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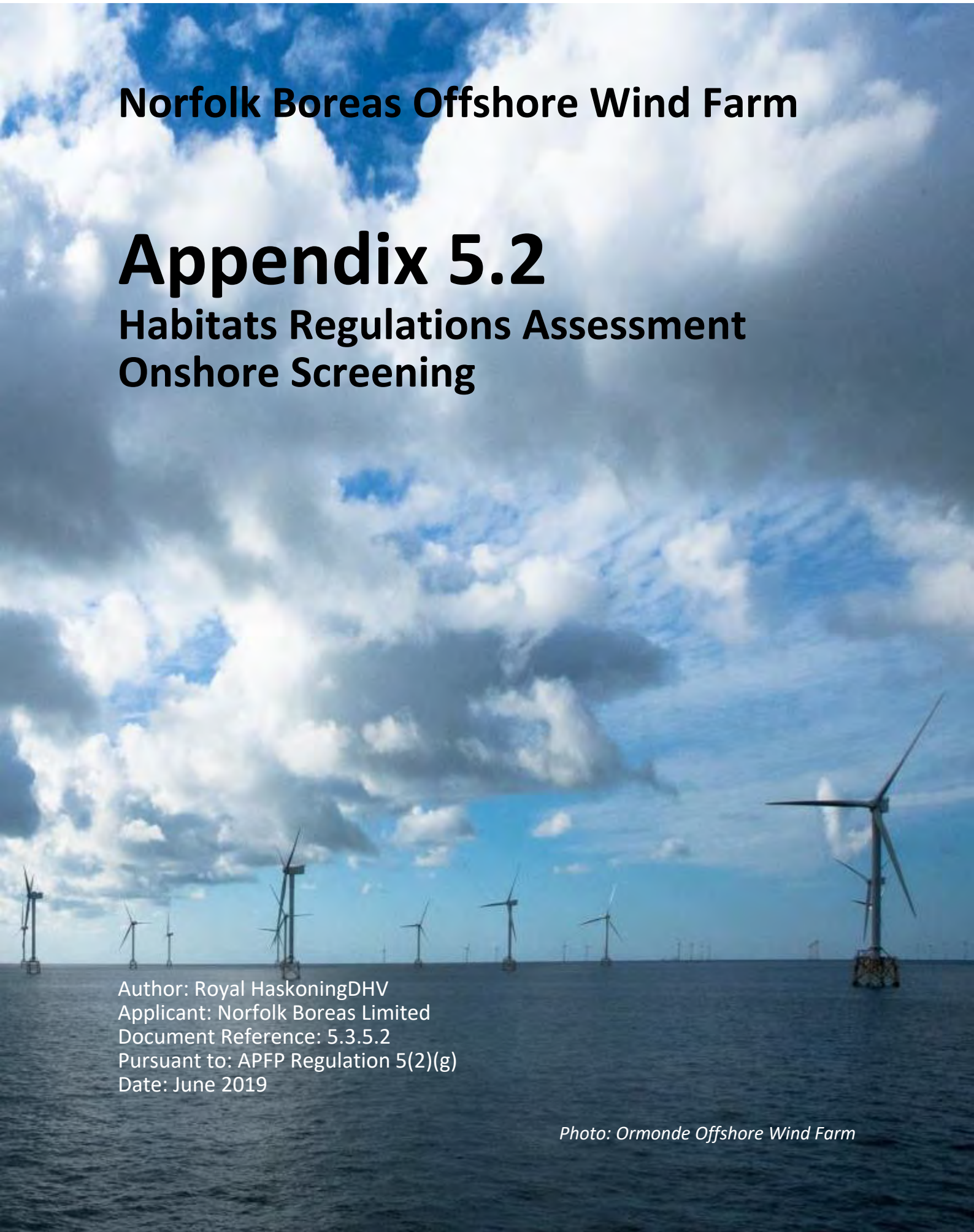
VATTENFALL

Norfolk Boreas Offshore Wind Farm

Appendix 5.2

Habitats Regulations Assessment
Onshore Screening



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Glossary of Acronyms

HRA	Habitats Regulations Assessment
AA	Appropriate Assessment
AfL	Agreement for Lease
BCT	Bat Conservation Trust
cSAC	Candidate SAC
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
EAOW	East Anglia Offshore Wind Limited
EC	European Commission
EEC	European Economic Community
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
HRGN	Habitats Regulations Guidance Note
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
NBIS	Norfolk Biodiversity Information Service
NBSG	Norfolk Barbastelle Study Group
NSER	No Significant Effects Report
NVC	National Vegetation Classification
O&M	Operational and Maintenance
ODPM	Office of the Deputy Prime Minister
pSAC	Possible SACs
pSPA	Possible SPA
SAC	Special Area of Conservation
SCI	Sites of Community Importance
SNCB	Statutory Nature Conservation Bodies
SPA	Special Protection Area
SPR	Scottish Power Renewables (UK) Limited
SSSI	Site of Special Scientific Interest
TEU	Treaty of the European Union
VWPL	Vattenfall Wind Power Ltd
ZAP	Zone Appraisal and Planning
ZDA	Zone Development Agreement
ZOI	Zone of Influence

Glossary of Terminology

Landfall	Where the offshore cables come ashore at Happisburgh South
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing low voltage electrical earthing links.
Mobilisation zone	Area within which a mobilisation area will be located.
National Grid overhead line temporary works	Area within which the work will be undertaken to complete the necessary modification to the existing 400kV overhead lines.
National Grid substation extension	The permanent footprint of the National Grid substation extension.
Natura 2000 site / European site	A network of nature protection areas in the territory of the European Union. It is made up of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated under the Habitats Directive and Birds Directive, respectively.
Necton National Grid substation	The grid connection location for Norfolk Boreas and Norfolk Vanguard
Onshore cables	The cables which take power and communications from landfall to the onshore project substation
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore infrastructure	The combined name for all onshore infrastructure associated with the project from landfall to grid connection.
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.
Ramsar sites	A Ramsar Site is a wetland site of international importance under the Convention on Wetlands, known as the Ramsar Convention.

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1 INTRODUCTION

1.1 Purpose of this document

1. This document provides the findings of the onshore screening of Natura 2000 sites for Habitats Regulations Assessment (HRA) in relation to the Norfolk Boreas Offshore Wind Farm (herein 'the project'). This document covers those Natura 2000 sites designated for the terrestrial and freshwater habitats and species they support, as well as those Natura 2000 sites designated for bird species which utilise terrestrial habitats. The document provides the information that was used in stakeholder consultation as part of the Evidence Plan Process, to seek agreement on the designated sites which should be considered further. This document also forms Stage 1 of the HRA Process (discussed further in section 1.4). Impacts of the offshore project infrastructure on Natura 2000 sites are screened separately in Appendix 5.1 of the Information to inform HRA Report.

2. This document was consulted on as part of the Norfolk Boreas Preliminary Environmental Information Report (PEIR). The consultation was undertaken between the 31st October and 11th December 2018.

3. Designated sites are proposed to be 'screened out' where no Likely Significant Effect (LSE) from the project is predicted. Where LSE cannot be ruled out at this stage the designated sites will be 'screened in' and assessed further. Information to support the HRA (both offshore and onshore) will be provided as part of the Development Consent Order (DCO) application, planned for June 2019.

4. The classes of Natura 2000 designations considered within this HRA Screening are:

- Special Protection Areas (SPAs) (some of which are also Ramsar sites);
- Potential SPA (pSPA);
    - SPAs that are approved by the UK Government but are still in the process of being classified.
- Special Areas of Conservation (SACs);
    - Sites that have been adopted by the European Commission and formally designated by the government of each country in whose territory the site lies.
- Possible SACs (pSACs);
    - A site which has been identified and approved to go out to formal consultation.
- Candidate SACs (cSACs); and

- Following formal consultation on the pSAC, the site is then submitted to the European Commission (EC) for approval (referred to as adoption). At this stage the site it is called a cSAC.

- Sites of Community Importance (SCI).
  - Once adopted by the EC, the site it becomes a SCI, before the national government then designates it as a SAC.

5. Consideration is also given to impacts on Ramsar sites. Ramsar sites protect wetland areas and extend only to 'areas of marine water the depth of which at low tide does not exceed six metres'.

6. Screening of SPAs and SACs affected by the offshore project elements is provided separately in Appendix 10.3 of the Information to inform HRA Report.

7. For readers of this document who are familiar with HRA screening undertaken for the Norfolk Vanguard project, all of the sites screened in for that project have also been screened in here. This includes the Broads SAC which was screened in at a late stage on the Norfolk Vanguard screening process. No further sites have been screened in.

8. This HRA Screening reports the screening exercise undertaken and reported as part of the project's PEIR in September 2018. The screening assessment has been checked against changes to the onshore project area made since this date, and the screening assessment presented below is still considered valid for the final onshore project area. The final the onshore project area is considered within the Information to inform HRA Report, to which this HRA Screening is an Appendix.

1.2 Project Background

1.2.1 Background

9. In December 2009, as part of the UK Offshore Wind Round 3 tender process, The Crown Estate awarded the joint venture company, East Anglia Offshore Wind (EAOW) Ltd, the rights to develop Zone 5 (later called the 'East Anglia zone'). These rights were granted through a Zone Development Agreement (ZDA). EAOW Ltd. is a 50:50 joint venture owned by Vattenfall Wind Power Ltd (VWPL) and ScottishPower Renewables (UK) Limited (SPR).

10. In December 2014, a decision was taken to split the zone, with VWPL having development rights within the north of the former East Anglia Zone, and SPR continuing to develop the southern part. In agreement with The Crown Estate, the ZDA was effectively dissolved in 2016. New Agreement for Lease (AfL) areas have been awarded by The Crown Estate within the former Zone, separately to VWPL and its affiliate companies, and SPR and its affiliates.

11. Norfolk Boreas Limited and Norfolk Vanguard Limited (affiliate companies of VWPL) are now seeking consent to develop the Norfolk Boreas and Norfolk Vanguard projects. Norfolk Vanguard is approximately one year ahead of Norfolk Boreas and submitted its DCO application in June 2018. Norfolk Boreas are planning to submit their DCO application in June 2019. Norfolk Boreas consist of a single wind farm site whereas Norfolk Vanguard consists of two distinct areas, Norfolk Vanguard East (NV East) and Norfolk Vanguard West (NV West). All three sites share and offshore cable corridor.

12. As part of the EIA process Norfolk Boreas submitted a Scoping Report and a subsequent PEIR to the Planning Inspectorate in May 2017 and September 2018 respectively (Royal HaskoningDHV, 2017).

1.2.2 Project description

13. The onshore project area consists of the following key elements:

- Landfall;
- Onshore cable route
- Onshore project substation; and
- Extension to the existing Necton National Grid substation and overhead line modifications.

14. The location of the onshore project area is shown in Figure 9.1. During the development of the project, the onshore Scoping Area that was initially defined has been refined, to identify a single landfall option, cable route as well as an onshore project substation location in proximity to the Necton National Grid.

1.2.3 Onshore project area site selection process

15. The project has undergone an extensive site selection process which has involved incorporating ecological constraints into the identification of the onshore project area. A constraints mapping exercise was undertaken prior to the publication of the Norfolk Boreas EIA Scoping Report (Royal HaskoningDHV, 2017) in order to determine the cable route for the onshore project area. This constraints mapping exercise identified international designated sites for nature conservation (SAC, SPA, Ramsar sites) to ensure that, where possible, these sites were avoided (see chapter 4 Site Selection and Alternatives for further information).

16. Where it was not possible to avoid the location of an internationally designated site, for example in the case of linear designated sites such as the River Wensum SAC, it is intended to use trenchless techniques (i.e. HDD) these locations in order to ensure that no above ground works occur within these designations.

The River Wensum SAC is the only example where an internationally designated site needs to be crossed in this way.

17. Further details on the site selection process are set out in Chapter 4 Site Selection and Consideration of Alternatives in the Norfolk Boreas Environment Statement (ES)

1.3 HRA Legislation, Policy and Guidance

1.3.1 Legislation

18. The HRA process derives from the requirements of specific European Directives and the Regulations that implement their requirements into UK and devolved national law.

19. The UK has triggered article 50 of the Treaty on European Union (TEU) and is in a two year process of negotiating a withdrawal agreement for the UK to leave the EU. The European Union (Withdrawal) Act 2018 ensures that all statutory instruments created under EU Directives, including The Conservation of Habitats and Species Regulations 2017, will continue to apply once the UK exits the European Union.

1.3.1.1 The Birds Directive

20. The EU Directive on the Conservation of Wild Birds (2009/147/EC) (hereafter called the Birds Directive) provides a framework for the conservation and management of wild birds in Europe. The relevant provisions of the Directive are the identification and classification of SPAs for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4). The Directive requires national Governments to establish SPAs and to have in place mechanisms to protect and manage them. The SPA protection procedures originally set out in Article 4 of the Birds Directive have been replaced by the Article 6 provisions of the Habitats Directive.

1.3.1.2 The Habitats Directive

21. The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (hereafter called the Habitats Directive) provides a framework for the conservation and management of natural habitats, wild fauna (except birds) and flora in Europe. Its aim is to maintain or restore natural habitats and wild species at a favourable conservation status. The relevant provisions of the Directive are the identification and classification of Special Areas of Conservation (SAC) (Article 4) and procedures for the protection of SACs and SPAs (Article 6). SACs are identified based on the presence of natural habitat types listed in Annex I and populations of the species listed in Annex II. The Directive requires national Governments to establish SACs and to have in place mechanisms to protect and manage them.

1.3.1.3 The Conservation of Habitats and Species Regulations 2017

22. The Conservation of Habitats and Species Regulations 2017, (hereafter called the 'Habitats Regulations') transpose the Birds Directive and the Habitats Directive into UK law. The Habitats Regulations place an obligation on 'competent authorities' to carry out an appropriate assessment of any proposal likely to affect a SAC or SPA, to

seek advice from Natural England and not to approve an application that would have an adverse effect on a SAC or SPA except under very tightly constrained conditions that involve decisions by the Secretary of State. The competent authority in the case of Norfolk Boreas is the Secretary of State for Business, Energy and Industrial Strategy.

1.3.1.4 Application of the legislation to designated sites

23. As discussed in section 1.1 the HRA process also applies as a matter of law or policy to the following sites:

- SCI and cSAC: HRA process applied as a result of Article 4(5) and Article 6(2)(4) of the Habitats Directive.
- pSPAs: HRA process applied as a result of UK Government policy - paragraph 118 of the National Planning Policy Framework (DCLG, 2012).
- pSACs: HRA process applied as a result of UK Government policy - paragraph 118 of the National Planning Policy Framework (DCLG, 2012).
- Listed and proposed Ramsar sites (internationally important wetlands designated under the Ramsar Convention 1971): HRA process applied as a result of UK Government policy (ODPM & Defra, 2005; DCLG, 2012).

1.3.2 Guidance on the HRA Process

24. In preparing this report, consideration has been given to the relevant guidance issued by a number of governmental, statutory and industry bodies.

25. In relation to guidance from government bodies this includes:

- European Commission: Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites;
- European Commission: EU Guidance on wind energy development in accordance with EU nature directives;
- Department of Communities and Local Government: Guidance on 'Planning for the Protection of European Sites: Appropriate Assessment';
- The Planning Inspectorate Advice Note Nine: Rochdale Envelope; and
- The Planning Inspectorate Advice Note Ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects.

26. In relation to guidance from the Statutory Nature Conservation Bodies (SNCBs) this includes:

- English Nature: Habitats Regulations Guidance Note (HRGN 1): The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations, 1994.

- English Nature: Habitats Regulations Guidance Note (HRGN 3): The Determination of Likely Significant Effect under the Conservation (Natural Habitats &c) Regulations, 1994.
- English Nature: Habitats Regulations Guidance Note (HRGN 4): Alone or in combination.

1.4 The HRA Process

27. The HRA process is carried out in a sequential manner and the stages of that sequence are described as follows in Planning Inspectorate Advice Note 10 (Planning Inspectorate, 2016):

- Stage 1 –Screening (This report) for LSE;
    - European and Ramsar sites are screened for LSE, both effects from the project alone and in combination with other projects. The Planning Inspectorate advises that for those projects where no LSE is predicted then that should reported in the form of a No Significant Effects Report (NSER) and the Stage 2 assessment is not carried out (the Planning Inspectorate, 2017).
- Stage 2 - Appropriate Assessment (AA);
    - For those sites where LSE on a European or Ramsar site cannot be excluded at Stage 1, then further information to inform the assessment will be prepared and the test applied to determine whether the project alone or in-combination could adversely affect the integrity of the site in view of its conservation objectives. This assessment stage will be reported in the form of a HRA AA Report and the results of the assessment summarised in the form of a series of matrices.

28. In those cases where the conclusion of the HRA AA Report is that an adverse effect on the integrity of a European or Ramsar site has been identified then the assessment proceeds to two further stages:

- Stage 3 - Assessment of Alternatives; and
    - The alternatives that have been considered will be assessed. The Planning Inspectorate advises that alternative solutions can include a proposal of a different scale, a different location and an option of not having the scheme at all – the 'do nothing' approach.
- Stage 4 – Assessment of Imperative Reasons of Overriding Public Interest (IROPI).
    - If it is demonstrated that there are no alternative solutions to the proposal that would have a lesser effect or avoid an adverse effect on

the integrity of the site(s), then a justified case will be prepared that the scheme must be carried out for IROPI.

29. If the conclusion of Stages 3 and 4 is that there is no alternative and that the project has demonstrated clear Imperative Reasons of Overriding Public Interest (IROPI) then the project may proceed with a requirement that appropriate compensatory measures are delivered.

1.4.1 In-combination Assessment

30. The Habitats Regulations require the consideration of the potential effects of a project on European sites and Ramsar sites both alone and in-combination with other plans or projects.

31. The identification of plans and projects to include the in-combination assessment will be based on:

- Approved plans;
- Constructed projects;
- Approved but as yet unconstructed projects; and
- Projects for which an application has been made, those which are currently under consideration and those which will be consented before the project's consent decision.

32. The classes of projects that could potentially be considered for the in-combination assessment include:

- Construction or improvement of highways or roads;
- Cycle tracks and other ancillary works;
- Other major transport works;
- Generating station development;
- Above ground electrical line installation;
- Pipeline development;
- Water operations (abstraction or impounding); and
- Major residential or commercial development.

33. The assessment will present relevant in-combination impacts of projects in the following tiered approach (Table 1.1) as advised by Natural England (Joint Nature Conservation Committee (JNCC) and Natural England, 2013a).

Table 1.1 Suggested tiers for undertaking a staged cumulative impact assessment (JNCC and Natural England, 2013a)

Tier description	Consenting or construction phase	Data availability
Tier 1	Built and operational projects should be included within the cumulative assessment where they have not been included within	Pre-construction (and possibly post-construction) survey data from the built project(s) and environmental

Tier description	Consenting or construction phase	Data availability
	the environmental characterisation survey, i.e. they were not operational when baseline surveys were undertaken, and/or any residual impact may not have yet fed through to and been captured in estimates of 'baseline' conditions e.g. 'background' distribution or mortality rate for birds.	characterisation survey data from proposed project (including data analysis and interpretation within the Environmental Statement (ES) for the project).
Tier 2	Tier 1 + projects under construction.	As Tier 1 but not including post-construction survey data.
Tier 3	Tier 2 + projects that have been consented (but construction has not yet commenced).	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project) and possibly pre-construction.
Tier 4	Tier 3 + projects that have an application submitted to the appropriate regulatory body that have not yet been determined.	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project).
Tier 5	Tier 4 + projects that the regulatory body are expecting an application to be submitted for determination (e.g. projects listed under the Planning Inspectorate programme of projects).	Possibly environmental characterisation survey data (but strong likelihood that this data will not be publicly available at this stage).
Tier 6	Tier 5 + projects that have been identified in relevant strategic plans or programmes (e.g. projects identified in Round 3 wind farm zone appraisal and planning (ZAP) documents).	Historic survey data collected for other purposes/by other projects or industries or at a strategic level.

34. Projects will be included in the quantitative assessment where there is sufficient certainty and data confidence that they make a meaningful contribution to the assessment process.

1.5 Process for the Identification of European and Ramsar Sites and Features Potentially Affected by the Project

35. In order to identify relevant European and Ramsar sites that have the potential to be affected by the project, a 5km buffer zone around the onshore infrastructure has been applied (see Figure 9.2).

36. The 5km buffer was used to capture all of the designated sites that are considered to have the potential to be affected by the project.

1.6 HRA Stage 1 Screening Process

37. Screening has been based on a conceptual 'source-pathway-receptor' approach. The approach identifies likely environmental impacts resulting from the proposed construction, operation and maintenance (O&M) and decommissioning of the wind farm and its supporting transmission infrastructure. The parameters are defined as follows:

- Source – the origin of a potential impact (noting that one source may have several pathways and receptors).
    - Example: Site clearance works required for cable trenching.
- Pathway – the means by which the effect of the activity could impact a receptor.
    - Example: Loss of vegetation leading to severance of ecological networks.
- Receptor – the element of the receiving environment that is impacted.
    - Example: Commuting / foraging routes for a bat species for which a site is designated are severed by vegetation removal.

38. Where there is no pathway or the pathway is so long that the effect from the source has dissipated to a negligible level before reaching the receptor, there is justification for the screening out of that particular receptor.

39. It only requires one category of site interest feature to be identified in the process below for the European and / or Ramsar site to be screened in, along with all its associated interest features.

40. Where there is insufficient information available at this stage to screen out a site, it is screened in for further consideration.

41. The assessment of LSE in the context of these sites comprised expert assessment of the likely effects of the project during both the construction, operational and decommissioning phases. This includes the analysis of the maximum distance over which potential impacts could occur (known as the 'zone of influence' (ZOI)) for specific environmental parameters associated with the construction and operational phases of the project. This screening exercise considers whether the project ZOIs overlap with either of the following footprints:

- The European and Ramsar site boundaries; and
- Ex-situ habitats of the qualifying features of European and Ramsar sites.

42. Ex-situ habitats are those which support qualifying features of the European or Ramsar site but are located outside of the designated site boundary.

43. The ZOI for different environmental parameters is summarised Table 1.2. The environmental parameters and also ex-situ habitats relevant for the qualifying features of specific designated sites are set out within section 4 below. These ZOIs have been determined using expert judgement. An explanation of how each ZOI is derived is set out in Table 1.2.

Table 1.2 The ZOI of potential effects for relevant environmental parameters

Environmental parameter	Zone of Influence (ZoI) of potential effect	Explanation
Noise	1km from the **onshore project area**.	**A precautionary buffer based** on the sensitivity of ornithological receptors to noise disturbance (Whitfield, Ruddock & Bullman, 2008).
Air quality	50m from the **onshore project area** for construction dust. 1km from the **onshore project area** for project emissions.	**Precautionary buffers based on the anticipated** dispersion distances of emissions generated by the project (IAQM guidance considers receptors within 500m of a pollution source (IAQM, 2014)).
Light	50m from the **onshore project area**, the zone of potential (controlled) light spill.	Buffer based on the potentially effects of light upon sensitivity ecological features (e.g. bat commuting / foraging routes).
Visual disturbance	500m from the **onshore project area**.	A precautionary buffer based on the sensitivity of ornithological receptors to noise disturbance (Whitfield, Ruddock & Bullman, 2008).
Geology and land contamination	500m from the **onshore project area**.	A precautionary buffer based on the assumed maximum extent of release of contaminated material caused by the project.
Groundwater and Hydrology	**Generally taken to be 1km from the** onshore project area**, although this could be larger where a groundwater connection exists.**	A precautionary buffer based on the maximum extent of groundwater bodies' functional connectivity with a designated site.

2 DESIGNATED SITES POTENTIALLY AFFECTED BY THE PROJECT

2.1 European and Ramsar sites included in the Screening Assessment

44. There are five European sites and one Ramsar site within 5km of the onshore infrastructure. These are:

- River Wensum SAC;
- Paston Great Barn SAC;
- Norfolk Valley Fens SAC;
- The Broads SAC; and
- Broadland SPA and Ramsar site.

45. The distances between the designated sites and the onshore infrastructure are shown in Table 2.1. Details of each designated site are provided below. The location of these sites is shown on Figure 9.2.

Table 2.1 European and Ramsar sites within 5km of the onshore infrastructure

European / Ramsar site	Closest point to the onshore infrastructure
River Wensum SAC	**Lies within the onshore project area**
Paston Great Barn SAC	**3km (located north-east of the onshore project area)**
Norfolk Valley Fens SAC	**Constituent SSSIs located within 5km of the onshore project area:** ***Booton Common*: 0.6km (located south of the onshore project area)** ***Potter & Scarning Fens, East Dereham*: 2.8km (located south of the onshore project area)** ***Southrepps Common*: 3.3km (located north of the onshore project area)** ***Badley Moor*: 3.5km (located south of the onshore project area)** ***Buxton Heath*: 3.8km (located south of the onshore project area)**
The Broads SAC	**4.5km (located south of the onshore project area)**
Broadland SPA and Ramsar site	**4.5km (located south of the onshore project area)**

2.1.1 River Wensum SAC

46. The River Wensum SAC[1] covers approximately 307ha and includes the river and certain adjacent floodplain habitats from its source near Fakenham to its confluence with the River Tud at Norwich. The river is a naturally enriched, calcareous lowland river. The upper reaches are fed by springs that rise from the chalk and by run-off from calcareous soils rich in plant nutrients. This gives rise to beds of submerged and emergent vegetation characteristic of a chalk stream. Lower down, the chalk is overlain with boulder clay and river gravels, resulting in aquatic plant communities more typical of a slow-flowing river on mixed substrate. Much of the adjacent land is

[1] http://jncc.defra.gov.uk/ProtectedSites/SACselection/n2kforms/UK0012647.pdf

managed for hay crops and by grazing, and the resulting mosaic of meadow and marsh habitats, provides niches for a wide variety of specialised plants and animals.

47. The qualifying features of the River Wensum SAC are summarised in Table 2.2.

Table 2.2 River Wensum SAC qualifying features

Qualifying features/reasons for notification
Annex I habitats that are a primary reason for selection of this site: • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Annex II species that are a primary reason for selection of this site: • White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes.* Annex II species present as a qualifying feature, but not a primary reason for selection of this site: • Desmoulin's whorl snail *Vertigo moulinsiana* • Brook lamprey *Lampetra planeri* • Bullhead *Cottus gobio*

48. The River Wensum SAC conservation objectives are as follows:

49. Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

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

2.1.2 Paston Great Barn SAC

50. Paston Great Barn SAC[2] covers approximately 1ha and the only known example of a maternity roost of barbastelle bats *Barbastella barbastellus* in a building. The Barn is a 16th century thatched barn with associated outbuildings. A maternity colony of barbastelles utilises a range of cracks and crevices in the roof timbers for roosting.

51. The qualifying features of the Paston Great Barn SAC are summarised in Table 2.3.

[2] http://jncc.defra.gov.uk/ProtectedSites/SACselection/n2kforms/UK0030235.pdf

Table 2.3 Paston Great Barn SAC qualifying features

Qualifying features/reasons for notification
Annex II species that are a primary reason for selection of this site • Barbastelle

52. Paston Great Barn SAC's conservation objectives are as follows:

53. Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

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

2.1.3 Norfolk Valley Fens SAC

54. Norfolk Valley Fens SAC[3] comprises a series of valley-head spring-fed flush fens located throughout Norfolk. The fens collectively represent 616ha of fen habitat at 17 separate sites within the county. Such spring-fed flush fens are very rare in the lowlands. The spring-heads are dominated by the small sedge fen type, mainly referable to black-bog-rush – blunt-flowered rush (*Schoenus nigricans – Juncus subnodulosus*) mire, but there are transitions to reedswamp and other fen and wet grassland types. The individual fens vary in their structure according to intensity of management and provide a wide range of variation. There is a rich flora associated with these fens, including species such as grass-of-Parnassus *Parnassia palustris*, common butterwort *Pinguicula vulgaris*, marsh helleborine *Epipactis palustris* and narrow-leaved marsh-orchid *Dactylorhiza traunsteineri*.

55. The qualifying features of the Norfolk Valley Fens SAC are summarised in Table 2.4.

Table 2.4 Norfolk Valley Fens SAC qualifying features

Qualifying features/reasons for notification
Annex I habitats that are a primary reason for selection of this site: • Alkaline fens Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Northern Atlantic wet heaths with *Erica tetralix* • European dry heaths • Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) • Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (Priority feature)

[3] http://jncc.defra.gov.uk/ProtectedSites/SACselection/n2kforms/UK0012892.pdf

Qualifying features/reasons for notification
• Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)(priority feature) Annex II species that are a primary reason for selection of this site: • Narrow-mouthed whorl snail *Vertigo angustior* • Desmoulin`s whorl snail *Vertigo moulinsiana*

56. Norfolk Valley Fens SAC's conservation objectives are as follows:

57. Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

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

2.1.4 The Broads SAC

58. The Broads SAC contains several examples of naturally nutrient-rich lakes which support relict vegetation of the original Fenland flora, and collectively this site contains one of the richest assemblages of rare and local aquatic species in the UK. The broads are the richest area for stoneworts (charophytes) in Britain, contain the largest blocks of alder *Alnus glutinosa* wood in England, and contain the largest example of calcareous fens in the UK. The qualifying features of the Broads SAC are set out in Table 2.5.

