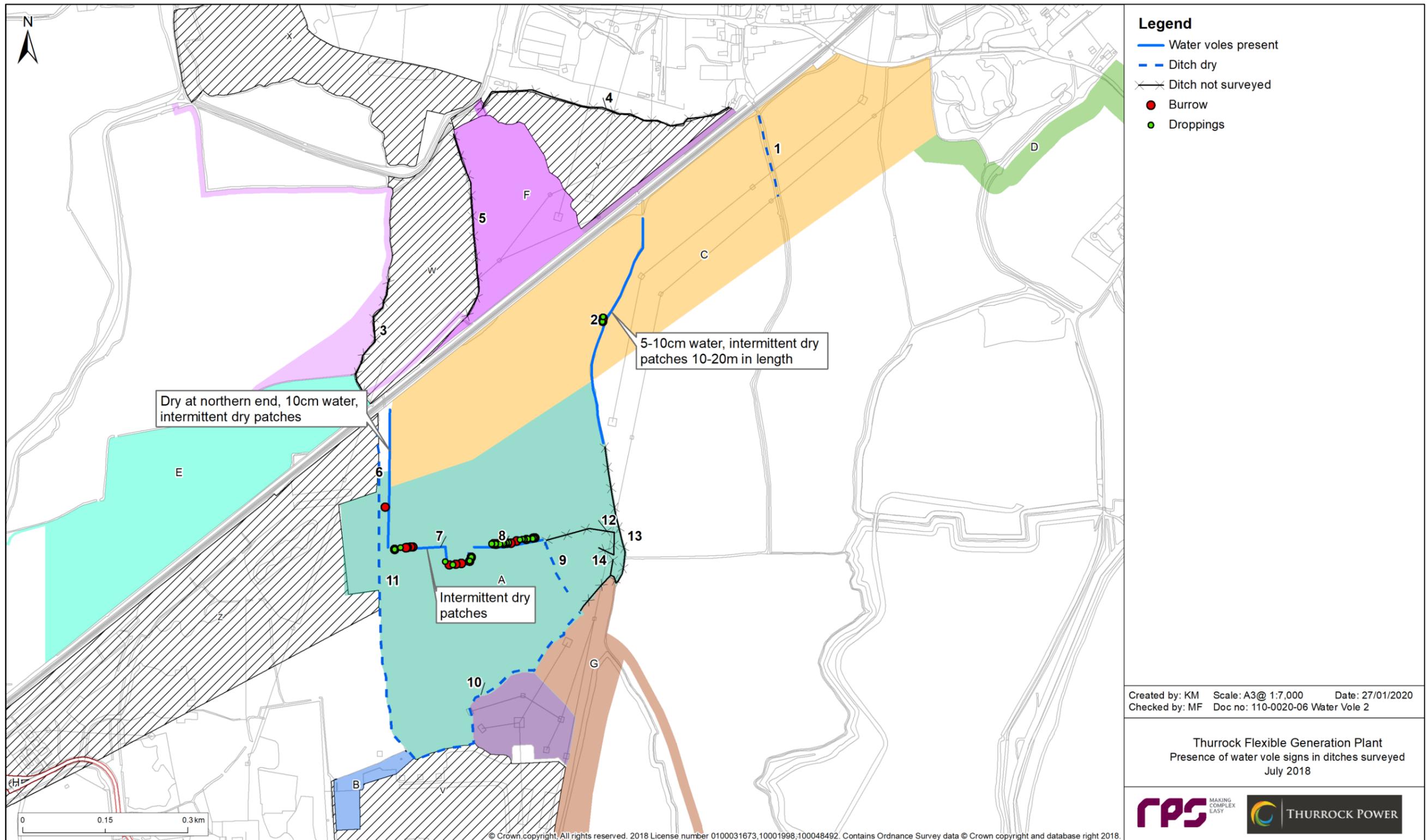


Figure 3.15: Presence of water vole signs in ditches surveyed July 2018

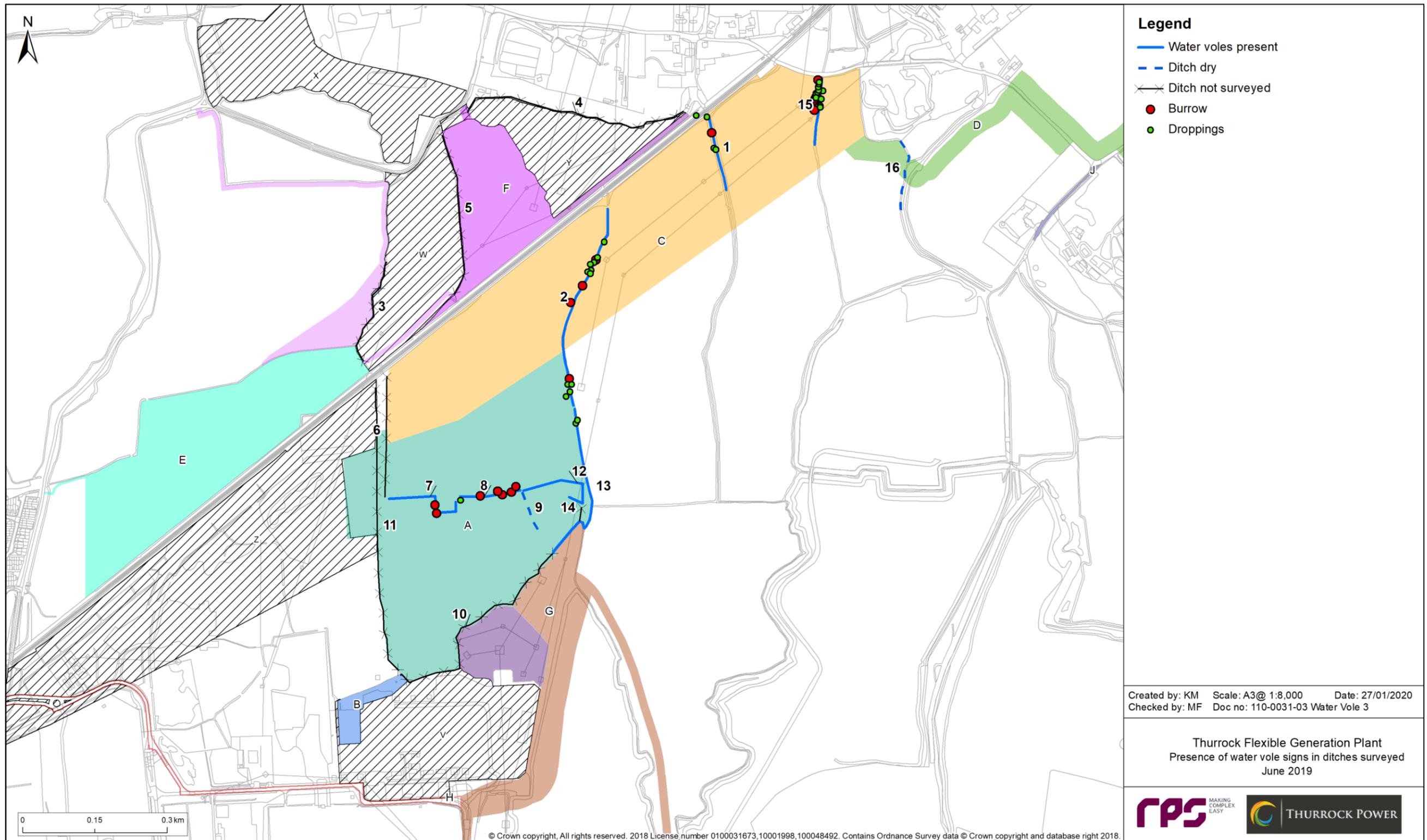


