

**ENVIRONMENTAL IMPACT ASSESSMENT
SCOPING REPORT
Bramford to Twinstead Tee 400kV Connection**

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Table of Contents

1.	INTRODUCTION	1
2.	MAIN ALTERNATIVES CONSIDERED	5
3.	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	13
4.	APPROACH TO THE ENVIRONMENTAL IMPACT ASSESSMENT	27
5.	LANDSCAPE AND VISUAL ASSESSMENT	35
6.	BIODIVERSITY AND NATURE CONSERVATION	77
7.	HISTORIC ENVIRONMENT	95
8.	GEOLOGICAL CONSERVATION.....	111
9.	FLOOD RISK, WATER QUALITY AND RESOURCES	117
10.	TRAFFIC AND TRANSPORT	125
11.	AIR QUALITY AND EMISSIONS	133
12.	NOISE AND VIBRATION.....	141
13.	SOCIO-ECONOMICS AND LAND USE	147
14.	ELECTRIC AND MAGNETIC FIELDS AND ELECTRO-MAGNETIC COMPATIBILITY	169
15.	CONTENTS AND SCOPE OF ENVIRONMENTAL STATEMENT	175

APPENDICES

Appendix A – Consultation Meeting Notes

Appendix B – Socio-Economic Baseline Data

Appendix C – EMC Certificate of Compliance

FIGURES

Figure 1- Location Plan

Figure 2 – Red Line Boundary

Figure 3 – Connection Route Plan

Figure 4 .1 – Red Line Boundary Substation A1

Figure 4.2 – Red Line Boundary Substation B1

Figure 4.3 – Redline Boundary Substation B2

Figure 4.4 – Red Line Boundary Substation B3

Figure 4.5 – Red Line Boundary Substation B4

Figure 4.6 – Red Line Boundary Substation B5

Figure 4.7 – Red Line Boundary Substation C2

Figure 4.8 – Red Line Boundary Substation C3

Figure 4.9 – Red Line Boundary Substation C4

Figure 5 – Removal of Overhead Line

Figure 6 – Environmental Constraints

Figure 7 – Substation Environmental Constraints

Figure 8 – Approximate Working Area of a Tower

Figure 9 – Approximate Cross Section of Working Area for an Underground Cable

Figure 10 – Generic Substation Layout 400kV AIS and 132kV AIS

Figure 11 – Generic Substation Layout 400kV AIS and 132kV GIS

Figure 12 – General Layout of a Sealing End Compound

Biodiversity and Nature Conservation Figures

Figure 13 – Phase 1 Section AB

Figure 14 – Phase 1 Section C

Figure 15 – Phase 1 Section D

Figure 16 – Phase 1 Section E

Figure 17 – Phase 1 Section F

Figure 18 – Phase 1 Section G

Figure 19 – Phase 1 Substation Study Area A

Figure 20 – Phase 1 Substation Study Area B

Figure 21 – Phase 1 Substation Study Area C

Figure 22 – Woodlands and NVC Sections A to D

Figure 23 – Woodlands and NVC Sections E to G

Figure 24 – Woodlands and NVC Substation Study Areas

Figure 25 – Grassland and NVC Sections A to D

Figure 26 – Grassland and NVC Sections E – G

Figure 27 – Grassland and NVC Substation Study Areas

Figure 28 – Breeding Bird Survey Substation Study Area A Visit 1

Figure 29 – Breeding Bird Survey Substation Study Area A Visit 2

Figure 30 – Breeding Bird Survey Substation Study Area B Visit 1

Figure 31 – Breeding Bird Survey Substation Study Area B Visit 2

Figure 32 – Breeding Bird Survey Substation Study Area C Visit 1

Figure 33 – Breeding Bird Survey Substation Study Area C Visit 2

Figure 34 – Breeding Bird Survey Section AB Visit 1

Figure 35 - Breeding Bird Survey Section AB Visit 2

Figure 36 – Breeding Bird Survey Section C Visit 1

Figure 37 – Breeding Bird Survey Section C Visit 2

Figure 38 – Breeding Bird Survey Section D Visit 1

Figure 39 – Breeding Bird Survey Section D Visit 2

Figure 40 – Breeding Bird Survey Section E Visit 1

Figure 41 – Breeding Bird Survey Section E Visit 2

Figure 42 – Breeding Bird Survey Section F Visit 1

Figure 43 – Breeding Bird Survey Section F Visit 2

Figure 44 – Breeding Bird Survey Section G Visit 1

Figure 45 – Breeding Bird Survey Section G Visit 2

Figure 46 – Dormouse Survey Results Sections A to D

Figure 47 – Dormouse Survey Results Sections E to G

Figure 48 – Dormouse Survey Results Substation Study Areas

Figure 49 – Bat Survey Transects and Detector Locations Sections

Figure 50 – Bat Survey Transects and Detector Locations Substation Study Areas

Figure 51 – Pond Survey Status Substations

Figure 52 – Pond Survey Status Section AB

Figure 53 – Pond Survey Status Section C

Figure 54 – Pond Survey Status Section D

Figure 55 – Pond Survey Status Section E

Figure 56 – Pond Survey Status Section F

Figure 57 – Pond Survey Status Section G

Figure 58 – Reptile Survey Section D

Figure 59 – Reptile Survey Section F

Figure 60 – Reptile Survey Section G

Figure 61 – Invertebrate Survey Section AB

Figure 62 – Invertebrate Survey Section D

Figure 63 – Invertebrate Survey Section E

Figure 64 - Invertebrate Survey Section F

Figure 65 – Invertebrate Survey Section G

1. INTRODUCTION

1.1. Overview of the Proposal

- 1.1.1. National Grid Electricity Transmission plc (National Grid) is preparing an application for an order to grant Development Consent (DCO) from the Planning Inspectorate (PINS) to develop a new 400,000 volt (400kV) connection between Bramford Substation (west of Ipswich) and Twinstead Tee (south of Sudbury). The proposed development is in East Anglia in the east of England, as shown at Figure 1.
- 1.1.2. National Grid is proposing to use a combination of overhead line and underground cables along the connection route. Sealing end compounds are proposed at each interface point between the overhead and underground connections. The proposal includes the removal of the existing 132kV overhead line between Burstall Bridge (approximately 2km south of Bramford Substation) and Twinstead Tee, and the removal of a short section (four spans, which equates to three pylons) of the existing Bramford – Braintree – Rayleigh 400kV overhead line from Twinstead Tee to the proposed sealing end compound at Henny Back Road. To replace the connection of the removed 132kV overhead line, it is National Grid's preference to construct a new 400kV/132kV substation at a location west of Twinstead Tee, although this is currently the subject of consultation. These proposals collectively are referred to in this report as 'the proposed development.' The proposed development will include temporary and permanent access tracks, temporary construction compounds and other associated works. The outline of the development as currently proposed is shown at Figures 2, 3 and 4.1 to 4.9. Figure 2 and Figures 4.1 to 4.9 show the 'red line boundary', detailing the presently anticipated extent of development for which permission will be sought in the DCO. The extent of the red line boundary may be altered prior to the submission of the DCO application based on detailed design matters and representations received during consultation.
- 1.1.3. The DCO application will be accompanied by an Environmental Statement (ES) in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 ('the 2009 EIA Regulations'), as amended by the Infrastructure Planning (EIA) (Amendment) Regulations 2012.
- 1.1.4. This report provides information regarding the proposed scope of the EIA to be reported in the ES and accompanies National Grid's request to PINS for a Scoping Opinion under Regulation 8 (1) of the 2009 EIA Regulations.

1.2. The Need for Environmental Impact Assessment

- 1.2.1. The proposed development is a Nationally Significant Infrastructure Project (NSIP) as defined by the Planning Act 2008. The development falls within Schedule 2 of the 2009 EIA Regulations. National Grid is voluntarily undertaking an EIA because of the nature, size and location of the proposed development and has informed PINS of its intention to make an application for development consent, which will be subject to EIA.

1.3. Contents of the Scoping Report

1.3.1. This scoping report has been prepared in accordance with The Planning Inspectorate's *Advice Note 7*¹. The following chapters in this scoping report include:

- Main alternatives considered – outlines the main alternatives considered and the reasons for selecting a preferred option;
- Characteristics of the proposed development – outlines the type of development proposed and the specific characteristics of the proposed development (assuming worst case e.g. maximum dimensions of a component);
- Approach to the Environmental Impact Assessment – outlines the need for an EIA, the proposed approach to the EIA and the key topics covered as part of this scoping exercise;
- Environmental topic scopes – outlines the existing environment supported by results of desktop studies where available; an indication of where significant effects are likely to result from; any designated nature conservation sites that are likely to be significantly affected by the proposed development; the guidance and best practice to be relied upon and whether this has been agreed with relevant bodies; the proposed method and approach to predict impacts and the significance criteria framework to be used; an indication of when mitigation will be proposed and types of mitigation where known; predicted residual impacts; and outlines how inter-relationships of effect and cumulative effects will be taken into account in the ES; and
- Contents of the Environmental Statement – outlines matters to be scoped out and full justification for matters scoped out. Also outlines the structure of the proposed ES.

1.3.2. In accordance with Advice Note 7 (page 4), the following drawings accompany this scoping report:

- Figure 1 - Location Plan – location of the proposed development;
- Figure 2 - Red Line Boundary – the indicative boundary for the DCO application including any permanent and temporary land take required;
- Figure 3 - Proposed Connection Route – part of the proposed development;
- Figures 4.1 to 4.9 – Substation Study Areas and Potential Sites – red line boundary of the potential sites for the proposed substation including any permanent and temporary land take required part of the proposed development;
- Figure 5 – Removal of Existing Overhead Line – part of the proposed development;
- Figure 6 – Environmental Constraints at the Connection Route – planning constraints and designated areas;
- Figure 7 – Environmental Constraints at the Substation Study Areas – planning constraints and designated areas;

¹ The Planning Inspectorate: Advice Note 7: Environmental Impact Assessment: Screening and Scoping: April 2012.

- Figure 8 – Working Area of a Suspension and Tension Tower (pylon);
- Figure 9 – Generic Layout of a Cross Section of Working Area of a 400kV Underground Cable;
- Figure 10 – Generic Layout of a 400kV/132kV AIS Substation;
- Figure 11 – Generic Layout of an 400kV/132kV AIS/GIS Substation;
- Figure 12 – Generic Layout of a 400kV Sealing End Compound (for 3 cores per phase).

1.3.3. The information provided was unsuitable to collate onto one figure. Separate figures have been provided detailing the different components of the proposed development at a recognisable scale. Ordnance Survey grid references for the proposed development have been provided on the Figures.

2. MAIN ALTERNATIVES CONSIDERED

2.1.1. This section sets out the need for the Bramford to Twinstead Tee Connection Project and sets out an outline of the alternatives considered that would meet the need for the project and the reasons for selecting the preferred option.

2.2. The Need for the Connection between Bramford and Twinstead Tee

2.2.1. National Grid operates the high voltage electricity transmission system in Great Britain and owns the system in England and Wales. The system operates mainly at 400kV and connects the electricity generators to substations where the high voltages are transformed to lower voltages. The power from these substations is then distributed to homes and businesses by local Distribution Network Operators (DNOs) whose network operates at a maximum of 132kV. The DNO in East Anglia is UK Power Networks (UKPN).

2.2.2. The existing transmission system in East Anglia is sufficient to comply with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) for current levels of generation and demand. However the electricity industry is undergoing unprecedented changes in the drive towards a low-carbon economy, which is seeing major investment in low-carbon generation. These new generation projects need connections to the transmission system.

2.2.3. National Grid is obliged to offer a connection to a new generation to the transmission system and contractual agreements for the connection of substantial quantities of new generation have been signed, including in East Anglia. In assessing the connection requirements relevant to East Anglia, National Grid has identified that the existing transmission system will not be sufficient from late 2016. From 2016 to 2021 the East Anglia region will require new transmission capacity in excess of 8,000MW to comply with the requirements of the NETS SQSS and as the existing transmission system becomes insufficient to meet customer requirements.

2.2.4. Through the terms of its transmission licence and obligations in the Electricity Act 1989, National Grid is required to operate its transmission system in an efficient, economic and co-ordinated manner whilst having regard to the preservation of amenity².

2.2.5. A detailed explanation of the need for the project is contained in National Grid document 'Need Case for the East Anglia Region'³.

² Schedule 9 of the Electricity Act 1989 requires National Grid to "have regard to the desirability of preserving natural beauty, of conserving flora, fauna, and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest: and shall do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects".

³ National Grid: Bramford to Twinstead Connection Project: Need Case for the East Anglia Region: June 2011: <http://www.nationalgrid.com/NR/rdonlyres/B4A3008F-4B04-41A4-8A3B-37BBA7E03580/47713/BTNeedCasefortheEastAngliaRegionJune2011.pdf>

2.3. Strategic Options

- 2.3.1. National Grid considered options for developing a new 400kV transmission connection in East Anglia. The options were evaluated at workshops involving representatives from National Grid's internal specialist teams and its alliance partners. The results of the strategic optioneering exercise are contained in a separate report⁴ which was reviewed in 2011⁵, and sets out the details of the main alternatives that were considered by National Grid and the reasons for selecting the preferred option.
- 2.3.2. The conclusion of the studies was that the option of constructing a new 400kV connection between Bramford Substation and Twinstead Tee would achieve a balance between National Grid's technical, economic and environmental obligations and should be the preferred strategic option. This decision took account of National Grid's statutory obligations, its licence requirements and all other relevant considerations, including relevant National Policy Statements. However, National Grid recognised that due to amenity issues in some areas sections of the proposed connection may need to be placed underground and that these and other mitigation measures would be investigated going forward.

2.4. Route Corridor Study

- 2.4.1. A Route Corridor Study⁶, recommended by National Grid after completing the strategic optioneering exercise, was commissioned from environmental consultants The Environment Partnership (TEP) Limited to identify possible route corridors between Bramford Substation and Twinstead Tee and to assess how these route corridors performed against National Grid's obligations set out in Sections 9 and 38 of the Electricity Act 1989. A detailed desk-based assessment, supplemented with site visits, was used to identify route corridors which sought to avoid environmental constraints.
- 2.4.2. The Route Corridor Study identified and compared potential route corridors, taking into account National Grid's commitments as set out in its Stakeholder, Community and Amenity policy⁷. In particular, it presented an assessment of the potential impacts of an overhead line connection in each corridor on environmental constraints within and in the wider vicinity of the study area. The environmental constraints considered were:

⁴ National Grid: Bramford to Twinstead connection project: Strategic Optioneering Report: April 2009
<http://www.nationalgrid.com/NR/rdonlyres/D88A3A85-F2CD-4484-9CA8-DDDB1BC7D4DE/38243/Strategicoptionsreport3.pdf>

⁵ National Grid: Bramford to Twinstead connection project: Review of Strategic Optioneering Report: June 2011
<http://www.nationalgrid.com/NR/rdonlyres/F50A1521-D755-4116-A787-E623F77D196E/47714/BTReviewofStrategicOptionsReportJune2011.pdf>

⁶ National Grid: Bramford to Twinstead Connection Project: Route Corridor Study for Public Consultation: October 2009
<http://www.nationalgrid.com/NR/rdonlyres/49525088-FFA3-4CD0-9671-A398F4C65EF3/38036/BramfordtoTwinsteadRouteCorridorStudyTextOnly.pdf>

⁷ National Grid plc: National Grid's commitments when undertaking works in the UK - our Stakeholder, Community and Amenity policy: February 2010

- Area of Outstanding Natural Beauty;
- Sites of Special Scientific Interest;
- Special Protection Areas;
- Ramsar sites;
- Woodlands;
- Scheduled monuments;
- Settlements, including conservation areas and listed buildings;
- Registered Parks and Gardens;
- Development Plan allocations for housing
- Minerals sites;
- Airfields;
- Topography;
- Landscape character, including impact on historic landscape; and
- Views.

2.4.3. The Route Corridor Study identified four broad corridors between Bramford Substation and Twinstead Tee. Corridor 2 envisaged removal of the existing 132kV overhead line, then owned by EDF Energy, between Burstall Bridge and the vicinity of Twinstead Tee and a new 400kV/132kV substation west of Twinstead Tee and east of Thaxted. A draft Substation Siting Study⁸ considered potential sites and concluded that three possible locations or 'substation study areas' should form a shortlist for further consideration. (EDF Energy transferred the part of its business comprising the 132kV distribution network in eastern England to UKPN in 2010.)

2.5. Stage 1 Consultation

2.5.1. The Route Corridor Study formed the basis of an extensive consultation exercise. This was carried out in accordance with a Consultation Strategy⁹. The Consultation Strategy was informed by relevant government guidance, specifically Department of Communities and Local Government's 'Consultation on the Pre-Application Consultation and Application Procedures for Nationally Significant Infrastructure Projects'¹⁰. The Consultation Strategy was prepared in consultation with Babergh District Council, Mid-Suffolk District Council, Braintree District Council, Suffolk County Council and Essex County Council.

2.5.2. Public consultation on route corridor options commenced in October 2009. National Grid received over 3,000 individual pieces of feedback during the Stage 1 Consultation. All of the responses were taken into account and in June 2011

⁸ National Grid: Bramford to Twinstead Connection Project: Substation Siting Study: October 2009
<http://www.nationalgrid.com/NR/rdonlyres/6B9A213A-CECE-47DB-8CC1-1C70B17FB551/38038/SummaryofSubstationSitingStudyOctober20091.pdf>

⁹ National Grid: Bramford to Twinstead Connection Project: Consultation Strategy: November 2011
<http://www.nationalgrid.com/NR/rdonlyres/A2AB9308-0454-4BB9-A6A4-9AF74E880920/53575/SOCCbramfordtotwinsteadAMENDEDfinalforpublication1.pdf>

¹⁰ Department of Communities and Local Government : Planning Act 2008 Consultation on the Pre-Application Consultation and Application Procedures for Nationally Significant Infrastructure Projects : March 2009

National Grid issued its Selection of Preferred Corridor Report¹¹ and announced Corridor 2 as the preferred corridor for the proposed Bramford to Twinstead Tee Connection. It was recognised that this option would involve the removal of a section of the existing 132kV overhead line and that a new 400kV/132kV substation may be required west of the Twinstead Tee to maintain security of supply to the 132kV distribution network.

- 2.5.3. Corridor 2 encompasses land to either side of the existing 400kV overhead line between Bramford Substation and Twinstead Tee. At the western end, the corridor broadens in recognition of the fact that there is scope for connections to be made to the Bramford – Braintree – Rayleigh overhead line to the south of Twinstead Tee.
- 2.5.4. Two options for the eastern end of Corridor 2 were identified. Corridor 2A runs due south from Bramford Substation passing the outskirts of Burstall before picking up the route of the existing 132kV overhead line at Burstall Bridge and turning west to run to the south of Hintlesham. Corridor 2B runs south west from Bramford Substation, passing to the north of Hintlesham village before joining the route of the existing 132kV overhead line about 2km west of Hintlesham. The 132kV overhead line between Burstall Bridge and Twinstead Tee would be removed irrespective of whether Corridor 2A or 2B is adopted.
- 2.5.5. At that stage, the overall route length was identified as approximately 28.5km following Corridor 2A and approximately 27km following Corridor 2B. The Selection of Preferred Corridor Report included a commitment that further studies should be undertaken to evaluate whether the undergrounding of sections of the proposed 400kV overhead lines may be appropriate to mitigate the potential impacts of the scheme on sensitive locations, including within the AONB and Stour Valley, and be subject to further consultation at Stage 2. The Selection of Preferred Corridor Report also included commitments to undertake further studies to determine the treatment of the Hintlesham sections of the route (Corridor 2A or 2B) subject to additional consultation at Stage 2, and also further studies should be undertaken to determine the appropriate location of a new substation west of Twinstead Tee, also to be subject to additional consultation at Stage 2.

2.6. Stage 2 Consultation - Connection Options Report

- 2.6.1. After the announcement of the preferred corridor in June 2011, National Grid undertook further studies to evaluate whether it may be appropriate to use underground cables instead of an overhead line for parts of the route and to determine whether the alignment should be to the north or south of Hintlesham (where the preferred route corridor divided into Corridor 2A or Corridor 2B).
- 2.6.2. To inform assessments, National Grid undertook additional investigations of a range of environmental topics. These studies have been informed by inputs from four Community Forums (Hintlesham/Chattisham, Hadleigh, Polstead/Dedham Vale and Twinstead) and three Thematic Groups (Landscape and Views, Biodiversity and Cultural Heritage). In addition, engineering studies were undertaken to identify

¹¹ National Grid: Bramford to Twinstead Connection Project: Selection of Preferred Corridor: June 2011
<http://www.nationalgrid.com/NR/rdoonlyres/84C15B2D-263F-4740-ABE6-9A7B4861001E/47725/BTSelectionofPreferredCorridorJune2011.pdf>

feasible technical options. National Grid also took into account representations received to its Stage 1 Consultation, when a large number of views were expressed which favoured undergrounding all or part of the route.

- 2.6.3. National Grid considered options in Corridor 2 for a new 400kV overhead line north of the existing Bramford – Twinstead – Pelham 400kV overhead line (2B northern alignment) and south of the existing line (2B southern alignment). It also considered underground cables. These options were considered for each Study Area and in some Areas, notably Study Area AB – Bramford Substation and Hintlesham, a range of options were considered.
- 2.6.4. The Connections Options Report¹² explains how National Grid took account of statutory duties, policy considerations, environmental, socio-economic, technical and cost issues in deciding how the connection should be installed (overhead or underground) and its appropriate alignment in each Study Area.
- 2.6.5. Interim locations for each of the sealing end compounds that would be required to deliver an overhead line and underground cables connection were identified in the Connection Options Report. The Connection Options Report did not consider the location of the substation needed west of Twinstead Tee further than the ‘study areas’ which had been identified in the 2009 draft Substation Siting Study.

2.7. Connection Options Report Consultation

- 2.7.1. Consultation was undertaken in the summer of 2012 to obtain comments from statutory bodies, other agencies, landowners and the general public on the Connections Options Report.
- 2.7.2. All of the responses were taken into account and in October 2012 National Grid confirmed its “preferred alignment” where it proposes to build overhead lines and underground cables for the majority of the route (west of Study Area AB - Bramford Substation and Hintlesham). A summary of the issues raised in the consultation and National Grid’s response were presented in the Connections Options Report – Consultation Feedback¹³. This report shows how National Grid has taken account of the issues raised during the consultation and details the process and the judgments made in arriving at the preferred route, using both overhead lines and underground cables. Appendix H of the consultation feedback report included further information on the identification of sealing end compounds and an initial landscape and visual assessment.
- 2.7.3. In response to representations received, National Grid made changes to its proposals as compared to the interim alignment in the Connection Options Report. In Study Area G - Stour Valley a revised route for the underground cable is proposed to connect to the Bramford – Braintree – Rayleigh overhead line in the vicinity of tower 4YLA004 rather than at tower 4YLA001 i.e. further south along the

¹² National Grid: Bramford to Twinstead Connection Project: Connections Options Report: May 2012
http://www.nationalgrid.com/NR/rdonlyres/13F652DA-9185-4536-AF2F-5E57112A21E5/53962/BramfordtoTwinsteadTeeConnectionOptionsReport_May2012.pdf

¹³ National Grid: Bramford to Twinstead Connection Project: Connections Options Feedback Report: October 2012
<http://www.bramford-twinstead.co.uk/assets/downloads/consultationFeedbackReport.pdf>

Bramford – Braintree – Rayleigh overhead line. This would avoid adverse effects associated with a sealing end compound (sealing end compound 1 at Figures 2 and 3) on the area close to Twinstead Tee and would deliver additional benefits associated with the removal of four spans of the Bramford – Braintree - Rayleigh overhead line in this area.

- 2.7.4. Consultation has been undertaken on the revision to the underground cable route and sealing end compound location in Study Area G - Stour Valley. Alternative options for the location of the sealing end compound were considered and discussed in consultation. National Grid's report on the 'proposed siting of the western cable sealing end compound'¹⁴ describes the considerations taken to the proposed siting of the western-most sealing end compound (Location 1). National Grid has reviewed all the representations received to assess if there were any significant new issues that should be considered before confirming the proposed location. No significant issues were raised and National Grid has confirmed its preferred alignment and sealing end compound location in Study Area G - Stour Valley as the revised route and location (as shown on Figures 2 and 3).
- 2.7.5. On-going liaison with English Heritage, in relation to the potential effects of the proposed interim overhead alignment on Grade I listed Hintlesham Hall, meant that the feedback report was not able to confirm National Grid's preferred alignment in Study Area AB – Bramford and Hintlesham. National Grid agreed that further work would be undertaken to provide English Heritage with additional information on the anticipated effects of its interim alignment on the setting of the Hall. This information has been provided to English Heritage which has provided a further representation stating that it remains concerned as to the potential effects on the setting of Hintlesham Hall. National Grid is currently taking into account English Heritage's opinion and will confirm its preferred alignment in Study Area AB in due course.
- 2.7.6. The Connection Options Report explains the reasons why the proposed development is the preferred option (with the exclusion of the interim alignment in Study Area AB, the location of the sealing end compound in Study Area G and the preference of a substation at a location west of Twinstead Tee). The judgements made on the preferred option have taken account of advice in National Policy Statements EN-1 and EN-5. The preference to use underground cables for part of the connection and their alignment have been identified taking account of the landscape in which the proposed connection would be set, together with the additional cost and environmental and archaeological consequences of undergrounding. An overhead line option south of the existing 400kV overhead line would have a lesser negative magnitude of effect on landscape and views than an overhead line to the north, as it would closely parallel the existing 400kV overhead line over a greater distance.

¹⁴ National Grid: Bramford to Twinstead, Western Cable Sealing End Compound Proposed Siting: November 2012
http://www.bramford-twinstead.co.uk/assets/downloads/NG_western_CSE_siting_report.pdf

2.8. Project Development of a Proposed Substation

- 2.8.1. UKPN identified that removing the 132kV overhead line between Burstall Bridge and Twinstead Tee, to allow a new 400kV connection to use part of its route and to avoid cumulative effects that would otherwise arise, would require additional works to maintain security of supply of electricity to local homes and businesses.
- 2.8.2. UKPN has reviewed the options for maintaining the security of local electricity supplies and published a report in July 2012 concluding that this could be best achieved by constructing a new Grid Supply Point (GSP) substation to the west of Twinstead Tee¹⁵. Other options considered included the construction of new 132kV overhead line or underground cable connections between different points on its network, in conjunction with reinforcement at existing substations or with a new GSP substation. National Grid has reviewed the options considered by UKPN and has published its own Distribution System Options Report which concludes that the option to develop a new GSP substation to the west of Twinstead Tee represents the most efficient, co-ordinated and economical option, whilst giving rise to fewer overall environmental effects than the other options considered¹⁶.
- 2.8.3. Three 'study areas' were selected for further investigation for a substation in the 2009 report: land north of Colne Valley Farm Park (Study Area A); land at Delvyn's Lane (Study Area B) and land at Butlers Wood and Waldegrave Wood (Study Area C)¹⁷ (as shown at Figure 2).
- 2.8.4. National Grid identified individual locations within each of these Substation Study Areas for more detailed assessment in the form of an options appraisal: One location in Study Area A - Colne Valley; five locations in Study Area B - Delvyn's Lane; and three locations in Study Area C - Butlers Wood and Waldegrave Wood. In each study area location, further consideration has been given to options which involve constructing an entirely Air Insulated Switchgear (AIS) solution (at 400kV and 132kV levels) and options that considers constructing a 400kV AIS element with a 132kV Gas Insulated Switchgear (GIS) element. A typical footprint of an AIS substation and AIS/GIS substation are shown at Figures 10 and 11.
- 2.8.5. All options were assessed against the following criteria: technical implications; environmental effects; socio-economic impacts; and cost. The Substation Siting Options Appraisal Study was published in February 2013¹⁸.
- 2.8.6. A specific consultation is currently being held to obtain views on all of the options considered in both the Distribution System Options Report and the Substation

¹⁵ <http://www.ukpowernetworks.co.uk/internet/en/help-and-advice/documents/132kV-network-reconfiguration-to-accomodate-wider-systems-works-July-2012.pdf>

¹⁶ National Grid: Bramford to Twinstead, Distribution System Options Report: February 2013 <http://www.bramford-tinstead.co.uk/substation-consultation.aspx>

¹⁷ National Grid: Bramford to Twinstead Connection Project: Summary of Substation Siting Study: October 2009 <http://www.nationalgrid.com/NR/rdonlyres/6B9A213A-CECE-47DB-8CC1-1C70B17FB551/38038/SummaryofSubstationSitingStudyOctober20091.pdf>

¹⁸ National Grid: Bramford to Twinstead, Substation Siting Options Appraisal Study: February 2013 <http://www.bramford-tinstead.co.uk/substation-consultation.aspx>

Siting Options Appraisal Report. A consultation feedback report will be produced in due course which will identify the relevant issues raised during the consultation period, the responses to these issues. Within this feedback report National Grid will confirm its proposal for this part of the project which will be taken forward as part of its application for development consent.

- 2.8.7. Until National Grid announce its preferred substation option and location, the assessments for the EIA will be based on each considered substation option and location in the Substation Study Areas, as shown at Figures 4.1 to 4.9.

3. CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

3.1. Current Project Status and Next Stages

3.1.1. National Grid has set out its interim alignment for Study Area AB - Bramford Substation and Hintlesham and has confirmed its preferred alignment in Study Areas C to G inclusive, with its preferred sites for sealing end compounds. For this scoping report the 'Study Areas' have been renamed as 'Sections' to avoid confusion of the term 'study area' in EIAs, which means the area to be assessed. This Scoping Report assumes that the EIA will be based on these 'Sections' as shown at Figures 2 and 3:

- Section AB – Bramford Substation and Hintlesham;
- Section C - Brett Valley;
- Section D – Polstead Heath;
- Section E – Dedham Vale AONB;
- Section F – Leavenheath/Assington; and
- Section G – Stour Valley.

3.1.2. National Grid will confirm its preferred alignment in Section AB- Bramford Substation and Hintlesham after considering English Heritage's response. National Grid's interim alignment is an overhead line to the north of Hintlesham (described as option 2B southern alignment in the Connections Options Report), utilising the existing 400kV overhead line through Hintlesham woods and re-routing the existing line to the north of the woods. There is also an option to route option 2B to the north of the existing 400kV overhead line (2B northern alignment). The 2B northern alignment and the option to route the alignment to the south of Hintlesham (described as 2A in the Connections Options Report), are yet to be discounted and are therefore included as part of the red line boundary (Figures 2 and 3).

3.1.3. Until the preferred substation site is confirmed (anticipated to be confirmed in spring 2013) the potential substation sites identified within the Substation Study Areas A, B and C are included in the red line boundary (Figures 2 and 4.1 to 4.9).

3.1.4. Until the decisions in Section AB and the options for a substation have been finalised, they will be the subject of environmental impact assessment in accordance with this scoping report and are included in the red line boundary as shown at Figure 2 and Figures 4.1 to 4.9.

3.1.5. The findings of the EIA of the proposed development will be reported in an ES.

3.2. Project Description

3.2.1. The proposed development (Figure 2, 3 and 4.1 to 4.9) includes the following principal elements:

- Construction of 400kV overhead line;
- Installation of 400kV underground cables;
- Construction of four sealing end compounds;
- Construction of a Grid Supply Point (GSP) substation, subject to consultation;
- Removal of the existing 132kV overhead line between Burstall Bridge and the diamond crossing at Twinstead Tee (Figure 5);
- Removal of four spans of existing 400kV overhead line south from Twinstead Tee (Figure 5); and

- Associated works, for example, temporary access roads, highway works, construction compounds, work sites and ancillary works.
- 3.2.2. The proposed connection will run predominantly to the south of the route of the existing 400kV Bramford – Twinstead – Pelham overhead line. The existing overhead line runs west from Bramford Substation in Suffolk to a ‘tee’ in the existing 400kV overhead line transmission system near Twinstead (known as the Twinstead Tee) in Essex. From the Twinstead Tee the existing 400kV overhead line splits into two, with one overhead line continuing west to Pelham Substation and the other running south to Braintree Substation (the Bramford – Braintree - Rayleigh overhead line). The proposed new connection will be approximately 28.5km long, comprising approximately 56 new pylons, and approximately 8km of underground cables. There will be 18 underground cables laid in six groups of three. Four sealing end compounds will be developed at the connection points where the overhead line becomes underground cables and vice versa. Temporary pylons will be required in Section AB – Bramford Substation and Hintlesham if the existing overhead line is re-routed north of Hintlesham Woods. The interim and preferred alignment incorporates a 20m limit of deviation either side of the proposed centre line of the alignment, which is accounted for in the red line boundary (Figures 2 and 3).
- 3.2.3. There is an existing 132kV overhead line that runs west from Burstall Bridge (approximately 2km to the south of Bramford Substation) to Pelham Substation. The 132kV overhead line is connected from Burstall Bridge to Bramford Substation by underground cables. The 132kV overhead line will be removed from Burstall Bridge up to, and including, it’s crossing beneath the existing 400kV Bramford – Braintree – Rayleigh overhead line south of Twinstead Tee (approximately 83 132kV pylons). The 132kV line crosses beneath the 400kV line by an arrangement of supports known as a ‘diamond crossing’ because of the shape formed by the 132kV line as it splits to pass beneath the higher voltage line.
- 3.2.4. A new substation is the preferred option to replace the function of the 132kV line to be removed (subject to consultation). A new substation would be required at a location west of Twinstead Tee and east of Thaxted. A specific consultation is currently being held to obtain views on all of the substation location options considered in both the Distribution System Options Report and the Substation Siting Options Appraisal Report. A consultation feedback report will be produced in due course which will identify the relevant issues raised during the consultation period, the responses to these issues. Within this feedback report National Grid will confirm its proposal for this part of the project which will be taken forward as part of its application for development consent.
- 3.2.5. The connection alignment is divided into ‘Sections’ to manage assessment and presentation of environmental information. The sections for the alignment and potential sites for the substation are shown at Figures 3 and 4 and defined as:
- Section AB – Bramford Substation and Hintlesham (interim alignment);
 - Section C – Brett Valley (preferred alignment);
 - Section D – Polstead Heath (preferred alignment);
 - Section E – Dedham Vale (preferred alignment);
 - Section F – Leavenheath and Assington (preferred alignment);
 - Section F – Stour Valley (preferred alignment);
 - Substation Study Area A - Colne Valley;
 - Substation Study Area B - Delvyn’s Lane; and

- Substation Study Area C - Butlers Wood and Waldegrave Wood.

3.3. Location of the Proposed Development

- 3.3.1. The proposed development is in East Anglia in the east of England and crosses a county administrative boundary defined by the River Stour, with Suffolk County to the east of the river and Essex County to the west. The proposed development is in three local administrative boundaries: Bramford Substation is in Mid-Suffolk District in Suffolk; the majority of the connection route and three sealing end compounds are in Babergh District in Suffolk; and the western part of the connection route and a sealing end compound are in Braintree District in Essex. The proposed development in relation to administrative boundaries is illustrated at Figure 1.
- 3.3.2. The area is defined by river valleys which run north to south and include: the Brett Valley south of Hadleigh; the Box Valley south of Boxford, the Stour Valley south of Sudbury and the Colne Valley north of Sible Hedingham and Castle Hedingham. There are plateaus of higher ground between the valleys.
- 3.3.3. The majority of the land where the development is proposed is under arable use. There are hamlets and individual residential properties within or adjacent to the proposed development areas. Beyond the proposed development boundary are villages, such as Upper Layham, Polstead and Castle Hedingham and the larger settlements of Hadleigh and Sudbury.
- 3.3.4. The main roads in the wider area include the A1071, A134 and A131, which extend between Ipswich, Hadleigh, Sudbury, Sible Hedingham and Castle Hedingham. The local road network comprises minor roads and narrow rural lanes which link smaller villages and individual properties and connect to the main roads.
- 3.3.5. Environmental designations within the development area are shown at Figures 6 and 7. The northern-most part of the Dedham Vale AONB extends across part of the preferred alignment. The AONB is designated for its undulating slopes, meandering River Stour, hedged water meadows, copses and river bank willows and its representation of English countryside. The AONB also has many cultural associations, including with landscape artist John Constable. The only Site of Special Scientific Interest (SSSI) in the development area is Hintlesham Woods. This SSSI is designated as it is one of the largest remaining areas of ancient coppice woodland in Suffolk. Historical and archaeological evidence shows that the woods have been in existence since the 12th century. There are many listed buildings within and adjacent the development area.
- 3.3.6. The paragraphs below provide a description of each aspect of the proposed development and a description of construction methods, operational and maintenance methods and decommissioning methods. The preferred design for the underground cables, overhead line, sealing end compounds and GSP substation are to be confirmed based environmental and technical studies and where appropriate, influenced by consultation. The description of the proposed development is based on current technology available to the project. National Grid will review the project proposals if new technology becomes available within the timescales leading up to the DCO application. The following information is provided to guide the environmental assessments although this is likely to be subject to some refinement before the DCO application is made. The scope of the environmental assessments for the EIA incorporate caveats to ensure changes,

which are envisaged to be primarily locational changes to the proposed development, can be addressed in the environmental assessments.

3.4. New 400kV Overhead Line

Description

- 3.4.1. It is currently anticipated that the overhead line will comprise triple 'araucaria' conductors and supported by lattice steel pylons likely to be of L13 design. The likely design will be similar to the design of pylons used on the existing 400kV line with the following characteristics:
- Suspension pylons (which support the overhead line in a straight line), tension pylons (which support the overhead line where the line changes direction) and terminal pylons (which support the overhead line where it connects to underground cables via a sealing end compound);
 - Standard height for a tension, terminal and suspension pylon of approximately 50m (pylon heights can vary according to environmental conditions e.g. taller to avoid navigable rivers);
 - Typical base footprint of approximately 10m x 10m (total area enclosed by pylon base comprising four stub foundations); and
 - Typical span between pylons of approximately 360m (distance between pylon spans will vary according to the size of the pylon being built and the route).
- 3.4.2. In Section AB - Bramford Substation and Hintlesham the interim overhead alignment is routed to the south of the existing 400kV overhead line (2B southern alignment) between Bramford Substation and Hintlesham Woods. The existing 400kV overhead line is proposed to be re-routed to the north of Hintlesham Woods and the proposed overhead line will use the route of the existing 400kV overhead line through the woodland. Temporary towers will be required for the re-routing of the existing overhead line. The existing line will reconnect to its existing alignment to the south of Hintlesham Woods near Clay Lane and the interim overhead alignment will continue to the south of the existing 400kV overhead line for the remainder of this Section. As noted at paragraph 2.6.3 above, a range of options were considered in Section AB (Study Area AB). The options considered included routeing the proposed alignment to the north of the existing overhead line (2B northern alignment), or routeing the proposed alignment south from Bramford Substation and then west to the south of Hintlesham, approximately following the route of the 132kV overhead line (Corridor 2A).
- 3.4.3. The proposed 400kV overhead line continues to follow the existing 400kV overhead line to the south through Sections C - Brett Valley and D – Polstead Heath. The connection then runs underground through Section E - Dedham Vale AONB from sealing end compound 4 to sealing end compound 3, as shown on Figure 2 (the location of the sealing end compounds are described from paragraph 3.6).
- 3.4.4. The proposed 400kV overhead line recommences at sealing end compound 3 and runs through Section F - Leavenheath and Assington. The route of the proposed 400kV overhead line is to the south of the existing 400kV overhead line.
- 3.4.5. The remainder of the connection route is via underground cables running from sealing end compound 2, through Section G - Stour Valley and to sealing end compound 1, south of Twinstead Tee. The proposed alignment connects to the existing 400kV Bramford – Braintree – Rayleigh overhead line approximately 1km

to the south of Twinstead Tee at the site of sealing end compound 1 (shown on Figures 2 and 3). The existing 400kV overhead line between the tee and the new connection point will be removed (4 spans).

Construction

- 3.4.6. Construction activities will begin with the preparation and installation of temporary access roads to each pylon site. The proposals for the temporary works are in draft at present and are evolving as the project progresses and further consultation with landowners and persons with an interest in the land is undertaken. The following information is provided to assist in defining the scope of the assessments although this is likely to be subject to some refinement before the DCO application is made.
- 3.4.7. There may need to be modifications to some public highways to accommodate abnormal indivisible loads (AIL) movements. Temporary access tracks will be required to the site of each pylon and may be required to possible scaffolding sites. For access on agricultural land temporary tracks will be installed, using crushed stone and trackway panels with a reinforcing semi-permeable membrane to protect soils. Temporary access roads will be approximately 4m wide and 350mm deep. Temporary stone 'pads' will also be required adjacent to each new pylon location for plant such as cranes and piling rigs, which will be used to construct the pylons. Materials will be delivered to site when required, as opposed to storing them on site.
- 3.4.8. The working area at each pylon will include a security hut and welfare facility. Security at the site will be required 24 hours a day, seven days a week. A typical working area at a suspension pylon and a tension pylon is shown at Figure 8.
- 3.4.9. Temporary scaffolding will be installed during the works as a safety measure to protect roads, railway, Public Rights of Way (PRoW) and distribution network overhead lines which are crossed by the new 400kV overhead line. Some distribution network overhead lines may be temporarily switched off or may be relocated or removed; scaffolding would not be needed in these cases.
- 3.4.10. The area around each new pylon will be cleared and where appropriate fenced to keep the public and any livestock away from construction work. During the works gated entrances will be installed to restrict access to construction vehicles and personnel only. Outside working hours the areas will be locked and attended by a security guard.
- 3.4.11. The foundations of the pylons will be piled or excavated. Pre-mixed concrete will be delivered to site in lorries along with steelwork for the foundation frames and bases. The foundation comprises steelwork encased in concrete with 'stubs' appearing through the concrete above ground to which the pylon legs are attached.
- 3.4.12. The steelwork for the pylons will be delivered to site in pre-constructed sections or in numbered parts and will be bolted together on the ground. The pylon will be assembled in sections beginning with each leg being fastened to the stubs. The pylon will be erected using a mobile crane which lifts the assembled steelwork into position. 'Linesmen' will bolt together the pylon, climbing to each part to help guide the next section into place and fasten the bolts. The number of pylon sections will vary according to the size of the pylon being built. The insulators will be fastened to the pylons in preparation for installing the conductors. Insulators are used to resist the flow of electricity. They prevent the electricity from the conductor reaching the pylon. This means the pylon can be accessed without always needing to disconnect the circuit.

- 3.4.13. The wires (conductors) of the overhead line will be delivered to site using lorries with the conductors wrapped around drums. Tractors and other smaller vehicles will be used to transport the drums and other materials along the temporary access roads. The conductors will be installed usually in sections between ‘tension pylons’ where the line changes direction. A ‘pulling’ site will be established at one end of the section with the conductors running out from a ‘tensioning’ site at the other end of the section.
- 3.4.14. Pilot wires will be laid at ground level (and over temporary scaffolding protecting obstacles such as roads and railway lines) along the length of the section between the pulling site and the tension site. The pilot wires will be lifted and fed through running wheels on the cross arms of all the pylons in the middle of the section, and then fed around the pulling machine at the pulling site. The tensioning machine will keep the wires off the ground and prevent the conductors running freely when the pulling machine pulls the pilot wire. In rare cases when it is not possible to run the pilot wires from ground level, helicopters may be used to pull them through. When the conductor is fully ‘run out’, it will be fastened at its finished tension and height above ground by linesmen working from platforms on the pylons and suspended from the conductors. Additional fittings such as, spacers and dampers, will be fitted to the conductors. Spacers prevent the conductors from touching each other and dampers prevent oscillations in the overhead line.
- 3.4.15. Once the overhead line is constructed, the temporary access tracks and working areas at the pylon sites will be removed and the ground reinstated by removing stone and trackways. Soils will be restored to their previous condition. Other surfaces will be reinstated and widened access will be restored to their original condition at the commencement of the works.

Maintenance

- 3.4.16. The overhead line will be subject to annual inspection from the ground or by helicopter. The inspection will identify if there are any visible faults or signs of wear and can also indicate if changes in plant or tree growth or development have occurred which may risk infringing safety clearances. Inspections will confirm when refurbishment is required.
- 3.4.17. The overhead line is made up of a variety of materials, from concrete and steel for the foundations, steelwork for the pylon and aluminium for the conductors. All these materials have an expected lifespan, which varies depending on how the overhead line is used and where it is located. Typically, the pylons have a life expectancy of approximately 80 years, the conductors have a life expectancy of approximately 60 years and the insulators and fittings normally have a life span of approximately 40 years. Refurbishment work will be undertaken typically on one side of the line and then the other, so that one side can be kept ‘live’ and in use.
- 3.4.18. Refurbishment can involve:
- The replacement of all the conductors and earth wire;
 - The replacement of insulators and all the steelwork that holds the conductors and insulators in place; and
 - Painting or replacing the pylon steelwork.
- 3.4.19. During refurbishment there will be activity along the overhead line, especially at tension pylons where the conductor is installed and the old conductor taken down.

- 3.4.20. Vans will be used to carry workers in and out of site and lorries will be used to bring new materials and equipment to site and remove old equipment. Temporary works including access routes and scaffolding to protect roads will be required as for construction.
- 3.4.21. The lifespan of the overhead line may be longer than the anticipated 80 years, depending on its condition, refurbishments and depending on the transmission network requirements.
- 3.4.22. ***Decommissioning***
- 3.4.23. If the connection is no longer required, the overhead line may be removed. Upon removal much of the material of the overhead line will be taken for recycling. Similar access will be required as for construction.
- 3.4.24. Fittings, such as dampers and spacers, will be removed from the conductors. The conductors will be cut into manageable lengths or will be winched onto drums in a reverse process to that described for construction. The fittings will be removed from the pylons and lowered to the ground.
- 3.4.25. The pylon may be dismantled by crane, with sections cut and lowered to the ground for further dismantling and removal from site. Depending on the space available, it may be possible to cut the pylon legs and then pull the pylon to the ground using a tractor. The pylon can then be cut into sections on the ground. Unless there is a compelling need for removal of all the foundations, these will be removed to approximately 1.5m deep and subsoil and topsoil reinstated.

3.5. 400kV Underground Cables

Description

- 3.5.1. The underground cables are likely to comprise approximately 150mm diameter cables made of a copper core, cross linked polyethylene insulation, seamless corrugated aluminium sheath and PVC outer sheath. Two fibre optic cables will be laid with the electricity cables for monitoring and protection of system conditions.
- 3.5.2. The cables will be laid within trenches. There will be up to 18 cables for the connection laid in six groups (six trenches) made up of three cables per group. There will be a gap of approximately 350mm between each of the three cables within the group, and a separation distance of approximately 3m between each of the groups. Depending on the cable manufacturer, joints in the cables will be required every 500m to 800m. At each cable joint either an above ground kiosk or a surface accessible Link Pit will be required, which will be used to monitor and occasionally test the underground cables. Each Link Pit would have the maximum dimensions of 4m long by 3m wide and 0.75m high. A kiosk is likely to have smaller dimensions than a Link Pit. A temporary access track will be required to access the kiosk when maintenance and repairs are required.
- 3.5.3. Underground cables will have to be routed deeper and wider where crossings are encountered that require a 'trenchless technique'. These crossings can be completed via Horizontal Directional Drilling (HDD) or thrust boring. These techniques will be used to avoid environmental constraints along the cables route including: Dollops Wood, at the eastern boundary of Section E; the River Box in Dedham Vale AONB; the River Stour; the Sudbury to Bures railway line in the Stour Valley; and under a belt of woodland at Ansell's Grove in Section G.

- 3.5.4. The underground cables are proposed to be laid through Section E - Dedham Vale AONB (between sealing end compounds 3 and 4) and Section G - Stour Valley (between sealing end compounds 1 and 2). Within Section E - Dedham Vale the underground cables will predominantly follow the line of the existing 400kV overhead line to the south. Approximately half way through Section E - Dedham Vale, the underground cables will run to the north of the existing 400kV overhead line to avoid woodland. The underground cables will then run southwards through a gap in an orchard to avoid Boxford Fruit Farm before turning north toward the existing and proposed 400kV overhead line in Section F - Leavenheath and Assington (at sealing end compound 3).
- 3.5.5. The underground cables in Section G - Stour Valley are proposed to start on the edge of the Stour Valley (at sealing end compound 2) with the cable route dropping downhill toward the River Stour. The underground cables will cross the River Stour and the Sudbury to Bures railway line before running up the western valley side and connecting to the existing Bramford – Braintree – Rayleigh overhead line at sealing end compound 1 near Henny Back Road, to the south of Twinstead Tee.

Construction

- 3.5.6. Similar to the construction of the overhead line, underground cables construction activities begin with the establishment and preparation of the working area and installation of the temporary haul road along the underground cable route and any temporary access tracks required to connect with the local road network. A temporary haul road will continue along the length of the underground cables as far as possible so that construction traffic can run on dedicated routes and avoid public highways. Post and wire fencing will be installed along both sides of the entire temporary haul road. The proposals for the temporary works are in draft at present and are evolving as the project progresses and further consultation with landowners and persons with an interest in the land is undertaken. The following information is provided to guide the assessments although this is likely to be subject to some refinement before the DCO application is made.
- 3.5.7. Existing accesses from public highways may need to be widened, due to the size of the construction vehicles, or temporary new accesses may be required. For access on agricultural land away from the temporary haul road temporary tracks will be installed, using crushed stone and trackway panels with a reinforcing semi-permeable membrane to protect soils.
- 3.5.8. Temporary contractor's compounds and offices will be established along the alignment (most likely at the cable joint points approximately every 500m - 800m) to house the staff, equipment and materials for the works. Where possible, a site will be chosen which is accessible for heavy goods vehicles, has existing services and ideally has some hard-standing to avoid or reduce the need to import material to set up the compound. Both static and mobile security will be deployed to the work sites.
- 3.5.9. A working area approximately 65m wide will be created along the majority of the length of the underground cables route, protected by post and wire fencing, as shown at Figure 9. Where there are 'pinch points' along the cable route, such as at Boxford Fruit Farm or at an ancient hedgerow, the working area will be reduced. Within this working area vegetation will be cleared and topsoil will be stripped. The topsoil will be stored along the working area so that it can be put back once the installation of the underground cables is complete. Drainage improvement works will be implemented to ensure the site of the cables installation minimises the risk of flooding.

- 3.5.10. The underground cables will be delivered to the working areas along the route using approximately 38 tonne lorries with the cables wrapped around drums. Tractors and other smaller vehicles will be used to transport the cable drums and other materials along the temporary haul road. The underground cables will be pulled off the drums onto rollers within the trenches.
- 3.5.11. The underground cable trenches will be excavated to approximately 1.4m deep and 1.3m wide. Timber panels will be used to reinforce the trench sides. Up to three cables will be laid in each of the trenches at a depth of approximately 1.1m on a bed of cement bound sand (CBS) and then surrounded by an additional layer of CBS, which will be delivered to site in lorries. Fibre optic cables will be placed in the trenches with the electricity cables to ensure the connection can be monitored from the above ground kiosks. Above the CBS, concrete protective tiles will be laid to protect the cables from future excavation works. As an additional warning method, marker tape will be placed into each trench above the concrete tiles to warn that cables lay beneath.
- 3.5.12. The underground cable joints will be constructed on-site in controlled and clean conditions. Underground cable jointing is labour-intensive and very technically demanding but essential to the working of the cables. The finished joints are protected by a glass fibre box filled with resin or bitumen.
- 3.5.13. At the sections where HDD or thrust boring will be undertaken, the cables will be pulled through ducts that have been installed. Cable pulling rigs will be required to pull the cables through ducts.
- 3.5.14. Once the cables have been laid, reinstatement work will begin. The temporary haul road and any temporary access tracks will be removed and the stored soil will be replaced, with any surplus soil taken off site. The post and wire fencing will then be removed. Where possible, hedgerows will be replanted or replaced although trees cannot be planted on top of the cables. Where trees have been removed from the cables swathe and planting elsewhere has been agreed, this will be undertaken. The land will be reinstated to its previous condition and uses wherever possible.

Maintenance

- 3.5.15. The underground cables have kiosks above ground at the joints to monitor the cables. Inspection is undertaken approximately every 3 years. Monitoring is carried out via fibre optic cables installed with the underground cables. If any cable repairs are required it will involve excavating at the site of the problem. When a repair is needed, the area where the fault is will be accessed via temporary access track made up of crushed stone, a working area will be established and the ground will be excavated. If a cable needs to be replaced then that section of the cable (between two joints) will need to be removed and new joints constructed.
- 3.5.16. Underground cables have a life expectancy of approximately 40 years. After 40 years the cables will require replacing, assuming the connection is still required. If there is space a new cable route would be constructed alongside the existing to avoid excavation and removal of the old cables. If the old cables need to be removed then a similar method will be followed as installation.

Decommissioning

- 3.5.17. If the connection is no longer required, the underground cable will be decommissioned. Unless there is a compelling need for removal of the underground cables, they will remain buried in the ground.

- 3.5.18. If the underground cables were to be removed upon decommissioning, similar methods and access will be required as for construction.

3.6. Sealing End Compounds

Description

- 3.6.1. A sealing end compound provides the point of connection between overhead lines and underground cables. Four sealing end compounds are required for the proposed development at the interface points of the proposed overhead line and underground cables. The locations of the sealing end compounds are shown at Figures 2 and 3.
- 3.6.2. Sealing end compound 1 is proposed south of Twinstead Tee, west of Henny Back Road and Sparrow's Farm and provides the interface point between the proposed underground cables in Section G – Stour Valley and existing 400kV overhead line.
- 3.6.3. Sealing end compound 2 is south east of Workhouse Green and south of Sawyers Farm and provides the interface point between the overhead line and the underground cables in Section G – Stour Valley.
- 3.6.4. Sealing end compound 3 is north of Leavenheath and north of Stewards Farm and provides the interface point between the overhead line and the underground cables in Section F – Leavenheath and Assington.
- 3.6.5. Sealing end compound 4 is south of Polstead Heath, north of Polstead and south east of Sprott's Farm and provides the interface point between the overhead line in Section D – Polstead Heath (to Section AB – Bramford Substation and Hintlesham) and the underground cables in Section E - Dedham Vale AONB.
- 3.6.6. Each sealing end compound will be approximately 80m x 50m and comprise a terminal overhead line pylon with down-leads connecting to a gantry (approximately 13m high) that then connects to cable sealing ends and other electrical equipment (Figure 12). A control room (approximately 10m x 6m x 4m) may be required in the compound. The compound would be surrounded by a 2.4m high fence to protect the equipment. A permanent access road (single carriageway width with passing places) is required to each of the compounds from the public highway.

Construction

- 3.6.7. Sealing end compound construction activities begin with the preparation and installation of the permanent access road to the sealing end compound. A temporary construction compound will be required adjacent to the site of the sealing end compound. The proposals for the access roads are in draft at present and are evolving as the project progresses and further consultation with landowners and persons with an interest in the land is undertaken. The following information is provided to guide the assessments although this is likely to be subject to some refinement before the DCO application is made.
- 3.6.8. The initial preparatory works will comprise stripping of the top soil layer and levelling the sites followed by installation of temporary perimeter fencing to secure the area. Construction of foundations for the terminal pylon and some of the electrical equipment, including installing troughs for cables will then be completed. The foundations will be either standard concrete foundations or piled foundations. A stone pad for a mobile crane will be installed within the working area. The permanent site boundary palisade fence will be completed later in the construction programme. A series of copper earth tapes will be installed below the ground to

create an “earth mat” to make the sealing end compound electrically safe. Security will be deployed to the sites throughout the construction phase.

- 3.6.9. Once the troughs are completed the underground cables will be channelled via the troughs onto the sealing end structures. The sealing ends terminations, line gantries and other electrical equipment, such as earth switches, will be lowered onto their foundations and support structures by a mobile crane. The cable sealing ends require a clean and controlled environment whilst being installed. To create a clean environment, a scaffold structure will be erected covered by weather-proof material around the cable sealing ends whilst the terminations are being installed. The electrical installation will be completed with connections of the overhead line to the underground electrical cables via down-leads and down-droppers.
- 3.6.10. The temporary site installation facilities will be removed and, where required, temporary working areas will be restored to their original condition. Soil stripped away for levelling may be used around the sealing end compounds where mitigation planting can be established.

Maintenance

- 3.6.11. Infrequent visits will be made to the sealing end compound to monitor the underground cables and carry out periodic maintenance and checks on the electrical equipment within the compound. When the sealing end compound requires refurbishment or replacement works, vans will be used to carry workers in and out of site and lorries will be used to bring new materials and equipment to site and remove old equipment. Temporary scaffolding may be required to protect any infrastructure around the sealing end compound.

Decommissioning

- 3.6.12. The lifespan of a sealing end compound is approximately 40 years. Any relays used for protection and control purposes in the small control building will typically have a life of 15 years. When the sealing end compound is no longer required the materials will be removed and taken for recycling. Similar methods and equipment will be required as for construction. If required, a replacement sealing end compound will be constructed.

3.7. GSP Substation

Description

- 3.7.1. This scoping report is based on all substation options within the Substation Study Areas (described at paragraphs 2.8.3 and 2.8.7), which are still subject to consultation. The red line boundaries for each substation location option are shown at Figures 4.1 to 4.9. If a substation is confirmed as the preferred form of securing the 132kV connection supply, the ES will report on the environmental assessments undertaken for the preferred substation site.
- 3.7.2. Substations change the voltage of electricity in the transmission system. The proposed GSP substation will be the electrical interface point between the high voltage transmission network (owned and operated by National Grid) and the DNO (in this case UKPN) and will transform the voltage from 400kV to 132kV. The lower 132kV voltage will be transformed to a lower voltage and distributed by the DNO to factories, offices and homes.
- 3.7.3. A transformer within a GSP substation is the component that changes (or “transforms”) the level of a voltage from one value to another value. Transformers

generally reduce a voltage from a higher level to a lower level. Due to the magnitude of Transmission Voltages (hundreds of thousands of volts), the voltage reduction equipment is referred to as a Super Grid Transformer. Other components within a GSP substation include, but are not limited to, protection equipment, isolation equipment, communication equipment, cooling fans, auxiliary diesel generator, water tank, switching devices and associated buildings where applicable.

- 3.7.4. The proposed GSP substation will contain one Super Grid Transformer to reduce the voltage from the transmission system at 400kV to the 132kV required by UKPN to distribute the electricity to homes and businesses.
- 3.7.5. The substation will be connected to the existing 400kV Bramford – Twinstead – Pelham overhead line via an existing or new tower (pylon) which will accommodate the downleads required between the line and the substation. The substation will be connected to UKPN’s existing 132kV overhead line via an underground cable to a new pylon on that line. The new 132kV pylon will have a sealing end platform attached where the underground cable connects to the 132kV overhead line.
- 3.7.6. The GSP substation will be constructed on areas of impermeable surfaces such as concrete and permeable surfaces such as chippings. The GSP substation will be secured with an electrified palisade fence. A permanent access road will be required from the public highway.

Construction

- 3.7.7. Construction activities generally will begin with the preparation and installation of the permanent access road to the substation. The proposals for the access road are in draft form at present and are evolving as the project progresses and further consultation with landowners and persons with an interest in the land is undertaken. The following information is provided to guide the assessments although this is likely to be subject to some refinement before the DCO application is made.
- 3.7.8. A temporary construction compound area will be constructed adjacent to the proposed substation that allows for the safe construction of the permanent operational substation compound. The construction compound area will generally comprise temporary ‘portakabin’ style accommodation units for the purposes of activities associated with the site, project and safety management of the construction site. Further temporary facilities will be provided for the provision of welfare facilities for construction site workers. There will also be allocated regions for the delivery of materials and the removal (where required) of excavated material and waste items.
- 3.7.9. The initial preparatory works will comprise the temporary removal of the top layer of ground and a temporary stone capping laid within areas of the GSP substation construction area to provide a clean and stable working platform. The permanent site boundary perimeter fencing typically will be completed early in the construction programme to secure the construction area. Where required, excavations and concrete foundations will be provided for the GSP substation electrical equipment. A series of copper earth tapes will be installed below the ground to create an “earth mat” to make the GSP compound electrically safe. The substation electrical equipment and support structures will then be erected. Electrification of the fence will take place as the substation is fitted out with lighting and power.
- 3.7.10. The Super Grid Transformer (SGT) will be delivered to site in a 14 axle girder frame trailer with tractor units at either end. Works to public highways and cut-back of overhanging trees may be required to accommodate AIL movements.

- 3.7.11. Commissioning tests will be undertaken, starting with testing the individual items of plant and culminating with testing the installed system as a whole. Following successful testing, the substation will be connected to the electricity transmission system.

Maintenance

- 3.7.12. Routine maintenance of the GSP substation is undertaken approximately every 3 years, which involves electrical isolation of the equipment. Visual checks generally are undertaken by personnel as and when they visit the GSP substation compound. If the GSP substation requires refurbishment or replacement works, vehicles will be used to carry workers in and out of site and suitable vehicles will be used to bring new materials and equipment to site and remove old equipment.

Decommissioning

- 3.7.13. The design lifespan of a substation is approximately 40 years. If it's useful life has expired and it is to be removed, much of the material of the substation will be taken for recycling. Similar methods and equipment will be required as for construction.

3.8. Removal of the Existing 132kV Overhead Line and 400kV Overhead Line

Description

- 3.8.1. The existing 132kV overhead line is supported by lattice steel pylons. The 132kV connection runs underground from Bramford Substation south to Burstall Bridge. At Burstall Bridge the 132kV underground cables become an overhead line. The 132kV overhead line runs in a predominantly east to west direction. The overhead line runs south of Hintlesham and south of Hintlesham Woods. The line continues to run west following the existing 400kV overhead line on a southern alignment. The 132kV overhead line splits into a diamond crossing to run beneath the existing 400kV Bramford – Braintree - Rayleigh overhead line (south of Twinstead Tee), before continuing to run west to Pelham Substation.
- 3.8.2. As part of the proposed development, the existing 132kV overhead line will be removed between Burstall Bridge, south of Bramford Substation, and up to and including the diamond crossing south of Twinstead Tee. The existing 132kV underground cables from Bramford Substation to Burstall Bridge will not be removed and will remain buried.
- 3.8.3. Four spans of the existing Bramford – Braintree – Rayleigh 400kV overhead line will be removed from Twinstead Tee to the site of proposed sealing end compound 1 at Henny Back Road. The overhead lines to be removed are shown at Figure 5.

Construction

- 3.8.4. Construction activities will begin with the preparation and installation of temporary access roads to each existing pylon site. The proposals for the temporary works are in draft at present and are evolving as the project progresses and further consultation with landowners and persons with an interest in the land is undertaken. The following information is provided to guide the assessments although this is likely to be subject to some refinement before the DCO application is made.
- 3.8.5. Existing accesses from public highways may need to be widened, due to the size of the construction vehicles, or temporary new accesses may be required. Temporary access tracks will be required to the site of each pylon. For access on agricultural

land temporary trackway may be laid or temporary tracks will be installed with a reinforcing semi-permeable membrane to protect soils.

- 3.8.6. A contractor's compound and office will be established in the vicinity of the development to house the staff during the working day, as well as equipment and materials for the works. Where possible, a site will be chosen which is accessible for heavy goods vehicles, has existing services and ideally has some hardstanding to avoid or reduce the need to create a level base for the compound. The import of material will be required to provide hardstanding if suitable material is not already there.
- 3.8.7. Scaffolding will be temporarily installed during the works as a safety measure to protect roads, railway, PRow and existing distribution network overhead lines.
- 3.8.8. The area around each pylon will be cleared and where appropriate fenced to keep the public and any livestock away from construction work. During the works gated entrances will be installed to restrict access to construction vehicles and personnel only. Outside working hours the areas will be locked and attended by a security guard.
- 3.8.9. Fittings, such as dampers and spacers, will be removed from the conductors. The conductors will be cut into manageable lengths or will be winched onto drums in a reverse process to that described for the construction of pylons. The fittings will be removed from the pylons and lowered to the ground.
- 3.8.10. Where possible, the legs of the pylons will be cut and the pylon pulled to the ground using a tractor. The pylons may be dismantled by crane, with sections cut and lowered to the ground for further dismantling or removed from site if there is limited space. The pylons can then be cut into sections on the ground. Unless there is a compelling need for removal of all the foundations, these will be removed to approximately 1.5m deep and subsoil and topsoil reinstated.
- 3.8.11. Once the overhead line is removed, the temporary access tracks and working areas at the pylon sites will be removed and ground reinstated by removing stone and trackways. Soils will be restored to their previous condition. Other surfaces will be reinstated and widened access will be restored to their condition at the commencement of the works.

Maintenance and Decommissioning

- 3.8.12. As the 132kV and a section of the 400kV overhead line will be removed, no maintenance or decommissioning phases will be involved for this aspect of the proposed development.