Table 2.5 The Broads SAC qualifying features

Qualifying features/reasons for notification
Annex I habitats that are a primary reason for selection of this site: • Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp.* • Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation • Transition mires and quaking bogs • Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [Priority feature] • Alkaline fens • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [Priority feature] Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site • *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) Annex II species that are a primary reason for selection of this site • Desmoulin's whorl snail

Qualifying features/reasons for notification
• Fen orchid *Liparis loeselii* • Ramshorn snail *Anisus vorticulus* Annex II species present as a qualifying feature, but not a primary reason for site selection • Otter *Lutra lutra*

59. The Broads SAC's conservation objectives are as follows:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

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

2.1.5 Broadland SPA

60. The Broadland SPA[4] covers approximately 5508ha. Table 2.6 summarises the qualifying features of the Broadland SPA.

Table 2.6 Qualifying features of the Broadland SPA (*population counts are derived from the SPA citation*)

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:
Over winter;
Bewick's Swan Cygnus *columbianus bewickii*, 495 individuals representing up to 7.1% of the wintering population in Great Britain (5 year peak mean 1987/8-1991/2)
Bittern *Botaurus stellaris*, 2-3 individuals representing up to 10-15% of the wintering population in Great Britain (5 year peak mean 1987/8-1991/2)
Hen Harrier *Circus cyaneus*, 22 individuals representing up to 3% of the wintering population in Great Britain (5 year peak mean 1987/8-1991/2)
Ruff *Philomachus pugnax*, 96 individuals representing up to 6.4% of the wintering population in Great Britain (5 yr peak mean 1987/8-1991/2)
Whooper Swan *Cygnus cygnus*, 121 individuals representing up to 2% of the wintering population in Great Britain (5 yr peak mean 1987/8-1991/2)
Marsh Harrier *Circus aeruginosus*, 16 individuals representing up to 16% of the wintering population in Great Britain (5 year peak mean 1987/8-1991/2)
This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

[4] http://jncc.defra.gov.uk/pdf/SPA/UK9009253.pdf

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:
Over winter;
Gadwall *Anas strepera*, 486 individuals representing up to 4.0% of the wintering Northwestern Europe population (5 yr peak mean 1987/8-1991/2)
Shoveler *Anas clypeata*, 675 individuals representing up to 1.7% of the wintering Northwestern Europe population (5 yr peak mean 1987/8-1991/2)
Widgeon *Anas penelope*, 8,966 individuals representing up to 1.2% of the wintering Northwestern Europe population (5 yr peak mean 1987/8-1991/2)
The following species was also included under the SPA Review (Stroud et al. 2001):
Pink-footed Goose *Anser brachyrhynchus*, 3,290 individuals representing up to 1.5% of the wintering Eastern Greenland/Iceland/UK population (5 yr peak mean 1994/5-1998/9)
Under the SPA Review (Stroud et al. 2001), the area also qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Over winter, the area regularly supports 22,603 individual waterfowl (RSPB, Count 99/00) including:
Cormorant *Phalacrocorax carbo*, Bewick's Swan Cygnus *columbianus bewickii*, Whooper Swan *Cygnus cygnus*, Ruff *Philomachus pugnax*, Pink-footed Goose *Anser brachyrhynchus*, Gadwall *Anas strepera*, Bittern *Botaurus stellaris*, Great Crested Grebe *Podiceps cristatus*, Coot *Fulica atra*, Bean Goose *Anser fabalis*, White-fronted Goose *Anser albifrons albifrons*, Wigeon *Anas penelope*, Teal *Anas crecca*, Pochard *Aythya ferina*, Tufted Duck *Aythya fuligula*, Shoveler *Anas clypeata*.

61. Following consultation with Natural England undertaken in September 2016, Natural England has supplied draft maps of functionally-linked (i.e. supporting) land for pink-footed goose outside of the Broadland SPA boundary (Natural England, pers. comm. 9th September 2016). This information provides additional baseline data on the key areas for this Broadland SPA qualifying species within the scoping area. A copy of these draft maps are provided in Annex 1.

62. The maps indicate that, based on the 2008/9-2012/3 distribution, the key feeding areas for pink-footed geese within the study area are located in a triangle between the villages of Happisburgh, Bacton and Witton Bridge, towards the east of the study area.

2.1.6 Broadland Ramsar Site

63. The Broadland Ramsar site shares a boundary with the Broadland SPA site and its reasons for designated are provided in Table 2.7.

Table 2.7 Qualifying features of the Broadland Ramsar site (*population counts are derived from the Ramsar Information Sheet*)

Ramsar criterion 6 – species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation):
Species with peak counts in winter:
Tundra swan, NW Europe 196 individuals, representing an average of 2.4% of the GB population (5 year peak mean 1998/9- 2002/3)
Eurasian wigeon, NW Europe 6769 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Ramsar criterion 6 – species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation):
Gadwall, NW Europe 545 individuals, representing an average of 3.1% of the GB population (5 year peak mean 1998/9- 2002/3)
Northern shoveler, NW & C Europe 247 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9- 2002/3)
Species/populations identified subsequent to designation for possible future consideration under criterion 6.
Species with peak counts in winter:
Pink-footed goose, Greenland, Iceland/UK 4263 individuals, representing an average of 1.7% of the population (5 year peak mean 1998/9-2002/3)
Greylag goose, *Anser anser anser*, Iceland/UK, Ireland 1007 individuals, representing an average of 1.1% of the population (Source period not collated)

3 BASELINE ENVIRONMENT

64. The existing environment for onshore ecology and ornithology are described in Chapters 22 Onshore Ecology and Chapter 23 Onshore Ornithology.

3.1 Data sources

65. Desk-based and field survey data has been collected from July 2016 through till August 2018 in order to inform the EIA process which is being undertaken for the project. The ecological baseline which is generated from this data collection programme will be used to inform the HRA process. The data sources used to inform this HRA screening are summarised in Table 3.1.

66. As field surveys were ongoing at the time of this screening assessment, full ecological survey data with respect to the qualifying features of the European and Ramsar sites within 5km of the onshore infrastructure were not available when this screening assessment was undertaken, however a full suite of data included in the Information to inform HRA Report which is being submitted as part of the DCO application.

67. All data sources upon which the ecological baseline is based are considered to be compliant with the relevant survey guidance and to provide robust evidence of the ecological receptors present with the study area.

Table 3.1 Data sources

Data source	Date	Data contents	Coverage	Status
Desk study data				
JNCC	July 2016 (updated March 2018)	Internationally designated sites (SPA, SAC, Ramsar sites)	Onshore project area plus a 2km buffer	Data obtained
JNCC Natural England	July 2016 (updated March 2018)	UK designated sites (SSSI, NNR, LNR, Ancient Woodland)	Onshore project area plus a 2km buffer	Data obtained
JNCC	July 2016 (updated March 2018)	UK Habitats of Principal Importance	Onshore project area plus a 50m buffer	Data obtained
Norfolk Biodiversity Information Service (NBIS)	July 2016	Locally designated sites (CWS, Roadside Nature Reserves (RNR))	Onshore project area plus a 2km buffer	Data obtained
NBIS	July 2016	Protected and notable species records including: • Wildlife & Countryside Act 1981 Schedules 1,5, 8 & 9; • The Conservation of Habitats & Species Regulations 2017 Schedules 2 & 5; • Protection of Badgers Act 1992; • Bonn Convention Appendix 1 & 2; • Bern Convention Annex 1 & 2; • Bern Convention Appendix 2 & 3; • Habitats Directive Annex 2, 4 & 5; • NERC Act 2006 Section 41 species; • UK BAP species (both local and national);	Onshore project area plus a 2km buffer (5km for bats)	Data obtained

Data source	Date	Data contents	Coverage	Status
		• UK species of principal importance (both local and national); • BoCC4 Red and Amber list species; • Veteran trees[5]; IUCN Red List Species; • Nationally Notable species; and • Locally Rare species.		
APEM	March 2017	High-resolution aerial photography data	Onshore project area plus a 50m buffer	Data obtained
NBIS	March 2017	Norfolk 'Living Map' remote sensing habitat mapping data	Onshore project area plus a 50m buffer	Data obtained
Norfolk Barbastelle Study Group	June 2017 (*further clarification on data provided January 2018*)	Barbastelles *Barbastella barbastellus*: • Radiotracking data for maternity colonies, to show roost locations and home ranges; • Barbastelle roosts (summer and winter), commuting routes (at hedgerow level as far as possible), core foraging areas; • Additional acoustic data for later summer/autumn. Other bat species: • Roosts, species, type and counts; and • Acoustic records.	Radiotracking data and other species roost data: Onshore project area plus a 5km buffer Commuting routes and acoustic data: onshore project area plus 50m buffer	Data obtained
Natural England	August 2016	Sensitivity maps for the following Broadland SPA species from 1986/87 to 2012/13: • Berwick's Swan; • Whooper swan; and • Pink-footed goose	10km buffer around Broadland SPA	Data obtained
NWT	July 2017	Management Statement for Kerdiston Old Hall Meadows	Site-specific information	Data obtained
Environment Agency	March 2018	Records of:	Watercourses in the Wensum and Bure catchments within the	Data obtained

[5] Veteran trees are not precisely defined (Forestry Commission, 2018), however the criteria set out in *Veteran Trees: A guide to good management* (Natural England, 2000) has been used here.

Data source	Date	Data contents	Coverage	Status
		• Crayfish (all species); • Fish species from the National Fish Population Database Details of river restoration works at Wendling Beck.	onshore project area plus a 50m buffer	
Field survey data				
2017 Extended Phase 1 Habitat Survey	February 2017	An Extended Phase 1 Habitat Survey following 'Extended Phase 1' methodology as set out in *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment (IEMA), 1995). Habitats were classified and mapped following JNCC's *Handbook for Phase 1 habitat survey: A technique for environmental audit* (2010). Included a search for: • Field signs of badgers; • Assessment of roost suitable of trees and structures for bats; • Assessment of commuting / foraging suitability of all linear features for bats; • Field signs of otter *Lutra lutra*; • Assessment of suitability of watercourse to support water voles *Arvicola amphibius*; • Habitats suitability assessment of all standing water bodies for ability to support great crested newts; • Assessment of suitability of habitats to support reptiles; • Assessment of suitability of habitats to notable invertebrates; • Evidence of non-native invasive species; and • assessment of suitable habitats to support common and notable[6] breeding birds.	Great crested newts: Onshore project area plus 250m buffer (temporary works) and 500m buffer (permanent works) All other habitats and species: Onshore project area plus a 50m buffer) Coverage of approx. 50% of survey area.	Full survey results available
2017 Water Vole Survey	May-June 2017	A water vole presence / absence and population estimate survey of those watercourses identified as suitable to support water voles during the Extended Phase 1 Habitat Survey. Field signs of otters were also searched for during this survey.	Onshore project area plus a 50m buffer Coverage of approx. 50% of survey area.	Full survey results available

[6] Notable species are defined here as those listed on Annex 1 of the Birds Directive, UK Red or Amber List species, UKSPI or Norfolk LBAP species.

Data source	Date	Data contents	Coverage	Status
2017 Bat Emergence / Re-entry Surveys	April - October 2017	Bat emergence / re-entry surveys of all trees and structures identified during the Extended Phase 1 Habitat Survey as providing moderate or high suitability to support roosting bats.	Onshore project area plus a 50m buffer	Full survey results available
2017 Bat Activity Surveys	May - October 2017	Bat activity surveys of all linear features (hedgerows, watercourses scrub patches and woodland edges, coastline) identified during the Extended Phase 1 Habitat Survey as providing moderate or high suitability to support commuting or foraging bats.	Onshore project area plus a 50m buffer	Full survey results available
2017 Desmoulin's whorl snail	July 2017	A survey for the Desmoulin's whorl snail within floodplain habitats adjacent to the River Wensum.	Floodplain habitats of the River Wensum	Full survey results available
2017 *Odonata* Transect Survey	July 2017	A transect survey for the Norfolk hawker (adult stage) along drainage ditches adjacent to the River Bure.	Drainage ditches of the River Bure floodplain	Full survey results available
2017 Botanical National Vegetation Classification (NVC) Survey	July 2017	A NVC survey searching for the qualifying flora species (Stream water-crowfoot *R. penicillatus ssp. Pseudofluitans*, thread-leaved water-crowfoot *R. trichophyllus* and fan-leaved water-crowfoot *R. circinatus*) of the River Wensum SAC.	Floodplain habitats of the River Wensum	Full survey results available
Wintering bird surveys	February 2017	A survey of ex situ habitats of the Broadland SPA, and of those SSSI within 1km of the cable route which support wintering bird interest features. This includes surveys of the following areas: • Agricultural fields in North Walsham District; • Dereham Rush Meadows SSSI; • Hundred Stream; and • North Norfolk Coast between Eccles-on-Sea and Paston.	Habitats within 300m[7] of the onshore infrastructure and 5km of the Broadland SPA; SSSI within 300m of the onshore infrastructure.	Full survey results available

[7] A 300m buffer for potential impacts on wintering and breeding bird species was agreed with Natural England in January 2017 (Onshore Wintering Bird Surveys Survey Methodology Approach Update (Document reference: PB4476.003.038), based on an estimated the maximum distance that bird species are likely to be subject to disturbance effects from construction activities provided by Ader & Bryant (2003).

Data source	Date	Data contents	Coverage	Status
Breeding bird survey	August 2017	A breeding bird surveys of the following areas: • Booton Common SSSI; • Dillington Carr SSSI; • Dereham Rush Meadows SSSI; • Land South of Dillington Carr CWS; • Coastal floodplain grazing marsh habitat has been identified along the habitats adjacent to the river within the survey area; and • Pigney's Wood LNR.	Designated sites supporting ornithological interest features within 300m of the onshore infrastructure.	Full survey results available
2018 Extended Phase 1 Habitat Survey	February 2018	An Extended Phase 1 Habitat Survey following 'Extended Phase 1' methodology as set out in *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment, 1995). Habitats were classified and mapped following JNCC's *Handbook for Phase 1 habitat survey: A technique for environmental audit* (2010). Included a search for: • Field signs of badgers; • Assessment of roost suitable of trees and structures for bats; • Assessment of commuting / foraging suitability of all linear features for bats; • Field signs of otter; • Assessment of suitability of watercourse to support water voles; • Habitats suitability assessment of all standing water bodies for ability to support great crested newts; • Assessment of suitability of habitats to support reptiles; • Assessment of suitability of habitats to notable invertebrates; • Evidence of non-native invasive species; and • assessment of suitable habitats to support common and notable breeding birds.	15 'priority areas' located within the onshore infrastructure (plus a 50m buffer) for which data was not obtained in 2017. 2017 and 2018 surveys achieved a combined coverage of approx. 65% of survey area.	Full survey results available
2018 Water Vole Survey	May-June 2018	A water vole presence / absence and population estimate survey of those watercourses identified as suitable to support water voles during the 2018 Extended Phase 1 Habitat Survey. Field signs of otters were also searched for during this survey.	All watercourses located within the 15 'priority areas' 2017 and 2018 surveys achieved a combined	Full survey results available

Data source	Date	Data contents	Coverage	Status
			coverage of approx. 65% of survey area.	
2018 Bat Emergence / Re-entry Surveys	April - October 2018	Bat emergence / re-entry surveys of all trees and structures identified during the 2018 Extended Phase 1 Habitat Survey as providing moderate or high suitability to support roosting bats.	All suitable habitats located within the 15 'priority areas' Onshore project area plus a 50m buffer	Full survey results available for Information to inform HRA Report
2018 Bat Activity Surveys	May - October 2018	Bat activity surveys of all linear features (hedgerows, watercourses scrub patches and woodland edges, coastline) identified during the 2018 Extended Phase 1 Habitat Survey as providing moderate or high suitability to support commuting or foraging bats.	All suitable habitats located within the 15 'priority areas' Onshore project area plus a 50m buffer	Full survey results available Information to inform HRA Report
2018 Desmoulin's whorl snail Survey	August 2018	A survey for the Desmoulin's whorl snail within floodplain habitats adjacent to the River Wensum not surveyed in 2017.	Floodplain habitats of the River Wensum unsurveyed in 2017	Full survey results available Information to inform HRA Report
2018 Botanical NVC Survey	July 2018	A NVC survey searching for the qualifying flora species (Stream water-crowfoot *R. penicillatus ssp. Pseudofluitans*, thread-leaved water-crowfoot *R. trichophyllus* and fan-leaved water-crowfoot *R. circinatus*) of the River Wensum SAC not surveyed in 2017.	Floodplain habitats of the River Wensum unsurveyed in 2017	Full survey results available Information to inform HRA Report

3.2 Desk study data

3.2.1 Desmoulin's whorl snail

68. No records of Desmoulin's whorl snail were identified during the desk study, indicating that this species has not been recorded within 2km of the onshore project area previously.

3.2.2 Bullhead and brook lamprey

69. NBIS holds no records NBIS returned no records of notable fish species within 2km of the onshore project area. The Environment Agency National Fish Population Database returned records of the following Annex II fish species (and qualifying features of the River Wensum SAC) within watercourses within the habitat and species study area:

- Bullhead; and
- Brook lamprey.

70. Table 3.2 summarises the National Fish Population Database for each watercourse within the habitat and species study area.

Table 3.2 National Fish Population Database records for bullhead, brook lamprey and brown trout

Watercourse	Catchment	Species recorded	Record location
Wendling Beck	Wensum	Bullhead Brown Trout	Within the habitat and species study area
Penny Spot Beck	Wensum	Bullhead Brown Trout	Within the habitat and species study area
River Wensum	Wensum	Bullhead Brown Trout Brook lamprey	Upstream and downstream of the habitat and species study area
Reepham Stream (western branch)	Wensum	Bullhead	Upstream of the habitat and species study area
Reepham Stream (eastern branch)	Wensum	Bullhead	Upstream of the habitat and species study area
Booton Watercourse	Wensum	Brown trout	Upstream and downstream of the habitat and species study area

71. These records show that bullhead and brook lamprey are present within tributaries of the River Wensum (and the River Wensum SAC itself) which are crossed by the onshore project area. The records also show that bullhead and brook lamprey are not known to be present within the reaches of the River Wensum which are within the onshore project area.

3.2.3 White-clawed crayfish, bullhead, brook lamprey

72. NBIS holds no records for white-clawed crayfish within 2km of the study area. Advice received from the Environment Agency indicated that white-clawed crayfish are not known to be present in any reaches located within the study area (Environment Agency, pers. comm. 24th March 2017). Further data supplied from the Environment Agency showing the results of the most recent white-clawed crayfish surveys indicates that white-clawed crayfish are not present in the Blackwater, a tributary of the Wensum upstream of the habitat and species study area (Environment Agency, 2018).

73. The River Wensum and River Bure are known to support populations of white-clawed crayfish in other reaches (Environment Agency, 2017).

3.2.4 Barbastelle

74. Norfolk Barbastelle Study Group (NBSG) has undertaken radio-tracking surveys of female barbastelle bats within the Paston Great Barn colony. Radio-tracking of between one and three females has been undertaken on six occasions between August 2013 and April 2015. The data obtained from this radio-tracking survey have been used to build up a picture of the home range for females which form part of the Paston Great Barn colony. The location of this home range is shown on Figure 9.3 of the Information to Support HRA document reference 5.3. The radio-tracking data indicate that the home range for the Paston Great Barn maternity colony covers an area which includes coastal habitat from Mundesley to Walcott in the east, Pigney's Wood and Dilham Canal in the west, and Bacton Wood and land around Witton in the south. This includes an area of approximately 70ha of the onshore project area footprint.

75. The radio-tracking data have also been used by NSBG to identify commuting and foraging routes used by females of the Paston Great Barn maternity colony. Figure 9.5 shows the foraging areas and commuting routes identified using the radio-tracking data. These indicate that the following key commuting and foraging features of the Paston Great Barn maternity colony are located within the onshore project area:

- Dilham Canal and land east of Dilham Canal (foraging);
- Hedgerow along North Walsham Road from Edingthorpe Green to Edingthorpe Heath (commuting/foraging);
- Witton Hall Plantation along Old Hall Road (commuting/foraging);
- Road from Bacton Wood to Witton (commuting); and
- Two hedgerows between Witton and North Walsham Road (commuting/foraging).

76. Occasional foraging has also been recorded at the following location:

- Drains and hedgerows at Ridlington Street.

77. The following points should be noted with regards to these data:

- The key foraging area identified by the radio-tracking data is the coastal cliffs at Mundesley. The inland foraging areas (including all of those listed above) were recorded during inclement weather conditions along the coast, making foraging at the cliffs unfavourable. Inland foraging was therefore also predominantly recorded in spring and autumn; and
- The radio-tracking data are based on data from up to three females from a maternity colony of between 20-55 individuals. Therefore, there are possible other commuting foraging routes used which have not been identified using the radio tracking data.

3.2.5 Otter

78. NBIS holds two records for otter within 2km of the onshore project area. These records are located within the North Walsham and Dilham Canal and within the Pigney's Wood LNR.

3.2.6 Bewick's Swan, whooper swan and pink-footed goose sensitivity maps

79. Natural England has supplied draft maps of functionally-linked (i.e. supporting) land for pink-footed goose outside of the Broadland SPA boundary (up to 5km from the site boundary) (Natural England, pers. comm. 9th September 2016). This information provides additional baseline data on the key areas for this Broadland SPA qualifying species within the onshore infrastructure area. These maps are provided in Annex 1.

80. The maps indicate that, based on the 2008/9-2012/3 distribution, the key feeding areas for pink-footed geese within the study area are located in a triangle between the villages of Happisburgh, Bacton and Witton Bridge, towards the east of the study area.

3.3 Field survey data

3.3.1 Botanical surveys of the River Wensum floodplain

81. The SAC intersects the Norfolk Vanguard cable corridor at Elsing. At the point where the SAC is crossed by the cable corridor, the SAC boundary covers the River Wensum river channel only (i.e. no floodplain habitat), and as such approximately 0.5ha of the SAC are located within the cable corridor. The location of the onshore cable corridor with respect to the SAC boundary and its associated ex-situ habitats is shown in Figure 9.2.

82. In addition to the SAC boundary, there is approximately 9.7ha of floodplain habitat of River Wensum on the right-hand (southern) bank of the River Wensum, and a further 1.3ha on the left-hand (northern) bank of the River Wensum, within the cable corridor. There are also four ditches within the floodplain habitat on the right-hand (southern) bank of the River Wensum, and one further ditch in the floodplain habitat on the left-hand (northern) bank.

83. Following consultation with Natural England during the Norfolk Vanguard EPP in January 2017, a detailed botanical survey of the River Wensum and its floodplain was undertaken to provide baseline information regarding the status qualifying features of the River Wensum SAC within both the SAC boundary and its adjacent floodplain habitats. The location of these surveys is shown in Figure 9.2.

84. The River Wensum within the cable corridor is approximately 2m deep and 20m wide, with good marginal vegetation, often floating in dense mats. Tree coverage is sparse on the southern bank, with only the occasional white willow *Salix alba* recorded. More trees are present on the northern bank, comprising some oaks *Quercus robur* and alders *Alnus glutinosa*.

85. Two main NVC communities (following Rodwell, 2006) were identified within the stretch of the River Wensum surveyed in July 2017:

- A8a-*Nuphar lutea* community, species-poor sub community; and
- S5-Glycerietum maximae swamp, Alisma plantago-aquatica-Sparganium erectum sub community.

86. The semi-improved grassland adjacent to the River Wensum consisted of two main NVC communities (following Rodwell, 2006), which were often transitional to each other:

- MG6 – Lolium perenne-Cynosusus cristatus grassland; and
- MG10 – *Holco-Juncetum effusi* rush pasture.

87. Five separate communities (following Doarks and Leach, 1990) were identified within the drain ditches of the River Wensum floodplain within the survey area:

- Aquatic End Group A5b – *Lemna minor-Lemna trisulca*-filamentous algae;
- Aquatic End Group A6 - Callitriche stagnalis/platycarpa;
- Aquatic End Group A7b - Potamogenton pectinatus-Myriophyllum spicatum;
- Emergent End Group E1 – Carex riparia/acutiformis-Phragmities australis;
- Emergent End Group E2 – Glyceria Maxima-Berula erecta; and
- Emergent End Group E3 - *Juncus effusus.*

88. None of the associated with the River Wensum SAC habitat were recorded during the botanical survey within the River Wensum or its floodplain (*R. peltatus, R. penicillatus ssp. pseudofluitans or R. fluitans*).

89. There was no evidence of calcareous ground water spring or seepage activity with the survey area. The full findings of the botanical survey are shown in Appendix 22.7.

90. No surveys were conducted on the floodplain on the left-hand (northern) bank of the River Wensum in 2017 due to landowner access restrictions. Surveys of this area were undertaken during 2018 and will inform the Information to inform the HRA Report.

3.3.2 Desmoulin's whorl snail surveys

91. As noted above, the SAC intersects the Norfolk Vanguard cable corridor at Elsing, and at the point where the SAC is crossed by the cable corridor, the SAC boundary covers the River Wensum river channel only (i.e. no floodplain habitat). The location of the onshore cable corridor with respect to the SAC boundary and its associated ex-situ habitats relevant to the Desmoulin's whorl snail are shown in Appendix 22.6 of the ES.

92. In addition to the SAC boundary, there are also four ditches within the floodplain habitat on the right-hand (southern) bank of the River Wensum, and one further ditch in the floodplain habitat on the left-hand (northern) bank.

93. Following consultation with Natural England during the Norfolk Vanguard EPP in January 2017, a Desmoulin's whorl snail survey of the River Wensum and its associated ditches was undertaken to provide baseline information regarding the status this species within both the SAC boundary and its associated ditches.

94. Desmoulin's whorl snail surveys of the southern bank of the River Wensum and the ditches of the floodplain on the southern bank of the River Wensum (the 'survey area') were carried out in August 2017, following the monitoring protocol developed by Killen and Morkens (2003). The location of the surveys detailed in Appendix 9.2.

95. Desmoulin's whorl snail was not recorded during any survey, and is therefore considered to be absent from the survey area. The full findings of the Desmoulin's whorl snail survey are shown in Appendix 22.6 of the ES.

96. No surveys were conducted within the single ditch on the left-hand (northern) bank of the River Wensum in 2017 due to landowner access restrictions. Surveys of these areas were undertaken during 2018 and will inform the Information to inform the HRA Report

3.3.3 Barbastelle bat surveys

97. During 2017, a suite of bat activity surveys were undertaken along two transects within the onshore project area and within 5km of the Paston Great Barn SAC between May and October. The location of these transects is shown in Figure 9.4 of the Information to Support HRA document reference 5.3.

98. Data were collected over six months with the aim of providing a detailed understanding of the usage of potential commuting and foraging features within the onshore project area by bats. Transects were designed to cover all linear features which had been identified (and subsequently assessed) as providing 'moderate' or greater suitability for supporting commuting of foraging bats following the Bat Conservation Trust's *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins *et al.,* 2016). Where survey access was possible, all transects were walked bi-monthly and all bat echolocations recorded. Static detectors were also set out along each transect for five nights each month, with two or three detectors placed on transects covering linear features identified as providing 'moderate' or 'high' suitability for supporting commuting of foraging bats respectively. Full details of the 2017 bat activity surveys are provided within Appendix 22.4.

99. These transects covered the following areas identified above by the NBSG's radio-tracking data:

- Dilham Canal (foraging);
- Witton Hall Plantation along Old Hall Road (commuting/foraging); and
- Road from Bacton Wood to Witton (commuting).

100. Barbastelles were recorded commuting and foraging along all two transects. The key findings from the 2017 transect surveys are summarised in Table 3.3 below.

Table 3.3 Barbastelle records for all transects located within 5km of Paston Great Barn

Transect	Transect location	Total species peak count	Barbastelle peak count (per night)	Months barbastelle recorded	Further comments
BACT 21	Dilham Canal and land east of Dilham Canal	529	2	October only	Occasional barbastelle record only, barbastelles only associated with hedgerow along Hall Lane
BACT 22	Witton Hall, Witton Hall Plantation and Edingthorpe Road	1650	13	Full survey period (May – October)	Barbastelles recorded throughout transect

101. Any commuting / foraging feature where bats have been recorded during more than a single visit (i.e. BACT 22) are considered to be important features for supporting barbastelle bats. Although BACT 21 (Dilham Canal and land east of Dilham Canal) only recorded a single possible barbastelle record (two passes within a few minutes of each other, likely the same individual), given the radio-tracking data for this site it is also considered to be an important feature for bats.

102. Further bat activity survey data within the Paston Great barn SAC maternity colony's home range has been undertaken during 2018 and will inform the Information to inform the HRA Report.

3.3.4 Otter

103. Field signs of otter were searched for during the 2017 and 2018 water vole surveys (see Appendix 22.3 of ES). Otter spraints were found in two locations, at WV15 (tributary of the River Wensum) and at WV22 (the River Bure). Feeding remains were also found at the River Bure in 2018. No holts were found during the 2017 and 2018 water vole surveys.