Figure 3.16: Presence of water vole signs in ditches surveyed June 2019

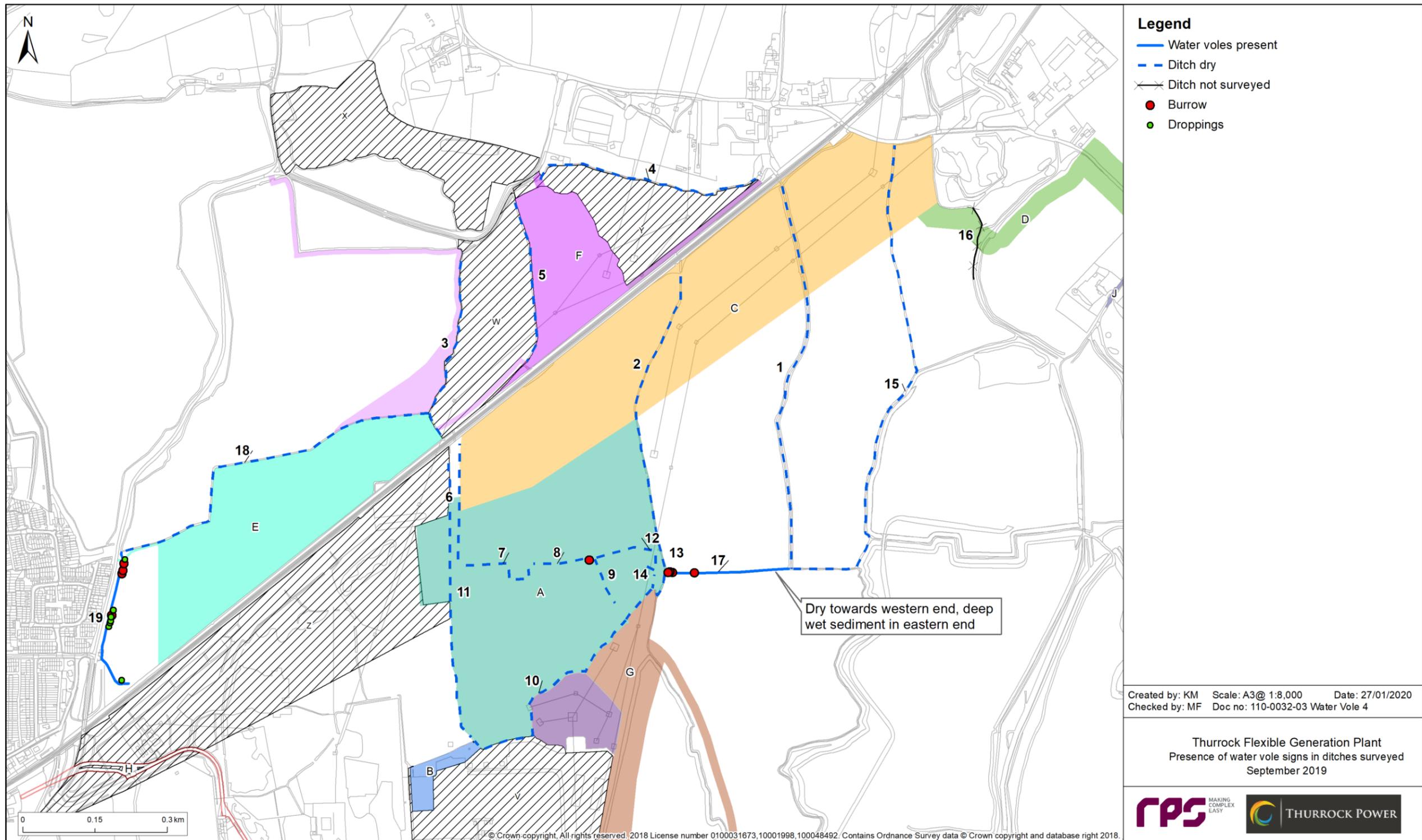


Figure 3.17: Presence of water vole signs in ditches surveyed September 2019.