4. APPROACH TO THE ENVIRONMENTAL IMPACT ASSESSMENT

4.1. Proposed Approach to the Environmental Impact Assessment

4.1.1. This section of the scoping report outlines the proposed approach to the EIA. In accordance with the 2009 EIA Regulations, the assessments undertaken for the EIA will evaluate and identify the likely significant environmental effects arising from the proposed development. Significant environmental effects will be identified for the construction, operational and decommissioning phases of the Bramford to Twinstead Tee Connection Project. Mitigation methods, residual effects, inter-relationship of effects and cumulative effects will also be identified for each environmental topic. This information will be presented in an ES.

4.1.2. The EIA will integrate environmental considerations into the design process of the proposed development so that potential effects can be considered and minimised at the earliest stages.

Approach to Identifying Significant Environmental Effects

4.1.3. The assessment process to identify significant environmental effects will be undertaken by:

- Developing an understanding of the baseline environment;
- Identifying environmental effects and evaluating their significance (generally by evaluating magnitude of the effect and the sensitivity of the receptor);
- Considering whether cumulative environmental effects will occur;
- Designing mitigation methods to minimise or avoid adverse effects; and
- Identifying residual effects.

4.1.4. The Institute of Environmental Management and Assessment's (IEMA) report on EIA in the UK¹⁹ advises that there are no scales or definitions of significance in EIA Regulations and effects of any scale of significance should be reported. That approach will be followed in the ES.

Approach to Assessing the Significance of Environmental Effects

4.1.5. The determination of the significance of likely effects arising from the proposed development is an important stage in the EIA process. To assess the overall significance of an effect it is necessary to establish the magnitude of the effect occurring i.e. the changes to the existing baseline conditions as a result of the proposed development, and the sensitivity or importance of the receiving environment or receptor.

¹⁹ Institute of Environmental Management: The State of Environmental Impact Assessments in the UK: EIA significance evaluation matrix page 61: IEMA 2011

- 4.1.6. Each environmental topic assessment will identify its own method to assess significance of effects although each will be broadly based on the following criteria from IEMA's *The State of Environmental Impact Assessments in the UK*²⁰.

Magnitude of Effect

- 4.1.7. The magnitude of potential effects (both beneficial and adverse) on environmental baseline conditions will be identified through the detailed consideration of the proposed development taking into account the following:
- Relevant legislation, policy or guidelines;
 - The degree to which the environment is potentially affected e.g. whether the quality is enhanced or impaired;
 - The scale or degree of change from baseline conditions as a result of the proposed development;
 - The duration of the effect e.g. whether it is temporary or permanent; and
 - The reversibility of the effect.
- 4.1.8. The following criteria provide a general definition for determining the magnitude of a particular effect:
- High Magnitude - Total loss or major alteration to key elements or features of the baseline conditions to the extent that post-development character or composition of baseline conditions will be fundamentally changed;
 - Moderate Magnitude - Loss or alteration to one or more key elements or features of the baseline conditions to the extent that post-development character or composition of the baseline conditions will be materially changed;
 - Low Magnitude - Minor shift away from baseline conditions. Changes arising will be detectable but not material; the underlying character or composition of the baseline conditions will be similar to the pre-development situation; and
 - Negligible Magnitude - Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

Sensitivity of Receptor

- 4.1.9. The sensitivity of the receptor will be assessed with reference to the relative importance of existing environmental features on or near to the connection route (e.g. whether features are of national, regional or local importance) and by the sensitivity of receptors which would potentially be affected by the development. Sensitivity is not an absolute criterion, but one which needs to be considered in relation to characteristics of the proposed development and the anticipated effects.
- 4.1.10. Criteria for the determination of sensitivity (high, medium, or low) will be established based on legislation, statutory designation, guidance and professional judgment.
- 4.1.11. The following criteria provide a general definition for determining the sensitivity of receptors.

²⁰ Institute of Environmental Management: The State of Environmental Impact Assessments in the UK:IEMA 2011

- Very High Sensitivity - The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance e.g. special qualities of a Special Protection Area or National Park;
- High Sensitivity - The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance e.g. special qualities of a Site of Special Scientific Interest or AONBs;
- Moderate Sensitivity - The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance. e.g. special qualities of a regionally important geological site;
- Low Sensitivity - The receptor is tolerant of change without detriment to its character, is of low environmental value, or local importance e.g. qualities of a hedgerow or industrial areas; and
- Negligible Sensitivity - The receptor is resistant to change or is of little environmental value.

Significance of Effect

4.1.12. A combination of the magnitude of the likely effect and the sensitivity of the receiving environment will determine the overall significance of effects. The significance of the likely effects arising from the proposed development will be categorised throughout the ES as follows (unless stated otherwise):

- Major adverse;
- Moderate adverse;
- Minor adverse;
- None;
- Minor beneficial;
- Moderate beneficial; and
- Major beneficial.

Table 4.1 Matrix for Assessing Significance of Effects

Assessing Significance of Effects					
Magnitude of Effect	Sensitivity of Receptors				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	None
Low	Moderate	Moderate	Minor	None	None
Negligible	Minor	Minor	None	None	None

4.1.13. Effects identified and assessed in the EIA are considered to be significant if both impact magnitude and receptor sensitivity are high/large or medium/moderate. Additionally, effects are considered to be significant if impact magnitude is large and receptor sensitivity is low, or alternatively if receptor sensitivity is high and

impact magnitude is small. This equates to major and moderate adverse/beneficial effects.

Mitigation

- 4.1.14. Where possible, for each adverse significant effect identified, mitigation will be proposed to avoid or to minimise the significance of the effect on the receptor in accordance with the 2009 EIA Regulations, Schedule 4, Part 1, Section 21.

Residual Effects

- 4.1.15. The overall significance of likely effects will take into account identified mitigation measures.

Construction, Operational and Decommissioning Effects

- 4.1.16. Potential effects will be separated into three types based on different phases of the proposed development as follows.

Construction Effects

- 4.1.17. Construction effects are effects that will occur during the construction phase of the proposed development. This will include effects resulting from the activities associated with installation of the overhead line, underground cables, sealing end compounds and substation and the removal of 132kV and 400kV overhead lines, including creation of temporary access tracks, temporary scaffolding and construction compound areas and work activities. Construction effects are temporary during the construction phase of the proposed development. Likely temporary effects during the construction phase of the proposed development will be described in the ES.

Operational Effects

- 4.1.18. Operational effects are effects that will occur as a result of the presence, operation and maintenance of the proposed development. Infrequent maintenance will be required throughout the lifespan of the infrastructure, which at times will involve the refurbishment and replacement of equipment. Some operational effects may be temporary, for instance, during the maintenance period of the proposed development, whereas other operational effects may occur throughout the life-span of the proposed development. Likely permanent and temporary effects during the operational phase of the proposed development will be described in the ES.

Decommissioning Effects

- 4.1.19. Decommissioning effects are effects that will occur during the decommissioning phase of the development only. This will include effects resulting from the activities associated with the removal of the proposed development once the development is no longer required. The effects are likely to be similar to those during the construction phase but could be temporary or permanent. Likely permanent and temporary effects during the decommissioning phase of the proposed development will be described in the ES.

Inter-Relationship between Effects

- 4.1.20. The potential effects of the proposed development will be considered in terms of potential effects on each of the environmental topic areas. However, topic areas

such as hydrology and biodiversity cannot always be considered in isolation since changes affecting one topic area can also have **indirect** (or secondary) implications for other topic areas. For example, if the proposed development could affect the quality of a watercourse, there is potential for flora and fauna to be subsequently affected.

Cumulative Effects

- 4.1.21. When considering cumulative effects, the ES will provide information on how the potential effects of the proposed development will combine and interact with the effects of other development.
- 4.1.22. Several developments in any given locality may have insignificant environmental impacts individually but together may have a cumulative significant effect.
- 4.1.23. Important factors which will be considered when identifying the proposed assessment of cumulative impacts are the 'spatial' boundary and the 'time frame' boundary. Cumulative impacts may well extend beyond the geographical site boundary of the project. It is unlikely that small development projects such as householder planning permissions will give rise to cumulative effects when considered with the Bramford to Twinstead Tee Connection Project. There is greater likelihood that major projects could give rise to cumulative effects. National Infrastructure Planning '*Advice Note Nine: Rochdale Envelope*'²¹ advises that other major development should be identified through consultation with the local planning authorities and other relevant authorities on the basis of those that are:
- Under construction;
 - Permitted application(s), but not yet implemented;
 - Submitted application(s) not yet determined;
 - Projects on the IPC's Programme of Projects;
 - Identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited; and
 - Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.
- 4.1.24. Consultation with the relevant authorities will be undertaken to identify projects which may give rise to cumulative effects. For each environmental topic, the spatial boundary for potential cumulative effects from other developments will be identified.
- 4.1.25. The ES will consider cumulative effects during the assessment of each environmental topic. This will include an assessment of cumulative effects between different projects, environmental topics within the same project and whether any insignificant effects from other developments could combine with the proposed development to create a significant impact on the environment.

²¹ National Infrastructure Planning: Advice Note Nine: Rochdale Envelop: Version 2: April 2012'

4.2. Purpose and Approach to Scoping

- 4.2.1. Section 8 (1) of the 2012 EIA Regulations states that ‘a person who proposes to make an application for an order granting development consent may ask the Commission to state in writing its opinion as to the information to be provided in the environmental statement’. This scoping report has been prepared to seek the opinion of the Secretary of State (and stakeholders) and includes the information proposed to be supplied in the ES.
- 4.2.2. This scoping report identifies the likely significant effects experienced by receptors (people and environmental resources) due to the proposed development. In accordance with Schedule 4 of the 2009 EIA Regulations, the environmental topics to be considered include:
- Population;
 - Fauna;
 - Flora;
 - Soil;
 - Water;
 - Air;
 - Climatic factors;
 - Material assets including architectural and archaeological heritage;
 - Landscape; and
 - The inter-relationship between the above factors.
- 4.2.3. Baseline studies considering the above environmental topics have been undertaken to help determine the preferred form and design of development including aspects of its location. Where this information is available, it is presented in the environmental topic chapters of this scoping chapter. The baseline information is informed by legislation, policy and guidance. Where there remain baseline assessments to be undertaken, this scoping report will describe the assessments proposed to be undertaken and will be presented in the ES.
- 4.2.4. In this scoping report, conclusions are made about the likely significance of the effect on a receptor based upon professional judgement, baseline assessments and the project description.
- 4.2.5. In some cases, only a few significant effects will be identified, which will be discussed in the ES in greater depth. In other cases, potential effects identified will have little significance and will be briefly discussed in the ES to indicate that their possible relevance has been considered. Where applicable, effects that are not considered likely to be significant based on work already carried out and on available information will be ‘scoped out’ and will not require further assessment. The matters proposed to be scoped out are presented in Chapter 15 of this report.
- 4.2.6. In accordance with the 2009 EIA Regulations, National Grid has engaged with the affected local planning authorities, national agencies and others on the proposed scope of the EIA in August to November 2012 through meetings where information and ideas were presented. The feedback received is provided at Appendix A and has been considered during the preparation of the scoping report. Each environmental topic outlines how the representations received during consultation have been applied to the scope of the EIA.

- 4.2.7. The Scoping Opinion issued by PINS will be taken into account by National Grid and, where appropriate, the environmental assessments will be reviewed in light of the Scoping Opinion and will be presented in the ES.
- 4.2.8. For each assessment topic in this scoping report the following information is provided:
- Description of the existing environment – where applicable this section will describe the existing environment under the sub-headings of the Sections of the route corridor and by the Substation Study Areas. Alternatively, where the existing environment is similar across all Sections and Substation Study Areas, the description of the existing environment will not be sub-divided;
 - Characteristic of potential effects – the potential significant effects likely to occur as a result of the proposed development will be described for the construction, operational and decommissioning phases of the project;
 - Proposed approach and method – this section will describe how the consultation undertaken has influenced the scope of the assessment. The proposed desk based assessments and site assessments to be undertaken in the EIA will also be described;
 - Assessing significance of effects – where possible, the criteria for assessing significance of effects will be described in this section. This is generally determined by defining the magnitude of effects and the sensitivity of receptors;
 - Mitigation and residual effects – this section will describe how mitigation and residual effects will be considered in the ES;
 - Inter-relationships of effects – this section will describe how the effects from other environmental topics will be considered in the ES; and
 - Cumulative effects – this section will describe how the effects from other developments will be considered in the ES.

5. LANDSCAPE AND VISUAL ASSESSMENT

5.1. Introduction

5.1.1. This chapter of the ES will report on the assessment of the likely significant effects of the proposed development on landscape character and the likely significant effects on views. Landscape assessment identifies the features which shape the character of the landscape and considers the effect a proposed development will have on this character. Visual assessment considers existing views and the effects a proposed development will have on these views. The Landscape and Visual Impact Assessment (LVIA) will identify and assess the likely significant effects of construction and of the presence of the proposed overhead line, underground cables, sealing end compounds and substation on the landscape resource and visual amenity of the area in the long-term.

5.2. Existing Environment

5.2.1. This section describes the existing environment in relation to the proposed development. The information provided in this chapter has been derived from the baseline information for landscape and views, which was gathered to inform the Connection Options Report²² and Substation Siting Options Appraisal²³. The plans to accompany these reports are available at: <http://www.bramford-tinstead.co.uk/library-stage-2.aspx>.

5.2.2. The new 400kV connection would run in an east-west direction between Bramford Substation and Twinstead Tee, crossing a landscape which consists of a series of river valleys with intervening plateaus or interfluves of higher ground. Where the new 400kV connection is proposed as a new overhead line it would run approximately parallel to the existing 400kV overhead line between Bramford Substation and Twinstead Tee. Many of the potential visual receptors along the proposed route have existing views of the 400kV overhead line or the 132kV overhead line or both lines. The existing 400kV and 132kV overhead line also influences the existing landscape character. As part of this connection project the existing 132kV overhead line which runs from Burstall Bridge to Twinstead Tee, and which broadly parallels the existing 400kV overhead line along the majority of this route, would be removed.

Section AB – Bramford Substation and Hintlesham

Bramford Substation

5.2.3. For this part of the new connection, west from Bramford Substation to Belstead Brook Valley, the interim overhead line alignment is to the south of the existing 400kV overhead line.

²² National Grid, Bramford to Twinstead Tee Connection Project: Connection Options Report: http://www.nationalgrid.com/NR/rdonlyres/13F652DA-9185-4536-AF2F-5E57112A21E5/53962/BramfordtoTwinsteadTeeConnectionOptionsReport_May2012.pdf

²³ National Grid, Bramford to Twinstead Tee Connection Project: Substation Siting Options Appraisal: <http://www.nationalgrid.com/NR/rdonlyres/CBE163AE-2C8B-4F19-9713-410C6239C6FC/58950/SubstationSitingOptionsAppraisal.pdf>

Landscape Designations

- 5.2.4. The Belstead Brook valley is designated a Special Landscape Area (SLA) in the Babergh District Local Plan. This designation extends northeast from the valley up to the local authority boundary, which is to the southwest of the substation. At present no district landscape character assessment is available and so the Suffolk Landscape Character Assessment (LCA) has been referred to in this chapter with regard to the qualities of the SLA.
- 5.2.5. The Suffolk LCA characterises this part of the SLA as Ancient Plateau Claylands. The Suffolk LCA states that the 'key characteristics' of the Ancient Plateau Claylands character type include a flat or gently rolling arable landscape dissected by small river valleys, field pattern of ancient enclosure, dispersed settlement pattern of loosely clustered villages and hamlets and isolated farmsteads of medieval origin, scattered ancient woodland parcels, and hedges of hawthorn and elm with oak, ash and field maple as hedgerow trees. Farmsteads are predominantly timber-framed, the houses colour-washed and the barns blackened with tar. Roofs are frequently tiled, though thatched houses can be locally significant. The network of winding lanes and paths often associated with hedges create visual intimacy.

Description of Existing Environment

- 5.2.6. Bramford Substation is on an interfluvium of higher ground between the Gipping Valley to the east, and a smaller valley which contains Belstead Brook to the west. Land is mainly in arable use with an irregular pattern of predominantly large fields. Fields have a mixture of open and hedgerow boundaries, interspersed by belts and blocks of broadleaved woodland. Bramford Substation and the existing 400kV and 132kV overhead lines which connect to the substation, the nearby A1071 (2km south of the substation) and views toward the edge of Ipswich influence the landscape character of this area. To the north of the A1071 the area is served by a network of minor roads and lanes, and extending from these are a series of public footpaths and bridleways which cross the land surrounding the substation. The Gipping Valley River Path, a long distance route, follows the River Gipping approximately 2km east of Bramford Substation. Intervening landform prevents views to the west from this route. A regional cycle route runs through the hamlet of Flowton (approximately 1.5km to the northwest of Bramford Substation) and has some open views of the existing 400kV overhead line to the south.
- 5.2.7. The village of Burstall is approximately 1km to the south of Bramford Substation, on the edge of the Belstead Brook valley. Mature vegetation and intervening built form restrict views toward the substation and the existing 400kV Bramford to Twinstead Tee overhead line from the majority of houses in the village. Residential properties in the hamlet of Flowton have views toward the substation and existing 400kV overhead line. There are a number of isolated farmsteads and groups of houses between Flowton and Burstall and east of Burstall that have views toward the substation and of the existing 400kV Bramford to Twinstead Tee overhead line. The villages of Bramford and Sroughton are approximately 2km east of Bramford Substation in the Gipping Valley. Landform restricts views to the west from these settlements.

Belstead Brook

- 5.2.8. For the part of the new connection through the Belstead Brook valley, the interim overhead alignment is to the south of the existing 400kV overhead line. The 132kV

overhead line crosses Belstead Brook and the SLA to the south of the A1071. This project proposes the removal of the 132kV overhead line between Burstall Bridge and Twinstead Tee.

Landscape Designations

- 5.2.9. The Belstead Brook valley is designated a SLA in the Babergh District Local Plan. The Suffolk LCA characterises this part of the SLA along the Belstead Brook and within the valley as Rolling Valley Farmlands. Its key characteristics include gentle valley sides with some complex and steep slopes, an organic pattern of fields smaller than on the plateaux, small ancient woodlands on the valley fringes and with a scattering of landscape parks.

Description of Existing Environment

- 5.2.10. Belstead Brook is a small watercourse approximately 1.5km west of Bramford Substation, which is a tributary of the River Orwell. Belstead Brook lies in a small secluded valley to the west of the village of Burstall. Large arable fields extend into the valley with pastoral land at the valley bottom. Fields have a mixture of open and hedgerow boundaries. There are public rights of way running along and crossing the valley. There are no long distance routes in this area. Mature vegetation along the watercourse and woodland belts on the valley sides offer localised screening in this area. There are a small number of houses in the valley close to the proposed new overhead line at Mill Farm. These properties have views of the existing 400kV overhead line. Views of the existing 400kV overhead line crossing Belstead Brook are limited from houses in Burstall by mature vegetation and tree belts to the western and southern edges of the village. There are also potential visual receptors at Burstall Hill, a group of houses that sit in the valley to the northwest of the proposed new overhead line and are served by a minor road which crosses the valley at this point. Belstead Brook is also crossed by the A1071 approximately 1.5km to the southeast of the proposed new overhead line (at Burstall Bridge). Views to the northwest are limited by vegetation along the watercourse at this point.

- 5.2.11. There are existing views of the 132kV overhead line where it crosses Belstead Brook in the vicinity of Burstall Bridge.

Hintlesham

- 5.2.12. For this part of the new connection between Belstead Brook Valley and the Brett Valley the interim overhead line alignment is principally to the south of the existing 400kV overhead line.
- 5.2.13. The existing 132kV overhead line runs from Burstall Bridge in the Belstead Brook Valley (approximately 2km to the south of Bramford Substation) toward the Brett Valley, passing to the south of Hintlesham and Hintlesham Woods SSSI. This project proposes the removal of the 132kV overhead line between Burstall Bridge and the Brett Valley.

Landscape Designations

- 5.2.14. The Belstead Brook Valley is designated a SLA in the Babergh District Local Plan. This designation extends westward from the valley as far as Hintlesham Woods SSSI. The Brett Valley is also designated a SLA in the Babergh District Local Plan. This designation extends eastward from the valley as far as Clay Lane.
- 5.2.15. The Suffolk LCA characterises the part of the Belstead Brook SLA that the interim overhead alignment crosses in this 'Hintlesham area' as Ancient Plateau Claylands,

whilst the part of the Belstead Brook SLA further south that the existing 132kV overhead line crosses is characterised as Ancient Estate Claylands.

- 5.2.16. The Suffolk LCA characterises the part of the Brett Valley SLA that the interim overhead alignment and existing 132kV overhead line crosses in this 'Hintlesham area' as predominantly Rolling Valley Farmlands, with small areas of Ancient Plateau Claylands and Ancient Estate Claylands.
- 5.2.17. The Suffolk LCA states that the key characteristics of the Ancient Plateau Claylands character type include a flat or gently rolling arable landscape dissected by small river valleys, field pattern of ancient enclosure, dispersed settlement pattern of loosely clustered villages and hamlets and isolated farmsteads of medieval origin, scattered ancient woodland parcels, and hedges of hawthorn and elm with oak, ash and field maple as hedgerow trees. Farmsteads are predominantly timber-framed, the houses colour-washed and the barns blackened with tar. Roofs are frequently tiled, though thatched houses can be locally significant. The network of winding lanes and paths often associated with hedges create visual intimacy.
- 5.2.18. The key characteristics of the Ancient Estate Claylands Character type described in the Suffolk LCA include a dissected plateau, ancient semi-natural woodland, parklands, villages with dispersed hamlets and farmsteads, and timber framed buildings.
- 5.2.19. The Suffolk LCA's key characteristics of the Rolling Valley Farmlands include gentle valley sides with some complex and steep slopes, an organic pattern of fields smaller than on the plateaux and small ancient woodlands on the valley fringes.

Description of Existing Environment

- 5.2.20. This part of the proposed connection is on an interfluvium of higher ground between these valleys. Land is mainly in arable use with a broadly geometric pattern of predominantly large fields. Fields have a mixture of open and hedgerow boundaries, interspersed by belts and blocks of broadleaved woodland, which help to limit the effect on views of the existing 400kV overhead line. Some of this woodland forms remnants of the former parkland that surrounded Hintlesham Hall (Grade I listed). This includes Hintlesham Woods SSSI. The hall is now a hotel and a golf course has been developed on the land between the hall and the Belstead Brook valley to the east. The existing 400kV overhead line crosses the former parkland, less than 0.5km from the hall and there are views of the existing overhead line from locations within the grounds of the hall and from parts of the golf course.
- 5.2.21. The A1071 runs through the village of Hintlesham and north of Hintlesham Woods SSSI toward Hadleigh. A secondary road (Pond Hall Road/Duke Street) connects with the A1071 at Hintlesham and also runs westward toward Hadleigh, but passes Hintlesham Woods SSSI to the south. A minor road network extends to the north of the A1071 and south of Pond Hall Road and there are also a number of public footpaths crossing the area. There are views of the existing 400kV overhead line from these routes. There are no long distance footpath routes in this area. National Cycle Route (Number 1) is well-screened where it runs along Hadleigh Railway Walk on the eastern edge of the Brett Valley, but where the route runs approximately 1km to the south of the existing overhead lines there are views of the existing 400kV overhead line and the 132kV overhead line.
- 5.2.22. The village of Hintlesham is approximately 1km to the south of the proposed new connection, although the majority of views to the north are limited by woodland and

mature vegetation associated with Hintlesham Hall and the golf course. Ribbon development extends along Duke Street, west of Hintlesham and a number of residences here have views of the existing 400kV overhead line, where not obscured by Hintlesham Woods SSSI. Approximately 1km to the south of Hintlesham is the village of Chattisham and there are some views of the existing 400kV overhead line from houses in the western part of the village. There are a number of other residential visual receptors at farmsteads in the area, and individual houses and groups of houses located principally along the A1071 and Pond Hall Road.

- 5.2.23. There are views from a number of houses in Hintlesham, Chattisham and Duke Street of the existing 132kV overhead line, which runs south of Hintlesham. There are also views of the 132kV overhead line from the A1071 (east of Hintlesham), the minor road network (including part of the National Cycle Route) and public right of way network.

Section C - Brett Valley

- 5.2.24. For this part of the new connection in the Brett Valley the preferred overhead line alignment is to the south of the existing 400kV overhead line on a similar alignment to the existing 132kV overhead line, which would be removed as part of the project.

Landscape Designations

- 5.2.25. The Brett Valley is designated a SLA in the Babergh District Local Plan. The Suffolk LCA characterises this part of the SLA within the valley as predominantly Rolling Valley Farmlands and Valley Meadowlands.
- 5.2.26. The key characteristics of the Rolling Valley Farmlands described in the Suffolk LCA include: gentle valley sides with some complex and steep slopes; an organic pattern of fields smaller than on the plateaux; small ancient woodlands on the valley fringes; sunken lanes; towns and villages with distinctive medieval cores; large, often moated houses; and a scattering of landscape parks.
- 5.2.27. The key characteristics of the Valley Meadowlands in the Suffolk LCA include: flat landscapes on the valley floors; cattle grazed fields; grassland divided by a network of ditches; fields converted to arable production and occasional carr woodland and plantations of poplar.
- 5.2.28. At this point the Dedham Vale AONB lies approximately 2km to the south of the preferred overhead line alignment.

Cultural Associations

- 5.2.29. Although Constable mainly painted within the Flatford area within the Dedham Vale, there is evidence that Constable visited the Brett Valley as he sketched Overbury Hall, which is on the western side of the Brett Valley.
- 5.2.30. Benton End Farm in the Brett Valley was former home to the East Anglian School of Painting and Drawing, run by Sir Cedric Morris between 1939 and the 1960s, which attracted a range of artists including Lucian Freud and Maggi Hambling. The landscape immediately surrounding Benton End Farm was a source of inspiration for Sir Cedric and some of the students.

Description of the Existing Environment

- 5.2.31. The Brett Valley is broadly comprised of arable land to its valley sides with pockets of pastoral land to the valley bottom. There is an irregular pattern of predominantly large fields which have a mixture of open and hedgerow boundaries. There are

some small blocks of broadleaved woodland, woodland belts and mature trees on the valley sides, some of which are associated with a small area of parkland at Layham Park.

- 5.2.32. The B1070 runs through the Brett Valley to the east of the river, from Hadleigh north of the existing 400kV overhead line and through the village of Upper Layham to the south. A minor road runs south from Hadleigh on the western side of the river and through Lower Layham and a further minor road runs parallel to this route on the upper valley side. There are some public footpaths crossing the valley between Hadleigh and Upper Layham and a footpath link between Upper and Lower Layham which crosses the river. There are views of the existing 400kV overhead line from these routes. There are no long distance footpath routes in this area. There are views of the existing 400kV overhead line and 132kV overhead line from parts of the National Cycle Route (Number 1) where the route runs through the Brett Valley on the minor road network.
- 5.2.33. The southern extent of the town of Hadleigh is approximately 0.5km from the preferred overhead line alignment and there are a number of potential visual receptors at the southern edge of the town. The village of Upper Layham is in the valley bottom, approximately 0.25km to the south of the preferred overhead line alignment and there are likely to be a number of visual receptors in the village. The village of Lower Layham is approximately 0.5km to the south of the preferred overhead line alignment and is tucked into a small tributary valley on the edge of the main Brett Valley. Apart from a few houses at the edge of the village, intervening landform restricts views northward. Within the Brett Valley, between Hadleigh and Upper and Lower Layham there are some individual residential properties on the B1070 and minor roads, which have views of the existing 400kV overhead line and 132kV overhead line.

Section D - Polstead Heath

- 5.2.34. For this part of the new connection between the Brett Valley and Box Valley the preferred overhead line alignment is to the south of the existing 400kV overhead line on a similar alignment to the existing 132kV overhead line, which would be removed as part of the project. A sealing end compound is proposed on land to the immediate east of Dollops Wood on the edge of the Box Valley.

Landscape Designations

- 5.2.35. The Brett Valley is designated a SLA in the Babergh District Local Plan. This designation extends westward from the valley as far as and across Layham Quarry. The Suffolk LCA characterises this part of the SLA as Rolling Valley Farmlands and Ancient Rolling Farmlands.
- 5.2.36. The Suffolk LCA describes that the key characteristics of the Rolling Valley Farmlands include: gentle valley sides with some complex and steep slopes; an organic pattern of fields smaller than on the plateaux; small ancient woodlands on the valley fringes; sunken lanes; and large, often moated houses.
- 5.2.37. The key characteristics of the Ancient Rolling Farmlands set out in the Suffolk LCA include: rolling arable landscape; field pattern of ancient random enclosure; hedges of hawthorn and elm with oak, ash and field maple as hedgerow trees; scattered with ancient woodland parcels; dispersed settlement pattern of loosely clustered villages, hamlets and isolated farmsteads of medieval origin; farmstead buildings are predominantly timber-framed, the houses colour washed and the barns blackened with tar; roofs are frequently tiled, though thatched houses can be locally

significant; villages are often associated with village green or the remains of greens; and network of winding lanes and paths, often associated with hedges, creates visual intimacy.

- 5.2.38. The Dedham Vale AONB is approximately 1.5km to the south of the preferred overhead line alignment at this point and the AONB designation extends into the Box Valley (to the immediate west of this area).

Description of Existing Environment

- 5.2.39. This part of the proposed connection is on an interfluvium of higher ground between the Brett Valley and the Box Valley. Land is mainly in arable use, with a mix of geometric and irregular pattern of medium to large sized fields. Fields are generally bound by hedgerows with hedgerow trees, interspersed by blocks of broadleaved woodland, which would assist in limiting the effects of a new overhead line and sealing end compound as proposed in the COR. There is a small tributary valley connected to the Brett which extends into the eastern part of this area and which contains a number of woodland belts. In the eastern part of this area, the existing overhead lines cross the Brett Aggregates' Layham Quarry. The quarry consists of some restored areas as well as worked areas with existing permission for gravel extraction. It is relatively well-screened from the surrounding area by mature vegetation around its periphery.
- 5.2.40. The A1071 is approximately 1.5km to 3km to the north of the existing 400kV overhead line. A network of minor roads and lanes serves the area to the south. There are public rights of way across farmland to the north and to the south of the existing 400kV overhead line and 132kV overhead line, but few public rights of way cross beneath the existing overhead lines. Users of these routes have views of the existing overhead lines along at least part of the routes. There are no long distance footpath routes, national or regional cycle routes in this immediate area, although there are distant views of the existing 400kV overhead line from part of the Stour Valley Path long distance route on high ground east of Stoke by Nayland (approximately 3km distant).
- 5.2.41. The small village of Polstead Heath is approximately 0.2km to the north of the existing 400kV overhead line in the western part of this area. Millfield Wood, a block of mature woodland, sits between the village and the existing overhead line and limits views to the south from some residential properties, although there are views of the existing 400kV overhead line from the eastern and western edges of the settlement. On the edge of the Box Valley, and approximately 1km to the south of the connection route, is the village of Polstead, which lies in the Dedham Vale AONB. The village is set on lower ground and the majority of views from the village are restricted by a combination of landform and mature vegetation, apart from a few properties at the northern edge of the village. There are a number of other potential residential visual receptors at farmsteads in the area, and at individual houses and groups of houses along the A1071 and on the minor road network.
- 5.2.42. Approximately 3km to the southwest of this area, is the village of Stoke by Nayland on high ground in the AONB. There are existing views of the 400kV overhead line on the interfluvium between the Brett and Box Valleys from the edge of the village.

Section E – Dedham Vale AONB (Box Valley)

- 5.2.43. For this part of the new connection in the Box Valley, the preferred alignment is an underground cables route. The 132kV overhead line crosses this part of the

Dedham Vale AONB parallel and to the south of the existing 400kV overhead line. This project proposes the removal of the 132kV overhead line in the AONB.

Landscape Designations

- 5.2.44. This part of the Box Valley and an adjacent tributary valley, through which the existing 400kV overhead line crosses, is part of the Dedham Vale AONB. A small triangular area of farmland on higher ground sits between the Box Valley and tributary valley and is outside the AONB designation.
- 5.2.45. This AONB designation protects an exceptional example of a lowland river valley. The Dedham Vale AONB and Stour Valley Project have published a position statement on 'Development in the setting of the Dedham Vale AONB'²⁴ and their description of the special qualities of the Dedham Vale AONB is included in Appendix C.
- 5.2.46. The Dedham Vale AONB and Stour Valley Management Plan 2010-15 also provides a statement of significance which seeks to outline what is special about the Dedham Vale AONB. This statement highlights that Constable's paintings of a working landscape strongly influenced the designation of the areas that has come to represent the epitome or lowland English countryside. The AONB stands apart from other lowland river valleys because of this and the assemblage of features he painted can still be seen. These features include a meandering river and its tributaries; gentle valley slopes with scattered woodlands; grazing and water meadows; sunken rural lanes; historic villages with imposing church towers and historic timber framed buildings; and small fields enclosed by ancient hedgerows. The AONB remains a predominantly farmed landscape and there is little evidence of urban sprawl and the area retains a sense of tranquillity.

Description of Existing Environment

- 5.2.47. The Box Valley is mainly comprised of pastoral land with some broadleaved woodland blocks to the valley sides, some of which is associated with parkland at Peyton Hall. On the eastern side of the valley is a tributary valley that joins the main valley south of Polstead and approximately 1km to the south of the new connection. The minor valley is flanked on its eastern side by Dollops Wood, a broadleaved woodland belt. The upper valley sides and the area of higher ground between the Box and this tributary valley are in arable use with an irregular pattern of predominantly large fields. Fields in this area have a mixture of open and hedgerow boundaries. On the western extent of the valley side are orchards and related infrastructure, including agricultural buildings, which form part of Boxford Fruit Farm and the Copella Pressing Plant.
- 5.2.48. The A1071 varies between approximately 1km to 2km to the north of the proposed new connection in this area and intervening landform and vegetation restricts views to the south. On the western side of the Box Valley the underground cables alignment crosses the B1068 which runs southwest along the valley edge. A network of minor roads and lanes provides connections between the A1071 and B1068. A number of public rights of way cross the area, including the public right of

²⁴ <http://www.dedhamvalestourvalley.org/assets/planning/Setting-of-Dedham-Vale-AONB.pdf>

way which runs along the bottom of the Box Valley and is part of the Suffolk Way, a published long-distance walking route. There is also a small network of public paths to the north of Polstead associated with the tributary valley and Dollops Wood. There are no other long distance footpath routes, national or regional cycle routes in this area.

- 5.2.49. The village of Boxford and hamlets of Stone Street, Calais Street and Whitestreet Green are to the north of the existing overhead line and the proposed underground cables alignment. Views south from Boxford and Stone Street are restricted by intervening landform and vegetation. Calais Street is on higher ground but is over 1km from the preferred underground cables alignment. There are some houses at the southern and western edge of Whitestreet Green, which are on higher ground overlooking the valley. The village of Polstead is to the southeast of the preferred underground cables route and views to the northwest are restricted by intervening landform. Views northward toward the Box Valley from the village of Stoke by Nayland (approximately 2km south of the preferred underground cables alignment) are limited by a combination of distance and intervening vegetation. There are other potential individual residential visual receptors in the Box Valley and tributary valley.

Section F - Leavenheath and Assington

- 5.2.50. For this part of the new connection between the Box Valley and Stour Valley the preferred overhead line alignment is to the south of the existing 400kV overhead line, with a sealing end compound proposed on land to the immediate west of Boxford Fruit Farm and the Box Valley.

Landscape Designations

- 5.2.51. The eastern extent of the Stour Valley is designated a SLA in the Babergh District Local Plan. This designation extends eastward from the valley as far as High Road, east of Assington. The Suffolk LCA characterises this part of the SLA as predominantly Ancient Rolling Farmlands and describes the key characteristics of the Ancient Rolling Farmlands as including: rolling arable landscape; field pattern of ancient random enclosure; hedges of hawthorn and elm with oak, ash and field maple as hedgerow trees; scattered with ancient woodland parcels; dispersed settlement pattern of loosely clustered villages, hamlets and isolated farmsteads of medieval origin; farmstead buildings are predominantly timber-framed, the houses colour washed and the barns blackened with tar; roofs are frequently tiled, though thatched houses can be locally significant; villages are often associated with village green or the remains of greens; and network of winding lanes and paths, often associated with hedges, creates visual intimacy.

- 5.2.52. The Dedham Vale AONB is approximately 2km south of the existing 400kV overhead line and the AONB designation extends into the Box Valley (to the immediate east of this area).

Description of Existing Environment

- 5.2.53. This part of the proposed connection is on an interfluvium of higher ground between these valleys. Land is mainly in arable use with an irregular pattern of predominantly large fields. Fields have a mixture of open and hedgerow field boundaries, interspersed with some blocks of woodland, including a substantial block of plantation woodland known as Assington Thicks. There are also woodland belts associated with minor watercourses which run in a southerly direction across the plateau. These linear features meet at an area of woodland known as Arger

Fen, which is designated a SSSI and is a Local Nature Reserve open to the public. These mature landscape features assist in limiting some views of the existing 400kV overhead line, although long views across the plateau are possible from a number of locations. As well as the existing 400kV and 132kV overhead lines in the landscape, in the western part of the area, close to the eastern edge of the Stour Valley, and approximately 0.6km north of the existing 400kV overhead line are two television transmitter masts (known as the Assington masts). The taller mast is approximately 160m high and the shorter mast is approximately 100m high. The masts form prominent landmarks in the surrounding landscape.

- 5.2.54. The A134 runs south from Sudbury through the eastern part of this area. At a point just south of the existing overhead lines the B1068 runs southeast from the A134 toward Stoke by Nayland, following the western edge of the Box Valley. The remainder of the area is served by a network of minor roads, which provides further connections between these main routes and also between the A134 and B1508 in the Stour Valley.
- 5.2.55. A number of public rights of way cross this landscape and there are existing views of the existing overhead lines along at least part of these routes. There are no long distance footpath routes, national or regional cycle routes in this immediate area. However, there are views of the existing 400kV overhead line from the Stour Valley Path long distance route, which is approximately 2km to the south in the eastern part of the area and the St Edmund Way long distance route, which is approximately 2km to the south in the western part of the area.
- 5.2.56. The village of Leavenheath, which comprises separate northern and southern parts of the settlement, is in the eastern part of this area. The northern settlement is at the junction between the A134 and B1068. Houses here are approximately 0.2km from the existing 400kV overhead line and would be close to the proposed overhead line and proposed sealing end compound location. The southern settlement at Leavenheath is on the western side of the A134, approximately 1km to the south of the existing 400kV overhead line. Houses along the northern edge of the village have views of the existing 400kV overhead line, obscured in places by vegetation along field boundaries and intervening woodland. Further west and to the north of the existing overhead lines is the village of Assington. This village forms a linear settlement along a minor road (The Street) orientated in a north-south direction. Houses at the southern edge of the village are approximately 0.2km from the existing overhead lines. There are a number of other potential residential visual receptors at farmsteads in the area, and at individual houses and groups of houses along the A134, B1068 and minor road network.
- 5.2.57. To the southwest of the B1068 and south of Boxford Fruit Farm is the Stoke by Nayland hotel and golf club. Although views from the hotel toward the existing overhead lines are restricted by tall and dense screen planting, there are some glimpsed views of the existing 400kV overhead line from the golf course.
- 5.2.58. Approximately 3km southeast of this area, is the village of Stoke by Nayland on high ground in the AONB. There are existing views of the 400kV overhead line on the interfluvium between the Box and Stour Valleys from the edge of the village.

Section G - Stour Valley

- 5.2.59. For this part of the new connection in the Stour Valley, the preferred alignment is predominantly an underground cables route, with a sealing end compound proposed on the eastern edge of the Stour Valley and a sealing end compound

proposed at the western extent of the cables route to connect to the existing 400kV overhead line which runs south to Braintree. The existing 132kV overhead line crosses the Stour Valley to the south of the existing 400kV overhead line. This project proposes the removal of the 132kV overhead line in the Stour Valley up to and including the diamond crossing arrangement (where the 132kV overhead line passes beneath the existing 400kV overhead line which runs south to Braintree). The project also proposes the removal of a section of existing 400kV overhead line (which runs south to Braintree) from the Twinstead Tee to the westernmost sealing end compound.

Landscape Designations

- 5.2.60. The eastern extent of the Stour Valley (in Babergh District) is designated a SLA in the Babergh District Local Plan. The Suffolk LCA characterises this part of the SLA as Valley Meadowlands, Rolling Valley Farmlands and Ancient Rolling Farmlands.
- 5.2.61. The Suffolk LCA states that the key characteristics of the Ancient Rolling Farmlands include: rolling arable landscape; field pattern of ancient random enclosure; hedges of hawthorn and elm with oak, ash and field maple as hedgerow trees; scattered with ancient woodland parcels; dispersed settlement pattern of loosely clustered villages, hamlets and isolated farmsteads of medieval origin; farmstead buildings are predominantly timber-framed, the houses colour washed and the barns blackened with tar; roofs are frequently tiled, though thatched houses can be locally significant; villages are often associated with village green or the remains of greens; and the network of winding lanes and paths, often associated with hedges, creates visual intimacy.
- 5.2.62. The LCA identifies that the key characteristics of the Rolling Valley Farmlands include: gentle valley sides with some complex and steep slopes; an organic pattern of fields smaller than on the plateaux; small ancient woodlands on the valley fringes; sunken lanes; Towns and villages with distinctive medieval cores and late medieval churches; a scattering of landscape parks and large, often moated houses.
- 5.2.63. The key characteristics of the Valley Meadowlands include: flat landscapes on the valley floors; cattle grazed fields; grassland divided by a network of ditches; fields converted to arable production; unsettled; and occasional carr woodland and plantations of poplar.
- 5.2.64. The western extent of the Stour Valley is in Braintree District and was formerly also a SLA. In Braintree District Council's LCA this part of the Stour Valley is characterised as the 'A2 – Stour River Valley' Landscape Character Area. The key characteristics of the Stour Valley Landscape Character Area are a wide valley with a broad, flat valley floor and with valley sides dissected by tributary valleys. Within this, there is a patchwork of pasture, arable farmland and woodland on the valley sides, with mainly meadows divided by hedgerows and/or wet ditches on the valley floor. Plantations of cricket bat willows and poplars are also common. Other key characteristics include a mix of settlement sizes to the valley floor, with traditional small settlements and isolated farmsteads to the valley sides. Church towers, traditional villages, farmsteads and barns form distinctive features. The area retains a sense of tranquillity with a network of quiet and sinuous rural lanes and public rights of way. Overall the area retains a strong sense of historic integrity. The relatively high sensitivity of this landscape to change is noted in the assessment.

- 5.2.65. The Stour Valley is subject to a countryside management project, the Dedham Vale AONB and Stour Valley Project, which also applies to the AONB. In November 2009, the Joint Advisory Committee resolved that the Partnership would issue a 'Statement of Intent to Natural England seeking an extension of the Dedham Vale AONB westward toward Sudbury. This intention has also been incorporated in the Dedham Vale AONB and Stour Valley Management Plan 2010-15.
- 5.2.66. The Dedham Vale AONB and Stour Valley Management Plan 2010-15 provides a statement of significance, which seeks to outline what is special about the Stour Valley (upstream of the AONB). This statement highlights the importance of the River Stour as a landscape feature, along with its wet meadows. The area remains predominantly rural and has its medieval settlement pattern. Changes to agricultural practices and the growth of villages have altered, but not fundamentally changed the landscape. Many of the villages retain their historic centres with timber framed buildings, imposing churches and village greens, and historic hamlets and isolated farm buildings are scattered throughout. Woodlands are situated within the tributary valleys and on the valley sides. Much of the valley floor has been given over to arable crops accommodated in enlarged fields, with former field boundaries still seen in the form of tree lines, drainage ditches and banks. Tributary valleys are generally steeper than the main valley and often they are less intensively farmed and so retain more of their landscape features.

Cultural Associations

- 5.2.67. Although Constable mainly painted within the Flatford area within the Dedham Vale, there is evidence that Constable visited the Stour Valley as he painted a view of Daw's Hall near Lamarsh.
- 5.2.68. The artist Gainsborough was born in Sudbury and painted and sketched in the area as a child and was inspired by the landscape within the Stour Valley. Although it is not always possible to pinpoint the exact locations of his paintings, there are recognisable features in his compositions.
- 5.2.69. The painter John Nash lived in Wormingford from 1929 until his death in 1977. Wormingford is approximately 2km to the southeast of Bures on the valley top with commanding views of the Stour and the landscape to the north and the local landscape was captured in many of his paintings.

Description of the Existing Environment

- 5.2.70. The land in the Stour Valley is a mix of arable and pasture with fields ranging in size, defined by a mixture of open and hedgerow field boundaries. On the western side of the valley and valley tops there is a greater predominance of grazing land and field sizes are much smaller and more enclosed by hedgerow trees and woodland belts. This reflects the more intricate nature of the topography in this particular area, where a series of tributary valleys connect with the main valley. As well as woodland belts associated with tributary valleys, some blocks of broadleaved woodland are found on the Stour Valley's sides and plantations of cricket bat willow on the valley floor.
- 5.2.71. In the Stour Valley, on the eastern side of the river, the B1508 runs southward from Sudbury (approximately 2km to the north of the existing overhead lines) to Bures (approximately 2km to the south of the existing overhead lines). A minor road runs between Sudbury and Bures on the western side of the river. The Sudbury to Bures railway line is also routed along the valley bottom. This part of the Stour is also navigable. A network of minor lanes crosses the valley sides; many of these

are sunken and flanked by tall hedgerow trees. On the western side of the valley some of these lanes are designated Protected Lanes in Braintree District Council's Local Plan. Protected Lanes are designated for their traditional landscape and nature conservation character and protection extends to their tranquillity as well as their physical appearance. The proposed underground cables route crosses two Protected Lanes. The Stour Valley Path and St Edmund Way long distance footpath routes take the same path northwards from Bures along the valley bottom before climbing up along the western valley side and approaching Sudbury from the southwest. These long distance paths cross the underground cables route on the valley side. There are a number of other public rights of way in the area.

- 5.2.72. The southern residential edge of Sudbury extends southward along the Stour Valley as ribbon development along the B1508 and is approximately 2km to the north of the existing 400kV overhead line. The village of Bures also sits in the valley bottom and is approximately 2km to the south of the existing overhead lines. There are a number of other small villages on the valley sides between Sudbury and Bures. The small village of Workhouse Green is on the eastern valley side and approximately 0.2km to the north of the existing 132kV overhead line and preferred underground cables route and 0.3km to the northwest of the cable sealing end compound proposed on the eastern side of the valley. The village of Lamarsh is on the western edge of the valley bottom, 0.25km to the south of the existing 132kV overhead line and the preferred underground cables route. The village of Alphamstone is on the western edge of the Stour Valley, approximately 0.6km to the south of the underground cables route and approximately 0.4km from the cable sealing end compound at the western end of the connection. Alphamstone is 0.4km to 1.6km from the section of existing 400kV overhead line that would be removed between the Twinstead Tee and western cable sealing end compound as part of this project. The village of Twinstead is 0.6km to the west of this section of 400kV overhead line. There are other potential visual receptors relevant to the project at individual residences in the Stour Valley.

New 400kV/132kV Substation

- 5.2.73. As described in Chapter 3, removal of the 132kV line between Burstall Bridge and Twinstead Tee will mean that its role in the distribution network will need replacing. Having considered options available, National Grid's preferred option (subject to consultation) is for a new 400kV/132kV substation west of Twinstead Tee within one of three Substation Study Areas. The existing 400kV overhead line, which continues west from Twinstead Tee, crosses the landscape at the three Substation Study Areas and the existing 132kV overhead line runs to the south and broadly parallel with this. Many of the potential visual receptors near the substation sites have existing views of the 400kV overhead line. The overhead lines also influence the existing landscape character of these areas. The following provides a description of the existing landscape and views in each of the Substation Study Areas.

Substation Study Area A – near Colne Valley Railway

Landscape Designations

- 5.2.74. This Substation Study Area is in Braintree District and is on land formerly designated as part of a SLA. In Braintree District Council's LCA this study area falls within the Colne River Valley Landscape Character Area (A4) and the relatively high sensitivity of this landscape to change is noted in the assessment.

Description of the Existing Environment

- 5.2.75. Substation Study Area A is in the Colne Valley. Here the valley bottom consists of pastoral land, with arable land to the valley sides and with some woodland blocks to the valley tops. Arable fields are large and arranged in a geometric pattern and have open boundaries, with some hedgerow boundaries with hedgerow trees. There is some vegetation along the banks of the River Colne, although this part of the valley bottom is relatively open. The valley sides assist in limiting views to the east and west.
- 5.2.76. The A1071 runs in a southerly direction from Great Yeldham to Castle Hedingham and passes through Substation Study Area A - Colne Valley. There are glimpsed views from the road of the land in the eastern and western parts of the study area where roadside vegetation does not obscure views. Residential built development extends south along the A1071 from Great Yeldham's village centre. The Colne Valley Railway visitor attraction, which uses a section of railway in the valley bottom to run vintage trains, is to the immediate southeast of the study area. The access road to the Railway from the A1071 crosses the Substation Study Area. There are views of farmland in the study area from this access. There are a number of engines and carriages in the Colne Valley railway site and there are glimpsed views of these from the surrounding area.
- 5.2.77. There is a public right of way to the immediate east of the river and the Substation Study Area and some vegetation filters views of agricultural land in the study area to the west from this route. There is also a public right of way to the north with views of the Substation Study Area. These public rights of way are part of the Edgar Eastall's Church Fields Way, which is a published long distance route. There are some more distant public footpaths on the eastern valley side with views of the Substation Study Area. There are no recognised cycle routes in this area.
- 5.2.78. The nearest villages to Substation Study Area A are Great Yeldham, whose southern edge is to the immediate north of the Substation Study Area and Castle Hedingham, which is approximately 1km to the southeast. Views toward the study area from Castle Hedingham village are prevented by intervening mature vegetation and the Colne Valley Railway site to the south, although one of the towers of the scheduled monument of Castle Hedingham is visible from the Substation Study Area. Some residential properties at the southern edge of Great Yeldham have views of the Substation Study Area. Within the Substation Study Area there is a short row of houses and two offices on the eastern side of the A1071 between the Colne Valley Railway site and its access. Due to the orientation of these buildings there are only open views of the Substation Study Area on the western side of the A1071. Views from a further residential property on the opposite side of the A1071 at this point are obscured by mature vegetation to its periphery and intervening landform, as the house is sunken into the valley side. Vegetation and topography obscures views of the Substation Study Area from minor roads and houses on the east side of the valley and the few houses described above are the only visual receptors on the western side of the valley.

Substation Study Area B – Delvyn's Lane

Landscape Designations

- 5.2.79. The Substation Study Area B - Delvyn's Lane is in Braintree District and is in an area which was formerly designated a SLA. In Braintree District Council's LCA this site area falls within the Yeldham Farmland Plateau Landscape Character Area

(B5) and the moderate sensitivity of this landscape to change is noted in the assessment.

Description of Existing Environment

- 5.2.80. The landscape in and surrounding Substation Study Area B - Delvyn's Lane broadly comprises gently undulating arable land, interspersed with blocks of woodland. There is an irregular pattern of predominantly large fields which have a mixture of open and hedgerow boundaries with hedgerow trees. The study area is on a low rise in the undulating landscape however Ramacre Wood and tall hedgerows and hedgerow trees within the study area limit views.
- 5.2.81. At the southern edge of Substation Study Area B - Delvyn's Lane the B1508 Sudbury Road runs in an east-west direction between the A131 (to the east) and Castle Hedingham (to the west). There are glimpsed open views of the land in the study area from this road where not filtered or obscured by hedgerow vegetation. Delvyn's Lane runs north from the B1508, through the Substation Study Area. Delvyn's Lane is flanked by tall hedgerow and mature trees, which filter the majority of views to the east and west from the lane.
- 5.2.82. There is a public footpath to the eastern side of Delvyn's Lane that runs along a green lane to the immediate south of Parkgate Farm. It is flanked by tall hedgerow with hedgerow trees which allows only filtered views of farmland to the south. There are open and near views of the Substation Study Area from public footpaths to the immediate west of Delvyn's Lane. Views from public footpaths in the wider area are restricted by intervening vegetation. There are no long distance footpath routes in this area or regional or national cycle routes.
- 5.2.83. The nearest villages to Substation Study Area B - Delvyn's Lane are Gestingthorpe, which is approximately 1km to the northeast and Castle Hedingham, which is approximately 1km to the southwest. Views from Castle Hedingham village are prevented by intervening mature vegetation. There are views toward the study area from some houses at the southern edge of Gestingthorpe and some houses at the eastern fringes of Castle Hedingham, however views are generally filtered and obscured by hedgerow field boundaries and pockets of mature trees. There are other potential views from Parkgate Farm to the northern edge of the study area, and Pannells Ash Farm to the immediate southwest of the study area, although both these properties have vegetation to their curtilages that limit views.

Substation Study Area C – Butler's Wood

Landscape Designations

- 5.2.84. The Substation Study Area C - Butlers Wood and Waldegrave Wood is in Braintree District and the majority of the study area was formerly designated a SLA. In Braintree District Council's LCA this study area falls within the Wickham Farmland Plateau Landscape Character Area (B6) and the relatively high sensitivity of this landscape to change is noted in the assessment. Two minor roads in the Substation Study Area (Old Road and Watery Lane) are designated as Protected Lanes in Braintree District Council's Local Plan.

Description of the Existing Environment

- 5.2.85. Approximately 1.0km to the east of the Substation Study Area is the western extent of the landscape that is subject to a countryside management project, the Dedham Vale AONB and Stour Valley Project, which also applies to the Dedham Vale AONB. In November 2009, the Joint Advisory Committee resolved that the

Partnership would issue a 'Statement of Intent to Natural England seeking an extension of the Dedham Vale AONB westward toward Sudbury. This intention has also been incorporated in the Dedham Vale AONB and Stour Valley Management Plan 2010-15, although at the current time no boundary for this extension has been drawn. There is potential for views toward Substation Study Area C - Butlers Wood and Waldegrave Wood from the future potential AONB, however landform and vegetation screening is likely to restrict views of a substation.

- 5.2.86. The landscape in and surrounding Substation Study Area C – Butler's Wood is broadly comprised of gently undulating arable land, interspersed with broadleaved blocks of woodland. There is an irregular pattern of predominantly large fields which have a mixture of open and hedgerow boundaries with hedgerow trees. The study area is on a low rise in the undulating landscape; however Butler's and Waldegrave Woods, within the study area, limit views.
- 5.2.87. The A131 runs in a southerly direction from Sudbury to Halstead and passes to the immediate east of Butler's and Waldegrave Woods and there are views of the land in the study area where not obscured by the woods. There are views of the Substation Study Area from the minor road network that extends east and west of the A131 (including the Protected Lanes), although views are limited where lanes are sunken and hedge-lined.
- 5.2.88. There are public rights of way to the west and east of Butler's and Waldegrave Woods that have open views of land within the study area. Views of the majority of the Substation Study Area from public footpaths to the north and south are restricted by woodland, although there are views from public footpaths to the south across the southern extent of the study area. There are no long distance footpath routes or regional or national cycle routes in this area.
- 5.2.89. The nearest villages to the Substation Study Area are Twinstead, which is over 1.0km to the east, Wickham St Paul, which is approximately 1.0km to the west and Bulmer Tye, which is over 1.0km to the north. Views toward the Substation Study Area from these locations are limited by intervening hedgerows and mature trees. The hamlet of Twinstead Green is at the southeastern edge of the study area and there are some existing views toward the Substation Study Area from the residential properties nearest, however mature vegetation to garden curtilages limits views. There are views of the Substation Study Area from a few individual farmsteads and other groups of houses within 0.5km of the woods; intervening vegetation again limits existing views.

5.3. Characteristics of Potential Effects

Construction and Operation Phase Effects

400kV overhead line, sealing end compounds and substation

- 5.3.1. The construction of the proposed 400kV overhead line, sealing end compounds and substation (including all temporary accesses, working areas and construction traffic using the wider road network) and operation (including any permanent vehicles accesses and visiting workers) will result in negative effects on landscape character and views which are likely to include the following:
- Direct loss or fragmentation of important and distinctive landscape elements during construction and operation. For example during construction, highway works on protected lanes, vegetation clearance to allow for

temporary work areas or accesses) and during operation, permanent tree clearance beneath the overhead line;

- The direct negative effect during construction and operation on the scale, quality and pattern of the existing landscape character and on any adjacent landscape character areas;
- The negative effect during construction and operation on the setting of the Dedham Vale AONB (see paragraph 5.5.10); and
- Negative effects on views will arise depending on the extent to which construction works and permanent above ground infrastructure appear in views experienced by receptors such as residents, recreational users and others in the area including local workers.

Removal of 132kV and 400kV overhead line

5.3.2. The removal of the existing 132kV overhead line between Burstall Bridge and Twinstead Tee and the removal of a section of the existing 400kV overhead line (between Twinstead Tee and the western-most sealing end compound) will result in negative effects on landscape character and views whilst the work is carried out which is likely to include the following:

- Direct loss or fragmentation of important and distinctive landscape elements during construction. For example, vegetation clearance to allow for temporary work areas or temporary accesses;
- Direct negative effect of the activity of overhead line removal on the scale, quality and pattern of the existing landscape character and the effect on any adjacent landscape character areas; and
- Negative effects on views will arise depending on the extent to which works of removal of the overhead line (including all accesses, working areas and construction traffic using the wider road network) appears in views experienced by receptors such as residents, recreational users and others in the area including local workers.

5.3.3. Following the removal of the sections of 132kV and 400kV overhead lines, positive effects on landscape character and views are likely to include the following:

- Direct positive effects as a result of the re-establishment of trees in the areas once cleared beneath the overhead lines, subject to landowner agreement;
- The direct positive effect of overhead line removal on the scale, quality and pattern of the existing landscape character and the positive effect on any adjacent landscape character areas; and
- Positive effects on views will arise depending on the extent to which the removal of the overhead line improves the views experienced by receptors such as residents, recreational users and others in the area including local workers.

400kV and 132kV underground cables

5.3.4. The construction of the proposed 400kV underground cables and the 132kV underground cables connection for the substation will result in negative effects on landscape character and views which are likely to include the following:

- Direct loss or fragmentation of important and distinctive landscape elements during construction. For example, vegetation clearance to allow for the temporary working area and accesses;
- The direct negative effect of the underground cables construction (including topsoil stripping, excavation, temporary access roads, site machinery,

vehicles and workers) on the scale, quality and pattern of the existing landscape character and any adjacent landscape character areas;

- Negative effects on views will arise depending on the extent to which construction of the underground cables route (including all accesses, working areas and construction traffic using the wider road network) appear in views experienced by receptors such as residents, recreational users and others in the area including local workers.

5.3.5. During the operation of the 400kV underground cables and the 132kV underground cables connection for the substation, effects on landscape character and views are anticipated to be broadly neutral in the long-term. However it is anticipated that there is the potential for some permanent tree losses above the underground cables route. There is also the potential for temporary negative effects on landscape character and that of adjacent landscape character areas, and the potential for temporary negative effects on views whilst the landscape above the underground cables route re-establishes;

Decommissioning Phase Effects

5.3.6. The decommissioning of the project will result in very similar potential negative effects on landscape character and views as those identified for the construction phase.

5.3.7. Following decommissioning the landscape and views would broadly return to the current baseline condition.

5.4. Proposed Approach and Method

5.4.1. The assessment of landscape and visual effects will be undertaken by Chartered Landscape Architects from TEP who are experienced in landscape and visual assessment. The Landscape Institute and Institute of Environmental Management and Assessment have produced guidelines which have been used as a basis for establishing the method for this assessment 'Guidelines for Landscape and Visual Impact Assessment – Second Edition', *Landscape Institute and Institute of Environmental Management and Assessment, 2002* (GLVIA). The Landscape Institute and Institute of Environmental Management and Assessment have recently consulted on a further draft edition of the guidelines, which is due to be published in April 2013. On publication, the final edition of the guidelines will also be reviewed in relation to the method proposed for assessment to ensure compliance.

Consultation

5.4.2. As part of preparing the scope of the landscape and visual impact assessment for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessment. A draft chapter was sent out to all consultees one week in advance of the meeting and following the meeting all consultees had a further two weeks to comment on the draft chapter. The representations received were taken into account when finalising the scope. The consultees who were sent the draft included:

- Mid-Suffolk, Babergh and Braintree District Councils;
- Suffolk and Essex County Councils;
- Dedham Vale AONB and Stour Valley Project; and
- Dedham Vale Society.

- 5.4.3. Table 5.1 outlines the representations made at the meeting and how these have been addressed. Detailed meeting notes from the scoping meetings held are provided at Appendix A.
- 5.4.4. Table 5.2 provides details of the additional representations received from consultees outside of the meeting and records how these have been addressed.