3.3.5 Wintering / passage bird surveys

104. A desk-based scoping exercise was undertaken in August 2016 to identify those habitats which may support wintering / passage bird species associated with statutory designated sites for nature conservation (Onshore Winter / Passage Bird Survey Scoping Report. Document Reference: PB4476-003-024 (Royal HaskoningDHV 2016b)). This assessment identified both in situ and ex situ habitats that have the potential to support the ornithological interest features of all internationally designated sites within 5km of the project scoping area. As such a suite of wintering birds surveys focussing on these habitats and areas, in order to describe the nature of the ornithological resource at these habitats, were recommended, the scope and methodology of which was agreed with Norfolk County Council and Natural England

in August 2016 and February 2017 (Natural England, pers. comm. 9th September 2016; Natural England, pers. comm. 5th September 2016; Natural England, pers. comm. 21st February 2017). The results of these surveys are summarised here, are presented in full in Appendix 23.2 of Chapter 23 Onshore Ornithology.

105. Following the ongoing site selection process for the project, the scoping area was revised into an onshore infrastructure area in December 2016. Following this, the scope of the planned wintering bird surveys were revised to only include those habitats with the potential to support the ornithological interest features of the internationally designated sites within 5km of the revised onshore infrastructure area. Therefore data for the full survey period, October – March, was collected for the following habitats:

- Agricultural land within 5km of the Broadland SPA and Ramsar site, and also within – or within a precautionary 1km disturbance buffer of – the onshore infrastructure;
- Coastal habitats within 5km of the Broadland SPA and Ramsar site, and also within – or within a precautionary 1km disturbance buffer of – the onshore infrastructure; and
- Lowland fen, rivers and lakes and lowland heathland habitats of the Hundred Stream within 5km of the Broadland SPA and Ramsar site, and also within – or within a precautionary 1km disturbance buffer of – the onshore infrastructure.

106. The findings of the wintering bird surveys of these habitats is summarised in the following section.

3.3.5.1 Agricultural fields in North Walsham District

107. All agricultural habitats (i.e. pasture and arable) within 5km of the Broadland SPA and Ramsar site were surveyed for their potential to support wintering populations of qualifying features of the Broadland SPA. These habitat areas were identified by the Onshore Wintering / Passage Bird Survey Scoping Report, and are shown on Figure 9.3.

Table 3.4 Agricultural fields in North Walsham District: peak count[8] of waterbird species across six visits

Importance	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Golden plover	-	-	-	-	-	120
Lapwing	-	-	-	-	-	197
Black-headed gull	-	-	-	-	28	192
Common gull	-	-	-	-	23	74

108. The recorded waterbird counts are considered to not be of a scale of national or greater importance or to be a significant component of the Broadland SPA.

109. Flocks of pink-footed geese were observed in flight during the surveys, but no evidence to confirm their roosting, foraging or loafing was noted within the study area. The peak size of these mobile flocks was approximately 2,000 individuals.

3.3.5.2 Hundred Stream

110. Reedbed, Lowland fen, Rivers and Lakes and Lowland heathland within 5km of the Broadland SPA and Ramsar site were surveyed for their potential to support wintering populations of qualifying features of the Broadland SPA. These habitat areas were identified along the Hundred Stream by the Onshore Wintering / Passage Bird Survey Scoping Report which was consulted on as part of the Norfolk Vanguard Evidence Plan Process (see Chapter 7 Technical consultation), and are shown on Figure 9.4.

Table 3.5 Habitats along the Hundred Stream: peak count[8] of waterbird species across six visits

Species	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Pink-footed Goose	-	-	75	-	-	-
Mallard	-	2	-	4	-	3
Black-headed Gull	-	-	47	1	4	2

111. Flocks of pink-footed geese were observed in flight during the surveys, but no evidence of them roosting, foraging or loafing was noted.

112. The recorded waterbird counts are considered to not be of a scale of national or greater importance or to be a significant component of the Broadland SPA.

3.3.5.2.1 North Norfolk Coast between Eccles-on-Sea and Paston

113. Coastal habitats within 5km of the Broadland SPA and Ramsar site were surveyed for their potential to support wintering populations of qualifying features of the Broadland SPA. These habitats areas were identified along the coast between Eccles-

[8] Peak counts highlighted in yellow

on-Sea and Paston by the Onshore Wintering / Passage Bird Survey Scoping Report, and are shown on Figure 9.4.

Table 3.6 North Norfolk Coast between Eccles-on-Sea and Paston: peak count[8] of waterbird species across six visits

Species	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Red-throated Diver	5	11	3	16	14	17
Black-throated Diver	-	-	1	1	2	-
Great Northern Diver	-	-	-	1	-	-
Great Crested Grebe	-	1	-	-	-	-
Cormorant	15	-	-	-	-	6
Gannet	2	1	-	2	7	70
Dark-bellied Brent Goose	4	-	1	-	-	-
Wigeon	-	-	11	-	-	-
Teal	14	-	-	-	-	-
Mallard	-	2	4	-	-	-
Shoveler	-	-	1	-	-	-
Eider	-	11	-	-	-	-
Common Scoter	14	53	-	3	15	-
Goldeneye	4	-	-	-	-	-
Red-breasted Merganser	-	4	-	-	-	-
Kestrel	-	1	-	-	-	-
Oystercatcher	-	-	-	2	-	3
Ringed Plover	-	8	12	1	5	3
Sanderling	-	7	2	3	2	-
Dunlin	-	2	-	-	-	-
Purple Sandpiper	-	1	-	-	-	-
Turnstone	30	38	26	26	29	49
Mediterranean Gull	1	2	2	1	2	2
Little Gull	-	-	-	1	-	-
Black-headed Gull	1,479	1,269	3,530	189	143	664
Common Gull	256	500	1,106	26	54	207
Lesser Black-backed Gull	4	7	1	1	2	3
Herring Gull	150	355	172	125	110	218
Great Black-backed Gull	110	568	79	41	16	47
Glaucous Gull	-	-	-	-	2	-
Kittiwake	-	-	-	-	-	8
Guillemot	10	7	16	20	10	1
Razorbill	-	2	2	2	2	-
Puffin	-	-	-	1	-	-
Auk sp.	1	-	-	1	-	-
Great Skua	1	2	-	-	-	1
Kingfisher	-	2	-	-	-	-
Carrion Crow	13	3	11	8	8	8
Jackdaw	8	-	1	-	-	-
Pied Wagtail	1	2	8	5	2	11
Meadow Pipit	-	2	3	-	-	3
Rock Pipit	-	-	-	-	-	2
Wren	-	-	1	-	-	-

Species	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Stonechat	-	1	-	-	-	-
Black Redstart	1	-	-	-	-	-
Starling	-	42	8	16	27	48
Snow Bunting	1	7	-	-	-	-
House Sparrow	-	-	1	-	-	1

114. The recorded waterbird counts are considered not to be of a scale of national or greater importance or to be a significant component of the Broadland.

3.3.6 Extended Phase 1 Habitats Survey

115. The Extended Phase 1 Habitat Survey conducted in February 2017 and February 2018 identified habitats and protected species potential within the onshore infrastructure. The full results of the Extended Phase 1 Habitat Survey are presented in Appendix 22.1.

116. Figure 22.5(a-c) within Chapter 22 Onshore Ecology shows those habitats recorded within 5km of the designated sites which have been screened in for further assessment.

3.3.6.1 Barbastelle

117. The Paston Great Barn SAC is situated 3km from the onshore project area at its closest point (Edingthorpe Green). However approximately 80ha of the onshore project area is located within 5km of the Paston Great Barn SAC, covering land from Swafield in the west to Ridlington in the East. Within this 5km range, the land is predominantly arable crop and hedgerows.

118. The findings of the Extended Phase 1 Habitat Surveys conducted in 2017 and 2018 and habitat mapping data from the Norfolk living Map were used to identify what habitats were suitable for support commuting and foraging barbastelle located within 5km of the Paston Great Barn SAC. Table 3.7 summarises the habitats which are present within this 5km area and their approximate area in hectares (ha).

Table 3.7 Habitat footprints within the onshore project area within 5km of Paston Great Barn SAC

Habitat type	Area (ha)
Broadleaved woodland - semi-natural	1.56
Broadleaved woodland - plantation	0.56
Scrub - dense/continuous	0.62
Broadleaved Parkland/scattered trees	0.15
Improved grassland	1.76
Marsh/marshy grassland	4.23
Poor semi-improved grassland	0.68

Habitat type	Area (ha)
Standing water	0.11
Cultivated/disturbed land - arable	52.24
Habitat	**Length (m)**
Hedge with trees - native species-rich	533
Hedge with trees - native species-poor	227

4 SCREENING ASSESSMENT

4.1 Introduction

119. This section presents the screening for LSE (Stage 1 of the HRA process). The qualifying features of each European or Ramsar site is considered against the ZOI of the different environmental parameters to determine whether an LSE may occur. Where the ZOI overlaps with either (i) the European or Ramsar site boundary or (ii) the ex-situ habitats associated with the European or Ramsar site, it will be noted that a LSE may occur and further assessment at the AA stage of the HRA process (Stage 2) will be required for that qualifying feature. Where no pathway to LSE is identified, it will be recommended that potential LSE upon that qualifying feature will not be considered further. If there is any uncertainty as to whether or not a LSE could arise, the precautionary principle has been applied and LSE concluded to ensure that the potential implications for the site are assessed further at the AA stage.

120. Potential effects upon each European or Ramsar site have been considered in the following four categories:

- **Direct effects within the site boundary** (i.e. onshore infrastructure located within the site boundary);
- **Direct effects on ex-situ habitats of site** (i.e. onshore infrastructure located within habitats located outside the site boundary but which have the potential to support its interest features);
- **Indirect effects within the site boundary** (i.e. the site boundary falls within the ZOI of an environmental parameter associated with the onshore infrastructure); and
- **Indirect effects on ex-situ habitats of site** (i.e. habitats located outside the site boundary but which have the potential to support its interest features falls within the ZOI of an environmental parameter associated with the onshore infrastructure).

4.2 River Wensum SAC

121. The River Wensum supports the following qualifying features:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation;
- White-clawed (or Atlantic stream) crayfish;
- Desmoulin's whorl snail;
- Brook lamprey; and
- Bullhead.

122. In the absence of more detailed information being available as to the location of these features, it has been assumed that they are present throughout the River Wensum SAC.

4.2.1 Direct effects within SAC boundary

123. The River Wensum is located within the onshore project area. The onshore cable corridor crosses the River Wensum at Elsing. As part of the embedded mitigation for the project, a trenchless technique (e.g. HDD) will be used when crossing the River Wensum. This technique will ensure that there are no direct effects upon any of the qualifying features of the SAC within the site boundary, and therefore potential direct effects upon the SAC boundary are **screened out** from any further assessment.

4.2.2 Direct effects upon ex-situ habitats

124. The following interest features of the River Wensum may also be present in habitats functionally connected to the River Wensum, including coastal floodplain and grazing marsh habitat:

- *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation; and
- Desmoulin's whorl snail.

125. The trenchless crossing techniques required for the project will involve activities located within coastal floodplain grazing marsh adjacent to the River Wensum at Elsing. In light of this, there is the potential for direct effects upon these qualifying features to occur, and therefore these potential effects been **screened in** for further assessment.

126. The ditches present within the coastal and floodplain grazing marsh habitats were assessed during the 2017 Extended Phase 1 Habitat Survey as being sub-optimal habitat for white-clawed crayfish and freshwater fish species. These ditches are separated from the River Wensum by water control structures and are static water bodies with silty beds, and do not possess suitable gravel beds for spawning. Consequently these habitats do not provide a suitable habitat for the remaining qualifying features of the River Wensum SAC, specifically:

- White-clawed (or Atlantic stream) crayfish;
- Brook lamprey; and
- Bullhead.

127. As such, potential effects upon these qualifying features have been **screened out** of further assessment.

4.2.3 Indirect effects within SAC boundary

128. Table 4.1 summarises the potential indirect effects upon the qualifying features of the River Wensum SAC.

Table 4.1 The ZOI of potential indirect effects on the River Wensum SAC boundary

Environmental parameter	Zone of influence of potential effect
Noise	The qualifying features of the River Wensum SAC are not sensitive to noise, visual, air quality or light disturbance, so indirect effects upon these qualifying features will not occur and these effects have been **screened out** of further assessment.
Air quality	
Light	
Visual disturbance	
Geology and land contamination	The trenchless crossing techniques will involve construction activities within 500m of the River Wensum SAC. This will include HDD beneath the River Wensum SAC, excavation at HDD receptor sites and cable trenching within the River Wensum floodplain. As a consequence, potential indirect effects arising as a result of land contamination encountered during construction have been **screened in** for further assessment.
Groundwater and Hydrology	Trenchless crossing techniques will involve construction activities within 1km of the River Wensum SAC. This will include trenchless activities beneath the River Wensum SAC, excavation at HDD receptor sites and cable trenching within the River Wensum floodplain. As a consequence, potential indirect effects arising as a result of changes to the groundwater / hydrology regime have been **screened in** for further assessment.

4.2.4 Indirect effects on ex-situ habitats

129. Table 4.2 summarises the potential indirect effects upon the qualifying features of the River Wensum SAC.

Table 4.2 The ZOI of potential indirect effects on the River Wensum SAC ex-situ habitats

Environmental parameter	Zone of influence of potential effect
Noise	The qualifying features of the River Wensum SAC are not sensitive to noise, visual, air quality or light disturbance, so indirect effects upon these qualifying features will not occur and these effects have been **screened out** of further assessment.
Air quality	
Light	
Visual disturbance	
Geology and land contamination	Trenchless crossing techniques will involve construction activities within 500m of the coastal floodplain grazing marsh ex-situ habitats of the River Wensum SAC. This will include excavation at HDD receptor sites and cable trenching within 500m of the River Wensum floodplain. As a consequence, potential indirect effects arising as a result of land contamination encountered during construction have been **screened in** for further assessment.
Groundwater and Hydrology	Trenchless crossing techniques will involve construction activities within 1km of the coastal floodplain grazing marsh ex-situ habitats of the River Wensum SAC. This will include excavation at HDD receptor sites and cable trenching within 500m of the River Wensum floodplain. As a consequence, potential indirect effects arising as a result of changes to the groundwater / hydrology regime have been **screened in** for further assessment.

4.3 Paston Great Barn SAC

130. Paston Great Barn supports a colony of Barbastelle bats.

4.3.1 Direct effects within the SAC boundary

131. Paston Great Barn is located 3km from on onshore infrastructure. Therefore direct effects upon the boundary are **screened out** from further assessment.

4.3.2 Direct effects on ex-situ habitats

132. Areas within the onshore infrastructure are known to be foraging areas for the barbastelle colony at Paston Great Barn. As these habitats will be directly affected by the project construction and operation phases, potential impacts on ex situ habitats have been **screened in** for further assessment.

4.3.3 Indirect effects within the SAC boundary

133. Paston Great Barn is located 3km from on onshore infrastructure. This is outside of the ZOI of any of the environmental parameters associated with the construction and operation of the project. Therefore direct effects upon the boundary are **screened out** from further assessment.

4.3.4 Indirect effects on ex-situ habitats

134. Table 4.3 summarises the potential indirect effects upon the qualifying features (Table 2.3) of the Paston Great Barn SAC.

Table 4.3 The ZOI of potential indirect effects on the Paston Great Barn SAC boundary

Environmental parameter	Zone of influence of potential effect
Noise	The qualifying features of the Paston Great Barn SAC are not sensitive to noise, visual or air quality disturbance, so indirect effects upon these qualifying features will not occur and these effects have been **screened out** of further assessment.
Air quality	
Visual disturbance	
Light	There are hedgerows which are identified barbastelle core foraging areas located within the ZOI of the onshore infrastructure, therefore lighting has been **screened in** for further assessment.
Geology and land contamination	Barbastelle bats are associated with hedgerow, scrub, woodland and watercourse habitats which will not be affected by changes to the geology or land contamination regime. Therefore these effects have been **screened out** of further assessment.
Groundwater and Hydrology	Watercourses identified as core foraging areas for the Paston Great Barn barbastelle colony (i.e. drains at Ridlington Street) will be subject to trenching works during the project construction phase, and as such there may be effects upon this ex-situ habitat. These effects have been **screened in** for further assessment.

4.4 Norfolk Valley Fens SAC

135. The Norfolk Valley Fens support the qualifying features detailed in Table 2.4.

136. The Norfolk Valley Fens are comprised of a 17 separate sites, spread across more than 70km of the county. The qualifying features of the SAC have not been recorded at every site.

137. Five of the 17 constituent SSSIs of the Norfolk Valley Fens SAC fall within 5km of the onshore project area. The qualifying features of these sites are summarised in Table 4.4 below.

Table 4.4 Norfolk Valley Fens SAC component SSSIs

Site name	Distance to onshore project area	SAC qualifying features supported by the site
Badley Moor	3.6km	• Alkaline fens. (Calcium-rich springwater-fed fens) • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae). (Purple moor-grass meadows)
Booton Common	0.6km	• Alkaline fens. (Calcium-rich springwater-fed fens) • Northern Atlantic wet heaths with Erica tetralix. (Wet heathland with cross-leaved heath)
Buxton Heath	3.9km	• Alkaline fens. (Calcium-rich springwater-fed fens) • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnionincanae, Salicion albae). (Alder woodland on floodplains) Calcareous fens with Cladium mariscus and species of the Caricion davallianae. (Calcium-rich fen dominated by great fen sedge (saw sedge)) • European dry heaths • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae). (Purple moor-grass meadows) • Northern Atlantic wet heaths with Erica tetralix. (Wet heathland with cross-leaved heath)
Potter & Scarning Fens, East Dereham	2.8km	• Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae. (Calcium-rich fen dominated by great fen sedge (saw sedge)) • European dry heaths
Southrepps Common	3.4km	• Alkaline fens. (Calcium-rich springwater-fed fens) • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnionincanae, Salicion albae). (Alder woodland on floodplains) • Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae. (Calcium-rich fen dominated by great fen sedge (saw sedge))

138. Only one of these units, Booton Common, is located within 1km, the typical maximum extent of the ZOIs of the potential indirect effects identified in section 1.6.

139. In summary, the following Annex I habitats that are a primary reason for selection of the Norfolk Valley Fens SAC are located across these five sites:

- Alkaline fens. (Calcium-rich springwater-fed fens);
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*). (Alder woodland on floodplains);
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*. (Calcium-rich fen dominated by great fen sedge (saw sedge));
- European dry heaths;
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*). (Purple moor-grass meadows); and
- Northern Atlantic wet heaths with *Erica tetralix*. (Wet heathland with cross-leaved heath).

140. The remaining Annex I habitats and Annex II species which are qualifying features of the Norfolk Valley Fens SAC are not present within these sites, and therefore are not considered further.

4.4.1 Direct effects within the SAC boundary

141. All sites which comprise Norfolk Valley Fens are located 0.6km or more from on onshore infrastructure. Therefore direct effects upon the boundary are **screened out** from further assessment.

4.4.2 Direct effects on ex-situ habitats

142. The relevant qualifying features of the Norfolk Valley Fens SAC are all habitats and not mobile species. As such, ex-situ habitats have not been identified for this site. Direct effects upon ex-situ habitats are **screened out** from further assessment.

4.4.3 Indirect effects within the SAC boundary

143. Table 4.5 summarises the potential indirect effects upon the qualifying features of the Norfolk Valley Fens SAC.

Table 4.5 The ZOI of potential indirect effects on the Norfolk Valley Fens SAC boundary

Environmental parameter	Zone of influence of potential effect
Noise	The qualifying features of the Norfolk Valley Fens SAC are not sensitive to noise, visual, or light disturbance, so indirect effects upon these qualifying features will not occur and these effects have been **screened out** of further assessment.
Light	
Visual disturbance	
Air quality	Potential nitrogen and acid sensitive habitats (Alkaline fens, Northern Atlantic wet heaths with *Erica tetralix*, Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*) are located within 1km of the onshore infrastructure. Therefore potential effects upon these sensitive habitats have been **screened in** for further assessment.
Geology and land contamination	The onshore infrastructure is located outside of 500m from the SAC boundary and outside the ZOI for geology and land contamination effects. As such effects from these environmental parameters have been **screened out** of further assessment.

Environmental parameter	Zone of influence of potential effect
Groundwater and Hydrology	Cable trenching will take place within 1km of the Norfolk Valley Fens SAC. As a consequence, potential indirect effects arising as a result of changes to the groundwater / hydrology regime have been **screened in** for further assessment.

4.4.4 Indirect effects on ex-situ habitats

144. The relevant qualifying features of the Norfolk Valley Fens SAC are all habitat types and not mobile species. As such, ex-situ habitats have not been identified for this site. Indirect effects upon ex-situ habitats are **screened out** from further assessment.

4.5 The Broads SAC

145. The Broads SAC support the qualifying features presented in Table 2.5.

4.5.1 Direct effects within SAC boundary

146. The Broads SAC is located 4.5km from the onshore project area. Therefore, direct effects upon the boundary are **screened out** from further assessment.

4.5.2 Direct effects upon ex-situ habitats

147. The 2017 and 2018 Extended Phase 1 Habitat Surveys (Appendix 22.1) and the Norfolk Living Map have identified the following habitats within the onshore project area and within 5km of The Broads SAC as being present:

- Arable;
- Hedgerows (species poor / rich, with / without trees, defunct and intact);
- Continuous and scattered scrub;
- Lowland mixed deciduous woodland;
- Improved, semi-improved and poor semi-improved grassland;
- Running water;
- Amenity grassland;
- Intertidal; and
- Dune grassland.

148. These habitats are not suitable for supporting Annex II qualifying features Desmoulin's whorl snail, fen orchid or ramshorn snail. Habitats suitable for supporting these species, including wetland habitats and unimproved grassland, were not recorded within the onshore project area or within 5km of The Broads SAC during the 2017 and 2018 Extended Phase 1 Habitat Surveys or using the Norfolk Living Map. Direct effects upon these Annex II qualifying features are therefore screened out from further assessment. Habitats suitable for supporting otter *Lutra lutra* (i.e. running water connected to the watercourses located within The Broads SAC) were recorded within the onshore project area and within 5km of The Broads SAC at two locations during the 2017 and 2018 Extended Phase 1 Habitat Surveys

(Appendix 22.1) or using the Norfolk Living Map (North Walsham and Dilham Canal, and the Hundred Stream[9]). As such, direct effects upon the Annex II qualifying feature, i.e. otter, are **screened in** for further assessment.

149. This assessment considers ex-situ habitats which may support Annex II qualifying features of the SAC. The Annex I qualifying features of The Broads SAC are habitats and not mobile species, and as such are considered to be restricted primarily to the SAC boundary. These features are therefore not considered to be subject to potential effects arising from the onshore project area given the distance between the onshore project area and the SAC boundary. As such, direct effects upon these qualifying features are **screened out** from further assessment.

4.5.3 Indirect effects within SAC boundary

150. The Broads SAC is located 4.5km from the onshore project area. Although this is outside of the Zone of Influence[10] (ZOI) of any of the environmental parameters associated with the construction and operation of the project, following a request from Natural England raised during consultation on a draft version of this report (23rd March 2018), the potential ZOI for effects arising from local changes in surface and groundwater hydrology has been extended to encompass those watercourses located within 5km of the Broads SAC. Therefore, indirect effects upon qualifying features of The Broads SAC within the site boundary arising from local changes in surface and groundwater hydrology are **screened in** for further assessment.

4.5.4 Indirect effects upon ex-situ habitats

151. The Norfolk Living Map has identified the following habitats within 1km (the maximum ZOI of indirect effects arising from the Norfolk Boreas onshore project area) of the onshore project area and within 5km of The Broads SAC:

- Arable;
- Hedgerows;
- Scrub;
- Lowland mixed deciduous woodland;
- Improved, semi-improved and poor semi-improved grassland;
- Running water
- Amenity grassland;
- Intertidal; and
- Dune grassland.

152. These habitats are considered unsuitable to support Annex II qualifying features, i.e. Desmoulin's whorl snail, fen orchid or ramshorn snail. Habitats suitable for supporting these species typically include wetland habitats and unimproved grassland. These habitats were not recorded within the onshore project area or

[9] Also referred to as the East Rushton Stream in its lower reaches
[10] The maximum ZOI for indirect effects was identified as 1km within the Onshore Screening Report. Please see Section 1.6 for full details on the ZOIs used.

within 5km of The Broads SAC during the 2017 and 2018 Extended Phase 1 Habitat Surveys (Appendix 22.1) or using the Norfolk Living Map. Indirect effects upon these Annex II qualifying features are therefore screened out from further assessment. Habitats suitable for supporting otter, i.e. running water connected to the watercourses located within The Broads SAC, were recorded within the onshore project area and within 5km of The Broads SAC at two locations during the Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a) or using the Norfolk Living Map (North Walsham and Dilham Canal, and the Hundred Stream). As such, indirect effects upon the Annex II qualifying feature otter are **screened in** for further assessment.

153. This assessment considers ex-situ habitats which may support Annex II qualifying features of the SAC. The Annex I qualifying features of The Broads SAC are habitats and not mobile species, and as such are considered to be restricted primarily to the SAC boundary. These features are therefore not considered to be subject to potential effects arising from the onshore project area given the distance between the onshore project area and the SAC boundary. As such, indirect effects upon these qualifying features are **screened out** from further assessment.

4.6 Broadland SPA

154. The Broadland SPA support the qualifying features presented in Table 2.6.

4.6.1 Direct effects within the SPA boundary

155. All sites which comprise the Broadland SPA are located 4.5km or more from on onshore infrastructure. Therefore direct effects upon the boundary are **screened out** from further assessment.

4.6.2 Direct effects on ex-situ habitats

156. The wintering qualifying features of the Broadland SPA are likely to utilise a range of supporting habitats outside the boundary of the SPA over the winter months. Hen Harrier are likely to utilise a range of habitats, including lowland farmland, heathland, coastal marshes, fenland and river, whereas bittern are associated solely with lowland fen during winter. The various qualifying species of wildfowl use predominantly reedbeds and rivers and lakes, although the qualifying geese species also rely on winter crop waste associated with arable agriculture. Cormorants and grebes are more firmly associated with coastal habitats or sizeable inland waterbodies over winter.

157. In summary, the qualifying species are likely to use the following supporting habitats:

- Reedbed;
- Lowland fen;

- Rivers and Lakes;
- Lowland heathland;
- Coastal habitats; and
- Farmland (pasture and arable).

158. The locations of these habitats within 5km of the Broadland SPA are shown Figure 9.3 and Figure 9.4. It should be noted that in particular the geese and swan species may travel up to 10km to forage over winter, however the main focus of foraging is likely to be at distances closer to the SPA. Therefore 5km is considered a reasonable study area. This study area was agreed with Natural England in September 2016 (Natural England pers. comm. 9th September 2016).

159. Wintering bird surveys of these ex-situ habitats were undertaken over six months between October 2016 and March 2017, as set out in section 3 and presented in full in Appendix 23.2 of Chapter 23 Onshore Ornithology. These surveys recorded waterbird counts that are considered to not be of a scale of national or greater importance or to be a significant component of the Broadland SPA. As a consequence, these ex-situ habitats are not considered to be important habitats for the qualifying features of the Broadland SPA, and potential effects upon these habitats are **screened out** from further assessment.

4.6.3 Indirect effects within the SPA boundary

160. The Broadland SPA is located 4.5km from on onshore infrastructure. This is outside of the ZOI of any of the environmental parameters associated with the construction and operation of the project. Therefore, direct effects upon the boundary are **screened out** from further assessment.

4.6.4 Indirect effects on ex-situ habitats

161. As set out in section 4.6.2 above, qualifying features of the Broadland SPA have not been recorded within ex-situ habitats within 5km of the Broadland SPA and as such potential effects upon these habitats are **screened out** from further assessment.

4.7 Broadland Ramsar site

162. The Broadland Ramsar site supports the following qualifying features presented in Table 2.7.

4.7.1 Direct effects within the Ramsar site boundary

163. All sites which comprise the Broadland Ramsar site are located 4.5km or more from on onshore infrastructure. Therefore direct effects upon the boundary are **screened out** from further assessment.

4.7.2 Direct effects on ex-situ habitats

164. The wintering qualifying features of the Broadland Ramsar site are likely to utilise a range of supporting habitats outside the boundary of the Ramsar site over the winter. The various qualifying species use predominantly reedbeds and rivers and lakes, although the qualifying geese species also rely on winter crop waste associated with arable agriculture.

165. In summary, the qualifying species are likely to use the following supporting habitats:

- Reedbed;
- Lowland fen;
- Rivers and Lakes; and
- Farmland (pasture and arable).

166. The locations of these habitats within 5km of the Broadland Ramsar site are shown in Figure 9.3 and Figure 9.4.

167. Wintering bird surveys of these ex-situ habitats were undertaken over six months between October 2016 and March 2017, as set out in section 3 and presented in full in Appendix 23.2 of Chapter 23 Onshore Ornithology. These surveys recorded waterbird counts that are considered to not be of a scale of national or greater importance or to be a significant component of the Broadland Ramsar site. As a consequence, these ex-situ habitats are not considered to be important habitats for the qualifying features of the Broadland Ramsar site, and potential effects upon these habitats are **screened out** from further assessment.