3.11 Badger survey

- 3.11.1 No active badger setts were found during the survey that would be directly affected by construction in Zone A.
- 3.11.2 Badger signs across the survey area were limited. These are shown in Figure 3.18.

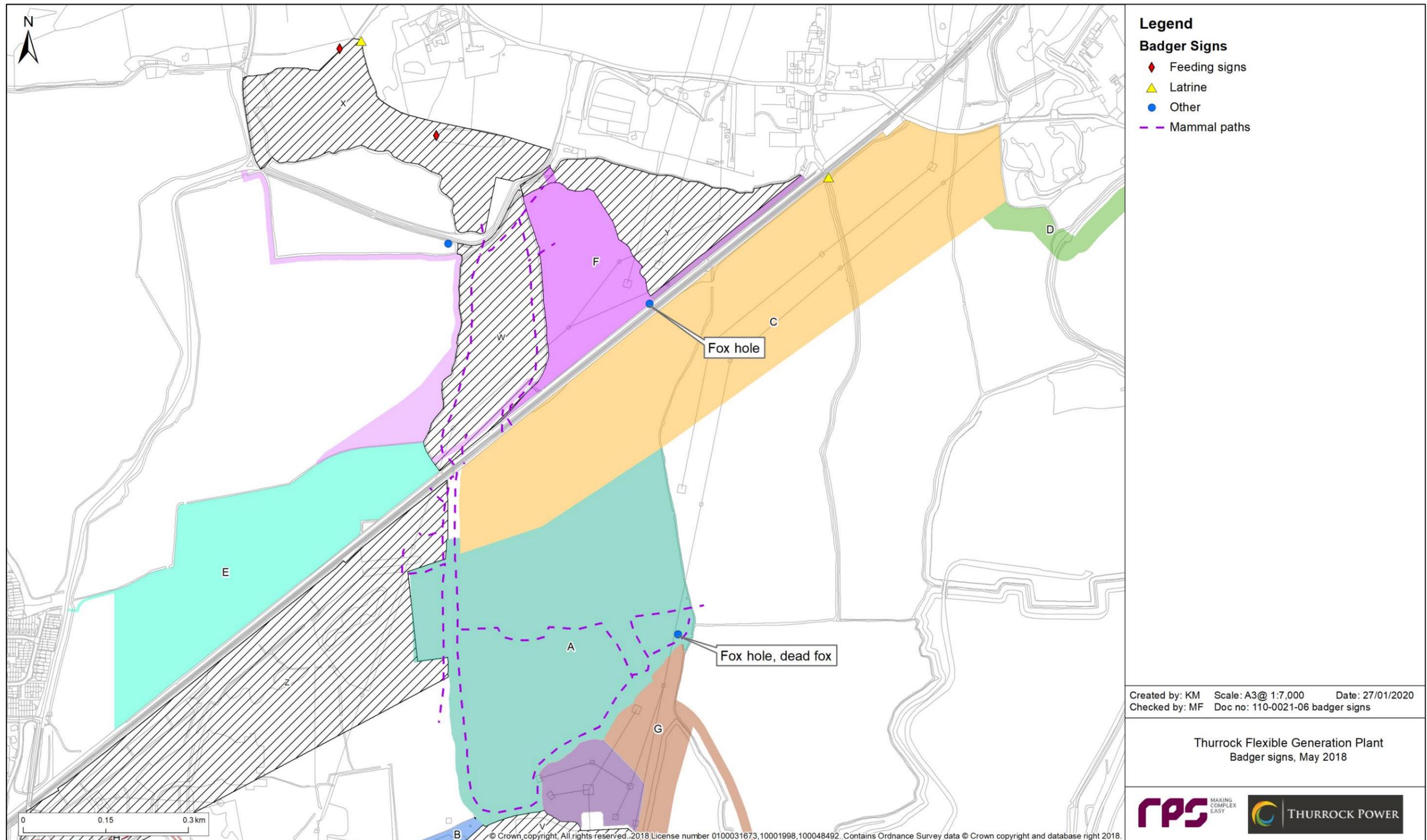


Figure 3.18: Badger signs recorded in May 2018.

4. Evaluation and summary

4.1 Designated sites

4.1.1 From the designated sites listed in Table 3.1 and Table 3.2, it is considered that the following sites are most likely to require further assessment of potential impacts during construction and operation of the Thurrock Flexible Generation Plant:

- Thames Estuary & Marshes SPA / Ramsar site;
- Mucking Flats & Marshes SSSI;
- Low Street Pit LWS;

4.1.2 In addition, potential air quality effects during operation will need to be considered for European sites up to a maximum of 15 km distance from the source of operational emissions.

4.2 Habitats

4.2.1 The majority of the site comprises arable fields and improved grassland of no intrinsic ecological interest.

4.2.2 Grasslands are an Essex Biodiversity Action Plan habitat. The arable and improved grassland on site were assessed as having limited intrinsic ecological value as the plant communities present indicate that nutrient enrichment has reduced floral diversity. The semi-improved grassland in Zone A comprises relict grazing marsh that does not meet the criteria for the UKBAP habitat Coastal and Floodplain Grazing Marsh due to its current condition, management and lack of floral diversity. It is considered to have value at the district level.