Table 5.1: Consultation on Scope of Landscape and Visual Impact Assessment – Representations Made at the Meeting

Representations, Discussions and Comments	Whether included in Scoping Report
<p>A discussion was held on the meaning of direct and indirect effects on landscape. Currently the chapter describes direct effects as effects on the immediate landscape where apparatus may be positioned. Indirect effects are described as effects on landscape character beyond the immediate landscape, but from where pylons may be visible. Thematic Group Members felt that this would be better described as effects on setting (such as in relation to the AONB) and that the term ‘indirect effects’ was misleading, as what was being described could also be termed a ‘direct effect’ on views. National Grid agreed to consider this further.</p>	<p>Reference to indirect effects has been removed from the chapter and instead reference is made to effects on setting of the AONB and the effect on adjacent landscape character areas.</p>
<p>The Thematic Group considered that the potential effects on ‘cultural associations’ (i.e. with artists) needs to be assessed within the landscape and views chapter, which is different to the assessment in the Historic Environment chapter of the EIA.</p>	<p>Cultural associations will be considered as part of the landscape assessment – see paragraph 5.6.2.</p>
<p>The Thematic Group suggested that the special qualities of the AONB and the special qualities of other landscapes e.g. Gainsborough’s paintings of the Stour Valley need to be added to the scoping chapter.</p>	<p>The description of the existing environment at Section 5.2 includes the key characteristics taken from relevant published landscape character area descriptions for the landscapes along the connection route and at the Substation Study Areas. A description of the special qualities of the AONB has also been included in this section, along with details of the relevant cultural associations.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The Thematic Group suggested that a definition of the setting of the AONB should be sought from Natural England and a definition is available on the Dedham Vale AONB website. If a definition is not provided by Natural England, the description of the setting should be agreed between the Thematic Group and National Grid.</p>	<p>Definition of setting of AONB added at paragraph 5.5.10.</p>
<p>It was advised that further data sources be added to help inform the landscape and visual assessment for the EIA.</p>	<p>The following data sources were added to paragraph 5.5.1 as requested:</p> <ul style="list-style-type: none"> • Historic Landscape Characterisation; • Stour Valley and Dedham Vale Management Plan; • Managing a Masterpiece; and Regional Characterisation (as updated by Natural England).
<p>The visual assessment will include all public and private visual receptors up to 1km from the development. Between 1km and 3km from the development representative viewpoints will be used for the visual assessment, which will be agreed with the District and County Councils. Beyond 3km from the development, representative and ‘valued views’ agreed with the District and County Councils will be assessed. Attendees at the meeting requested that priority be given to high sensitivity visual receptors in selecting representative viewpoints.</p>	<p>Reference to this has been added to the scoping chapter (paragraphs 5.5.13 and 5.5.14) and this will be taken into account in agreeing the viewpoints with the District and County Councils.</p>
<p>National Grid was asked to look into opportunities for landscape restoration where the 132kV overhead line is removed.</p>	<p>Incorporated into the scoping report at paragraph 5.3.3 and 5.7.1, which note that this is subject to landowner agreement.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The Thematic Group questioned the low sensitivity assigned to motorists and rail users. For example the railway line through the Stour Valley is known as the ‘Gainsborough Line’ and could be considered to be more sensitive. TEP to consider the ‘low sensitivity’ assigned to motorists and rail users.</p> <p>TEP to add receptors to the list, including:</p> <ul style="list-style-type: none"> • Education establishments and nature reserves e.g Dawes Hall and Assington Mill; • Educational access land and higher-level stewardship schemes; • Bed and breakfasts; and • Public House gardens. 	<p>Changes incorporated into Table 5.6.</p>

Table 5.2: Consultation on Scope of Landscape and Visual Impact Assessment – Representations Made Outside the Meeting

Representations, Discussions and Comments	Whether included in Scoping Report
<p>Discussion of the existing environment should include, impact of the current installation on the character of the landscape, and an evaluation of the extent and magnitude of current visual effects. It is not enough to say that a receptor has views of the current arrangements; there must be an evaluation of the extent and magnitude of these effects.</p>	<p>The existing overhead lines form part of the baseline landscape and views, against which change as a result of the proposed development will be assessed.</p>
<p>Discussion of the existing environment should include the special character and qualities of national and local landscape designations.</p>	<p>Added to the description of the existing environment in Section 5.2.</p>
<p>Discussion of the existing environment should not include discussion of the proposed development or its impacts.</p>	<p>Removed from the description of the existing environment (Section 5.2)</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The use of the terms direct and indirect effects – suggest that this is reviewed as it is somewhat misleading as currently set out. Pylons both within and outside the AONB are capable of having a direct visual impact on the character and condition of the designated area. This issue also applies to other areas discussed in the document such as the Stour Valley.</p>	<p>Reference to indirect effects has been removed from the chapter and instead reference is made to effects on setting of the AONB and the effect on adjacent landscape character areas.</p>
<p>A definition of the setting for the AONB should be set out. This should ideally be supplied by Natural England, however if this is not available, a definition should be agreed between the parties. The Dedham Vale and Stour Valley Partnership has also produced a position statement on the setting of the AONB.</p>	<p>Added at paragraph 5.5.10.</p>
<p>The definition of setting should also be used when assessing the impact of the proposals on Local Landscape Designations.</p>	<p>Impact of proposals on Local Landscape Designations will be considered as part of the assessment of direct effects on landscape character and effects on adjacent landscape character areas.</p>
<p>The draft scoping chapter makes reference to the cultural issues associated with the Brett Valley. However, given the importance of these issues throughout much of the route corridor it would be appropriate to deal with this matter in the LVIA, perhaps in section 1.13. This is a different issue from the impact on specific cultural assets, which would be dealt with in the heritage section of the Environmental Statement. Rather it is a feature of the much of the route corridor and part of the identity of the area. This matter also has a bearing on the socio-economic impacts of the proposal, so should be properly explored and evaluated.</p>	<p>Cultural associations with landscape, along the connection route, will be considered in the landscape assessment (see paragraph 5.6.2). Description of existing environment at paragraphs 5.2.29 and 5.2.67 make specific reference to cultural associations with the landscape.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The evaluation of the effects of the development from individual viewpoints should not be restricted to the matrix approach set out, but should also include a narrative description that is readily accessible to a non-specialist audience. This is particularly important given the very high level of public interest in this proposal.</p>	<p>This has been taken into account.</p>
<p>Other Data sources that should be included are as follows: Historic Landscape Characterisations of Suffolk and Essex, East of England LCA, the Managing a Masterpiece Historic LCA. As the National Character Areas are being revised these should be used if available.</p>	<p>Added to list of data sources at paragraph 5.5.1.</p>
<p>It is noted that photo-montages will be created in line with current Landscape Institute Guidance. This process should also have regard to Visual representation of windfarms: good practice guidance, in particular those sections relating to lighting (217-218) to ensure that the images produced are an effective representation.</p>	<p>Paragraph 5.5.19 amended to add specific reference to 'Visual Representation of Windfarms: Good Practice Guidance'.</p>
<p>The principle that off-site planting will be sought to minimise the landscape and visual effects is welcomed.</p>	<p>This has been taken into account.</p>
<p>The removal of the 132kV line may also provide opportunities for landscape restoration which should be explored.</p>	<p>Incorporated into the scoping report at paragraphs 5.3.3 and 5.7.1, which notes that this is subject to landowner agreement.</p>
<p>Assessment of the significance of the effects: this may be the place to cover the cultural value of the route corridor landscape and the impacts of the proposal.</p>	<p>Cultural associations will be considered in the landscape assessment (see paragraph 5.6.2) and will contribute to the overall judgement on the significance of effect.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>It should also be noted that in the absence of PPS7 and the emphasis on “Valued Landscapes” in the NPPF (paragraph 109), as well as the recognition of the hierarchy of landscape ecology and geodiversity designations (paragraph 113), the effect of the proposal on character and qualities of Special Landscape Areas should be properly evaluated.</p>	<p>The effect on the landscape character of the SLAs will be included in the landscape assessment.</p>
<p>Table 3 (of the draft scoping chapter) “sensitivity of receptors” in respect of both categories, such as the addition of navigation users and other public open spaces of accessible sites, and the assigned levels of sensitivity, such as the low sensitivity assigned to rail users, for example, should be reviewed.</p>	<p>Additional receptors added to Table 5.6 and the sensitivity of receptors has been adjusted in line with feedback received.</p>
<p>Impacts of the proposed underground sections. A detailed route alignment will indicate those areas of the route which will create a significant residual impact because of the permanent loss of hedgerow trees. Proposals to mitigate these effects should be included.</p>	<p>Effects of the underground cable route during construction and operation will be assessed (see paragraphs 5.3.4 and 5.3.5). Mitigation will include proposals for replacement hedgerow planting along the cable swathe and off-site tree planting where there is landowner agreement (see paragraph 5.7.1).</p>
<p>The section on ‘Existing Environment’ should make mention of existing environment rather than a description of proposals, e.g. qualities of the area, in particular the characteristics of the AONB and its national importance and the Stour Valley.</p>	<p>Description of the existing environment amended (Section 5.2)</p>
<p>Remove references to indirect effects on the AONB, this should be direct effects.</p>	<p>References to indirect effects removed.</p>
<p>Include Dedham Vale AONB and Stour Valley Management Plan 2010-2015. Also refer to AONB setting document approved by AONB and Stour Valley Partnership.</p>	<p>Added to the list of data sources at paragraph 5.5.1 and the definition of AONB setting at paragraph 5.5.10.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>Table on sensitivity of receptors needs looking at to include other receptors:</p> <ul style="list-style-type: none"> • Impacts on publicly accessible land e.g. accessible through higher level stewardship (HLS) • Visual receptor from navigation • Visual receptor from railway line • Visual receptor from education establishments • Visual receptor from public house gardens • Impact on businesses trading on landscape – education establishments, accommodation providers, walking and canoeing activities etc. 	<p>Additional receptors added to Table 5.6.</p>
<p>Criteria for determining the importance of a view: a view may still be important even if it is not included in a guidebook.</p>	<p>Additional wording from current GLVIA added to paragraph 5.6.27.</p>
<p>In the description of the existing environment reference is made to an urban feel around the Colne Valley Railway site. This should be removed as this is very much a rural area despite the presence of these features.</p>	<p>Reference removed.</p>
<p>The assessment will need to consider the potential impact of sealing end compounds in more detail and the consideration of alternatives, especially since these have been located in the Connection Options Report to match the indicative overhead line route, rather than an assessment of the most environmentally least damaging location. Essex County Council would seek a more detailed impact of these locations.</p>	<p>The landscape and visual assessment will include the locations of sealing end compounds. The ES will include details of the alternatives considered.</p>
<p>Para 1.8.7 (of the draft scoping chapter) – refers to the impact on landscape and views of the removal of the 132kV line – will an assessment be undertaken regarding the 132kV line west of Twinstead Tee to Rushley Green, which could be redundant if not required by UKPN. It would provide a positive benefit to local communities in terms of landscape and views.</p>	<p>The removal of the 132kV overhead line west of Twinstead Tee is not currently part of this project and so effects of this will not be assessed. This would alter if it is included in the project.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>Substation – the report implies that the preferred location for a substation will be west of Twinstead Tee. If proposals are put forward for alternative locations for a substation or other approach will these be considered regarding their impact on landscape and views. Any response to the substation study should consider the alternative proposals put forward.</p>	<p>Consultation on the Substation Study Areas and alternatives is on-going. The EIA will be based on the outcome of this consultation.</p>
<p>Horizontal Directional Drilling – there will be construction impacts on landscape and views of HDD works underneath key transport routes (Sudbury Branch line) and natural features such as rivers (Stour).</p>	<p>This will be considered as part of the assessment of effects of the underground cable route during construction (referred to in paragraph 5.3.4).</p>
<p>Nationally Designated Landscapes: As the preferred route crosses Dedham Vale AONB, consideration should be given to the direct and indirect effects upon this designated landscape and its setting. In particular the effect upon its purpose for designation within the environmental impact assessment, as well as the content of the relevant management plan for Dedham Vale AONB should be considered. It would be useful to consider what constitutes a direct impact and what constitutes an indirect impact on the AONB and its setting.</p>	<p>Direct effects and effects on the setting of the AONB will be included in the assessment (see Section 5.3).</p>
<p>Landscape and visual impacts: Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography. The European Landscape Convention places a duty on Local Planning Authorities to consider the impacts of landscape when exercising their functions.</p>	<p>This has been taken into account.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. The use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2002, is strongly advocated. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.</p>	<p>This has been taken into account (see paragraph 5.5.2).</p>
<p>Natural England supports the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2002 (2nd edition). The methodology set out is almost universally used for landscape and visual impact assessment.</p>	<p>This has been taken into account (see paragraph 5.5.2).</p>
<p>In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, Natural England encourages all new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.</p>	<p>Noted. Alternatives will be reported in the ES.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>Heritage Landscapes: Consideration should be given to whether there is land in the area affected by the development qualifying for conditional exemption from capital taxes on the grounds of outstanding scenic, scientific or historic interest. These are considered to be designated landscapes of national importance and the impact of your plan on these should be assessed where appropriate. An up-to-date list may be obtained at www.hmrc.gov.uk/heritage/lbsearch.htm and further information can be found on Natural England’s landscape pages.</p>	<p>The only land in the area which has the potential for landscape and visual effects as a result of the new connection is Tiger Hill Nature Reserve (also a Site of Special Scientific Interest). This is of scientific rather than scenic interest and so would not fall into the category of a designated landscape of national importance. The Nature Reserve is accessible to the public and effects on views will be assessed from this location.</p>
<p>Access and Recreation: Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.</p>	<p>Will be considered as part of mitigation measures and will be subject to landowner agreement. Reference to local authority green infrastructure strategies added to paragraph 5.5.1.</p>
<p>Rights of Way and Access Land: The EIA should consider potential impacts on access land, public open land and rights of way in the vicinity of the development.</p>	<p>This has been taken into account (see paragraph 5.5.5 and Table 5.6).</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>Cumulative and in-combination effects: The EIA should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment. (Subject to available information):</p> <ol style="list-style-type: none"> a. Existing completed projects b. Approved but uncompleted projects c. On-going activities d. Plans or projects for which an application has been made and which are under consideration by the consenting authorities e. Plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects. 	<p>Noted. However, existing completed projects will not be included in the cumulative assessment as this development forms part of the baseline conditions, against which the effect of the proposed development is assessed.</p>

5.5. Desk Based Assessment

Data Sources

5.5.1. Desk-based baseline information will be collected from a review of:

- Criteria in The Hedgerow Regulations 1997;
- Land use data and policies detailed in relevant local plans, including any Tree Preservation Orders;
- Published national, regional and local landscape character assessments including the Countryside Character Volume 6: East of England (Natural England) and emerging National Character Area Profiles (Natural England), the East of England Landscape Character Typology, Suffolk County Council’s LCA, Essex County Council’s Landscape Character Assessment, the Braintree LCA and ‘Managing a Masterpiece: Landscape Character Study’ commissioned by the Managing a Masterpiece: Stour Valley Landscape Partnership;
- Suffolk and Essex Historic Landscape Characterisation;
- Stour Valley AONB and Dedham Vale Management Plan 2010-2015;
- Dedham Vale AONB Position Statement: Development in the Setting of the Dedham Vale AONB;
- Babergh Development Framework: A Green Infrastructure Framework for Babergh District, August 2012;
- Braintree Green Spaces Strategy, September 2008; and
- Ordnance Survey mapping and aerial photography.

- 5.5.2. The Landscape and Visual Impact Assessment will be undertaken in accordance with the GLVIA. The GLVIA acknowledges a relationship between the perception of landscape character and the experience of viewers (receptors) which include residents, visitors, people in their workplace, users of recreational facilities, people travelling through an area and other groups of viewers.
- 5.5.3. GLVIA relies on an appreciation of the existing landscape and its visual form, analysis of its scenic quality and an assessment of its sensitivity to change, a thorough understanding of the development proposals, the magnitude of change that will likely result from the construction and operation of the proposed development and the potential to mitigate potential landscape and visual effects.
- 5.5.4. There are four stages to the assessment:
- Recording and analysis of the character, quality, value and sensitivity to change of the existing landscape and visual receptors;
 - An appreciation of the nature, form and features of the proposed development;
 - An assessment of the magnitude of change likely to result from the proposed development; and
 - Evaluation of the significance of the changes identified based on magnitude of change and sensitivity.
- 5.5.5. The desk-based and field study carried out to inform the connection design to date (see paragraph 5.2.1) will be used to identify representative viewpoints to be appraised as part of the LVIA. National Grid will consult with the planning authorities in respect of the viewpoints prior to undertaking the assessment and these may be refined in accordance with responses. These viewpoints will include a mixture of viewpoints from publicly accessible locations such as from public rights of way and roads and some representative of views from private property. The views currently experienced from these receptors will be reported in a description of baseline views. Photomontage locations will also be reviewed with relevant planning authorities.

Zone of Theoretical Visibility (ZTV) Mapping

- 5.5.6. ZTV mapping is used to determine the area over which a development can be theoretically seen. It does not take the place of site visits to determine the reality of visibility as it cannot take into account accurately the effects of localised screening such as hedgerows for example and it does not convey the nature, magnitude or significance of the effect. It is a useful tool to give a broad indication from where a proposed overhead line may be seen. ZTV maps are generated by computer from a Digital Terrain Model (DTM) representing the bare ground topography overlaid on a map base although significant areas of vegetation (woodlands) and built form (settlements) can be ascribed a height and added to understand how this affects visibility.
- 5.5.7. ZTV mapping of a potential overhead line connection has already been used to help inform the visual baseline surveys carried out in the field. This ZTV mapping identified an extensive area that the proposed overhead line may be visible from as it did not take into account local screening features, such as individual buildings, trees or hedgerows. The ZTV mapping has been verified and superseded by a more accurate on-the-ground assessment of baseline views, which will be used to inform further visual surveys and the selection of representative viewpoints as described at paragraphs 5.5.13 and 5.5.14.

- 5.5.8. ZTV mapping of the sealing end compounds and substation has not been carried out to date but will be used for these specific elements to help inform the visual assessment.

Site Assessment

Landscape Assessment

- 5.5.9. Site assessment will supplement the extensive landscape and visual site surveys that have been carried out in order to inform the project to date (as described at Chapter 2 of this scoping report). Further site assessment will involve visits by car and on foot to the area in which the development would be built to appreciate landscape character and consider effects. This will include the assessment of direct effects on landscape as a result of tree and hedgerow removal, for example. (The identification of important hedgerows under the Hedgerow Regulations 1997 will be undertaken under the 'Nature Conservation and Biodiversity' and 'Cultural Heritage and Archaeology' topics.)

Setting of the AONB

- 5.5.10. As part of the site survey work, there will be an assessment of the effect of the parts of the project which lie outside the AONB on the setting of the AONB, as a nationally important designated landscape. The Dedham Vale AONB and Stour Valley Project have published a position statement on 'Development in the setting of the Dedham Vale AONB'. In the position statement the definition of the setting of the AONB is 'the area within which development and land management proposals, by virtue of their nature, size, scale, siting materials or design can be considered to have an impact, positive or negative, on the natural beauty and special qualities of the Dedham Vale AONB.' It is understood that whilst Natural England has not formally defined 'setting', it is in agreement with this definition.

Visual Assessment

- 5.5.11. Potential visual receptors will be identified and views considered from publicly accessible locations. Where views from private properties are considered, the assessment will be based on the nearest publicly accessible location. The following will be used as the basis for undertaking the assessment of effects on views as a result of the proposed new 400kV overhead line:

Up to 1km from the proposed 400kV overhead line

- 5.5.12. All potential visual receptors within 1km of the proposed overhead line will be considered in the visual assessment. Where appropriate, settlements will be assessed from representative receptors usually on the edge of settlements nearest the proposed overhead line where views are greatest because views from properties within the settlements further from the overhead line generally are obscured by built form. Exceptions to this will be noted and assessed. Views along public footpaths and roads will be assessed sequentially.

1-3km from the proposed 400kV overhead line

- 5.5.13. Between 1km and 3km from the proposed overhead line the baseline visual surveys carried out to date will be analysed to identify representative visual receptors. These viewpoints, which will prioritise views experienced by high sensitivity receptors, will be discussed and agreed with the local authorities. Views along

long distance footpath and cycle routes and tourist routes along roads will be assessed sequentially.

Over 3km from the proposed 400kV overhead line

- 5.5.14. Representative and valued views will be assessed at distances of over 3km from the proposed overhead line. These viewpoints, which will prioritise views experienced by high sensitivity receptors, will be discussed and agreed during consultation with the local authorities and statutory consultees. Specific views over 3km from the proposed overhead line alignment which have been recorded as important during consultation to date will be assessed.
- 5.5.15. A typical 400kV overhead line pylon can be seen up to distances of approximately 10km, however visibility diminishes with distance. From distances of over 5km it may be possible to discern an overhead line on a clear day however it would not form a prominent part of that view.

Assessment of the effects of the removal of the 132kV overhead line

- 5.5.16. The assessment of the effects on views as a result of the removal of the existing 132kV overhead line at distances from 0 to 3km will follow the same approach described above for the new overhead line connection. However it is not proposed that any change to views would be assessed at a distance of over 3km from the 132kV line.

Assessment of underground cables route, sealing end compounds and substation

- 5.5.17. The assessment of the effects on views as a result of the proposed underground cables route, sealing end compounds and the substation will follow the same approach described above for the new overhead line connection for viewpoints from 0 to 3km distant from each component. However, these elements of the project will have more localised effects on landscape and views compared to the proposed sections of overhead line and so it is not proposed that any visual assessment be carried out beyond 3km.

Chalara Dieback of Ash

- 5.5.18. According to the Forestry Commission by 22nd November 2012 the *Chalara fraxinea* infection had been confirmed in recently planted sites and the wider environment in both Suffolk and Essex. In line with the Landscape Institute's latest guidance the landscape and visual impact assessment will take into account the contribution of ash to the baseline landscape character and the screening of views. The assessment will also consider mitigation methods which could be employed to maintain screening over time if there are effects anticipated from *Chalara*.

Digital Model and Photomontages

- 5.5.19. A digital model of the landscape in which the new connection would be built has started to be constructed for use during consultation events. 3 dimensional (3D) modelling of the new connection and substation will also be used as the basis for photomontages which will be produced in accordance with the guidelines issued by the Landscape Institute in Appendix 9 (Guidelines on photomontage and CAD) of the 'Guidelines for Landscape and Visual Impact Assessment' (Second Edition) 2002, as well as guidance contained in the Landscape Institute Advice Note 01/11 (Photography and Photomontage in Landscape and Visual Impact Assessment). . The production of photomontages will also have regard to the guidance provided in

'Visual Representations of Windfarms: Good Practice Guidance' prepared for Scottish Natural Heritage (SNH) March 2006, which the LI Advice Note 01/11 strongly advises (LI) members to follow where applicable in preference to any other guidance or methodology.

- 5.5.20. Photomontage viewpoints will be chosen that are representative of views in the area and the location of these viewpoints and the timing of photographic surveys will be discussed with the relevant local planning authorities. It is expected that photomontage views will be prepared to show a reasonable 'worst case', which can be compared with 'before' views (presented at the same scale). The purpose and any limitations of visualisations will be clearly explained in the ES.

5.6. Assessing Significance of Effects

Effects on Landscape Character

- 5.6.1. The assessment of landscape character for the ES will commence with a desk-based study of current published landscape character assessments and a review of maps and aerial or satellite photography available. The desk study will be supplemented with field survey to verify or determine character areas and to identify the typical landscape features or elements which form the key characteristics.
- 5.6.2. An evaluation will be made of the importance or value of key features and character, including the consideration of cultural associations, the condition or quality of the landscape and also its capacity to accommodate a particular development without significantly affecting its character. An evaluation will also be made of the magnitude of effect that would be experienced by the landscape as a result of the proposed development.

Magnitude of Effect

- 5.6.3. Magnitude of effect considers the scale of change (i.e. whether it is high, medium or low); its nature (negative or positive); and its duration (short, medium, long-term or temporary). More weight is usually given to effects that are greater in scale and permanent or long-term in duration. Descriptions of magnitudes of effect on landscape character and typical criteria are set out in Table 5.3 below.

Table 5.3: Magnitude of Effect on Landscape Character

Magnitude of Effect	Typical Criteria
High	Major alteration to key features or characteristics in the existing landscape and/or the introduction of elements considered totally uncharacteristic. Typically this would be where there would be a great scale of change to the character of a landscape.
Moderate	Partial alteration to key features or characteristics of the existing landscape and/or the introduction of prominent elements. Typically this would be where there would be a perceivable scale of change to the character of a landscape.
Low	Minor alteration to key features and characteristics of the existing landscape and/or the introduction of features which may already be present in the landscape. Typically this would be where there is a low scale of change to the character of a landscape.
Negligible	A very minor alteration to key features or characteristics of the existing landscape. Typically this would be where the scale of change on the baseline landscape character would be barely perceptible.

Sensitivity of Receptor

- 5.6.4. Landscape value assessment considers the relative value that is attached to a landscape. Highly valued landscapes are typically identified by national level designations such as National Parks and Areas of Outstanding Natural Beauty (AONB). Landscapes of local value may be identified by designations in the local planning process such as Areas of Great Landscape Value and Special Landscape Areas although central government guidance advocates a ‘criteria-based’ approach to landscape protection and enhancement.
- 5.6.5. Landscape condition, or quality, is a factual description of the physical state of the landscape, and considers its intactness from visual and functional perspectives.
- 5.6.6. Landscape sensitivity or capacity refers to the degree to which a landscape can accommodate change without suffering detrimental effects on its character. This varies with:
 - Existing land use;
 - The pattern and scale of the landscape;
 - Visual enclosure or openness;
 - The scope for mitigation which would be in character with the existing landscape (where appropriate); and
 - The value placed on the landscape.
- 5.6.7. The capacity of a landscape to accommodate change is dependent on the characteristics of the receiving landscape and the type and nature of the proposed development. For example, a larger scale landscape may be able to accommodate

a large development more readily than an area with a smaller more complex landscape character. Landscape types also have varying capacity in the types of development they are able to accommodate.

5.6.8. The following criteria taken from IEMA's *The State of Environmental Impact Assessments in the UK*²⁵ provide a general definition for determining the sensitivity of the landscape as a receptor.

- Very High Sensitivity - The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance e.g. special qualities of a Special Protection Area or National Park;
- High Sensitivity - The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance e.g. special qualities of a Site of Special Scientific Interest or AONBs;
- Moderate Sensitivity - The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance. e.g. special qualities of a regionally important geological site;
- Low Sensitivity - The receptor is tolerant of change without detriment to its character, is of low environmental value, or local importance e.g. qualities of a hedgerow or industrial areas; and
- Negligible Sensitivity - The receptor is resistant to change or is of little environmental value.

Significance of Effect

5.6.9. The significance of the effect of a development on the landscape is not an absolute scale but is a **judgement** based on the magnitude of the anticipated effect (or scale of change), the value and condition of the landscape and the sensitivity or capacity of the landscape to accommodate a particular development.

5.6.10. The significance of effect also considers the nature of the effect. Change can be consistent with (neutral effect) or can enhance the landscape (positive effect). Conversely it may be at odds with or harmful to the landscape's key features or character (negative effect). The significance of landscape effects will be considered according to the criteria adapted from examples given in LI/IEMA (2002) and as presented in Table 5.4 below. The proposed development does not have to meet all of the criteria given to be assigned a certain significance of effect.

²⁵ Institute of Environmental Management: The State of Environmental Impact Assessments in the UK:IEMA 2011

Table 5.4: Significance of Landscape Effects

Significance	Definition
Major adverse	The proposed development would: <ul style="list-style-type: none"> • be at complete variance with the landform, scale and pattern of the landscape; • would permanently degrade, diminish or destroy the integrity of valued characteristic features and/or their setting; • substantially damage a high quality, highly valued landscape.
Moderate adverse	The proposed development would: <ul style="list-style-type: none"> • be at considerable variance with the landform, scale and pattern of the landscape; • degrade, diminish or destroy the integrity of some characteristic features and/or their setting; • cause damage to the character of a valued landscape.
Minor adverse	The proposed development would: <ul style="list-style-type: none"> • not quite fit into the landform, scale and pattern of the landscape; • have an adverse effect on an area of recognised landscape character.
Neutral	The proposed development would: <ul style="list-style-type: none"> • be in keeping with the scale, landform and pattern of the existing landscape; • maintain the existing landscape quality.
Minor beneficial	The proposed development would: <ul style="list-style-type: none"> • fit with the scale, landform and pattern of the landscape; • enable the restoration of valued characteristic features partially lost through other land uses to improve the landscape quality and character.
Moderate beneficial	The proposed development would: <ul style="list-style-type: none"> • fit well with the existing scale, landform and pattern of the landscape; • improve the quality of the landscape through removal of damage caused by previous or existing land uses.
Major beneficial	The proposed development would: <ul style="list-style-type: none"> • enhance and redefine the landscape character in a positive manner; • repair or restore landscape badly damaged or degraded through previous or existing land uses.

Effects on Views

5.6.11. The first stage in visual impact assessment is to establish the extent and nature of existing views in the area from sensitive visual receptors. This has been determined through the ZTV mapping and site work which has already been carried out in assessing connection and substation options along the route. As proposed at paragraph 5.5.8, ZTV mapping of the sealing end compounds and substation will be used for these specific elements to help inform the visual assessment. For the purposes of the ES field survey will be carried out based on the detailed design, which will verify potential visibility and identify features which might obscure views. No access to private property will be sought and the assessment of views from properties will be based on a best assumption from publicly accessible locations outside or close to the properties.

5.6.12. Defining the relative sensitivity of visual receptors together with the importance of the view and the magnitude of the effect of the development on the existing view is taken into consideration in determining the significance of the development on the receptor. Each of these elements is described in turn below.

Magnitude of Effect

5.6.13. The magnitude of effect considers the degree to which the existing view would change as a result of the proposed development. The following aspects will be taken into consideration in determining the magnitude of effect on a receptor.

Distance between the receptor and the overhead line

5.6.14. The distance between the receptor and the proposed development is important with the magnitude generally decreasing with distance.

Angle of View

5.6.15. The angle of view will be taken into consideration with changes to direct views largely considered to be of greater importance than changes in oblique or indirect views.

Proportion of view affected

5.6.16. The proportion of view affected is an important consideration, with a change to a large proportion generally having a greater effect than a change to a small proportion.

Filtering of the view

5.6.17. Any filtering of a view by vegetation, landform or built form will be taken into consideration as the filtering of even part of a development can reduce the scale of change on the view. Consideration will be given to the extent of filtering in 'full leaf' and during winter.

Topography and landform

5.6.18. Consideration will be given to whether the development is looked down to, looked up to or whether it is viewed on a level. Views up to a development are generally considered to be of greater magnitude due to the enhanced verticality of the structures than views down to a development where the apparent height appears reduced.

Backgrounding

5.6.19. With specific reference to new overhead line, the lattice structures of the pylons and the conductors are more difficult to discern when viewed against a textured

background than against an open sky background. Any backgrounding of a view by vegetation, landform or built form will be taken into consideration as backgrounding generally minimises the scale of change on the view as is acknowledged in the ‘Holford Rules’.

Degree of Change

- 5.6.20. Consideration will be given to the scale or degree of change from the present views experienced. For example the introduction of an overhead line into a view where similar structures are already present is more likely to result in a lower scale of change than the introduction of an overhead line into a view where there are no existing structures present.

Duration and Nature of the Effect

- 5.6.21. Consideration will be given to whether the effect would be temporary, such as certain construction effects, or permanent. The duration of the effect will also be considered. For example whether the view experienced is continuous, such as the view experienced by a resident in their home during the course of the day, or intermittent or fleeting, such as the view experienced by a motorist or rail user.
- 5.6.22. Table 5.5 below describes magnitude criteria for visual assessment which can be positive or negative.

Table 5.5: Criteria for Assessment of Magnitude on Effects of View

Magnitude of Effect	Typical Criteria
High	<p>Major alteration to the existing view and/or the introduction of elements considered totally uncharacteristic in the view.</p> <p>Typically this would be where a development would be seen in close proximity with a large proportion of the view affected with no/minimal filtering or backgrounding and there would be a great scale of change from the present situation.</p>
Moderate	<p>Partial alteration to the existing view and/or the introduction of prominent elements in the view.</p> <p>Typically this would be where a development would be seen in views where a moderate proportion of the view is affected. There may be some screening or backgrounding which minimise the scale of change from the present situation.</p>
Low	<p>Minor alteration to the existing view and/or the introduction of features which may already be present in views.</p> <p>Typically this would be where a development would be seen in distant views; where only a small proportion of the view is affected; where the effect is reduced due to a high degree of filtering or backgrounding or where there is a low scale of change from the existing view.</p>

Magnitude of Effect	Typical Criteria
Negligible	<p>Very minor alteration to the existing view.</p> <p>Typically this would be where a development would be barely perceptible within a long distance panoramic view and or where a very small proportion of the view is affected. The scale of change from the existing view would be barely perceptible.</p>

Sensitivity of Receptor

- 5.6.23. Visual receptors are those considered to potentially have a view of a proposed development They include the users of public footpaths and rights of way; private residents; users of recreation and amenity open space; users of public roads, railways, navigable waterways; and workers (in their workplace).
- 5.6.24. The sensitivity of visual receptors depends upon the location of viewpoint, the activity of the receptor, expectations of the view. For example the user of a footpath for the purposes of recreation and the enjoyment of the countryside is considered to be of higher sensitivity than a worker in their work place where the main focus is on work rather than views out from the workplace.
- 5.6.25. In visual assessment, lower storey views from residential properties are generally considered to be more sensitive than upper storey views, as these are the rooms in which residents spend more time experiencing the view. There are exceptions to this as some residences have living rooms on upper storeys and this will be taken into consideration if evident.
- 5.6.26. The land use planning system considers that public views are of greater value than views from private property. In this assessment, sensitivity will generally be assigned to receptors as shown below. Table 5.6 below sets out receptors and their relative sensitivity although this is not an exhaustive list and the sensitivity of other receptors encountered during the field work will also be assessed.

Table 5.6: Sensitivity of Receptors

Receptor	Relative Sensitivity
Residential properties (Lower storeys and gardens)	High
Residential properties (Upper storeys)	Medium
Users of public rights of way and other recreation routes	High
Public open space	High
Nature Reserves and outdoor education or activity establishments (e.g Dawes Hall, Arger Fen)	High
Other publicly accessible land (i.e. higher-level	High

Receptor	Relative Sensitivity
stewardship schemes)	
Users of sports pitches	Low
Users of golf courses	Medium
Patrons of public house gardens	Medium
Guests staying at self-catering accommodation, a bed and breakfast or hotel	Medium
Workers	Low
Motorists using main roads	Low
Users of rural lanes and recognised tourist road routes	Medium
Rail users between Sudbury and Bures (the 'Gainsborough Line')	Medium
River users on the Stour	High

Importance of View

- 5.6.27. The importance of the view is considered in the context of the value placed on a scene, alternatives available and the relative scenic quality of a view. As an example, reference to a view in a guidebook or on a tourist map would indicate a highly important view which can be experienced by many people. The importance of the view may also be determined with respect to its popularity or numbers of people affected, in facilities provided for its enjoyment or references to it in literature or art.

Significance of Effect

- 5.6.28. The assessment of the significance of visual effects is a judgement based on the sensitivity of the receptor, the importance of the view and the magnitude of the effect. Large-scale changes which introduce new, discordant or intrusive elements into the view of a sensitive receptor are considered to be more likely to be more significant than small changes or changes involving features already present in the view or changes in the views of less sensitive receptors. Changes in views from recognised and important viewpoints or amenity routes are likely to be more significant than changes affecting other less important paths, roads and private residences.
- 5.6.29. The significance of effects can be adverse or beneficial and will be considered in the context of the comparative scale in Table 5.7 below.

Table 5.7: Significance of Visual Effects

Significance of Effect	Typical Criteria
Major	An effect of major significance is generally recorded where a high magnitude of effect occurs to a highly sensitive receptor. For example where an unobstructed view of development would represent a large part of the view from a recreational footpath where views are presently open and of high scenic quality.
Moderate	An effect of moderate significance is generally recorded where a moderate magnitude of effect is experienced by a receptor of high or medium sensitivity. For example where part of a development is visible in a view from a private property, but where it does not comprise the whole view.
Minor	An effect of minor significance generally relates to a low magnitude of effect and often relates to a change in a distant view or a change in only a small part of a view, possibly because the view is already screened to a large extent.
Neutral	An effect of neutral significance is where the change to a view will be barely perceptible from the view presently experienced.

5.7. Mitigation and Residual Effects

- 5.7.1. Mitigation measures to address negative effects on landscape and views in relation to both below and above ground infrastructure will be considered in the assessment. These measures will include the design of infrastructure and on-site and off-site planting proposals to minimise landscape and visual effects. In addition, opportunities for landscape enhancement as a result of overhead line removal will be considered. The significance of the effect on landscape and views once mitigation methods have been incorporated will be described (residual effects). Where mitigation methods involve landscape restoration and/or planting proposals, the judgement of residual effects will be made following 15 years' establishment.

5.8. Inter-relationship of effects

- 5.8.1. The landscape and visual assessment will consider the inter-relationship of effects from the proposed development, between different aspects of the environment. It is anticipated that there is likely to be an inter-relationship between planting proposed to mitigate for landscape and visual effects and biodiversity and nature conservation and historic environment effects. Mitigation proposals for biodiversity and nature conservation could also have an effect on landscape and views.

5.9. Cumulative Effects

- 5.9.1. The landscape and visual assessment will include potential cumulative effects as a result of the proposed development in combination with other major developments.

The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

6. BIODIVERSITY AND NATURE CONSERVATION

6.1. Introduction

6.4.1. This chapter of the ES will report on the assessment of the likely significant effects of the proposed development on biodiversity and nature conservation interests. The Ecological Impact Assessment (EclA) will identify and assess the likely effects of the construction, operation and decommissioning of the proposed overhead line, underground cables, sealing end compounds and substation.

6.2. Existing Environment of the Route

6.2.1. The preferred alignment and Substation Study Areas fall within a predominately agricultural landscape comprised of arable and pasture fields often bordered by mature hedgerows with small woodland blocks, numerous ponds and a series of river valleys. There are no international wildlife sites within the influence of the proposals. However, there is a single nationally designated wildlife site and numerous local wildlife sites within the route corridor.

6.2.2. A record of the habitats along the preferred alignment and Substation Study Areas has been gathered during a Phase 1 habitat survey. Valuable habitats within and adjacent to the alignment and substation areas include the semi-natural ancient woodlands and wet woodlands, the species-rich hedgerows, the river valleys and the network of ponds. Grassland habitats are largely agricultural and of little intrinsic value but in association with other valuable habitats provide resources for a range of wildlife including farmland birds, badger and brown hare. Small patches of acidic grassland and less intensively managed grassland are found in the west of the route corridor but no grasslands have been recorded as unimproved.

6.2.3. A detailed desk-based study has been undertaken and a number of species surveys have commenced. A range of protected and priority species have been recorded within and adjacent to the preferred alignment and Substation Study Areas. These include but are not limited to: bats, badger, brown hare, dormouse, water vole, otter, reptiles, amphibians (including great crested newts), European eel and a range of bird species including Schedule 1²⁶ and amber and red listed²⁷ species.

6.2.4. The route corridor has been divided into Sections (AB to G, from east to west). This approach is used across all the disciplines engaged in the EIA to ensure consistency.

Section AB – Bramford Substation and Hintlesham Hall

6.2.5. The only nationally designated wildlife site within the influence of this development is found within Section AB. Hintlesham Woods Site of Special Scientific Interest (SSSI) is designated for its ancient semi-natural woodland habitat and associated

²⁶ Wildlife and Countryside Act 1981

²⁷ Birds of Conservation Concern 3 (2009): *the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*. British Birds v102 pp296-241.

bird communities. The designation includes Wolves Wood, Keeble Grove, Ramsey Wood and Hintlesham Great Wood. The latter two fall along the interim alignment and are connected by secondary woodland dating to the 16th and 19th centuries. Part of the SSSI is also a RSPB Reserve.

6.2.6. There are six County Wildlife Sites (CWS) within Section AB - Bramford Substation and Hintlesham:

- Fore and Bushy Grove CWS is a woodland site in the northeast of route corridor 2B;
- Round Wood and Elms Grove CWS is an ancient woodland site in the northeast of route corridor 2A and is noted for supporting a wide range of woodland birds, particularly warblers;
- Sproughton Park CWS in the southeast of route corridor 2B covers a range of habitat including wet grassland, alder carr, veteran trees, hedgerows, ponds and springs. Fauna associated with the site include birds, bats, badger, otter, water vole, water shrew and amphibians;
- Tom's/Broadoak Wood CWS is an ancient woodland site (although a large proportion has been planted with conifers) in the southwest of the Section.
- Valley Farm Meadow comprises wet grassland and a drier herb-rich meadow and is in the far southwest of the Section; and
- Hadleigh Railway Walk CWS is a former railway line converted into a footpath and bridleway and designated as a Local Nature Reserve (LNR). It forms the west boundary of this Section. The designation contains chalk grassland and woodland habitats and passes through Raydon Great Wood CWS south of the Section.

Section C – Brett Valley

6.2.7. There are no CWS designations within Section C. The Hadleigh Railway Walk CWS and LNR forms the east boundary of this Section and has been considered within Section AB. The River Brett is partly designated as a CWS but not along the section within or adjacent to the preferred alignment.

Section D – Polstead Heath

6.2.8. There are four CWS designations within Section D:

- Valley Farm Wood CWS is designated for its mix of wet and ancient woodland and hedges which support dormice. The site contains a number of reptile and bird species. The preferred alignment crosses this designation in the east of Section D;
- Layham Grove CWS is an ancient woodland site north of the preferred alignment in Section D;
- Layham Pit Woodland and Meadow CWS is an active quarry with an undisturbed area of wet woodland and unimproved wet meadow. It supports invertebrate, amphibian, reptile and bird communities. The preferred alignment crosses this designation in the east of Section D; and
- Milfield Wood CWS is an ancient woodland site covering two blocks of woodland separated by arable land. The preferred alignment crosses between the two designated woodland blocks in the west of Section D.

Section E – Deadham Vale AONB

- 6.2.9. There are two CWS designations within Section E, both are avoided by the preferred alignment:
- Broom Hill Wood CWS is an ancient woodland site; and
 - Bushy Park Wood CWS is an ancient woodland site which contains old oak pollards and wet flushes. There are dormouse records associated with this wood.

Section F – Leavenheath/Assington

- 6.2.10. There are no wildlife site designations within Section F - Leavenheath and Assington although Assington Thicks CWS (designated for its woodland habitats) is adjacent to the north boundary and Arger Fen SSSI is over 0.5km south of the preferred alignment.

Section G – Stour Valley

- 6.2.11. Section G spans the counties of Suffolk and Essex. Locally designated sites in Suffolk are called County Wildlife Sites and in Essex are called Local Wildlife Sites (LWS). There are eight county/local wildlife sites within Section G - Stour Valley:
- Appletree Wood/Meadow CWS lies north of the preferred alignment and is listed for its ancient woodland, species-rich meadow and associated butterfly community;
 - Daws Hall LWS lies north of the preferred alignment contains a mix of grassland, marsh and aquatic habitats. It also contains multiple trees with a Tree Preservation Order (TPO) which is an amenity-based designation;
 - Loshes Meadow Complex LWS (also an Essex Wildlife Trust reserve) comprises grassland, woodland, young plantation, hedgerows and marsh habitats. It supports a variety of flowering plants, breeding birds, butterflies and reptiles and is north of the preferred alignment;
 - Twinstead Marsh LWS comprises a range of wet woodland and grassland habitat types and open water. The designation covers two sites both are north of the preferred alignment;
 - Ansell's Grove/Ash Ground LWS comprises a range of wet woodland and grassland habitat types and open water. The preferred alignment is adjacent to the east edge of this designation;
 - Alphamstone Meadows LWS comprises a mix of wet and dry grassland habitats. The preferred alignment is adjacent to the west edge of this designation;
 - Alphamstone Complex LWS comprises a mix of dry grassland (in an old gravel pit), scrub, wet alder woodland and swamp. The preferred alignment is within 200m of this designation; and
 - Moat Farm/Burnt House Marsh LWS is southeast of the preferred alignment and comprises a wooded stream with a mix of wet and dry grassland habitats.
- 6.2.12. In addition to the Local Wildlife Sites, the area west of the River Stour contains a number of Protected Lanes. This is a Braintree District designation that includes the road and associated roadside habitat features.

New 400kV/132kV Substation

- 6.2.13. A new 400kV/132kV substation is proposed at one of three potential locations west of Twinstead Tee to maintain the supply to the 132kV network following the removal of the existing 132kV overhead line between Burstall Bridge and Twinstead Tee. National Grid's interim location for a substation is at site C2.
- 6.2.14. The existing species records for the Substation Study Areas are similar to the route sections and have been described earlier in the chapter, the following paragraphs identify designations and habitats for each area.

Substation Study Area A – near Colne Valley Railway

- 6.2.15. Substation Study Area A - Colne Valley is northwest of Castle Hedingham on the A1017. There are no wildlife designations within or adjacent to Substation Study Area A.
- 6.2.16. The site is dominated by farmland, with large arable fields to the west of the A1017 and to the east of the River Colne. The site contains two small woodland areas, one mature hedgerow and several recently planted hedgerows. The River Colne flows across the eastern side of the site. There are no ponds in the site but there are a few field ditches which may periodically hold water.

Substation Study Area B – Delvyns Lane

- 6.2.17. Substation Study Area B - Delvyn's Lane is northeast of Castle Hedingham off the Sudbury Road. The site is divided by Delvyn's Lane which runs north and south through the centre of the site and the verges along Delvyn's Lane are designated by Essex County Council as Special Roadside Verges (SRV). The only other wildlife designation within or adjacent to Substation Study Area B is a SRV just southeast of the site along Sudbury Road.
- 6.2.18. The site is dominated by arable fields and contains two small woodland areas (Ramacre Wood in the centre of the site and the woodland behind Parkgate Farm). Both are predominantly broadleaved plantation woodlands. There are numerous mature species-rich hedgerows within the site. There are a few ponds in the east of Substation Study Area B and a few field ditches which may periodically hold water.

Substation Study Area C – Butler's Wood

- 6.2.19. Substation Study Area C - Butlers Wood and Waldegrave Wood is between Twinstead and Wickham St Paul. The A131 crosses the site north and south. Butler's Wood and Waldegrave wood are within the site and are designated by Essex County Council as Local Wildlife Sites (LWS) and listed on the ancient woodland inventory and Braintree District Council's TPO records. There is a further LWS adjacent to the site; Twinstead Green LWS comprises damp grassland, scattered young trees and a small pond.
- 6.2.20. In addition to the LWSs there are two further wooded areas within the site a small plantation block in the southwest and a wooded green lane in the east. The site is dominated by arable fields and there are numerous mature species-rich hedgerows, ponds and field ditches within the site.

6.3. Characteristics of Potential Effects

- 6.3.1. Potential construction, operational and decommissioning effects could include:

- Loss of habitats and species through permanent land take for overhead line pylons (the feet of the pylons) and for cable sealing end compounds;
- Loss of habitats and species through permanent habitat changes along the easement of the overhead line (relating to tree cutting to maintain electrical safety clearances) and along the easement of the underground cable (relating keeping this free of deep-rooting tree and shrub species);
- Loss of habitats and species through temporary land take for construction or decommissioning works (for example laydown and access areas and underground cable installation areas);
- Possible effects on vegetation and bird activity in and around Hintlesham Woods SSSI during construction, operational and decommissioning phases of the project;
- Possible effects on local wildlife sites through disturbance during construction or decommissioning works and longer-term fragmentation of habitats arising from habitat changes within operational easements;
- Pollution of watercourses and waterbodies during construction or decommissioning activities; and
- Possible effects on protected and priority species including, water voles, otters, badgers, bats, dormouse, birds and great crested newts through disturbance during construction or decommissioning works and longer-term fragmentation of habitats arising from habitat changes within operational easements.

6.4. Proposed Approach and Method

Consultation

- 6.4.1. A draft scoping chapter was sent to consultees for informal comments which have been taken into account when finalising the scope of the assessments. Groups that were consulted included:
- Braintree District Council;
 - Suffolk County Council;
 - Suffolk Wildlife Trust;
 - Essex County Council;
 - Environment Agency;
 - Natural England; and
 - RSPB.
- 6.4.2. Table 6.1 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meeting are provided at Appendix A.

Table 6.1 Consultation on Scope of Biodiversity Assessments

Representations, Discussions and Comments	Whether Included in Scoping Report
<p>Although the access points are currently unknown, the baseline assessments to date have covered a large area and the team have used their best judgements to identify the likely access routes. TEP is confident the data its ecologists have gathered to date will cover the areas of the access points.</p>	<p>The data has been used to describe the existing environment.</p>
<p>The habitat plans are continually being updated as the NVC and other surveys progress.</p>	<p>The data has been used to describe the existing environment.</p>
<p>The woodland NVC survey maps show the locations of all the woodlands where NVC surveys have been undertaken. The maps produced will be accompanied with target notes and should be read alongside the Phase 1 Habitat Plans.</p>	<p>The data has been used to describe the existing environment and will be shown in the ES.</p>
<p>The grassland NVC survey maps show the grasslands where NVC surveys have been undertaken.</p>	<p>The data has been used to describe the existing environment.</p>
<p>All hedgerows in the study area will have a Phase 1 Habitat Survey undertaken. Target notes will accompany the survey plans for noteworthy hedgerows.</p>	<p>The data has been used to describe the existing environment.</p>
<p>Surveys will be undertaken in accordance with the Hedgerow Regulations 1997 along the underground cable route and at the substation site; as these are the areas where there may need to be hedgerow removal.</p> <p>The Thematic Group noted that other hedges which may be removed to facilitate construction and access should also be subject to Hedgerow Regulations Assessment.</p>	<p>This has been incorporated into the scoping report. See paragraph 6.4.10.</p>
<p>TEP will identify the potential for bat roosts based on habitat potential whilst undertaking the tree surveys.</p>	<p>Bat assessments of trees are being undertaken. See paragraph 6.4.23.</p>
<p>Breeding bird surveys have been undertaken across the route corridor and at the substation sites. Two visits have been undertaken and each bird species has been identified.</p>	<p>The data has been used to describe the existing environment.</p>

Representations, Discussions and Comments	Whether Included in Scoping Report
<p>Suffolk Wildlife Trust (SWT) has been undertaking the dormouse surveys. Nest tubes have been placed along the route corridor and will be checked over 5 day periods at the end of September and the end of November. There is the potential for dormice across the whole of the corridor.</p>	<p>The data has been used to describe the existing environment.</p>
<p>Two types of bat surveys have been undertaken; transect (walking and driving); and static. Surveys were undertaken in July, August and September 2012. The results will be produced in tables with accompanying plans.</p> <p>Consider extending the bat surveys into October 2012 to cover the pre-hibernation season.</p>	<p>This has been taken into consideration. See paragraph 6.4.22.</p>
<p>A large part of the amphibian surveys was undertaken in spring 2012 on all ponds identified during the Phase 1 Habitat surveys. TEP could not gain access to some ponds before the end of the survey season, and will complete these in 2013. TEP does not have the right to survey ponds in private gardens. Natural England has accepted this limitation. A 250m buffer has been used at the ponds during surveys as recommended by Natural England.</p> <p>In addition to the field survey, Suffolk County Council would like to see consideration of impacts up to 500m within the ES.</p>	<p>This has been taken into consideration. See paragraphs 6.4.27 and 6.4.28.</p>
<p>TEP proposes to undertake reptile surveys in the areas where there is habitat potential along the underground cable route and substation site. Not proposed to carry out detailed reptile surveys elsewhere.</p> <p>The Thematic Group suggested consideration of surveys in other working areas might also be appropriate.</p>	<p>This has been taken into consideration. See paragraph 6.4.28.</p>

Representations, Discussions and Comments	Whether Included in Scoping Report
<p>Badger surveys have been undertaken as part of the Phase 1 Habitat surveys. It is envisaged that they will not form part of the EIA, which is reserved to assess the effects on sensitive receptors at a county or higher level. Due to the confidentiality of badger habitats, a separate report will be produced that will not be available to the public, but will form part of the DCO application.</p> <p>The Thematic Group advised that the topic of badgers should be mentioned in the EIA, because public perceptions and confidence in the EIA will be undermined if badgers aren't referenced, even though it is accepted that the species is not of conservation concern in the area.</p>	<p>This has been taken into consideration. See paragraph 6.4.4</p>
<p>Desk-top surveys on invertebrates have been undertaken, and habitat potential identified during the Phase 1 Habitat surveys. Further review of desk and habitat data will be carried out.</p> <p>The Thematic Group noted that particular sensitive tower positions or other sensitive sites may need surveys.</p>	<p>This has been taken into consideration. See paragraph 6.4.30.</p>

Desk Based Assessment

6.4.3. A desktop review of all existing relevant records and data will be undertaken. This will draw upon the data collated so far and will be supplemented with a review of any additional data where available. Data sources that have been contacted to date are as follows:

- National Biodiversity Network;
- Natural England;
- Nature on the Map (Natural England);
- MAGIC Map;
- Environment Agency;
- RSPB;
- Essex Field Club (includes records from Essex County Recorders);
- Essex Wildlife Trust;
- Essex County Council;
- Essex Bat Group;
- Braintree District Council;
- Northeast Essex Badger Group;
- Suffolk Wildlife Trust;
- Suffolk Biological Records Centre (includes Suffolk Amphibian and Reptile Group, Suffolk Bat Group Suffolk Badger Group);
- Suffolk County Council;

- Suffolk County Bird Recorder;
- Babergh District Council; and
- Ipswich Museum.

6.4.4. Following consultation with the Biodiversity Thematic Group, it was agreed that Frog Life will be contacted to identify the location of any known toad crossings within the influence of the development proposals.

Site Assessments

Botanical Surveys

- 6.4.5. An extended Phase 1 Habitat Survey has been undertaken along the route corridor and the three Substation Study Areas during 2011 and 2012. The Phase 1 habitat survey is shown at Figures 13 to 21. The survey was undertaken by experienced botanists (qualified under the Field Identification Skills Certificate scheme) in line with JNCC guidelines²⁸ and this included habitat assessments for protected and BAP priority species.
- 6.4.6. If during the development of the scheme any road improvements are required outside the route corridor then an extended Phase 1 Habitat Survey will be undertaken in these areas.
- 6.4.7. Following the Phase 1 habitat survey, woodlands within the route corridor and the three Substation Study Areas were identified for more detailed survey. The surveys were undertaken in spring and summer 2012 by experienced botanists (qualified under the Field Identification Skills Certificate scheme) using National Vegetation Community (NVC) methods²⁹ and Tablefit software to assign NVC categories to selected woodlands. Figures 22 to 24 show the location of these surveys.
- 6.4.8. Following the Phase 1 habitat survey, grasslands within the route corridor and the three Substation Study Areas were identified for more detailed survey. The surveys were undertaken in summer 2012 by experienced botanists (qualified under the Field Identification Skills Certificate scheme) using National Vegetation Community (NVC) methods³⁰ and Tablefit software to assign NVC categories to selected grasslands. Figures 25 to 27 show the location of these surveys.
- 6.4.9. Following the Phase 1 habitat survey, hedgerows intersected by the proposed underground cable route were identified for assessment against the ecological criteria within the Hedgerows Regulations³¹. Surveys were undertaken in spring and summer 2012 by experienced botanists (qualified under the Field Identification Skills Certificate scheme). When an alignment is fixed and working areas (including access routes and laydown areas) are identified, any additional hedgerows requiring removal will also be subject to survey and assessment (during the 2013 season) against the ecological criteria within the Hedgerows Regulations.

²⁸ JNCC (2003) Phase 1 Habitat Survey – a technique for environmental audit

²⁹ National Vegetation Classification, field guide to woodland (JNCC, 2001)

³⁰ British Plant Communities (Volumes 1 to 5) (Rodwell, 1991 – 2000)

³¹ Hedgerow Regulations 1997

- 6.4.10. The findings of the habitat and botanical surveys have been used and will continue to be used in conjunction with the desktop records to identify the potential for habitats to support species of conservation concern such as those listed in the Natural Environment and Rural Communities (NERC) Act³². This chapter outlines where detailed species surveys are proposed (or have already been undertaken).

Tree Surveys

- 6.4.11. A tree survey will be undertaken following British Standard *BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations*. It will include all trees and tree groups within the working areas covered by the DCO application. To ensure the findings of the tree survey are available to inform the detailed design it is likely that the tree survey will be undertaken in stages, initially covering the preferred alignment and then expanding to cover any refinements to the alignment and emerging working areas and access routes.
- 6.4.12. An arboricultural impact assessment will be produced providing a schedule of all trees within influencing distance of the site, a categorisation of potential value based on *BS 5837:2012*, an assessment of the impact of the proposed development and measures to minimise any such impact including a tree removal and protection plan.

Bird Surveys

- 6.4.13. Winter bird surveys were undertaken on a monthly basis during winters 2009/2010 and 2010/2011. Surveys were undertaken during the route corridor selection phase of the project when the RSPB drew attention to several bird species which it suggested will require consideration in relation to overhead line routeing, particularly golden plover and a number of species of raptor (Hintlesham Woods SSSI has breeding buzzard and kestrel, and hobby have bred in Brimlin Wood).
- 6.4.14. Land use and crop types were recorded to determine their value to birds, focussing particularly on their importance to wintering golden plover. The winter surveys covered the entirety of the four original route corridor options although greater effort was directed to areas containing large agricultural fields or wetlands. Bird counts and flight movements of golden plover, waders, wildfowl and raptors were recorded during all survey visits.
- 6.4.15. Dawn and dusk watches were undertaken in 2010/2011 where the desktop study and the 2009/2010 surveys had indicated potential 'hotspots' for roosting of lapwing and golden plover.
- 6.4.16. Vantage point surveys for raptors were undertaken between April and September 2010.
- 6.4.17. The surveys concluded that it is very unlikely that a new overhead line in any of the corridors would result in an increase in displacement or collision risk (during migratory flights or daily foraging flights) to an extent that would cause any population perturbation. Risk of adverse effects on birds was not a factor that influenced the selection of a preferred route corridor. The findings of the bird

³² Natural Environment and Rural Communities Act (2006)

surveys (2009 to 2011) were published on the project website³³ and consulted upon at Biodiversity Thematic Group meetings.

- 6.4.18. A breeding bird survey (BBS) has been undertaken along the route corridor and the three Substation Study Areas in 2012. The survey was undertaken in accordance with the guidelines published jointly by the Joint Nature Conservation Committee, RSPB and British Trust for Ornithology³⁴. This method employs a transect technique, combined with point counts where appropriate and is conducted during two morning visits (April to June) and spaced at least four weeks apart. Species and activity patterns are recorded during the survey. The findings of the breeding bird surveys are shown at Figures 28 to 45.
- 6.4.19. No additional bird surveys are proposed.

Dormouse Surveys

- 6.4.20. Dormouse surveys were undertaken during 2012 by Suffolk Wildlife Trust (on behalf of National Grid) within the route corridor and the three Substation Study Areas. Habitat survey data and desktop records were used to identify potential dormouse habitat. Site visits were used to undertake suitability assessments and where appropriate, nest tube surveys were carried out in line with Natural England guidance³⁵. The findings of the dormouse surveys are shown at Figures 46 to 48. No additional dormouse surveys are proposed at this time, however, if during the development of the scheme any works are required outside the route corridor then habitat suitability assessments will be undertaken in these areas and if appropriate, nest tube surveys will be carried out.

Bat Surveys

- 6.4.21. Bat activity surveys have been undertaken within the route corridor and the three Substation Study Areas. In line with Bat Conservation Trust guidelines³⁶ surveys used a mix of static recording and transect surveys. Transect surveys used public rights and publically accessible land and included walking and driving transects and were repeated once a month in July, August and September. Static surveys used locations along linear habitat features. Surveys at each location lasted 4 days and were repeated once or twice a month in July, August and September. Following consultation with the Biodiversity Thematic Group the static surveys were extended into October. The locations of these surveys are shown at Figures 49 to 50.
- 6.4.22. A ground level bat roost assessment will be undertaken of all trees within the working areas covered by the DCO application. The assessment will follow the

³³ National Grid Bramford to Twinstead Tee Connection Project: Ornithological Assessment: Jun 2011: http://www.nationalgrid.com/NR/rdonlyres/2A1367F1-3333-45BC-B590-C5B446F86C4B/50045/Suffolk_Connections_Ornithological_Assessment_June_2011_Final.pdf

³⁴ Bibby, C. J., et al. (2000) *Bird Census Techniques* 2nd ed. Academic Press, London and BTO Census Unit: Breeding Bird Survey Instructions

³⁵ Dormouse Conservation Handbook (2006), 2nd Edition. Natural England 2006 and Interim Natural England Advice Note – Dormouse surveys for mitigation licensing (WML-G37 12/11)

³⁶ Bat Conservation Trust (2012) 2nd Edition *Bat Surveys Good Practice Guidelines*. Bat Conservation Trust, London

categorisation set out in the Bat Conservation Trust guidelines. To ensure the findings of the bat tree survey are available to inform the detailed design it is likely that the tree survey will be undertaken in stages, initially covering the preferred alignment and then expanding to cover any refinements to the alignment and emerging working areas and access routes. Where trees identified for removal or branch pruning are categorised as either 1 of 1* under the BCT guidance, additional close inspection (using ladders, rope access or similar) will be carried out. Depending on the survey findings and predicted impacts roost emergence surveys may also be undertaken.

Water Vole and Otter Surveys

- 6.4.23. Water vole and otter surveys commenced in 2012 and will continue in 2013. They include surveys of rivers, streams and suitable field ditches along the proposed underground cable route. The surveys follow guidance set out in the water vole conservation handbook³⁷ and extend at least 50m along watercourses either side of the proposed alignment. Any evidence of water vole or otter activity identified during amphibian surveys of ponds is also being recorded and mapped. If during the development of the scheme, any working areas include aquatic habitats not already covered, water vole and otter surveys will also be undertaken in these areas.

Badger Surveys

- 6.4.24. Badger surveys were undertaken as part of the extended Phase 1 habitat survey. All badger setts identified during survey were mapped. If during the development of the scheme any works are required outside the route corridor then a badger survey will also be undertaken in these areas. If any badger setts falls within working areas additional surveys may be required in 2013, including mapping of sett entrances, identifying if the sett is active and determining the sett status in relation to neighbouring setts^{38 39}.

Amphibian Surveys

- 6.4.25. Great crested newt surveys have been undertaken (Spring 2012) within the route corridor and the three Substation Study Areas. The locations of waterbodies were identified using a mix of mapping, aerial images and habitat survey sources and through correspondence with landowners. Habitat suitability assessments were undertaken and where appropriate, full amphibian surveys were undertaken in line with Natural England guidance⁴⁰. It was not possible to gain access to survey all ponds during the 2012 season; surveys will continue in 2013 to cover ponds within 250m of proposed working areas. The location of the ponds surveyed in 2012 and the ponds proposed for survey in 2013 are shown at Figures 51 to 57.

³⁷ STRACHAN ET. AL. (2006) *Water Vole Conservation Handbook Second Edition*

³⁸ Harris S, Cresswell P and Jefferies D (1989) *Surveying Badgers*, Mammal Society.

³⁹ Natural England (2009) *Guidance on 'Current Use' in the definition of a Badger Sett*, WMLG17. Natural England, Peterborough.

⁴⁰ English Nature (2001) *Great crested newt mitigation guidelines*. English Nature, Peterborough

- 6.4.26. The 250m survey area was agreed with the Biodiversity Thematic Group and is based on current guidance (English Nature 2001) which states that as a minimum, the area of survey should normally cover any land which is proposed for development. However, as a general guide, suitable terrestrial habitats within 250m of a breeding pond are likely to be used most frequently. Furthermore, Natural England guidance states “*for developments resulting in permanent or temporary habitat loss at distances over 250m from the nearest pond, carefully consider where a survey is appropriate.*”
- 6.4.27. Although it is appropriate for the survey area extend to 250m from working areas, it is recognised that great crested newts can move over distances greater than this. Therefore, following consultation with the Biodiversity Thematic Group it was agreed that aerial images and mapping data will be utilised to identify any additional potential newt habitat (breeding and terrestrial) within 250-500m of working areas. This information will be use along with the field survey data to inform the characterisation of predicted impacts and the design of mitigation.

Reptile Surveys

- 6.4.28. The potential for impacts on reptiles during the construction of overhead line sections of the connection are small and avoidable using reasonable avoidance measures during construction works. Existing reptile records in association with habitat assessments are sufficient to judge impacts on and design mitigation for this group of species.
- 6.4.29. However, there is an increased risk of impacts on reptiles during construction of underground sections and construction of cable sealing end compounds and the substation. Reptile surveys⁴¹ using artificial refuges and undertaking seven survey visits per site, will be carried out within these areas where a habitat assessment identifies good quality reptile habitat. Following discussions with the Biodiversity Thematic Group it was agreed that this approach would also be used to assess working areas for compound sites and tower locations. Using the above approach, three areas have been identified as requiring reptile surveys these are illustrated in Figures 58 to 60 and were presented to the Biodiversity Thematic Group in February 2013.

Invertebrate Surveys

- 6.4.30. The potential for impacts on invertebrates during the construction of overhead line sections of the connection are small. Existing invertebrate records in association with habitat assessments are sufficient to judge impacts on and design mitigation for this group of species.
- 6.4.31. However, there is an increased risk of impacts on invertebrates during construction of underground sections and construction of cable sealing end compound and the substation. Therefore invertebrate surveys will be undertaken within these areas where a habitat assessment identifies high quality invertebrate habitat. Following discussions with the Biodiversity Thematic Group it was agreed that this approach

⁴¹ Froglife, Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth (1999)

would also be used to assess working areas for compound sites and tower locations.

- 6.4.32. Invertebrate survey scope and methods is dependent on the target species or groups of species. In determining site specific survey details account will be taken of known records, habitat mix, landscape features and character of likely impacts. Survey methods will reflect standard guidance⁴² and will include direct observation, sweep netting, hand searching, aquatic netting, beating and pitfall traps.
- 6.4.33. A number of locations across the preferred alignment (as illustrated in Figures 61 to 65) and Substation Study Area A have been identified as potentially providing high quality invertebrate habitat. These locations will be visited during a recce visit in April 2013 at which time the detailed survey method will be produced and circulated to consultees for comment. This approach was presented to the Biodiversity Thematic Group in February 2013 along with the list of target invertebrate assemblages. It is initially anticipated that surveys will entail an early visit in May and a late visit in August but this approach and the assemblages covered will be reviewed following the April recce visit.).

Reporting

- 6.4.34. The results of the ecology and biodiversity impact assessment will be reported in a chapter of the ES supported by figures and technical appendices as appropriate to demonstrate the findings of the baseline surveys and the anticipated effects. Tables will be used to describe the scale and significance of effects on receptors.
- 6.4.35. The ES will describe all potential effects on biodiversity and state their significance on each particular receptor. In summary the assessment will be an iterative process comprising the following processes:
- Identification of the baseline environment and quality relevant to the development;
 - Identification and evaluation of ecological receptors likely to be affected;
 - Identification of the activities associated with the development and the resultant changes likely to affect valued ecological receptors;
 - Assessment as to whether these changes are likely to give rise to significant ecological effects on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within the study area;
 - Refinement of the project to incorporate ecological enhancement measures, mitigation measures to avoid or reduce negative effects and compensation measures for any residual significant adverse effects;
 - Consideration of any cumulative effects; and
 - Statement of the residual effects and their significance.

6.5. Assessing Significance of Effects

- 6.5.1. The overall significance of the effects on biodiversity will depend on the spatial scale and reversibility of effects. The approach to be used in Ecological Impact

⁴² Surveying terrestrial and freshwater invertebrates for conservation evaluation, Natural England Research Report NERR005, 2007

Assessment (EclA) follows the contemporary guidelines from the Institute of Ecology and Environmental Management (IEEM) (July 2006) which focus on describing effects and stating if they are significant or not on each particular receptor.