4.7.3 Indirect effects within the Ramsar site boundary

168. The Broadland Ramsar site is located 4.5km from on onshore infrastructure. This is outside of the ZOI of any of the environmental parameters associated with the construction and operation of the project. Therefore direct effects upon the boundary are **screened out** from further assessment.

4.7.4 Indirect effects on ex-situ habitats

169. As set out in section 4.6.2 above, qualifying features of the Broadland Ramsar site have not been recorded within ex-situ habitats within 5km of the Broadland Ramsar site and as such potential effects upon these habitats are **screened out** from further assessment.

5 SUMMARY

170. Following the initial screening process, three sites will be considered further at Stage 2 within the HRA process to determine whether any LSE may occur. These are:

- River Wensum SAC;
- Norfolk Valley Fens SAC;
- Paston Great Barn SAC; and
- The Broads SAC.

171. The Broadland SPA and Ramsar site has been screened out from further assessment.

172. Table 5.1 provides a summary of the HRA screening assessment that has been presented in section 4. Those potential effects which have been screened in for further assessment, and those which have been screened out, are summarised and the list of sites screened in for further assessment is also presented.

Table 5.1 Screening summary

Site name	Potential effects screened in	Potential effects screened out	Site screened in for further assessment?
River Wensum SAC	• Direct effects on ex-situ habitats for *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation and Desmoulin's whorl snail qualifying features due to suitable ex-situ habitats for these features being present. • Indirect effects within SAC boundary arising from geology / contamination and groundwater / hydrology effects due to lying within the ZOI for these parameters. • Indirect effects upon ex-situ habitats arising from geology / contamination and groundwater / hydrology effects due to lying within the ZOI for these parameters.	• Direct effects within SAC boundary due to distance from onshore infrastructure. • Direct effects on ex-situ habitats for white-clawed (or Atlantic stream) crayfish, brook lamprey and bullhead qualifying features due to no suitable ex-situ habitats for these features being present. • Indirect effects within SAC boundary arising from noise, air quality, visual or light effects due to no pathway being present. • Indirect effects upon ex-situ habitats arising from noise, air quality, visual or light effects due to no pathway being present.	Yes
Paston Great Barn SAC	• Direct effects upon ex-situ habitats due to known ex-situ habitats of barbastelle (hedgerows / watercourses) being present within the onshore infrastructure. • Indirect effects upon ex-situ habitats arising from light and groundwater/hydrology effects due to lying within the ZOI for these parameters.	• Direct effects within SAC boundary due to distance from onshore infrastructure. • Indirect effects within SAC boundary due to lying outside the ZOI or due to no pathway being present. • Indirect effects upon ex-situ habitats arising from noise, air quality, visual, or geology / contamination effects due to lying outside the ZOI or due to no pathway being present.	Yes
Norfolk Valley Fens SAC	• Indirect effects within SAC boundary arising from air quality and groundwater/hydrology due to lying within the ZOI for these parameters. [Effects on Alkaline fens, Northern Atlantic wet heaths with *Erica tetralix* and Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* only screened in]	• Direct effects within SAC boundary due to distance from onshore infrastructure. • Direct effects upon ex-situ habitats due to no mobile qualifying features present. • Indirect effects within SAC boundary arising from noise, light, visual, or geology / contamination effects due to lying outside the ZOI or due to no pathway being present. • Indirect effects upon ex-situ habitats due to no mobile qualifying features present.	Yes

Site name	Potential effects screened in	Potential effects screened out	Site screened in for further assessment?
The Broads SAC	• Direct effects upon ex-situ habitats which may support the qualifying feature otter, due to suitable ex-situ habitats for this feature being present. • Indirect effects upon habitats and species within the SAC boundary arising from changes in local groundwater / hydrology conditions. • Indirect effects upon ex-situ habitats which may support the qualifying feature otter, arising from changes in groundwater / hydrology conditions.	• Direct effects upon the boundary are screened out from further assessment. • Direct effects upon non-mobile features of the SAC.	Yes
Broadland SPA	None	• Direct effects within SPA boundary due to distance from onshore infrastructure • Direct effects upon ex-situ habitats due to survey evidence indicating that qualifying features are not present in significant numbers within the ex-situ habitats. • Indirect effects within SPA boundary due to distance from onshore infrastructure (outside of ZOIs) • Indirect effects upon ex-situ habitats due to survey evidence indicating that qualifying features are not present in significant numbers within the ex-situ habitats.	No
Broadland Ramsar site	None	• Direct effects within Ramsar site boundary due to distance from onshore infrastructure • Direct effects upon ex-situ habitats due to survey evidence indicating that qualifying features are not present in significant numbers within the ex-situ habitats. • Indirect effects within Ramsar site boundary due to distance from onshore infrastructure (outside of ZOIs)	No

Site name	Potential effects screened in	Potential effects screened out	Site screened in for further assessment?
		• Indirect effects upon ex-situ habitats due to survey evidence indicating that qualifying features are not present in significant numbers within the ex-situ habitats.	

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7 ANNEX 1 BEWICK SWAN, WHOOPER SWAN AND PINK FOOTED GEESE SENSITIVITY MAPS

7.1 Bewicks Swan

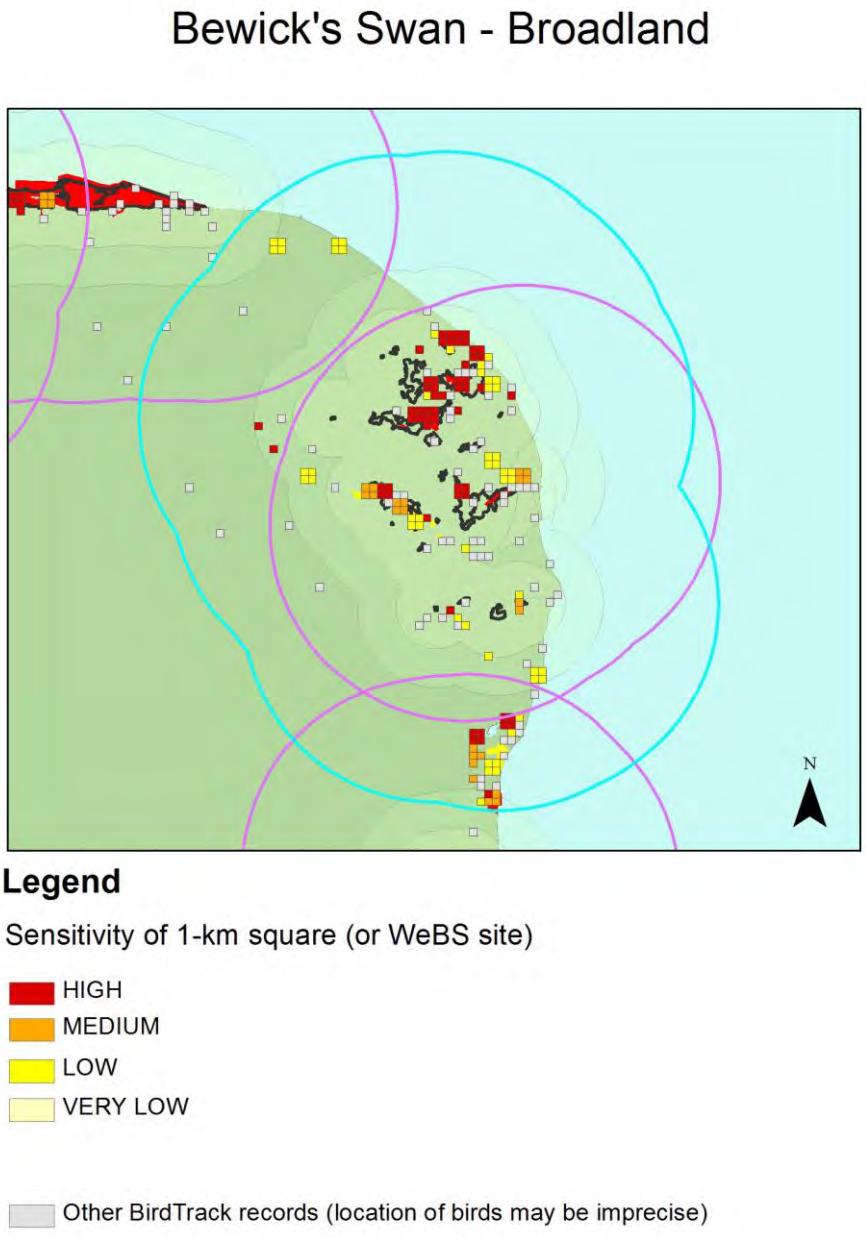


Plate 7.1 Sensitivity map for the Bewick's Swan for the Broadland SPA (Natural England)

7.2 Whooper Swan

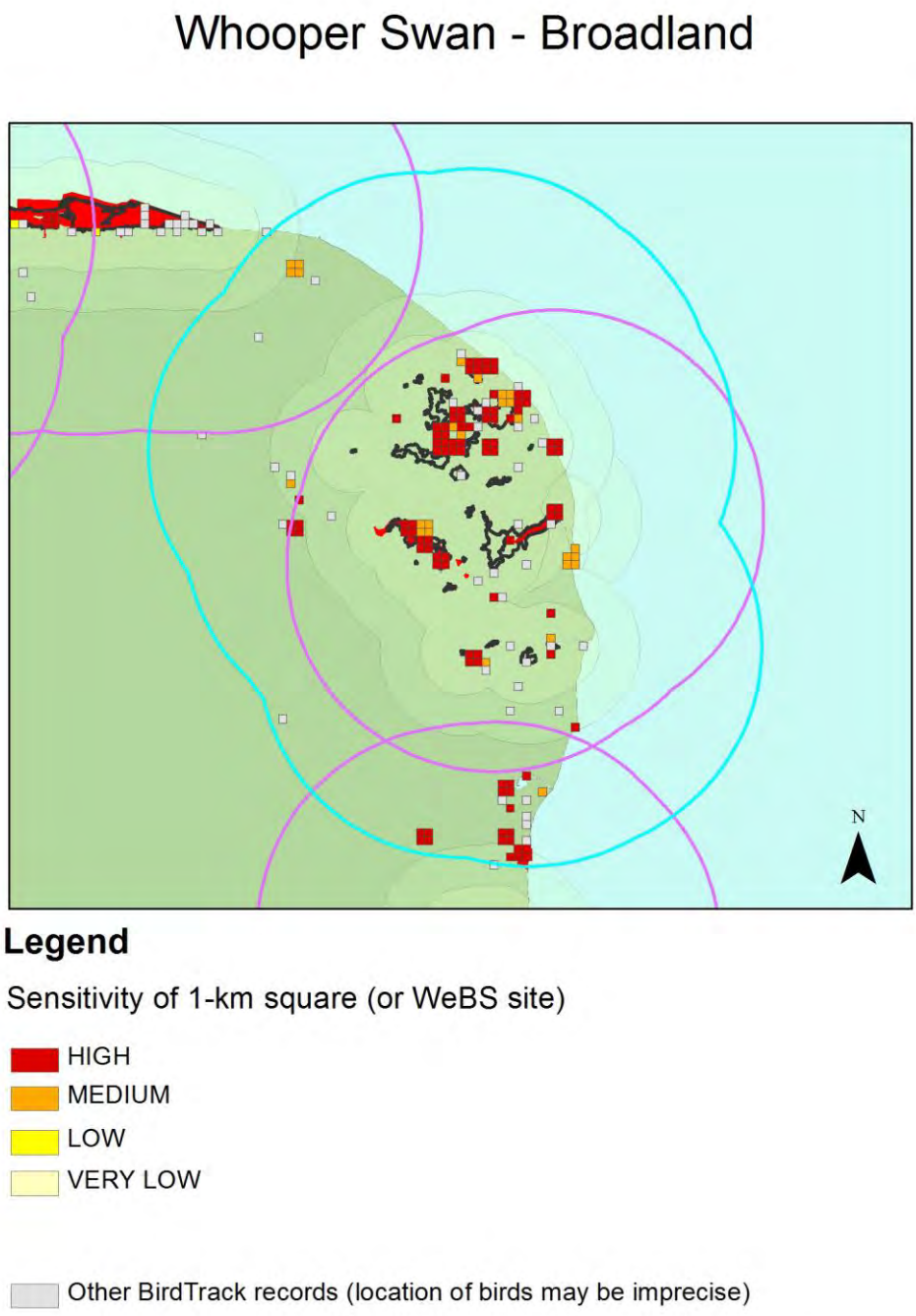


Plate 7.2 Sensitivity map for the Whooper Swan for the Broadland SPA (Natural England)

7.3 Pink Footed Geese Sensitivity maps – Broadland SPA

For each SPA for which the site is designated and selected important roost sites, two maps are presented; one showing the distribution of all feeding records (from the period 1986/87 to 2012/13) and one showing the distribution of feeding records from the most recent five years (2008/09 to 2012/13).

7.3.1 Sensitivity Map Key

For Plate 7.3 and Plate 7.4, the following symbols were used:

1) Sensitivity Index represented by four graduated dark blue symbols (dots).

2) 1km squares for which no quantitative data exists but geese were known to be present (see 2.3.1 above) represented by small red symbols (dots).

3) The SPA boundary (thick red line).

4) Important roosts either within the SPA boundary (if known) or other nearby waterbodies (see 2.5 and appendix 2) represented by green symbols (dots).

5) 20km line surrounding the SPA boundary (black line).

7.3.2 Interpreting the maps

The maps show the distribution of feeding geese based on available data for Broadland SPA (UK9009253). There are fewer records from the most recent period (from 2008/09 to 2012/13) partly due to the shorter time period (five years) and partly due to the reduction in the number of geese being ringed in recent years and a subsequent reduction in the number of sightings.

However, at some sites, a reduction in feeding records may also represent an absence, or reduction in number of geese. The maps should therefore be interpreted in conjunction with results from any available local surveys, recent roost count data, annual IGC reports (e.g. Mitchell 2011), a review of goose use of SPAs (Mitchell & Hall 2012) and the Waterbird Review Series reports for Pink-footed Goose (Mitchell & Hearn 2004).

7.3.3 Roost locations and feeding distribution

The two main Pink-footed Goose roosts within Broadland are Horsey Mere and Berney Marshes (Plate 7.3). Birds from there generally remain close to the roost sites when feeding, moving mainly along the coast rather than inland. The main concentration is around Horsey Mere, though some move as far south as north Suffolk.

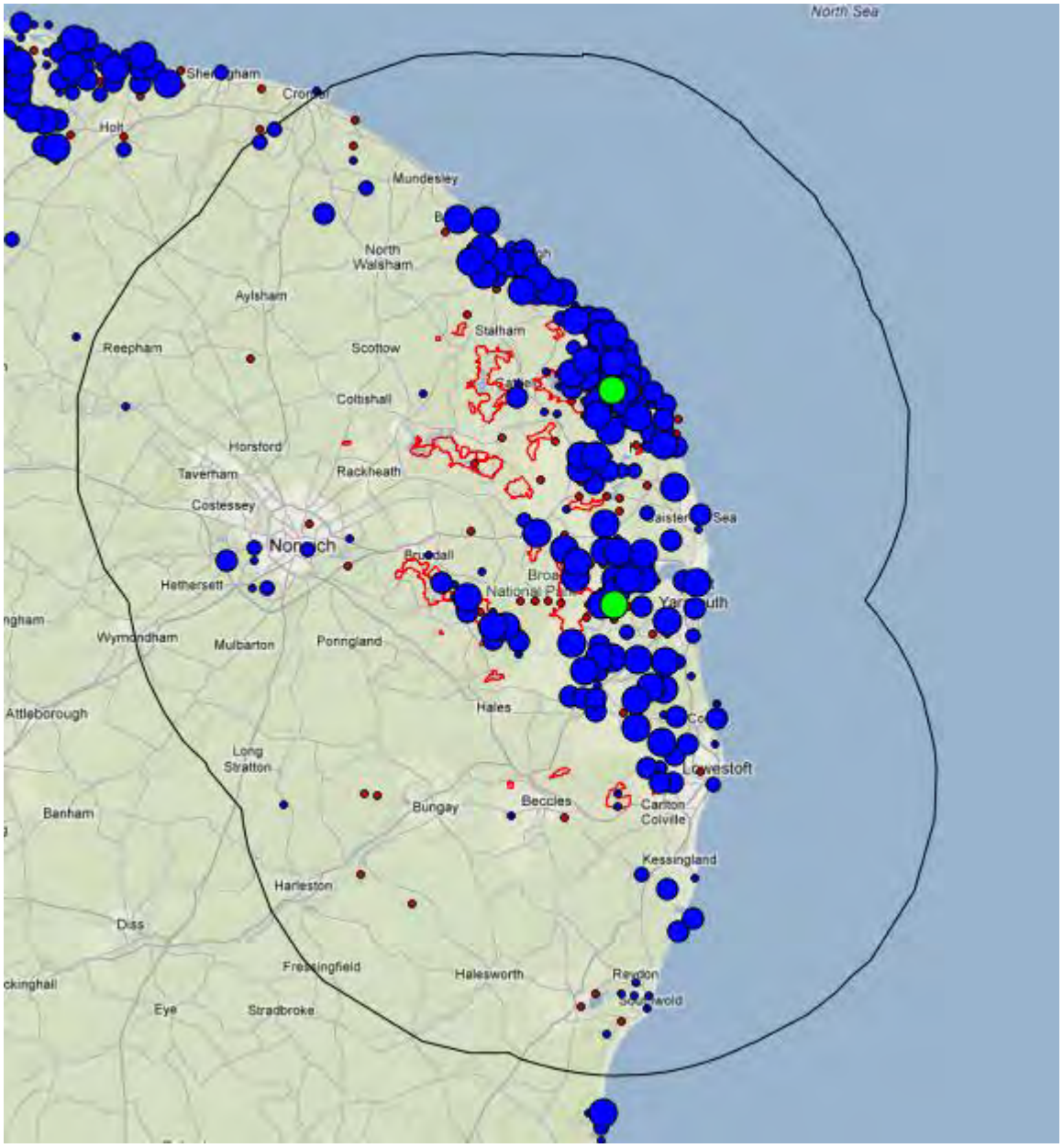


Plate 7.3 Feeding distribution (1986/87 to 2012/13 - all records) of Pink-footed Geese in relation to the Broadland SPA. For key see Section 7.3.1.

The data for the most recent five years (Plate 7.4) show that during this period little change has taken place in the main feeding areas of birds roosting within Broadland.

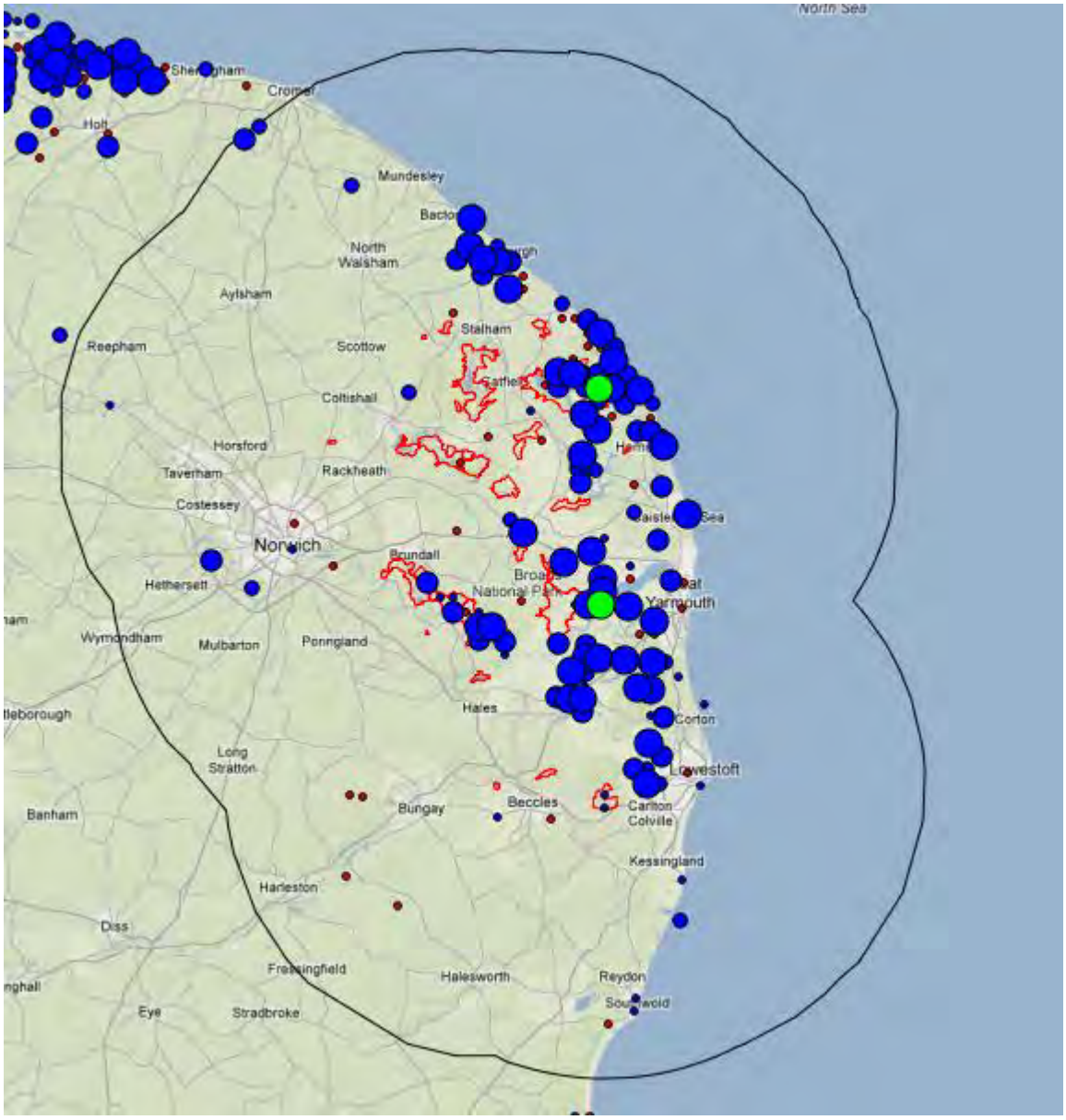


Plate 7.4 Feeding distribution (2008/09 to 2012/13 - new records) of Pink-footed Geese in relation to the Broadland SPA. For key see Section 7.3.1.

8 ANNEX 2 PASTON GREAT BARN SAC BARBASTELLE CORE FORAGING AREAS

173. This annex of the Norfolk Boreas HRA Screening contains maps that were provided to Norfolk Vanguard Limited as part of the EPP for that project in March 2017. The base mapping was provided by Norfolk Vanguard Limited and images were returned by the Norfolk Barbastelle Study Group (NBSG). At that time the proposed cable route for Norfolk Vanguard and Norfolk Boreas contained a number of options (see Chapter 4 Site selection and Assessment of Alternatives for further detail).

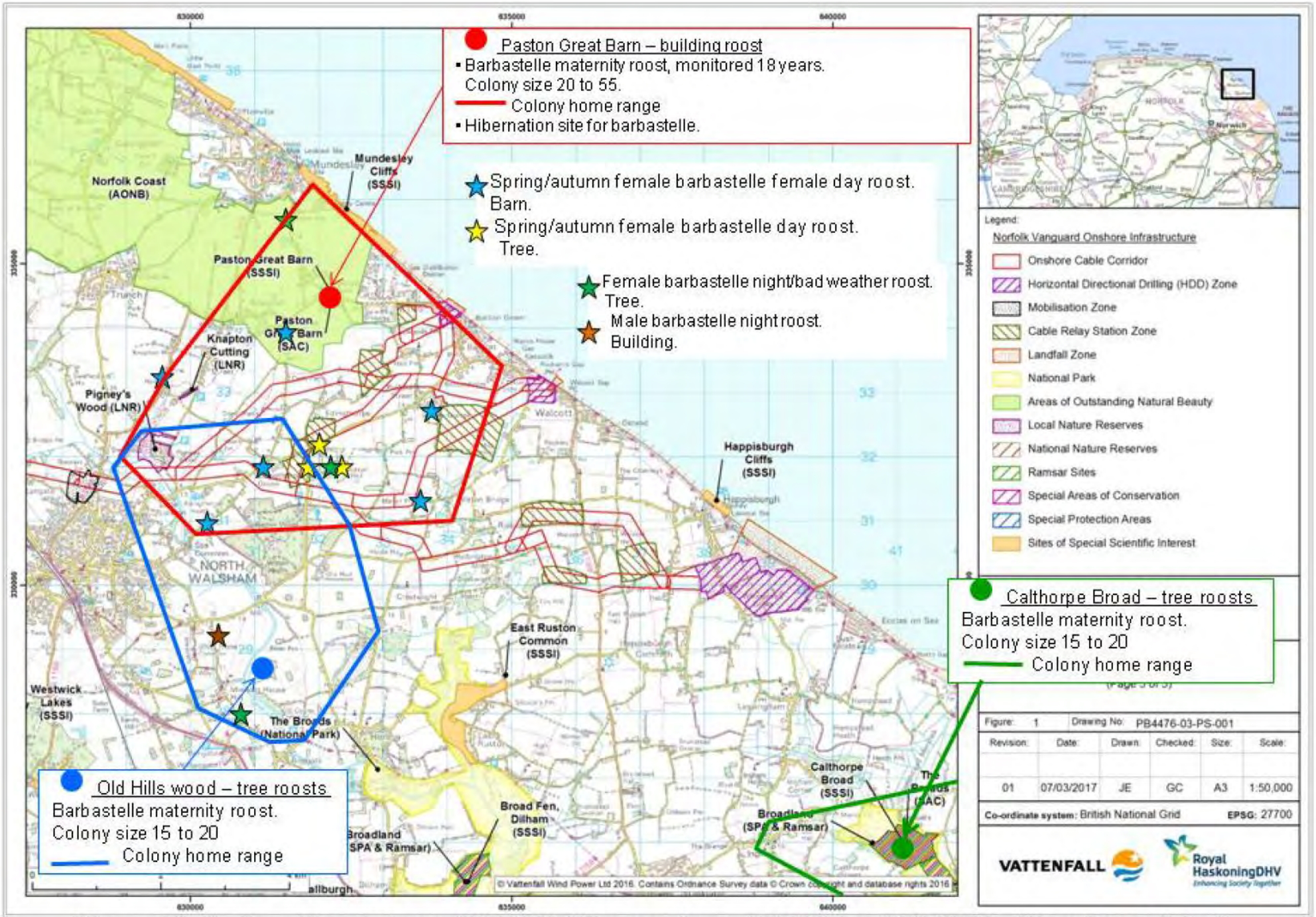


Figure 3. Paston Great Barn NNR, Calthorpe Broad NNR and Old Hills (Honing estate) – barbastelle maternity colonies