4.2.3 Ancient hedgerows are an Essex Biodiversity Action Plan habitat and all native species hedgerows are a UK Biodiversity Action Plan habitat. None of the hedgerows on site are considered to be ancient.

4.2.4 Although not a priority habitat, the ditches on site are considered to have value for ecological connectivity and presence of protected species.

4.3 Species

4.3.1 Annex A outlines the relevant protected species legislation on site.

Plants

4.3.2 No plant species of particular conservation significance were found to occur on site, and no Schedule 9 invasive plant species were recorded.

Aquatic invertebrates

4.3.3 The ditches on site are not considered to be suitable for white-clawed crayfish as they do not contain suitable substrate and many of the ditches were found to have dried up over the course of the 2018 field season. No further surveys for this species or other aquatic invertebrates are therefore required.

4.3.4 Despite the relatively poor condition of the ditches around Area A, retention and enhancement of the ditches is recommended where practicable, as wet ditches in arable fields are capable of supporting some aquatic invertebrate fauna.

Terrestrial invertebrates

4.3.5 No site is completely lacking in value to invertebrates. All green areas make some contribution to the wider ecological interest of the landscape for invertebrates, even if it is simply the maintenance of an open aspect. However, it is considered that Zone A and the surveyed part of Zone F4/G do not have an intrinsic invertebrate interest that is likely to be raised significantly above the expected regional background level. No further survey work is therefore recommended.

4.3.6 However, given Zone A's direct proximity to several areas that are known to support nationally important invertebrate assemblages (Telfer, 2017), it is considered that Zone A makes some contribution to the invertebrate ecology of the wider landscape. Numerous rare and threatened species of aculeate Hymenoptera (bees and wasps) are known to nest in the Tilbury area and many of these require extensive grasslands in which to forage, in particular the shrill carder bee *Bombus sylvarum* and brown-banded carder bee *Bombus humilis*, both of which are Section 41 species. The availability of suitable forage (nectar and pollen) sources throughout the whole season from May to September is crucial for populations of these species, which appear to operate at a landscape scale and their survival in the East Thames Corridor is dependent upon the entire remaining network of post-industrial sites and nearby grasslands.

4.3.7 Although the herbaceous flora of the site is very limited, it does include forage plants utilised by bee species. On this basis, mitigation for loss of grassland in Zone A is recommended.

4.3.8 In addition to retention and management of hedgerows and ditches around the boundary of Zone A wherever feasible, additional habitat creation for invertebrates is recommended.

4.3.9 This will comprise the creation of a managed compensation area to mitigate for this loss of pollinator habitat in Zone A. This should be sown with wildflower seed mixes to provide a continuity of nectar and pollen throughout the flight season. If soil fertility is high, the plant seed mix should include yellow rattle to reduce the competitive growth of grasses and maintain a more open and diverse sward.

4.3.10 Given the presence of a rich aculeate Hymenoptera fauna in the surrounding area, the construction of bee banks will also be undertaken. These can provide useful habitat for many thermophilic ground-nesting invertebrate species including solitary bees, solitary wasps, beetles and spiders and are best created in open, south-facing situations. Compacted soil and gravel should be shaped into a mound with various slopes, hollows and angles that may be utilised and favoured by different species. Vertical or very steep banks often take much longer to vegetate due to the greater heat stress they experience and provide bare ground that could be used for mining/burrowing invertebrate species.

Fish

4.3.11 Given the lack of permanent water in the majority of the ditches surveyed, it is not considered that surveys for fish are required. Site design will include retention of boundary ditches in Zone A and hence any potential upstream migratory movements by eels are not likely to be affected.

4.3.12 Results of an Eel scoping survey conducted on the advice of the Environment Agency can be found in Volume 6, Appendix 9.2: Third Party Survey Reports. The survey concluded that the ditches within the Application Site that will be permanently affected by the proposed development are unsuitable to support Eels and that this species was not therefore a constraint.

Amphibians

4.3.13 None of the ditches or waterbodies covered by the RPS and RWE surveys that are directly affected by construction contained GCN, and no waterbodies surveyed by the Tilbury2 project were found to contain GCN.

4.3.14 However, the RWE survey recorded GCN in ponds in Low Street Pit LWS, adjacent to Zone D where the gas pipeline will be installed.

4.3.15 It is considered, based on these results, that GCN are not present on or near Zone A and do not therefore present a constraint to the main construction programme. However, the presence of GCN will need to be considered for installation of the gas pipeline and mitigation will therefore be required.

Reptiles

4.3.16 The status of reptile populations on site has been looked at for areas that will be directly affected by construction.

4.3.17 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.

4.3.18 The Main Site is located on Zone A, and while it is intended to retain ditches and hedges on the site boundary, 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 majority of the existing grassland.

4.3.19 Whether the main portion of the grassland is utilised by reptiles is uncertain; sheets were not put out in the centre of the field because the field is managed by mowing and was cut towards the end of the survey period. Placing sheets in the main grassland would therefore have risked increasing reptile mortality from the mowing operation.

4.3.20 Given the management of the grassland and its relatively homogenous nature, it is considered that the field itself probably does not support large numbers of reptiles, but they are likely to use it. The main areas where reptiles are likely to be concentrated in Zone A is therefore the unmown grassland, ditch and hedgerow margins around the Walton Common grassland.

4.3.21 A total of 80 refugia were laid out in this area. If one treats the whole of Walton Common (11.2 ha) as suitable reptile habitat, this gives a refugia density of 7.14 / ha. Froglife (1999) provides guidelines for assessing reptile population sizes based on the numbers of adult sightings on a single visit for refugia at a density of up to 10 sheets / ha.