Sensitivity of Receptors

6.5.2. IEEM Guidelines for the assessment of ecological impacts aim to establish a standard in the evaluation of the effects of potential development on wildlife receptors. IEEM guidelines require ecological receptors to be valued (or to have the potential to be valued) according to a geographical scale as follows:

- **International:** Internationally designated sites or candidate sites (e.g. Special Areas for Conservation (SAC), Special Protection Areas (SPA), Ramsar Site);
- **National:** Nationally designated site (e.g. Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR));
- **County:** Local Nature Reserves; County Wildlife Sites; ancient woodlands; habitats or species populations of importance for Suffolk/Essex;
- **Local:** Significant ecological features such as old hedgerows, woodlands, ponds for the local area;
- **Site:** Features with ecological value of significance within the Site only;
- **Negligible:** Areas of built development, active mineral extraction.

Significance of Effect

6.5.3. The value of an ecological receptor is then used to determine the legal, policy and development control consequences of a significant impact. A significant impact, in ecological terms, is defined in the IEEM guidelines as:

“an impact (adverse or positive) on the integrity of a defined site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area, including cumulative impacts.”

6.5.4. The Government Circular ODPM 2005/06 defines site integrity as:

“the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of species for which it was classified”.

6.5.5. The conservation status of a species is defined in Article 1(i) of the Habitats Directive as favourable when:

“population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats; and the natural range of the species is neither being reduced nor is likely to be reduced in the foreseeable future; and there is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis”.

6.5.6. It should be noted that the values assigned to ecological receptors do not take account of the amenity or economic values of the ecological resources. Assigned ecological values are based purely on the innate value of the flora, fauna and habitats in terms of the conservation of genetic resources.

6.5.7. IEEM guidelines evaluate the effects of potential development on wildlife receptors. They also highlight the importance of considering the likelihood that a change/activity will occur as predicted, and also the degree of confidence in that impact assessment on ecological structure and function. The following four-point scale is proposed by IEEM to standardise the degree of certainty in a prediction is stated as follows:

- **Certain/Near Certain:** probability estimated at 95% chance or higher;
- **Probable:** probability estimated at above 50% but below 95%;
- **Unlikely:** probability estimated above 5% but below 50%;
- **Extremely Unlikely:** probability estimated at less than 5%.

6.5.8. IEEM guidance states that the purpose of assigning a geographical value to receptors is to allow effects to be considered in relation to the receptor value, thereby determining whether the effect is significant or not.

6.5.9. Significant ecological effects are those that affect the integrity/conservation status of a defined receptor within the given geographical context/value. In line with IEEM guidelines, when describing changes/activities and impacts on ecosystem structure and function, reference will be made to the following parameters:

- **Adverse or Beneficial:** is the impact positive or negative?
- **Magnitude:** refers to the size or “amount” of the impact.
- **Extent:** the area over which the impact occurs.
- **Duration:** The time for which the impact is expected to last prior to recovery or replacement of the resource or feature.
- **Reversibility:** an irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale: a reversible (temporary) impact is one from which spontaneous recovery is possible or for which effective mitigation is possible.
- **Timing/Frequency:** some changes may only cause an impact if they happen to coincide with critical life-stages or seasons (e.g. bird nesting season).

6.6. Mitigation and Residual Effects

6.6.1. The approach adopted for this project follows the five-point strategy of: information gathering to inform potential for impacts; project design to avoid impacts; working approaches to mitigate impacts, implementing proposals to compensate impacts and considering options to enhance baseline conditions.

6.6.2. Mitigation measures to address negative effects on ecology include the micro-siting of infrastructure and temporary working areas, timing of works, methods of working including contractor awareness talks and on-site and off-site habitat creation proposals.

6.6.3. The residual impact expected following mitigation will be identified.

6.7. Inter-relationships of Effects

6.7.1. The biodiversity assessment will consider the inter-relationship of effects from the proposed development, between different aspects of the environment. It is anticipated that there is likely to be an inter-relationship between planting proposed

to mitigate for landscape and visual effects and historic environment effects. Mitigation proposals for landscape and visual effects and historic environment could also have an effect on landscape and views.

6.8. Cumulative Effects

- 6.8.1. The ecology and biodiversity assessment will consider the cumulative effects of the various elements of the project and the potential effects of the proposed development in combination with other developments. The scope of projects to be considered in the cumulative assessment will be discussed with the relevant planning authorities and the Biodiversity Thematic Group.

7. HISTORIC ENVIRONMENT

7.1. Introduction

7.1.1. This chapter sets out the proposed approach to assessing the likely significant effects on the historic environment associated with the construction, operation and decommissioning of the proposed development.

7.1.2. In accordance with the requirements of the Overarching National Policy Statement for Energy (EN-1) an assessment will be undertaken to identify the significance of the heritage assets⁴³ affected by the proposed development and the contribution of their setting to that significance. The technical approach is proposed to be in accordance with the Institute for Archaeologists (IfA) standard and guidance documents, other standard guidance and documents where appropriate, the IfA code of conduct, and proposes to follow guidance documents produced by English Heritage for such assessments (as agreed in consultation), namely:

- English Heritage (2008), Conservation Principles; Policy and Guidance for the Sustainable Management of the Historic Environment; and
- English Heritage (October 2011), The Setting of Heritage Assets, English Heritage Guidance.

7.2. Existing Environment

Route Corridor – Sections AB - G

7.2.1. Within the route corridor, and a 250m buffer from the corridor edge, there are:

- 146 non-designated heritage assets (of which 92 were recorded by the National Monuments Record (NMR) and Historic Environment Records (HER) for Essex and Suffolk, the remainder have been identified from historic mapping, aerial photography and Light Detection and Radar (LiDAR) survey as part of the on-going assessment of the route corridor);
- One Scheduled Monument (SM);
- Two conservation areas (CA);
- Three Grade I listed buildings (LB I);
- Four Grade II* listed buildings (LB II*), and;
- 70 Grade II listed buildings (LB II).

7.2.2. The route corridor has a high potential for the survival of previously unrecorded buried archaeology, particularly dating from the Bronze Age, Iron Age, Roman, medieval and post medieval periods. The potential is high throughout the route corridor, with the exception of areas previously disturbed by quarrying and some agricultural and horticultural activities. Within the valleys of the Rivers Brett, Box and Stour cropmark evidence and previous finds indicate a concentration of prehistoric and Roman activity and the potential for unrecorded buried archaeology is particularly high.

⁴³ Paragraph 5.8.2 of the Overarching national Policy Statement for Energy (EN1) defines 'heritage assets' Those elements of the historic environment that hold value to this and future generations because of their historic, archaeological, architectural or artistic interest.

7.2.3. In addition to the known heritage assets within the route corridor and buffer, designated heritage assets have been identified for a wider area, in order to determine where potential effects on setting could occur. Designated heritage assets within buffers of 2km, 5km and 10km of the preferred and interim alignment are detailed in Table 7.1.

Table 7.1: Designated Heritage Assets

Distance	Designated Heritage Asset					
	SM	LBI	LBII*	LBII	RPG ⁴⁴	CA
2km	4	14	38	562	0	5
5km	19	51	109	-	3 Grade II	13
10km	67	126	277	-	7 Grade II 3 Grade II* 1 Grade I	-
TOTAL	90	191	424	562	14	18

Substation Study Areas A - C

7.2.4. Heritage assets within the Substation Study Areas, and a 250m buffer from the edge of the Substation Study Areas comprise:

- Substation Study Areas A - Colne Valley: Two Grade II listed buildings and five non-designated heritage assets;
- Substation Study Areas B - Delvyn’s Lane: Seven Grade II listed buildings and one non-designated heritage asset; and
- Substation Study Areas C - Butlers Wood and Waldegrave Wood: One Grade II* listed building, eight Grade II listed buildings and six non-designated heritage assets.

7.2.5. Designated heritage assets within the wider area of the substation have also been identified to determine those where potential effects on setting could occur.

7.2.6. The information provided to describe the existing environment has been derived from the baseline information for historic environment, which was gathered to

⁴⁴ Registered Park and Garden (RPG); A Park or Garden included in the English Heritage 'Register of Historic Parks and Gardens of special historic interest in England', established in 1983.

inform the Connection Options Report⁴⁵ and Substation Siting Options Appraisal⁴⁶. The plans to accompany these reports are available at: <http://www.bramford-twinstead.co.uk/library-stage-2.aspx>.

7.3. Characteristics of Potential Effects

7.3.1. The potential effects of the proposed development on the historic environment include:

- Physical effects on buried archaeology;
- Physical effects on historic landscape;
- Visual effects on designated heritage assets;
- Visual effects on undesignated heritage assets which are demonstrably of equivalent significance;
- Visual effects on historic landscape character; and
- Effects of noise, dust and vibration.

Construction Phase Effects

7.3.2. During the construction of the proposed development, there is the potential for effects on known and previously unrecorded buried archaeology and historic landscape features.

7.3.3. Specifically, all below ground works including the construction of pylon bases, the underground cable working area and any temporary working areas, such as access tracks, crane bases and compounds, could affect buried archaeology. Mitigation embedded in the design of the connection will avoid significant effects on buried archaeology of identified high importance, but inevitably and in common with any construction project of this type, there are likely to be multiple direct physical effects on buried archaeology.

7.3.4. Historic landscape effects principally comprise loss of character through temporary hedgerow removal.

7.3.5. The construction phase will have temporary visual effects on multiple heritage assets.

Operational Phase Effects

7.3.6. During the operational phase of the development, the overhead line connection, sealing end compounds and substation site have the potential to affect the setting of heritage assets and historic landscape character.

7.3.7. Repairs and refurbishment of the overhead line, underground cables, sealing end compounds and substations are anticipated to be above ground or to affect areas where the ground has already been disturbed, investigated and mitigated during

⁴⁵ National Grid, *Bramford to Twinstead Tee Connection Project: Connection Options Report*: http://www.nationalgrid.com/NR/rdonlyres/13F652DA-9185-4536-AF2F-5E57112A21E5/53962/BramfordtoTwinsteadTeeConnectionOptionsReport_May2012.pdf

⁴⁶ National Grid, *Bramford to Twinstead Tee Connection Project: Substation Siting Options Appraisal*: <http://www.nationalgrid.com/NR/rdonlyres/CBE163AE-2C8B-4F19-9713-410C6239C6FC/58950/SubstationSitingOptionsAppraisal.pdf>

construction. Consequently, no effects on buried archaeology are anticipated during the operational phases of the project.

Decommissioning Phase Effects

- 7.3.8. Any below ground disturbance necessary to the decommissioning of the project are anticipated to be in areas where the ground has already been disturbed, investigated and mitigated during construction. Consequently, no effects on buried archaeology are anticipated during the decommissioning phase of the project.
- 7.3.9. During decommissioning there could be temporary noise, vibration or dust effects experienced at, or within the setting of, designated and non-designated heritage assets. These effects would be indirect and time-limited to the period of decommissioning activities. On completion of decommissioning negative construction, operational and decommissioning effects on the setting of heritage assets would be reversed, assuming the removal of above ground infrastructure.

7.4. Proposed Approach and Method

Consultation

- 7.4.1. As part of preparing the scoping report and preparing the scope of the cultural heritage and archaeological assessments for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. The representations received were taken into account when finalising the scope of the assessments. Groups that were represented at the meetings include:
- English Heritage;
 - Suffolk County Council;
 - Essex County Council;
 - Essex CPRE;
 - Suffolk CPRE; and
 - Babergh District Council.
- 7.4.2. Table 7.2 and Table 7.3 outline the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A.

Table 7.2: Consultation on Scope of Archaeological Assessment

Representation, Discussions and Comments	Whether included in Scoping Report
<p>The desk-based archaeological assessment is 95% complete. The outstanding items are completion of the historic map regression and to undertake a more detailed aerial photograph (AP) assessment. The AP assessment may be of the whole route or just the underground sections, subject to their confirmation after National Grid has considered representations to the Connections Options Report (COR).</p>	<p>The baseline information known to date is described at section 7.2.</p>
<p>The line walk has been undertaken; as most of the route is in arable use (and under crop at the time of the walk over survey) this was done from vantage points for part of the route and is now complete.</p>	<p>This helps inform the baseline information known to date and further assessments to complete.</p>
<p>It is proposed to undertake a staged approach assessment of the potential for buried archaeology to comprise: geo-archaeological review of the geotechnical survey and palaeo-environmental assessment, geophysical survey, geophysics, trial trenching. The purpose of the staged approach is to gather intelligence so that each stage can inform the next.</p>	<p>This is incorporated in the proposed approach and method section of this chapter.</p>
<p>Site investigation works will be proposed for the connection option, to inform the technical design, once appropriate details can be determined following the COR Feedback Report publication and further consultation, particularly with persons with an interest in the land.</p> <p>The officers agreed that specialist monitoring of the geotechnical survey by a geo-archaeologist would be useful, and that they would also consider it appropriate to provide a palaeo-environmental assessment across the River Valleys. (This requirement does not relate to the section of overhead line connection.)</p>	<p>This is incorporated in the proposed approach and method section of this chapter.</p>

Representation, Discussions and Comments	Whether included in Scoping Report
<p>National Grid noted that Ground Penetrating Radar (GPR) may be used as part of the geotechnical survey for the underground sections and for overhead pylon bases.</p> <p>The usefulness of GPR in identifying archaeology has improved dramatically recently and may be useful.</p>	<p>This is incorporated in the proposed approach and method section of this chapter.</p>
<p>Trench evaluation will be required, within the underground section and within the footprint of the pylon bases and any other ground disturbing ancillary works. The trial trenching programme (timing/ number of trenches/ location of trenches/ size of trenches) will be informed by the previous surveys described above.</p> <p>It was agreed that the timing should be flexible as a number of factors can affect the ability to deliver this work, but it was National Grid’s present intention that this would be complete prior to commencement.</p>	<p>This is incorporated in the proposed approach and method section of this chapter.</p>

Table 7.3: Consultation on Scope of Built Heritage Assessment

Representations	Whether included in Scoping Report
<p>The assessment will be in accordance with the guidance provided in policy (NPPF and EN-1) and in guidance documents (English Heritage guidance on the setting of heritage assets and seeing history in the view).</p> <p>Group members noted that there could be non-designated heritage assets of equivalent significance within the area of the development that should be treated the same as a designated asset.</p>	<p>National Grid noted that some caution needs to be applied; the Secretary of State will distinguish between assets that are designated and those which are not and assessments need to be clear on this point. This has been incorporated into the scoping report.</p>
<p>Designated heritage assets up to 10km from the route as shown in the COR have been mapped.</p> <p>The proposed method of assessment is to include all assets within 2km distance from the overhead line preferred alignment and also to include assets beyond 2km where long views or the wider landscape is important to their setting. The approach will be flexible to include, for example, a grade II listed farmhouse beyond 2km if that is part of a group of buildings where the development could lead to a loss of significance.</p> <p>Concern was raised by a group member over reliance on the Zone of Theoretical Visibility (ZTV) to determine which assets may be affected.</p>	<p>Use of the ZTV is one method used to focus the more detailed assessment to those assets where the development could lead to a loss of significance through change within their setting. This has been incorporated into the scoping report..</p>
<p>The assessment will identify where harm is likely and this is part of an on-going process feeding into the design of the scheme with mitigation through avoidance.</p> <p>A group member also suggested that there needs to be an assessment of the cumulative effect of the scheme, i.e. the “clutter” of multiple pylons in the landscape.</p>	<p>This has been incorporated into the scoping report by identifying the likely significant effects.</p>

Representations	Whether included in Scoping Report
<p>The effects of the overhead line on historic landscape character will also be assessed.</p> <p>Group Members queried whether the assessment of hedgerows will consider those with evidence of pollards including ancient lime stools.</p>	<p>This is part of the on-going assessment and that at this stage hedgerows are being treated as ‘important’ using the regulations as a guide and taking a precautionary and inclusive approach. Additional survey will be undertaken on hedgerows affected by the preferred alignment. This has been incorporated into the scoping report.</p>

7.4.3. In addition, a draft of this chapter was provided to:

- English Heritage;
- Suffolk County Council;
- Essex County Council;
- Suffolk CPRE;
- Braintree District Council;
- Mid Suffolk District Council; and
- Babergh District Council.

7.4.4. Feedback received has been incorporated into this chapter. This is summarised in Table 7.4.

Table 7.4: Feedback on Draft Scoping Chapter

Representations	Whether included in Scoping Report
<p>Suffolk County Council note that the 'Historic landscape effects principally comprise loss of character through temporary hedgerow removal'. Firstly, the removal is very final for the original piece of hedgerow, what follows is a replacement. So it is not temporary. Secondly, although this is admitted as an effect, there is no apparent mention of how this will be assessed or mitigated.</p> <p>There is a very generally worded proposal regarding intrusive archaeological surveys. We believe that 5% sampling should be required for those areas where there will be substantial ground disturbance.</p>	<p>The scope of intrusive field investigation remains generally worded as a number of factors can affect the ability to deliver this work, but it is National Grid’s present intention that intrusive survey for buried archaeology will be undertaken. This has been incorporated into the scoping report.</p>
<p>English Heritage generally endorse the format and contents, but would make the following comments:</p> <p>In the EH guidance on settings of heritage assets "Construction of a distant but high building; development generating noise, odour, vibration or dust over a wide area; or new understanding of the relationship between neighbouring heritage assets may all extend what might previously have been understood to comprise setting". We therefore recommend that these effects are also referred to here.</p> <p>EH had concerns as to the 2km buffer, but assume that the potential to extend it to up to 10 km, discussed in 1.24 will be applicable where EH or other consultees request it.</p> <p>EH suggest again reference to noise, vibration etc.</p> <p>EH ask that that assessment of accumulation of effects is to be carried by an agreed methodology such as verified views with montages.</p>	<p>This has been considered in the approach to the ES.</p>
<p>Suffolk Preservation Society request that a site visit is undertaken to all designated heritage assets within 2km to ascertain whether the wider setting could be affected by the proposed overhead line.</p>	<p>This has been incorporated into the scoping report.</p>

Desk-Based Assessment of Potential Direct Physical Effects

- 7.4.5. A detailed desk-based assessment will be undertaken in accordance with the IfA Standard and Guidance for Historic Environment Desk Based Assessment (2011) to identify known heritage assets within the route corridor and assist in predicting the potential for buried archaeology within the area affected. Initial assessment will focus on the red line boundary with more detailed assessment (detailed historic map regression and field reconnaissance survey) focused on the preferred alignment and the 20m limit of deviation either side of that alignment.
- 7.4.6. Data sources that will be used for the desk-based assessment will comprise:
- Essex and Suffolk Historic Environment Records (HERs);
 - National Monuments Record (NMR) and National Heritage List maintained by English Heritage;
 - Defence of Britain project, as reported by the Archaeological Data Service;
 - The Suffolk and Essex historic landscape characterisation (HLC) projects; and
 - Braintree District Council and Babergh District Council Conservation Area appraisals and landscape characterisation.
 - Aerial photography, maintained by the above as well as modern vertical aerial and satellite images;
 - Primary and secondary sources held by the Essex and Suffolk County Record Offices; and
 - Historic mapping, primarily the Tithe Maps for Essex and Suffolk and historic Ordnance Survey mapping series.
- 7.4.7. Data from the sources listed in bullet points 1 – 5 above provided the baseline for the Connections Options Report.
- 7.4.8. In addition, the archaeological and historic criteria for determining important hedgerows⁴⁷ will be applied to determine a schedule of hedgerows that are important in terms of their heritage value. The Hedgerow Regulations criteria will be taken as a guide and the schedule will be inclusive of hedgerows that form part of a historic field pattern, or are associated with a heritage asset, regardless of the date that either were recorded.

Site Assessment of Potential Direct Physical Effects

Field Reconnaissance Survey

- 7.4.9. The alignment and limit of deviation will be visited by a suitably qualified and experienced archaeologist as part of the historic environment assessment. The field survey will aim to identify surface evidence for any previously unrecorded heritage assets, the condition and nature of the recorded heritage assets, land use and

⁴⁷ The Hedgerow Regulations 1997, Schedule 1: Additional criteria for determining “important” hedgerows, Part II

character as an indicator of potential for buried archaeology and past land use, and any health and safety or methodological constraints to further site surveys.

Archaeological Geophysical Survey

- 7.4.10. Geophysical survey will be used to inform the potential for buried archaeology at the pylon locations, the substation site and within the corridor proposed for underground cables. The proposed techniques are Ground Penetrating Radar (GPR) at the pylon bases and recorded magnetometer survey within the underground cable corridor. The assessment will be undertaken in accordance with the technical specifications provided by English Heritage in *Geophysical Survey in Archaeological Field Evaluation, English Heritage Guidelines, second edition, 2008*.

Assessment of palaeo-environmental and geo-archaeological potential

- 7.4.11. Site investigation works undertaken for geotechnical purposes will be monitored by an appropriately qualified specialist to determine the potential of the interim alignment for the survival of palaeo-environmental deposits and geo-archaeological potential.
- 7.4.12. A palaeo-environmental assessment across the River Valleys crossed by the underground cable will also be undertaken by an appropriate specialist, to determine the potential for the survival of palaeo-environmental and geo-archaeological deposits within the area that will be affected by construction of the underground cable.

Intrusive archaeological surveys

- 7.4.13. Where desk-based assessment and non-intrusive survey are insufficient to properly assess the archaeological interest of specific locations within the area affected, a programme of pre-construction intrusive survey will be proposed, as part of a staged assessment of the archaeological potential.

Desk Based Assessment and Site Assessment of Potential Indirect and Setting Effects

- 7.4.14. An assessment will be undertaken, in line with English Heritage's October 2011 Guidance, which will identify designated heritage assets likely to be affected and their settings; assess whether, how and to what degree setting makes a contribution to the significance of a heritage asset, and assess the potential effect of the proposed development on those assets. Non-designated heritage assets where the development could result in loss of significance through development within their setting will also be identified as far as reasonably possible.
- 7.4.15. All designated heritage assets within 2km of the preferred alignment will be assessed. This initial assessment will identify the extent of setting for these assets, through desk-based assessment and site survey. The setting will initially be compared with the landscape and visual effects Zone of Theoretical Visibility (ZTV) to determine which assets would potentially be affected, although setting may include non-visual effects and these will also be assessed.
- 7.4.16. The 2km buffer will be extended up to 10km for designated heritage assets where a relationship with the wider landscape, long views, vistas, sightlines and intervisibility between assets contributes to significance, to ensure that the approach to assessment is inclusive. This will include consideration of all Registered Parks and Gardens, Grade II* and Grade I listed buildings and any Scheduled Monuments where the criteria outlined above apply up to 10km from the proposed development.

This approach does not preclude including some conservation areas or Grade II listed buildings to this distance, again, where the above criteria apply.

7.4.17. In addition, the ZTV, in combination with site survey, will be used to assess which assets are affected. For those assets where an effect is predicted site visits will also determine, in combination with desk based research, whether, how and to what degree setting makes a contribution to the significance of the heritage asset. These site visits will consider:

- Asset character, integrity, appearance and the way in which it is appreciated;
- Relationships with other heritage assets, including group value and shared settings;
- Reasons for designation, and degree to which they contribute to appreciation and significance of the asset;
- Formal design, intended sight lines and vistas and intervisibility with other heritage assets, and natural features;
- 'Key' (principal/critical) views towards, from, across and within heritage asset;
- Topography/landscape situation;
- Asset scale: prominence/dominance;
- Predicted relative scale of proposed development;
- Landscape character, particularly unaltered settings;
- Degree of alteration within setting, and existing impacts.

7.4.18. The assessment of the effect of the proposed development on the setting of heritage assets will compare the location, scale and appearance of the proposed development against the contribution made by setting to the significance of the heritage assets affected. In addition non-visual effects on setting will be assessed, that is any noise, dust, or vibration effects, likely to occur during construction or operation.

7.4.19. The effects of the development on the historic landscape character will also be assessed, in conjunction with the assessment of landscape and views.

Reporting

7.4.20. The results of the baseline assessments will be presented as technical appendices to the ES. A chapter will be produced for the ES that will:

- Summarise the historic environment baseline;
- Summarise the potential for the survival of buried archaeology within the proposed development boundary and limit of deviation;
- Describe the likely significant impacts on heritage assets;
- Describe the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance;
- Assess the magnitude of potential impact of the proposal on the significance of the known heritage assets and potential for buried archaeology. An assessment of the predicted magnitude of effect will be made both before and after the implementation of mitigation to identify residual effects. This will demonstrate the effectiveness of the mitigation and will provide a framework for the assessment of overall significance;
- Provide verified views and photomontages to assist assessment of visual effects on the setting of heritage assets; and

- Identify embedded, and specify proposed mitigation measures in order to reduce assessed negative effects.

7.5. Assessing Significance of Effects

7.5.1. In common with other topics, and following the approach advocated by EN-1 and English Heritage guidance, a staged assessment will be undertaken to determine the significance of effects of the development on the historic environment. This will involve undertaking baseline survey to determine the significance (or sensitivity) of the assets that may be affected and assessing the extent of the impact of the proposed development (magnitude of effect) on that significance. By comparing the sensitivity of the asset and the magnitude of change the overall significance of the effect can be determined. The following criteria will be used:

Magnitude of Effect

- 7.5.2. The significance of a heritage asset can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. The former relates to any direct physical harm, including total or partial loss of the asset. Development within the setting of a heritage asset can result in a reduced ability to experience the asset's significance.
- 7.5.3. The effect of development within the setting of a heritage asset can also be beneficial. For example, as part of the proposed development, an intrusive building or feature is removed or replaced with a more harmonious one; historic features are restored or revealed; a new feature is added which adds to public appreciation; new views are introduced that add to public experience of an asset; or public interpretation or access is improved to an asset or its setting.
- 7.5.4. The magnitude of effect reflects the scale of change. This is defined in Table 7.5 below:

Table 7.5: Defining Magnitude

Defining Magnitude of Effect	
Level of Magnitude	Definition of Magnitude
High	Total loss or substantial harm to key elements/features/characteristics of the baseline conditions. The contribution that setting makes to significance is lost such that post development character/attributes of baseline, or relationship to other assets or sites would be fundamentally changed/no longer discernible.
Moderate	Partial loss or harm to one or more key elements/features/characteristics of the baseline conditions. Contribution that setting makes to significance is reduced such that post development character/attributes of baseline would be partially changed/less discernible.
Low	Minor loss. Degradation arising from the loss/alteration to fabric or setting would be discernible but post

Defining Magnitude of Effect	
Level of Magnitude	Definition of Magnitude
	development character/attributes would be similar to baseline condition.
Negligible	Very minor loss. Baseline conditions would be largely unaltered.
None	No loss. Change does not lead to any loss of significance.

Sensitivity of Receptor

- 7.5.5. Significance (for heritage policy) is defined by the Glossary to the National Planning Policy Framework as “The values of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset’s physical presence, but also from its setting”
- 7.5.6. For the purpose of determining the likely effects of the Bramford to Twinstead Tee Connection project on heritage assets, the relative importance of each heritage asset will be determined to provide a framework for comparison.
- 7.5.7. This will be in accordance with broad categories of importance described below. These categories do not reflect a definitive level of significance or value of a heritage asset, but a provisional one based on the asset’s heritage values to provide an analytical tool that can inform later stages of assessment and the development of appropriate mitigation.
- 7.5.8. Some non-designated assets can be of equivalent importance to designated heritage assets. Their relative importance means that they are treated as if they are designated assets.
- 7.5.9. The grading of importance of heritage assets is based on the criteria listed in Table 7.6 below:

Table 7.6: Sensitivity of Receptor

Assessing Significance - Sensitivity	
Importance	Definition
Very High	Heritage assets with acknowledged international importance. Examples include World Heritage Sites, Grade I and some II* listed buildings or Registered Parks and Gardens and some Scheduled Monuments.
High	Heritage assets (designated or undesignated) of national importance. Examples include some Grade II* listed buildings and Registered Parks and Gardens, Scheduled Monuments, Grade II Listed Buildings, Conservation Areas.
Moderate	Heritage assets of regional importance. Examples include historic townscapes or landscapes or structures

D	recorded by the County Historic Environment Record and well preserved buried archaeology.
e f iLow	Heritage assets of local importance. Examples include historic (unlisted) buildings, assets recorded in the County Historic Environment Record of low heritage value, and assets compromised by poor preservation.
e f iNegligible	Heritage assets of community importance. Examples include remains previously subject to large-scale destruction, assets with very little or no surviving archaeological or historic interest and assets which hold little intrinsic archaeological value.
n gUnknown	Assets and structures of uncertain character, extent and/or date where the importance cannot be readily predicted.

Significance of Effect

7.5.10. The overall significance of effect compares the magnitude of effect against the relative sensitivity of the heritage asset(s) affected.

Table 7.7: Assessing Significance

Significance Matrix						
Magnitude	Importance					
	Very High	High	Moderate	Low	Negligible	Unknown
High	<i>Major</i>	<i>Major</i>	<i>Major</i>	Moderate	Minor	Uncertain
Moderate	<i>Major</i>	<i>Major</i>	Moderate	Minor	Minor	Uncertain
Low	Moderate	Minor	Minor	Minor	Minor	Uncertain
Negligible	Minor	Minor	Minor	Minor	None	Uncertain
None	None	None	None	None	None	None
Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain

7.6. Mitigation and Residual Effects

- 7.6.1. Proposed mitigation measures will be specific to the asset and the effect of the development on that asset. For example, the permanent loss of historic hedgerow will be mitigated through minimising breaches of historically important hedgerows, archaeological recording during construction activities and replanting. In the case of very important hedgerows direct physical effects could be avoided by using a non-open cut technique to breach the hedgerow.
- 7.6.2. Mitigation of effects on buried archaeology will be either through avoidance or recording.
- 7.6.3. Mitigation of effects on the setting of heritage assets will be either through avoidance; or planting schemes, where desirable and achievable.
- 7.6.4. The residual impact expected following mitigation will be identified.

7.7. Inter-relationship of Effects

- 7.7.1. The effects on landscape and views and ecology could lead to effects on cultural heritage. The potential inter-relationship of effects will be considered during the assessment.

7.8. Cumulative Impacts

- 7.8.1. The assessment will include potential cumulative effects as a result of the proposed development in combination with other major developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

8. GEOLOGICAL CONSERVATION

8.1. Introduction

- 8.8.1. This chapter of the Environmental Statement (ES) will consider the likely significant effects on the geological environment of the construction, operation and decommissioning phases of the proposed development.
- 8.8.2. The development has the potential for significant effects on soils, geology and hydrogeology and ground contamination through activities that will be undertaken primarily during the construction phase of the development but also during the operational lifespan and decommissioning phases. These effects could result from the disturbance of existing ground contamination, as well as the potential for the release of contaminants during the works.
- 8.8.3. For the purpose of the geological assessment the 'study area' will comprise the interim and preferred alignment and other land to be used for the connection route together with the Substation Study Areas, the area required for decommissioning of the adjoining 132kV overhead line and any ancillary developments.

8.2. Existing Environment

- 8.2.1. Land in the Sections and Substation Study Areas is dominated by arable farmland with occasional orchards and juvenile woodland. Other features of note include several large sand and gravel pits (Layham Quarry), which Environment Agency (EA) records show to comprise an authorised landfill.
- 8.2.2. A number of surface watercourses cross the alignment, generally flowing from north to south. These include the River Stour, River Box, River Brett and Belstead Brook.
- 8.2.3. The geology of the Sections and Substation Study Areas comprises superficial Glacial Till (Boulder Clay) overlying undifferentiated Glacial and Fluvial Sands and Gravels. Where river valleys bisect the alignment, Alluvium and River Terrace Deposits are present, occasionally underlain by Glacial Till deposits but generally underlain by the local Bedrock Geology where the river valleys are incised through the superficial geology.
- 8.2.4. Beneath the superficial deposits, the solid geology comprises either Red Crag deposits or the underlying London Clay Formation, dependent upon the local topography. Where large river valleys are present, these are generally incised through these near surface bedrock deposits into the underlying Woolwich and Reading Formation and, in two locations (River Stour and River Brett Valley), into the underlying White Chalk Sub-group.
- 8.2.5. Alluvium, River Terrace Deposits, and Glacial and Fluvial Sands and Gravels are classified by the EA as Secondary A aquifers. The Woolwich and Reading Formation are also classified as a Secondary A aquifer.
- 8.2.6. The extensive Glacial Till deposits and the London Clay Formation are classified as unproductive strata.
- 8.2.7. The underlying Red Crag and the underlying White Chalk Sub-group are classified as a Principal Aquifer.
- 8.2.8. It is anticipated that there is potential for contaminated ground to be present beneath the Sections and Substation Study Areas associated with present day land

uses including active landfilling, nearby sewerage works and agricultural operations. Previous land uses are as yet unknown and may further increase the likelihood of contaminated land to be present along the proposed alignment.

8.3. Characteristics of Potential Effects

Construction, Operational and Decommissioning Phase Effects

8.3.1. The following effects on ground conditions, groundwater and surface watercourses, may occur during the construction, operational and decommissioning phases of the development if appropriate good practice and mitigation is not implemented:

- Chemical and fuel spillages and leaks from plant and machinery and other polluting substances (e.g. cement) stored on site;
- Inappropriate disposal of foul water and site derived waste;
- Creation of pathways for the migration of landfill gas and leachate (if present within the landfilled area);
- Groundwater flooding from a rise in groundwater levels;
- Contamination of surface watercourses with silt-laden runoff; and
- Direct effects on surface watercourses (such as the creation of preferential pathways for the migration of contamination, chemical and fuel spills and leaks from plant and machinery), during the construction of crossings.

8.4. Proposed Approach and Method

Consultation

8.4.1. As part of preparing the scoping report and preparing the scope of the geological assessments for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. No geological representatives were present at the meeting. Discussions on the scope of the geological assessment were undertaken and general comments were made.

8.4.2. Table 8.1 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A.

Table 8.1: Consultation on Scope of Geological Assessments

Representations, Discussions and Comments	Whether included in Scoping Report
Basic investigation works will be undertaken along the alignment comprising the excavation of 1m deep trial trenches at 200m centres.	This has been incorporated into the scoping report at the proposed approach and method.

Representations, Discussions and Comments	Whether included in Scoping Report
Along the alignment additional targeted intrusive surveys may be required if desk based investigation identifies any unexpected sources of potential contamination. However, such an instance will not be identified until the baseline data acquisition is underway.	This has been incorporated into the scoping report at the proposed approach and method.

Desk Based Assessment

8.4.3. A desk-based geo-environmental study will be undertaken to collect baseline data for the study area utilising a 250m radius search buffer. The desk-based review will be undertaken using information from the following sources:

- Ordnance Survey mapping;
- Landmark Envirocheck environmental database report, including historical maps;
- British Geological Survey maps;
- EA website, including online Aquifer Designation and Groundwater Source Protection Zone maps;
- EA Groundwater Vulnerability Maps; and
- Direct enquiries to the Local Authority Environmental Health Departments and Environment Agency.

Site Assessment

8.4.4. A site walkover survey will be undertaken to identify important geological features and evaluate the existing site setting, surface watercourses and hydrogeology and any potentially contaminative land.

8.4.5. Based on the findings of the desk based assessment and site walkover survey, it may be necessary to undertake intrusive and/or non-intrusive ground investigation works in areas of potentially contaminated ground with a view to clarifying mitigation measures.

8.4.6. The assessment is proposed to be undertaken in accordance with European and national legislation including the Water Framework Directive, BS10175 (Code of Practice for the Investigation of Potentially Contaminated Sites) and Contaminated Land Report (CLR) 11 (Model Procedures for the Management of Land Contaminated). In addition, the assessment will take account of national and local planning policies including the National Planning Policy Framework.

8.4.7. Potential effects in relation to ground contamination and land quality will be assessed using guidance given in the Construction Industry Research and Information Association (CIRIA) document 552 'Contaminated Land Risk Assessment, A Guide to Good Practice'. The assessment of significance will be based on the risk assessment process and will take account of the different sensitivities of the identified receptors.

8.5. Assessing Significance of Effects

8.5.1. The significance of likely effects arising from the proposed development on ground conditions will be determined by identifying the magnitude of the effect and the sensitivity of the receptor.

Magnitude of Effect

8.5.2. The magnitude of potential effects (both beneficial and adverse) on environmental baseline conditions is identified in Table 8.2

Table 8.2: Magnitude of Effect

Magnitude	Definition
Major	Total loss or substantial alteration to key elements or features of the baseline (pre-development) conditions such that the post-development character, composition or attributes will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character, composition or attributes of the baseline will be materially changed.
Minor	A minor shift away from baseline conditions. Change arising from the loss or alteration will be discernible but not material. The underlying character, composition or attributes of the baseline condition will be similar to the pre-development circumstances or situation.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Sensitivity of Receptor

8.5.3. A judgement has been made on the importance (sensitivity) of the receptors involved, as indicated in Table 8.3.

Table 8.3: Method for determining sensitivity/importance of the environment

Receptor sensitivity	Description
High	Areas of critical topography, including steep slopes Inner groundwater source protection zones (SPZ 1) Areas of high groundwater vulnerability Principal aquifers Areas of known/confirmed contaminated land/groundwater Rivers with a Grade A water classification Areas of flood risk (Flood Zones 2 and 3)

Receptor sensitivity	Description
	End users of the site Neighbouring properties and residents
Medium	Outer groundwater source protection zones and total catchment areas (SPZ 2 and SPZ 3) Secondary aquifers Areas with intermediate groundwater vulnerability Rivers with a Grade B water classification.
Low	Industrial site topography Rivers with a Grade C or D water classification Unproductive strata Areas with low groundwater vulnerability.

Significance of Effect

8.5.4. The categories used when classifying the overall significance of potential effects (both beneficial and adverse) by considering the sensitivity of receptor and the magnitude of effect, are shown in Table 8.4.

Table 8.4: Effect Significance Matrix

Magnitude	Sensitivity of Receptor		
	High	Medium	Low
Major	Major	Moderate	Minor
Moderate	Moderate	Moderate	Minor
Minor	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible

8.6. Mitigation and Residual Effects

8.6.1. The assessment will seek to identify suitable mitigation to reduce, remove or compensate for significant adverse effects identified. Where appropriate, opportunities to enhance beneficial effects will also be identified. The residual effect expected following mitigation will be identified.

8.7. Inter-relationship of Effects

8.7.1. The effects on ground conditions could lead to inter-related effects on hydrology, protected species and habitats, and on the wider countryside. The potential inter-relationship of effects will be considered during the assessment.

8.8. Cumulative Effects

- 8.8.1. The geological assessment will include potential cumulative effects as a result of the proposed development in combination with other major developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

9. FLOOD RISK, WATER QUALITY AND RESOURCES

9.1. Introduction

9.1.1. This chapter of the Environmental Statement (ES) will consider the likely significant effects of the proposed development on the hydrological environment and the risk of flooding to the proposed development during the construction, operational (including maintenance) and decommissioning phases of the development.

9.2. Existing Environment

9.2.1. Within a 150m buffer of the proposed development, there are a number of Main River watercourses including:

- Belstead Brook;
- River Brett;
- River Box; and
- River Stour.

9.2.2. There are also a number of smaller watercourses and unnamed watercourses and ditches which drain the area. None of the watercourses are tidally influenced.

9.2.3. Based on the Environment Agency's (EA's) online Flood Maps the main sources of flood risk are the Rivers Brett, River Box, River Stour and Belstead Brook.

9.2.4. Sections of the development are partially within Flood Zones 2 and 3. The boundary of the Flood Zones will be provided in detail in the ES chapter. The risk of river flooding in Flood Zone 2 is between the 1 in 100 year and 1 in 1000 year event and is considered to be a moderate risk of flooding. The risk of river flooding in Flood Zone 3 is within the 1 in 100 year event and is considered to be a high risk of flooding. The remainder of the proposed development is within Flood Zone 1 and the risk of flooding from fluvial sources is outside the 1 in 1000 year event and is considered to be at low risk of flooding.

9.2.5. Based on a review of Ordnance Survey mapping, there are small ponded areas within the Sections of the interim and preferred alignment and a reservoir near to Appletree Wood. Further detail on the ponded areas and location of the reservoir will be provided in the ES.

9.3. Characteristics of the Potential Effects

Construction Phase Effects

Surface Water Quality

9.3.1. The potential for adverse direct and indirect effects on the surface water environment will occur primarily during the construction phase of the proposed development.

9.3.2. Potential effects on surface water quality from the construction of the development (and decommissioning of the development) include:

- Surface water pollution from silt laden run-off (including dewatering of excavations);
- Surface water pollution from spillages and leaks of polluting substances (e.g. cement, fuel) used and stored on site; and
- Localised erosion of banks and beds of watercourses when works are required in their proximity (e.g. construction of new crossings).

Fluvial Flooding

- 9.3.3. Sections of the proposed development are in the floodplains of Main Rivers and Ordinary Watercourses (including the River Brett, River Box, River Stour and Belstead Brook). Sections of the proposed connection route are also in Flood Zones 2 and 3.
- 9.3.4. Construction activities have the potential to cause blockages within watercourses and/or impact upon the floodplains of watercourses ultimately reducing their floodwater storage capability.
- 9.3.5. It will be important that there is no increase in flood risk if the storage of any material is on the flood plain.

Flooding from Land (Pluvial Flooding)

- 9.3.6. Construction of the proposed development could potentially change pluvial flow routeing in Sections of the proposed development, which could increase the risk of pluvial flooding. This is unlikely to be significant due to the rural nature of the study area.

Flooding from Artificial Waterbodies

- 9.3.7. Based on the small size of the ponds in the study area, it is considered that the risk of flooding from these waterbodies is low.
- 9.3.8. Based on the EA's flood maps for reservoirs, it is likely that the small section of the study area around Appletree Wood would be at risk of flooding from the reservoir.

Tidal Flooding

- 9.3.9. Based on the distance of the site from the sea, the risk of tidal flooding is of nil probability. It is therefore proposed that tidal flooding should be scoped out of this EIA with no further assessments being made.

Groundwater Flooding

- 9.3.10. Groundwater flooding occurs from a rise in groundwater levels. The effects on groundwater will be assessed in the geology section of the ES. The requirement and consequences of localised dewatering will be considered.

Operational Phase Effects

Surface Water Quality

- 9.3.11. There is the possibility of some effects on surface water quality during the operational phase primarily during future maintenance.

Flooding from Sewers

- 9.3.12. Given the rural nature of the development area it is unlikely that a large number of sewerage systems will be crossed by the connection route.
- 9.3.13. No effects on flooding from sewers are anticipated as it is unlikely that the proposed development will require a connection into the existing sewerage network. Flooding from sewers is therefore proposed to be scoped out of the EIA.

Decommissioning Phase Effects

Surface Water Quality

- 9.3.14. Potential effects during decommissioning are predicted to be broadly similar to construction.

9.4. Proposed Approach and Method

Consultation

- 9.4.1. As part of preparing the scoping report and preparing the scope of the hydrological assessments for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. The representations received were taken into account when finalising the scope of the assessments. Groups that were represented at the meetings include:
- Braintree District Council;
 - Babergh District Council;
 - Mid-Suffolk District Council;
 - Suffolk County Council; and
 - Essex County Council.
- 9.4.2. Table 9.1 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A.

Table 9.1: Consultation on Scope of Hydrological Assessments

Representations, Discussions and Comments	Whether included in Scoping Report
Discussions were held around the technical surveys and studies to be undertaken to inform any Horizontal Directional Drilling (HDD) e.g. soil investigations (boreholes) and river bed depth surveys. Examples of projects where HDD has been used were discussed e.g. Ross on Wye.	The use of HDD has been considered in this scoping report.
Discussions were held regarding land drains. National Grid confirmed that before any works would be undertaken, a drainage survey would be completed, which includes speaking to land owners and occupiers, obtaining and reviewing existing map records. These will inform the temporary drainage scheme required whilst construction activities are on-going. On completion of construction works, a permanent drainage scheme would be designed and installed.	This has been incorporated into the scoping report at the proposed approach and method.
A full land drainage survey will be carried out to identify all land drains prior to any works being carried out to ensure that channel flows and capacity are not adversely impacted.	This has been incorporated into the scoping report at the proposed approach and method.
Discussions were held with the Environment Agency on the potential crossings of watercourses to identify any consent required.	This has been taken into consideration.

Desk Based Assessment

- 9.4.3. A desk study will be undertaken to further identify the existing hydrological features and assess any potential effects caused by the proposed development during construction, operational and decommissioning phases of the proposed development. The hydrology will be assessed in terms of the natural drainage patterns, base flows and volumes, run-off rates, geomorphology and water quality.
- 9.4.4. It is proposed that data will be collated from the following sources:
 - British Geological Survey (BGS) 1:50,000 scale geological mapping;
 - Information from the EA and local authorities on abstractions and discharges to watercourses;
 - Hydrogeological maps;
 - Groundwater vulnerability maps;
 - Soil survey maps;
 - EA water quality and discharge records;
 - Highway drainage records;
 - Local authority private water supply records; and

- Publications including, but not limited to, the Strategic Flood Risk Assessment (SFRA), Preliminary Flood Risk Assessments (PFRA), Catchment Management Plan (CMP) and Anglian Region River Basin Management Plan (RBMP).
- 9.4.5. Further consultation will be carried out with the EA, Mid-Suffolk District Council, Braintree District Council, Essex County Council and Suffolk County Council.
- 9.4.6. A qualitative assessment will be undertaken incorporating the objectives of the Water Framework Directive (WFD) and the issues set out for the watercourses under the Anglian RBMP so as to determine compliance with these objectives. The assessment will also identify any WFD mitigation measures proposed to improve the status of locally designated water bodies. However, since the WFD is concerned with non-temporary effects, it is considered that no appraisal of construction effects is required.
- 9.4.7. A Flood Risk Assessment (FRA) of the proposed development will be undertaken in accordance with the National Planning Policy Framework (NPPF), BS 8533-2011 *Assessing and managing flood risk in development Code of practice* and the *Interim Code of Practice for Sustainable Drainage*. The assessment will include:
- A review of previous relevant studies including geotechnical, hydrological and other previous drainage assessments;
 - A review of the existing drainage systems; and
 - Consultation with the EA, Mid-Suffolk District Council, Braintree District Council, Babergh District Council, Essex County Council and Suffolk County Council.
- 9.4.8. Under the terms of the Water Resources Act 1991, and the Anglian Region Land Drainage & Sea Defence Byelaws, prior written consent of the EA is required for any proposed works or structures, in, under, over or within 9 metres of the top of the bank of a designated a 'Main River'. Consent will be required for permanent works and any temporary works. It will be important to ensure that any in channel works do not cause blockages that could increase the flood risk in the area. Where consents from the EA is required, if possible, the consent will be sought as part of the DCO application to PINS.
- Site Assessment**
- 9.4.9. A site walkover reconnaissance survey will be undertaken to establish flood related features and other relevant information on existing drainage including crossing points.
- 9.4.10. A constraints map will be produced presenting the results of the desk-based assessment and field survey.

9.5. Approach to the Assessment of Effects

9.5.1. Potential effects will be assessed using criteria from the Institute of Environmental Management (IEMA)⁴⁸. Where necessary, mitigation strategies will be devised in consultation with the EA, and will follow best practice guidelines including the EA's Pollution Prevention Guidelines,

Magnitude of Effect

9.5.2. The assessment will seek to identify suitable mitigation to reduce, remove or compensate for significant adverse effects identified, for example, a drainage strategy will be developed to address the management of surface waters to ensure flood risk to the surrounding area is not increased. Appropriate pollution prevention and site management methods will be outlined to protect local residents, workers and the environment during site development. An assessment of residual effects after mitigation will be presented.

9.5.3. The magnitude of potential effects (both beneficial and adverse) on hydrological baseline conditions will be identified through the detailed consideration of the proposed development. The following criteria will be used for determining the magnitude of a particular effect:

- High Magnitude - Total loss or major alteration to key elements or features of the baseline conditions to the extent that post-development character or composition of baseline conditions will be fundamentally changed;
- Moderate Magnitude - Loss or alteration to one or more key elements or features of the baseline conditions to the extent that post-development character or composition of the baseline conditions will be materially changed;
- Low Magnitude - Minor shift away from baseline conditions. Changes arising will be detectable but not material; the underlying character or composition of the baseline conditions will be similar to the pre-development situation; and
- Negligible Magnitude - Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

Sensitivity of Receptor

9.5.4. The sensitivity of the hydrological baseline conditions will be assessed with reference to the relative importance of existing features on or near to the connection route (e.g. whether features are of national, regional or local importance) and by the sensitivity of receptors which would potentially be affected by the development. The following criteria will be used for determining the sensitivity of receptors:

- Very High Sensitivity - The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance e.g. European

⁴⁸ Institute of Environmental Management: The State of Environmental Impact Assessments in the UK:IEMA 2011

Community (EC) designated salmonid fishery or Flood plain or defence protecting more than 100 residential properties from flooding;

- High Sensitivity - The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance e.g. a waterbody with a water quality status of good to high or a flood plain or defence protecting between 1 and 100 residential properties or industrial premises from flooding;
- Moderate Sensitivity - The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance. e.g. a watercourse of interest at a County, regional or national scale with a water quality status of moderate to good. Or a flood plain or defence protecting 10 or fewer residential properties or industrial premises from flooding.
- Low Sensitivity - The receptor is tolerant of change without detriment to its character, is of low environmental value, or local importance e.g. a watercourse of interest at a local to district scale with a water quality status of poor to moderate or an area of flood plain with limited constraints and a low probability of flooding of residential and industrial properties; and
- Negligible Sensitivity - The receptor is resistant to change or is of little environmental value. e.g. a local water feature of very limited value or very poor quality or an area outside flood plain or flood plain with very low probability of flooding.

Significance of Effect

9.5.5. A combination of the magnitude of the likely effect and the sensitivity of the receiving environment will determine the overall significance of effects. The significance of the likely effects arising from the proposed development will be categorised as follows:

Table 9.2: Significance of Effect

Magnitude	Sensitivity/Importance				
	Very High	High	Moderate	Low	Negligible
High	Major	Moderate	Moderate	Moderate	Minor
Moderate	Moderate	Moderate	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Minor	None
Negligible	Minor	Minor	None	None	None

- 9.5.6. Table 9.2 is based on the Institute of Environmental Management's '*Statement of Environmental Impact Assessment in the UK*⁴⁹ as a guide to approach the assessment of an effect's significance.

9.6. Mitigation and Residual Effects

- 9.6.1. Where appropriate, opportunities to enhance beneficial effects will also be identified. The residual impact expected following mitigation will be identified.

9.7. Inter-relationship of Effects

- 9.7.1. The effects on hydrology could lead to effects on protected species and habitats, and on the wider countryside. The potential inter-relationships of effects will be considered during the assessment.

9.8. Cumulative Effects

- 9.8.1. The hydrological assessment will include potential cumulative effects as a result of the proposed development in combination with other major developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

⁴⁹ Institute of Environmental Management: The State of Environmental Impact Assessments in the UK: IEMA 2011

10. TRAFFIC AND TRANSPORT

10.1. Introduction

10.1.1. This chapter of the Environmental Statement (ES) will use the results of the Transport Assessment to consider the likely significant effects of traffic associated with the proposed development during the construction, operational and decommissioning phases of the works. The chapter will also include an assessment of the likely effects on other aspects of the transport network, such as, Public Rights of Way (PRoW), footpaths, public bridleways, byways, railways, rivers and cycle routes. This will include the potential effects on the users of the transport networks including, pedestrians, cyclists, equestrians, service buses, school buses, heavy goods vehicles, users of the rivers and general road traffic. The assessment will include the identification of sensitive receptors, roads and access points likely to be affected, the extent of any likely effects, and potential mitigation measures to reduce or remove identified effects.

10.2. Existing Environment

10.2.1. The development area is rural and is predominantly used for arable farming. The existing road system mainly comprises B-roads and lanes that serve access to villages and individual properties and farms. The main roads to access the area of the proposed development are the A1071, which travels east and west to the north of the route corridor; the A134, which travels north and south to the east of Assington and connects to the A1071; and the A131, which travels north and south to the west of Twinstead and connects to the A134. The main roads link the larger villages and towns near to the proposed development including, Sudbury, Boxford and Hadleigh and link to Ipswich. Many lanes within and adjacent to the proposed development are protected under local planning policies.

10.2.2. There are many PRoW that cross the alignment and the Substation Study Areas. A railway track crosses the alignment in a north and south direction to the south of Sudbury in Section G - Stour Valley and is adjacent to the River Stour. The River Stour is navigable by shallow-draft boats such as a canoe or a rowing boat.

10.3. Characteristics of the Potential Effects

Construction Phase Effects

10.3.1. The construction of the proposed development will result in temporary increases in traffic flow on the road networks around the development associated with the delivery of materials, plant and equipment and the removal of spoil. There may also be a requirement for abnormal loads on the highway network for the delivery of the super grid transformer delivered to the substation. It is likely that temporary haul roads will be required immediately parallel along the underground cables location to facilitate the movement of construction vehicles. Permanent access roads will be required to the substation and sealing end compounds.

10.3.2. The activities listed above could result in effects including:

- Temporary increases in existing traffic flows;
- Temporary road closures (mainly short night closures), diversions and/or widening;
- Temporary disruption on railway tracks due to short overnight closures;

- Temporary bell mouths and site entrances for access to construction areas;
- Temporary closures and/or diversions of PRow and other public access routes;
- Temporary disruption to Protected Lanes; and
- Temporary disruption to traffic flows associated with vehicle access points to the connection alignment, substation, temporary haul road and/or permanent access roads to the substation and sealing end compounds.

10.3.3. Effects that may occur on the transport networks could potentially affect the users including:

- Pedestrians;
- Cyclists;
- Equestrians;
- Service buses;
- School buses;
- Heavy goods vehicles deliveries;
- General road traffic users; and
- Users of the rivers, such as sailors and canoeists.

10.3.4. Once construction is complete, reinstatement of the transport network will be to its original condition. Photographs and videos will be taken of all access routes before, during and after the construction works, to ensure that there is a record of road conditions throughout the project.

Operational Phase Effects

10.3.5. It is not anticipated that there will be adverse effects on transport networks during the operational phase of the development and is proposed to be scoped out of the EIA. Permanent access roads are required to the substation and sealing end compounds. Traffic movements will be limited to infrequent repair and routine maintenance works on all aspects of the development. Where any repair works are required on the development, there may be a temporary minor increase in construction vehicles providing and removing equipment to and from the site.

Decommissioning Phase Effects

10.3.6. The effects on the transport networks during the decommissioning of the development will be similar to the effects identified during the construction phase. It is likely there will be temporary increases in traffic flow associated with the removal of materials, plant and equipment and the removal of spoil. There may also be a requirement for abnormal loads on the highway network for the removal of the Super Grid Transformer at the substation. It is likely that temporary haul roads will be required immediately parallel along the underground cables to facilitate the movement of construction vehicles. The permanent access roads to the substation and sealing end compounds will be removed.

10.4. Proposed Approach and Method Consultation

10.4.1. As part of preparing the scoping report and preparing the scope of the traffic and transport assessments for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. The

representations received were taken into account when finalising the scope of the assessments. Groups that were represented at the meetings include:

- Braintree District Council;
- Babergh District Council;
- Mid-Suffolk District Council;
- Suffolk County Council; and
- Essex County Council.

10.4.2. Table 10.1 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A.

Table 10.1: Consultation on Scope of Traffic and Transport Assessments

Representations, Discussions and Comments	Whether included in Scoping Report
<p>National Grid discussed the following requirements and procedures usually undertaken during construction:</p> <ul style="list-style-type: none"> • Construction preference is to close or divert PRow where affected by working areas and access roads; • Construction will identify diversions and netting of PRow where appropriate, subject to feasibility; • For stringing works, 2 x 4 week closures may be required on PRow; and • For safety reasons, pylons are not designed to be positioned on PRowS, roads or ditches. 	<p>This has been taken into consideration in the scoping report in the ‘potential effects during construction’ section.</p>
<p>National Grid discussed the following requirements and procedures usually undertaken during construction:</p> <ul style="list-style-type: none"> • Netting is undertaken overnight, with a 4 hour closure; • Consultation is undertaken before the submission of the EIA; • Only abnormal loads are expected for the delivery of transformers to the new substation site; and • A condition assessment of roads and PRowS can be done before, during and after the works. Photos are given a grid reference and are accompanied by a written description. Joint inspection with a County Council officer is possible. 	<p>This has been taken into consideration in the scoping report in the ‘potential effects during construction’ section.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>Under Public Rights of Way:</p> <ul style="list-style-type: none"> • Netting should be considered for priority PRow; • When stiles are removed as part of the works, SCC policy is to normally leave a gap unless a barrier is required to retain livestock, in which case a hand or bridle gate should be installed; • Reinstatement needs to be to at least existing standard, and in any case in line with SCC current standards; • Temporary closures must be sought a minimum of 8 weeks prior to the requested date of closure. 	<p>These proposed mitigation methods will be considered during the assessment and in the ES.</p>

Desk Based Assessment and Site Assessment

- 10.4.3. The Transport Assessment is proposed to be produced in line with the document “Guidance on Transport Assessments” and proposed to use relevant assessment guidelines including WebTAG and Design Manual for Roads and Bridges (DMRB) methods where appropriate.
- 10.4.4. A desk-based study and traffic count surveys will be undertaken focusing on the transport network in the vicinity of the proposed development. The study will consider existing traffic flows based on available traffic data and identify how the construction works and associated traffic movements will affect the existing transport networks, including roads, railway tracks, rivers and PRow. The assessment will also identify ‘pinch-points’ on the networks which may affect construction activities and access routes. In consultation with the highways agency and local planning authorities, traffic counts will be carried out to support desk top studies.
- 10.4.5. The assessment will take into account the sensitivities of the transport networks, (including effects on users and people living in close proximity to the roads), the nature of the effect and whether potential effects are temporary or permanent.
- 10.4.6. The assessment will:
 - Attribute sensitivity to specific receptors;
 - Identify roads and other accesses at increased risk of adverse effects due to increase in vehicle movements, vibration and noise from construction vehicles, and construction dust or vehicle emissions;
 - Identify extent of likely effects, before and after mitigation; and
 - Comment on the requirement for construction traffic management plan(s).

Data Sources

- 10.4.7. It is proposed that information from relevant development plans will be obtained to provide an overview of the transport networks and areas that are likely to be

affected in the vicinity of the proposed development, for example, allocated areas for highway improvements or new highways. In consultation with the Highways Agency and local planning authorities, traffic data will be collected for roads directly and indirectly affected by the proposed development. Where applicable, consultation will be undertaken with the District Authorities regarding the designated Protected Lanes to understand the use and amenity of the highway network.

10.5. Assessing the Significance of Effect

10.5.1. The significance of likely effects arising from the proposed development on traffic and transport will be determined by identifying the magnitude of the effect and the sensitivity of the receptor. Identifying the sensitivity, magnitude and significance will be based on the criteria described in the DMRB⁵⁰.

Magnitude of Effect

Table 10.2: Criteria for Defining Magnitude of Effect

Magnitude of impact	Typical criteria descriptors
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

⁵⁰ Department for Transport: Design Manual for Roads and Bridges: Volume 11: Section 2: Part 5: 2008.

Sensitivity of Receptor

Table 10.3: Criteria for Defining Sensitivity of Receptors

Value (sensitivity)	Typical descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low (or Lower)	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Significance of Effect

Table 10.4: Criteria for Assessing Significance

Environmental Value (Sensitivity)	Magnitude Of Impact (Degree of Change)					
		No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large	
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large	
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large	
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate	
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight	

10.6. Mitigation and Residual Effects

10.6.1. The assessment will seek to identify suitable mitigation to reduce, remove or compensate for significant adverse effects identified. Where appropriate, opportunities to enhance beneficial effects will also be identified. The residual impact expected following mitigation will be identified.

10.7. Inter-relationship of Effects

10.7.1. The effects from traffic could lead to effects on air quality, noise and vibration and on landscape and views. The potential inter-relationship of effects will be considered during the assessment.

10.8. Cumulative Effects

10.8.1. Cumulative impacts for the construction, operational and decommissioning phases of the development will be considered by assessing the combined effects of the development with major developments which could result in accumulation of effects

on the transport network. In particular, it will be necessary to identify major developments where there may be overlapping construction timetables. This will be completed through consultations with the local planning authorities.

11. AIR QUALITY AND EMISSIONS

11.1. Introduction

- 11.1.1. An assessment will be undertaken of the likely significant effects on air quality that may occur during the construction of the development. Potential effects on air quality may be due to particulate matter, for example dust from earthworks, or gases, such as nitrogen oxides from vehicle exhausts.
- 11.1.2. The proposed development will not adversely affect air quality during its operation. The proposed development does not release emissions. Effects on air quality during the operation of the development will not be assessed as part of this EIA.
- 11.1.3. The decommissioning of the proposed development is likely to have similar effects on air quality to those effects identified in the construction phase.

11.2. Existing Environment

- 11.2.1. The proposed development is within three different local authority boundaries. There is only one Air Quality Management Area (AQMA) in these three districts which is that declared by Babergh District Council that encompasses part of Cross Street in Sudbury for Nitrogen Dioxide (NO₂) and respirable dust (PM₁₀). The proposed connection route does not cross through and is not close to this AQMA. The potential for construction traffic to affect the air quality will be considered in this chapter of the ES.

11.3. Characteristics of the Potential Effects

Construction Phase Effects

- 11.3.1. Construction activities associated with the proposed development may give rise to dust emissions and vehicle emissions, although these will be temporary and restricted to areas close to construction activity. The potential for dust nuisance is most likely to arise from the movement of vehicles over soil, topsoil stripping, trench digging, storage of excavated subsoil, material transfers to and from lorries, material spills during transportation, handling and particularly during prolonged periods of dry weather. Construction traffic leaving the site may also bear dust and mud from the working areas which can be spread as vehicles move along the local highway network.
- 11.3.2. The amount of nitrogen oxides and ammonia released from the construction-related emission sources is considered to be negligible when compared to those released from the traffic on the existing road network. Whilst the construction-related air quality impacts tend to be temporary and local to the construction site areas, the eutrophication effect is a regional and long-term phenomenon. Hence the potential eutrophication effect caused by the construction activities is scoped out of the air quality assessment.
- 11.3.3. Vehicle and machinery activities associated with the construction of the development will give rise to emissions, for example from petrol and diesel combustion. The effects of these emissions may have the potential to reduce air quality and affect human health.

Operational Phase Effects

- 11.3.4. The overhead line, underground cables and sealing end compounds will not give rise to emissions or direct effects which could influence air quality. If a substation is developed sulphur hexafluoride (SF₆) will be used to insulate the equipment. SF₆ is a greenhouse gas which, if leaked into the atmosphere, could increase greenhouse gas levels. There is a very low risk of SF₆ being leaked from a substation. During the operational phase of the substation, it is currently anticipated that there will be a monthly running of the auxiliary diesel generator. The potential effects of SF₆ being leaked into the atmosphere and the effects of the use of the diesel generator will be assessed during the air quality assessment if a substation is proposed.
- 11.3.5. The eutrophication effects are potentially caused by emissions to air from large stationary combustion sources such as those installed in energy generating plants. As noted in paragraph 11.3.2, no significant emission sources, such as large combustion plants, are proposed as part of the development. The potential eutrophication effects of the proposed development are considered to be negligible and scoped out of the air quality assessment.

Decommissioning Phase Effects

- 11.3.6. Effects from the decommissioning phase of the project are likely to be similar to those identified during the construction phase.

11.4. Proposed Approach and Method *Consultation*

- 11.4.1. As part of preparing the scoping report and preparing the scope of the air quality assessments for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. The representations received were taken into account when finalising the scope of the assessments. Groups that were represented at the meetings include:
- Braintree District Council;
 - Babergh District Council;
 - Mid-Suffolk District Council;
 - Suffolk County Council; and
 - Essex County Council.
- 11.4.2. Table 11.1 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A.