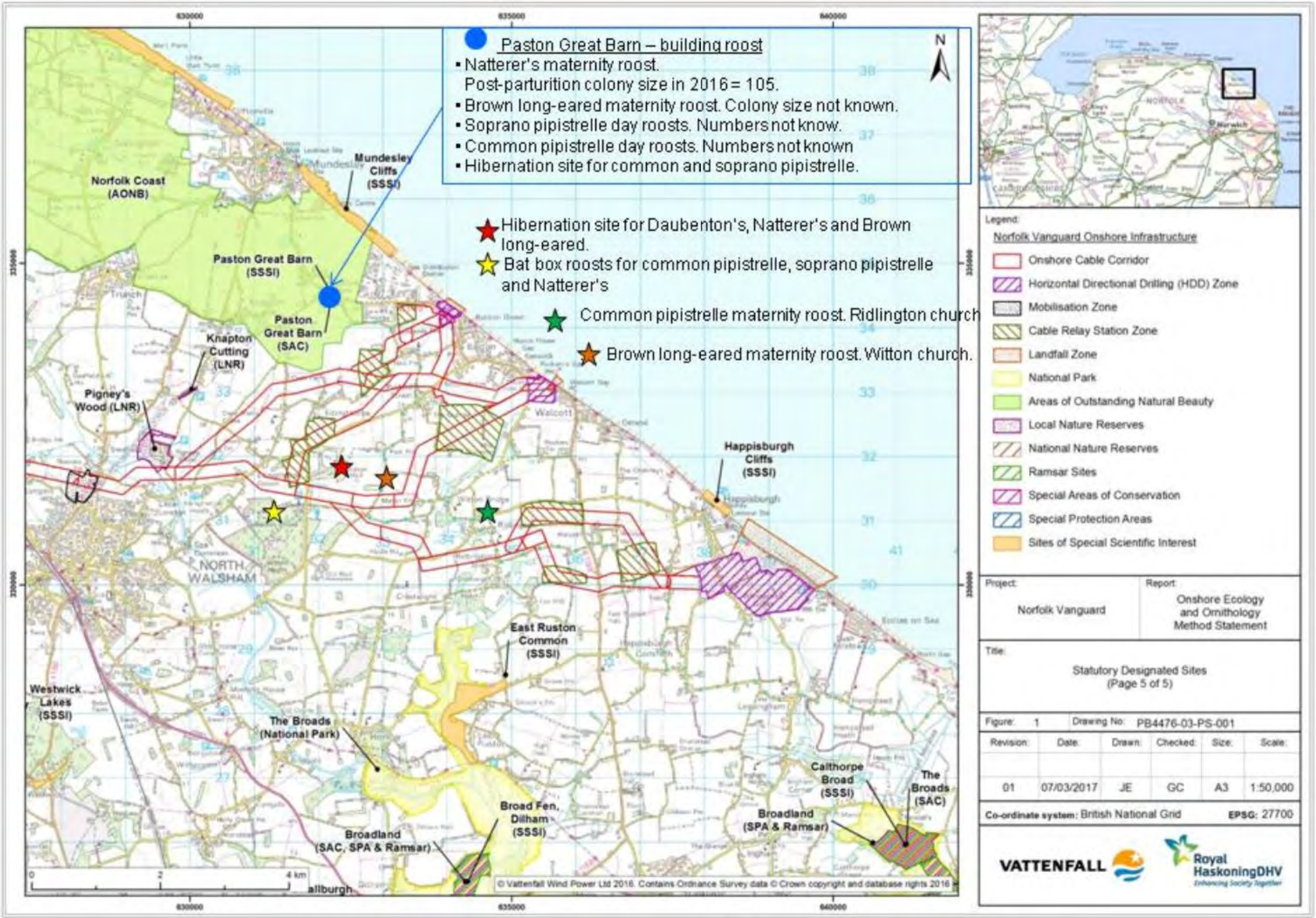


Figure 4. Other bat species and roost types within 5km

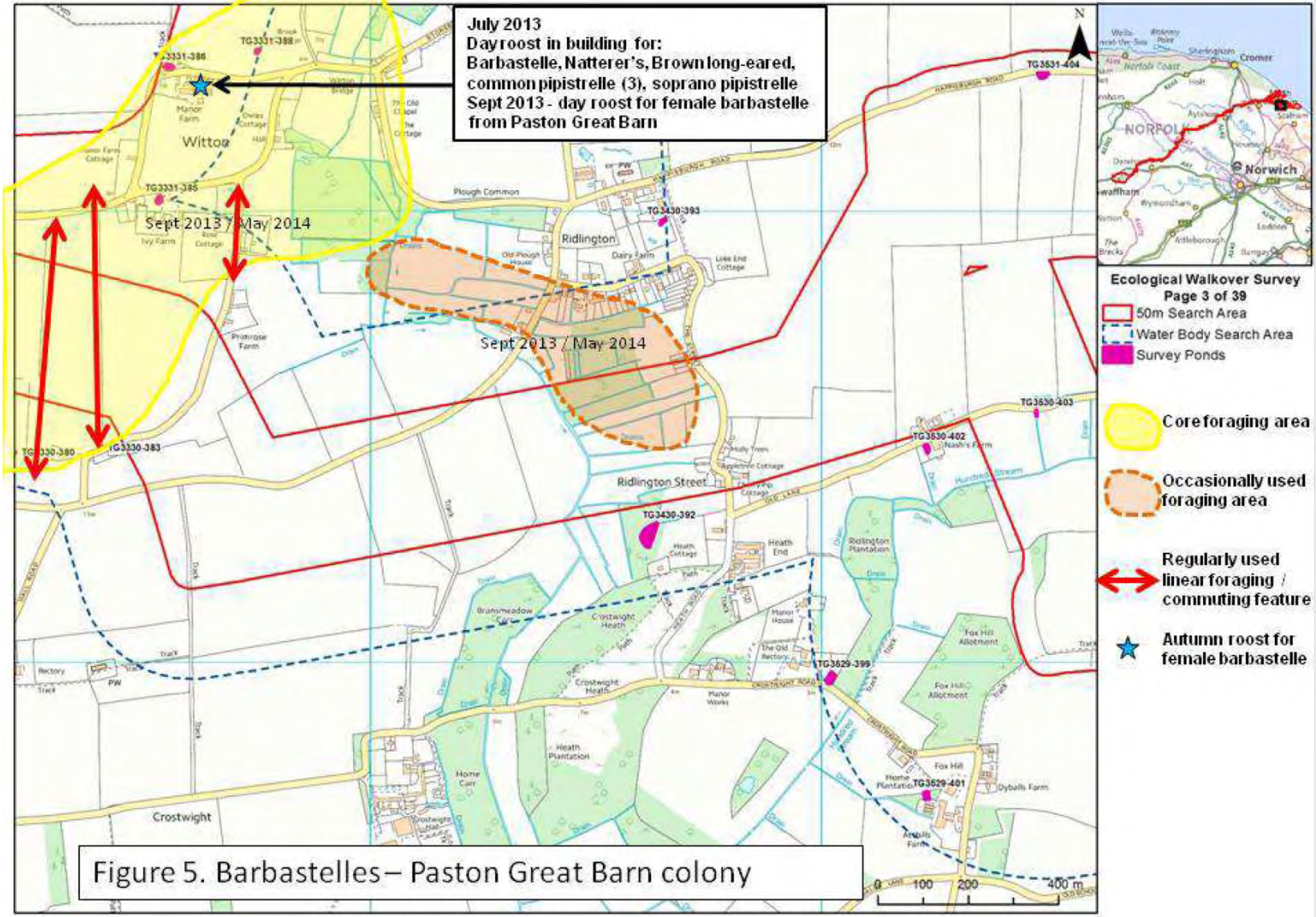


Figure 5. Barbastelles – Paston Great Barn colony

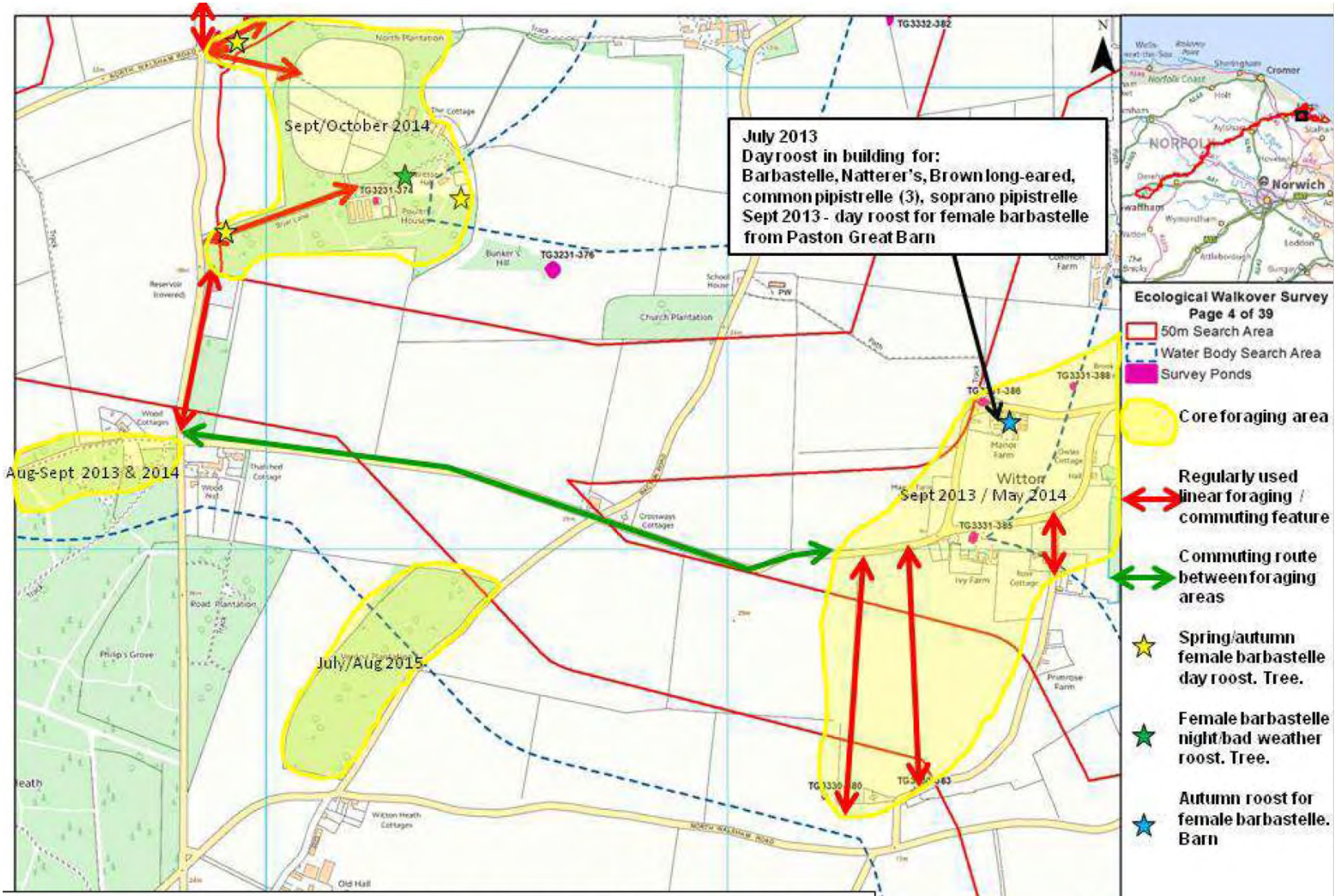


Figure 6. Barbastelles– Paston Great Barn and Old Hills colony

Figure 7. Barbastelles – Paston Great Barn colony

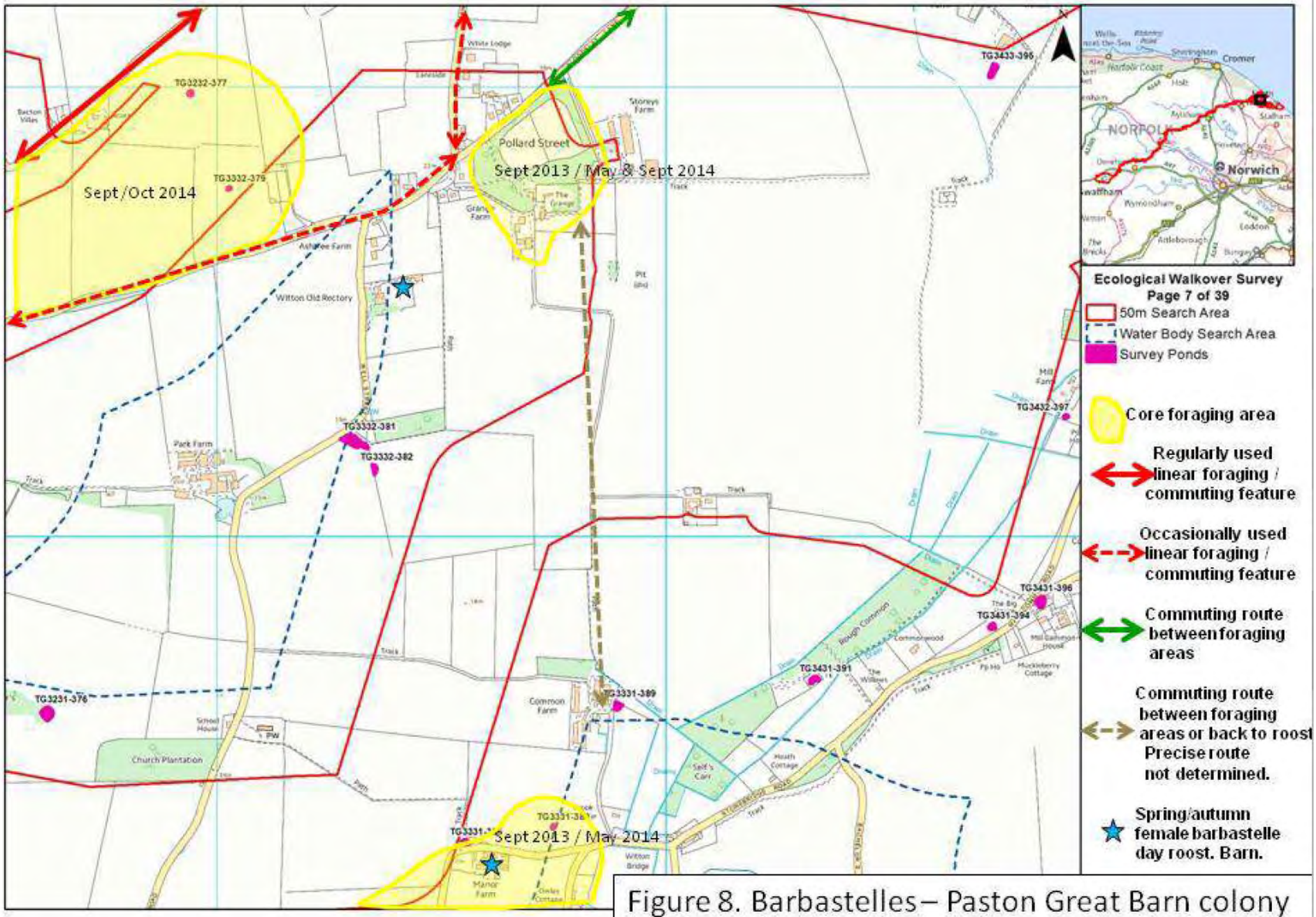


Figure 8. Barbastelles – Paston Great Barn colony

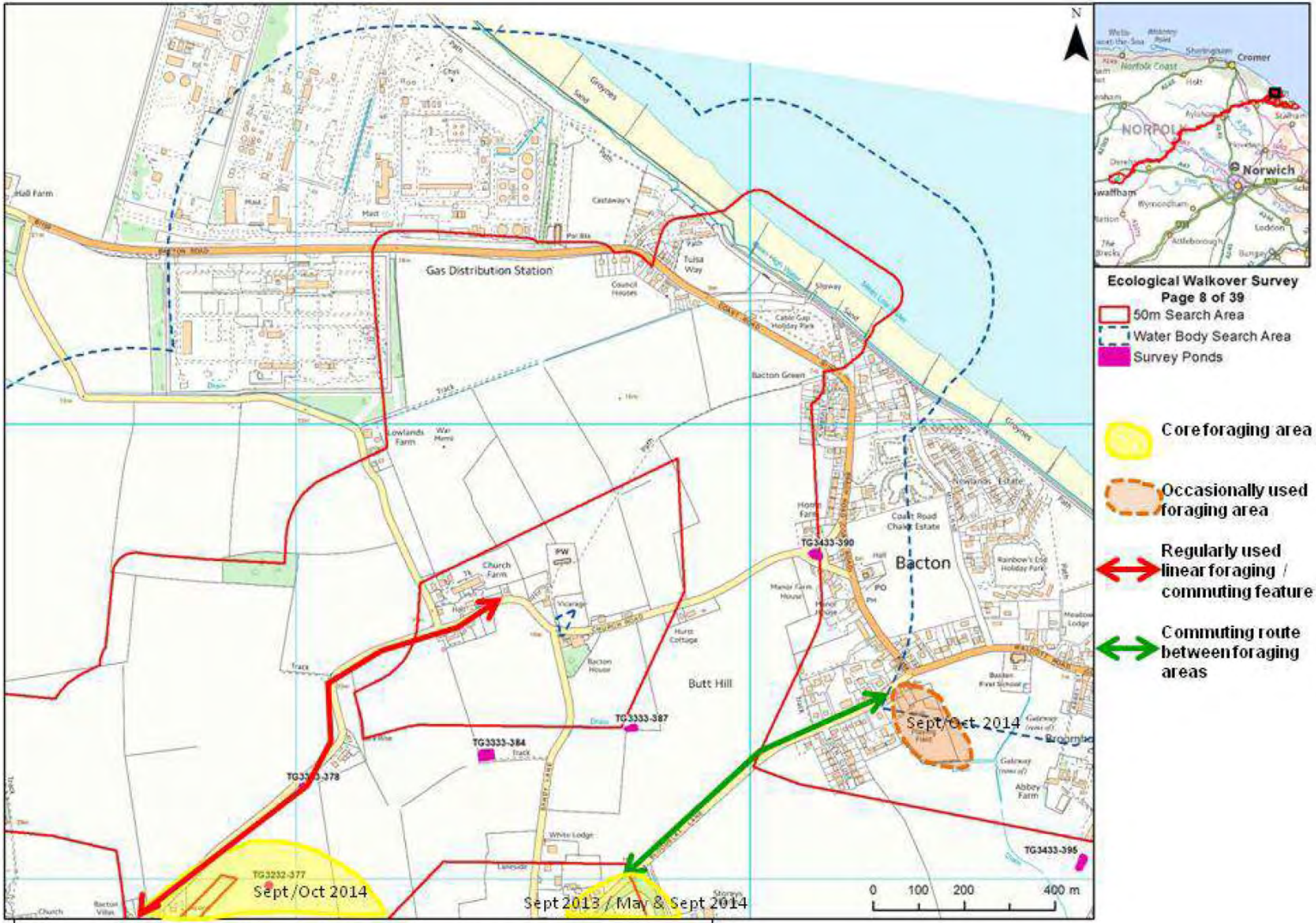


Figure 9. Barbastelles – Paston Great Barn colony

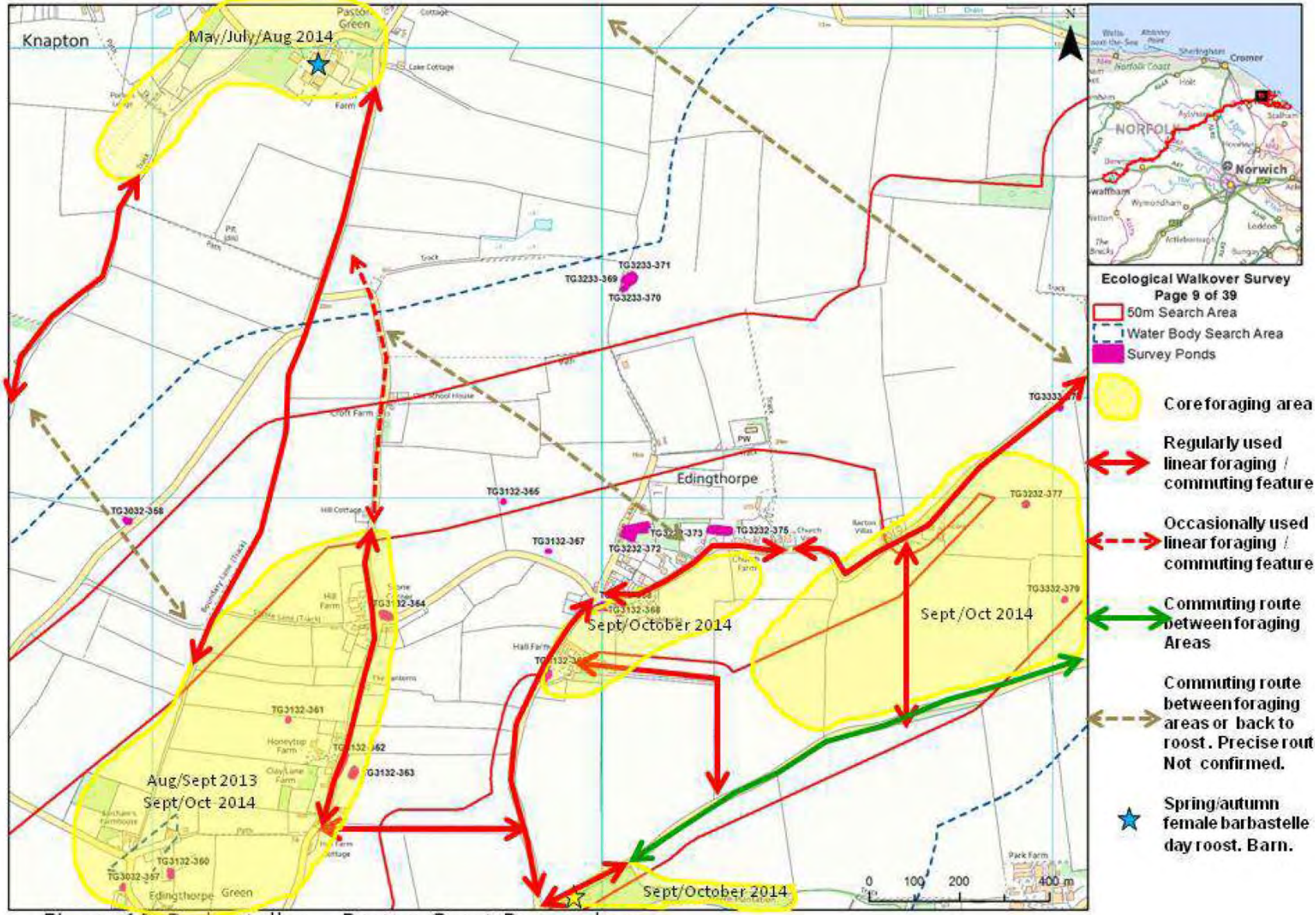


Figure 10. Barbastelles – Paston Great Barn colony

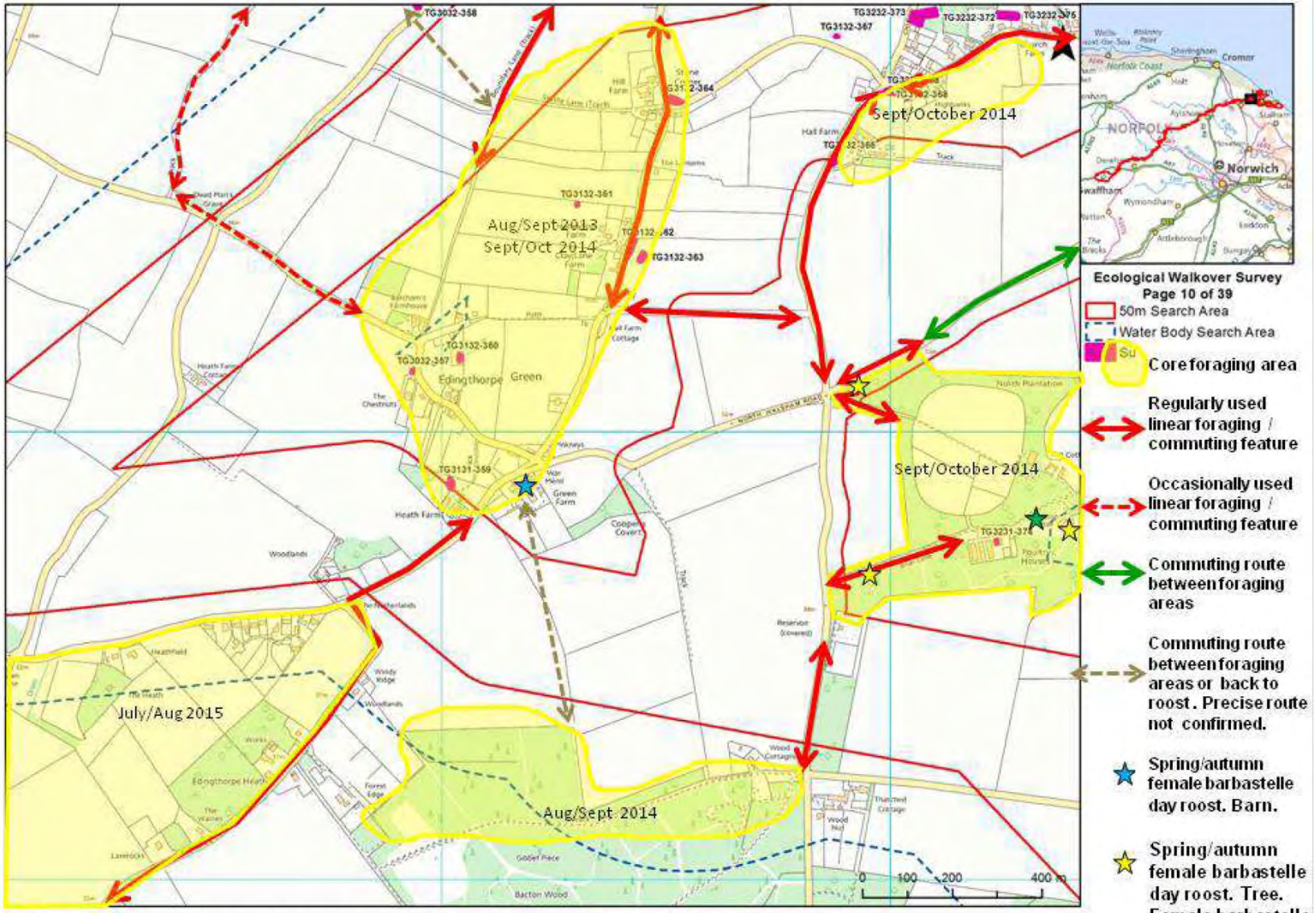


Figure 11. Barbastelles – Paston Great Barn and Old Hills colony

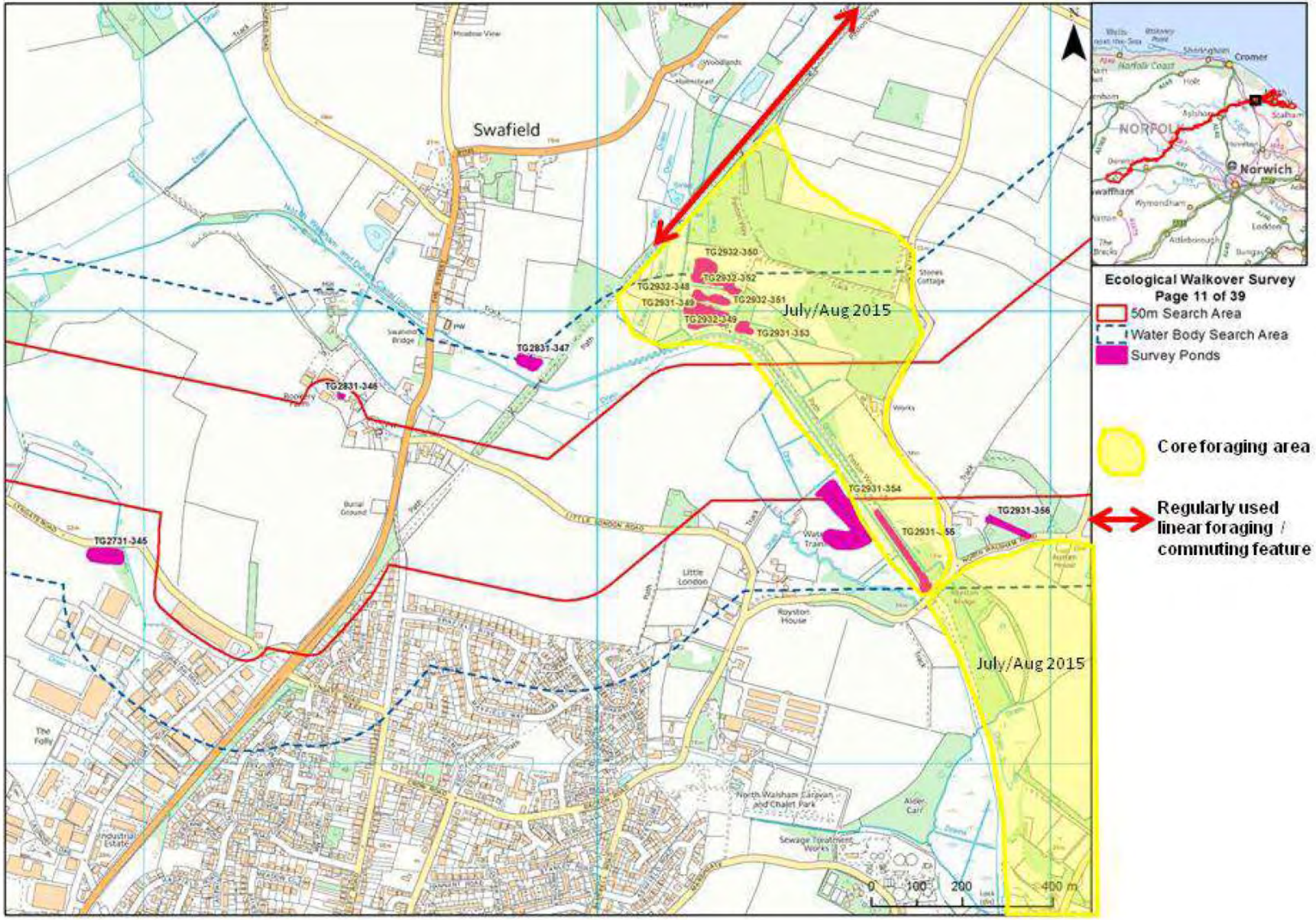
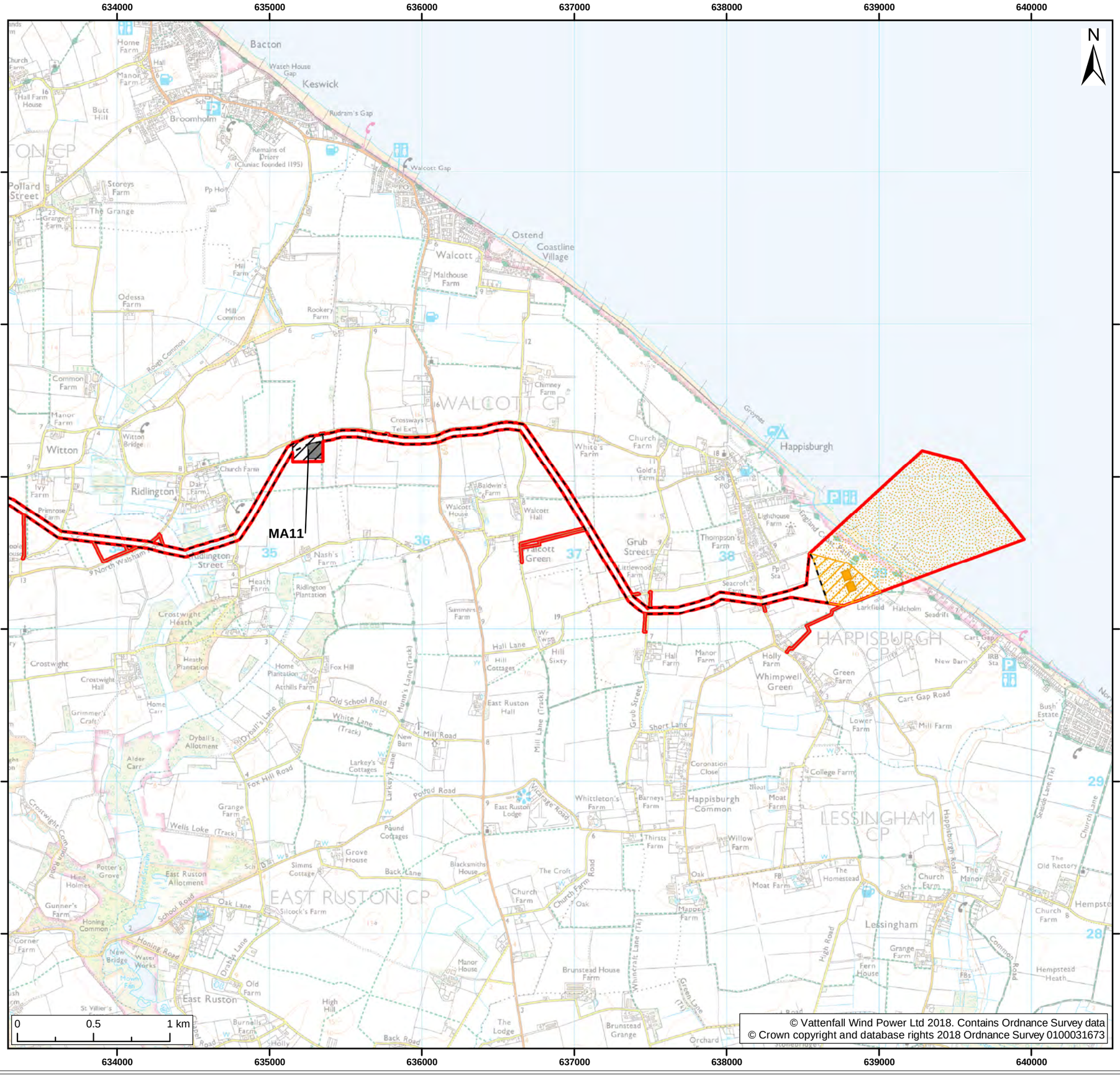