4.3.22 Applying these criteria for the adult reptile maximum counts for Zone A gives:

- Adder: 4 adults – ‘low’ population (<5);
- Grass snake: 1 adult – ‘low’ population (<5);
- Slow-worm: 13 adults – ‘good’ population (5-20); and
- Common lizard: 4 adults – ‘low’ population (<5).

4.3.23 Another method of assessing reptile population size is provided in Herpetofauna Groups of Britain and Ireland (1998), which assesses populations as High, Medium or Low based on density of adults. However, applying these criteria to the whole of the grassland area of Zone A would probably result in an underestimate of density given that no sheets were placed in the main grassland area.

4.3.24 Zone A, with populations of four species one of which is 'good' and two of which are only just below the threshold for 'good' according to the Froglife criteria, is therefore considered to be of county value for reptiles, and mitigation is therefore required, comprising translocation and habitat creation.

Breeding birds

4.3.25 The assessment of the breeding bird community at Tilbury includes a focus on species that are afforded special statutory protection or those included on one, or more, of the lists of species of conservation interest. These include:

- Species listed on Annex 1 of the EC Birds Directive (Directive 2009/147/EC) (EC, 2009) or species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- Species included in the Birds of Conservation Concern (BoCC) Red and Amber Lists (Eaton et al 2015), and priority species within the UK Biodiversity Action Plan (UKBAP) (Anon, 2008) or Essex Local BAP species (Essex Biodiversity Project, 2011); and
- Those occurring in nationally, regionally or locally important numbers (Harris *et al.* 2014; Musgrove *et al.*, 2013).

4.3.26 Annex 1 species are those for which the UK Government are required to take special measures, including the designation of Special Protection Areas, to ensure the survival and reproduction of these species throughout their area of distribution.

4.3.27 The NERC list of Species of Principal Importance is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006; under section 40 every public authority (e.g. a local authority or local planning authority) must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. In addition, with regard to those species on the list of Species of Principal Importance prepared under section 41, the Secretary of State must:

- *“(a) take such steps as appear to the Secretary of State to be reasonably practicable to further the conservation of the living organisms and types of habitat included in any list published under this section”, or*

- *“(b) promote the taking by others of such steps.”*

4.3.28 Species listed on the BoCC Red List are those that have declined in numbers by 50% over the last 25 years, those that have shown an historical population decline between 1800 and 1995 and species that are of global conservation concern. The 67 species on the Red List are of the most urgent conservation concern.

4.3.29 Species listed on the BoCC Amber List, of which there are currently 96, include those that have shown a moderate decline in numbers (25%-49%) over the last 25 years and those with total populations of less than 300 breeding pairs. Also included are those species which represent a significant proportion (greater than 20%) of the European breeding or wintering population, those for which at least 50% of the British population is limited to 10 sites or less, and those of unfavourable conservation status in Europe.

4.3.30 The survey of breeding birds recorded a breeding assemblage of 43 species in 2018. The survey undertaken from April - June 2018 was an optimal peak breeding time.

4.3.31 Of the 43 species recorded as breeding or probably / possibly breeding within the survey area, 18 species meet at least one of a range of criteria relating to special statutory protection or conservation importance.

4.3.32 No species considered as breeding or probably / possibly breeding are present in any significant numbers, approaching 1% of the UK population.

4.3.33 The diversity of species present within the survey area is at a level indicative of district importance to breeding birds.

4.3.34 The proposed development will mainly remove areas of habitat in Zone A/C including semi-natural grassland, scrub and ditches. This is likely to cause a loss of suitable breeding and foraging habitat, and mitigation is therefore recommended.

Wintering birds

4.3.35 Surveys to assess whether significant numbers of wintering birds associated with the Thames Estuary and Marshes did not record any wildfowl or waders. It is therefore concluded that the land affected by the proposed development is not Functionally Linked Land with respect to the SPA, and therefore no further assessment of effects on wintering birds on terrestrial habitat is required.

4.3.36 Surveys for wintering birds within the intertidal zone are ongoing (Sept 2019-March 2020) but there have been a series of surveys undertaken since 2007 which have been reviewed, the most recent of which are Bioscan surveys for Tilbury2 in 2016/17 and RWE surveys in 2017/18), and which were summarised in Appendix 9 of the revised HRA report submitted during the Tilbury2 Examination in response to a request for further consideration of intertidal bird distributions (Bioscan, 2018).

4.3.37 The data from these multiple sources indicates sporadic to occasional use by low numbers of SPA species in Zone G in the vicinity of the proposed causeway. Higher aggregations of waders and wildfowl are recorded outside and to the east of the survey area and further east within the SPA. Based on the historical data showing available the intertidal wintering bird assemblage is considered to be of district importance (to be reviewed when the 2019/20 data is available)

Mammals

Water voles

4.3.38 Water vole populations have been assessed in accordance with the method set out Dean *et al.* (2016), which uses numbers of latrines recorded per 100 m of surveyed ditch to give an indication of relative population

4.3.39 The summer of 2018 has been characterised by exceptionally low rainfall and these results indicate that the central Zone A ditches provide an important refuge habitat for water voles during periods when the boundary ditches dry out. These ditches all dried out later in the 2019 season (by September) and water vole were absent from Zone A and from the ditches in Zone C.

4.3.40 If this trend persists and water voles are still absent at the time the project commences, water vole mitigation would not be required. Monitoring will be undertaken to determine whether water voles remain absent in 2020.

4.3.41 If water voles are present in ditches which will be affected by open-cut trenching, or other disturbance, a licence from Natural England would need to be obtained to either disturb or translocate water voles while the works take place.

Otters

4.3.42 No signs indicating presence of otters were recorded during surveys, and the ditches on site are not considered particularly suitable for otters. This species is therefore not considered to be a constraint.