Table 11.1: Consultation on Scope of Air Quality Assessments

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The following points were discussed during the discussion on Air Quality:</p> <ul style="list-style-type: none"> • Air quality and dust impacts are relevant at the locations of sensitive receptors; • Sensitive receptors selected for assessment will include residential homes and ecologically sensitive sites; • Background air quality conditions are characterised using DEFRA's UK-AIR data (no specific onsite measurements are considered necessary). The UK-AIR data provides background air quality data for all council areas, at a resolution of 1km x 1km. This data will identify any air quality-sensitive locations along the cable route and near the substation; • The assessment will consider construction phase and operation phase separately; • Guidance provided by Environmental Protection UK and the Institute of Air Quality Management are specifically relevant to identify air quality and dust impacts of this project. National Grid will follow these guidance criteria in order to determine the scope of works and mitigation measures; • Construction phase dust impacts are from (i) Construction equipment operation (ii) Road traffic - Heavy Duty Vehicles (HDVs). Construction impacts are localised and for a short duration (works are done for short period at any given stretch of the cable route and at the substation location). The number of HDVs generated as a result of this project at any given stretch will be negligible when compared to the HDVs on the existing road network. Dust and air quality impacts are not considered significant at locations greater than 100m from the emission generation source. Mitigation measures will be included in the EIA to control dust and air pollution impacts; • Operational impacts are considered negligible; and • Cumulative impacts where required will also be addressed within the air quality Environmental Statement chapter. 	<p>This has been taken into consideration in the scoping report in the 'potential effects during construction' section and 'proposed approach to the assessment' section.</p>
<p>The proposed assessment method will be documented and consulted on with individual Scientific Officers (or</p>	<p>This has been incorporated in the</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>Environmental Health Officers (EHOs) who deal with air quality and dust issues) separately to obtain any further comments and agreement on the method. All comments will be considered and addressed in the assessment where appropriate to inform the EIA.</p>	<p>scoping report at the proposed approach and method.</p>
<p>The following comments will be considered during the assessment where appropriate to inform the EIA:</p> <ul style="list-style-type: none"> • The public should be informed about the construction works and any deviations; • Mitigation measures should be applied as per the agreed plans e.g. the Construction Environmental Management Plan; and • It is unlikely there will be significant air quality and dust issues from a project of this type. 	<p>This has been incorporated in the scoping report.</p>
<p>National Grid explained that they follow best practice methods for construction works that aim to minimise impacts on local air quality.</p>	<p>This has been incorporated in the scoping report at the proposed approach and method.</p>

Desk Based Assessment

- 11.4.3. Current air quality conditions along the proposed alignment, the existing 132kV overhead line and at the sites of the substation and sealing end compounds will be characterised using publicly available data from the following sources:
- District Councils’ air quality monitoring programmes; and
 - Data from the Department for Environment, Food and Rural Affairs (DEFRA) online monitoring records, <http://uk-air.defra.gov.uk/>
- 11.4.4. Additional consultation will be undertaken with EHO’s at Braintree, Babergh and Mid-Suffolk District Councils. Any concerns raised by the EHO’s will be taken into consideration.
- 11.4.5. A qualitative assessment of the effects of construction works on air quality is proposed to be carried out with reference to the following guidance:
- The Institute of Air Quality Management’s (IAQM) Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance;
 - The Greater London Authority (GLA) and London Councils’ Best Practice Guidance on The Control of Dust and Emissions from Construction and Demolition; and
 - The Environmental Protection (UK) Planning for Air Quality (2010 Update) guidance on dealing with air quality concerns within the development control process.

11.4.6. Should the Transport Assessment identify that significant additional road traffic will be generated on the existing road network during the construction phase, a quantitative assessment of road traffic emissions to air will be undertaken using the method outlined in the DMRB developed by the UK Department for Transport. Sensitive receptors (for example, residential homes and ecologically sensitive sites) will be included in the assessment and pollutant concentrations will be predicted at these locations for comparison with relevant air quality standards after accounting for background air quality conditions.

11.5. Assessing the Significance of Effects

11.5.1. The significance of likely effects arising from the proposed development on air quality will be determined by identifying the magnitude of the effect and the sensitivity of the receptor. Identifying the sensitivity, magnitude and significance will be based on the criteria described below.

Magnitude of Effect

11.5.2. The Institute of Air Quality Management (IAQM) has published a guidance document for the assessment of construction phase impacts. The risk category of the construction site is assessed and used to specify the level of mitigation required. To assess the potential impacts, construction activities are divided into four types, as follows:

- Demolition;
- Earthworks;
- Construction; and
- 'Trackout' of material onto local roads.

11.5.3. For each activity, the risk of dust annoyance and/or health or ecological impacts is determined using three risk categories: low, medium and high risk.

Sensitivity of Receptor

11.5.4. Example criteria to identify the sensitivity of the surrounding area are provided in the IAQM guidance and are summarised in Table 11.2, below.

Table 11.2: Sensitivity of the Area Surrounding the Site

Sensitivity of Area	Human Receptors	Ecological Receptors ⁽¹⁾
Very High	Very densely populated area; >100 dwellings within 20m; Local PM ₁₀ concentrations exceed the objective; Contaminated building present; Very sensitive receptors (e.g. oncology units); Works continuing in one area of the site for more than 1 year	European Designated site.
High	Densely populated area; 10 - 100 dwellings within 20m; Local PM ₁₀ concentrations close to the objective (annual mean 36 - 40µg/m ³); Commercially sensitive horticultural land within 20m.	Nationally Designated site
Medium	Suburban or edge of town area; <10 dwellings within 20m; Local PM ₁₀ concentrations below the objective (annual mean 30 - 36µg/m ³)	Locally designated area
Low	Rural or industrial area; No receptor within 20m; Local PM ₁₀ concentrations well below the objective (<75%) Wooded area between site and receptors	No designations

Note: (1) Only if there are habitats that might be sensitive to dust.

Significance of Effects

- 11.5.5. The criteria for assessment of the significance of effects for each of the four construction activities, before applying mitigation measures, is summarised in **Error! Reference source not found.** below.

Table 11.3: Significance of Effects for Each Activity (Before Mitigation)

Sensitivity of surrounding area	Risk of Site Giving Rise to Dust Effects		
	High	Medium	Low
Very High	Substantial adverse	Moderate adverse	Moderate adverse
High	Moderate adverse	Moderate adverse	Slight adverse
Medium	Moderate adverse	Slight adverse	Negligible
Low	Slight adverse	Negligible	Negligible

11.6. Mitigation and Residual Effects

11.6.1. Appropriate mitigation measures will be formulated to minimise any adverse effects during construction, potentially including:

- Recycling materials to reduce the extent of off-site disposal and the use of fresh materials, thus reducing the need to load, unload and transport potentially dust generating materials;
- Minimising dust generation from the loading of lorries by wetting of very fine or dry materials and minimising drop heights;
- Using wheel washers;
- Covering lorries carrying potentially dust generating materials;
- Wetting or profiling materials stored on site to minimise dust generation by the wind;
- Locating storage areas away from potentially sensitive receptors where practicable;
- Siting stationary equipment with the potential for dust generation (such as sieving equipment) distant from sensitive receptors. Where dust generating operations are close to sensitive receptors, providing enclosures if appropriate;
- Sweeping access roads and crossing points of highways along the route periodically to remove dust from hard surfaces;
- Watering unsurfaced working areas when necessary (such as during prolonged periods of dry weather) to maintain moisture content and reduce dust generation;
- Monitoring road crossings for mud deposition on the public roads and employing road brushes and road sweepers where necessary to control mud on public roads at construction crossing points; and
- Restricting site vehicle speeds and requiring all vehicles to adhere to site speed limits which will be designed to minimise on site dust generation.

11.6.2. The assessment will seek to identify suitable mitigation to reduce, remove or compensate for significant adverse effects identified. Where appropriate, opportunities to enhance beneficial effects will also be identified. The residual impact expected following mitigation will be identified.

11.7. Inter-relationship of Effects

- 11.7.1. The effects on air quality as a result of emissions from the construction phase of the proposed development could lead to effects on health, protected species and habitats, and on the wider countryside. The potential inter-relationship of effects will be considered during the assessment.

11.8. Cumulative Effects

- 11.8.1. The air quality and emissions assessment will include potential cumulative effects as a result of the proposed development in combination with other major developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

12. NOISE AND VIBRATION

12.1. Introduction

12.1.1. This chapter of the Environmental Statement (ES) will assess the likely significant noise and vibration effects associated with the construction, operation and decommissioning of the proposed development.

12.2. Existing Environment

12.2.1. The proposed development is predominantly in rural areas, which are anticipated to be low noise environments. Existing noise sources will include road traffic noise and agricultural noise from farm machinery.

12.3. Characteristics of the Potential Effects

Construction Phase Effects

12.3.1. During the construction of the development there are potential activities that could generate temporary noise and vibration effects including:

- Deliveries;
- Site preparation and construction of compound(s) and access roads;
- Trenching;
- Welding and grinding;
- Cable laying;
- Horizontal Directional Drilling (HDD);
- Backfilling;
- Preparing foundations of substation, sealing end compounds and pylons;
- Removal of existing overhead lines;
- Installation of substation, sealing end compounds and pylons; and
- Restoration works.

12.3.2. Vibration sensitive receptors will only experience effects if the vibrations produced by the proposed development are adjacent to them. The main aspect of the proposed development that is likely to cause vibration effects on receptors is the movement of construction vehicles on roads. The location of the access roads is currently being developed by National Grid. If the access roads and haul roads are near to sensitive receptors, a qualitative assessment of vibration effects will be undertaken. Vibration effects are only likely to occur if the existing road surfacing is damaged.

Operational Phase Effects – Substation

12.3.3. There are three basic sources of audible noise from substations. Each of these has its own characteristic frequency spectrum and pattern of occurrence due to the nature of the noise-generating mechanisms involved.

- Transformer noise is practically constant, with a low frequency hum occurring at exact harmonics of the supply frequency; 100Hz and 200Hz components are usually dominant. Transformers generally run continuously except for occasional maintenance and fault outages. Transformer coolers generate broadband noise, however these generally operate infrequently, depending on temperature and loading;

- Switchgear noise is generated, in the main, by the operation of circuit breakers whose noise is “impulsive” in character (i.e. of short duration). Switchgear operations will be very infrequent. Modern switchgear of the SF6 type operates with a dull ‘thud’; and
- Substation auxiliary plant comprises standby diesel generators. When present, these may contribute to the broadband noise climate. They do not run continuously, and in any case, are housed in a building or outdoor acoustic enclosure. Noise from such assets, if installed at the substation, is seldom discernible beyond the substation perimeter fence.

12.3.4. For the purposes of the substation noise assessment, the only relevant noise is from the transformer and its cooler.

Operational Phase Effects – Overhead Line

12.3.5. Noise from energised overhead lines is produced by “corona discharge” (a limited electrical breakdown of the air). For audible noise to be generated, the conductor surface electrical stress has to exceed the inception level for corona discharge activity. The level of surface electrical stress is derived from a combination of factors, including the operating voltage, diameter of conductors and the number of conductors which are “bundled” together. The proposed overhead line triple conductor system at the proposed operating voltage is designed to be quiet in all operating modes and weather conditions, since the surface electrical stresses are too low to instigate audible noise

12.3.6. Pylon fittings, including insulators, can produce audible noise but this is weather dependant. The noise produced dissipates within tens of metres from the source. The design of the insulators on the pylon fittings minimises noise impacts by extensive corona and wind tunnel testing of prototype designs prior to the procurement process for new equipment.

12.3.7. No significant noise effects are anticipated during the operational phase of the proposed overhead line and this is proposed to be scoped out of this assessment.

Operational Phase Effects – Underground Cables and Sealing End Compounds

12.3.8. High voltage underground cables have no noise effects and are proposed to be scoped out of this assessment.

12.3.9. Sealing end compounds have no noise effects and are proposed to be scoped out of this assessment.

Operational Phase Effects – Maintenance

12.3.10. The connection route, sealing end compounds, and substation will require routine inspections and occasional maintenance works, which are very unlikely to result in noise disturbance. Any noise disturbances caused by maintenance works will be slight and temporary. Noise associated with maintenance is proposed to be scoped out of this assessment.

Operational Phase Effects – Vibration

- 12.3.11. There will be no vibration effects during the operation of the development and is proposed to be scoped out of this assessment.
- 12.3.12. The development will require routine inspections and occasional maintenance works, which are very unlikely to result in adverse vibration effects on receptors. Any vibration disturbances caused by maintenance works will be slight and temporary. Vibration associated with maintenance is proposed to be scoped out of this assessment.

Decommissioning Phase Effects

- 12.3.13. Decommissioning of the development will be undertaken once its useful life is complete. It is assumed that the noise and vibration impacts for the decommissioning process would be much the same as the construction phase, assuming the decommissioning of the entire connection route, sealing end compounds and substation.

12.4. Proposed Approach and Method

Consultation

- 12.4.1. As part of preparing the scoping report and preparing the scope of the noise and vibration assessments for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. The representations received were taken into account when finalising the scope of the assessments. Groups that were represented at the meetings include:
- Braintree District Council;
 - Babergh District Council;
 - Mid-Suffolk District Council;
 - Suffolk County Council; and
 - Essex County Council;
- 12.4.2. Table 12.1 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A. A draft scoping report was sent to the relevant councils, with comments incorporated into the final document where appropriate.

Table 12.1: Consultation on Scope of Noise and Vibration Assessments

Representations, Discussions and Comments	Incorporation into the Scoping Report
<p>The Group commented that there are limitations to the use of BS 4142 in rural locations due to the method of assessment and suggested that the WHO guidance for community noise may be better criteria to work to in this instance.</p>	<p>Although technically out of scope of BS4142 due to the quiet rural location, National Grid believes that this is still the most appropriate method to assess potential effects on sensitive receptors to determine the level of mitigation required. Compliance with WHO guidelines will also be considered as part of the assessment.</p>
<p>The Group noted that with regard to substation noise, both during construction and operation, it is considered best to consult with individual councils as the impacts from these are localised.</p>	<p>Consultation has been undertaken through meetings (Appendix A). If required, National Grid will undertake further consultation with the District Councils.</p>
<p>The Group noted that it will be necessary to assess the effect of noise and vibration from Heavy Duty Vehicle (HDV) on construction traffic routes.</p>	<p>National Grid confirmed noise will be assessed against BS 5228-1 (paragraph 13.4.5)</p> <p>National Grid confirmed an assessment of vibration effects on nearby sensitive buildings will be undertaken.</p> <p>Approach Incorporated.</p>
<p>The Group noted that the assessment of tonal penalty in BS 4142 needs to be applied to the substation noise.</p>	<p>National Grid’s assessment methodology for substation noise includes a +5dB penalty for tonality in transformer noise.</p> <p>Approach Incorporated.</p>

Representations, Discussions and Comments	Incorporation into the Scoping Report
The Group suggested that cumulative impacts from neighbouring developments should be considered in the assessment.	National Grid will identify if any other major developments are proposed to be constructed at the same time as the proposed Bramford to Twinstead Tee Connection to determine if there would be additional noise and vibration effects from construction traffic.
National Grid confirmed that they apply best practice guidance in order to maximise the distance between the works undertaken and the sensitive receptors.	Approach Incorporated.
National Grid explained the use of three bundle cables to reduce electrical stress and noise from overhead lines. The likelihood of an impact from noise from the new ('triple bundle') lines is considered to be negligible and is proposed to be scoped out of the assessment.	Approach Incorporated.

Desk Based Assessment

- 12.4.3. A desk-based review will be undertaken to identify potential noise and vibration sensitive receptors, which could include residential properties, businesses and recreational users of the area.
- 12.4.4. The desk-based study will identify those receptors that are nearest to the development. The receptors beyond 1km of the development are unlikely to experience noise effects from the construction of the development.

Construction Assessment

- 12.4.5. A desk-based assessment of construction noise will be undertaken in accordance with BS 5228:2009: Noise and Vibration Control on Construction and Open Sites, using tabulated noise output data for typical items of construction plant and machinery. Predictions will be assessed against standard threshold levels.
- 12.4.6. Due to the rural nature of the surrounding area it is assumed background noise levels are below the cut-off value for threshold values for construction noise of 65dB(A), 55 dB(A) and 45 dB(A) for daytime, evening and night-time respectively (as per the 'Example Method 2-5 dB(A) change' assessment method within BS 5228: 2009, Appendix E.3.3). As a result, no baseline monitoring is required. Noise measurements already undertaken by National Grid in the area indicate that this approach is acceptable.

Operation Assessment

- 12.4.7. The substation operational noise assessment would be technically out of scope of BS 4142 due to the very low background noise levels in the area. However, it is recognised that the application of the World Health Organisation (WHO) guidelines could also be inappropriate because this would allow levels at residential facades to be substantially increased from the existing low level. The BS4142 method will be applied to identify potentially significant adverse effects and will be used to specify appropriate noise mitigation for the transformer to ensure sensitive receptors will not be adversely affected by noise emitted from the transformer. Compliance with WHO 'Night-time Noise Guidelines for Europe' will also be demonstrated

12.5. Assessing the Significance of Effects

- 12.5.1. The significance of likely effects arising from the proposed development on noise and vibration will be determined by identifying the magnitude of the effect and the sensitivity of the receptor. Detailed criteria to identify the sensitivity, magnitude and significance will be submitted as part of the ES. The criterion is proposed to be based on the latest guidance within British Standards and will be formalised after the responses to scoping have been received to take into account comments made by consultees.

12.6. Mitigation and Residual Effects

- 12.6.1. Mitigation will focus on front end engineering in the design and post-consenting stages to avoid or minimise effects as far as possible.
- 12.6.2. Mitigation during the construction phase may include working time restrictions and the provision of an appropriate Construction Management Plan.
- 12.6.3. Mitigation of operational substation noise will be achieved by considering general and site specific mitigation measures, such as acoustic enclosures and sound barrier walls, as part of the design where necessary.
- 12.6.4. If any residual impacts are identified, these will be detailed in the ES.

12.7. Inter-relationship of Effects

- 12.7.1. The potential inter-relationship of effects such as noise on protected species and habitats will be considered during the assessment.

12.8. Cumulative Impacts

- 12.8.1. The assessment will include potential cumulative effects for the construction phase as a result of the proposed development in combination with other major developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

13. SOCIO-ECONOMICS AND LAND USE

13.1. Introduction

13.1.1. This Chapter of the Environmental Statement (ES) will assess the likely significant effects on socio-economic features and on existing and future land uses as a result of the proposed development during the construction, operational (including maintenance) and decommissioning phases of the project.

13.2. Existing Environment

13.2.1. Baseline data collection was undertaken to identify socio-economic and land use features during earlier stages of the project. Potential effects on these features were assessed and the findings contributed to identifying technically and environmentally feasible options to determine the preferred alignment.

13.2.2. The data sources used to describe the socio-economic baseline included: the Dedham Vale AONB Visitor Survey and Visitors Perception Survey (2009); official labour market statistics; Visit England statistics; a Postcode address data file on tourist related business (2012); publicly available mapping, local, regional and national economic and social indices databases, policy documents and strategies, national, regional and local development plan documents and other publicly available information. Field surveys were also undertaken to identify local businesses within, and close to, the route corridor. Baseline data will be updated as new evidence becomes available, such as that being released from the 2011 census⁵¹.

13.2.3. The route corridor has been divided into Sections to allow for a more manageable assessment and presentation of baseline information. A description of the existing land uses and specific socio-economic features is provided below for each Section along the route corridor, and for the Substation Study Areas which are currently being considered to select the optimal and least constrained location. The predominant land use within all of the Sections of the route corridor and Substation Study Areas is arable farming but it does not account for a large proportion of This has been taken into account.

13.2.4. A description of the socio-economic characteristics of the whole study area is provided below to set the context for the project. Detailed data tables are available in Appendix B.

Route Corridor Socio-Economic Characteristics

13.2.5. The baseline socio-economic characteristics of the proposed development area have been obtained utilising the following spatial approaches.

13.2.6. The practicality of defining the spatial parameters for socio-economic impacts is complex. In addition, there are a range of spatial levels over which socio-economic information is available, for instance, Lower Layer Super Output Areas (LSOA),

⁵¹ <http://www.ons.gov.uk/ons/guide-method/census/2011/index.html>

ward profiles and local authority administrative boundaries. A two tier study area will be defined for the assessment:

1. Local Area of Influence – this will address the overall footprint of the development plus a 250m corridor around the footprint. This will be the focus of the assessment of direct impacts. The 250m corridor is considered to be the extent within which other impacts affecting socio-economic receptors (e.g. noise, air quality and transport) will occur. However, should the assessment of these topics suggest significant impacts over a greater/lesser extent this will be taken into account.
2. Wider Study Area – this will include the Local Area of Influence and also the wider area in which socio-economic effects could occur. This will be defined based on the scale at which suitable data are available and is likely to range from the parish level to country level (there may be potential for effects beyond these boundaries through supply chain and capital expenditure matters).

13.2.7. The assessment will be undertaken for the direct and indirect effects occurring over these differing spatial areas. The effects on land use are likely to be direct effects from the proposed sites for the infrastructure and construction areas of the project.

Table 13.1: Administrative Areas within Route Corridor

Sections	Administrative Areas crossed by preferred alignment and local area of influence (250m buffer)
Section AB – Bramford Substation and Hintlesham	<i>County:</i> Suffolk <i>Districts:</i> Babergh, Mid Suffolk <i>Wards:</i> Bramford and Blakenham, Brook, Hadleigh South <i>Super Output Areas:</i> Babergh 006A, Babergh 004D, Mid Suffolk 012A
Section C – Brett Valley	<i>County:</i> Suffolk <i>District:</i> Babergh <i>Wards:</i> Hadleigh South, Lower Brett <i>Super Output Areas:</i> Babergh 004D, Babergh 009C
Section D – Polstead Heath	<i>County:</i> Suffolk <i>District:</i> Babergh <i>Wards:</i> Lower Brett <i>Super Output Areas:</i> Babergh 009C
Section E – Dedham Vale	<i>County:</i> Suffolk <i>District:</i> Babergh <i>Wards:</i> Lower Brett, Nayland Ward <i>Super Output Areas:</i> Babergh 009C, Babergh 009D
Section F – Leavenheath and Assington	<i>County:</i> Suffolk <i>District:</i> Babergh <i>Wards:</i> Lower Brett, Levenheath Ward <i>Super Output Areas:</i> Babergh 009B, Babergh 009C

Sections	Administrative Areas crossed by preferred alignment and local area of influence (250m buffer)
Section G – Stour Valley	<i>County:</i> Suffolk, Essex <i>District:</i> Babergh, Braintree <i>Wards:</i> Stour Valley South, Bures St Mary, Levenheath Ward <i>Super Output Areas:</i> Braintree 002C, Babergh 006A, Babergh 009B

Demographics

- 13.2.8. The total population of the wards was 20,932 in 2001. Mid-year population estimates are not available at ward level. For 2010, the mid-year population estimates demonstrate 3% growth in population size in the Babergh District and 9% growth in Mid Suffolk and Braintree Districts, compared with 8% and 6% for the East of England Region and England respectively. The population density of all districts within the study area was lower than regional and national average density at the 2001 census. Mid Suffolk had the lowest density at an average 1 person per hectare while Braintree had the highest density at 2.16 people per hectare, in comparison with a regional average of 2.82 people per hectare and a national average of 3.77 people per hectare.
- 13.2.9. The proportion of residents aged 0-15 was lower than national, regional and district averages. The proportion of residents aged 75 and over was more varied between wards. The proportion of residents of Nayland Ward aged 75 and over was 12%, compared with an average of 8% for England and the East of England. The proportion of male and female residents was very similar to national, regional and district averages.

Indices of Multiple Deprivation

- 13.2.10. The Index of Multiple Deprivation (IMD) measures multiple deprivation of small areas using indicators relating to income deprivation, employment, health and disability, education, skills and training, barriers to housing and services, crime; and living environment. IMD scores are commonly ranked, with areas with lower ranks being more deprived. The deprivation of all but two of the wards increased between 2007 and 2010; however all wards experience notably below average deprivation. South Cosford and Leavenheath are the least deprived of the wards through which the route corridor passes. None of the Super Output Areas (SOAs) within the route corridor are in the most deprived 25% of SOAs in England. The most deprived SOA in the study area is Babergh 004A, whose residents are consistently more deprived than the average for England and more deprived than those of surrounding SOAs. This SOA covers the northern part of Hadleigh town centre. The relative deprivation of almost all of the SOAs within the study area has worsened since 2004. In 2004, 9 of the SOAs within the study area were within the top 25% least deprived in the country, and of those 2 SOAs were within the top 10%. By 2010, 4 of the SOAs were within the top 25% in the country, one of which was within the top 10% least deprived.

Economic Activity

- 13.2.11. The proportion of the residents who were economically active in 2001 was above the average for England for all wards except Nayland, Boxford and Hadleigh North. Economic activity in each of these wards was 66% in comparison with 67% for England. Average economic activity rates of residents in the East of England was 69%, and thus similarly above the average for England.
- 13.2.12. Nationally, an average 4.7% of the population is employed in hotels and restaurants, with a regional average of 4.2%. Brook and Lower Brett Wards have the highest proportion of residents employed in hotels and restaurants at 6.3% and 5.5% respectively. The average proportion of residents employed in hotels and restaurants across all wards within the route corridor is 4.4%. The baseline research has identified that tourist related businesses within the AONB, close to the line, are concentrated in the villages of Polstead, Stoke-by-Nayland and Leavenheath. The Babergh Local Plan specifically seeks to promote tourism around Sudbury, Hadleigh, Lavenham and Long Melford.
- 13.2.13. The number of residents claiming Job Seekers Allowance (JSA) credits is a commonly-used proxy indicator for unemployment levels. All local authorities through which the route corridor passes experienced a significant increase in JSA claimant rates in late 2008 and early 2009 as a result of the global economic climate but claimant rate levels have remained below the average for Great Britain. JSA claimant rates are low in Mid Suffolk and Babergh Districts, in which the majority of the study area is located. In October 2012, claimant rates in Mid Suffolk were 1.9% and in Babergh were 2.5%, compared with 3.0% and 3.8% for East of England and Great Britain respectively. Claimant rates in Braintree have been lower than the average for the East of England and Great Britain since early 2011 and in October 2012 were 2.8%.

Employment Sectors

- 13.2.14. The proportion of the study area's residents who were employed in each economic sector in 2001 was similar to national and regional averages for all sectors except for the agriculture, hunting and forestry sector. The proportion of the study area's residents employed in agriculture, hunting and forestry was typically between 5% and 7% in 2001, in comparison with an average of 1% for England and 2% for the East of England Region.
- 13.2.15. NOMIS labour market profiles show that in 2008, the proportion of employment in Babergh which related to tourism was 8.9%. This was higher than the average for the East of England (7.7%) and for Great Britain (8.2%). However, the proportion of employment in 2008 which related to tourism in Braintree and Mid Suffolk was below the East of England and Great Britain average (7.5% in Braintree and 5.6% in Mid Suffolk). Tourism accounted for less than 10% of jobs for all authorities.

Socio-Economic Group

- 13.2.16. Associate professional and technical, skilled trades and elementary occupations are the most dominant social economic groups within the study area. The proportion of residents of Babergh in associate professional and technical occupations (19%) and skilled trades' occupations (15%) was markedly higher than the average for Great Britain (14% and 11% respectively). The proportion of residents of Mid

Suffolk employed in elementary occupations (16%) and skilled trades occupations (15%) was also notably above the average for England (11% and 11% respectively). The proportion of residents of all three Districts employed in 'professional occupations' (as defined by NOMIS) was markedly lower than the average for England, particularly Babergh where the proportion was less than half that for England (7% compared with 19%).

Education and Skills

13.2.17. The proportion of residents of the study area who were economically inactive students in 2001 was lower than the national and regional averages for all wards. The proportion of economically active students was above the regional average for all wards except Hadleigh South and Mid Sandford (2.5 and 2.9% respectively, compared with 2.3% for the East of England). The proportion of residents who were economically inactive students in Bures St Mary (3.3%) is notably higher than county and district averages and the proportion of all other wards.

Qualifications

13.2.18. The proportion of residents with no qualifications was below the average for England (29%) for all wards except Hadleigh North where 37% of residents in 2001 had no qualifications. The proportion of residents with Level 4/5 qualifications⁵² in 2001 was equal to or above the average for the East of England Region (18%) for all wards except Hadleigh North (14%), and Bramford and Blakenham (15%).

Section AB – Bramford Substation and Hintlesham

13.2.19. The main attractions and employers in this Section are Hintlesham Hall Hotel and Golf Club, north of Hintlesham along the A1071, and the commercial fishing lakes at Kate's Hill and Fen Farms, between the two existing overhead lines to the southeast of Hadleigh, both of which attract people to the area. To the east of Section AB - Bramford Substation and Hintlesham, in Sproughton, Bramford and the western suburbs of Ipswich are hotels, bed and breakfast premises and local restaurants, cafes and coffee shops.

Section C – Brett Valley

13.2.20. This is one of the smaller Sections, focused around the market town of Hadleigh. Hadleigh offers a range of shops and services and acts as a local employment centre reflecting its function as a market town serving the rural surroundings. Hadleigh is a market town containing a concentration of tourism and recreation-related businesses including cafés, restaurants, bed and breakfast premises and hotels. The Brett Valley offers cycle trails and water-based activities. To the north of the route corridor within Hadleigh there is a riverside walk and picnic areas. The Hadleigh Railway Walk runs northwest and southeast from Hadleigh through the

⁵² Level 4/5 qualifications are the highest level achievable and relate to First degree, Higher degree, NVQ levels 4 and 5, HNC, HND, Qualified Teacher status, Qualified Medical Doctor, Qualified Dentist, Qualified Nurse, Midwife, Health Visitor

route corridor. Hadleigh also provides a venue for the annual Hadleigh Agricultural Show. Outside of Hadleigh the predominant land use is agriculture. The villages of Upper and Lower Layham, approximately 1km south of Hadleigh, both have village pubs. The B1070 runs north and south through the Brett Valley and the route corridor. The road is used by tourists passing through the area.

Section D – Polstead Heath

- 13.2.21. Other than farming, the main economic activity in this Section of the route corridor is Layham Quarry (operated by Brett Aggregates Ltd). Layham Quarry occupies part of the eastern extent of this Section of the route corridor. A mineral reserve area is identified in the corridor around the existing quarry in Suffolk County Council's Minerals Plan. The village of Polstead Heath is in the western part of this Section. The hamlet is a residential community with no tourist-related facilities.
- 13.2.22. There are a number of tourist related facilities along the A1071, which runs approximately east and west 1km north of Polstead Heath, including a pub and caravan and camping site.

Section E – Dedham Vale Area of Outstanding Natural Beauty (AONB)

- 13.2.23. The principal land use in this Section of the route corridor relates to farming including established orchards and the Copella fruit juice business, approximately 0.5km northeast of Leavenheath. Copella and the adjacent but separate Boxford Fruit Farm are important local employers.
- 13.2.24. The villages of Polstead and Stoke-by-Nayland, approximately 1km and 2km respectively south of the route corridor, contain a number of tourist-related businesses such as pubs, hotels and bed and breakfast premises. The village of Stoke-by-Nayland, is popular with visitors. The AONB Visitors Perception Survey found that 36% of people surveyed visited Stoke-by-Nayland. The small village of Polstead is also popular with visitors and the AONB Visitor Perception Survey showed that 24% of people surveyed had visited Polstead.

Section F – Leavenheath and Assington

- 13.2.25. Farming is an important land use in this Section of the route corridor. The village of Assington is approximately 0.5km north of the Section and Leavenheath is approximately 1km south of the route corridor. The villages contain a number of tourist-related businesses such as pubs, farm shops and self-catering accommodation. The village of Nayland is popular with visitors, however it is approximately 4km south of the route corridor with no views of it. The Stoke-by-Nayland Hotel and Golf Course, approximately 1km south of the route corridor, has an 80 bed hotel and restaurant with two 18 hole Golf Courses and fishing lakes.
- 13.2.26. The A134 runs northwest and southeast through the route corridor. There are a number of businesses which rely on passing trade along the A134, including pubs, bed and breakfast premises and other tourist accommodation.
- 13.2.27. Tiger Hill and Arger Fen, approximately 1km south of the route corridor, are areas of woodland used extensively for informal recreation that are popular with visitors and local residents. The 2009 AONB Visitor Survey shows that Arger Fen was

identified as a 'hot spot' in the area by 5% of visitors and 36% of visitors visit Stoke-by-Nayland.

Section G – Stour Valley

- 13.2.28. The Stour Valley is a focal point for tourists to the area. Tourist interest is centred around Sudbury, which is a market town containing tourism and recreation related businesses, including cafés, pubs, restaurants, bed and breakfast premises, hotels, camping facilities, caravan parks and cycle and boat hire facilities. The Stour Valley offers cycle trails and water based activities focussed on the river. Sudbury also acts as a local employment centre reflecting its function as a market town serving the surrounding rural area.
- 13.2.29. Loshes Meadow Nature Reserve between the existing overhead lines in Twinstead, the Cornard Mere Nature Reserve and Great Cornard County Park bordering the southern boundary of Sudbury are areas used for informal recreation. The Daws Hall Centre for Environmental Education is close to Lamarsh, approximately 0.5km south of the route corridor. The Stour Valley Path and St Edmund Way also run predominantly northwest and southeast through the route corridor and are currently oversailed by the existing 400kV and 132kV overhead lines. In the villages of Lamarsh and Bures (approximately 3km south of the route corridor) there are a number of pubs and restaurants. However, the village of Bures would have no views of the proposed connection.

Substation Study Area A - Colne Valley

- 13.2.30. Substation Study Area A is in the Colne Valley; a rural area with market towns and small areas of woodland. The A1017 runs northwest and southeast through the site, and local PRowS and the Edgar Eastall's Church Fields Way and Colne Valley Path long distance walking routes run through or are close to the Area. Access to the Colne Valley Railway Visitor Attraction, which includes a range of provisions for tourists, is also located within the Substation Study Area.
- 13.2.31. The closest settlement is Castle Hedingham approximately 1km southeast of the Substation Study Area. The remaining surrounding land is principally used for grazing and arable agricultural activities and informal recreation, with some provision for tourist/visitor accommodation. There are additional visitor attractions within 5km of the Substation Study Area, most notably Hedingham Castle and gardens. Local businesses and amenities are concentrated at Great Yeldham and Sible Hedingham.

Substation Study Area B - Delvyn's Lane

- 13.2.32. The Substation Study Area is in an area of agricultural land. Ramacre Wood is in the centre of the Substation Study Area and local PRowS pass through the Area.
- 13.2.33. Hedingham Castle and gardens are within 2km of the Substation Study Area. The closest settlement is Castle Hedingham approximately 1km southwest of the Substation Study Area, with remaining surrounding land principally used for grazing and arable agricultural activities and informal recreation, with some provision for tourist and visitor accommodation.

Substation Study Area C - Butlers Wood and Waldegrave Wood

13.2.34. This Substation Study Area is principally agricultural land and ancient woodlands, used for informal recreation, with small market towns and hamlets in the surrounding area. There are a number of footpaths in the area including a footpath to the west of the Substation Study Area. The Stour Valley path and St. Edmunds Way, both long distance walking paths, are approximately 2km to the east of the Substation Study Area. The surrounding towns and villages include some visitor/tourist accommodation including at Bulmer Tye to the north and in Wickham Saint Paul to the west of the Substation Study Area.

13.3. Characteristics of the Potential Effects

13.3.1. Effects on socio-economics and land use from the proposed development will be assessed for the construction, operational and decommissioning phases of the project. Effects may occur as a result of direct interaction with socio-economic and land use features, such as severance or disruption to access along a PRoW during construction. Severance can be temporary cutting off of access or permanent restrictions to access. There also may be effects on economic activity such as the generation of construction employment opportunities affecting a much wider spatial area.

13.3.2. The likely effects associated with the stages of the project on land uses and socio-economic resources and receptors will vary and are considered likely to fall in the following broad categories:

Construction Phase Effects

- Land take and temporary impacts upon land holdings;
- Impact on local plan development either through preventing or delaying development coming forward in part or in its entirety;
- Temporary severance or restricted access to resources and receptors;
- Amenity impacts as a result of other environmental impacts, for example, visual, noise, tourism, traffic; and
- Economic consequences, for example, employment and spending impacts through the supply chain.

Operational Phase Effects

- Permanent land take and impacts on land holdings;
- Impact on local plan development through preventing or delaying development coming forward in part or in its entirety; for example through restricting the location of development in close proximity to a project;
- Permanent severance of access to and from or along resources and receptors; for example the permanent diversion of a right of way due to surface infrastructure;
- Amenity impacts as a result of other environmental impacts, for example visual, noise; and
- Economic consequence, for example, generation of additional employment opportunities or loss of employment from business/tourism displacement.

Decommissioning Phase Effects

13.3.3. Effects during the decommissioning phase of the project are likely to be similar to those identified during the construction phase of the project.

Definitions of effects

- *Land take*: the physical utilisation of land within a property, land holding or allocation.
- *Incursion*: The requirement to temporarily or permanently occupy or restrict the use of land within a property, land holding or allocation including impacts on the viability for future land uses.
- *Severance*: The creation of a barrier to the completion of a usual journey to, through or along a resource or undertaking of an operation.
- *Displacement*: The re-location of receptors from one location to another location within the study area, for example businesses moved from their premises as a direct consequence of the project or visitors using tourism and recreation facilities in a different area.
- *Amenity*: The benefits of enjoyment and well-being that receptors gain from a resource in line with its intended function. This is referred to as an amenity value. The amenity value that receptors give to resources is subjective and likely to be viewed qualitatively rather than in quantitative terms and may be affected by factors such as: noise, visual and traffic impacts. It is recognised that outdoor recreational resources could be affected by projects and the following will be included within the consideration of amenity impacts on these:
 - effects on the quality of the resources enjoyed by people, linked to aesthetic changes;
 - restrictions or limitation on the kinds of recreational activities pursued;
 - direct effects on the facilities or infrastructure used to undertake informal recreation; and
 - restriction of access to facilities, barriers, physical restrictions or limitations on the use of the site or facility, or its relocation or loss.
- *Economic Consequences*: an adverse or beneficial variation in employment and expenditure as a directly and attributable consequence of the scheme.

13.4. Proposed Approach and Method

Consultation

13.4.1. As part of preparing the scoping report and preparing the scope of the socio-economics and land use assessments for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. The representations received were taken into account when finalising the scope of the assessments. Groups that were represented at the meetings include:

- Braintree District Council;
- Babergh District Council;
- Dedham Vale AONB;
- Suffolk County Council;
- Essex County Council; and
- National Farmers Union.

- 13.4.2. Table 13.2 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A.
- 13.4.3. The consultation highlighted that some consultees would like National Grid to undertake an economic valuation of the potential effects of the scheme on individual house prices and tourism businesses in the EIA. National Grid has considered this and consider that effects on house prices and monetising tourism effects should not be assessed in the EIA for the following reasons:

- The EIA process assesses the likely significant effects of the development on the environment and its conclusions are taken into account in decision-making on the application for consent under the Planning Act 2008. National Policy Statement EN-1 sets out an extensive list of matters related to socio-economic effects which are relevant to proposals for Nationally Significant Infrastructure Projects; property values are not amongst those matters. Effects on house prices and tourism were considered in relation to the Rookery South Resource Recovery Facility, Panel Decision and Statement of Reasoning (October 2011) which states in Paragraph 5.171:

Paragraph 5.12 7 of EN-1 advises that limited weight should be given to assertions of socio-economic impacts that are not supported by evidence. In this regard, such studies that have been undertaken on the effects plants such as that proposed have had on house prices have tended to be inconclusive (DOC/5.5, s3.3). On the latter, whilst we can appreciate people's concerns, we found nothing to substantiate the view that the area's potential as a tourist destination or attractiveness as a place to do business would be significantly harmed were the proposal to go ahead. Accordingly, we take the view that these concerns should not attract significant weight in the overall balance.

The effect on house prices of an overhead transmission line is not a matter that requires assessment under the EIA Regulations. The IPC and the Planning Inspectorate have not required such effects to be assessed in scoping opinions that have been adopted in relation to other nationally significant infrastructure projects. The effect on house prices as a result of this development, as with all types of development, is not material to the planning merits of the proposal.

- The effects on tourism will be assessed qualitatively, with a focus on potential amenity impacts to tourism and recreation features affected by the development. The assessment will use a combination of locally and nationally available data on tourism in the area, field surveys, consultation feedback and professional judgement.

Table 13.2: Consultation on Scope of Socio-Economics and Land Use Assessments

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The spatial scope of the assessment will cover two study areas:</p> <ul style="list-style-type: none"> • Local area of influence – direct effects on a 250m buffer around the alignment; • Wider study area – the effects on the overall spread of the project influence, which is likely to be up to national level. 	<p>This has been incorporated in the scoping report at the proposed approach and method.</p>
<p>The receptors that will be assessed include:</p> <ul style="list-style-type: none"> • Planning land use allocations e.g. employment, housing, mineral resources; • Tourism and recreation e.g. users, features and businesses; • Agricultural land and holdings; • Business operators and land uses; • Local communities and community facilities e.g. health, schools and community; and • Employment and socio-economics. 	<p>This has been incorporated in the scoping report.</p>
<p>The likely effects and the significance will be assessed. Likely effects could include temporary severance, restricted land use, amenity effects, transport effects, direct land take, operator functionality, economic consequences, local procurement and jobs.</p>	<p>This has been incorporated in the scoping report at the potential effects section.</p>
<p>The EIA method will include a consideration of anticipated change against the baseline environment; an assessment of magnitude, sensitivity and significance; a qualitative assessment on the likely effects; an assessment on the cumulative and in-combination effects with other EIA topics; and an identification of mitigation methods.</p>	<p>This has been incorporated in the scoping report at the proposed approach and method.</p>
<p>The assessment will use guidance from the Planning Act 2008, the National Policy Statements for Energy (EN 1 and EN 5) and from the Design Manual for Roads and Bridges.</p>	<p>This has been incorporated in the scoping report at the proposed approach and method.</p>

Representations, Discussions and Comments	Whether included in Scoping Report
<p>The assessment of house prices and assigning a monetary value to tourism effects during the EIA.</p> <p>The Group would like the assessment of house prices and monetary effects on tourism to be taken into account by National Grid. National Grid identified that it was not a requirement of the EIA to address this as a material consideration. National Grid's position in relation to this comment is outlined in Section 13.4.3</p>	<p>Additional clarity on the approach to assessing amenity value was incorporated.</p>
<p>An assessment will be undertaken of likely impacts the development will have on access for communities to reach facilities such as hospitals, doctors, local shops etc. The assessment will not consider the impacts the development may have on health, other than with regard to exposure to electric and magnetic fields (which will be assessed in a separate chapter of the ES), as there are no adverse effects on health anticipated and no guidance or method on how assessment of any other health effects could be measured.</p> <p>National Grid noted that the Group felt effects on health and wellbeing, such as stress related illnesses due to the prospect of changes to individual's amenity and community splits in Hintlesham, arising from the engagement undertaken related to the project, should be considered.</p>	<p>National Grid does not intend to undertake an assessment of individual or community stress impacts. Amenity value impacts on communities and community facilities will be incorporated.</p>
<p>National Grid will undertake a qualitative assessment based on quantitative information (e.g. users survey results) and make professional judgement on adverse, beneficial and significance of likely effects.</p>	<p>This has been incorporated in the scoping report.</p>
<p>National Grid will identify suitable mitigation methods to seek to reduce identified effects. The mitigation methods will be chosen appropriately to address the significant effect and the residual effect will be reported.</p>	<p>This has been incorporated in the scoping report and will be described in the ES.</p>

13.4.4. The National Policy Statement EN-1 and the National Policy Statement for Electricity Networks Infrastructure EN-5 are the relevant policy documents which set out policies or circumstances that should be taken into account in decisions on Electricity Network projects. Section 5.12 of National Policy Statement EN-1 sets out the approach for energy infrastructure relating to socio-economics and 5.12.7

states that 'little weight is to be given to assertions of socio-economic impacts not supported by evidence'. This assessment will be undertaken using established good practice environmental impact assessment methods⁵³ and wherever possible will be supported by quantitative information.

Identification of Socio-Economic and Land Use Assessment Resources and Receptors

- 13.4.5. The socio-economic and land use assessment will identify the likely significant effects of the proposed development in relation to the following resources and receptors. These have been defined taking account of the planning policy context defined by the National Policy Statements, guidance documents such as the Design Manual for Roads and Bridges (DMRB), consultation comments to date and professional judgement. Decommissioning impacts are considered likely to be similar to those associated with construction.
- 13.4.6. The socio-economic and land use assessment will identify the resources and receptors which define the socio-economic and land use context of the proposed development and consider the likely significant effects. Some considerations of potential effects on socio-economic receptors are set out in Table 13.3.

⁵³ Such as, A Handbook on Environmental Impact Assessment, Scottish Natural Heritage, 2009

Table 13.3: Resources and Receptor Groups and Stages of Potential Impacts

Resources and Receptor Groups	Example receptors	Construction and Decommissioning	Operational
Planning allocations and applications	Allocated areas or approved planning sites with potential for creating economic value and inward investment e.g. Employment, housing and mineral allocations and approvals.	Direct impacts of construction land take on mineral allocation within Section D – Polstead Heath.	Direct impacts of permanent land take on mineral allocation within Section D – Polstead Heath.
Tourism and recreational businesses, features and users	Tourism attractions, Public Rights of Way, tourism accommodation, recreational areas and public open space and the users of these.	Direct impacts on tourism and recreation features and businesses within overall project area of influence, consideration of amenity value impacts on features outside area of influence (defined by impacts identified through other environmental topics e.g. noise, visual, transport/access).	Direct impacts on tourism and recreation features and businesses within overall project area of influence, consideration of amenity value impacts on features outside area of influence (defined by impacts identified through other environmental topics e.g. noise, visual, transport/access).
Agricultural land holders	Quality of agricultural land, functionality of agricultural land holdings	Direct impacts of construction land take on agricultural land holdings within project area of influence.	Direct impacts of permanent land take on agricultural land holdings within project area of influence.
Business operators	Business operators and economic land uses (excluding agriculture and tourism)	Direct impacts on businesses within overall project area of influence, consideration of amenity value impacts on businesses (defined by impacts	Direct impacts on businesses within overall project area of influence, consideration of amenity value impacts on businesses (defined by impacts

Resources and Receptor Groups	Example receptors	Construction and Decommissioning	Operational
		identified through other environmental topics e.g. noise, visual, transport/access).	identified through other environmental topics e.g. noise, visual, transport/access).
Local communities and community facilities	Residential areas and community facilities within the study area. Community facilities are considered to include those related to health, education and community gathering (halls etc). Recreational open spaces will be accounted for under tourism and recreation.	Direct impacts on residential property, community facilities and community open space within overall project area of influence. Consideration of amenity value impacts on receptors (defined by impacts identified through other environmental topics e.g. noise, visual, transport/access).	Direct impacts on residential property, community facilities and community open space within overall project area of influence. Consideration of amenity value impacts on receptors (defined by impacts identified through other environmental topics e.g. noise, visual, transport/access).
Employment and economic profile	Employment and economic sectors	Direct and indirect effects of construction works.	Direct and indirect effects of operation.
Other property and Land uses	Other property and land uses not captured by the above categories	The baseline assessment of the study area identifies the socio-economic receptors within the study area that will be addressed by the above resource and receptor groups.	The baseline assessment of the study area identifies the socio-economic receptors within the study area that will be addressed by the above resource and receptor groups

Desk Based Assessment and Site Assessment

13.4.7. Baseline data has been collected for the preferred and interim alignment. Additional baseline data will be gathered at the Substation Study Areas and for the wider study area identified above. It is proposed that baseline information will be collected from desk-study data, consultation and where appropriate field surveys. Baseline information will be collected on:

- Grades of agricultural land from publicly available national Agricultural Land Classification mapping;
- Agricultural land holdings;
- PRoW, National Trails and other rights of access and non-designated and local walkways and cycle routes;
- Residential, commercial or industrial properties;
- Community facilities;
- Mineral reserves (and safeguarded areas);
- Waste sites;
- Open space e.g. green infrastructure, informal recreation, CROW land, formal recreation areas, common land and village greens;
- Tourism and recreation attractions and businesses;
- Tourism and recreation users;
- Local business operators; and
- Employment and economic profile.

13.4.8. The desk-based review will focus on collating data relating to the relevant resources and receptors within the study area and the socio-economic and land use characteristics of the study area. Potential data sources include:

- Mapping information and postal databases;
- Local, regional and national economic and social indices databases, policy documents and strategies;
- Publicly available information on receptors;
- Multi-Agency Geographic Information for the Countryside;
- Environment Agency's website;
- Ordnance Survey maps;
- Relevant national, regional and local development plan documents;
- Existing planning permissions and planning applications;
- Suffolk County Council's website for information on tourism attractions, planning documents, economic statistics;
- Essex County Council's website for information on tourism attractions, planning documents, economic statistics;
- Babergh District Council's website for information on tourism attractions, planning documents, economic statistics;
- Braintree District Council's website for information on tourism attractions, planning documents, economic statistics; and
- Mid-Suffolk District Council's website for information on tourism attractions, planning documents, economic statistics.

13.4.9. Consultation with tourism, recreation and employment operators and organisations within the study area will be important in confirming data collated through the desk

study and identifying and gathering further data. Consultation will be undertaken through a variety of mechanisms from data requests to public engagement and individual meetings. Information on land use and business operations will be sought from directly affected land owners.

13.4.10. Field surveys will be undertaken where sufficient data cannot be collated through the above activities and/or a specific requirement is identified to validate the assessment. Field surveys may include:

- Site visits and condition surveys of features (e.g. PRoW);
- User counts at specific identified receptors/resources; and
- Questionnaires and interviews.

13.5. Assessing Significance of Effects

13.5.1. The socio-economic and land use assessment will evaluate the significance of effects through a qualitative assessment of the magnitude of the identified effects of the project against the sensitivity of the resources or receptors affected. There is limited guidance in relation to defining these aspects for socio-economic assessments. The following definitions have been developed based on experience of precedent assessments including projects currently in the National Infrastructure Planning process⁵⁴ and professional judgement and are considered to provide a robust basis for assessment. Although it is anticipated that receptors may adjust to any effects that are predicted over the life of the project, the assessment will not attempt to predict social change or assume changes in the pattern of use of facilities over time. The assessment will use the base data available and consider the impacts within the worse-case year identified through the life of the project.

Magnitude of Effect

13.5.2. The magnitude of an impact represents its severity or scale, and is influenced by:

- spatial extent (localised/isolated versus widespread with potential secondary effects);
- extent (number of groups and/or people, households or businesses affected);
- duration (long term or permanent to short term or temporary);
- frequency; and
- the scope for mitigation.

13.5.3. Characteristics of how the overall magnitude of effects will be considered are shown at Table 13.4.

⁵⁴ <http://infrastructure.planningportal.gov.uk/projects/register-of-applications/>

Table 13.4: Impact Magnitude

Impact Magnitude	
Large	An impact that will dominate over baseline conditions, and/or will be very likely to affect large numbers of businesses and/or people (with number depending on the local context), and that will usually continue and effectively constitute a permanent, long-term impact on the base case conditions.
Medium	An impact that can be demonstrated to change the baseline conditions and likely to affect a moderate number of businesses and/or people (with number depending on the local context).
Small	An impact that will result in a perceptible difference from baseline conditions and is likely or may affect a small number of businesses and/or people (with number depending on the local context)
Negligible	An impact that does not result in a variation beyond the baseline conditions and/or is unlikely to measurably affect the well-being of businesses and/or people.

13.5.4. Where quantifiable data are available, these definitions may be refined to include specific values.

13.5.5. The assessment of amenity value will consider a number of impacts assessed in other topics of the EIA and further consideration of how this will be assessed has been set out in Table 13.5. The primary consideration within the amenity value assessment will be the nature of the effects on the functionality of the resource. As identified above, impacts on amenity value will be derived from other environmental impacts upon the receptors and this will inform the assessment of magnitude, as set out in Table 13.5.

Table 13.5: Impact Magnitude (Amenity Value)

Impact Magnitude of Amenity Value	
Large	Three or more residual significant impacts are identified with at least one being major in nature. Two residual major significant impacts are identified
Medium	Two residual significant impacts are identified with one being major in nature.
Small	Two residual significant impacts are identified both being moderate or less in nature.
Negligible	1 (or no) significant residual impacts identified.

13.5.6. The duration of the impacts identified will be considered within the assessment. Impacts with duration of 6 months (or less) may reduce the magnitude of impact identified.

13.5.7. Professional judgement will be employed within the assessment and there is potential that based on the specific local context and characteristics a greater or lesser magnitude will be applied. Where this occurs it will be clearly identified and explained.

Sensitivity of Receptor

13.5.8. Receptor sensitivity is defined based on consideration of the following characteristics:

- Importance of the receptor for example local, regional, national and international,
- The availability of comparable alternatives within the study area and/or the ease with which the resource could be replaced/relocated
- The capacity of the resource to recover or adapt to the impacts identified, over what period of time
- The level of usage and the nature of the users (e.g. sensitive groups, such as older people, children, people of poor health).

13.5.9. It is generally considered the greater the number of users the more sensitive the receptor. In addition, whilst individual residential properties will be considered as receptors, community impacts will be defined where five or more properties within a location are affected by the same impact.

Significance of effects

13.5.10. The significance of a socio-economic effect is a product of the magnitude of the impact and the sensitivity of the receptor as shown at Table 13.6. Where possible this will be based on quantifiable evidence. However, some assessments will be based on professional judgement and existing EIA practice.

Table 13.6: Definitions of Significance

Definitions of Significance				
Magnitude	Negligible	Small	Medium	Large
Sensitivity				
Low	Negligible – not significant	Negligible – not significant	Minor adverse/beneficial – not significant	Moderate adverse/beneficial – significant
Medium	Negligible – not significant	Minor adverse/beneficial – not significant	Moderate adverse/beneficial - significant	Major adverse/beneficial – significant
High	Negligible – not significant	Moderate adverse/beneficial – significant	Major adverse/beneficial - significant	Major adverse/beneficial – significant

13.5.11. Effects identified and assessed in the EIA are considered to be significant if both impact magnitude and receptor sensitivity are high/large or medium/moderate. Additionally, effects are considered to be significant if impact magnitude is large and receptor sensitivity is low, or alternatively if receptor sensitivity is high and impact magnitude is small. This equates to major and moderate adverse/beneficial effects.

13.5.12. Other effects, equating to minor adverse/beneficial and negligible effects, are not considered to be significant.

13.6. Mitigation and Residual Impacts

13.6.1. The assessment will seek to identify suitable mitigation to reduce, remove or compensate for significant adverse effects identified. Where appropriate, opportunities to enhance beneficial effects will also be identified. The residual impact expected following mitigation will be identified.

13.7. Inter-relationship of Effects

13.7.1. Socio-economic and land use effects may arise from impacts identified from assessment of other EIA topics such as landscape and views; ecology; noise; and transport. The socio-economic and land use assessment will consider the findings in this EIA. The potential inter-relationship of effects on receptors (including communities) will be considered during the assessment.

13.8. Cumulative Effects

13.8.1. The socio-economics and land use assessment will include potential cumulative effects as a result of the proposed development in combination with other major

developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

14. ELECTRIC AND MAGNETIC FIELDS AND ELECTRO-MAGNETIC COMPATIBILITY

14.1. Introduction

- 14.1.1. This chapter of the Environmental Statement (ES) will consider the likely significant effects of electric and magnetic fields (EMFs) produced by the proposed development.
- 14.1.2. All equipment that generates, distributes or uses electricity produces EMFs. The UK power frequency is 50 Hz which is the principal frequency of the EMFs produced, also known as Extremely Low Frequency (ELF) EMFs.
- 14.1.3. Electric fields depend on the operating voltage of the equipment producing them and are measured in V/m (Volts per metre). The operating voltage of the equipment is a relatively constant value. Electric fields are shielded by most common building materials, trees and fences and diminish rapidly with distance from the source. In a typical UK home, the background electric field ranges between 1-20 V/m.
- 14.1.4. Magnetic fields depend on the electrical currents flowing, which vary according to the electrical power requirements at any given time, and are measured in μT (microtesla). They are not significantly shielded by most common building materials or trees but do diminish rapidly with distance from the source.
- 14.1.5. Magnetic fields are found in all areas where electricity is in use (e.g. office and homes), arising from electric cabling and equipment in the area. In UK houses, typical magnetic fields will be in the range of 0.01 – 0.2 μT , with higher values in localised areas close to electrical appliances.
- 14.1.6. The spatial scope of the assessment includes all areas where the EMFs could potentially extend from the electrical assets proposed by this project. Extensive operational experience has shown that equipment operating at the proposed voltage and rating will not produce EMFs greater than background levels at distances of more than 200m. Therefore a 200m corridor around the proposed development has been defined as an appropriate assessment area.

14.2. Existing Environment

- 14.2.1. All equipment that generates, distributes or uses electricity produces EMFs. In the assessment area this includes the existing overhead lines, the existing Bramford Substation and domestic, office and industrial equipment that uses electricity.
- 14.2.2. Whilst there are no statutory regulations in the UK that limit the exposure of people to power-frequency electric or magnetic fields, responsibility for implementing appropriate measures for the protection of the public from EMF lies with the UK Government. In 2004, the Government adopted guidelines published in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in line with the terms of the 1999 EU recommendation on public exposure to EMFs. The National Policy Statement (NPS) EN-5 repeats this policy and it is the requirements of this policy which will form the basis of the EIA.
- 14.2.3. These exposure guidelines are explained, together with details of how to apply them, in the Department for Environment and Climate Change's (DECC's) Code of Practice 'Power Lines: Demonstrating compliance with EMF public exposure

guidelines – a voluntary Code of Practice’. This Code of Practice has been agreed between the Energy Network Association and the Government, which specify how compliance with exposure guidelines will be determined.

- 14.2.4. There is also a second Code of Practice; ‘Optimum Phasing of High Voltage Double-circuit Power Lines’, which sets out the principals for optimum phasing of overhead lines. This details the Government’s supported precautionary measures recommended by the Stakeholder Advisory Group on ELF EMFs (SAGE) in its First Interim Assessment.
- 14.2.5. The assessment will be carried out in line with the above relevant legislation, standards and guidance.

14.3. Characteristics of the Potential Effects ***Construction, Operational and Decommissioning***

Electric and magnetic Fields

- 14.3.1. EMFs will be produced by the proposed overhead line and will be highest directly under the line and will decrease to the sides at increasing distance.
- 14.3.2. As a consequence of their design, some types of equipment do not produce an external electric field. This applies to underground cables and gas insulated switchgear (GIS) substations, which are enclosed in a metal sheath (a protective metal layer within the cable) and have solid metal enclosures respectively. Magnetic fields are produced by underground cables and GIS substations, which in both cases are greatest directly on top or next to the equipment and reduce quickly with distance.
- 14.3.3. For substations and sealing end compounds, the EMFs close to the site are dominated by the overhead lines and cables entering the installation and not the equipment within the site.
- 14.3.4. Exposure to EMF can have potential direct effects on the human body and potential indirect effects. When a person is exposed to electric and/or magnetic field(s), a current is induced in the body; this is a direct effect, which the exposure limits are set to prevent. Compliance with the exposure limits ensures that no direct effects of EMF will occur.
- 14.3.5. Electric fields can cause objects to become charged which can result in microshocks or contact currents, known as an indirect effect. The exposure guidelines set out in the Department of Energy and Climate Change (DECC) document NPS EN-5 are set to deal with both direct and indirect effects. Exposure guidelines will be adhered to on the project.
- 14.3.6. EMFs can potentially affect active implantable medical devices (AIMDs), such as pacemakers, insulin pumps and defibrillators, if the field strength exceeds the immunity of the device.
- 14.3.7. NPS EN-5 states that “The Department of Health’s Medicines and Healthcare Products Regulatory Agency (MHRA) does not consider that transmission line EMFs constitute a significant hazard to the operation of pacemakers” and EU directive 90/385/EEC states that “Devices must be designed and manufactured in

such a way as to remove or minimise as far a possible...risks connected with reasonably foreseeable environmental conditions such as magnetic fields, external electrical influences ...”

- 14.3.8. All modern AIMDs should operate uninfluenced in field levels below the General Public Reference levels of 1999/519/EC, where the AIMD has been implanted and programmed in a standard manner. The effects of EMF on AIMDs will be assessed using the criteria set out in DECC code of Practice.
- 14.3.9. There is little evidence that the exposure of crops, farm animals or natural ecosystems to transmission line EMF has any agriculturally significant consequences.

Electro-magnetic Compatibility

- 14.3.10. In 2009 the European Council Directive on electromagnetic compatibility, 89/336/EEC (EMC Directive) and its amendments, was enacted into UK law. The main objective of the EMC Directive is to guarantee the free movement of electrical and electronic appliances and to create an acceptable electromagnetic environment within the European Union.
- 14.3.11. Fixed apparatus and large networks of the type owned and operated by National Grid are also included in the EMC Directive. The requirements of the EMC Directive are that the electromagnetic disturbance that the apparatus generates should not exceed a level allowing radio and telecommunication equipment and other apparatus to operate as intended; and the apparatus has an adequate level of intrinsic immunity to electromagnetic disturbance to enable it to operate as intended.
- 14.3.12. National Grid’s Transmission System has met the essential requirements detailed in Article 4 of the EMC Directive. This was achieved by creating a Technical Construction File (TCF) as per article 10.2 of the EMC Directive. The TCF is based largely on extensive on-site testing of both overhead lines and substations and a search of National Grid’s document databases conducted by the project team. The on-site surveys showed that there were no significant emission problems to address and using the rationale of the TCF it was determined that the National Grid system meets the essential requirements of the EMC Directive. A Certificate of Conformity was issued and is provided at Appendix C.
- 14.3.13. Underground cables were acknowledged in this assessment but it was not considered necessary to perform measurements on these. The electric field from these cables are screened, however power frequency magnetic fields are always present. Underground cables do not radiate high frequency electromagnetic fields but they can act as a path for conducting such interference.
- 14.3.14. The overhead line, substation, sealing end compounds and underground cables proposed for this project are of similar construction and operational parameters as those tested in the TCF and will be covered by the Certificate of Conformity (Appendix C). The proposed development will present no issues with TV or radio interference under normal operating conditions, therefore EMC is proposed to be scoped out of the EIA.

14.4. Proposed Approach and Method
Consultation

14.4.1. As part of preparing the scoping report and preparing the scope of the EMF assessment for the EIA, National Grid met with statutory and non-statutory consultees to discuss the potential scope of the assessments. The representations received were taken into account when finalising the scope of the assessments. Groups that were represented at the meetings include:

- Braintree District Council;
- Babergh District Council;
- Mid-Suffolk District Council;
- Suffolk County Council; and
- Essex County Council.

14.4.2. Table 14.1 outlines the discussions held, the representations received and where the representations have been incorporated into the scope of the assessments. Detailed meeting notes from the scoping meetings held are provided at Appendix A.

Table 14.1: Consultation on Scope of EMF Assessment

Representations, Discussions and Comments	Whether included in Scoping Report
A discussion was held on the approach to EMFs. National Grid will follow the Government adopted guidelines published in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in line with the terms of the 1999 EU recommendation on public exposure to EMFs. The National Policy Statement EN-5 also repeats this policy and it is the requirement of this policy which will form the basis of the Environmental impact assessment (EIA).	This has been incorporated in the scoping report at the proposed approach and method.

Desk Based Assessment

14.4.3. The following factors will be considered in the proposed development:

- Current and new legislation, guidance and standards on EMFs; and
- Optimal phasing of the overhead line.

14.4.4. It is proposed that EMFs from the proposed assets associated with the new circuits between Bramford Substation and Twinstead Tee will be assessed using the conditions set out in two of DECCs Codes of Practices ‘Power Lines: Demonstrating Compliance with Public Exposure Guidelines’ and ‘Optimum Phasing of high voltage double-circuit Power Lines’.

14.4.5. The Energy Network Association maintains a list of equipment where the design of equipment is such that it is not capable of exceeding the ICNIRP exposure guidelines, with evidence as to why this is the case. Where equipment is to be installed which are not inherently compliant with exposure guidelines, calculations

of EMFs will be performed using the list of conditions set out in DECC's Code of Practice.

- 14.4.6. It is proposed that the outcomes of this will be assessed in line with the EMF requirements of the NPS EN-5. The calculated EMF from the project will be evaluated against UK Government guidelines to demonstrated compliance with EMF exposure limits and policy.

14.5. Assessing the Significance of Effect

- 14.5.1. The significance of effects arising from the proposed development on electric and magnetic fields will be determined by assessing the proposed development against the Government guidelines set out in paragraph 14.2.2. The assessment will conclude whether the project is compliant with the guidelines.

- 14.5.2. A significant effect will occur if the proposed development is found not to be compliant with the guidelines i.e. if the proposed development exceeds the EMF guideline limits. There will be no significant effect if the proposed development complies with the guidelines.

- 14.5.3. All receptors are of equal sensitivity for an EMF assessment. Therefore the assessment will not differentiate the sensitivity of receptors.

14.6. Mitigation and Residual Effects

- 14.6.1. Mitigation will be through the design of the proposed development, which will be in accordance with legislation and guidance. There will be no residual effects once EMF levels are reduced to the appropriate limit in the guidelines.

14.7. Inter-relationship of Effects

- 14.7.1. The exposure guidelines deal with both direct effects of EMF on the body and potential indirect effects. When a person is exposed to electric and/or magnetic field(s), a current is induced in the body (direct effect) which the exposure limits are set to prevent. Electric fields can cause objects to become charged which can result in microshocks or contact currents. These inter-relationship of effects will be considered during the assessment.

14.8. Cumulative Impacts

- 14.8.1. The EMF assessment will include potential cumulative effects as a result of the proposed development in combination with other major developments. The scope of projects to be considered in the cumulative assessment will be agreed with the relevant planning authorities.