Figure 12. Barbastelles – Paston Great Barn and Old Hills colony

9 ANNEX 3 FIGURES

174. The following figures are provided in this Annex.

- Figure 9.1 Norfolk Boreas onshore project area (1:60,000)
- Figure 9.2 Designated sites and 5km buffer (1:60,000)
- Figure 9.3 Agricultural habitats within 5km of Broadland SPA (1:30,000)
- Figure 9.4 Coastal and wetland habitats within 5km of Broadland SPA (1:25,000)
- Figure 9.5 Paston Great Barn SAC - Norfolk Barbastelle Study Group Core foraging areas (1:10,000)



Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Landfall zone
- Landfall compound zone
- Indicative landfall compound
- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Mobilisation zone
- Indicative mobilisation area compound

Project: Norfolk Boreas	Report: Norfolk Boreas HRA Screening: Onshore

Title: Norfolk Boreas onshore project area (Map 1 of 9)

Figure: 9.1a | Drawing No: PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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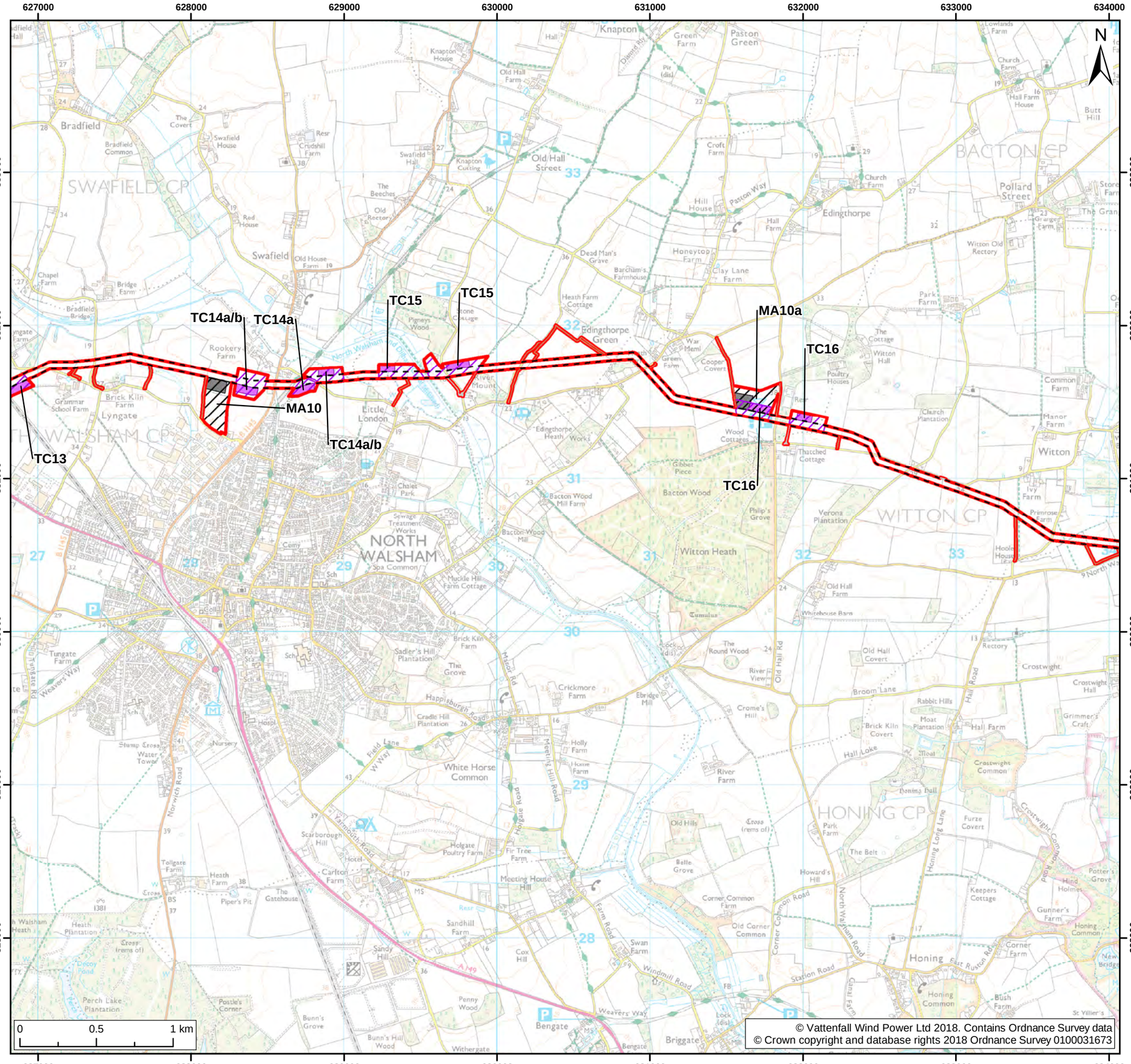

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Project: Norfolk Boreas	Report: Norfolk Boreas HRA Screening: Onshore

Title: Norfolk Boreas onshore project area (Map 2 of 9)

Figure: 9.1a | Drawing No: PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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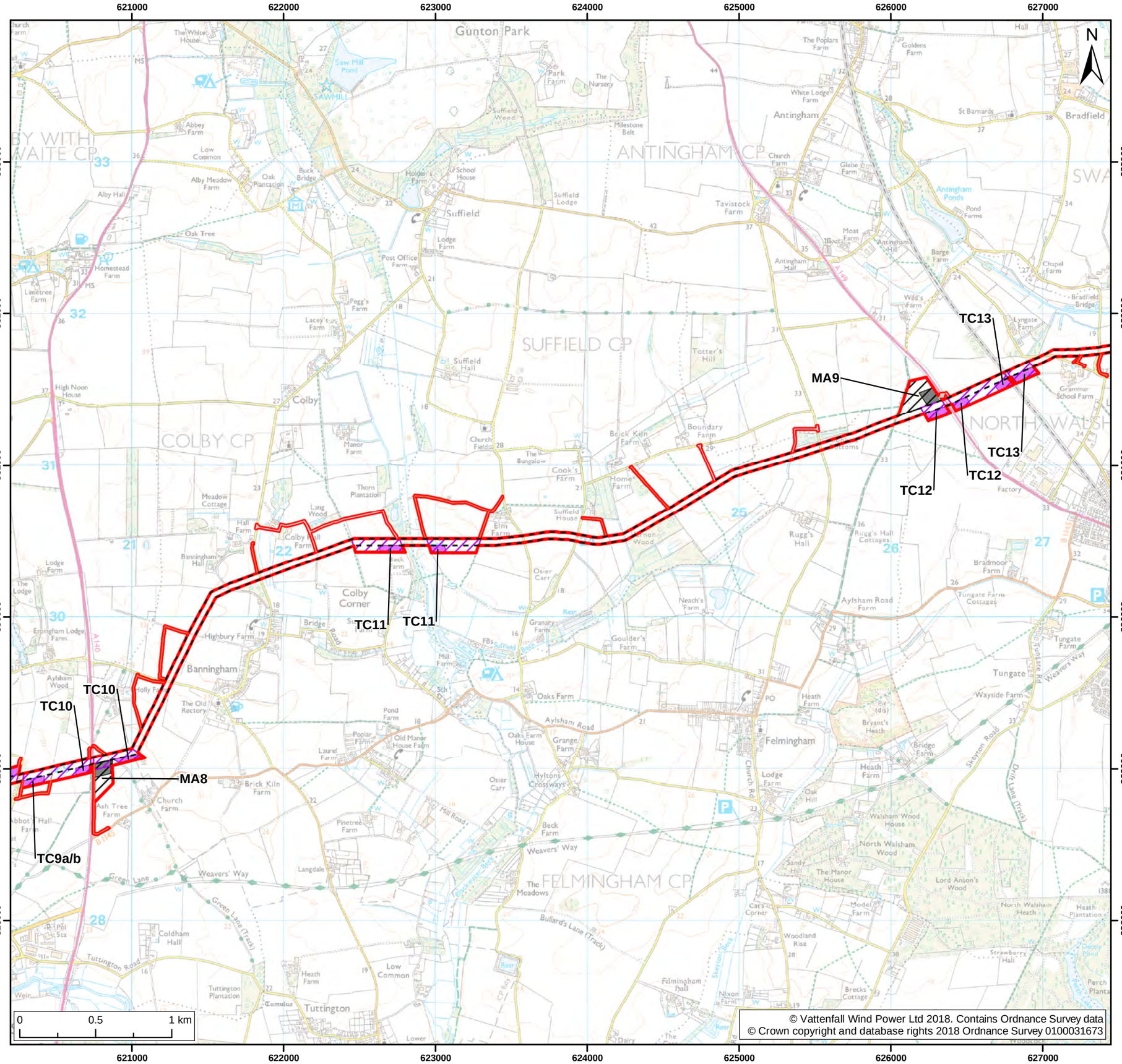

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Project: Norfolk Boreas	Report: Norfolk Boreas HRA Screening: Onshore

Title: Norfolk Boreas onshore project area (Map 3 of 9)

Figure: 9.1a | Drawing No: PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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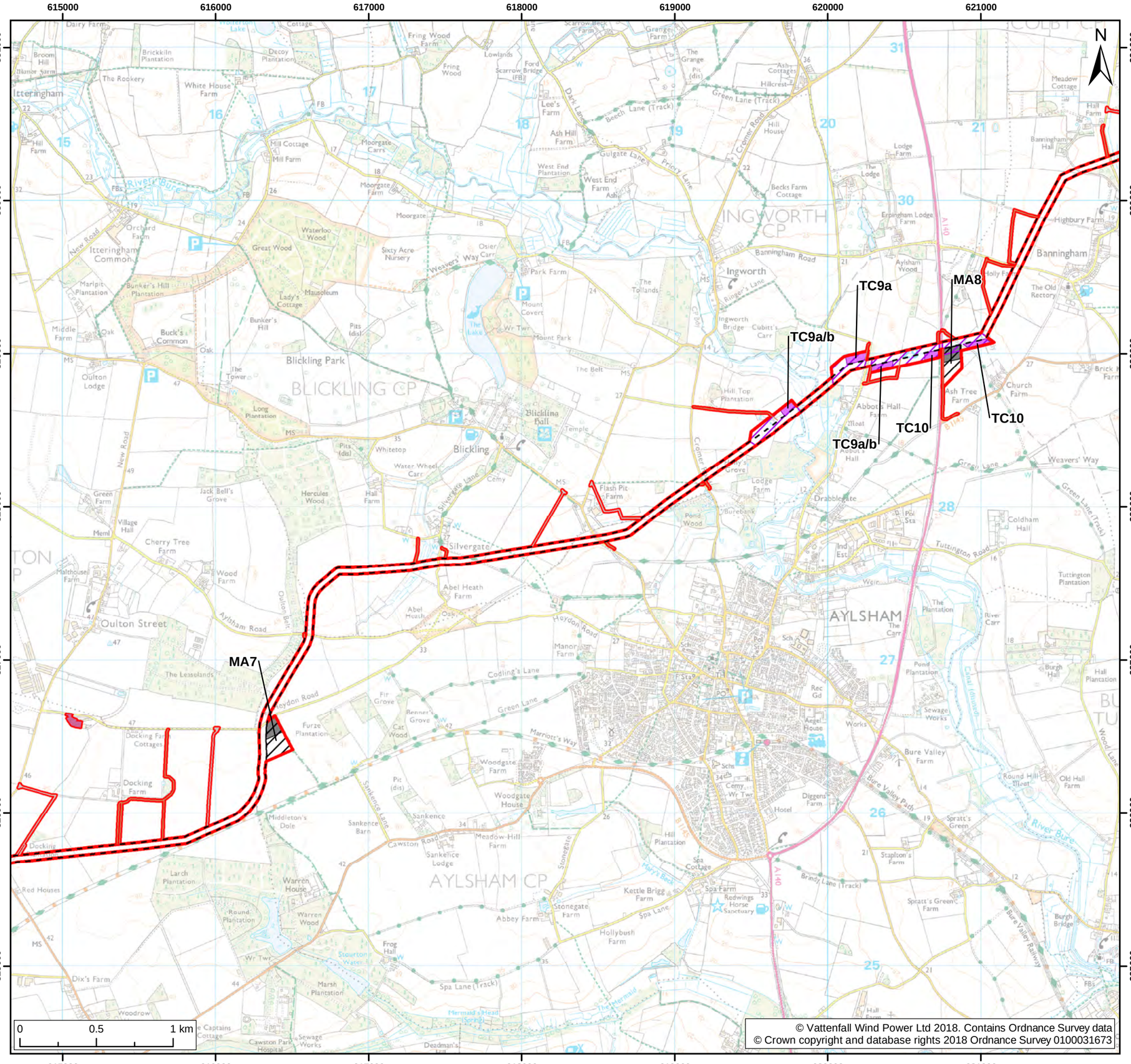

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Cable logistics area
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Project: Norfolk Boreas	Report: Norfolk Boreas HRA Screening: Onshore

Title: Norfolk Boreas onshore project area (Map 4 of 9)

Figure: 9.1a | Drawing No: PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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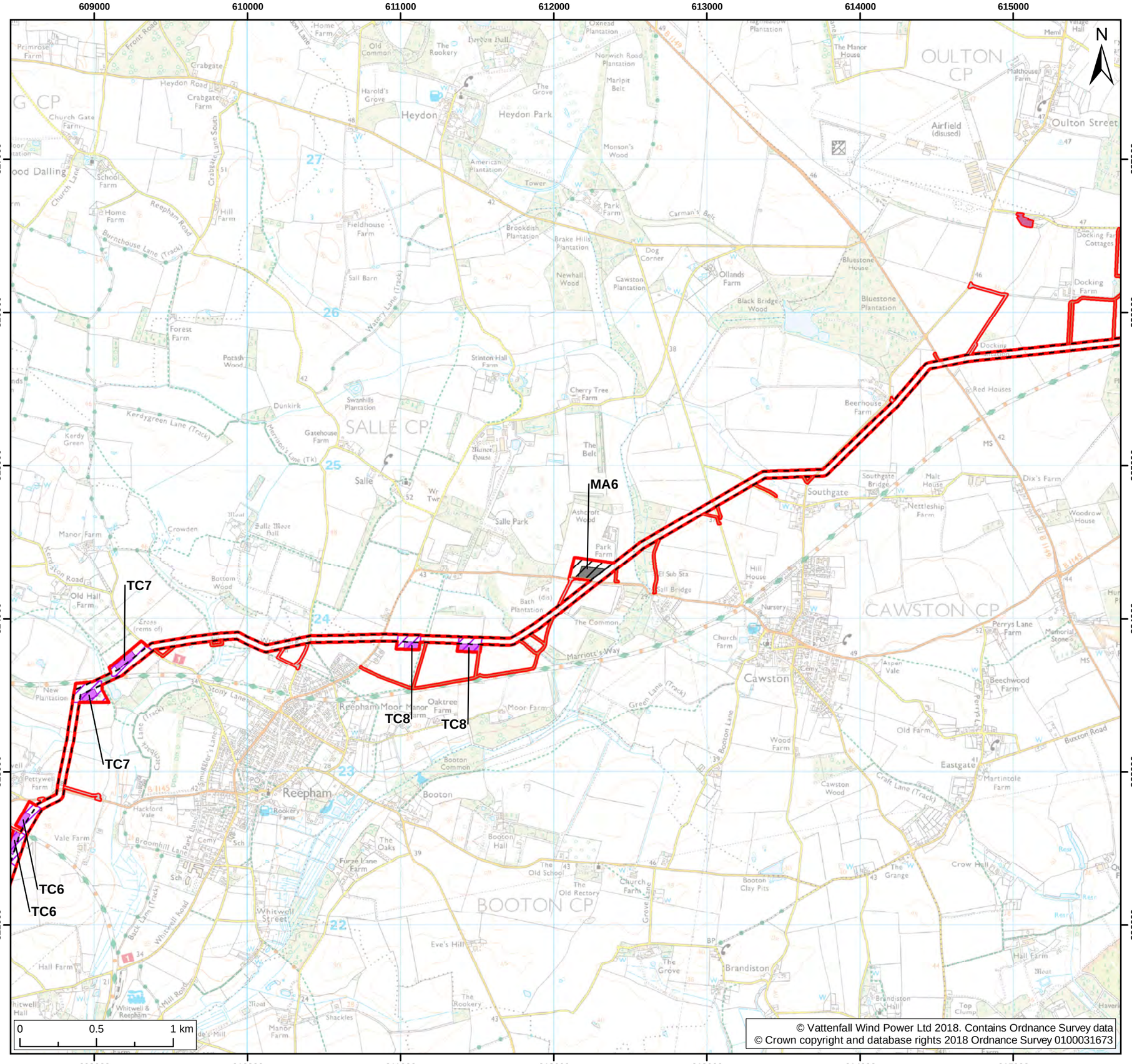

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Cable logistics area
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Norfolk Boreas onshore project area
(Map 5 of 9)

Figure:	Drawing No:
9.1a	PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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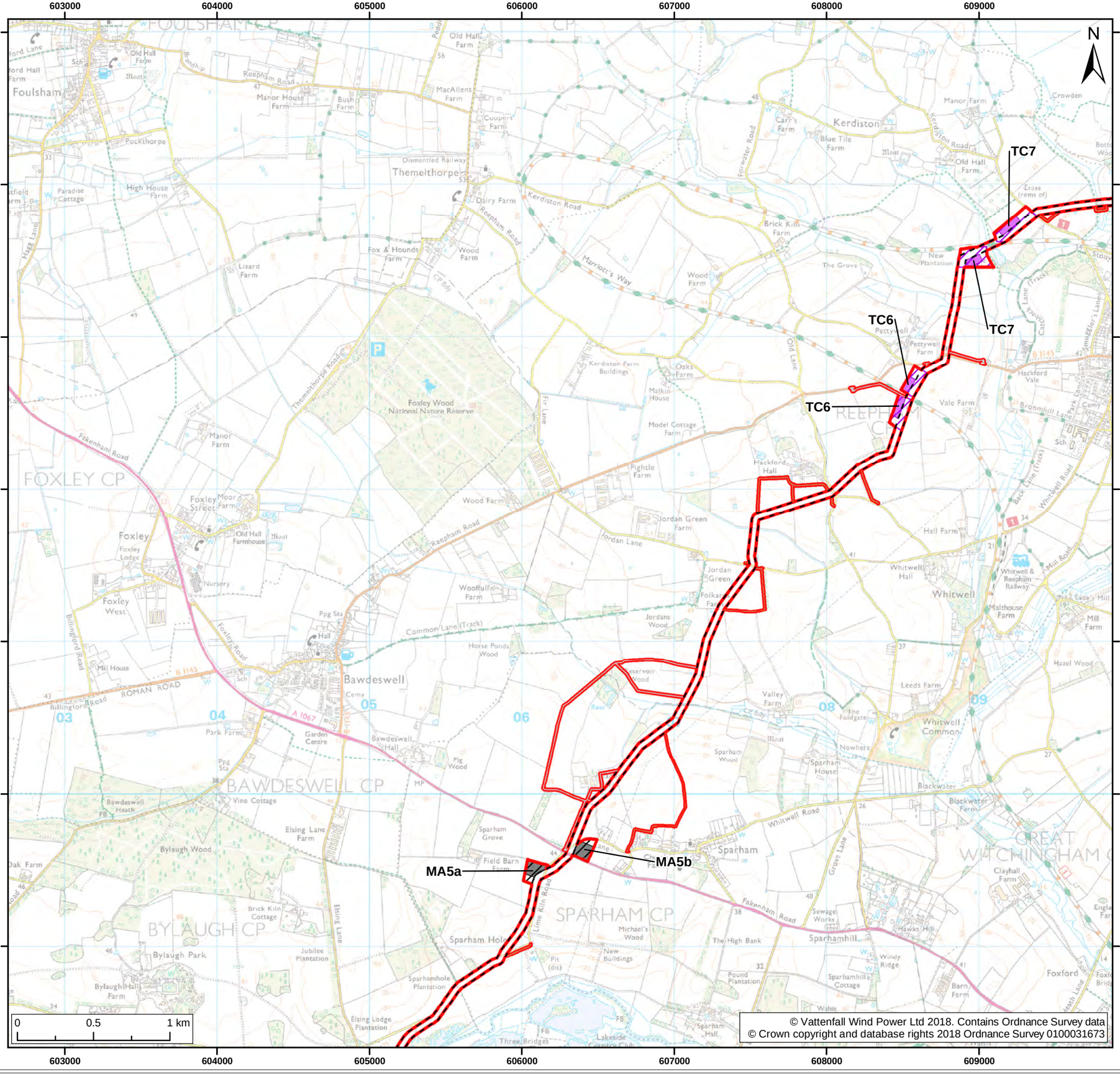

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Norfolk Boreas onshore project area
(Map 6 of 9)

Figure: 9.1a | Drawing No: PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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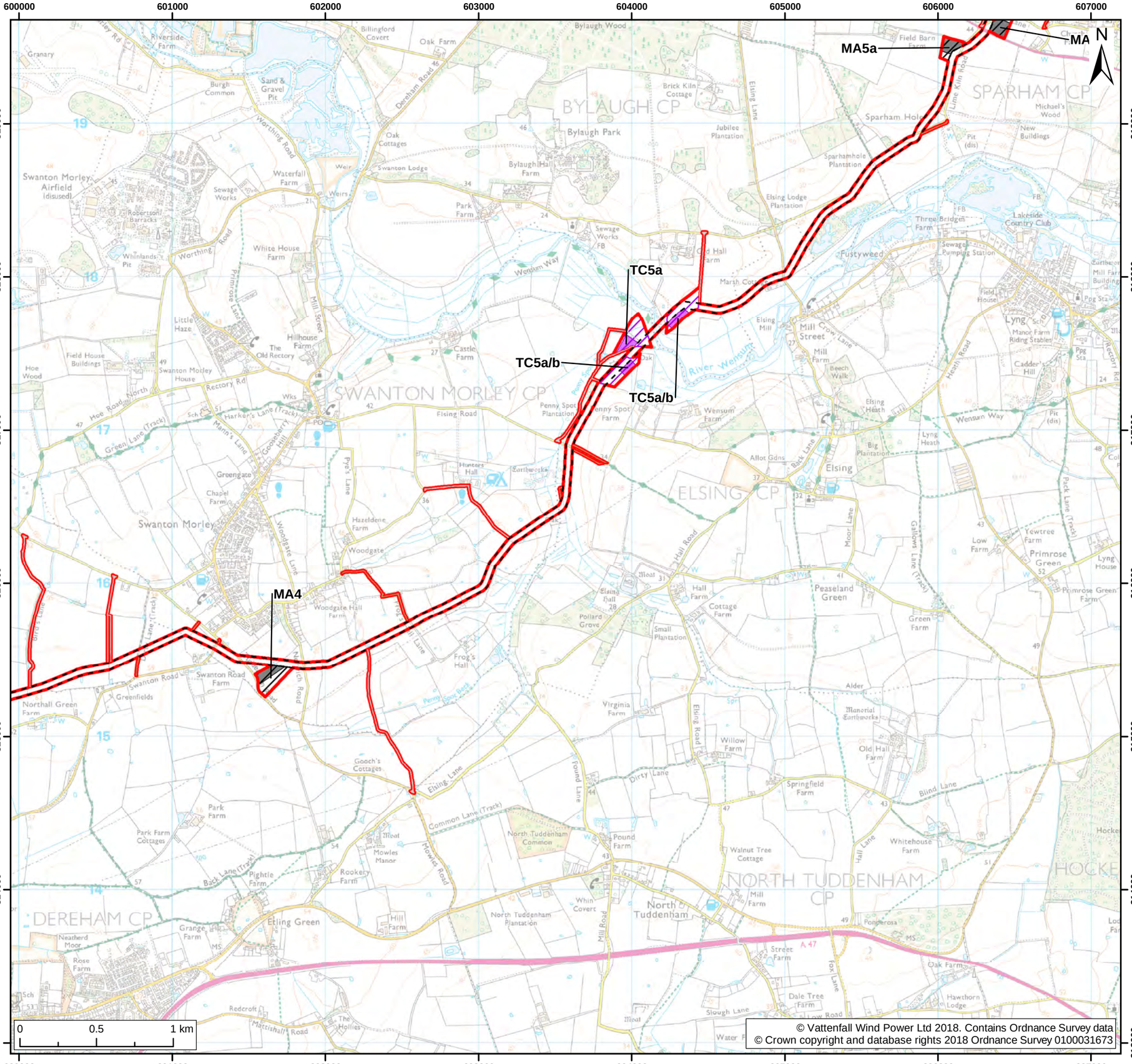

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Project: Norfolk Boreas	Report: Norfolk Boreas HRA Screening: Onshore

Title:

Norfolk Boreas onshore project area
(Map 7 of 9)