Badgers

4.3.43 Information obtained from the PINS scoping report has suggested that an artificial badger sett has been created west of Zone A, but no current active setts are known within the Thurrock Flexible Generation Plant application boundary.

4.3.44 A disused single hole outlier sett was present in close to a location that would be affected by construction access road widening, and therefore the status of the sett should be monitored until the start of construction. If it is found to be active when road widening works are required, a licence from Natural England would need to be obtained to either disturb or close the set while the widening works take place.

4.3.45 The site as a whole has limited badger activity, and it is not considered that the construction of the development site would result in significant losses of badger foraging habitat or other impacts on local badger populations.

Bats

4.3.46 No buildings or trees with bat roost potential were recorded on site. As such, surveys for roosting bats are not considered necessary.

4.3.47 Activity surveys for bats in Zones A and C were undertaken in 2019. Very little bat foraging activity was observed, and only three species (Common and Soprano Pipistrelle and Noctule) were recorded. 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 permanent habitat loss in Zones A and C.

4.3.48 Results of bat surveys carried out in 2019 can be found in Volume 6, Appendix 9.2: Third Party Survey Reports.

Other mammals

4.3.49 No surveys for other mammal species are considered necessary.

5. References

- Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. (2000) *Bird Census Techniques*: 2nd edition. London, Academic Press.
- Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R.A., Foster, J., Wilkinson, J., Arnett, A., Williams, P., and Dunn, F. (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Oxford, Freshwater Habitats Trust.
- Bioscan (2018) Habitats Regulations Assessment (HRA) Stage 2 Report Appendix 9: Proposed port terminal at former Tilbury Power Station: Tilbury2 note on winter bird use of the intertidal area. [Online] Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR030003/TR030003-000995-Port%20of%20Tilbury%20London%20-%20Habitats%20Regulations%20Stage%20-%20report%20-%20Clean.pdf> [Accessed 02 December 2019]
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2017) Guidelines for Preliminary Ecological Assessment [Online] Available at: <https://cieem.net/wp-content/uploads/2019/02/Guidelines-for-Preliminary-Ecological-Appraisal-Jan2018-1.pdf> [Accessed 02 December 2019]
- Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds Fiona Matthews and Paul Chanin. London, The Mammal Society.
- Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove A., Noble D., Stroud, D. and Gregory, R. (2015) Birds of Conservation Concern 4. The population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds*, pp. 108, 708-746
- Essex Biodiversity Project (2011) Essex Biodiversity Action Plan.
- Froglife (1999) Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Note 9. Halesworth, Froglife.
- Fuller, R.J. (1980) A Method for Assessing the Ornithological Interest of Sites for Conservation. *Biological Conservation*, 17, 229-239.
- Gent, A. and Gibson, S. (1998) *Herpetofauna Workers' Manual*. Peterborough, UK. Joint Nature Conservation Committee.
- Gilbert, G., Gibbons, D.W. and Evans, J. (1998) *Bird Monitoring Methods: A manual of techniques for key species*. Sandy, Bedfordshire, RSPB/BTO.
- Harris, S.J., Massimino, D., Newson, S.E., Eaton, M.A., Balmer, D.E., Noble, D.G., Musgrove, A.J., Gillings, S., Procter, D. & Pearce-Higgins, J.W. (2015) *The Breeding Bird Survey 2014*. BTO Research Report 673. Thetford, BTO.
- Herpetofauna Groups of Britain and Ireland (1998) *Evaluating local mitigation / translocation programmes: maintaining best practice and lawful standards*. Halesworth, HGBI.
- Holling, M. and the Rare Breeding Birds Panel (2012) Rare breeding birds in the United Kingdom in 2012. *British Birds*, 107, pp. 504-560.
- Joint Nature Conservation Committee (JNCC) (2011) UK Biodiversity Action Plan. [Online]. Available at: <http://jncc.defra.gov.uk/page-5155> [Accessed 28 September 2018].
- Joint Nature Conservation Committee (JNCC) (2016) Handbook for Phase 1 habitat survey – a technique for environmental audit. [Online] Available at: <https://hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a> [Accessed 02 December 2019]
- Musgrove, A., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parsons, M., Risely, K. and Stroud, D. (2013) Population estimates of birds in Great Britain and the United Kingdom. *British Birds*, 106, 64-100.
- Natural England (2015) Guidance: Great crested newts: surveys and mitigation for development projects [Online] Available at: <https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects> [Accessed 02 December 2019]
- Rodwell (1991 *et seq*) *British Plant Communities* volumes 1-5. Cambridge, Cambridge University Press.
- RPS (2008) *Tilbury Power Station: Intertidal Ornithological Survey Report*. St Ives, RPS.
- Smith, G. (2013). *Essex Bird Report 2013*. Essex Birdwatching Society.
- Strachan, R., Moorhouse, T. and Gelling, M. (2011) *Water Vole Conservation Handbook*. Third Edition. Abingdon, Wildlife Conservation Research Unit.
- Telfer, M.G. (2017) Invertebrate survey of Tilbury 2. Report to Bioscan (UK) Ltd. [Online]. Available at: [https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR030003/TR030003-000239-ES%20Appendix%2010.L%20Invertebrate%20Survey%20of%20Tilbury2%20\(2017\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR030003/TR030003-000239-ES%20Appendix%2010.L%20Invertebrate%20Survey%20of%20Tilbury2%20(2017).pdf) [Accessed 28 September 2018].