15. CONTENTS AND SCOPE OF ENVIRONMENTAL STATEMENT

15.1. Structure of the Environmental Statement

15.1.1. This chapter provides a description of anticipated structure proposed for the ES. This chapter also includes a list of the environmental topics to be incorporated into the EIA based on the results of this scoping report. The environmental matters to be scoped out of the EIA are presented at the end of this chapter

15.1.2. The proposed content of the ES is presented in Table 15.1.

Table 15.1: Proposed Content of Environmental Statement

CHAPTERS	CONTENTS	FIGURES
Summary	Non-Technical Summary (to be provided as a separate document)	Site Location Plan and Proposed Layout
Introduction	Scope and 'scoped out' impacts Summary table illustrating potential significant effects identified during scoping Developer, advisors and consultation	-
Project Description	Overview of development Layout Access Design proposals	Site Location Plan, Proposed Layout and Design Details
	Construction phasing Duration/timing of works Access routes Storage areas Methods of working Machinery/plant required Anticipated hours of operation	-
Context	High-level summary of the baseline environment	Site Context/ Constraints
Alternatives	Summary of strategic optioneering and route corridor study Summary of location and design options considered in the route corridor	Route corridor options 'Alignment' options
Planning Context	Summary of relevant planning documents/policy/guidance	-
Environmental Assessment Chapters	Baseline Environment Method of Assessment Potential Receptors Significance criteria and Impact Prediction Mitigation and monitoring	As required
Conclusion	Summary and Conclusion	-

15.1.3. The 2009 EIA Regulations, Schedule 4, Part 1 provides a checklist of topics to include in EIA derived from the relevant European Directives which are those aspects of the environment which are considered likely to be significantly affected by the proposed development. The Regulations state that an ES should not cover every aspect of the proposed development’s environmental impacts, but should focus on the aspects likely to have significant environmental effects. The aspects of the environment which developers should consider include:

- Population;
- Fauna;
- Flora;
- Soil;
- Water;
- Air;
- Climatic factors;
- Material assets including the architectural and archaeological heritage;
- Landscape; and
- The inter-relationship between the above factors.

15.1.4. Based on the 2009 EIA Regulation’s list for aspects of the environment to be assessed, the ES will report on the following environmental topics:

- Landscape and Visual;
- Biodiversity and Nature Conservation;
- Historic Environment;
- Geological Conservation;
- Flood Risk, Water Quality and Resources;
- Traffic and Transport;
- Air Quality and Emissions;
- Noise and Vibration;
- Socio-Economic and Land Use; and
- Electric and Magnetic Fields.

15.1.5. Table 15.2 identifies how the environmental aspects covered in the 2009 EIA Regulations will be considered in the proposed environmental topics of the ES.

Table 15.2: Environmental Aspects to be considered in ES.

Environmental Aspect	To be included?	Comments
Population	✓	Effects on population will be incorporated into the environmental assessments on noise and vibration, views, historic environment (cultural heritage), land use, socio-economics, transport, and electric and magnetic fields.
Fauna	✓	Effects on fauna will be in the biodiversity assessment.
Flora	✓	Effects on flora will be in the biodiversity assessment.

Environmental Aspect	To be included?	Comments
Soil	✓	Effects on soil will be in the geology and hydrology assessment.
Water	✓	Effects on water and land drainage will be in the geology and hydrology assessments. A flood risk assessment will be summarised in the hydrology chapter of the ES.
Air	✓	Effects on air will be in the air quality assessment. No effects are anticipated from operation of the development.
Climatic Factors	✗	Climatic factors have been scoped out. No significant effects are anticipated as a result of the development. The potential increase in flood risk due to climate change will be assessed within the flood risk and hydrology assessment. Temporary increase in vehicle emissions and potential SF ₆ emissions will be assessed in the air quality chapter.
Material Assets	✓	Effects on material assets will be incorporated into the environmental assessments on historic environment, land use, socio-economic and electro and magnetic fields.
Landscape	✓	Effects on landscape character and views will be assessed.
Interrelationship	✓	Interrelationship between effects will be considered throughout each assessment as appropriate.

15.1.6. Details of the method and approach for each environmental assessment to be undertaken as part of the EIA are set out in Chapters 5 to 14.

15.2. Environmental Aspects Proposed to be Scoped Out of the EIA

15.2.1. During the scoping process some environmental matters have been identified as unlikely to be adversely effected by the proposed development and therefore the significance of the impact on the receptor does not need to be assessed as part of this EIA. Table 15.3 describes the environmental matters proposed to be scoped out of the EIA for the Bramford to Twinstead Tee Connection Project.

Table 15.3: Environmental Matters to be Scoped Out

Topic to be Scoped Out	Reason
Effects on Climate Change	Climate change may introduce increased risk of surface and groundwater flooding due to predicted increases in average winter rainfall and extreme rainfall events. The proposed development’s risk to flooding and potential to increase the risk of flooding will be assessed in the flood risk assessment. The flood risk assessment accounts for climatic changes.
	The potential temporary increase in vehicle emissions due to construction vehicles will be assessed in the air quality assessment.
	The overhead line, underground cables and sealing end compounds will not give rise to emissions or direct effects which could influence the climate during their operation. If a GIS substation is developed SF ₆ will be used to insulate the equipment. SF ₆ is a greenhouse gas which, if leaked into the atmosphere, could increase greenhouse gas levels. There is a very low risk of SF ₆ being leaked from a GIS substation. The potential effects of SF ₆ being leaked into the atmosphere will be assessed in the air quality assessment if a GIS substation is proposed.
Air Quality - Eutrophication	As the proposed development does not give rise to emissions such as nitrogen oxides and ammonia, an assessment on the effects of eutrophication will not be undertaken in this EIA.
Effects of Tidal Flooding	Effects on and from tidal flooding is scoped out of this EIA due to the distance of the proposed development from the sea.
Effects of Flooding from Sewers	Effects on and from flooding from sewers is scoped out of this EIA as it is unlikely the proposed development will require a connection to the existing sewerage network.
Effects from Vibration	Effects from vibration during the operational phase of the development are unlikely to occur and are therefore scoped out of this EIA.
Effects from Noise	No significant noise effects are anticipated from the proposed overhead line, underground cables or sealing end compounds during the operational phase of the project and will therefore be scoped out of this EIA.
Effects on the transport network	It is not anticipated that there will be adverse effects on transport networks during the operational phase of the development.

Topic to be Scoped Out	Reason
Effects on property prices	The effect on house prices of an overhead transmission line is not a matter that requires assessment under the EIA Regulations. The IPC and the Planning Inspectorate have not required such effects to be assessed in scoping opinions that have been adopted in relation to other nationally significant infrastructure projects. The effect on house prices as a result of this development, as with all types of development, is not material to the planning merits of the proposal.
Effects on the tourism economy	The effects on tourism will be assessed qualitatively, with a focus on potential amenity impacts to tourism and recreation features affected by the development. The assessment will use a combination of locally and nationally available data on tourism in the area, field surveys, consultation feedback and professional judgement.
Electro-magnetic compatibility (EMC)	The overhead line, substation, sealing end compounds and underground cables proposed for this project are of similar construction and operational parameters as those tested in the Technical Construction File (TCF) and will be covered by the Certificate of Conformity (Appendix C). The proposed development will present no issues with TV or radio interference under normal operating conditions, therefore EMC is proposed to be scoped out of the EIA.

Bramford to Twinstead Tee Connection Project

**APPENDIX A
CONSULTATION MEETING NOTES**

APPENDIX A – CONSULTATION MEETING NOTES

BRAMFORD – TWINSTEAD CONNECTION FINAL NOTE OF ARCHAEOLOGY SCOPE MEETING

10th August 2012 West Suffolk House, Bury St Edmunds

Attendees:

John Ette	English Heritage
Richard Havis	Essex County Council
Edward Martin	Suffolk County Council
Jess Tipper	Suffolk County Council

Robert Fielden	Engineer, National Grid
Ian Grimshaw	Director, TEP (Consultants to National Grid)
Helena Kelly	Senior Archaeologist (TEP)

ARCHAEOLOGY SCOPE MEETING ACTION LOG

ACTION	WHOM	
3.2	TEP/HK to provide a GIS 'polygon' to Essex CC to enable its in-house AP specialist to provide fee quotes for undertaking an aerial photograph regression analysis.	HK/TEP
	<i>Action Closed - Completed and report expected in December 2012.</i>	
3.6i	RH to provide HK with ECC approved method for fieldwalking to use as the basis for the method in the written scheme of investigation.	RH
	<i>Action Closed - Completed.</i>	
3.6ii	TEP/HK to provide a written scheme of investigation for field walking for the officers to consider and to mobilise to undertake field walking as quickly as possible	HK/TEP
	<i>Action Closed - Site visits confirmed insufficient suitable land available to make any survey meaningful.</i>	
3.6iii	ECC and SCC officers to provide National Grid with a list of approved or preferred contractors with the appropriate specialism to undertake this and other work in the area	RH/EM/ JT
	<i>Action Closed - Completed.</i>	
3.8i	TEP/HK/National Grid to liaise to ensure that the programme of geotechnical boreholes has appropriate specialist input.	HK/TEP/ National Grid
	Action On-going - this is likely to be post-DCO submission.	
3.8ii	TEP/HK to take specialist advice on how to assess the palaeo-environmental potential of the River Valleys.	HK/TEP
	Action On-going	
3.8iii	Officers to provide National Grid with a list of approved or preferred contractors with the appropriate specialism to undertake this and other work in the area.	RH/EM/ JT
3.9i	EP/HK to liaise with National Grid specialist provider to investigate if GPR survey results could be used for archaeological purposes.	HK/TEP
	<i>Action Closed - Telecon held with specialist subconsultant, work to proceed including archaeology specification as set out in EH guidance.</i>	
3.9ii	TEP/HK to provide an appropriate scheme for geophysical assessment to the officers for their consideration.	HK/TEP
	Action On-going	

ARCHAEOLOGY SCOPE MAIN MEETING NOTES

ITEM		ACTION
1.0	INTRODUCTIONS	
1.1	The meeting had been convened with persons drawn from the cultural heritage thematic group to discuss specifically the on-going assessment for and of buried archaeology along the to-be-announced Bramford-Twinstead preferred alignment.	
1.2	The specific objective of the meeting is to broadly agree the generic scope of the required surveys to assist in preparing National Grid's proposed scope of assessment for its report accompanying its request for a 'Scoping Opinion' from the Planning Inspectorate (PINS) in due course.	
1.3	A separate meeting will be held to discuss the built heritage assessment with the members of the thematic group appropriate to that topic.	
2.0	PROJECT UPDATE	
2.1	The Connection Options Report (COR) was published on 29 th May 2012. The COR describes the interim decision on undergrounding and the indicative overhead line alignments in each study area. The COR describes the reasons for the indicative connection option to be routed underground in the AONB and in the Stour Valley. It also describes the reasoning for the indicative alignment to be routed to the north of Hintlesham and elsewhere along the route to the south of the existing 400kV overhead line.	
2.2	The route through the AONB and Stour Valley was assessed as involving particularly sensitive landscapes where the benefits to landscape and views from undergrounding potentially outweigh the economic and other environmental costs (in accordance with EN-5). The total indicative underground route totals 8km and it was acknowledged in the COR that each of the two areas where underground cables are proposed has high potential for encountering archaeology.	
	<p><u>Query: Description of the physical impact of a) the underground section and b) pylon bases</u></p> <p>a) Underground section The underground cables installation working swathe would be 65m wide and although the amount of soil stripped could reduce at certain points to be less than 65m, for assessment a 'worst case' of 65m should be assumed.</p> <p>Engineering and design solutions can be employed during construction to allow for the preservation of buried archaeology. If that is not possible or desirable, mitigation through recording of remains (archaeological excavation) can be achieved within the construction programme.</p>	
	<p>b) Overhead section For the overhead line connection, it is anticipated that the route will require between 50 and 60 pylons at approximately 350m intervals. The footprint of each pylon base will be approximately 10 x 10m. Concrete foundations will be excavated at each corner of the pylon base, to a depth of approximately 5m. A pylon design similar to the existing pylons would be used. However, until National Grid has considered the representations made to the COR, it cannot speculate further regarding pylon sites and, once its preferred alignment is confirmed, there is more consultation to undertake, not least with persons with an interest in the land.</p>	

	<p>Ancillary works will include: temporary access roads, crane pads at each pylon location, sealing end compounds and an off-site yard. The overhead line connection will not require any laydown area outside the working area around the bases. There will not be ground disturbance between pylons on the overhead line connection unless access tracks are required.</p> <p>The consent for the project will include a limit of deviation of 20m for the overhead connection, within which the pylons can be located if there are any unanticipated obstructions or constraints (which could include buried archaeology) that need avoiding. The 20m limit of deviation is drawn each side from the centreline of the proposed line but may be narrowed where there is a constraint on which the line would not be built (eg woodland; nature conservation site; road; pond etc).</p>	
2.3	Most consultation representations have now been received and the consultation period has ended. National Grid will now take on board the comments from the representations and confirm the alignment it will take forward. National Grid will issue a summary report at the end of the summer to confirm its preferred alignment having reviewed representations.	
2.4	The judgements set out in the COR have been made taking account of guidance in the National Policy Statement 5 Electricity Networks Infrastructure (EN-5). As with all planning applications, an express arithmetical 'weight' is not given to one material consideration over another when determining the outcome of the application. All decisions are based on judgement of the factors in the application and the importance of the factors.	
3.0	EIA SCOPING STAGE	
3.1	Environmental baseline assessments have been undertaken to help inform the scope of the EIA. Discussions on the proposed scope of the EIA will be undertaken with relevant Statutory Consultees prior to the submission of the Scoping Report to the Planning Inspectorate (PINS) when requesting a Scoping Opinion. It is hoped that this will assist with the response from PINS which will consult with the consultees before issuing its Scoping Opinion.	
3.2	The desk-based archaeological assessment is 95% complete. The outstanding items are completion of the historic map regression and to undertake a more detailed aerial photograph (AP) assessment. The AP assessment may be of the whole route or just the underground sections, subject to their confirmation after National Grid has considered representations to the COR.	
	Action: TEP/HK to provide a GIS 'polygon' to Essex CC to enable its in-house AP specialist to provide fee quotes for undertaking an aerial photograph regression analysis.	HK/TEP
3.4	The line walk has been undertaken; as most of the route is in arable use (and under crop at the time of the walk over survey) this was done from vantage points for part of the route and is now complete.	
3.5	It is proposed to undertake a staged approach assessment of the potential for buried archaeology to comprise: geo-archaeological review of the geotechnical survey and palaeo-environmental assessment, geophysical survey, fieldwalking, geophysics, trial trenching. The purpose of the staged approach is to gather intelligence so that each stage can inform the next.	
3.6	The proposed method for fieldwalking requires immediate approval as crops are being removed and fields ploughed now and the seasonal 'window' for doing this survey is short.	
	Action: RH to provide HK with ECC approved method for fieldwalking to use as the basis for the method in the written scheme of investigation.	RH
	Action: TEP/HK to provide a written scheme of investigation for fieldwalking for the officers to consider and to mobilise to undertake fieldwalking as quickly as possible	HK/TEP

	Action: ECC and SCC officers to provide National Grid with a list of approved or preferred contractors with the appropriate specialism to undertake this and other work in the area	RH/EM/ JT
3.7	A geotechnical borehole survey is going to be undertaken at each of the pylon locations, and in the area of the underground connection, once appropriate details of the connection can be determined following the COR Feedback Report publication and further consultation, particularly with persons with an interest in the land.	
3.8	The officers agreed that specialist monitoring of the geotechnical survey by a geo-archaeologist would be useful, and that they would also consider it appropriate to provide a palaeo-environmental assessment across the River Valleys. (This requirement does not relate to the section of overhead line connection.)	
	Action: TEP/HK/National Grid to liaise to ensure that the programme of geotechnical boreholes has appropriate specialist input.	HK/TEP/ National Grid
	Action: TEP/HK to take specialist advice on how to assess the palaeo-environmental potential of the River Valleys.	HK/TEP
	Action: Officers to provide National Grid with a list of approved or preferred contractors with the appropriate specialism to undertake this and other work in the area.	RH/EM/ JT
3.9	National Grid noted that Ground Penetrating Radar (GPR) may be used as part of the geotechnical survey for the underground sections and for overhead pylon bases. JE noted that the usefulness of GPR in identifying archaeology has improved dramatically recently and may be useful. (JE showed a recent example from investigation at the Brandvnm, Norfolk site.)	
	Action: TEP/HK to liaise with National Grid specialist provider to investigate if GPR survey results could be used for archaeological purposes.	HK/TEP
	Action: TEP/HK to provide an appropriate scheme for geophysical assessment to the officers for their consideration.	HK/TEP
3.10	Trench evaluation will be required, within the underground section and within the footprint of the pylon bases and any other ground disturbing ancillary works. It was agreed that the timing should be flexible as a number of factors can affect the ability to deliver this work, but it was National Grid's present intention that this would be complete prior to commencement.	
3.11	The trial trenching programme (timing/number of trenches/location of trenches/size of trenches) will be informed by the previous surveys described above.	
4.0	AOB/NEXT MEETING	
4.1	The actions log from the Cultural Heritage Thematic Group was briefly reviewed (see below) and it was noted that actions are still outstanding related to the report from the Second Yorkshire Line archaeological investigations. National Grid is having difficulty retrieving the records but will persevere.	
4.2	It was agreed that the need for and timing of a subsequent meeting should be informed by progress on the above actions.	TEP/ National Grid

**BRAMFORD – TWINSTEAD CONNECTION
FINAL NOTE OF BUILT HERITAGE THEMATIC SUB-GROUP MEETING**

20TH September 2012; Ipswich Town Football Club

Attendees:

Michael Munt	English Heritage
Richard Havis	Essex County Council
Edward Martin	Suffolk County Council
Richard Beauchamp	Essex CPRE
Simon Cairns	Suffolk CPRE
Nick Ward	Babergh District Council
Mark Barnard	Suffolk County Council

Simon Pepper	National Grid
Ian Grimshaw	Director, TEP (Consultants to National Grid)
Helena Kelly	Senior Archaeologist

BUILT HERITAGE THEMATIC SUB-GROUP MEETING ACTION LOG

ACTION	WHOM
3.5 Provide a copy of the presentation to the Thematic Group members	HK/ TEP
3.7 Group members to flag up any assets to potentially include in the assessment.	All
3.8 TEP/ HK/ National Grid to liaise with Group Members to ensure that the assets assessed include non-designated assets of equivalent significance or assets listed at a lower grade than they may be elsewhere in the country.	HK
3.9 TEP/ HK to provide a hard copy of the figures at A1, to include labels and an associated gazetteer of assets.	HK/ TEP
3.9 TEP/ HK key on figure to read 'National Heritage List designated assets' rather than 'English Heritage constraints'.	HK/ TEP
4.2 National Grid to issue draft Scoping Report chapter to Group members for comment.	TEP

BUILT HERITAGE THEMATIC SUB-GROUP MAIN MEETING NOTES

ITEM	ACTION
1.0 INTRODUCTIONS	
1.1 The built heritage thematic sub-group is a sub-group of the cultural heritage thematic group, convened to discuss specifically the on-going assessment of the likely effects on built heritage as a result of the proposed Bramford to Twinstead Tee Connection. This primarily relates to the likely effects of the scheme on the setting of designated heritage assets.	
1.2 The specific objective of the meeting is to broadly agree the generic scope of the surveys to assist in preparing the Scoping Report which will accompany National Grid's request for a Scoping Opinion from the Planning Inspectorate (PINS).	
1.3 A separate meeting has been held to discuss the buried archaeology assessment with the appropriate members of the thematic group and there is some overlap in attendance.	

2.0	PROJECT UPDATE	
2.1	The COR was published on 29 th May 2012. The COR describes the decision on undergrounding and the indicative overhead line alignments in each study area. The COR describes the reasons for the indicative connection option to be routed underground in the AONB and in the Stour Valley. It also describes the reasoning for the indicative alignment to be routed to the north of Hintlesham and to the south of the existing 400kV overhead line route.	
2.2	The underground route through the AONB and Stour Valley was assessed as being a particularly sensitive landscape. The indicative underground route totals 8km.	
2.3	Most consultation responses have now been received and the consultation period has ended. National Grid has taken on board the comments from the representations and will confirm its preferred alignment.	
2.4	The judgements set out in the COR have taken into account guidance in the National Policy Statement Electricity Networks Infrastructure 5 (EN-5). As with all planning applications, an arithmetical 'weight' is not given to one material consideration over another when determining the outcome of the application. All decisions are based on judgement of the factors in the application and the importance of the factors.	
2.5	A joint thematic group meeting was held on 27 th June 2012 to provide an opportunity to the Thematic Group members to raise any comments or queries regarding the COR feedback process.	
2.6	Actions outstanding from the joint thematic group:	
	Asset life of an overhead line – National Grid can confirm that this is nominally 80 years, but in reality the asset can be maintained in perpetuity.	Action Closed
	A list of the businesses invited to community forums has been prepared and can be provided.	Action Closed
3.0	EIA SCOPING STAGE	
3.1	Environmental baseline assessments have been undertaken, which will help to inform the scope of the EIA.	
3.2	Under the EIA 2009 Regulations it is not compulsory for the developer to discuss the scope of the EIA with Statutory Consultees, although PINS is obliged to consult before giving its Scoping Opinion. National Grid has taken the opinion that it will consult on the scope of the EIA with relevant statutory consultees before seeking a Scoping Opinion from PINS. This is consistent with its engagement programme and will help inform its Scoping Report and consultees will also have the opportunity to clarify points with National Grid. It will also assist Statutory Consultees in their response to PINS when consulted on the Scoping Opinion.	
3.3	Today's meeting provides the opportunity for National Grid to explain the approach that they propose and seek feedback from the relevant consultees on that scope.	
3.4	<u>Query: Will the built heritage assessment (primarily concerned with the effects on setting of heritage assets) also consider effects on historic landscape character?</u> The landscape and views assessment and historic environment assessment will be undertaken in parallel with close liaison to ensure that aspects of historic landscape character are covered.	
3.5	HK ran through a presentation.	
	Action: Provide a copy of the presentation to the Thematic Group members	HK/ TEP

3.6	The assessment will be in accordance with the guidance provided in policy (NPPF and EN-1) and in guidance documents (English Heritage guidance on the setting of heritage assets and seeing history in the view).	
3.7	Group members noted that the presentation implied that assessment will focus on designated heritage assets, but it is understood that there could be non-designated heritage assets of equivalent significance within the area of the development that should be treated the same as a designated asset. National Grid noted that some caution needs to be applied; the Secretary of State will distinguish between assets that are designated and those which are not and assessments need to be clear on this point.	
	Action: Group Members to inform National Grid of non-designated assets to include in the assessment.	All
3.8	Concern was raised by the Group over the inadequacies of the listed building listings in the area, given that the Babergh list in particular is potentially out of date.	
	Action: TEP/HK/National Grid to liaise to ensure that the assets assessed include non-designated assets of equivalent significance or assets listed at a lower grade than they may be elsewhere in the country. (As above, Group members to inform National Grid of assets of importance.)	HK
3.9	Designated heritage assets up to 10km from the route as shown in the COR have been mapped.	
	Action: TEP/HK to provide a hard copy of the figures at A1, to include labels and an associated gazetteer of assets.	HK/ TEP
	Action: TEP/HK key on figure to read 'National Heritage List designated assets' rather than 'English Heritage constraints'.	HK/ TEP
3.10	Concern was raised by a group member over reliance on the Zone of Theoretical Visibility to determine which assets may be affected. HK re-iterated that this was one method used to focus the more detailed assessment to those assets where the development could lead to a loss of significance through change within their setting. It was pointed out that at ground level, a pylon and a building may not be 'intervisible' but from a vantage point one may be able to see the building and a pylon behind it.	
3.11	The proposed method of assessment is to include all assets within 2km distance from the overhead line preferred alignment and also to include assets beyond 2km where long views or the wider landscape is important to their setting. The approach will be flexible to include, for example, a grade II listed farmhouse beyond 2km if that is part of a group of buildings where the development could lead to a loss of significance or harm the ability to appreciate that asset.	
3.12	A group member also suggested that there needs to be an assessment of the cumulative effect of the scheme, i.e. the "clutter" of multiple pylons in the landscape.	
3.13	The assessment will identify where harm is likely and this is part of an on-going process feeding into the design of the scheme with mitigation through avoidance.	
3.14	Group Members queried whether the assessment of hedgerows will consider those with evidence of pollards including ancient lime stools. HK confirmed that this is part of the on-going assessment and that at this stage hedgerows are being treated as 'important' using the regulations as a guide and taking a precautionary and inclusive approach. Additional survey will be undertaken on hedgerows affected by the preferred alignment.	
3.15	It was noted that the Stour Valley includes pill boxes from the Second World War 'eastern command' as part of a 'stop line' where it was planned invasion could be rebuffed.	

3.16	Group members referred to the 'time-depth' of the landscape and ancient woodlands and that this should be considered in assessment. There are also perceptions of 'wildness' and 'wilderness' associated with parts of the landscape although it is principally a managed landscape.	
3.17	Group members reiterated observations made in earlier engagement about the 'Constable Countryside'; epitome of lowland England; associations with Gainsborough and the East Anglia School of Art. The potential for restoring or re-creating 'lost landscapes' such as the gap in the plantation at Hintlesham should be considered.	
3.18	Group members referred to the introduction of cricket bat willow in the Stour Valley and that this had been frowned upon at the time but the trees are now viewed as important to landscape character. There is also industrial archaeology in the Stour Valley related to the use of the river for navigation.	
4.0	NEXT STEPS	
4.1	All attendees were thanked for their input and it was noted that engagement will continue as the Bramford to Twinstead Tee Connection Project develops. National Grid explained that the next important 'milestone' would be its Feedback Report setting out how it has considered representations made on its COR and confirming its intended route.	
4.2	HK explained that a draft Scoping Report chapter would be prepared and circulated to group members and comments would be welcomed. This should be issued in the next two weeks or so.	
	Action: National Grid to issue draft Scoping Report chapter to Group members for comment.	

**BRAMFORD – TWINSTEAD CONNECTION
FINAL NOTE OF BIODIVERSITY THEMATIC GROUP MEETING, 13TH SEPTEMBER 2012 1:30pm,
IPSWICH TOWN FOOTBALL CLUB, IPSWICH**

Attendees:

Emma Simmonds	Countryside and Ecology Officer, Essex County Council
Richard Parmee	Tree and Landscape Officer, Braintree District Council
Simone Bullion	Senior Conservation Officer, Suffolk Wildlife Trust
Peter Holborn	Countryside Management Leader, Suffolk County Council
Sue Hooton	Senior Ecologist, Suffolk County Council
James Carr	Technical Officer, Environment Agency
Eleanor Bellotti	Fisheries and Biodiversity Officer, Environment Agency

Simon Pepper (SP)	Senior Consents Officer, National Grid (Chair)
Francis Hesketh (FH)	Director, TEP (Consultants to National Grid)
Liz Seal (LS)	Principal Ecologist, TEP
Amy Longmore (AL)	Environmental Planner, TEP
Robert Fielden (RF)	Construction Engineer, National Grid
Simon Chandler (SC)	Project Manager, Overhead Lines, National Grid

BIODIVERSITY SCOPING MEETING ACTION LOG 13TH SEPTEMBER 2012 (agreed at meeting)

ACTION		WHOM
C/F (JM/4.5)	ACTION: Provide the list of businesses invited to join a Community Forum to members of the Thematic Groups.	National Grid
	ACTION ONGOING	
C/F (JM/4.13)	National Grid to confirm the lifespan of the existing 400kV overhead line once refurbished.	National Grid
	ACTION ONGOING	
C/F (M3/2.7)	National Grid to provide the archaeological report which took place during installation of the Second Yorkshire Line (overhead and underground components).	National Grid
	The Second Yorkshire Line archaeological summary report on the overhead line element was attached in an email sent to all Thematic Group members on 20/06/12. The archaeological report on undergrounding has been requested and will be forwarded to the Cultural Heritage Thematic Group Members shortly.	
	ACTION ONGOING	
3.3	National Grid to provide an update on why there has been a delay on the programme for the refurbishment works (referred to as FYL Refurbishment) to the existing overhead line.	National Grid
3.4	National Grid to provide a programme of the key dates for the B-T Connection Project to the members of the Thematic Group.	National Grid
4.3	AL to send a link to the habitats maps to RF and SC.	Amy Longmore
4.4	LS to send the Habitat Maps to the members of the Thematic Group.	Liz Seal
4.5	AL to check the emailing list as some members reported they hadn't received documents and links from TEP.	Amy Longmore
4.8	LS to send the target note report on habitat surveys to members of the Thematic Group.	Liz Seal

ACTION		WHOM
4.8	Thematic Group to provide comments on the habitat target notes report once received from LS by 9 th October 2012.	Thematic Group
4.13	LS to formally supply baseline data undertaken by TEP to Councils and other public-domain bodies once EIA is completed.	Liz Seal
4.17	LS to consider undertaking Hedgerow Regulations Assessment for hedges to be removed to facilitate construction and access, and not just undergrounding and substation areas.	Liz Seal
4.19	TEP will circulate the tree survey methodology to the Biodiversity and Landscape and Views Thematic Groups for comment.	Liz Seal
4.21	LS to include the tree survey and AIA methodology in the Scoping Report.	Liz Seal
4.23	LS to obtain information from "Nature on the Map" for Field Margins in Environmental Stewardship and to consider them in the EIA.	Liz Seal
4.29	LS to consider extending the bat surveys into October 2012 pre-hibernation season.	Liz Seal
4.30	LS to note that the Thematic Group would like to see a commitment to repeat surveys of suitable watercourses as part of the construction working practices.	Liz Seal
4.31	TEP to consider how to assess possible GCN impacts 500m from route (Natural England has agreed a 250m buffer)	Liz Seal
4.33	LS to Contact Frog Life for locations of toad crossing points	Liz Seal
4.35	LS to check the information regarding Adders, as questions were raised on the reliability of the information.	Liz Seal
4.38	National Grid to confirm its approach on previous jobs e.g. gas pipeline jobs, towards reptile surveys.	National Grid
4.40	LS to provide a list of all invertebrate data to members of the Thematic Group for comment. This issue to be considered in future meetings.	Liz Seal
4.41	LS to ensure all NERC Act s41 species are referenced/considered in the EIA (this mainly relates to the need to ensure BAP priority invertebrates are considered).	Liz Seal
4.43	ECCOS (Essex Ecology Services) and BRIE (Biological Records in Essex) contact to be confirmed by LS.	Liz Seal
4.44	At paragraph 1.3.10 of the draft Scoping Report change Essex to Braintree. Essex County Council does not have TPO's.	Liz Seal
4.45	At paragraph 1.2.3 of the draft Scoping Report part of the SSSI is also an RSPB Reserve.	Liz Seal
4.46	LS to add tree surveys, bat surveys into the Scoping Chapter and clarify the approach regarding field margins, invertebrates, GCN 250/500m buffer, toad crossings, invertebrates, reptiles.	LS

BIODIVERSITY SCOPING MAIN MEETING NOTES

ITEM		ACTION
1.0	INTRODUCTIONS	
1.1	All introduced themselves.	
2.0	MATTERS ARISING FROM NOTES OF PREVIOUS MEETING	
2.1	No comments. Draft notes can be finalised.	
3.0	PROJECT UPDATE	
3.1	National Grid is currently reviewing the comments received on the Connections Options Report (COR). The comments will help to inform National Grid's decision on its preferred alignment. Consultation with the Thematic Groups, Community Forums and Persons with an Interest in the Land will commence once the preferred alignment has been announced.	
3.2	National Grid is aiming to submit the Development Consent Order (DCO) application to the Planning Inspectorate in late summer to early autumn 2013.	
3.3	A group member noted that there have been some complaints about the refurbishment works on the existing overhead line taking longer than programmed. ACTION: National Grid to provide an update on why there has been a delay on the programme for the refurbishment works to the existing overhead line.	National Grid
3.4	ACTION: National Grid to provide a programme of the key dates for the project to the members of the Thematic Group.	National Grid
4.0	BIODIVERSITY ASSESSMENT SCOPING	
4.1	The aim of this meeting is to outline the approach to the biodiversity assessments and receive comments and advice from the members of the Thematic Group on the proposed approach and the baseline information gathered to-date. The members of the Thematic Group were provided with a draft scoping chapter for the Biodiversity assessment prior to the meeting.	
4.2	The Scoping Report will be submitted formally to the Planning Inspectorate (PINS). This meeting will allow discussions and comments on the proposed assessments and ensure any surveys missed can be undertaken before the end of the survey season.	
4.3	ACTION: AL to send a link to the habitats maps to RF and SC.	AL
4.4	ACTION: LS to send the Habitat Maps to the members of the Thematic Group.	LS
4.5	ACTION: AL to check the emailing list.	AL
4.6	<u>Query: It will be important for the assessments to capture the areas that will be proposed for access to the development areas, including contractors' compounds.</u> Although the access points are currently unknown, the baseline assessments to date have covered a large area and the team have used their best judgements to identify the likely access routes. TEP is confident the data its ecologists have gathered to date will cover the areas of the access points.	
	Habitat Survey	

4.7	The habitat plans are continually being updated as the NVC and other surveys progress.	
4.8	<p>The members of the Thematic Group made no comments on the approach to the habitat surveys. They wished to review the target note report before being in a position to comment on the habitat surveys.</p> <p>ACTION: LS to send the target note report on habitat surveys to members of the Thematic Group.</p> <p>ACTION: Thematic Group to provide comments on the habitat target notes report once received from LS by 9th October 2012.</p>	<p>LS</p> <p>Thematic Group</p>
	Woodland NVC Surveys	
4.9	The woodland NVC survey maps show the locations of all the woodlands where NVC surveys have been undertaken. The maps produced will be accompanied with target notes and should be read alongside the Phase 1 Habitat Plans.	
4.10	The members of the Thematic Group made no comments on the approach to the woodland surveys.	
	Grassland Surveys	
4.11	The grassland NVC survey maps show the grasslands where NVC surveys have been undertaken.	
4.12	<p><u>Query: Have road verges been surveyed?</u></p> <p>Road verges along designated SRV roads have had NVC surveys. The protected lanes have not had NVC surveys, but target notes are available for them. The habitat survey did include walkovers of other verges, but (apart from the SRVs and protected lanes) there did not seem to be particular botanical interest. If any were seen, target notes were made.</p>	
4.13	<p><u>Query: Will data be made available to Local Records Centres?</u></p> <p>All of the baseline data undertaken by TEP is mapped in GIS and can be used in the future by Councils and other public-domain bodies.</p> <p>ACTION: LS to formally supply baseline data undertaken by TEP to Councils and other public-domain bodies once EIA is completed.</p>	LS
4.14	<p><u>Query: Will further checks be undertaken on the road verges beyond the study area boundary? The Thematic Group noted that the Stour Valley has a network of narrow lanes and verges which would be vulnerable to churning-up by heavy vehicles</u></p> <p>TEP will undertake checks and surveys where widening of the roads is required e.g. for turning points.</p>	
	Hedgerow and Tree Surveys	
4.16	All hedgerows in the study area will have a Phase 1 Habitat Survey undertaken. Target notes will accompany the survey plans for noteworthy hedgerows.	

4.17	<p>Surveys will be undertaken in accordance with the Hedgerow Regulations 1997 along the underground cable route and at the substation site; as these are the areas where there may need to be hedgerow removal The Thematic Group noted that other hedges which may be removed to facilitate construction and access should also be subject to Hedgerow Regulations assessment.</p> <p>ACTION: LS to consider undertaking Hedgerow Regulations Assessment for hedges to be removed to facilitate construction and access, and not just undergrounding and substation areas.</p>	LS
4.18	If a hedgerow is required to be removed, the application will be included within the Development Consent Order (DCO) application to PINs.	
4.19	<p><u>Query: Will tree surveys be undertaken?</u></p> <p>Tree surveys will be undertaken in October when the preferred alignment is known. The information from the survey will be included in the DCO application and within either the Landscape Chapter or Ecology Chapter.</p> <p>ACTION: TEP will circulate the tree survey methodology to the Biodiversity and Landscape and Views Thematic Groups for comment.</p>	LS
4.20	<p><u>Query: East Anglia Offshore Wind Farm have used roadside verges during the installation of their underground cable. This has been damaging to hedgerows. Will this be encountered on Bramford to Twinstead Connection Project?</u></p> <p>Detailed discussion with the landowners will help to identify hedgerows in verges and will be taken into account in the surveys.</p>	
4.21	<p>An Arboricultural Impact Assessment (AIA) will be prepared for the construction works and Tree protection measures will be put in place during construction. The Group noted that removal should be regarded as a last resort, if reduction or pollarding was not possible.</p> <p>ACTION: LS to include the tree survey and AIA methodology in the Scoping Report.</p>	LS
4.22	<p><u>Query: Will bat roosts in trees be taken into account?</u></p> <p>TEP will identify the potential for bat roosts based on habitat potential whilst undertaking the tree surveys.</p>	
4.23	<p><u>Query: Field Margins – several field margins associated with hedgerows have biodiversity value. Often these form part of an Environmental Stewardship scheme and farmers move the conservation margins (aka headlands) regularly. Thematic Group wanted to ensure that biodiverse field margins were considered in EIA and in construction-stage protection methods.</u></p> <p>ACTION: LS to obtain information from “Nature on the Map” for Field Margins in Environmental Stewardship and to consider them in the EIA.</p>	LS
	Birds Surveys	
4.24	Breeding bird surveys have been undertaken across the route corridor and at the substation sites. Two visits have been undertaken and each bird species has been identified.	
4.25	Thematic Group confirmed they are happy with the proposed approach.	
	Dormouse Surveys	

4.26	Suffolk Wildlife Trust (SWT) has been undertaking the dormouse surveys. Nest tubes have been placed along the route corridor and will be checked over 5 day periods at the end of September and the end of November. There is the potential for dormice across the whole of the corridor.	
4.27	Thematic Group members agreed with the proposed approach.	
	Bat Surveys	
4.28	Two types of bat surveys have been undertaken; transect (walking and driving); and static. Surveys were undertaken in July, August and September 2012. The results will be produced in tables with accompanying plans.	
4.29	<u>Query: Can the bat surveys be extended into October to consider pre-hibernation season? (specifically swarming of Nathusius's bat)</u> TEP has not intended on doing this. ACTION: LS to consider extending the bat surveys into October 2012 to cover the pre-hibernation season.	LS
	Water Vole and Otter Surveys	
4.30	Water vole and otter surveys have been/will be undertaken in watercourses at the area of undergrounding and at the substation site. Pond surveys for amphibians (carried out in spring 2012) also looked for signs of voles. These surveys will help to inform working methods and mitigation methods. The Thematic Group would like to see a commitment to repeat surveys of suitable watercourses as part of the construction working practices. ACTION: LS to note that the Thematic Group would like to see a commitment to repeat surveys of suitable watercourses as part of the construction working practices.	LS
	Amphibian Surveys	
4.31	A large part of the amphibian surveys was undertaken in spring 2012 on all ponds identified during the Phase 1 Habitat surveys. TEP could not gain access to some ponds before the end of the survey season, and will complete these in 2013. TEP do not have the right to survey ponds in private gardens. Natural England has accepted this limitation. A 250m buffer has been used at the ponds during surveys as recommended by Natural England. Suffolk County Council would prefer to see a 500m buffer for EIA purposes. ACTION: TEP to consider how to assess possible GCN impacts 500m from route (Natural England has agreed a 250m buffer).	LS
4.32	Clusters of Great Crested Newts have been found along the eastern side of the corridor, but none along the west. This may be due to soil type. The Layham cluster is probably due to the beneficial effects of mineral extraction in respect of creating new clean waterbodies.	
4.33	The Thematic Group advised LS to contact Frog Life for information on toad crossing points. ACTION: LS to Contact Frog Life for locations of toad crossing points.	LS

4.34	The Thematic Group agreed with the approach to the amphibian surveys, subject to consideration of how 500m buffer distance is to be considered in EIA.	
	Reptile Surveys	
4.35	Adders used to be found in Arger Fen woods, however, none were found during the desk-top assessment. An Adder was found in Ramsey Wood during the desk-top study. ACTION: LS to check the information regarding Adders, as questions were raised on the reliability of the information.	LS
4.36	TEP propose to undertake reptile surveys in the areas where there is habitat potential along the underground cable route and substation site. Not proposed to carry out detailed reptile surveys elsewhere.	
4.37	It was noted that there will be a high potential for reptiles in Essex.	
4.38	<u>Query: What approach to reptile surveys has been undertaken on previous National Grid Jobs?</u> ACTION: National Grid to confirm its approach on previous jobs e.g. gas pipeline jobs, towards reptile surveys.	National Grid
	Any Other Comments	
4.39	<u>Query: Will badgers be included in the EIA?</u> Badger surveys have been undertaken as part of the Phase 1 Habitat surveys. It is envisaged that they will not form part of the EIA, which is reserved to assess the effects on sensitive receptors at a county or higher level. Due to the confidentiality of badger habitats, a separate report will be produced that will not be available to the public, but will form part of the DCO application. The Thematic Group advised that the topic of badgers should be mentioned in the EIA, because public perceptions and confidence in the EIA will be undermined if badgers aren't referenced, even though it is accepted that the species is not of conservation concern in the area.	
4.40	<u>Query: Will invertebrates be included within the EIA?</u> Desk-top surveys on invertebrates have been undertaken, and habitat potential identified during the Phase 1 Habitat surveys. Further review of desk and habitat data will be carried out. The Thematic Group noted that particular sensitive tower positions or other sensitive sites may need surveys. ACTION: LS to provide a list of all invertebrate data to members of the Thematic Group for comment. This issue to be considered in future meetings.	LS
4.41	ACTION: LS to ensure all NERC Act s41 species are referenced/considered in the EIA (this mainly relates to the need to ensure BAP priority invertebrates are considered).	LS
4.43	ECCOS (Essex Ecology Services) and BRIE (Biological Records in Essex) contact to be confirmed by LS.	LS
4.44	ACTION: At paragraph 1.3.10 of draft Scoping Report, change Essex to Braintree. Essex County Council does not have TPO's.	LS
4.45	ACTION: At paragraph 1.2.3 of the draft Scoping Report, note that part (not all) of the SSSI is also an RSPB Reserve.	LS

4.46	ACTION: LS to add tree surveys, bat surveys into the Scoping Chapter and clarify the approach regarding field margins, invertebrates, GCN 250/500m buffer, toad crossings, invertebrates, reptiles.	LS
5.0	ACTION LOG/ITEMS FOR NEXT MEETING AGENDA/DATE AND TIME OF NEXT MEETING	
5.1	The Action Log was reviewed and agreed.	
5.2	ACTION: TEP to agree the date of the next Thematic Group Meeting for the week commencing 5 th November 2012.	TEP

**BRAMFORD – TWINSTEAD CONNECTION
FINAL NOTE OF LANDSCAPE AND VIEWS THEMATIC GROUP MEETING, 18TH SEPTEMBER
2012, IPSWICH TOWN FOOTBALL CLUB, IPSWICH**

Attendees:

Peter Holburn	Countryside Management Leader, Suffolk County Council
Alan Massow	Senior Policy Planner, Braintree District Council
Philip Watson	Landscape Development Officer, Suffolk County Council
Robert Erith	President, Dedham Vale Society
Simon Amstutz	Dedham Vale AONB Manager and Planning and Development Officer

Simon Pepper (SP)	Senior Consents Officer, National Grid (Chair)
Ian Grimshaw (IG)	Director, TEP (Consultants to National Grid)
Charlotte Hayden (CH)	Senior Consultant, TEP
Amy Longmore (AL)	Environmental Planner, TEP
Robert Fielden (RF)	Construction Engineer, National Grid

LANDSCAPE AND VIEWS SCOPING MEETING ACTION LOG 18TH SEPTEMBER 2012 (agreed at meeting)

ACTION		WHOM
C/F (JM/4.5)	Provide the list of businesses invited to join a Community Forum to members of the Thematic Groups.	National Grid
	ACTION ONGOING	
C/F (JM/4.13)	National Grid to confirm the lifespan of the existing 400kV overhead line once refurbished.	National Grid
	ACTION ONGOING	
3.5	National Grid to confirm how long the DCO planning permission would remain valid once it has been granted.	National Grid
3.6	National Grid to issue a programme on the timescales of the application process for a DCO application.	National Grid
4.3	TEP to incorporate consideration of cultural associations into the landscape and visual assessment scope.	TEP
4.4	TEP to include a description of the special qualities of the AONB and other landscapes in section 1.2.	TEP
4.5	TEP to check with Natural England whether it has a definition for the setting of the AONB and also look at the Dedham Vale AONB and Stour Valley Project description on their website.	TEP
4.7	TEP to add data sources to help inform the landscape and visual assessment for the EIA, including: <ul style="list-style-type: none"> • Historic Landscape Characterisation; • Stour Valley and Dedham Vale Management Plan; • Managing a Masterpiece; and • Regional Characterisation (as updated by Natural England). 	TEP
4.8	TEP to ensure site surveys undertaken from: <ul style="list-style-type: none"> • Educational access land (Natural England should have data on this as part of high-level stewardship schemes); and • Navigable rivers. 	TEP
4.9	TEP to prioritise high sensitivity visual receptors in selecting representative viewpoints.	TEP

ACTION		WHOM
4.12	As the project progresses National Grid will look at how landscape restoration beneath the 132kV overhead line (once removed) could be achieved and will keep the Landscape and Views Thematic Group updated.	National Grid
4.16	TEP to consider 'low sensitivity' assigned to motorists and rail users. TEP to add receptors to the list, including: <ul style="list-style-type: none"> • Education establishments and nature reserves e.g. Dawes Hall and Assington Mill; • Educational access land and higher-level stewardship access schemes; • Bed and Breakfasts; and • Public House Gardens. 	TEP
4.17	National Grid will consider this in proposing a scope for the Socio-Economic assessment.	National Grid
4.21	All members of the Thematic Group to provide any comments on the draft landscape and visual scoping chapter by 2 nd October 2012.	Thematic Group
5.2	TEP to agree the date of the next Thematic Group Meeting, potentially for the week commencing 5 th November 2012.	TEP

LANDSCAPE AND VIEWS SCOPING MEETING NOTES

ITEM		ACTION
1.0	INTRODUCTIONS	
1.1	All introduced themselves.	
2.0	MATTERS ARISING FROM NOTES OF PREVIOUS MEETING	
2.1	No comments were received on the draft notes circulated and these have been finalised.	
3.0	PROJECT UPDATE	
3.1	National Grid is currently reviewing the comments received on the Connections Options Report (COR). The comments will help to inform National Grid's decision on its preferred alignment. Consultation with the Thematic Groups, Community Forums and Persons with an Interest in the Land will recommence once National Grid's preferred alignment has been announced.	
3.2	National Grid is aiming to submit the Development Consent Order (DCO) application to the Planning Inspectorate in late summer to early autumn 2013.	
3.3	<p><u>Query: "The generator projects at Sizewell and East Anglia Offshore Wind Farm have been delayed, therefore does this mean that the Bramford to Twinstead Connection Project could be put back?"</u></p> <p>National Grid is aware of speculation around delays associated these two generation projects. However, this has not been confirmed to National Grid nor has a change to the contracted connection dates been sought by the generators. Delay of these two projects does not affect the date required to implement the Bramford to Twinstead Connection Project which is still needed to ensure that the high voltage electrical transmission system has capacity to accommodate full power flows of existing and future identified generation in East Anglia.</p>	
3.4	The DCO application will take approximately 18 months to be determined. Once the DCO application has been submitted, the Planning Inspectorate has one year to advise the Secretary of State on the determination of the application. The Secretary of State then has 3 months to agree or disagree with the Planning Inspectorates advice.	
3.5	<p><u>Query: How long is the Planning Permission on a DCO application valid for?</u></p> <p>ACTION: National Grid to confirm how long the DCO planning permission would remain valid once it has been granted.</p>	National Grid
3.6	<p><u>Query: Can National Grid issue a programme on the timescales of the application process for a DCO application?</u></p> <p>ACTION: National Grid to issue a programme on the timescales of the application process for a DCO application.</p>	National Grid

4.0	LANDSCAPE AND VISUAL ASSESSMENT SCOPING	
4.1	The members of the Thematic Group had been provided with a draft scoping chapter for the Landscape and Visual assessment in advance of the meeting. The main aim of the meeting is for members of the Thematic Group to provide comments on the scope of the Landscape and Visual assessments prior to the submission of the Scoping Report to PINS.	
4.2	A discussion was held on the meaning of direct and indirect effects on landscape. Currently the chapter describes direct effects as effects on the immediate landscape where apparatus may be positioned. Indirect effects are described as effects on landscape character beyond the immediate landscape, but from where pylons may be visible. Thematic Group Members felt that this would be better described as effects on setting (such as in relation to the AONB) and that the term 'indirect effects' was misleading, as what was being described could also be termed a 'direct effect' on views. National Grid agreed to consider this further. See item 4.5 below.	
4.3	The Thematic Group considered that the potential effects on 'cultural associations' (i.e. with artists) needs to be assessed within the landscape and views chapter, which is different to the assessment in the Cultural Heritage chapter of the EIA. ACTION: TEP to incorporate consideration of cultural associations into the landscape and visual assessment scope.	TEP
	Baseline Environment	
4.4	The Thematic Group suggested that the special qualities of the AONB and the special qualities of other landscapes e.g. Gainsborough's paintings of the Stour Valley need to be added to section 1.2. ACTION: TEP to include a description of the special qualities of the AONB and other landscapes in section 1.2.	TEP
4.5	<u>Query: Is there a description of the setting of the AONB?</u> There is a description of the setting on the Dedham Vale website and Natural England may be able to provide further information on this. The Group suggested that if a definition of the setting of the AONB is not provided by Natural England, the description of the setting should be agreed between the Thematic Group members and National Grid. ACTION: TEP to check with Natural England whether it has a definition for the setting of the AONB and also look at the Dedham Vale AONB and Stour Valley Project description on their website.	TEP
	Zone of Theoretical Visibility Plans	
4.6	Zone of Theoretical Visibility (ZTV) plans were created to help inform the baseline assessment of views. On-the-ground assessment of baseline views has also been undertaken which will be used to inform further visual surveys. ZTV mapping of the sealing end compounds and substation will be used to help inform the visual assessment of these particular elements.	
	Site Survey	

4.7	<p>It was advised that further data sources be used to help inform the landscape and visual assessment for the EIA.</p> <p>ACTION: TEP to add data sources to help inform the landscape and visual assessment for the EIA, including:</p> <ul style="list-style-type: none"> • Historic Landscape Characterisation; • Stour Valley and Dedham Vale Management Plan; • Managing a Masterpiece; and • Regional Characterisation (as updated by Natural England). 	TEP
4.8	<p>The landscape and visual surveys would be undertaken by two chartered Landscape Architects from publicly accessible locations by car, foot, river and rail.</p> <p>ACTION: TEP to ensure site surveys undertaken from:</p> <ul style="list-style-type: none"> • Educational access land (Natural England should have data on this as part of high-level stewardship schemes); and • Navigable rivers. 	TEP
4.9	<p>The visual assessment will include all public and private visual receptors up to 1km from the development. Between 1km and 3km from the development representative viewpoints will be used for the visual assessment, which will be agreed with the District and County Councils. Beyond 3km from the development, representative and 'valued views' agreed with the District and County Councils will be assessed.</p> <p><u>Query: It is assumed that for the representative viewpoints from 1km and beyond, these will include high sensitivity visual receptors?</u></p> <p>ACTION: TEP to prioritise high sensitivity visual receptors in selecting representative viewpoints.</p>	TEP
4.10	<p>The visual assessment of potential effects of the underground cable construction and reinstatement and the removal of the 132kV overhead line will be undertaken using the same method as described at 4.9.</p>	
4.11	<p><u>Query: When will the 132kV overhead line be removed during the construction programme?</u></p> <p>The 132kV overhead line (between Burstall Bridge and Twinstead Tee) would be removed after the substation is constructed and commissioned.</p>	
4.12	<p><u>Query: Is there the opportunity to propose a landscape restoration scheme where the 132kV overhead line is removed and at the points where there will be no 400kV overhead line?</u></p> <p>National Grid will look into opportunities for landscape restoration although these are likely to be restricted to seeking hedges are reinstated and trees allowed to grow or to be planted and will be subject to landowner agreement, where previously clearances restricted them.</p> <p>ACTION: As the project progresses National Grid will look at how landscape restoration beneath the 132kV overhead line (once removed) could be achieved and will keep the Landscape and Views Thematic Group updated.</p>	National Grid

4.13	<p><u>Query: Will consultation on the Scoping Report be with statutory and non-statutory consultees?</u></p> <p>During the formal process, the Planning Inspectorate (PINS) will issue the Scoping Report to all statutory consultees. The statutory consultees can seek comments from non-statutory consultees. TEP is issuing draft Scoping chapters to members of the Thematic Groups for informal comment, including non-statutory consultees. TEP will only be consulting the statutory consultees on viewpoints, who can consult other bodies. Comments are welcome at any time, which can either be sent directly to National Grid or to the District and County Councils.</p>	
	Assessment Method and Reporting	
4.14	<p>The Landscape and Visual Impact Assessment will follow guidelines set out by the Landscape Institute and will consider the value or importance and sensitivity of the receptor, and the magnitude of change the receptor would experience in determining the overall significance of effect.</p>	
4.15	<p>TEP acknowledged that the judgements on the magnitude of effect experienced by receptors is likely to be something that the consultees and National Grid will not be able to agree with on. National Grid has stated in its Connection Options Report that it does not consider that the avoidance of effects on landscape and views outweighs the cost of undergrounding for the majority of the route whereas the planning authorities have set out positions which are different. In this circumstance, there could not be agreement on the effects of an overhead line. However it is important to agree the approach to survey and the definition of the scales of change to be used.</p>	
4.16	<p>The draft scoping chapter identifies the sensitivity of receptors.</p> <p>The Thematic Group questioned the low sensitivity assigned to motorists and rail users. For example the railway line through the Stour Valley is known as the 'Gainsborough Line' and could be considered to be more sensitive.</p> <p>ACTION: TEP to consider 'low sensitivity' assigned to motorists and rail users. TEP to add receptors to the list, including: Education establishments and nature reserves e.g. Dawes Hall and Assington Mill; Educational access land and higher-level stewardship access schemes; Bed and Breakfasts; and Public House Gardens.</p> <p>TEP note that at the moment the receptors identified in the scoping report are general, and they will be more focussed for the EIA.</p>	TEP
4.17	<p><u>Query: The Thematic Group note Suffolk's description as the 'greenest County in England' and its use to publicise the County to tourists. What is the Socio-Economic cost of the overhead line on the natural capital of the area?</u></p> <p>ACTION: National Grid will consider this in proposing a scope for the Socio-Economic assessment.</p>	National Grid
	Digital Model and Photomontages	
4.18	<p>Digital 3D modelling will be produced primarily for use at consultation events. The 3D modelling will also be used to assist production of photomontages of the proposed development in accordance with the recognised guidance. The photomontage viewpoints and timings are to be agreed with the Local Planning Authority and other consultees. TEP intend to record the views to be used for photomontages during the winter when vegetation screening is at its minimum. Photomontage views will be compared to 'before views' at the same scale.</p>	

	Cumulative Effects	
4.19	Intra-project effects for the various components of the Bramford to Twinstead Connection Project will be assessed, including the sealing end compounds and substation. The draft scoping chapter states that cumulative effects as a result of a new substation west of Twinstead Tee and the new connection are not anticipated.	
4.20	Inter-project effects of other projects in the area of particular scale and nature will be assessed. These will be agreed with the Local Planning Authorities and County Councils.	
4.21	ACTION: All members of the Thematic Group to provide any comments on the draft landscape and visual scoping chapter by 2nd October 2012.	Thematic Group
5.0	ACTION LOG/ITEMS FOR NEXT MEETING AGENDA/DATE AND TIME OF NEXT MEETING	
5.1	The Action Log was reviewed and agreed.	
5.2	ACTION: TEP to agree the date of the next Thematic Group Meeting, potentially for the week commencing 5th November 2012.	TEP

**BRAMFORD – TWINSTEAD TEE CONNECTION
FINAL NOTE OF EIA SOCIO-ECONOMICS AND LAND USE SCOPING MEETING,
12TH DECEMBER 2012, 9:15am, IPSWICH TOWN FOOTBALL CLUB, IPSWICH**

Attendees:

Kevin Fraser	Principal Planning Officer, Essex County Council
Michael Wilks	Spatial Planning Projects Manager, Suffolk County Council
Mike Dowdall	Economic Development Manager, Suffolk County Council
Simon Amstutz	Dedham Vale AONB Manager and Planning and Development Officer
Rob Wise	East Anglia Regional Manager, National Farmers Union (NFU)
Tim Woodward	Country Land and Business Association (CLA)
David Benham	Corporate Manager, Babergh District Council
Nick Ward	Babergh District Council
Brain Smethurst (BS)	Senior Project Manager, National Grid
Simon Pepper (SP)	Senior Consents Officer, National Grid (Chair)
Amy Longmore (AL)	Environmental Planner, TEP
Will Hazel (WH)	Principal Consultant, ERM
Howard Walker (HW)	Principal Economic Consultant, Bridge Economics

Action Log from EIA Socio-Economics and Land Use Scoping Meeting 12th December 2012

ITEM	ACTION	
3.2	National Grid to determine the maximum deviation a suspension tower can have before a tension tower is used.	National Grid
	No deviation is allowed on suspension pylons because the pylons are designed for a straight line condition to ensure the conductors do not arc across to the pylon steelwork, even under extreme weather conditions. National Grid has towers designed for 0 ⁰ to 30 ⁰ which have correspondingly different arm lengths to allow the conductors to turn the corner without affecting electrical clearances. <i>Action Closed</i>	
4.3	ACTION: National Grid to provide the presentations	National Grid
	Links have been provided in the meeting notes. <i>Action Closed</i>	
4.4	ACTION: National Grid to update presentations with an update sealing end compound.	National Grid
5.14	National Grid to consider if local contractors could be used for certain schemes of the development e.g. landscape reinstatement.	National Grid
5.18	National Grid to confirm if local authorities will receive compensation for substations developed on their land.	National Grid

MAIN MEETING NOTES

ITEM		ACTION
1.0	INTRODUCTIONS	
1.1	All introduced themselves.	
2.0	INTRODUCTION TO THE PROJECT	
2.1	The need for a new connection has arisen from a 'bottleneck' in the high voltage transmission network in East Anglia, where three 400kV lines enter Bramford substation and only one 400kV line leaves. Following a review of options National Grid proposes to address this by a new 400kV connection between Bramford Substation and Twinstead Tee. The need case report is available on the project website (http://www.bramford-twinstead.co.uk/library-project-need.aspx).	
2.2	Four route corridors for the new connection were identified between Bramford Substation and Twinstead Tee. Corridor 2 has been selected as the preferred corridor as it offers the least scale of change because the new 400kV connection would be routed near the existing 400kV overhead line and the existing 132kV UK Power Networks (UKPN) overhead line between Bramford Substation and Twinstead Tee, which currently runs alongside the existing 400kV overhead line for the majority of the route, will be dismantled. As a result of the removal of the 132kV overhead line between Bramford Substation and Twinstead Tee, a new substation will be needed to transform the 400kV transmission to 132kV at a location close to the Bramford Substation to Pelham line, west of Twinstead Tee. There are 3 substation sites currently under consideration and National Grid is reviewing options other than a new substation together with evaluating the potential substation sites.	
2.3	The aim of this scoping meeting is to seek advice which will inform National Grid's proposed scope for the socio-economics topic for the Environmental Impact Assessment (EIA). The proposed scope will be set out in a Scoping Report which will be submitted to the Planning Inspectorate (PINS) with National Grid's request for a scoping opinion and PINS will in turn consult with statutory consultees, some of whom are attendees at this meeting on the scope. It is hoped that this meeting will allow the scope to largely be agreed prior to the application to PINS for a Scoping Opinion. The aim would be to achieve a consensus on the scope, but it is understood that this may not be possible and National Grid will have to consider differing views and decide on its proposed scope before requesting a scoping opinion from PINS.	
2.4	National Grid has confirmed its preferred alignment in Study Areas C to G of the route corridor. The decision was based on the feedback from the Connections Options Report (COR). In Study Area AB, the alignment remains as an interim alignment until a representation from English Heritage is received by National Grid. Once the representation has been received and considered, a preferred alignment will be announced for Study Area AB. The preferred alignment will be taken forward for EIA. Consultation with the Thematic Groups, Community Forums and Persons with an Interest in the Land will recommence once the preferred alignment has been announced to help inform the detailed design.	
2.5	National Grid aims to submit the Development Consent Order (DCO) application to the Planning Inspectorate towards the end of 2013.	

2.6	<p><u>Query: If UKPN decides to develop a connection back to Bramford substation instead of proposing a new substation will the new 400kV overhead line still be required?</u></p> <p>UKPN has assessed many options to ensure its supply of electricity to the local area is maintained. One option is to build a new 132kV connection to Bramford substation; another is to build a new substation west of Twinstead. The need for the new 132kV connection or substation is required because of the proposed 400kV connection. The decision made on the infrastructure required to maintain a 132kV supply will not influence the need for the 400kV connection.</p>	
2.7	<p><u>Query: Will the new pylon designs be considered for use in the Bramford to Twinstead Tee Connection?</u></p> <p>National Grid is continuing to work on the development of the T-pylon, which was the winning design in the competition for a new pylon design held in 2012. For the Bramford to Twinstead Connection Project, using the T-pylon, if it was available in time, would draw greater attention to the new line alongside the existing 400kV lattice tower. An important reason for selecting Corridor 2 was that a new lattice tower design pylon in the place of an existing smaller lattice design and next to the existing lattice tower design line would bring the smallest amount of change. Although National Grid will take representations on the use of the T-pylon it is envisaged that a lattice tower design, similar to the existing 400kV overhead line, will be used on this project.</p>	
3.0	<p>Presentation on construction of double circuit connection using overhead lines</p>	
3.1	<p>The PowerPoint presentation is available on the project website (http://www.nationalgrid.com/NR/ronlyres/320B186F-193D-4FAD-9575-4026EEC0AFC3/49959/National_Grid_Overhead_Line_Construction_Presentation_FINAL.pdf). In addition, the following specific points were noted during the presentation.</p>	

3.2	<ul style="list-style-type: none"> • In each span there would be 5 to 7 spacers which ensure that the conductors do not clash. • Dampers are fitted to conductors to prevent oscillation (vibration of the conductors in the wind which can cause stress and damage). The earth wire protects the overhead line from lightning strikes. • Between tension towers, conductors are electrically connected using a jumper. Tension towers are larger as they need to be stronger to withstand the loading of the conductors in tension and so also need larger foundations. Terminal towers and their foundations also have to be larger than suspension towers for the same reason. • The positions of tower working areas and site accesses are carefully considered to minimise disturbance. Where temporary stone tracks are installed these are laid on geotextile so that they can be easily removed post-construction. • It takes approx. 1 day to construct a tower (pylon). This is not including construction of foundations. Typically the majority of metalwork would be assembled on the ground in sections and a crane would be used to lift these into place. The majority of the metalwork is bolted together, but the earth/top peak is welded as there is less loading imposed on this part. • Foundations are shuttered. A temporary jig (metal frame) is used to position the tower legs in place. The pyramidal foundations mean that the soil backfill forms part of the foundation as it provides a downward force on the pyramid of concrete. • Conductors would be pulled through pulleys attached to the insulator strings by a pull-wire or 'bond'. The pull-wire can be installed between towers by hand, using a tractor to travel between pylons. The conductor does not touch the ground. In areas with sensitive ground conditions, the 	
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	<p>bond can be pulled through using a helicopter. The aim would be to minimise disturbance to ground. Linesmen in trolleys install the spacers.</p> <ul style="list-style-type: none"> • Once construction is complete the working area is cleared. Metal detection is used to clean up working areas following overhead line construction. Temporary tracks are removed and the land reinstated to its original condition in consultation with the landowners. • A vinyl paint system is applied to each tower 2 – 3 years after installation, allowing time for the galvanising to have hardened. This paint system should then last approx. 20 years. National Grid has one standard paint colour that it uses. • Towers are repainted approximately every 18 – 20 years. Fittings have approximately a 20 – 25 year life span and conductors approximately a 40 year life, although as technology improves this could be extended to approximately 60 years. • Substation construction also requires adequate road access to transport abnormal indivisible loads and this access has to be maintained for potential future replacement of transformers. As pylons are transported to site in pieces, these are not abnormal indivisible loads. • Substation construction results in permanent land-take. The exact details of the substation are not known until a contractor/supplier is appointed, as manufacturers' equipment varies. The environmental assessments are being based on the maximum measurements the substation could be. • <u>Query: What is the maximum deviation a suspension tower can have before a tension tower is required?</u> <p>ACTION: National Grid to determine the maximum deviation a suspension tower can have before a tension tower is used.</p> <ul style="list-style-type: none"> • <u>Query: How many pylons will be used on the connection?</u> Approximately 66. 	National Grid
4.0	Presentation on construction of double circuit connection using underground cables	
4.1	The powerpoint presentation is available on the project website (http://www.nationalgrid.com/NR/rdonlyres/320B186F-193D-4FAD-9575-4026EEC0AFC3/49958/National_Grid_Underground_cable_construction_Presentation_FINAL.pdf). In addition, the following specific points and actions were noted during the presentation.	