Figure:	Drawing No:
9.1a	PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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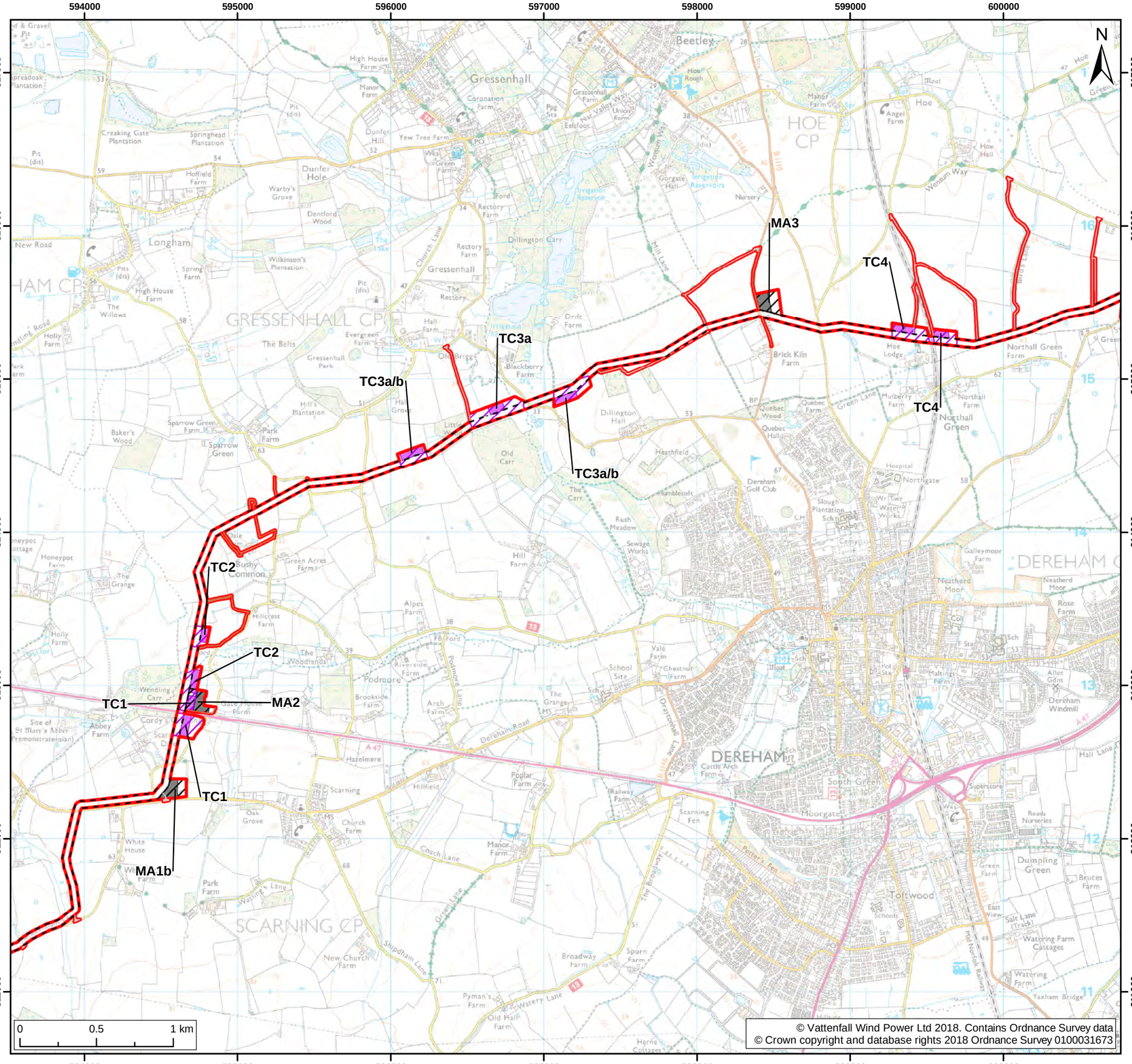

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Project: Norfolk Boreas	Report: Norfolk Boreas HRA Screening: Onshore

Title:

Norfolk Boreas onshore project area
(Map 8 of 9)

Figure: 9.1a | Drawing No: PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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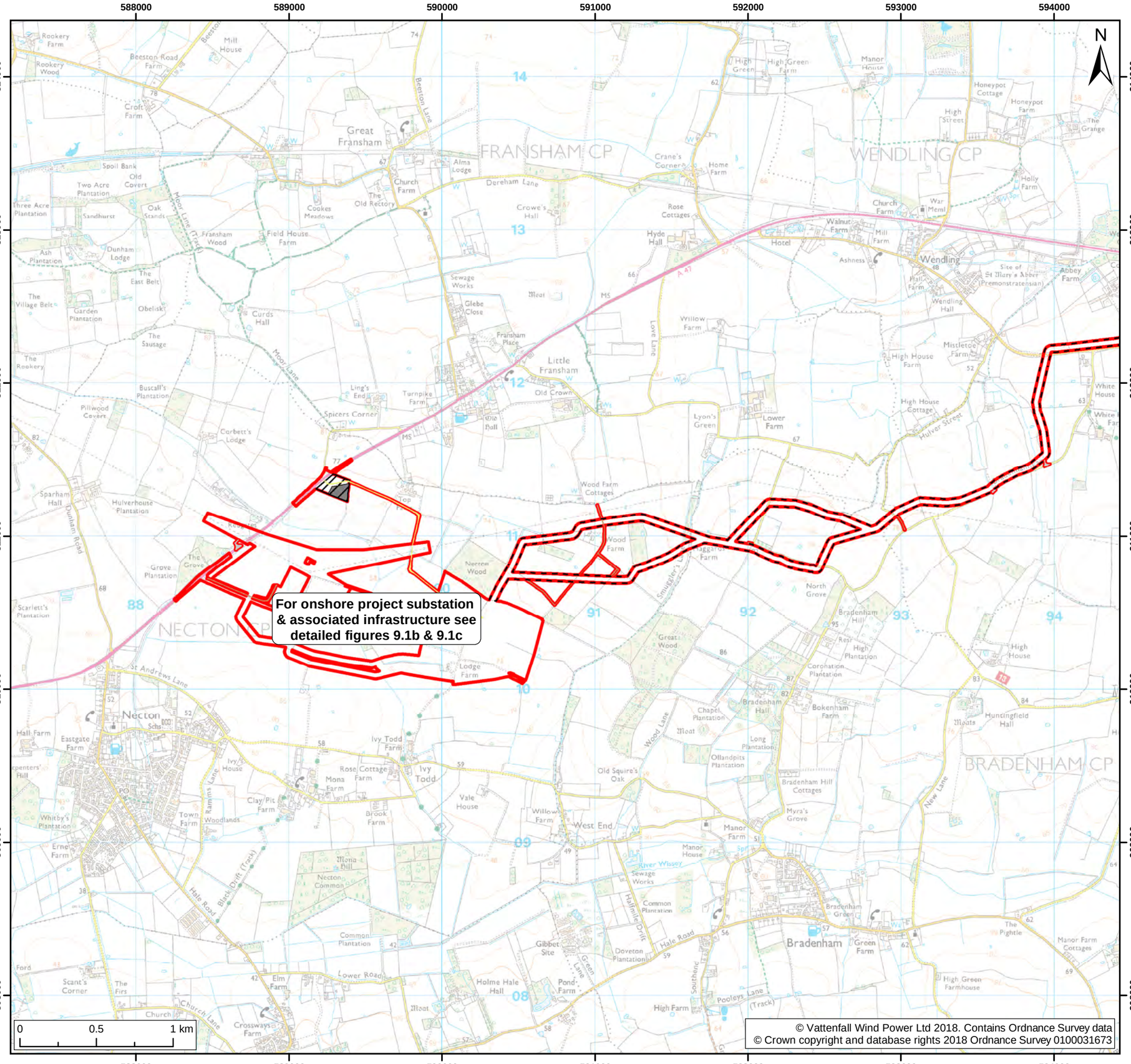

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access
- Permanent access

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Norfolk Boreas onshore project area (Map 9 of 9)

Figure: 9.1a | Drawing No: PB5640-005-2215-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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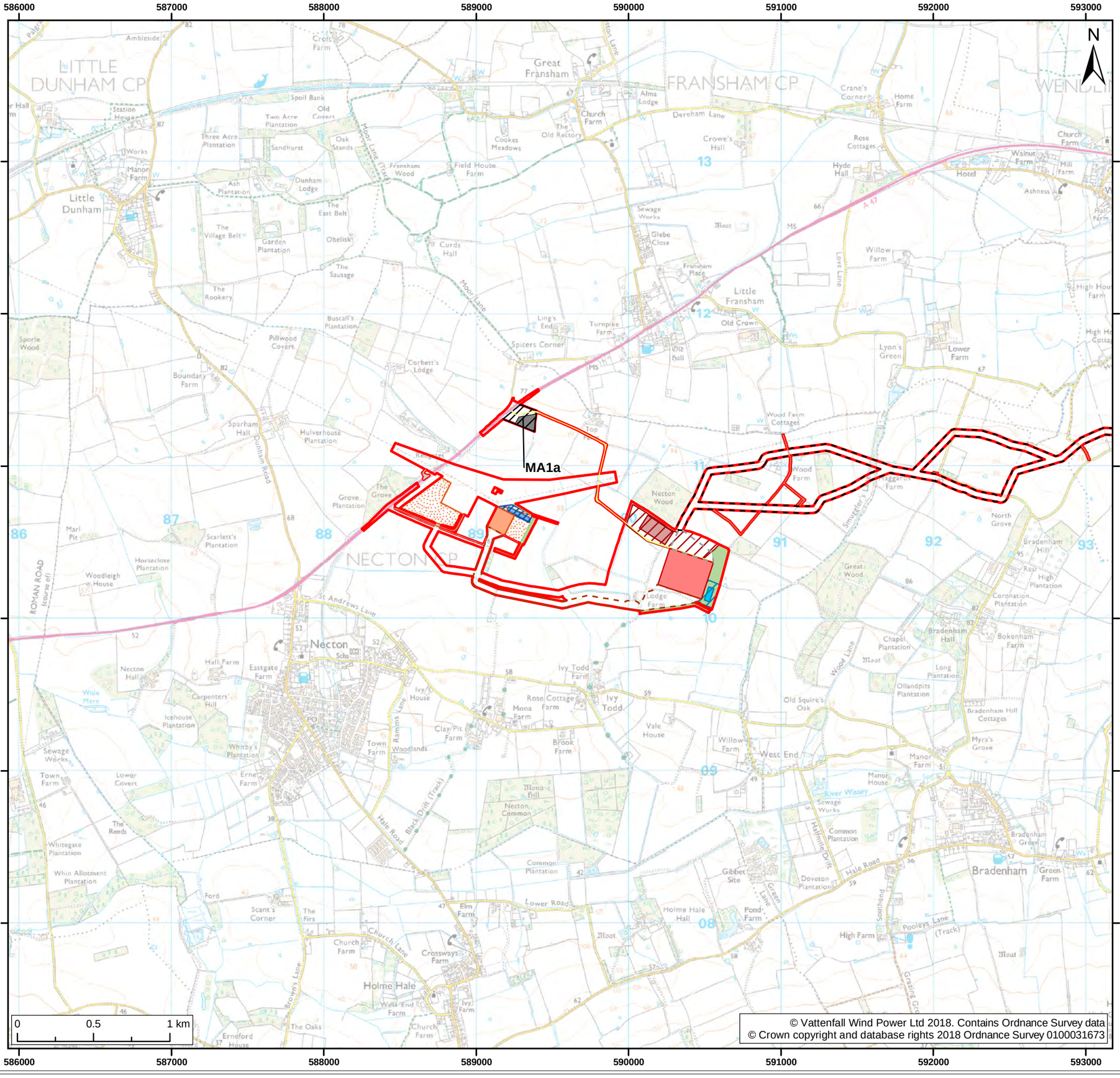

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Cable route entry to substation
- Onshore 400kV cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access
- Permanent access
- Onshore project substation
- Onshore project substation temporary construction compound zone
- Indicative onshore project substation temporary construction compound
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- National Grid substation extension
- National Grid temporary works
- National Grid attenuation pond location search area
- Indicative National Grid attenuation pond

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title: Norfolk Boreas onshore project area

Figure: 9.1b | Drawing No: PB5640-005-2215-001b

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	CD	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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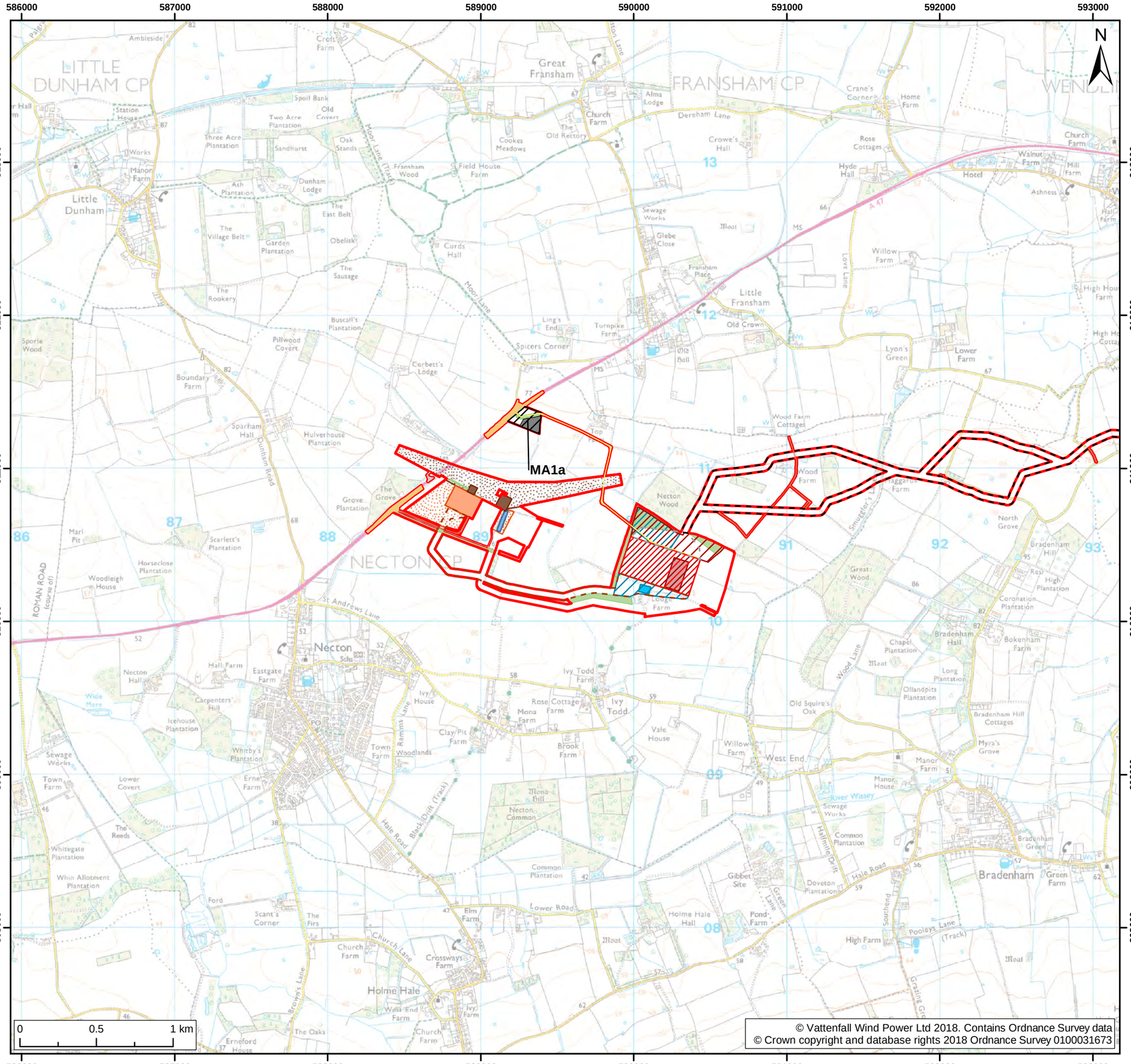

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Cable route entry to substation
- Onshore 400kV cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Highways temporary works area
- Construction access
- Operational access
- Permanent access
- Onshore project substation search area
- Onshore project substation temporary construction compound zone
- Indicative onshore project substation temporary construction compound
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- National Grid substation extension
- National Grid new / replacement OHL tower
- National Grid temporary works
- Overhead line temporary works
- National Grid attenuation pond

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title: Norfolk Boreas onshore project area

Figure: 9.1c | Drawing No: PB5640-005-2215-001c

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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632000 634000 636000 638000 640000 642000 644000 646000 648000

338000 336000 334000 332000 330000 328000 326000 324000

N

Paston Great Barn SAC

MA10a

MA11

TC16

TC16

Broadland Ramsar/SPA
The Broads SAC

Broadland Ramsar/SPA
The Broads SAC

Broadland Ramsar/SPA
The Broads SAC

Broadland Ramsar/SPA
The Broads SAC

Great Yarmouth
North Denes SPA

Winterton-Horsey
Dunes SAC

0 1 2 km

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Landfall zone
- Landfall compound zone
- Indicative landfall compound
- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Environmental Designation

- Special Area of Conservation (SAC)[1]

Environmental Designation

- Special Protection Area (SPA)[1]
- Ramsar[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Designated sites and 5km buffer
(Map 1 of 5)

Figure: 9.2a | Drawing No: PB5640-005-2215-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:60,000

Co-ordinate system: British National Grid **EPSG:** 27700

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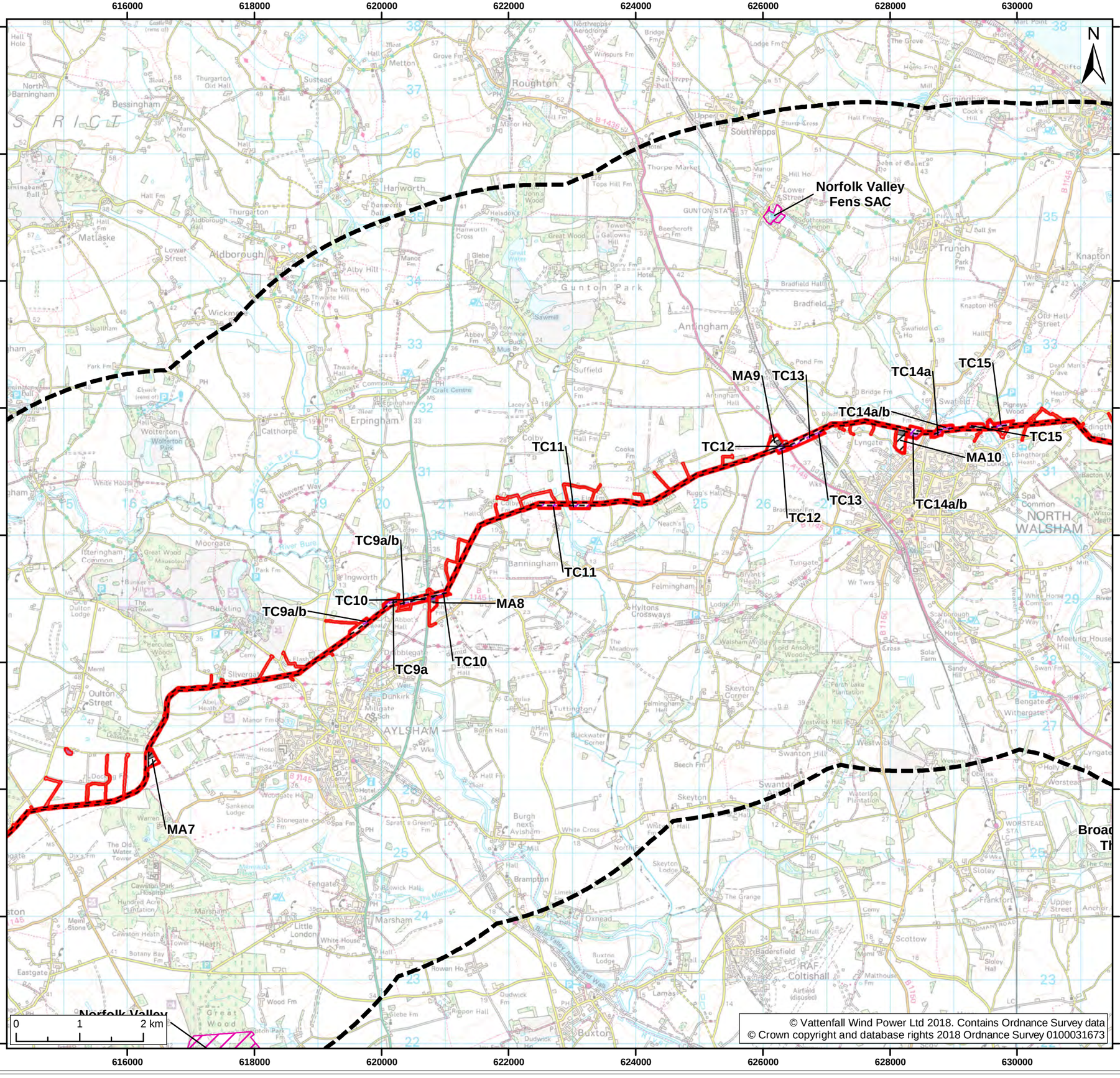

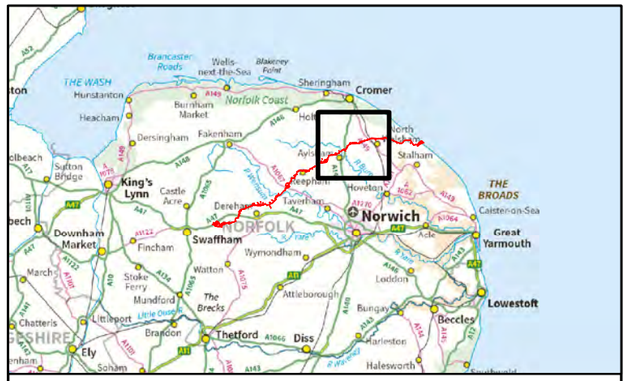

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Cable logistics area
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Environmental Designation

- Special Area of Conservation (SAC)[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Designated sites and 5km buffer (Map 2 of 5)

Figure: 9.2a | Drawing No: PB5640-005-2215-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:60,000

Co-ordinate system: British National Grid **EPSG:** 27700

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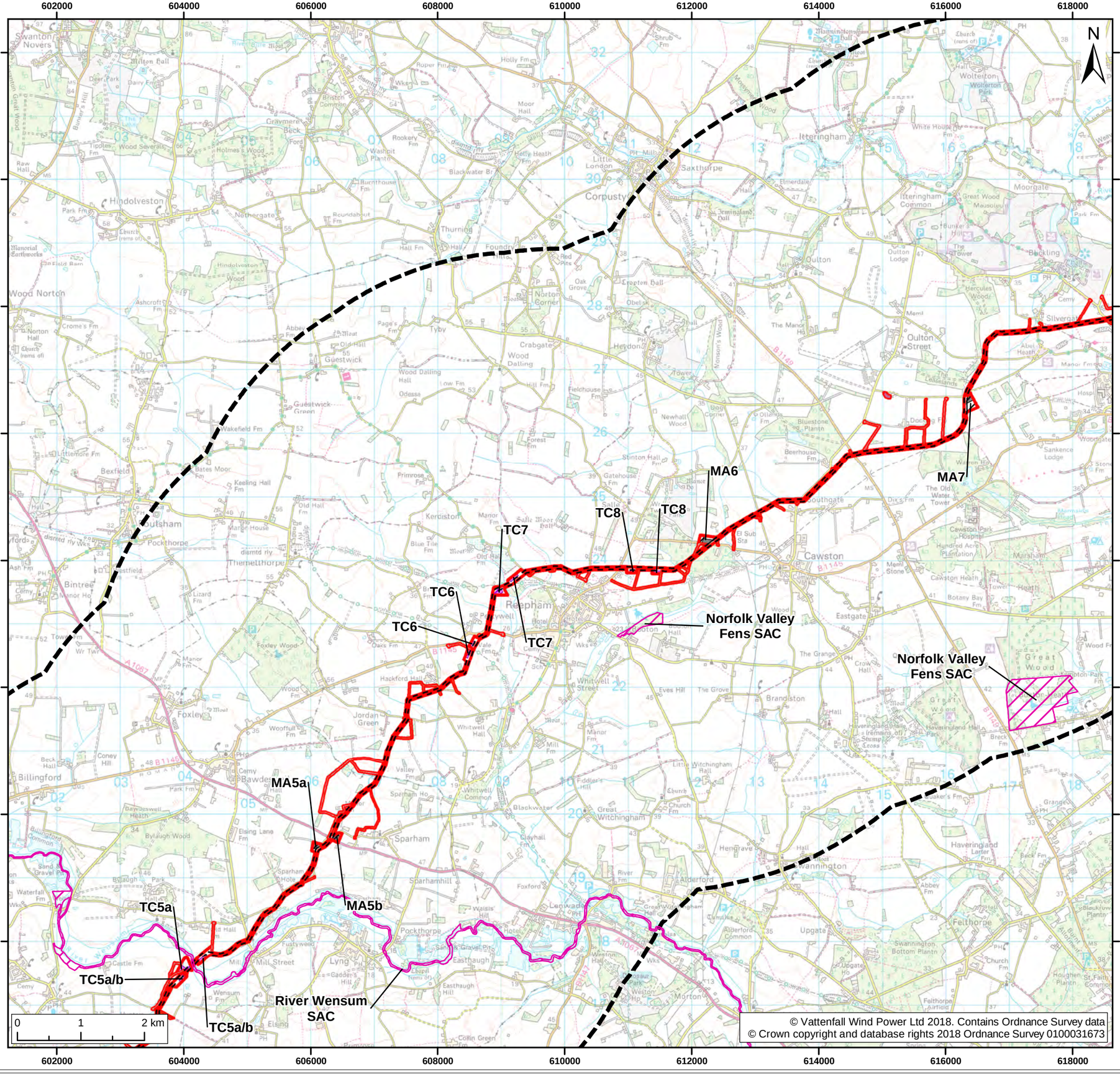

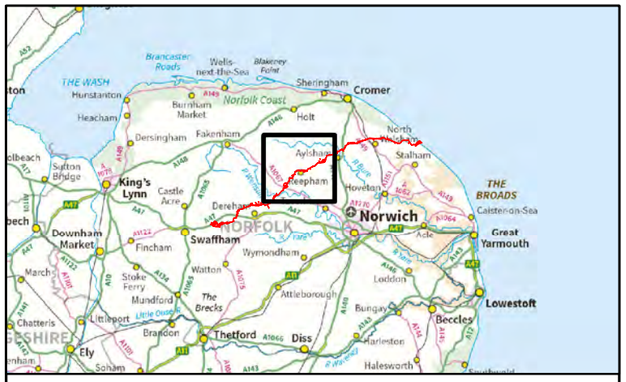

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Cable logistics area
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Environmental Designation

- Special Area of Conservation (SAC)[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Designated sites and 5km buffer (Map 3 of 5)

Figure: 9.2a | Drawing No: PB5640-005-2215-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:60,000

Co-ordinate system: British National Grid **EPSG:** 27700

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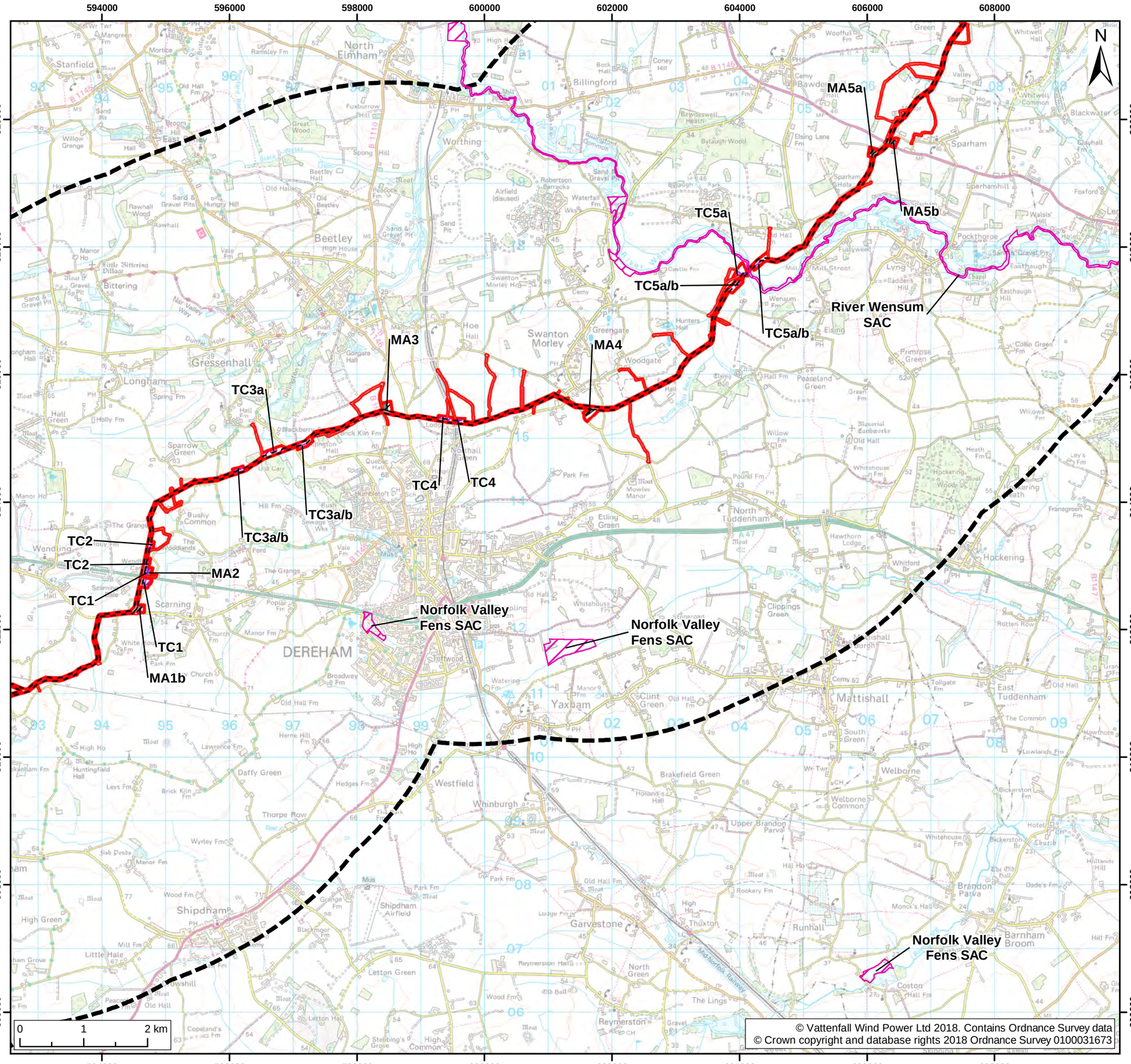