Annex A Relevant Legislation

A.1 Great Crested Newts

A.1.1.1 Great Crested Newts *Triturus cristatus* are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (and as amended), which affords the species protection under Section 9. The species is also listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2010. In combination, this makes it an offence to:

- Intentionally kill, injure or take (capture etc.) a Great Crested Newt;
- Possess a Great Crested Newt;
- Intentionally or recklessly damage, destroy, obstruct access to any structure or place used by Great Crested Newt for shelter or protection, or disturb any animal occupying such a structure or place; and sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative) or advertise for buying or selling such things.

A.1.1.2 Great Crested Newts are also listed on the UKBAP as a Priority Species and are listed as a species of principal importance for biodiversity in England & Wales under Section 41 of the Natural Environment & Rural Communities Act (2006).

Reptiles

A.1.1.3 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). This prohibits:

- Intentional or reckless injuring or killing;
- Selling, offering or exposing for sale, or having in possession or transporting for the purpose of sale, any live or dead wild animal or any part of, or anything derived from, such an animal; or
- Publishing or causing to be published any advertisement likely to be understood as conveying buying or selling, or intending to buy or sell, any of those things.

Breeding birds

A.1.1.4 All birds, their nests and eggs are afforded protection under the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. It is an offence to:

- Intentionally kill, injure or take any wild bird;

- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- Intentionally take or destroy the egg of any wild bird.

A.1.1.5 Schedule 1 birds cannot be intentionally or recklessly disturbed when nesting and there are increased penalties for doing so. Licences can be issued to visit the nests of such birds for conservation, scientific or photographic purposes but not to allow disturbance during a development even in circumstances where that development is fully authorised by consents such as a valid planning permission.

Badgers

A.1.1.6 Badgers and their setts are protected under various legislation, drawn together under the Protection of Badgers Act 1992. This makes it a criminal offence to:

- Wilfully kill, injure, take, possess, or cruelly ill-treat a badger, or to attempt to;
- Interfere with a sett by damaging or destroying it;
- Obstruct access to, or any entrance of, a badger sett; and
- To disturb a badger when it is occupying a sett.

A.1.1.7 This legislation effectively prevents development on a site, or within 30 m of a site, occupied by badgers without mitigation being agreed and carried out prior to construction works. If there are potential impacts on any of the setts such as disturbance or if the only option is to close the sett then a licence from Natural England would be required. It would be necessary to undertake appropriate mitigation, for example construction of an artificial sett.

Water voles

A.1.1.8 Water vole is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (under section 9 of the Act), receiving full protection since 2008. The Wildlife and Countryside Act 1981, together with amending legislation, makes it an offence to:

- Intentionally kill, injure or take (capture etc.) water voles;
- Possess or control live or dead water voles or any part or derivatives;
- Intentionally or recklessly damage or destroy a water vole's place of shelter or protection;
- Intentionally or recklessly disturb a water vole whilst occupying a structure or place used for shelter or protection;
- Intentionally or recklessly obstruct access to a water vole's place of shelter or protection; and

- Sell, offer for sale or possession and transportation for the purposes of sale any live or dead water vole, or any part or derivative, or advertising any of these for buying and selling.

A.1.1.9 A place of shelter or protection includes a network of active burrows and/or any nests that have been constructed within the burrow system or above ground amongst dense vegetation.

Annex B Plant species recorded on semi-improved grassland

Walkover survey

Family	Species	Common Name	DAFOR abundance
Apiaceae	<i>Anthriscus sylvestris</i>	Cow Parsley	F
Apiaceae	<i>Heracleum sphondylium</i>	Hogweed	O
Araliaceae	<i>Hedera helix</i>	Ivy	R
Asteraceae	<i>Picris echioides</i>	Bristly Oxtongue	A
Asteraceae	<i>Senecio jacobaea</i>	Ragwort	O
Asteraceae	<i>Tragopogon pratensis</i>	Goat's-beard	R
Asteraceae	<i>Arctium minus</i>	Lesser Burdock	F
Asteraceae	<i>Taraxicum officinale</i>	Dandelion	O
Asteraceae	<i>Achillia millefolium</i>	Yarrow	O
Asteraceae	<i>Anthemis cotula</i>	Stinking Camomile	D
Asteraceae	<i>Matricaria discoidea</i>	Pineappleweed	A
Asteraceae	<i>Cirsium arvense</i>	Spear Thistle	F
Asteraceae	<i>Hieracium Sp.</i>	Hawkweed sp.	F
Asteraceae	<i>Sonchus arvensis</i>	Field Milk Thistle	A
Asteraceae	<i>Carduus crispus</i>	Curled Thistle	A
Asteraceae	<i>Sonchus asper</i>	Spiny Sow Thistle	A
Brassicaceae	<i>Capsella bursa-pastoris</i>	Shepherds purse	A
Brassicaceae	<i>Brassica napus</i>	Rape	D
Chenopodiaceae	<i>Chenopodium album</i>	Fat-hen	O
Dipsacaceae	<i>Dipsacus fullonum</i>	Common Teasel	O
Equisetaceae	<i>Equisetum arvense</i>	Common Horsetail	D
Fabaceae	<i>Galega officinales</i>	Common goat's rue	O
Fabaceae	<i>Lotus glaber</i>	Narrow-leaved Birds Foot Trefoil	R
Fabaceae	<i>Medicago arabica</i>	Spotted Medick	F