4.2	<ul style="list-style-type: none"> • All underground cables now used by National Grid use cross-linked polyethylene (XLPE) as insulation (oil filled cables are no longer installed). There will be 6 cable trenches, each with 3 cables laid (investigations are taking place to identify if 12 cables could be laid instead of 18). Cables are laid approximately 1m below ground; • An approximately 65m working area would be required to accommodate the cable trenches, temporary haul road, soil storage area and new drainage. Underground cables cannot dissipate heat like overhead line conductors and separation is required between the cables in the trenches and between the trenches themselves; • Permanent drainage would be installed at each side of the working area to maintain drainage during works and also to ensure controlled conditions around the cables during their operation (in particular to minimise risk of the Cement Bound Sand layer washing away); • Soil stored would be replaced as backfill. There would be some surplus to take off site because the cables and the Cement Bound Sand are put in excavated trenches; and • Land will be reinstated to its previous condition where possible. As trees cause soil to become dry, trees cannot be planted along the cable route. Crops can still be planted and cultivated. Hedgerows can also be planted. • Small kiosks (similar in size to the typically green-coloured BT telephone cables kiosks on roadsides) will be placed above ground where there are joints in the cable to monitor any faults. • <u>Query: What is the working width for a 132kV underground cable?</u> UKPN state a working width of approximately 35m would be required. • <u>Query: What is the permanent easement for no tree planting along the underground cable route?</u> The permanent easement for a 132kV underground cable is 8.5m. The permanent easement for a 400kV underground cable is 35m. • <u>Query: If there are 12 underground cables as opposed to 18 would the sealing end compounds be smaller?</u> Yes. At present the connection is planned on the basis that there will be 18 underground cables required to match the rating of the overhead line. The approximate size of a sealing end compound for 18 cables is 80m x 50m. 	
4.3	ACTION: National Grid to provide the presentations	National Grid
4.4	ACTION: National Grid to update presentations with an image of a sealing end compound similar to that which would be required for the Bramford to Twinstead Tee Connection.	National Grid
4.5	<u>Query: How long does it take to construct the components of the development?</u> The substation will be constructed first, which will take approximately 2 years. The overhead line takes approximately one to two weeks per pylon and installation of the underground cables takes approximately 2 years including reinstatement.	
4.6	<u>Query: Is compensation being provided to land owners?</u> National Grid is providing compensation to land owners for temporary construction, surveys and permanent structures. A one-off permanent easement fee will be provided instead of yearly wayleave payments. Where these are not agreed voluntarily, they will be sought in the DCO application.	

4.7	<p><u>Query: Are any other methods of compensation to be provided?</u></p> <p>There is no existing legislation that requires National Grid to provide compensation for indirect effects. National Grid is open-minded to contributing to Community benefit initiatives in due course in association with construction activities, but cannot consider this issue in detail until consent for the development has been received.</p>	
4.8	<p><u>Query: What is the cost difference between overhead lines and underground cables for this project?</u></p> <p>Based on the Electricity Transmission Costing Study by Parsons Brinckerhoff and Associates, a connection that is fully undergrounded would cost approximately £600,000,000. A connection that fully comprises an overhead line would cost approximately £60,000,000.</p> <p>The Group commented that this cost does not take into account the socio-economic costs of the project.</p> <p><u>Query: Why have the socio-economic costs in relation to likely effects on communities not been accounted for?</u></p> <p>National Grid notes that this is a concern of some of the organisations represented, however it is not a requirement of the Planning Act 2008 that effects are ascribed monetary values and taken into account as a material consideration. Furthermore, identifying a way to ascertain costs is very difficult and unreliable. A qualitative assessment on the potential effects of the development on socio-economics and the community will be undertaken.</p>	
5.0	EIA SOCIO-ECONOMICS AND LAND USE SCOPING DISCUSSION	
5.1	<p>National Grid has asked this Group to meet to look at the proposed appraisal for the socio-economic and land use assessment for the Environmental Impact Assessment (EIA). Due to similarities in the sub-topics covered in the socio-economic and land use assessments the two topics have been combined. Baseline information has started to be gathered through desk-based research. This information will be used to measure the likely effects the proposed development will have on the socio-economics and land use of the area.</p>	

5.2	<p>A presentation was shown detailing National Grid’s proposed approach to the socio-economic assessment. The presentation summarised the following points:</p> <ul style="list-style-type: none"> • The spatial scope of the assessment will cover two study areas: <ul style="list-style-type: none"> ○ Local area of influence – direct effects on a 250m buffer around the alignment; ○ Wider study area – the effects on the overall spread of the project influence, which could be up to county or national level. • The receptors that will be assessed include: <ul style="list-style-type: none"> ○ Planning land use allocations e.g. employment, housing, mineral resources; ○ Tourism and recreation e.g. users, features and businesses; ○ Agricultural land and holdings; ○ Business operators and land uses; ○ Local communities and community facilities e.g. health, schools and community; and ○ Employment and socio-economics. • The likely effects and the significance will be assessed. Likely effects could include temporary severance, restricted land use, amenity effects, transport effects, direct land take, operator functionality, economic consequences, local procurement and jobs. • The EIA method will include a consideration of anticipated change against the baseline environment; an assessment of magnitude, sensitivity and significance; a qualitative assessment on the likely effects; an assessment on the cumulative and in-combination effects with other EIA topics; and an identification of mitigation methods. • The assessment will use guidance from the Planning Act 2008, the National Policy Statements for Energy (EN 1 and EN 5) and from the Design Manual for Roads and Bridges. 	

5.3	<p><u>Query: Will National Grid be considering the likely effects on house prices and will National Grid assign a monetary value to likely effects on tourism?</u></p>	
	<p>It is not National Grid's intention to assess house prices or assign a monetary value to tourism during the EIA.</p>	
	<p>House prices will not be assessed because of the following reasons:</p>	
	<ul style="list-style-type: none"> • Valuation of property is influenced by a number of factors. The detail of how National Grid's proposal may affect residential property would depend, amongst other things, on the detail of each property including its orientation; size and number of windows; views available; screening and filtering by vegetation and other intervening features. There are other factors than National Grid's proposal which may affect the value of a property. The valuation of property can be undertaken but would be imperfect and there would be uncertainty around the effect of National Grid's proposal. This would limit the value of the exercise. 	
	<ul style="list-style-type: none"> • Disclosing property valuation and details, including factors that may affect the value of any property, would give rise to issues of privacy and confidentiality of the owners and occupiers. It would be necessary to generalise and summarise any results, limiting the value of information presented. 	
	<ul style="list-style-type: none"> • The Environmental Impact Assessment process is to support decision-making on the application for consent under the Planning Act 2008. Effects on amenity which will be reported in the Environmental Statement are material considerations in making a decision on the planning merits of the proposal. Effects on property value are not material to the planning merits of the proposal. National Policy Statement EN-1 sets out the matters related to socio-economic effects which are relevant to proposals for Nationally Significant Infrastructure Projects; property values are not amongst those matters. 	
	<ul style="list-style-type: none"> • There is no mechanism under statute or protocol for compensation for any adverse effects on the value of property as the result of National Grid's proposal other than the provisions where equipment is installed on or over property. In this circumstance, it would be disingenuous to undertake an exercise of valuation of property. 	
	<p>A monetary value will not be assigned to tourism for the EIA as there is no legislation or guidance to undertake this method in a reliable procedure. The effects on tourism will be assessed qualitatively using locally and nationally available data on the percentage of tourism in the area. Tourism data was offered by Suffolk County Council.</p>	
5.4	<p>National Grid acknowledged that the Group would like the assessment of house prices and monetary effects on tourism to be included in the EIA. National Grid will take this into account but has not heard anything in the meeting which it considers would make it undertake such an assessment.</p>	
5.5	<p><u>Query: In Study Area E there are a number of small businesses; will these be taken into account in the assessment?</u></p>	
	<p>National Grid will consider all impacts on local businesses along the alignment where the impacts are likely to be material.</p>	
5.6	<p><u>Query: If the alignment changes, will the study area of the socio-economic and land use assessment change?</u></p>	
	<p>Yes, the local area of influence study area (250m around the alignment) would follow the movement of the alignment if any changes are made.</p>	

5.7	<p><u>Query: Will National Grid assess the likely impacts on individual businesses?</u></p> <p>It would be very difficult to assess the likely effects on individual businesses. The landscape and visual impact assessment will assess the likely effects on views from business premises. The socio-economic assessment will assess the likely effect of this on the business.</p>	
5.8	<p>It was noted that the Dedham Vale AONB has data on tourist visitor numbers and spend.</p>	
5.9	<p><u>Query: Will health and wellbeing of communities be assessed?</u></p> <p>An assessment will be undertaken on likely impacts the development will have on access for communities to reach facilities such as hospitals, doctors, local shops etc. The assessment will not consider the impacts the development may have on health, other than with regard to exposure to electric and magnetic fields (which will be assessed in a separate chapter of the ES), as there are no adverse effects on health anticipated and no guidance or method on how assessment of any other health effects could be undertaken or measured.</p>	
5.10	<p>National Grid noted that the Group felt effects on health and wellbeing, such as stress related illnesses due to the prospect of changes to individual's amenity and community splits in Hintlesham, arising from the engagement undertaken related to the project, should be considered. However it does not intend to undertake such an assessment.</p>	
5.11	<p>National Grid notes that the scope of the EIA will be assessing material considerations covered in EIA regulations and guidance.</p>	
5.12	<p><u>Query: Were local socio-economic effects considered during the original routeing of the existing 400kV overhead line?</u></p> <p>The existing 400kV overhead line was built in 1972 and it is unknown if socio-economics were considered in its routeing.</p>	
5.13	<p><u>Query: During the Community Forums the attendees were asked to note areas and sites of local value. Will these be considered in the socio-economic assessment?</u></p> <p>Yes, National Grid will take into account the information from the Community Forums.</p>	
5.14	<p>The Group notes that it will be beneficial if local contractors could be used for certain schemes of the development e.g. landscape reinstatement.</p> <p>ACTION: National Grid to consider if local contractors could be used for certain schemes of the development e.g. landscape reinstatement.</p>	National Grid
5.15	<p>The Group noted that National Grid could contact the Royal Institute for Chartered Surveyors (RICS) for information on the local property market.</p>	
5.16	<p>National Grid will undertake a qualitative assessment and make professional judgement on adverse, beneficial and significance of likely effects, but will not add a quantitative value.</p>	
5.17	<p><u>Query: What type of mitigation will be used on identified effects?</u></p> <p>National Grid will identify suitable mitigation methods where significant effects are identified. The mitigation methods will be chosen appropriately to address the significant effect.</p>	

5.18	<p><u>Query: Will the local authorities receive compensation for substations developed on their land?</u></p> <p>ACTION: National Grid to confirm if local authorities will receive compensation for substations developed on their land.</p>	National Grid
5.19	The Group commented that tourism bodies might be useful consultees. The Group also commented that Local Enterprise Partnerships are unlikely to be involved in commenting on the scope of the EIA assessment.	
6.0	AOB	
6.1	National Grid will issue a draft scoping chapter in January 2013 to the consultees invited to the socio-economics and land use scoping meeting for comments. Comments on the chapter should be returned to amylongmore@tep.uk.com two weeks after the scoping chapter has been issued.	

**BRAMFORD – TWINSTEAD CONNECTION
 FINAL NOTE OF EIA SCOPING MEETING (for Air Quality, Traffic and Transport, Geology and
 Land Contamination, Land Use, Hydrology, EMF and Noise and Vibration)
 25TH SEPTEMBER 2012 1:00pm, IPSWICH TOWN FOOTBALL CLUB, IPSWICH**

Attendees:

Kevin Fraser	Principal Planning Officer, Essex County Council
Emma Goodings	Planning Officer, Braintree District Council
Peter Holburn	Countryside Management Leader, Suffolk County Council
Phil Watson	Landscape Development Officer, Suffolk County Council
Andrew Woodin	Right of Way Access Manager, Suffolk County Council
Adam Garland	Strategic Development Engineer, Essex County Council
David Stiff	Highways Officer, Suffolk County Council
David Harold	Environmental Health Officer, Mid-Suffolk District Council
David Chapman	Environmental Health Officer, Essex County Council
Alison Collins	Lead Adviser, Natural England

Martin Davies (MD)	Lead Project Manager, National Grid
Simon Pepper (SP)	Senior Consents Officer, National Grid (Chair)
Charlotte Hayden (CH)	Senior Landscape Architect, TEP
Amy Longmore (AL)	Environmental Planner, TEP
Robert Fielden (RF)	Construction Engineer, National Grid
Simon Chandler (SC)	Project Manager, Overhead Lines, National Grid
James Kennerly (JK)	Engineer, National Grid
Colin Whittingham (CW)	Hydrology Consultant, RSK
Andrew Kent (AK)	Geology Consultant, RSK
Srinivas Srimath (SS)	Air Quality Consultant, RSK
Hayley Tripp (HT)	EMFs Consultant, National Grid
James Ombudo (JO)	Undergrounding Engineer, National Grid

Action Log from EIA Scoping Meeting 25th September

ITEM	ACTION	
5.9	Lorry Movement Network to be sent to National Grid.	Statutory Consultees
5.9	National Grid to advise whether a monetary bond with the Local District Councils can be set up should any reinstatement work not be to an acceptable standard.	National Grid

MAIN MEETING NOTES

ITEM		ACTION
1.0	INTRODUCTIONS	
1.1	All introduced themselves.	
2.0	INTRODUCTION TO THE PROJECT	
2.1	The need for a new connection has arisen from a 'bottleneck' in the high voltage transmission network in East Anglia, where three 400kV lines enter Bramford substation and only one 400kV line leaves. Following a review of options it is considered that the best way of addressing this is through a new 400kV connection between Bramford Substation and Twinstead Tee. The need case report is available on the project website (http://www.bramford-tinstead.co.uk/library-project-need.aspx).	
2.2	Four route corridors for the new connection were identified between Bramford Substation and Twinstead Tee. Corridor 2 has been selected as the preferred corridor as it offers the least scale of change as the new 400kV connection would be routed near the existing 400kV overhead line and the existing 132kV UK Power Networks (UKPN) overhead line between Bramford Substation and Twinstead Tee, which currently runs alongside the existing 400kV overhead line for the majority of the route, will be acquired by National Grid and dismantled. As a result of the removal of the 132kV overhead line between Bramford Substation and Twinstead Tee, a new substation will be needed to transform the 400kV transmission to 132kV at a location close to the Bramford Substation to Pelham line, west of Twinstead Tee. There are 3 substation sites currently under consideration.	
2.3	The aim of this scoping meeting is to seek the Group's advice, which will inform National Grid's proposed scope for the Environmental Impact Assessment (EIA). The proposed scope will be set out in a scoping report which will be submitted to the Planning Inspectorate (PINS) as part of the request for a scoping opinion and PINS will in turn consult with attendees at this meeting on the scope. It is hoped that this meeting will allow the scope to largely be agreed prior to the application to PINS for a Scoping Opinion. The aim would be to achieve a consensus on the scope, but it is understood that this may not be possible and National Grid will have to consider differing views and decide on its proposed scope before requesting a scoping opinion from PINS.	
2.4	National Grid is currently reviewing the comments received on the Connections Options Report (COR), published in May 2012, which outlines National Grid's interim alignment for the new connection. The comments will help to inform National Grid's decision on its preferred alignment which will be taken forward for EIA. Consultation with the Thematic Groups, Community Forums and Persons with an Interest in the Land will recommence once the preferred alignment has been announced to help inform the detailed design.	
2.5	National Grid aims to submit the Development Consent Order (DCO) application to the Planning Inspectorate in late summer to early autumn 2013.	
3.0	Presentation on construction of double circuit connection using overhead lines	
3.1	The powerpoint presentation is available on the project website (http://www.nationalgrid.com/NR/rdonlyres/320B186F-193D-4FAD-9575-4026EEC0AFC3/49959/National_Grid_Overhead_Line_Construction_Presentation_FIN_AL.pdf). In addition, the following specific points were noted during the presentation.	
3.2	<ul style="list-style-type: none"> In each span there would be 5 to 7 spacers which hold the conductors together. 	

	<p>Dampers are included in tower construction to prevent oscillation (vibration of the conductors in the wind which can cause stress and damage). The earth wire protects the overhead line from lightning strikes.</p> <ul style="list-style-type: none"> • Between tension towers, conductors are electrically connected using a jumper. Tension towers are larger as they need to be stronger to withstand the loading of the conductors in tension and so also need larger foundations. Terminal towers and their foundations also have to be larger for the same reason. • The positions of tower working areas and site accesses are carefully thought through to minimise disturbance. Where temporary stone tracks are installed these are laid on geotextile so that they can be easily removed post-construction. • <u>Query: How long does it take to construct a tower?</u> It takes approx. 1 day to construct a tower (pylon). This is not including construction of foundations. Typically the majority of metalwork would be assembled on the ground in sections and a crane would be used to lift these into place. The majority of the metalwork is bolted together, but the earth/top peak is welded as there is less loading imposed on this part. • Foundations are shuttered. A temporary jig (metal frame) is used to position the tower legs in place. The pyramidal foundations mean that the soil backfill forms part of the foundation as it provides a downward force on the pyramid of concrete. • Conductors would be pulled through pulleys attached to the insulator strings by a pull-wire or 'bond'. The pull-wire can be installed between towers by hand, using a tractor to travel between pylons. The conductor does not touch the ground. In areas with sensitive ground conditions, the bond can be pulled through using a helicopter. The aim would be to minimise disturbance to ground. Linesmen in trolleys install the spacers. • Once construction is complete the working area is cleared. Metal detection is used to clean up working areas following overhead line construction. Temporary tracks are removed and the land reinstated to its original condition in consultation with the landowners. • A vinyl paint system is applied to each tower 2 – 3 years after installation, allowing time for the galvanising to have hardened. This paint system should then last approx. 20 years. National Grid has one standard paint colour that it uses. • Towers are repainted approximately every 18 – 20 years. Fittings have approximately a 20 – 25 year life span and conductors approximately a 40 year life, although as technology improves this is likely to extend to say 60 years. • Substation construction also requires adequate road access to transport abnormal indivisible loads and this access has to be maintained for potential future replacement of transformers. As pylons are transported to site in pieces, these are not abnormal indivisible loads. • Substation construction results in permanent land-take. The exact details of the substation are not known until a contractor/supplier is appointed, as manufacturers' equipment varies. 	
4.0	Presentation on construction of double circuit connection using underground cables	

4.1	The powerpoint presentation is available on the project website (http://www.nationalgrid.com/NR/rdonlyres/320B186F-193D-4FAD-9575-4026EEC0AFC3/49958/National_Grid_Underground_cable_construction_Presentation_FINAL.pdf). In addition, the following specific points and actions were noted during the presentation.	
4.2	<ul style="list-style-type: none"> • All cables now used by National Grid use cross-linked polyethylene (XLPE) as insulation (oil filled cables are no longer installed). There will be 6 cable trances, each with 3 cables laid. Cables are laid approximately 1m below ground; • An approximately 65m working area would be required on this project to accommodate the cable trenches, temporary haul road, soil storage area and new drainage. Below ground cables cannot dissipate heat like overhead line conductors and separation is required between the cables in the trenches and the trenches themselves; • Permanent drainage would be installed at each side of the working area to maintain drainage during works and also to ensure controlled conditions around the cables during their operation (in particular to minimise risk of the Cement Bound Sand layer washing away); • Soil stored would be replaced as backfill. There would be some surplus to take off site because the cables and the Cement Bound Sand are put in excavated trenches; and • Land will be reinstated to its previous condition where possible. As trees cause soil to become dry, trees cannot be planted along the cable route. Crops can still be planted and cultivated. Hedgerows can also be planted. • <u>Query: Will there be any above ground developments in association with the cable?</u> Small kiosks (similar in size to the BT telephone kiosks) will be placed above ground where there are joints in the cable to monitor any faults. 	
5.0	EIA SCOPING (Group splits into sub-groups)	
5.1	The Group split into relevant environmental topic sub-groups to discuss the scope of the EIA.	

5.2	<p>AIR QUALITY</p> <p>The following points were discussed during the discussion on Air Quality:</p> <ul style="list-style-type: none"> ● Air quality and dust impacts are relevant at the locations of sensitive receptors; ● Sensitive receptors selected for assessment will include residential homes and ecologically sensitive sites; ● Background air quality conditions are characterised using DEFRA's UK-AIR data (no specific onsite measurements are considered necessary). The UK-AIR data provides background air quality data for all council areas, at a resolution of 1 km x 1 km. This data will identify any air quality-sensitive locations along the cable route and near the substation; ● The assessment will consider construction phase and operation phase separately; ● Guidance provided by Environmental Protection UK and the Institute of Air Quality Management are specifically relevant to identify air quality and dust impacts of this project. National Grid will follow these guidance criteria in order to determine the scope of works and mitigation measures; ● Construction phase dust impacts are from (i) Construction equipment operation (ii) Road traffic - Heavy Duty Vehicles (HDVs). Construction impacts are localised and for a short duration (works are done for short period at any given stretch of the cable route and at the substation location). The number of HDVs generated as a result of this project at any given stretch will be negligible when compared to the HDVs on the existing road network. Dust and air quality impacts are not considered significant at locations greater than 100m from the emission generation source. Mitigation measures will be included in the EIA to control dust and air pollution impacts; ● Operational impacts are considered negligible; and ● Cumulative impacts where required will also be addressed within the air quality Environmental Statement chapter. 	
5.3	<p>The proposed assessment method will be documented and consulted on with individual Scientific Officers (or Environmental Health Officers (EHOs) who deal with air quality and dust issues) separately to obtain any further comments and agreement on the method. All comments will be considered and addressed in the assessment where appropriate to inform the EIA.</p>	
5.4	<p>The following comments will be considered during the assessment where appropriate to inform the EIA:</p> <ul style="list-style-type: none"> ● The public should be informed about the construction works and any deviations; ● Mitigation measures should be applied as per the agreed plans e.g. the Construction Environmental Management Plan; and ● It is unlikely there will be significant air quality and dust issues from a project of this type. 	
5.5	<p>National Grid explained that they follow best practice methods for construction works that aim to minimise impacts on local air quality.</p>	

5.6	<p>TRAFFIC AND TRANSPORT</p> <p><u>Public Rights of Way (PRoW)</u></p> <p>The following requests and comments were made on PRoW for National Grid to consider:</p> <ul style="list-style-type: none"> • Keep closures to a minimum; • When removing stiles as part of the scheme, look to remove permanently or replace with gates; • Reinstatement needs to be of good quality and relevant to use of the PRoW (bridleway, cycleway, pedestrian route etc.); • Signage used during closures need to be correct; • As soon as work is completed, (and between work periods) PRoW to open with notices removed; • Definitive map details are available from Suffolk County Council; and • PRoW management in Suffolk are split East and West. 	
5.7	<p><u>Query: Can temporary diversions within landowners' land be discussed with grantors?</u></p> <p>National Grid confirmed that this can be discussed.</p>	
5.8	<p>National Grid discussed the following requirements and procedures usually undertaken during construction:</p> <ul style="list-style-type: none"> • Construction preference is to close PRoW where affected by working areas; • Construction will identify diversions and netting of PRoW where appropriate, subject to feasibility; • For stringing works, 2 x 4 week closures may be required on PRoW; and • For safety reasons, pylons are not designed to be positioned on PRoWs, roads or ditches. 	
5.9	<p><u>Roads</u></p> <p>The following requests and comments were made on roads for National Grid to consider:</p> <ul style="list-style-type: none"> • Issues with weight restrictions in the area; • Some road closures may not have suitable diversion routes due to the network in the area; • Concern expressed over the suitability of the road network in Study Area G for cable construction / installation requirements. The roads are fairly narrow, many bound by hedges on both sides and not robust enough to take heavy loads. A detailed transport and access study should be done to inform any proposed access routes; • Lorry route networks are available from Suffolk County Council and the Council encourages their use by HGVs; • It was mentioned that a lorry movement network has been put together by Statutory Consultees to help inform access decisions; <p>ACTION: Lorry Movement Network to be sent to National Grid.</p> <ul style="list-style-type: none"> • National Grid notes that bonds are not normally issued under normal circumstances as the DCO application identifies concerns and conditions can be put in place on this; • <u>Query: Is National Grid willing to put up a monetary bond for the Local District Councils that can be drawn should any reinstatement work be not to an acceptable standard?</u> National Grid advised that this was not usually the case on projects but will seek further guidance; <p>ACTION: National Grid to advise whether a monetary bond with the Local District Councils can be set up should any reinstatement work not be to an acceptable standard.</p> <ul style="list-style-type: none"> • Road management in Suffolk is undertaken from 3 local area offices. 	

5.10	National Grid discussed the following requirements and procedures usually undertaken during construction: <ul style="list-style-type: none"> • Netting is undertaken overnight, with a 4 hour closure; • Consultation is undertaken before the submission of the EIA; • Only abnormal loads are expected for the delivery of transformers to the new substation site; and • A condition assessment of roads and PRowS can be done before, during and after the works. Photos are given a grid reference and are accompanied by a written description. Joint inspection with a County Council officer is possible. 	
5.11	<u>Tree Preservation Orders (TPOs)</u> TPO information is available from the District Councils.	
	GEOLOGY AND LAND CONTAMINATION	
5.12	It was agreed that basic contamination testing will provide National Grid with a good insight into the baseline conditions.	
5.13	Additional intrusive surveys could be required if the scope of the desk study reports identify any unexpected source of contamination along the connection route. However, such an instance will not be identified until National Grid is working through the baseline data acquisition which cannot commence until the preferred alignment has been agreed in detail.	

5.14	LAND USE	
	<u>Desk-Based Assessment</u>	
	<p>The method of the proposed desk-based assessment was discussed and the following comments were made, which will be considered by National Grid:</p> <ul style="list-style-type: none"> • Land Use effects to be considered within a 5km study area; • Advised to take photos (as part of the condition assessments) of land along the construction areas before works commence and after works are completed to ensure reinstatement is carried out such that upon completion the areas are all made good - at least to the state they were before any works if not better; • Definitions of allocations, e.g. Green Infrastructure, needs to be identified for each District Council, as each authority has different definitions; • Babergh District Council has released a Green Infrastructure Strategy; • Effects on agriculture should not be based on Agricultural Grade, but instead on their use and the effects on the use; • Agricultural assessment should also include horticulture; • Effects on common land, village greens, private greens and other 'greens', to be considered in the assessment, e.g. Polstead Heath, Hadleigh Heath, Witherstreet Green. There will be a cross over with cultural heritage on this aspect; • The effects on submitted planning applications should be considered; • Locally valued land uses to be considered e.g. local walking routes – suggest use 'Visit Suffolk' website; • Terminology should be used from Local Plans and Local Development Frameworks instead of the generic terms; • Effects on the use of Rivers and Rail to be considered; • New forestry under the woodland grant scheme to be considered. This may have been checked in the ecology assessments; • Proposed areas to be designated to be taken into account; • Special Landscape Areas in the Braintree District have been removed, and information on the types of developments to be considered applicable for the area are identified in the Landscape Character Assessment; • Cross-checks should be made with the Land Agents to check if they have identified land uses that are not on local plans or OS maps; • Essex County Council is undertaking a study on their Protected Lanes, and will be completed by March 2013. This will need to be taken into account; • A cross-check on the land-use effects experienced during the reconductoring works should be undertaken; • <u>Query: Will the effects on PRoW be covered in the Land Use assessment or the Transport assessment?</u> National Grid confirmed that the effects on PRoW will be covered in the Transport assessment and referred to in the Land Use chapter. 	
5.15	<u>Assessment of Effects</u>	
	<p>The Group emphasised the Land Use assessment needs to assess the use of the land and not just the effect on the allocation e.g. an open space may be allocated for recreational use, however it is important to assess the effects on the type of recreation it is used for.</p>	
5.16	It is important to identify and assess the effects on land use at a local level.	
6.0	HYDROLOGY	
6.1	Discussions were held around the technical surveys and studies to be undertaken to inform any Horizontal Directional Drilling (HDD) e.g. soil investigations (boreholes) and river bed depth surveys. Examples of projects where HDD has been used were discussed e.g. Ross on Wye.	

6.2	Discussions were held regarding land drains. National Grid confirmed that before any works are undertaken, a drainage survey is completed, which includes speaking to land owners and occupiers, obtaining and reviewing existing map records. These will inform the temporary drainage scheme required whilst construction activities are on-going. On completion of construction works, a permanent drainage scheme is designed and installed.	
6.3	Any ditch crossing (non-main river) will require consent. This applies to permanent and/or temporary works in or within 8m of the top of bank.	
6.4	A full land drainage survey will be carried out to identify all land drains prior to any works being carried out to ensure that channel flows and capacity are not adversely impacted.	
7.0	EMF	
7.1	A discussion was held on the approach to EMFs. National Grid will follow the Government adopted guidelines published in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in line with the terms of the 1999 EU recommendation on public exposure to EMFs. The National Policy Statement EN-5 also repeats this policy and it is the requirement of this policy which will form the basis of the Environmental impact assessment (EIA). The group agreed in principle with this approach.	
8.0	NOISE AND VIBRATION	
8.1	The Group commented that there are limitations to the use of BS 4142 in rural locations due to the method of assessment and suggested that the WHO guidance for community noise may be better criteria to work to in this instance. National Grid will consider the use of guidance by WHO during the noise assessment.	
8.2	The Group noted that with regard to substation noise, both during construction and operation, it is considered best to consult with individual councils as the impacts from these are localised. Consultation will be undertaken with the District Councils for informal comments prior to the submission of the Scoping Report to PINS.	
8.3	The Group noted that there could be potential complaints of both noise and vibration when piling is done near to sensitive receptors.	
8.4	The Group noted that it will be necessary to assess the effect of noise and vibration from HDV routes. National Grid confirmed this will be assessed against BS 5228-1. National Grid confirmed an assessment of vibration effects on nearby sensitive buildings will be undertaken.	
8.5	The Group noted that the assessment of tonal penalty in BS 4142 needs to be applied to the substation noise. National Grid will take this into consideration.	
8.6	The Group commented that relationships with the local community need be made and maintained through clear and consistent communication from National Grid. The local community need to be informed of the plans, and any changes need to be communicated effectively. The construction company appointed need to manage this, but it should be planned at this stage. National Grid confirmed that this will be taken into consideration.	
8.7	The Group suggested that cumulative impacts from neighbouring developments should be considered in the assessment. National Grid confirmed that this will be taken into consideration.	

8.8	National Grid confirmed that they apply best practice guidance in order to maximise the distance between the works undertaken and the sensitive receptors.	
8.9	National Grid explained the use of three bundle cables to reduce electrical stress and noise from overhead lines. The likelihood of an impact from noise from the new (three bundle) lines is considered to be negligible and is proposed to be scoped out of the assessment.	
9.0	AOB	
9.1	National Grid will provide draft scoping chapters to the consultees on the topics discussed at this meeting by Tuesday 9 th October.	
9.2	The statutory consultees will then be given 2 weeks to provide any informal comments on the draft scoping chapters. Comments are to be received by 23 rd October 2012.	
9.3	The comments received by the statutory consultees will be taken into consideration by National Grid in the final Scoping Report, which will be submitted to PINS.	

Bramford to Twinstead Tee Connection Project

**APPENDIX B
SOCIO-ECONOMIC BASELINE DATA**

1.1 STUDY AREA

Table 1.1 Administrative Areas crossed by Preferred Alignment

	Administrative Areas crossed by preferred alignment and local area of influence (250m buffer)
Section 1	County: Suffolk Districts: Babergh, Mid Suffolk Wards: Bramford and Blakenham, Brook, Hadleigh South Super Output Areas: Babergh 006A, Babergh 004D, Mid Suffolk 012A
Section2	County: Suffolk District: Babergh Wards: Hadleigh South, Lower Brett Super Output Areas: Babergh 004D, Babergh 009C
Section3	County: Suffolk District: Babergh Wards: Lower Brett Super Output Areas: Babergh 009C
Section4	County: Suffolk District: Babergh Wards: Lower Brett, Nayland Ward Super Output Areas: Babergh 009C, Babergh 009D
Section5	County: Suffolk District: Babergh Wards: Lower Brett, Levenheath Ward Super Output Areas: Babergh 009B, Babergh 009C
Section6	County: Suffolk, Essex District: Babergh, Braintree Wards: Stour Valley South, Bures St Mary, Levenheath Ward Super Output Areas: Braintree 002C, Babergh 006A, Babergh 009B

1.2 DEMOGRAPHICS

The population of each ward at the 2001 census¹ is shown below. Mid-year population estimates for 2010 demonstrate 3% growth in population size in

¹ Updates to 2011 census data will be undertaken during the Assessment process as Data is released.

Babergh District and 9% growth in Mid Suffolk District, compared with 8% and 6% for the East of England Region and England respectively.

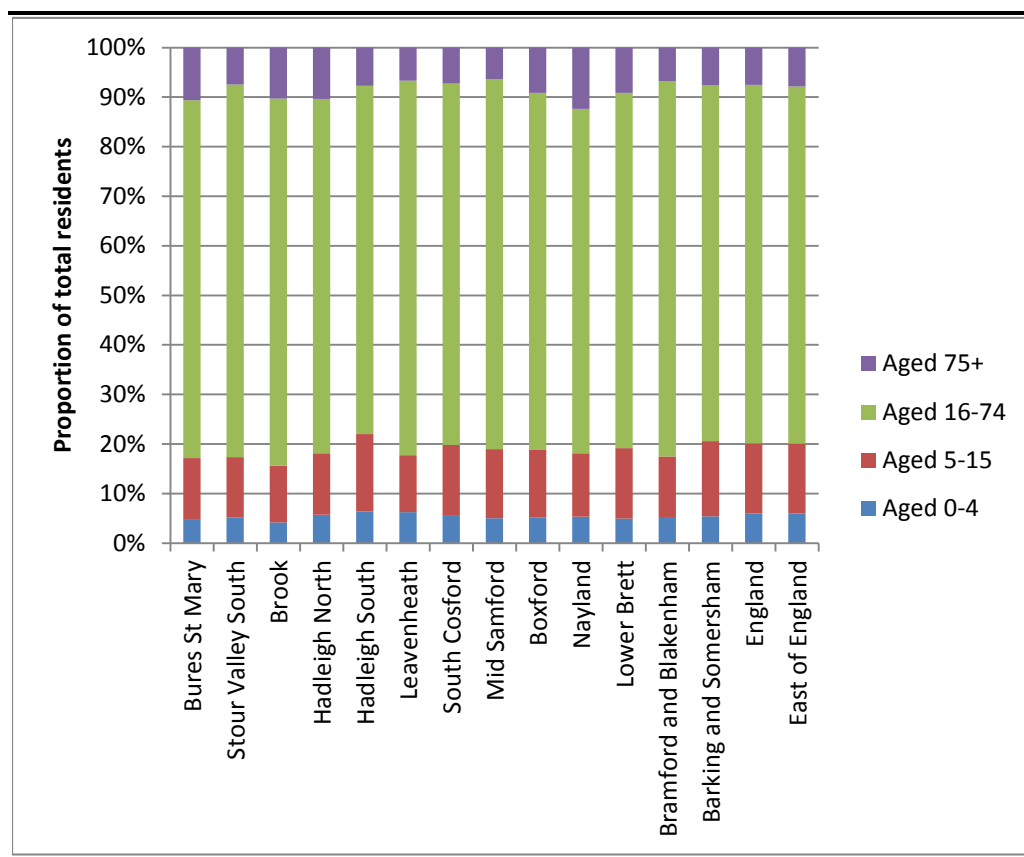
Table 1.2 *Population size*

Ward	Number of Residents
Bures St Mary	1227
Stour Valley South	1552
Brook	2828
Hadleigh North	2444
Hadleigh South	2684
Leavenheath	1317
South Cosford	1561
Mid Samford	3055
Boxford	1524
Nayland	1296
Lower Brett	1483
Bramford and Blakenham	2916
Barking and Somersham	1526

Source: 2001 Census data, Office for National Statistics

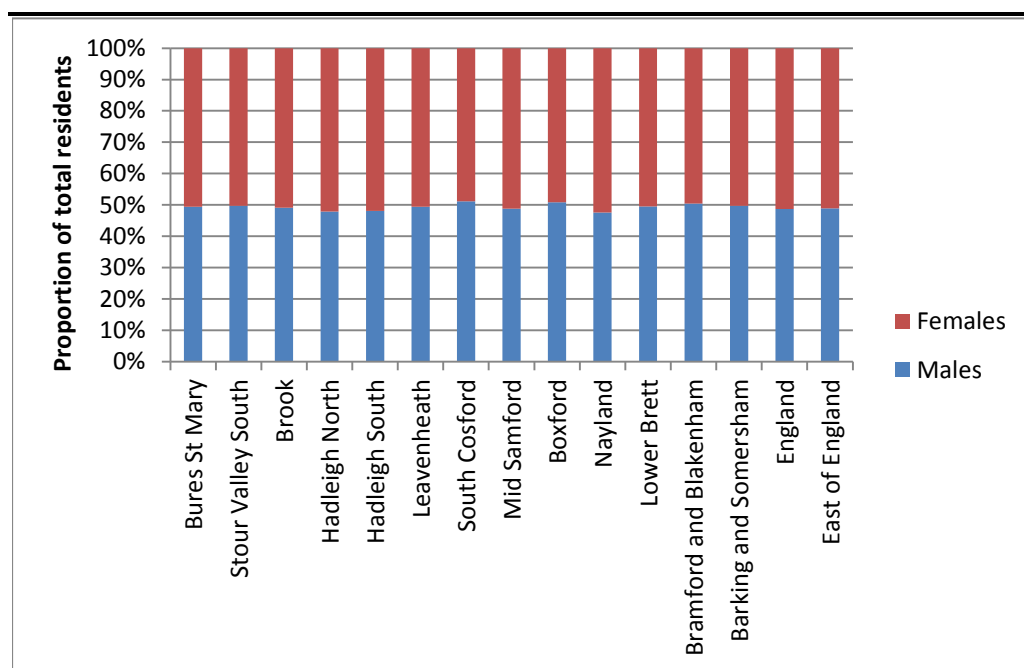
The age and gender composition of the residents of the study area in 2001 is shown below. In general, the proportion of residents aged 0-15 was lower than for the study area than National, regional and district averages. The proportion of residents aged 75 and over was more varied between wards. The proportion of residents of Nayland Ward aged 75 and over was 12%, compared with an average of 8% for England and the East of England, most likely as a result of the desirability of the ward's location within the AONB. The proportion of male and female residents was very similar to National, regional and district averages.

Figure 1.1 Age profile of the study area, 2001



Source: 2001 Census data, Office for National Statistics

Figure 1.2 Gender profile of the study area, 2001



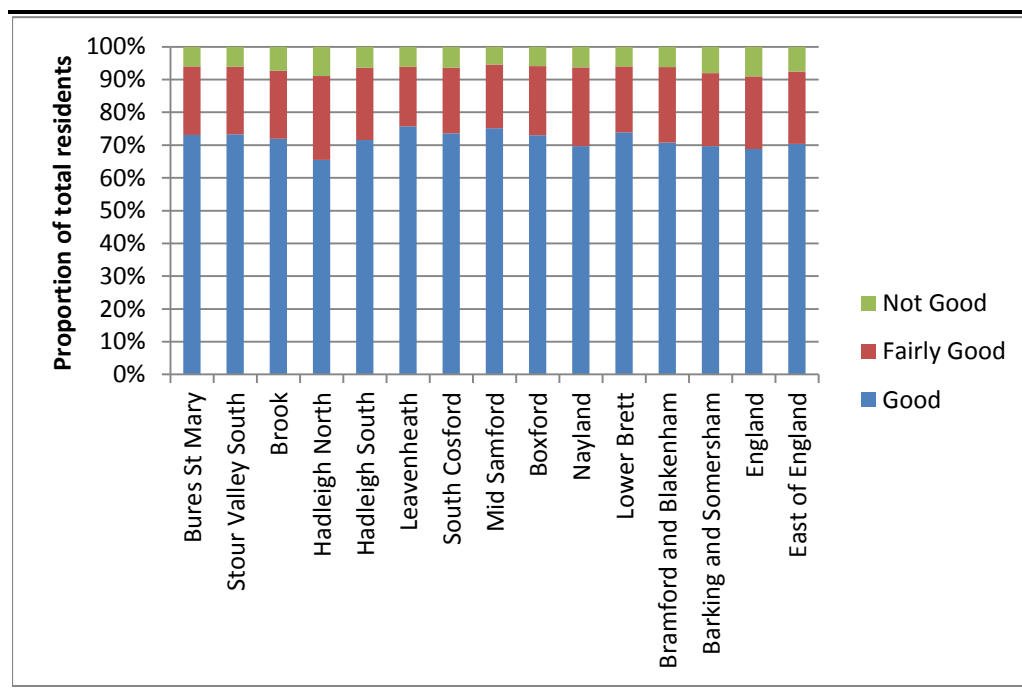
Source: 2001 Census data, Office for National Statistics

1.3 HEALTH

With the exception of Hadleigh North Ward, the proportion of residents within the study area who considered their health to be 'good' in 2001 was

equal to or greater than the proportion for the East of England. In Hadleigh North, 65% of residents considered themselves to be in 'good' health, compared with 70% for the East of England Region and 69% for England. The proportion of residents who considered their health to be 'not good' was the same as or lower than that for the East of England in 2001 for all wards except Hadleigh North (8% for the East of England, compared with 9% for Hadleigh North).

Figure 1.3 *Self-Assessed Health of Residents, 2001*

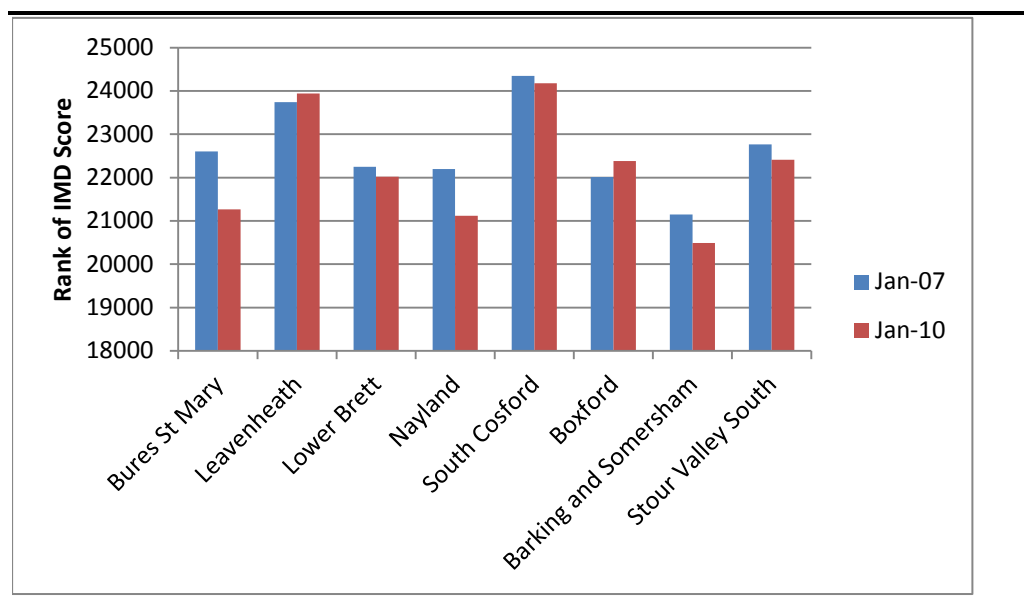


Source: 2001 Census data, Office for National Statistics

1.4 DEPRIVATION

The Index of Multiple Deprivation (IMD) measures multiple deprivation of small areas using indicators relating to income deprivation, employment, health and disability, education, skills and training, barriers to housing and services, crime; and living environment. IMD scores are commonly ranked, with areas with lower ranks being more deprived. Of the wards through which the study area passes, South Cosford and Leavenheath are the least deprived. The relative deprivation of all but two of the wards increased between 2007 and 2010; however all wards experience notably below average deprivation.

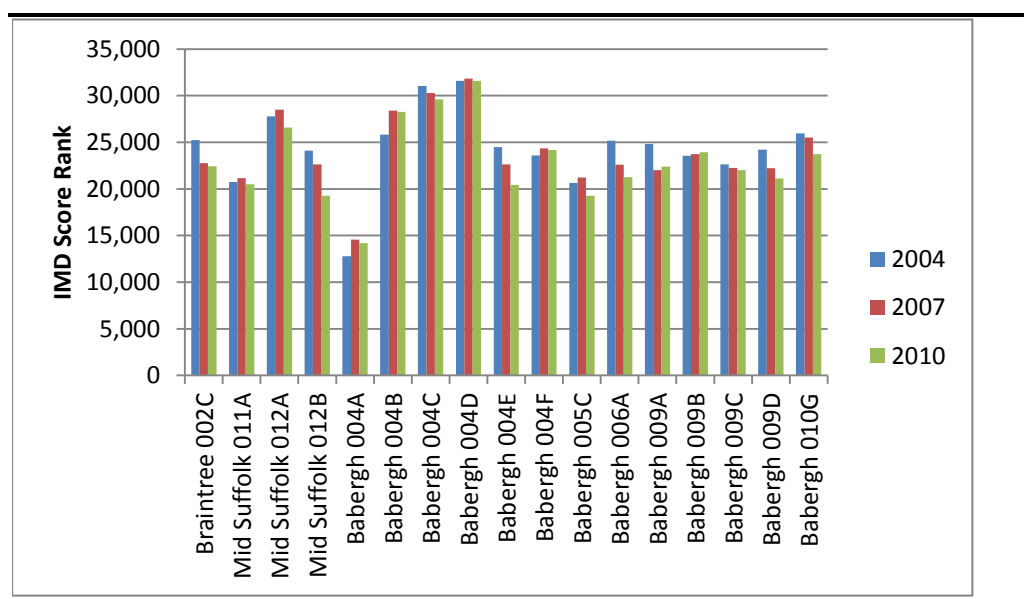
Figure 1.4 Ward-level IMD ranking



The district with a rank of 1 is the most deprived, and 32,482 the least deprived.

Residents of Super Output Area (SOAs) Babergh 004A are consistently more deprived than the average for England and more deprived than those of surrounding SOAs. This SOA covers the northern part of Hadleigh town centre. The relative deprivation of almost all of the SOAs within the study area has increased since 2004.

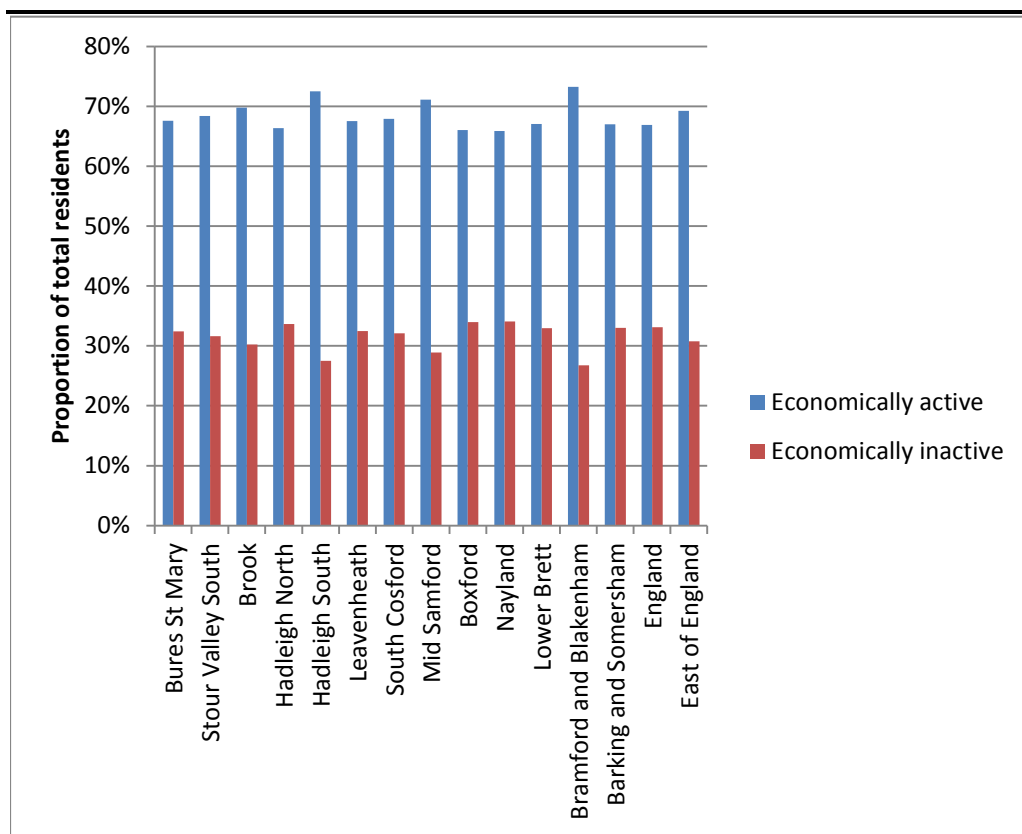
Figure 1.5 Super Output Area-level IMD ranking



The Super Output Area with a rank of 1 is the most deprived and 32,482 is the least deprived.

The proportion of the study area’s residents who were economically active in 2001 was above the average for England for all wards except Nayland, Boxford and Hadleigh North. Economic activity in each of these wards was 66% in comparison with 67% for England. Average economic activity rates of residents in the East of England was 69%, and thus similarly above the average for England.

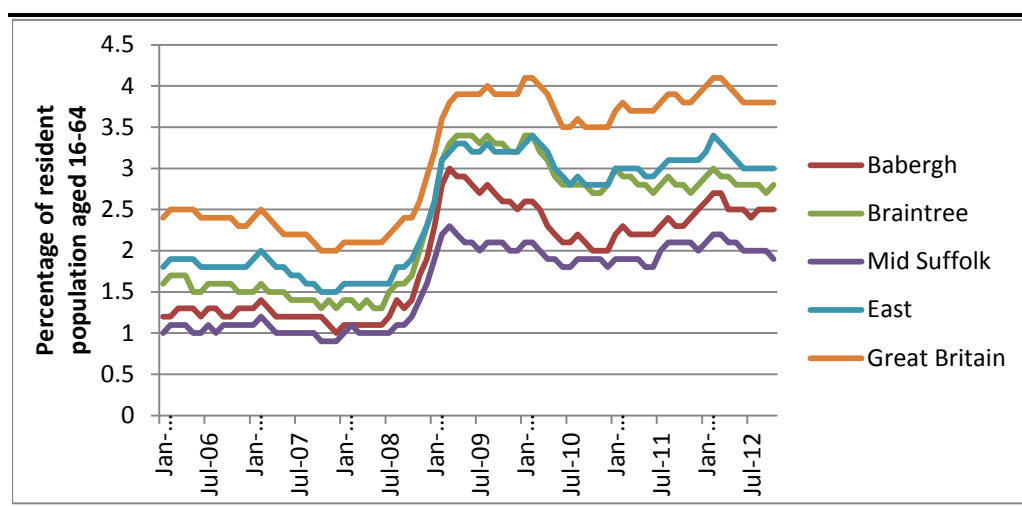
Figure 1.6 Proportion of Residents who are Economically Active or Inactive, 2001



Source: 2001 Census data, Office for National Statistics

The number of residents claiming Job Seekers Allowance (JSA) credits is a commonly-used proxy indicator for unemployment levels. All local authorities through which the study area passes experienced a significant increase in JSA claimant rates in late 2008 and early 2009 as a result of the global economic climate but have remained below claimant rates for Great Britain. JSA claimant rates are consistently lowest in Mid Suffolk and Babergh Districts, in which the majority of the study area is located. Claimant rates in Braintree have been lower than the average for the East of England and Great Britain since early 2011.

Figure 1.7 JSA claimant rate 2006-2012



Source: ONS claimant count, Nomis

1.6 EMPLOYMENT SECTORS

The proportion of the study area’s residents who were employed in each economic sector in 2001 was similar to national and regional averages for all sectors except for the agriculture, hunting and forestry sector. The proportion of the study area’s residents employed in agriculture, hunting and forestry was typically between 5% and 7% in 2001, in comparison with an average of 1% for England and 2% for the East of England Region.

NOMIS labour market profiles show that in 2008, the proportion of employment in Babergh which related to tourism was higher than the average for the East of England and for Great Britain. However, the proportion of employment in which related to tourism in 2008 was below the East of England and Great Britain average in Braintree and Mid Suffolk. Tourism accounted for less than 10% of jobs for all authorities.

Table 1.3 Percentage of total employee jobs by industry, 2008

2008	Babergh	Braintree	Mid Suffolk	East	Great Britain
Manufacturing	17.6	14.1	15.3	10.3	10.2
Construction	5.4	7.6	10.1	5.4	4.8
Services	72.4	76.7	68.1	82.5	83.5
Distribution, hotels & restaurants	27.3	25.2	20.8	25	23.4
Transport & communications	3.2	5.5	7.1	6	5.8
Finance, IT, other business activities	19.8	16.8	14.4	21.4	22
Public admin, education & health	17.6	23.8	21.7	25.3	27
Other services	4.5	5.5	4	4.8	5.3
Tourism-related ¹	8.9	7.5	5.6	7.7	8.2

Source: Office for National Statistics annual business inquiry employee analysis, Nomis

¹ Tourism-related industry includes the following sectors: 551 Hotels, 552 Camping sites etc, 553 Restaurants, 554 Bars, 633 Activities of travel agencies etc, 925 Library, archives, museums etc, 926 Sporting activities and 927 Other recreational activities

The proportion of residents of Babergh in associate professional and technical and skilled trades occupations was markedly higher than the average for England. The proportion of residents of Mid Suffolk employed in elementary and skilled trades occupations was also notably above the average for England. The proportion of residents of all three Districts employed in professional occupations was markedly lower than the average for England, particularly Babergh where the proportion was less than half that for England.

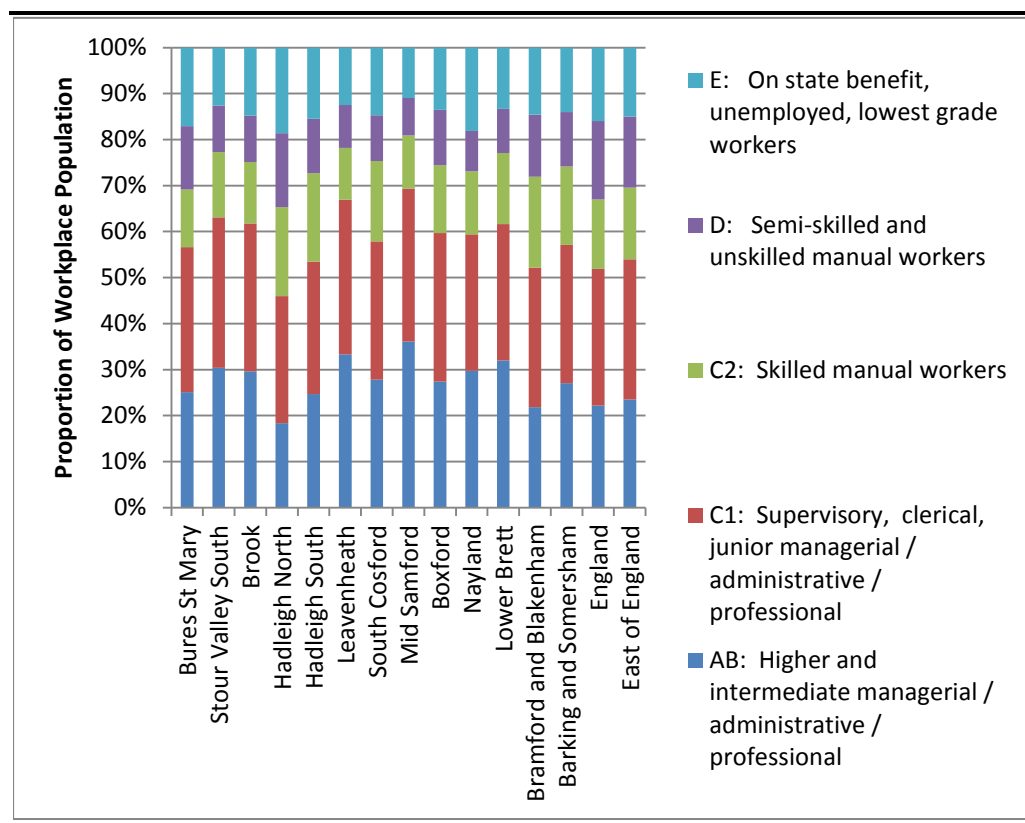
Table 1.4 *Socio-economic group, July 2011-June 2012*

% all in employment who are (SOC2010)	Babergh	Braintree	Mid Suffolk	England
1: managers, directors and senior officials	10.8	12.7	10.1	10.4
2: professional occupations	7.4	15.7	11.8	19.2
3: associate prof & tech occupations	19.4	13.3	12.9	14.2
4: administrative and secretarial occupations	12.4	9.0	9.4	11.0
5: skilled trades occupations	15.2	12.8	14.9	10.6
6: caring, leisure and other service occupations	9.3	9.0	12.6	8.9
7: sales and customer service occupations	10.1	10.4	4.2	8.0
8: process, plant and machine operatives	6.4	3.1	8.1	6.3
9: elementary occupations	9.0	14.1	16.1	10.9

Source: Office for National Statistics annual business inquiry employee analysis, Nomis

The proportion of the study area's residents who were of the highest social grade, as defined by the 2001 census, was above the National and regional averages for all wards except Hadleigh North and Bramford. The proportion of Hadleigh North residents who are on state benefit, unemployed or the lowest grade workers was 19% in comparison with 16% for England and 15% for the East of England Region.

Figure 1.8 *Approximated Social Grade of Workplace Population, 2001*

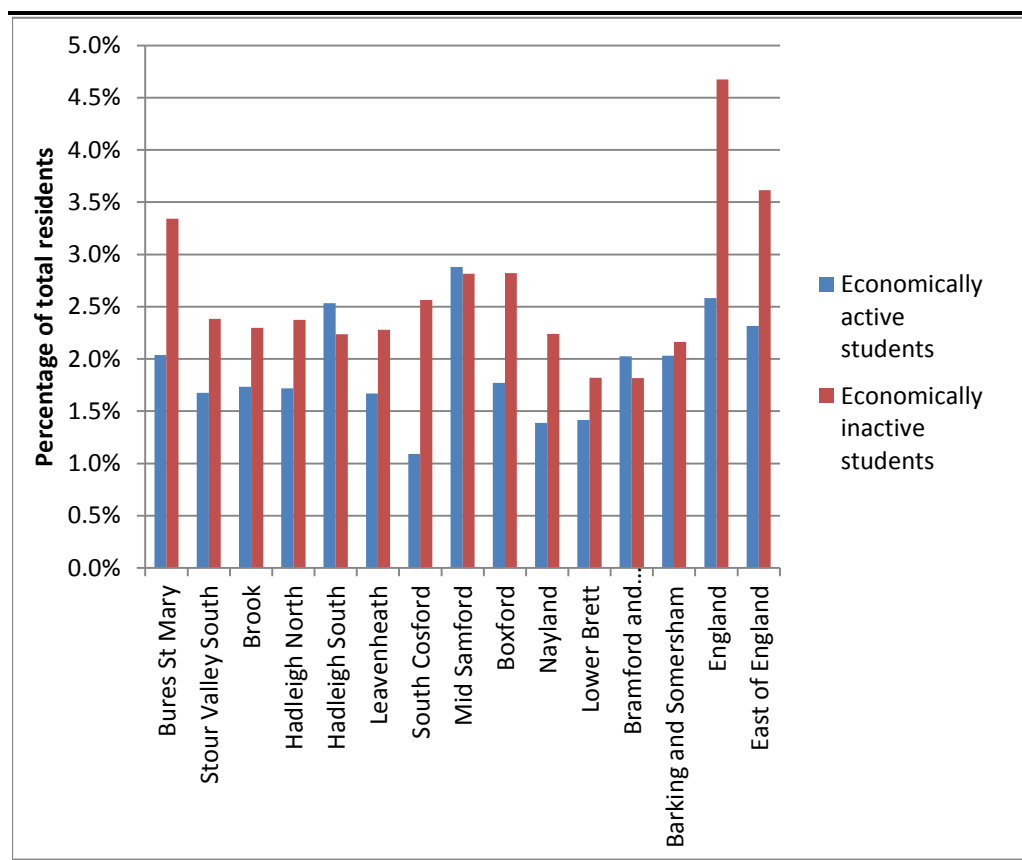


1.8 *EDUCATION AND SKILLS*

The proportion of residents of the study area who were economically inactive students in 2001 was lower than the national and regional averages for all wards. The proportion of economically active students was above the regional average for all wards except Hadleigh South and Mid Sandford (2.5 and 2.9% respectively, compared with 2.3% for the East of England). The proportion of residents who were economically inactive students in Bures St Mary (3.3%) is notably higher than county and district averages and the proportion of all other wards.

Figure 1.9

Figure 1.4 Proportion of Residents who are Economically Active or Economically Inactive Students, 2001



Source: 2001 Census data, Office for National Statistics

1.9

QUALIFICATIONS

The proportion of residents with no qualifications was below the average for England (29%) for all wards except Hadleigh North where 37% of residents in 2001 had no qualifications. The proportion of residents with Level 4/5 qualifications¹ in 2001 was equal to or above the average for the East of England Region (18%) for all wards except Hadleigh North (14%), and Bramford and Blakenham (15%).

Table 1.5 Levels of Educational Attainment, 2001

	No qualifications	Level 4/5 qualifications
Bures St Mary	29%	20%
Stour Valley South	23%	23%
Brook	25%	22%
Hadleigh North	37%	14%
Hadleigh South	25%	19%
Leavenheath	21%	21%
South Cosford	26%	23%
Mid Samford	19%	24%
Boxford	24%	24%
Nayland	23%	28%
Lower Brett	23%	27%

¹ Level 4/5 qualifications are the highest level achievable and relate to First degree, Higher degree, NVQ levels 4 and 5, HNC, HND, Qualified Teacher status, Qualified Medical Doctor, Qualified Dentist, Qualified Nurse, Midwife, Health Visitor

	No qualifications	Level 4/5 qualifications
Bramford and Blakenham	29%	15%
Barking and Somersham	27%	19%
England	29%	20%
East of England	28%	18%

Source: 2001 Census data, Office for National Statistics

Bramford to Twinstead Tee Connection Project

**APPENDIX C
EMC COMPLIANCE CERTIFICATE**

Technical Certificate 05R110 issued by
Hursley EMC Services Ltd

*Appointed by the Secretary of State for Trade and Industry
as a UK EMC Competent Body*



**HURSLEY
EMC
SERVICES**

TECHNICAL CERTIFICATE

PRODUCT TITLE: NGT Electricity Transmission Network

MANUFACTURED BY: National Grid Transco (NGT) plc

Manufacturers Address: NGT House, Warwick Technology Park, Gallows Hill,
Warwick CV34 6DA UK

Applicants Name: Mr Jon Carlton, of NGT plc.

Product Description: The NGT Electricity Transmission Network (consisting of some 14,000 Km of high voltage supply lines) is the high voltage electricity transmission system in England and Wales.


Technical Statement: The Technical Construction File (TCF), "NGT Electricity Transmission Network" (dated 2005), describes the general construction, conformity procedures and EMC test rationale for the Electricity Network. This Technical Construction File, in so far as is technically viable, is based on testing to international standards, specifically EN50121-2:2000 and CISPR 18 for emissions. These standards were used as the most suitable guide for the emissions testing in lieu of any other practical or harmonized product related standards. Given the size of the equipment, testing was performed in-situ at several representative sites and is therefore an approximation to the standards. The results of the tests applied and described in the test reports along with the EMC detail supplied in the TCF indicate that the product complies with the standards. Taking into consideration the technical rationale provided in the TCF and the results of the site measurement reports, Hursley EMC Services is satisfied the TCF does demonstrate compliance with the essential protection requirement of EC Directive 89/336. NGT operates a certified ISO 9001 quality management system covering both the operation and installation procedures for the Electricity Network. Due to its size and nature along with quality procedures used for installations the NGT Electricity Transmission Network would seem inherently immune to normal EMC phenomena.