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Environmental Designation

- Special Area of Conservation (SAC)[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Designated sites and 5km buffer (Map 4 of 5)

Figure: 9.2a | Drawing No: PB5640-005-2215-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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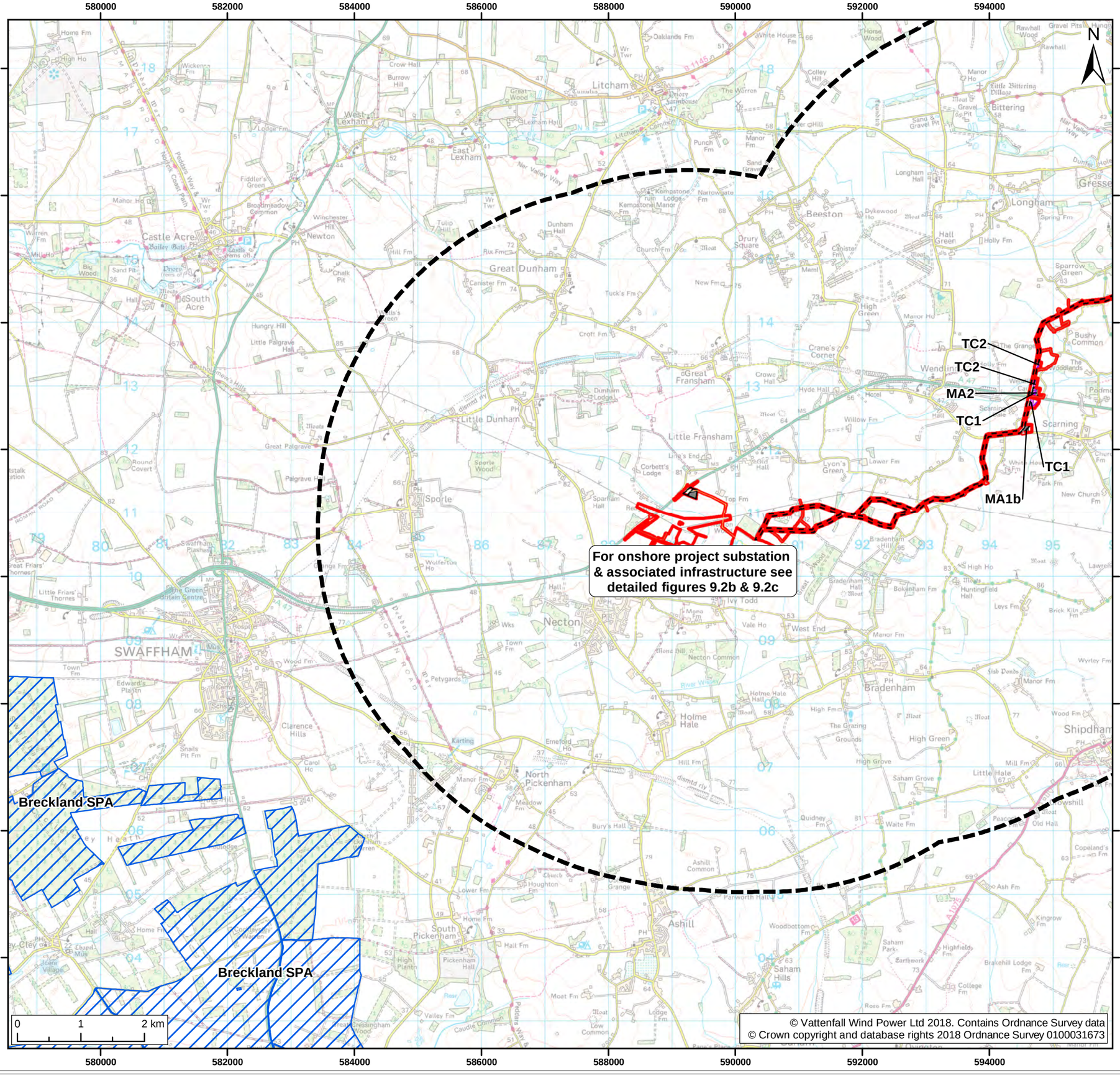

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access
- Permanent access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Environmental Designation

- Special Protection Area (SPA)[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Designated sites and 5km buffer (Map 5 of 5)

Figure: 9.2a | Drawing No: PB5640-005-2215-002a

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:60,000

Co-ordinate system: British National Grid **EPSG:** 27700

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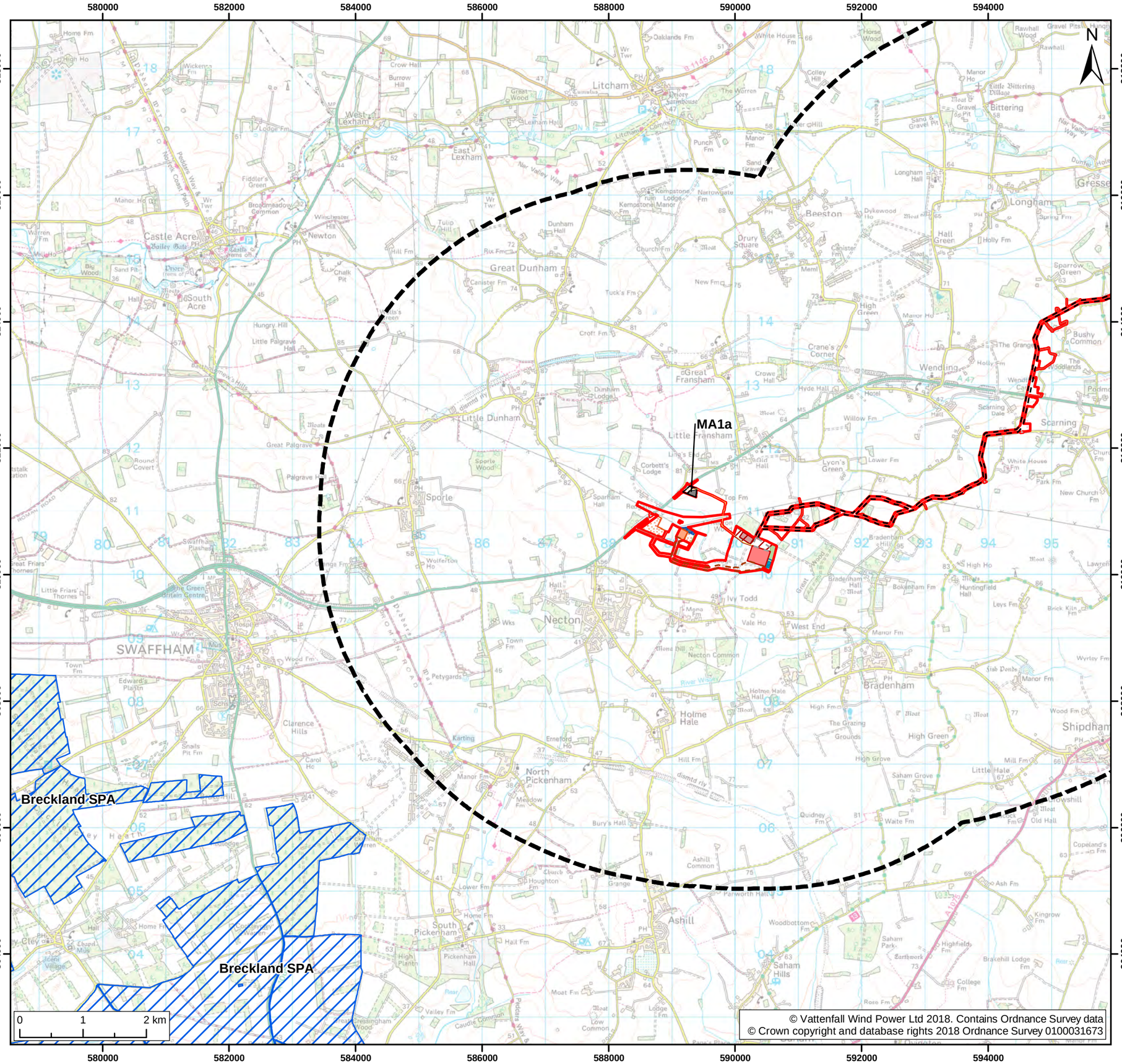

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Cable route entry to substation
- Onshore 400kV cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access
- Permanent access
- Onshore project substation
- Onshore project substation temporary construction compound zone
- Indicative onshore project substation temporary construction compound
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- National Grid substation extension
- National Grid temporary works
- National Grid attenuation pond location search area
- Indicative National Grid attenuation pond

Environmental Designation

- Special Protection Area (SPA)[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title: Designated sites and 5km buffer

Figure: 9.2b | Drawing No: PB5640-005-2215-002b

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:60,000

Co-ordinate system: British National Grid **EPSG:** 27700

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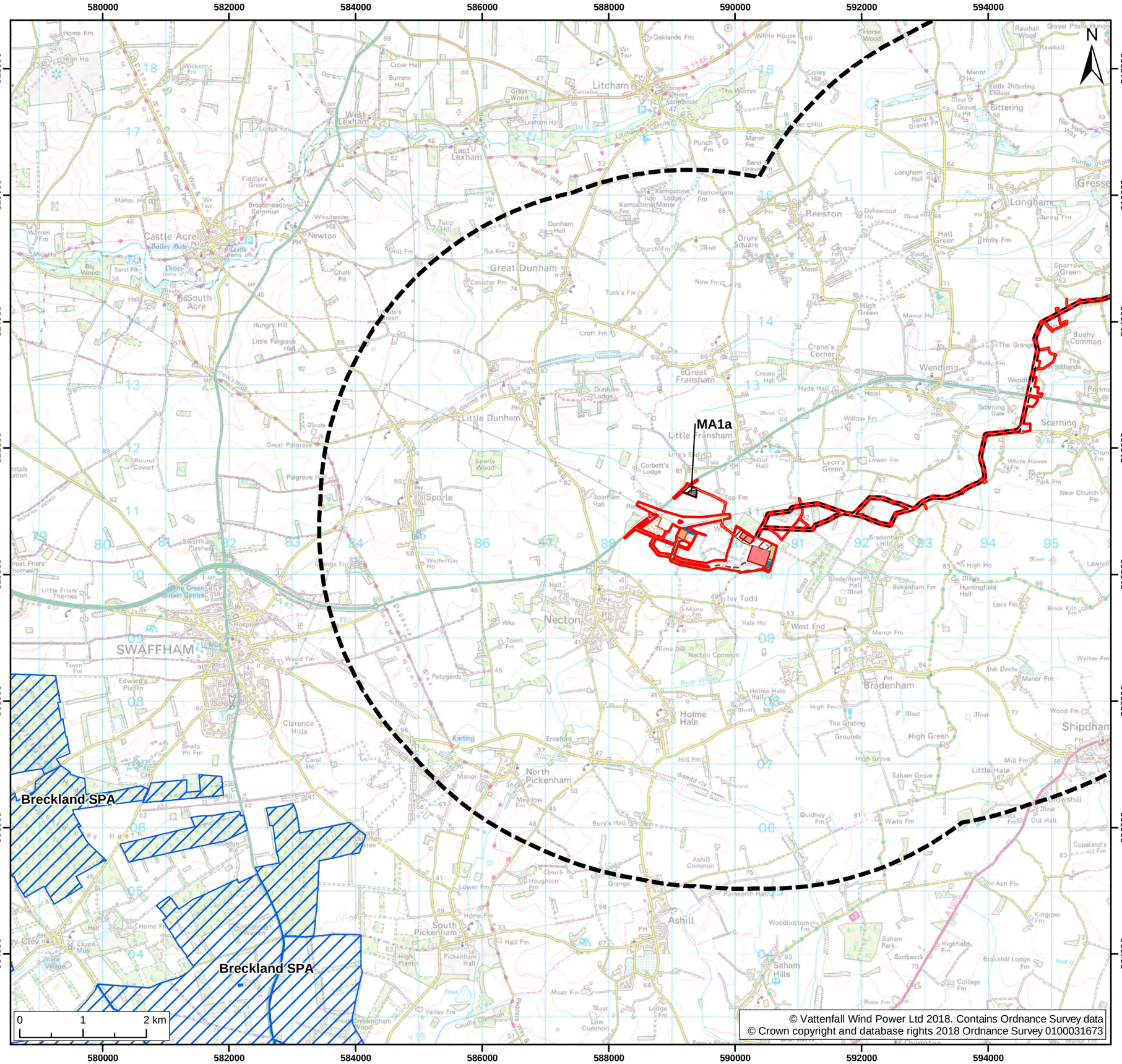

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 1)

- Onshore cable route
- Cable route entry to substation
- Onshore 400kV cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Construction access
- Operational access
- Permanent access
- Onshore project substation
- Onshore project substation temporary construction compound zone
- Indicative onshore project substation temporary construction compound
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- National Grid substation extension
- National Grid temporary works
- National Grid attenuation pond location search area
- Indicative National Grid attenuation pond

Environmental Designation

- Special Protection Area (SPA)[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title: Designated sites and 5km buffer

Figure: 9.2b | Drawing No: PB5640-005-2215-002b

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:60,000

Co-ordinate system: British National Grid **EPSG:** 27700

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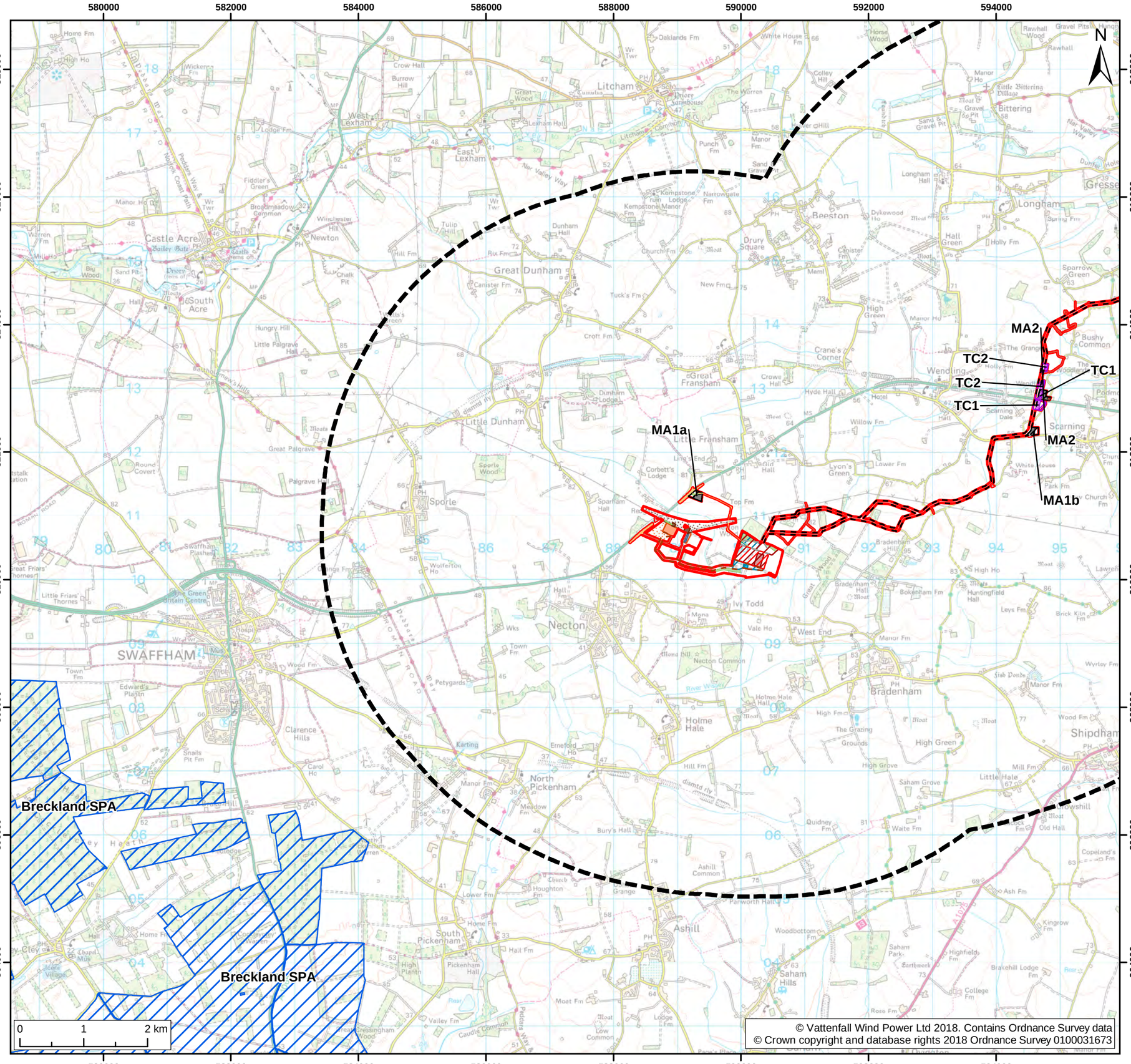

Legend:

- Norfolk Boreas red line boundary
- 5km buffer zone

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Onshore cable route
- Cable route entry to substation
- Onshore 400kV cable route
- Mobilisation zone
- Indicative mobilisation area compound
- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Highways temporary works area
- Construction access
- Operational access
- Permanent access
- Onshore project substation search area
- Onshore project substation temporary construction compound zone
- Indicative onshore project substation temporary construction compound
- Attenuation pond zone
- Indicative attenuation pond
- Indicative mitigation planting
- National Grid substation extension
- National Grid new / replacement OHL tower
- National Grid temporary works
- Overhead line temporary works
- National Grid attenuation pond

Environmental Designation

- Special Protection Area (SPA)[1]

[1] Natural England, 2018.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title: Designated sites and 5km buffer

Figure: 9.2c | Drawing No: PB5640-005-2215-002c

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid **EPSG:** 27700

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633000 634000 635000 636000 637000 638000 639000 640000

334000 333000 332000 331000 330000 329000 328000 327000

N

TC16

MA11

0 0.5 1 km

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Landfall zone
- Landfall compound zone
- Indicative landfall compound
- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Study area

- Study area
- Broadland Special Proection Area (SPA) 5km study area
- Land subject to road transect survey

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Agricultural habitats within 5km of Broadland SPA

Figure: 9.3 | Drawing No: PB5640-005-2215-003

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:30,000

Co-ordinate system: British National Grid **EPSG:** 27700

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634000 635000 636000 637000 638000 639000 640000

333000 332000 331000 330000 329000 328000

N

MA11

Hundred Stream

0 0.5 1 km

Legend:

- Norfolk Boreas red line boundary

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Landfall zone
- Landfall compound zone
- Indicative landfall compound
- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Mobilisation zone
- Indicative mobilisation area compound

Study area

- Study area
- Broadland Special Proection Area (SPA) 5km study area

UK Habitats of Principal Importance[1]

- Coastal sand dunes
- Lowland heathland
- Hundred Stream watercourse[2]

[1] Natural England, 2018.
[2] Internal Drainage Board, 2017.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:

Coastal and wetland habitats within 5km of Broadland SPA

Figure: 9.4 | Drawing No: PB5640-005-2215-004

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:25,000

Co-ordinate system: British National Grid **EPSG:** 27700

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633500 634000 634500 635000 635500 636000

332000 331500 331000 330500 330000

N

MA11

Two hedgerows between Witton and North Walsham Road

0 200 400 m

Legend:

- Norfolk Boreas red line boundary
- Paston Great Barn Special Area of Conservation (SAC) 5km buffer

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Mobilisation zone
- Indicative mobilisation area compound

Environmental Designation

- Special Area of Conservation (SAC)[1]

Survey results[2]

- Commuting routes
- Commuting/foraging routes
- Core foraging areas
- Important barbastelle features

[1] Natural England, 2018.
[2] Norfolk Barbastelle Study Group, 2017.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title:
Paston Great Barn SAC - Norfolk Barbastelle Study Group Core foraging areas (Map 1 of 3)

Figure: 9.5 Drawing No: PB4476-005-2215-006

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:10,000

Co-ordinate system: British National Grid **EPSG:** 27700

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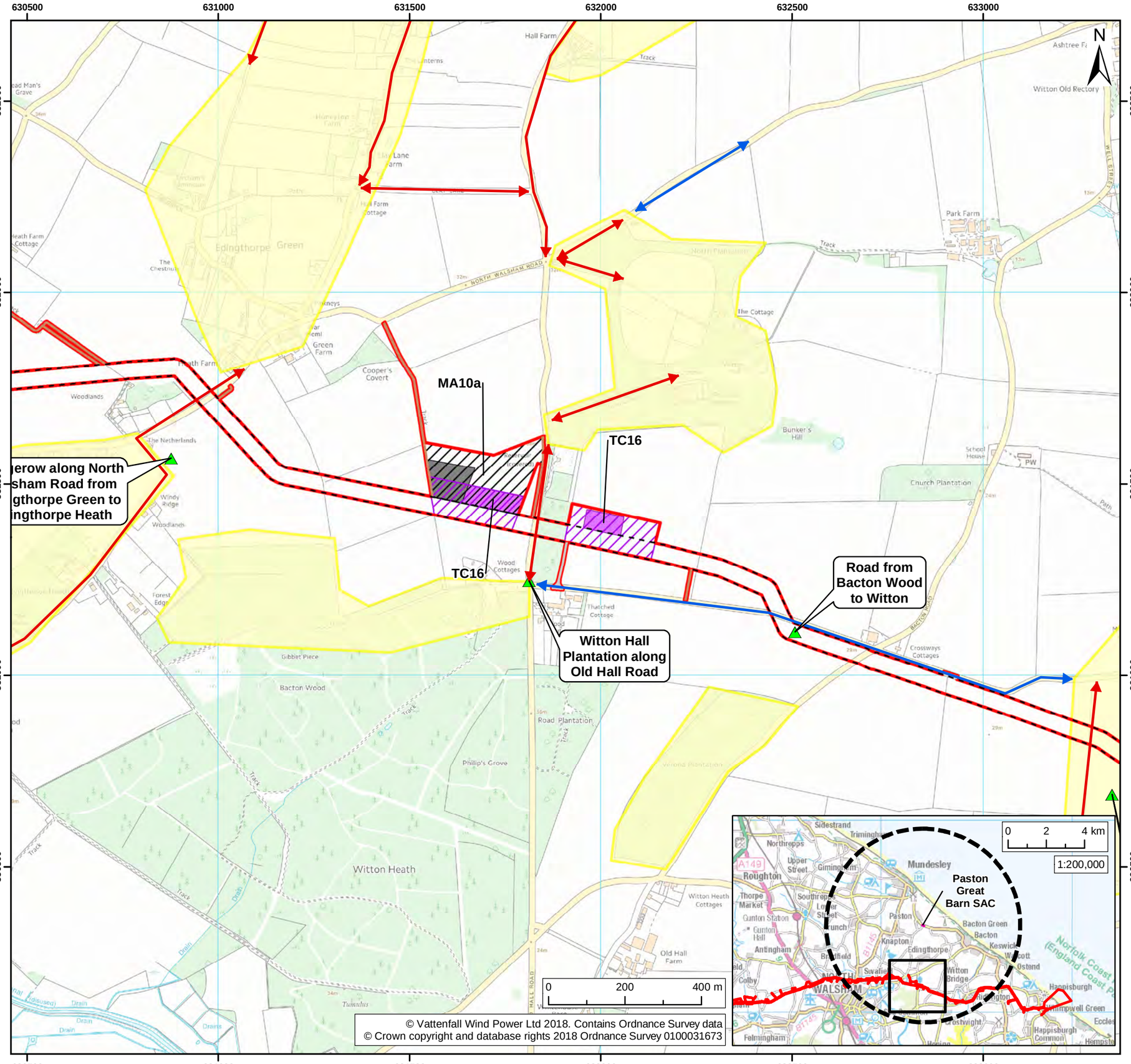

Legend:

- Norfolk Boreas red line boundary
- Paston Great Barn Special Area of Conservation (SAC) 5km buffer

Norfolk Boreas Onshore Project Infrastructure (Scenario 1 & 2)

- Onshore cable route
- Construction access
- Operational access

Norfolk Boreas Onshore Project Infrastructure (Scenario 2)

- Trenchless crossing zone (e.g. HDD)
- Indicative trenchless crossing compound
- Mobilisation zone
- Indicative mobilisation area compound

Environmental Designation

- Special Area of Conservation (SAC)[1]

Survey results[2]

- Commuting routes
- Commuting/foraging routes
- Core foraging areas
- Important barbastelle features

[1] Natural England, 2018.
[2] Norfolk Barbastelle Study Group, 2017.

Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title: Paston Great Barn SAC - Norfolk Barbastelle Study Group Core foraging areas (Map 2 of 3)

Figure: 9.5 | Drawing No: PB4476-005-2215-006

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	08/03/2019	JT	GC	A3	1:10,000

Co-ordinate system: British National Grid **EPSG:** 27700

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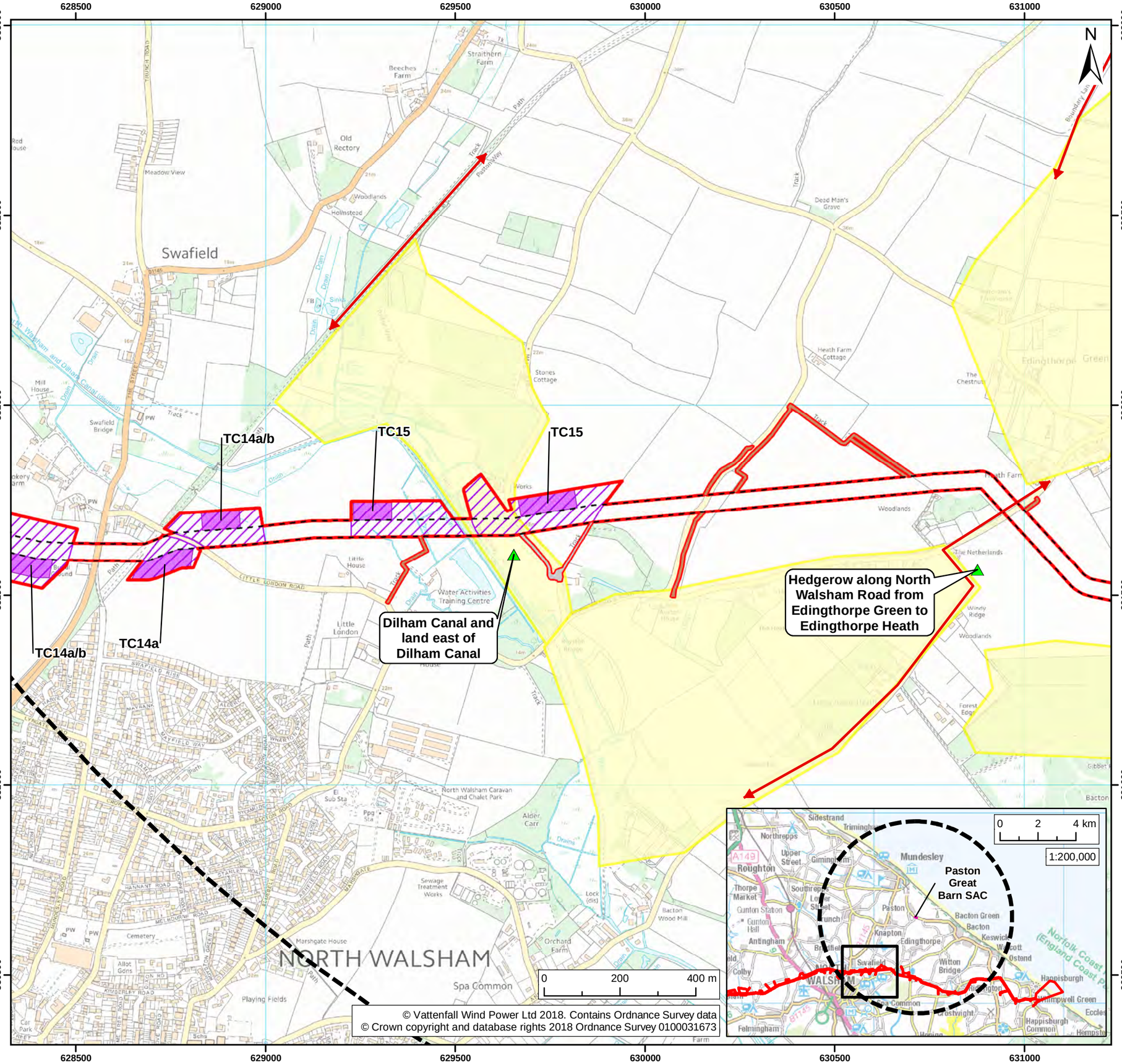

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Project:	Report:
Norfolk Boreas	Norfolk Boreas HRA Screening: Onshore

Title: Paston Great Barn SAC - Norfolk Barbastelle Study Group Core foraging areas (Map 3 of 3)

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