Family	Species	Common Name	DAFOR abundance
Fabaceae	<i>Vicia cracca</i>	Tufted vetch	O
Fabaceae	<i>Trifolium repens</i>	White Clover	O
Geraniaceae	<i>Geranium molle</i>	Dove's-foot Crane's-bill	F
Geraniaceae	<i>Geranium dissectum</i>	Cut-leaved Crane's-bill	F
Lamiaceae	<i>Ballota nigra</i>	Black Horehound	R
Lamiaceae	<i>Lamium album</i>	White Dead-nettle	O
Malvaceae	<i>Malvus sylvestris</i>	Common Mallow	A
Plantagenaceae	<i>Plantago lanceolata</i>	Ribwort Plantain	O
Plantagenaceae	<i>Plantago media</i>	Hoary Plantain	O
Plantagenaceae	<i>Plantago major</i>	Broad-leaved Plantain	O
Poaceae	<i>Dactylis glomerata</i>	Cock's Foot	F
Poaceae	<i>Festuca rubra</i>	Red Fescue	F
Poaceae	<i>Phleum bartolonii</i>	Smaller Cat's-tail	R
Poaceae	<i>Bromus sterilis</i>	Barren Brome	F
Poaceae	<i>Hordeum murinum</i>	Wall Barley	O
Poaceae	<i>Phragmites australis</i>	Common Reed	A
Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass	A
Poaceae	<i>Poa annua</i>	Annual Meadow Grass	F
Poaceae	<i>Holcus lanatus</i>	Yorkshire Fog	O
Poaceae	<i>Hordeum vulgare</i>	Barley	R
Poaceae	<i>Avena fatua</i>	Wild Oat	R
Poaceae	<i>Arrhenatherum elatius</i>	False Oat-grass	D
Polygonaceae	<i>Rubus fruticosus</i> agg.	Bramble	A
Polygonaceae	<i>Polygonum aviculare</i>	Common Knotgrass	F
Polygonaceae	<i>Rumex crispus</i>	Curly Dock	F
Rosaceae	<i>Potentilla reptans</i>	Creeping Cinquefoil	F
Rubiaceae	<i>Gallium aparine</i>	Cleavers	O
Urticaceae	<i>Urtica dioica</i>	Common Nettle	D
Urticaceae	<i>Urtica urens</i>	Small-leaved Nettle	O

Family	Species	Common Name	DAFOR abundance
Field A Ditches			
Brassicaceae	<i>Rorippa nasturtium-aquaticum</i>	Water Cress	O
Convolvulaceae	<i>Convolvulus arvensis</i>	Field Bindweed	R
Cyperaceae	<i>Bolboschoenus maritimus</i>	Sea Club-rush	A
Poaceae	<i>Phragmites australis</i>	Common Reed	D
Poaceae	<i>Arrenatherum elatius</i>	False Oat-grass	D
Typhaceae	<i>Sparganium erectum</i>	Branched Bur-reed	R

NVC survey

Species	Common name	Quadrat number and DOMIN value						Domin range
		1	2	3	4	5	6	
<i>Anthemis cotula</i>	Stinking Camomile		5	4				4-5
<i>Anthriscus sylvestris</i>	Cow Parsley	2			4	4	2	2-4
<i>Arrenatherum elatius</i>	False Oat-grass	5			8	6	5	5-8
<i>Ballota nigra</i>	Black Horehound						6	6
<i>Brassica napus</i>	Rape		8	5				5-8
<i>Capsella bursa-pastoris</i>	Shepherds purse			4				4
<i>Cirsium arvense</i>	Spear Thistle					4		4
<i>Dactylis glomerata</i>	Cock's Foot	4			1			1-4
<i>Dipsacus fullonum</i>	Common Teasel						4	4
<i>Equisetum arvense</i>	Common Horsetail			5				5
<i>Galega officinales</i>	Common goat's rue						7	7

Species	Common name	Quadrat number and DOMIN value						Domin range
		1	2	3	4	5	6	
<i>Gallium aparine</i>	Cleavers	2						2
<i>Lamium album</i>	White Deadnettle	1						1
<i>Lolium perenne</i>	Perennial Ryegrass						5	5
<i>Malva sylvestris</i>	Common Mallow			5				5
<i>Phragmites australis</i>	Common Reed				5			5
<i>Plantago lanceolata</i>	Ribwort Plantain		1	1			2	1-2
<i>Polygonum arviculare</i>	Common Knotgrass		4			5		4-5
<i>Potentilla reptans</i>	Creeping Cinquefoil	7				2		2-7
<i>Rubus fruticosus</i> agg,	Bramble	2						2
<i>Rumex crispus</i>	Curly Dock			2			6	2-6
<i>Senecio jacobaea</i>	Ragwort			4				4
<i>Sonchus arvensis</i>	Field Milk Thistle		1					1
<i>Taraxacum officinale</i>	Dandelion			1				1
<i>Urtica dioica</i>	Common Nettle	6			5	6		5-6

Annex C Reptile survey results (adults and juveniles)

Adults

Visit	Reptile counts (adults)																											
	Zone A				Zone C				Zone W				Zone X				Zone F				Zone Z				Whole site			
	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C
1	3		2												1				1			1	3		3	1	7	
2	2		13	1				1												2			3		2		16	4
3	2		4	1								1			1					1			3	2	2		8	5
4	2	1	6	1			1				1				1				2	5			4		2	1	15	6
5	4		8	2			3	2			4				9				1				9		4		34	4
6	2		13		2		6				1				1				2				4		4		27	
7	1		3	4			4				1				6				1				2		1		17	4

Juveniles

Visit	Reptile counts (juveniles)																											
	Zone A				Zone C				Zone W				Zone X				Zone F				Zone Z				Whole site			
	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C	A	G	S	C
1	4		5			1								1							1	1			5	3	5	
2	1		5				2							1									1		2	1	8	
3	4	1	6																		1				5	1	6	
4	3		12	1			3				4				1				2						3		22	1
5	3	1	19			1	2			1											1				4	3	21	
6	2	2	11			1	2				1								2				2		2	3	18	