This route to compliance with respect to the provisions of EC Directive 89/336 is in accordance with section 42(c) of the UK Statutory Instrument 1992 No 2372 (The Electromagnetic Compatibility Regulations). This application and certificate applies only to the NGT Electricity Transmission Network for the UK as described in the Technical Construction File.

COMPETENT BODY CONFORMITY STATEMENT

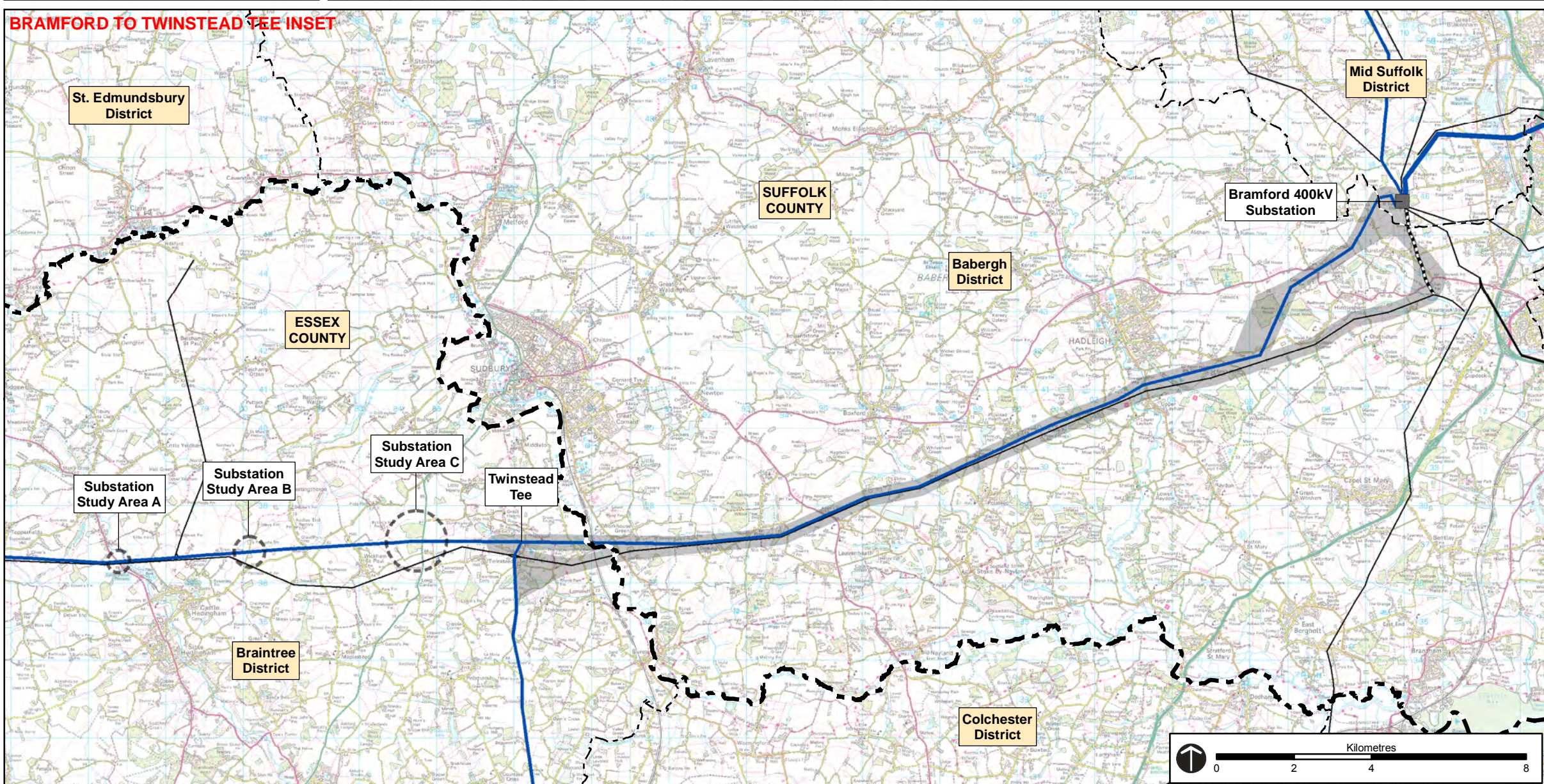
Hursley EMC Services Ltd. certifies that the National Grid Transco plc TCF demonstrates that the NGT Electricity Transmission Network conforms to the protection requirements of European Council Directive 89/336 and its amendments. This directive is on the approximation laws of the Member States relating to electromagnetic compatibility.

Signed: 
Rob St John James
EMC Technical Manager

Approved: 
Ian Kenney
EMC Quality Manager

Hursley EMC Services Ltd
Unit 16, Brickfield Lane, Eastleigh
Hampshire, SO53 4DP, UK
Tel: 44-(0)2380 271111, Fax: 271144
e-mail: sales@hursley-emc.co.uk

Issue Date: 17th March 2005



Key

Proposed Infrastructure

Preferred Route Corridor

Substation Study Area

Existing Infrastructure

Existing Substation

Existing 400kV Overhead Line

Existing 132kV Overhead Line

Existing 132kV Underground Cable

Administrative Boundaries

County Boundary

District Boundary

Bramford Substation Grid Reference

Easting - 609959
Northing - 245863

Twinstead Tee Grid Reference

Easting - 587189
Northing - 237060

Substation Study Area A

Easting - 576784
Northing - 236554

Substation Study Area B

Easting - 250160
Northing - 236807

Substation Study Area C

Easting - 584477
Northing - 237087

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Project: **Bramford to Twinstead Tee Connection**

Title: **Location Plan**

Drawing No: **Figure 1**

Date: 06-02-2013
TEP Ref No: G1980.948c

Drawn: CB	Checked: AL	Approved: CH
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Key
Proposed Infrastructure

- Preferred Route Corridor
- Substation Study Area

Section AB

- Interim Southern Overhead Alignment on Corridor 2B (using the existing 400kV pylon at Hintlesham Woods)
- Interim Alignment for Existing 400kV Overhead Line around Hintlesham Woods

Section C to G

- Preferred Southern Overhead Alignment
- Preferred Underground Cables Route
- Preferred Cable Sealing End (CSE) Compound Location

Key
Existing Infrastructure

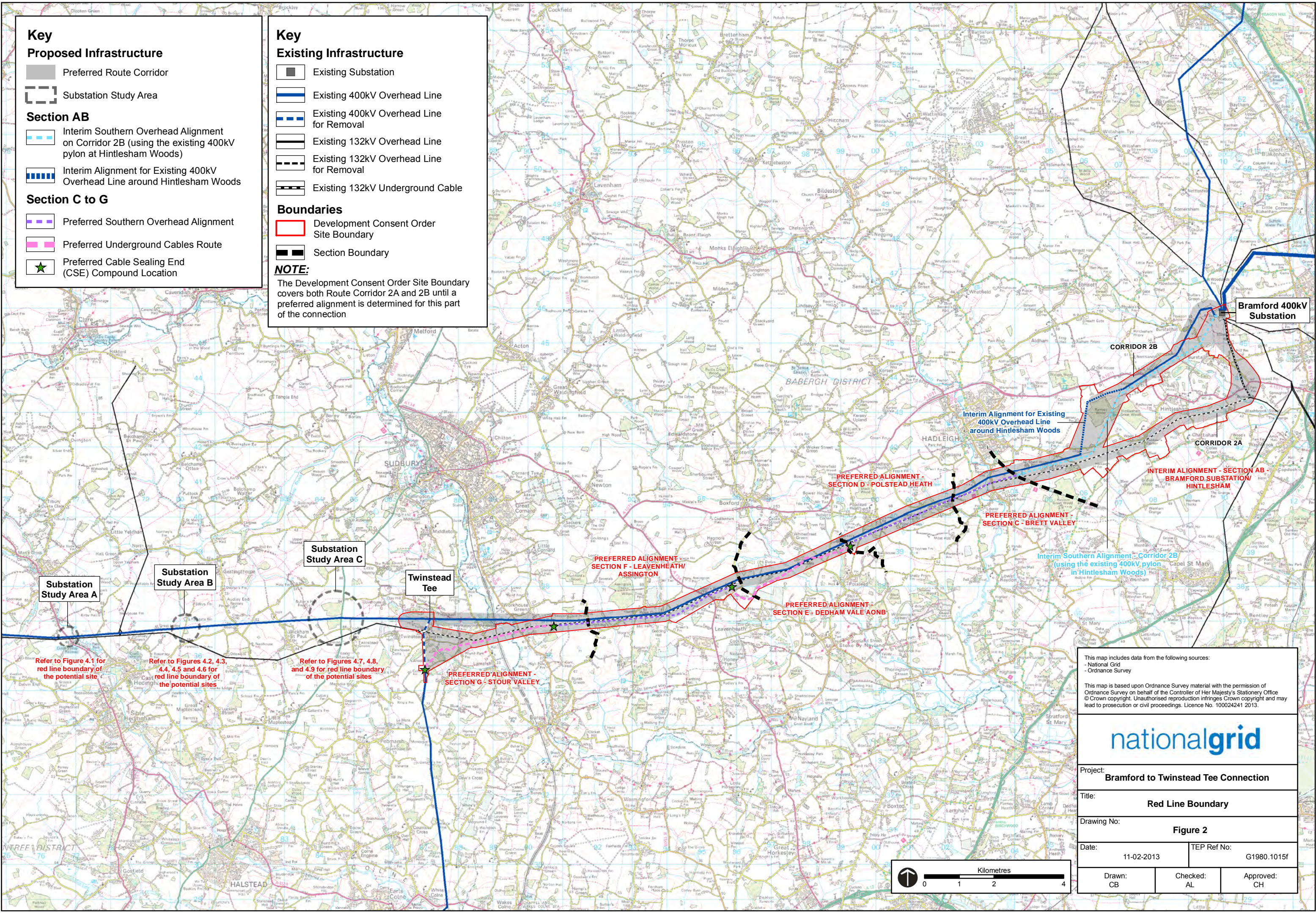
- Existing Substation
- Existing 400kV Overhead Line
- Existing 400kV Overhead Line for Removal
- Existing 132kV Overhead Line
- Existing 132kV Overhead Line for Removal
- Existing 132kV Underground Cable

Boundaries

- Development Consent Order Site Boundary
- Section Boundary

NOTE:

The Development Consent Order Site Boundary covers both Route Corridor 2A and 2B until a preferred alignment is determined for this part of the connection



Refer to Figure 4.1 for red line boundary of the potential site

Refer to Figures 4.2, 4.3, 4.4, 4.5 and 4.6 for red line boundary of the potential sites

Refer to Figures 4.7, 4.8, and 4.9 for red line boundary of the potential sites

PREFERRED ALIGNMENT - SECTION G - STOUR VALLEY

PREFERRED ALIGNMENT - SECTION F - LEAVENHEATH/ ASSINGTON

PREFERRED ALIGNMENT - SECTION E - DEDHAM VALE AONB

PREFERRED ALIGNMENT - SECTION D - POLSTEAD HEATH

PREFERRED ALIGNMENT - SECTION C - BRETT VALLEY

INTERIM ALIGNMENT - SECTION AB - BRAMFORD SUBSTATION/ HINTLESHAM

Interim Southern Alignment - Corridor 2B (using the existing 400kV pylon in Hintlesham Woods)

Interim Alignment for Existing 400kV Overhead Line around Hintlesham Woods

CORRIDOR 2B

CORRIDOR 2A

Bramford 400kV Substation

Substation Study Area A

Substation Study Area B

Substation Study Area C

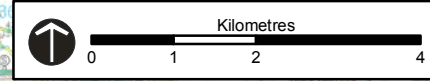
Twinstead Tee

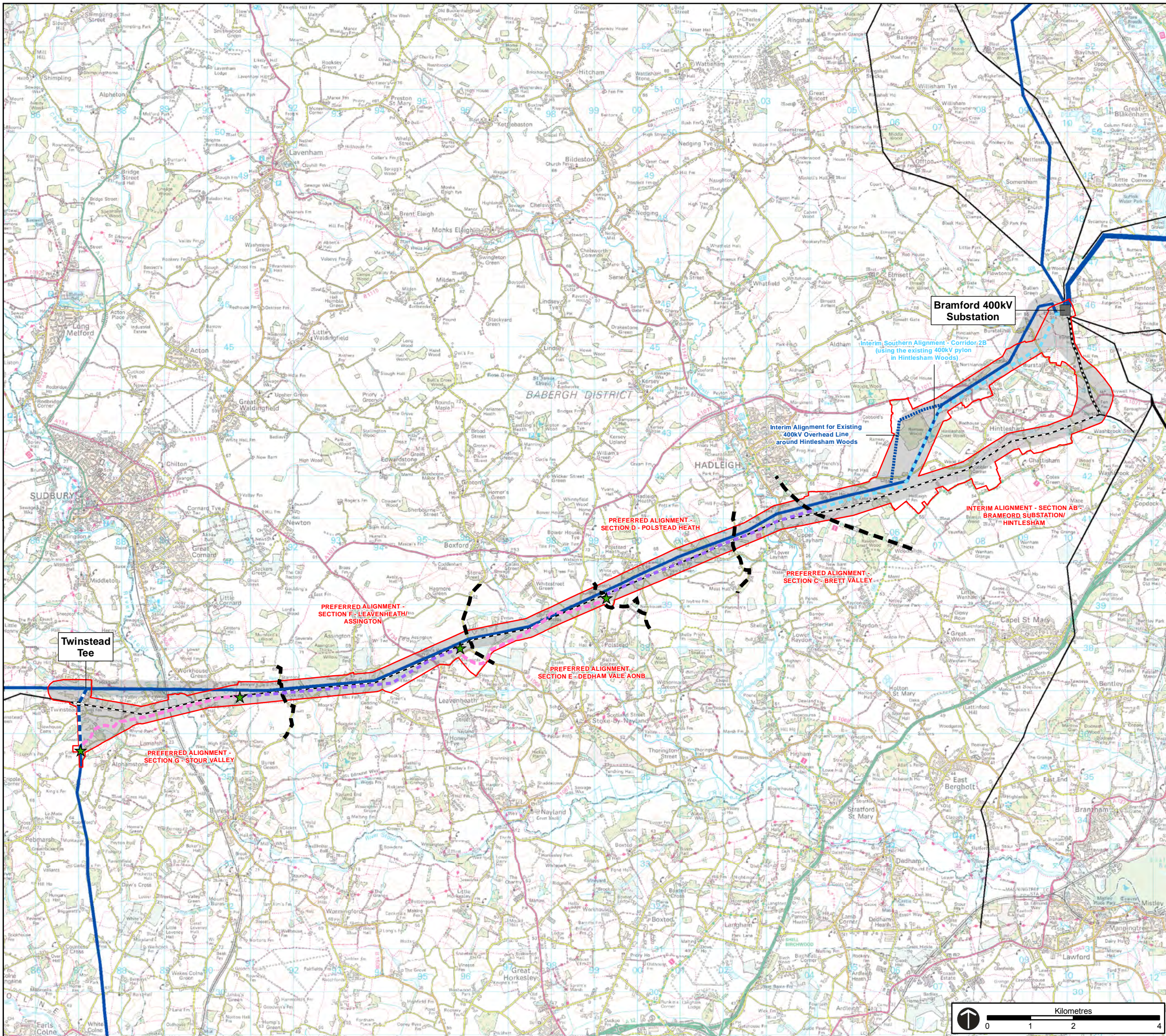
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


Project:	Bramford to Twinstead Tee Connection		
Title:	Red Line Boundary		
Drawing No:	Figure 2		
Date:	11-02-2013	TEP Ref No:	G1980.1015f
Drawn:	CB	Checked:	AL
Approved:	CH		








Key




Existing Infrastructure

-  Existing Substation
-  Existing 400kV Overhead Line
-  Existing 400kV Overhead Line for Removal
-  Existing 132kV Overhead Line
-  Existing 132kV Overhead Line for Removal
-  Existing 132kV Underground Cable


Proposed Infrastructure

-  Preferred Route Corridor
- Section AB**
-  Interim Southern Overhead Alignment on Corridor 2B (using the existing 400kV pylon at Hintlesham Woods)
-  Interim Alignment for Existing 400kV Overhead Line around Hintlesham Woods

Section C to G

-  Preferred Southern Overhead Alignment
-  Preferred Underground Cable Route
-  Preferred Cable Sealing End (CSE) Compound

Boundaries

-  Proposed Development Consent Order Site Boundary
-  Section Boundaries

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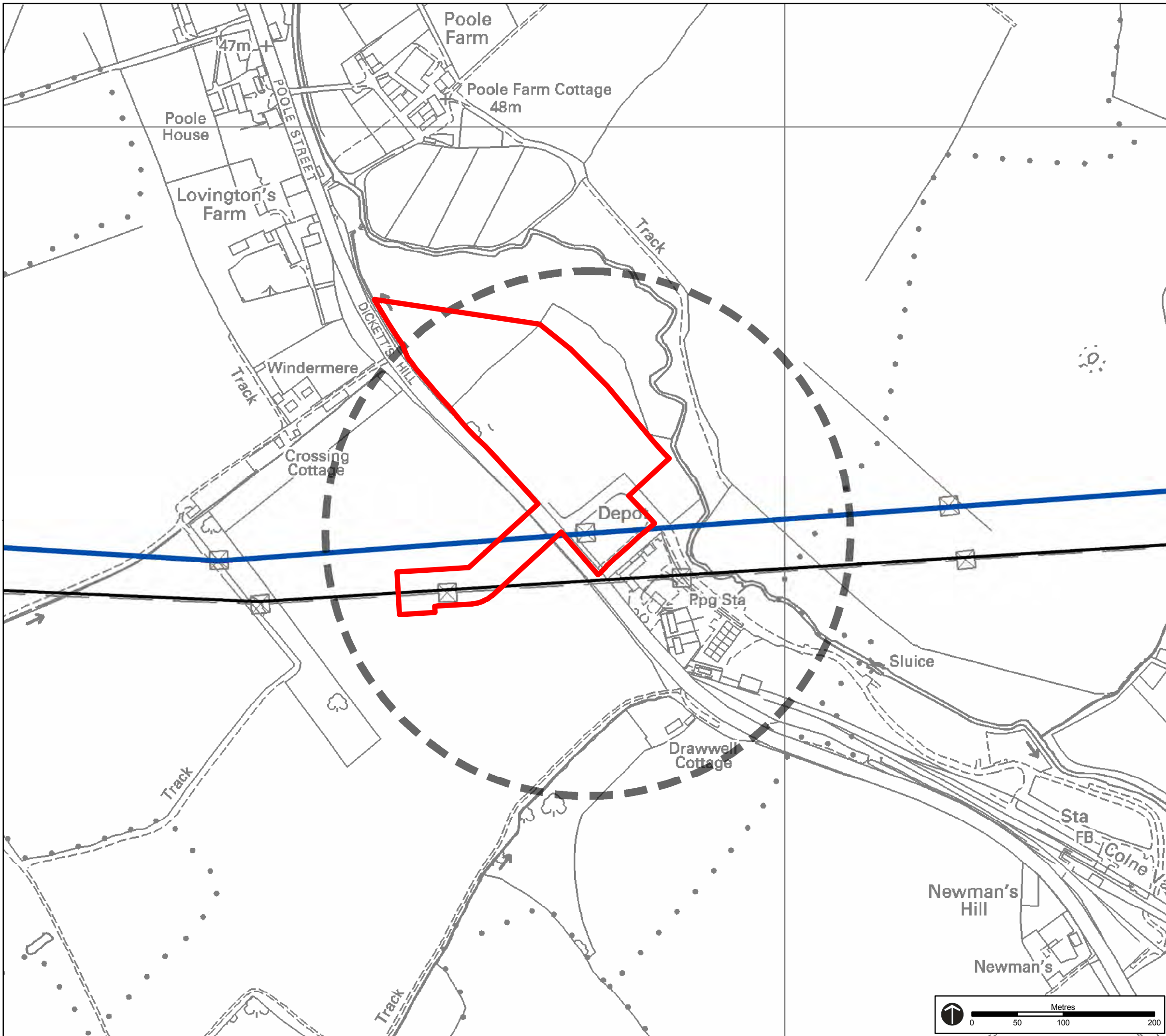
Project: **Bramford to Twinstead Tee Connection**

Title: **Proposed Connection Route**

Drawing No: **Figure 3**



Date: 11-02-2013	TEP Ref No: G1980.959c
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Drawn: CB	Checked: AL	Approved: CH
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Key


Existing Infrastructure

-  Existing 400kV Overhead Line
-  Existing 132kV Overhead Line

Proposed Infrastructure

-  Substation Study Area

Boundaries

-  Potential Development Consent Order Site Boundary

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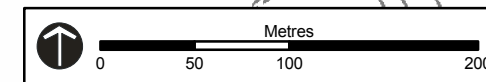
Project: **Bramford to Twinstead Tee Connection**

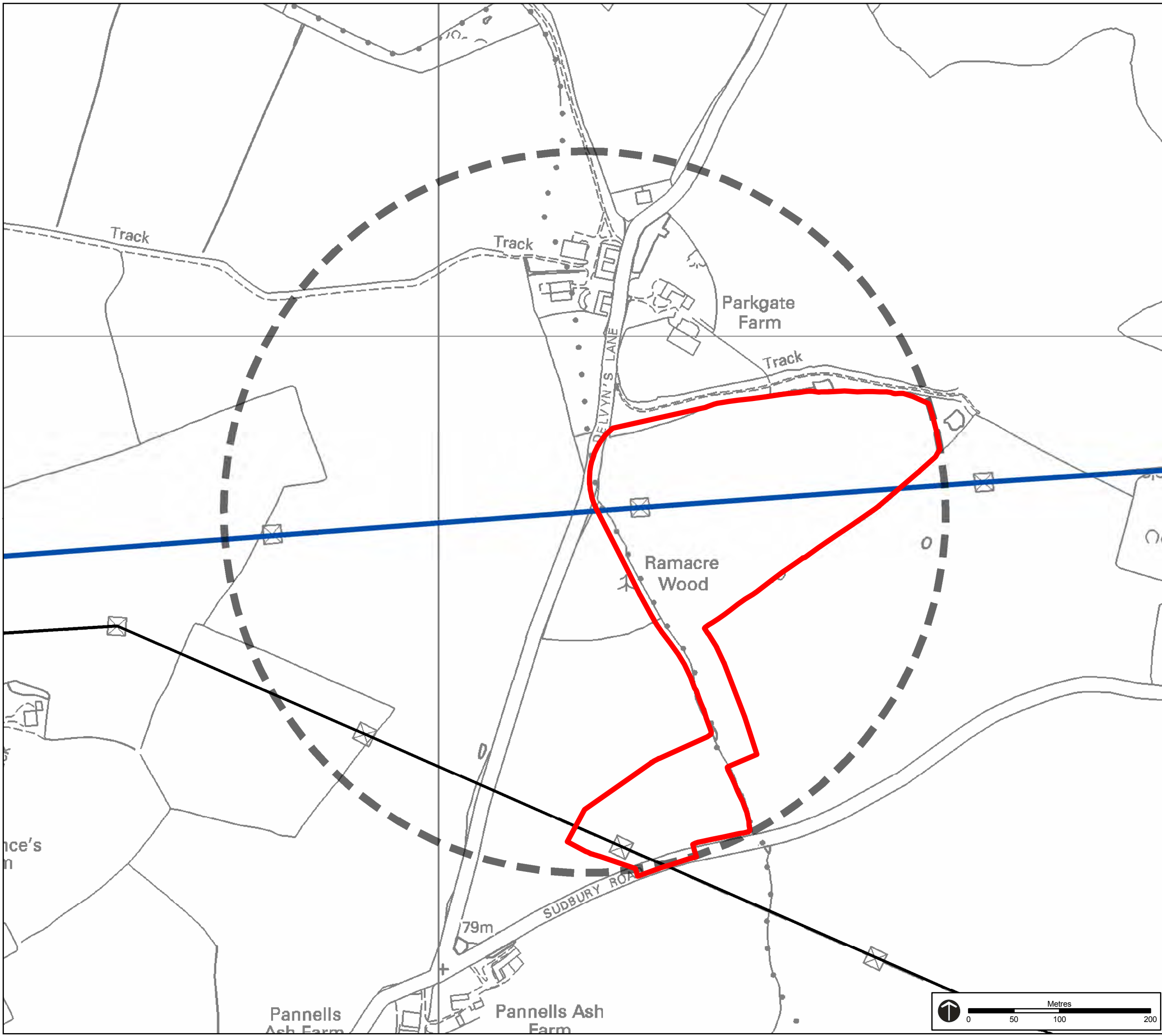
Title: **Substation Study Area A
Location A1**

Drawing No: **Figure 4.1**

Date: 06-02-2013	TEP Ref No: G1980.1113a
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Drawn: CB	Checked: AL	Approved: CH
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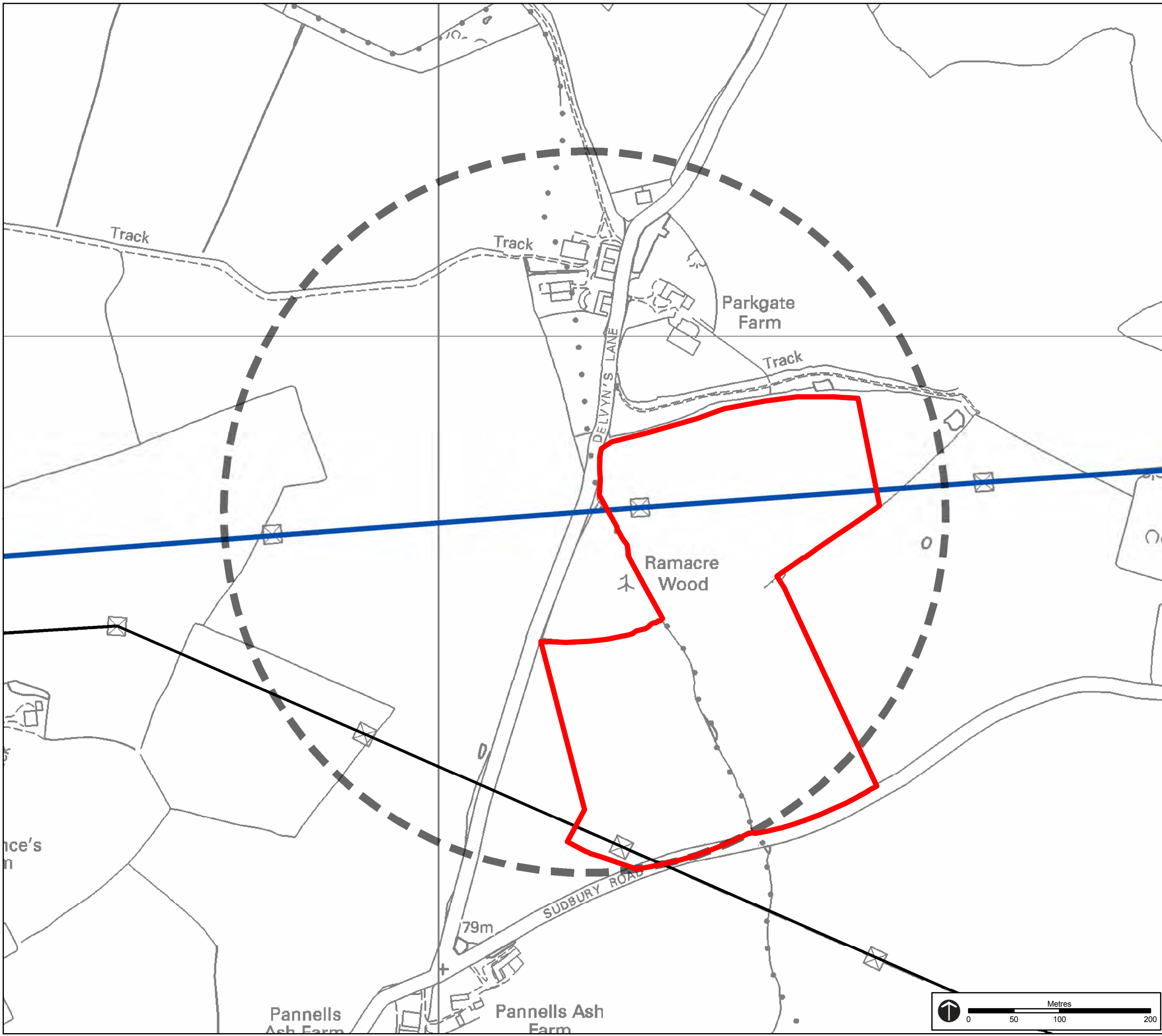


- Key**
- Existing Infrastructure**
- Existing 400kV Overhead Line
 - Existing 132kV Overhead Line
- Proposed Infrastructure**
- Substation Study Area
- Boundaries**
- Potential Development Consent Order Site Boundary

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Project: Bramford to Twinstead Tee Connection		
Title: Substation Study Area B Location B1		
Drawing No: Figure 4.2		
Date: 06-02-2013	TEP Ref No: G1980.1114a	
Drawn: CB	Checked: AL	Approved: CH



Key

Existing Infrastructure

- Existing 400kV Overhead Line
- Existing 132kV Overhead Line

Proposed Infrastructure

- Substation Study Area

Boundaries

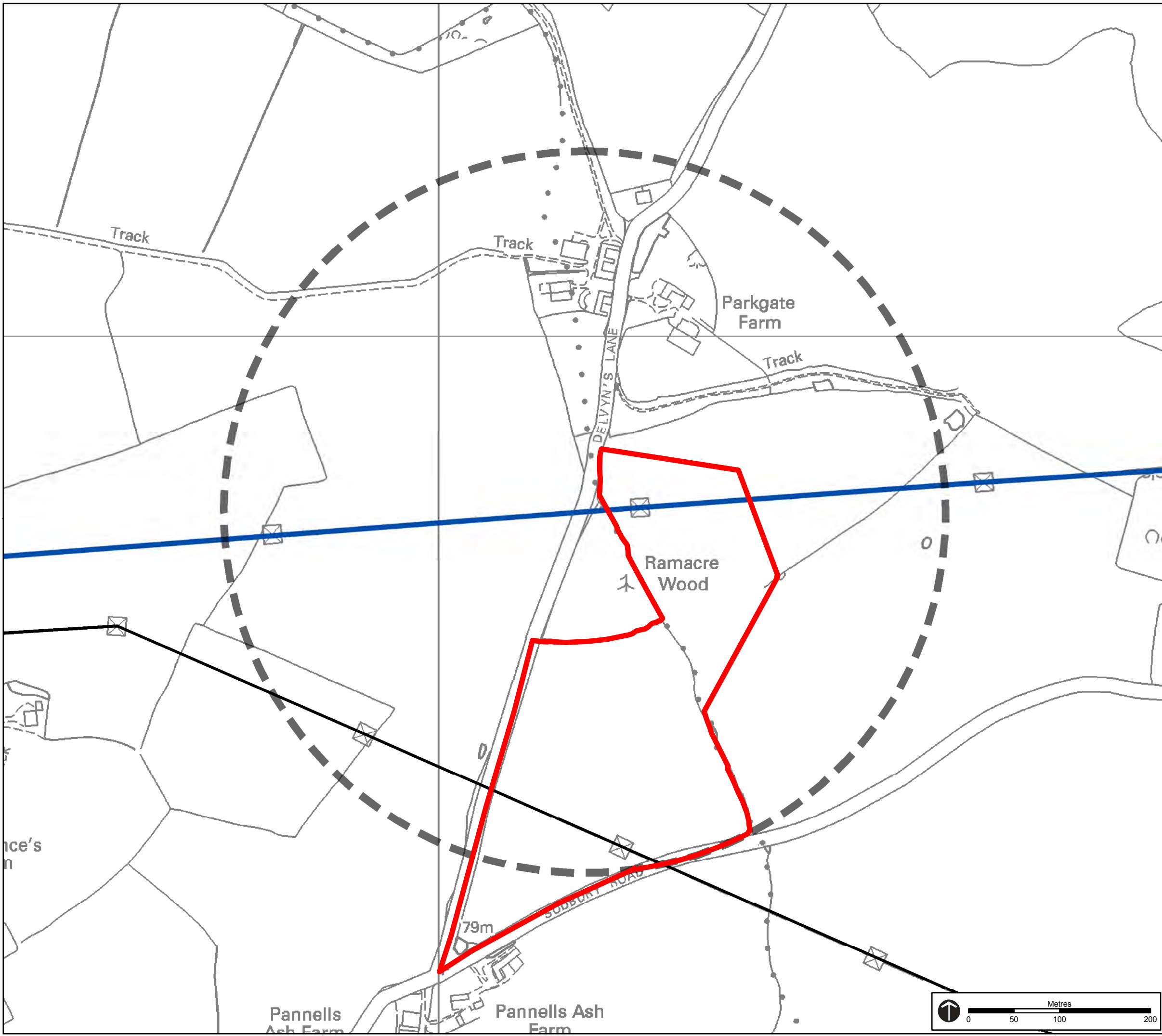
- Potential Development Consent Order Site Boundary

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


Project: Bramford to Twinstead Tee Connection		
Title: Substation Study Area B Location B2		
Drawing No: Figure 4.3		
Date: 06-02-2013	TEP Ref No: G1980.1115a	
Drawn: CB	Checked: AL	Approved: CH



Key


Existing Infrastructure

-  Existing 400kV Overhead Line
-  Existing 132kV Overhead Line

Proposed Infrastructure

-  Substation Study Area

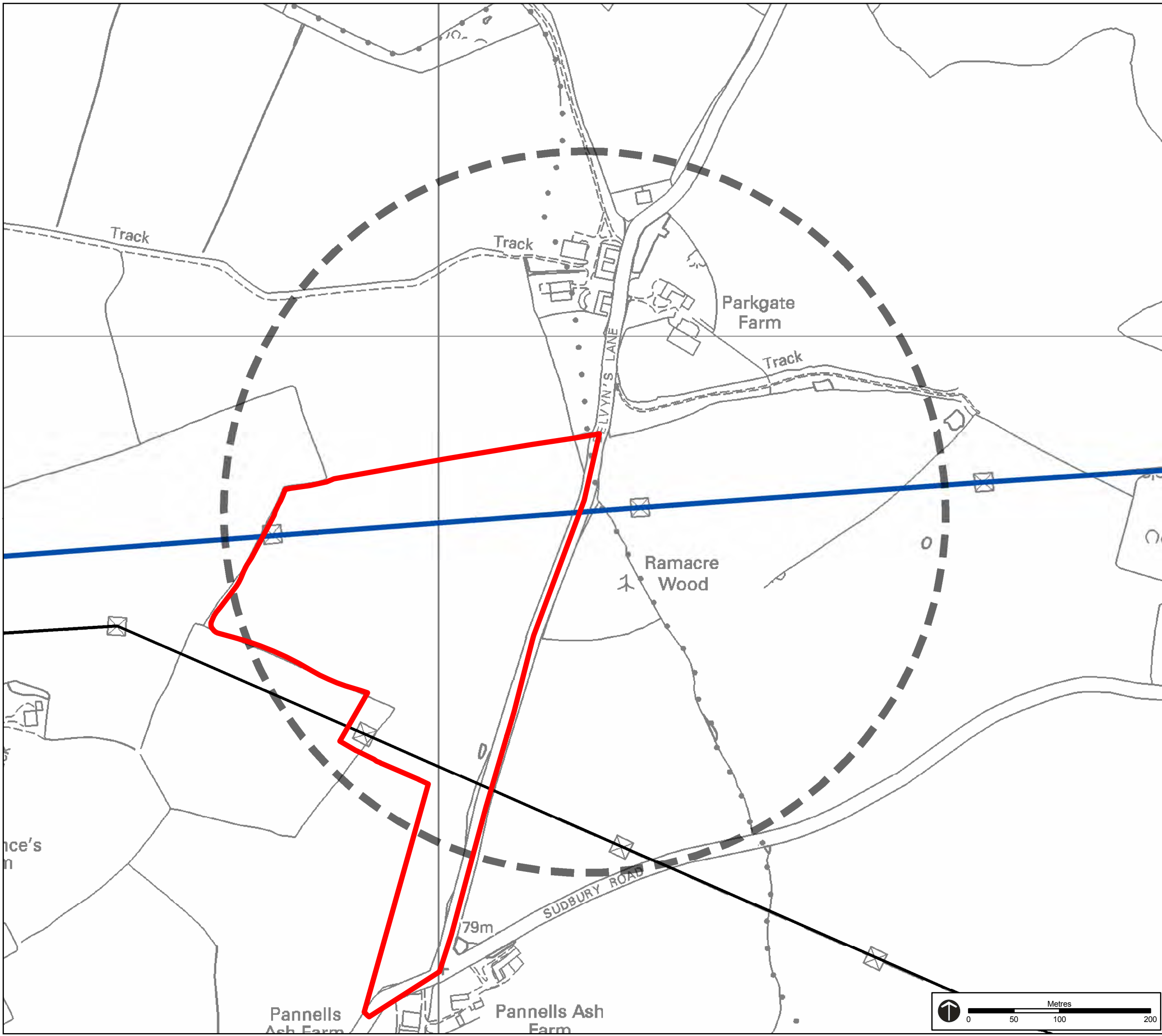
Boundaries

-  Potential Development Consent Order Site Boundary

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Project: Bramford to Twinstead Tee Connection		
Title: Substation Study Area B Location B3		
Drawing No: Figure 4.4		
Date: 06-02-2013	TEP Ref No: G1980.1116a	
Drawn: CB	Checked: AL	Approved: CH



Key

Existing Infrastructure

- Existing 400kV Overhead Line
- Existing 132kV Overhead Line

Proposed Infrastructure

- Substation Study Area

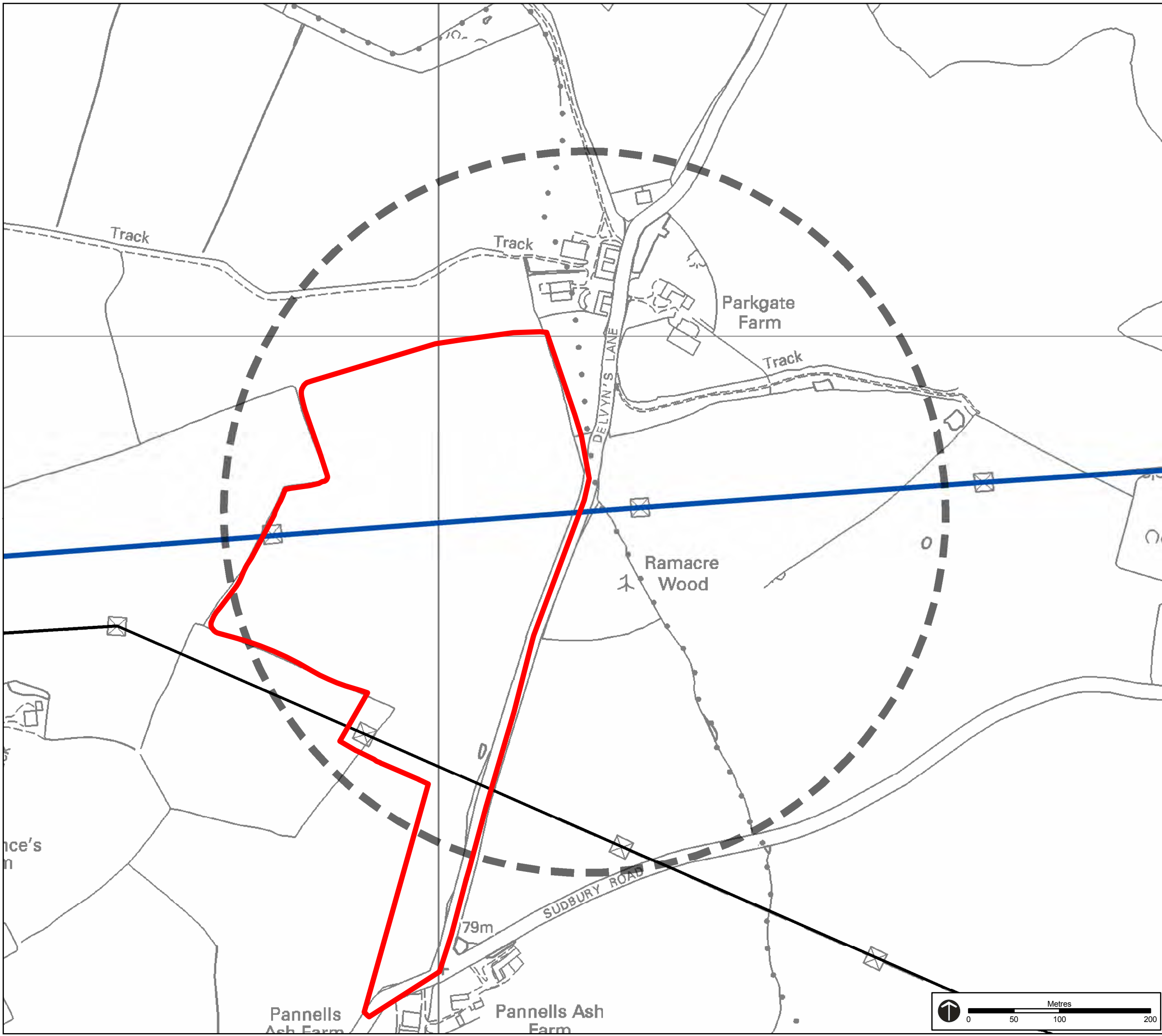
Boundaries

- Potential Development Consent Order Site Boundary

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
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Project: Bramford to Twinstead Tee Connection		
Title: Substation Study Area B Location B4		
Drawing No: Figure 4.5		
Date: 06-02-2013	TEP Ref No: G1980.1117a	
Drawn: CB	Checked: AL	Approved: CH




Key


Existing Infrastructure

-  Existing 400kV Overhead Line
-  Existing 132kV Overhead Line

Proposed Infrastructure


-  Substation Study Area

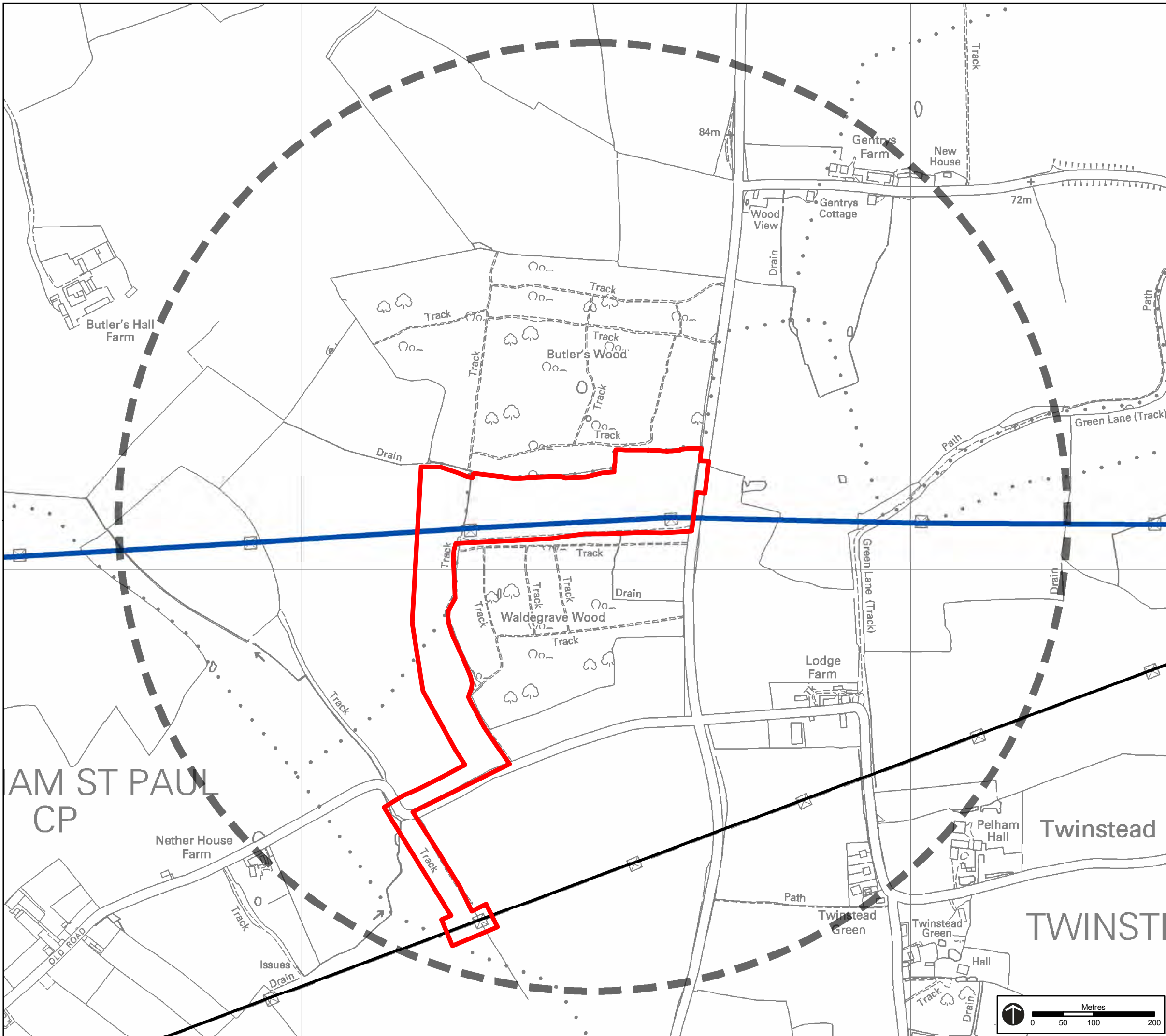
Boundaries

-  Potential Development Consent Order Site Boundary

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
		
Project: Bramford to Twinstead Tee Connection		
Title: Substation Study Area B Location B5		
Drawing No: Figure 4.6		
Date: 06-02-2013	TEP Ref No: G1980.1118a	
Drawn: CB	Checked: AL	Approved: CH



Key

Existing Infrastructure


 Existing 400kV Overhead Line

 Existing 132kV Overhead Line

Proposed Infrastructure

 Substation Study Area

Boundaries

 Potential Development Consent Order Site Boundary

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Project: **Bramford to Twinstead Tee Connection**

Title: **Substation Study Area C
Location C2**

Drawing No: **Figure 4.7**

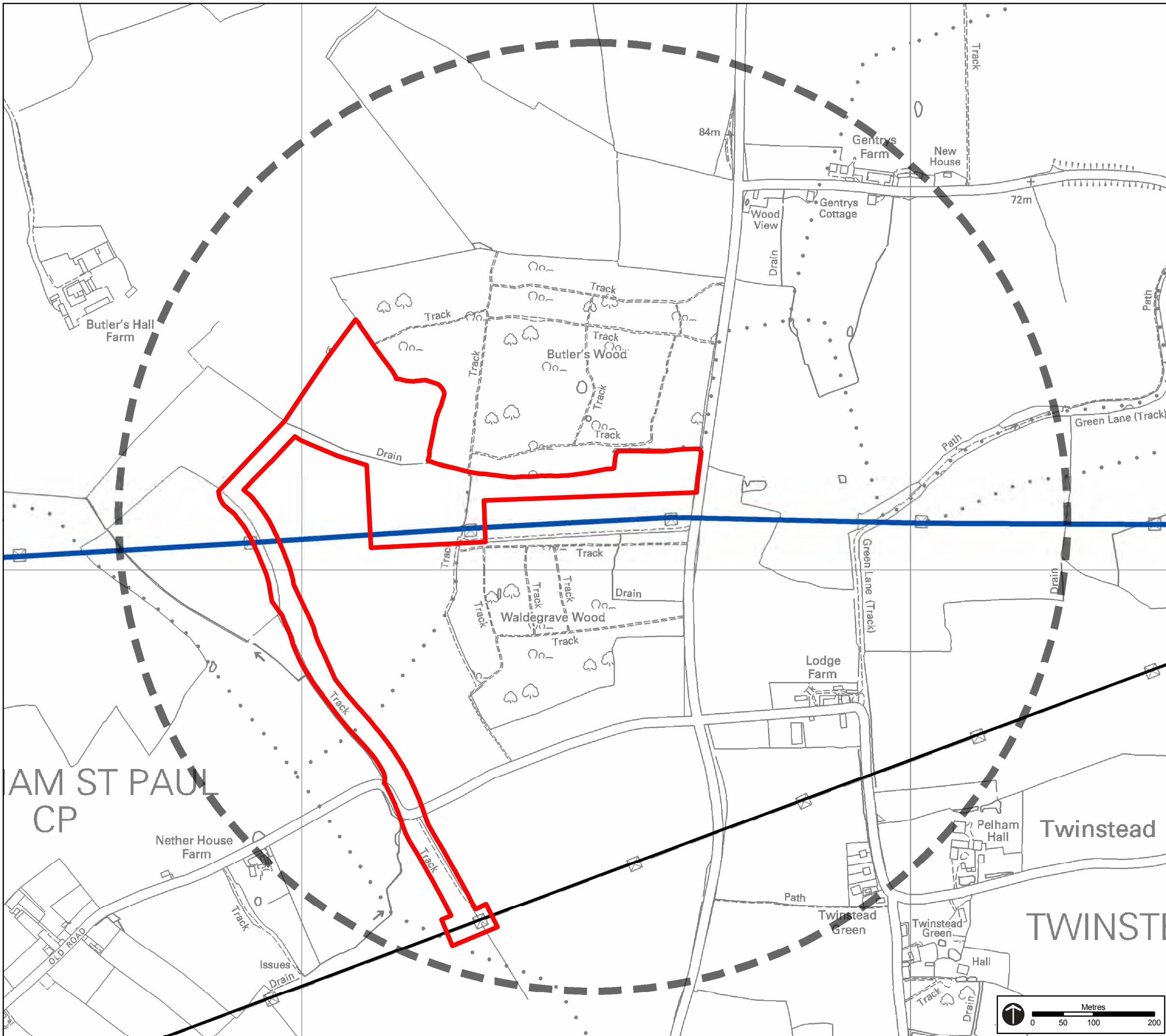
Date: 06-02-2013

TEP Ref No: G1980.1119a

Drawn: CB

Checked: AL

Approved: CH



Key

Existing Infrastructure


 Existing 400kV Overhead Line

 Existing 132kV Overhead Line

Proposed Infrastructure

 Substation Study Area

Boundaries

 Potential Development Consent Order Site Boundary

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Project: **Bramford to Twinstead Tee Connection**

Title: **Substation Study Area C
Location C3**

Drawing No: **Figure 4.8**

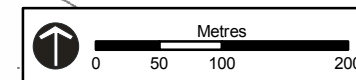
Date: 06-02-2013

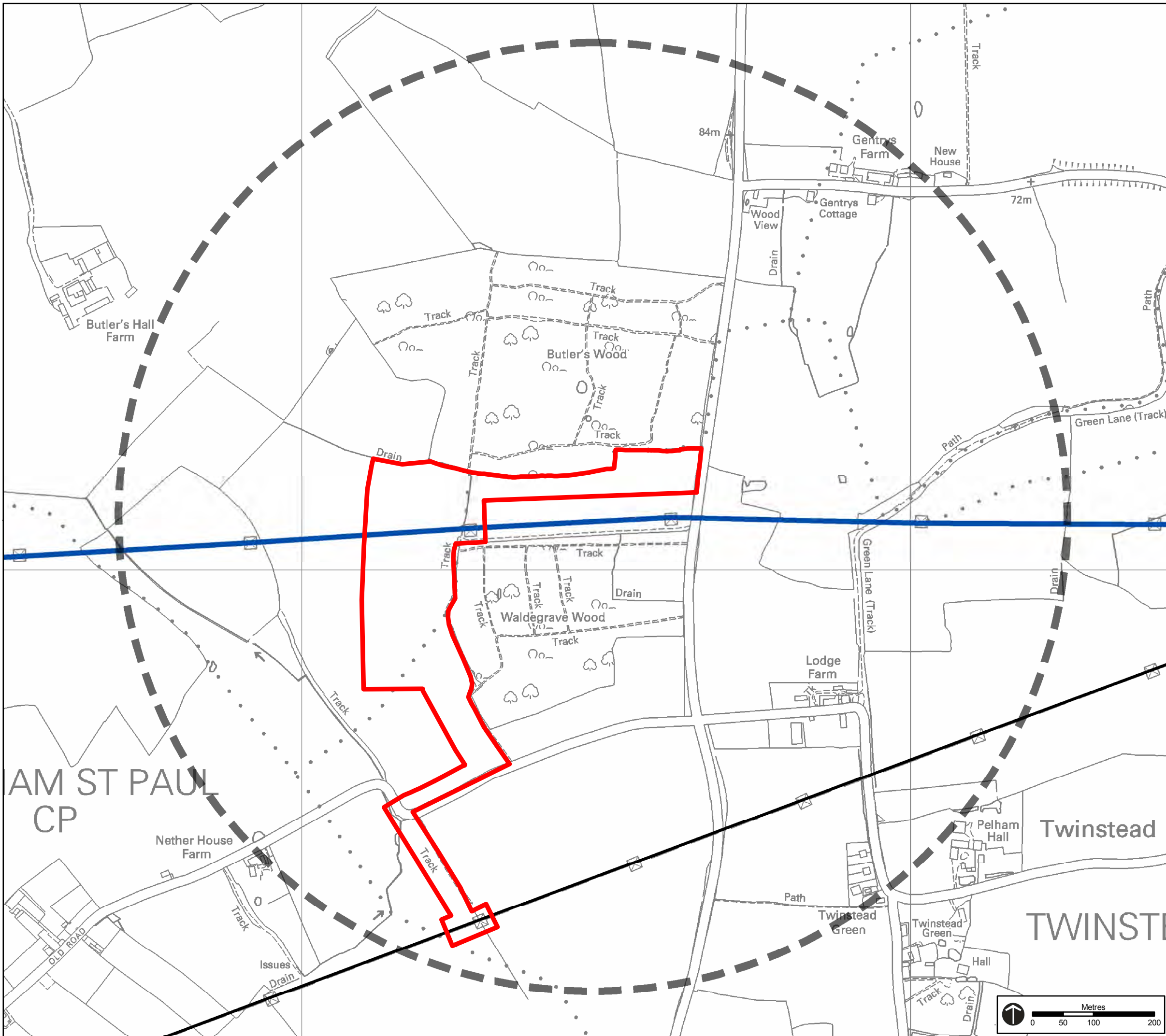
TEP Ref No: G1980.1120a

Drawn: CB

Checked: AL



Approved: CH





Key


Existing Infrastructure

-  Existing 400kV Overhead Line
-  Existing 132kV Overhead Line

Proposed Infrastructure

-  Substation Study Area

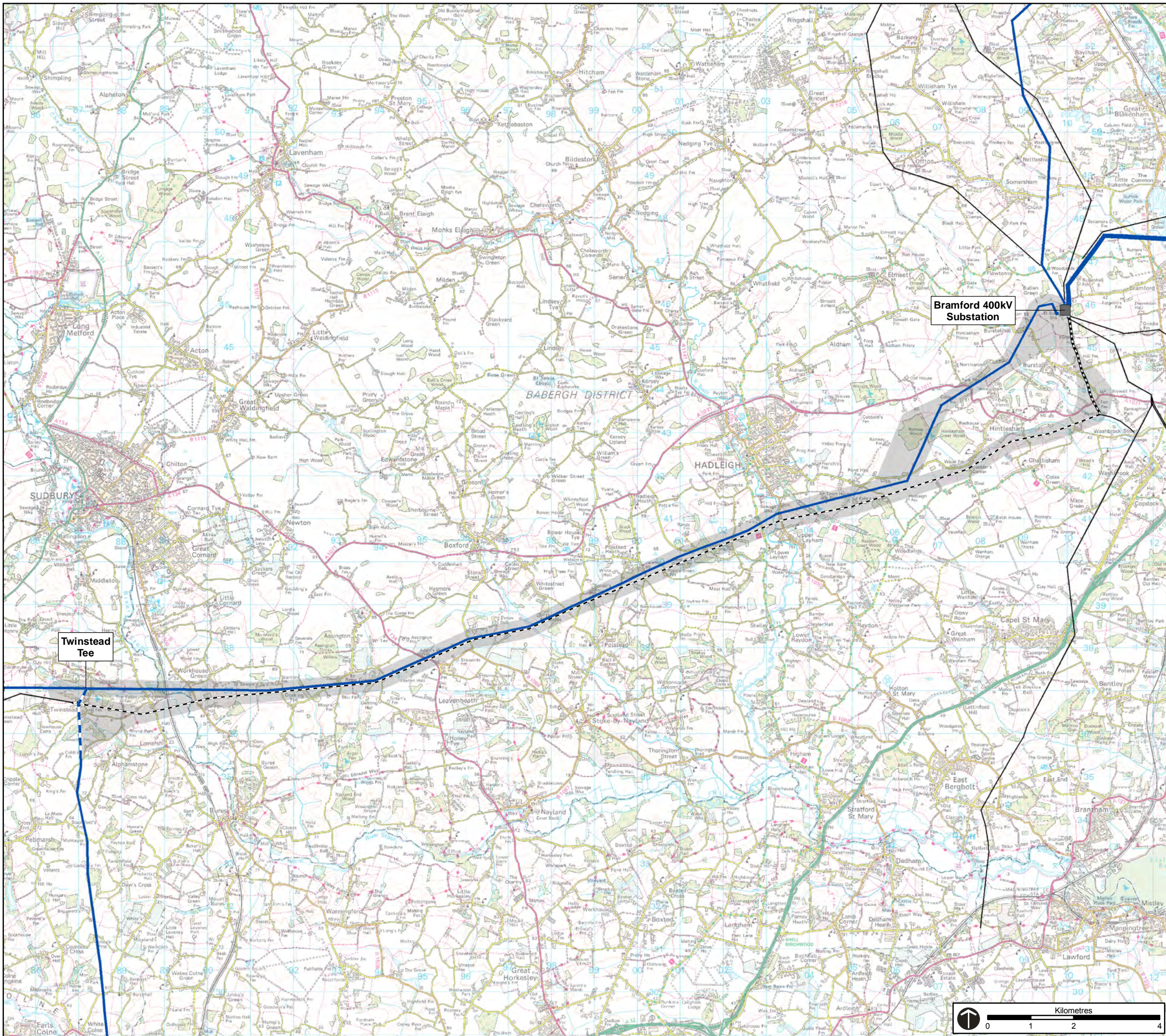
Boundaries

-  Potential Development Consent Order Site Boundary

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




Project: Bramford to Twinstead Tee Connection		
Title: Substation Study Area C Location C4		
Drawing No: Figure 4.9		
Date: 01-02-2013	TEP Ref No: G1980.1121a	
Drawn: CB	Checked: AL	Approved: CH



Key

Existing Infrastructure

-  Existing Substation
-  Existing 400kV Overhead Line for Removal
-  Existing 400kV Overhead Line
-  Existing 132kV Underground Cable
-  Existing 132kV Overhead Line
-  Existing 132kV Overhead Line for Removal

Proposed Infrastructure

-  Preferred Route Corridor

Bramford 400kV Substation

Twinstead Tee

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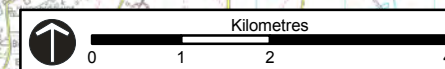
Project: **Bramford to Twinstead Tee Connection**

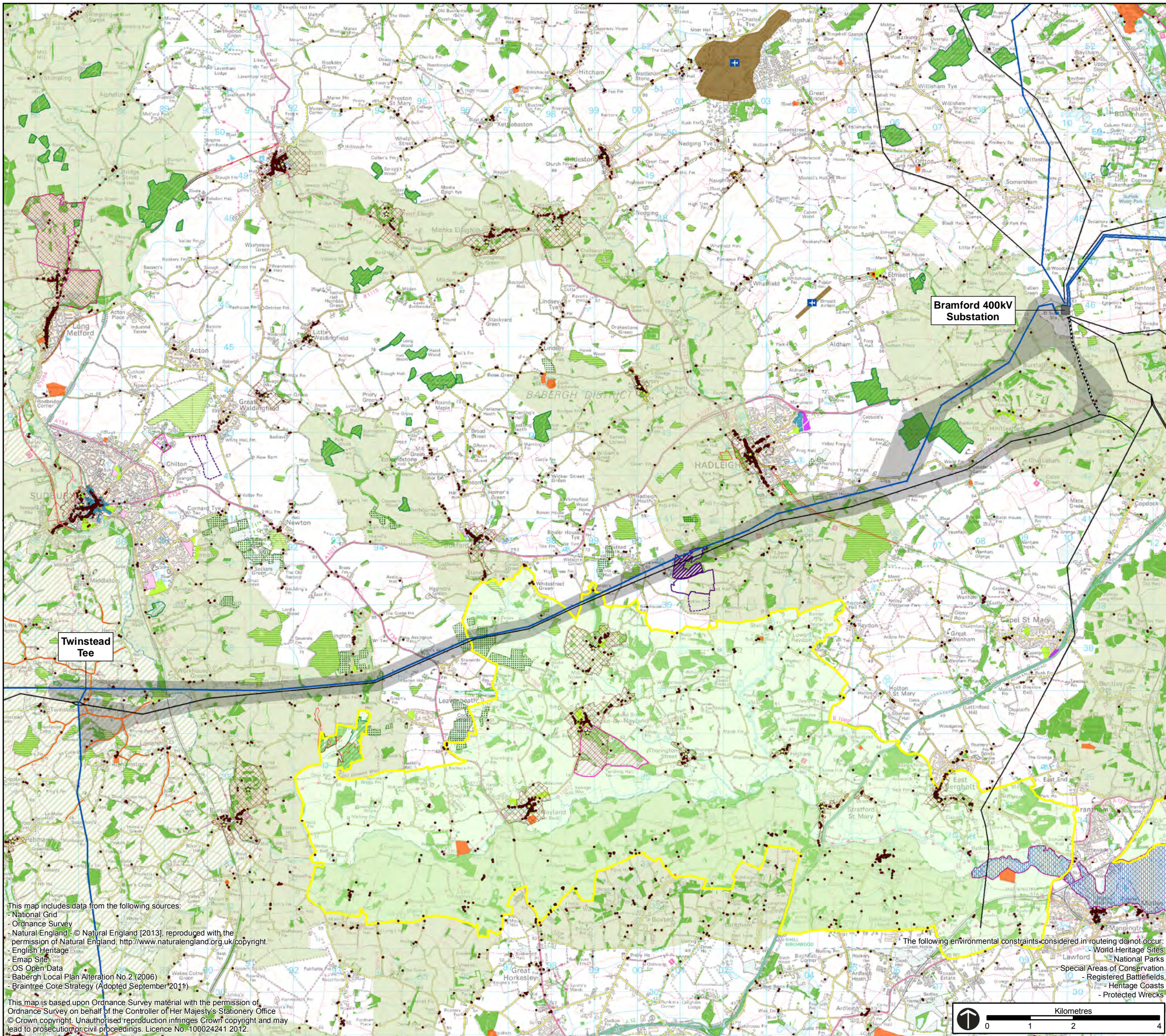
Title: **Removal of Existing Overhead Line**

Drawing No: **Figure 5**

Date: 06-02-2013	TEP Ref No: G1980.961b
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Drawn: CB	Checked: AL	Approved: CH
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Key

Proposed Infrastructure

- Preferred Route Corridor

Existing Infrastructure

- Existing Substation
- Existing 400kV Overhead Line
- Existing 132kV Overhead Line
- Existing 132kV Underground Cable

Environmental Constraints

- Area of Outstanding Natural Beauty
- Ramsar
- Special Protection Area
- Site of Special Scientific Interest
- National Nature Reserve
- Local Nature Reserve
- Scheduled Monument
- Registered Park and Garden
- Listed building (Grade I, II* and II)
- Airport/Airfield
- Woodland
- Orchard

Local Plan Allocations

- Conservation Area
- Special Landscape Area
- Former Braintree DC Special Landscape Area
- Local / County Wildlife Site
- Open Space Allocation
- Housing Allocation
- Mixed Use Allocation
- Proposed Employment
- Suffolk Waste Policy - Allocated Site
- Suffolk Mineral Policy - Layham Quarry
- Suffolk Mineral Policy - Proposed Site
- Protected Lane

nationalgrid

Project: **Bramford to Twinstead Tee Connection**

Title: **Environmental Constraints Connection Route**

Drawing No: **Figure 6**

Date: 06-02-2013 TEP Ref No: G1980.962b

Drawn: CB	Checked: AL	Approved: CH
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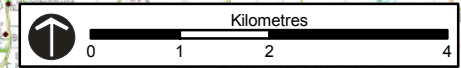
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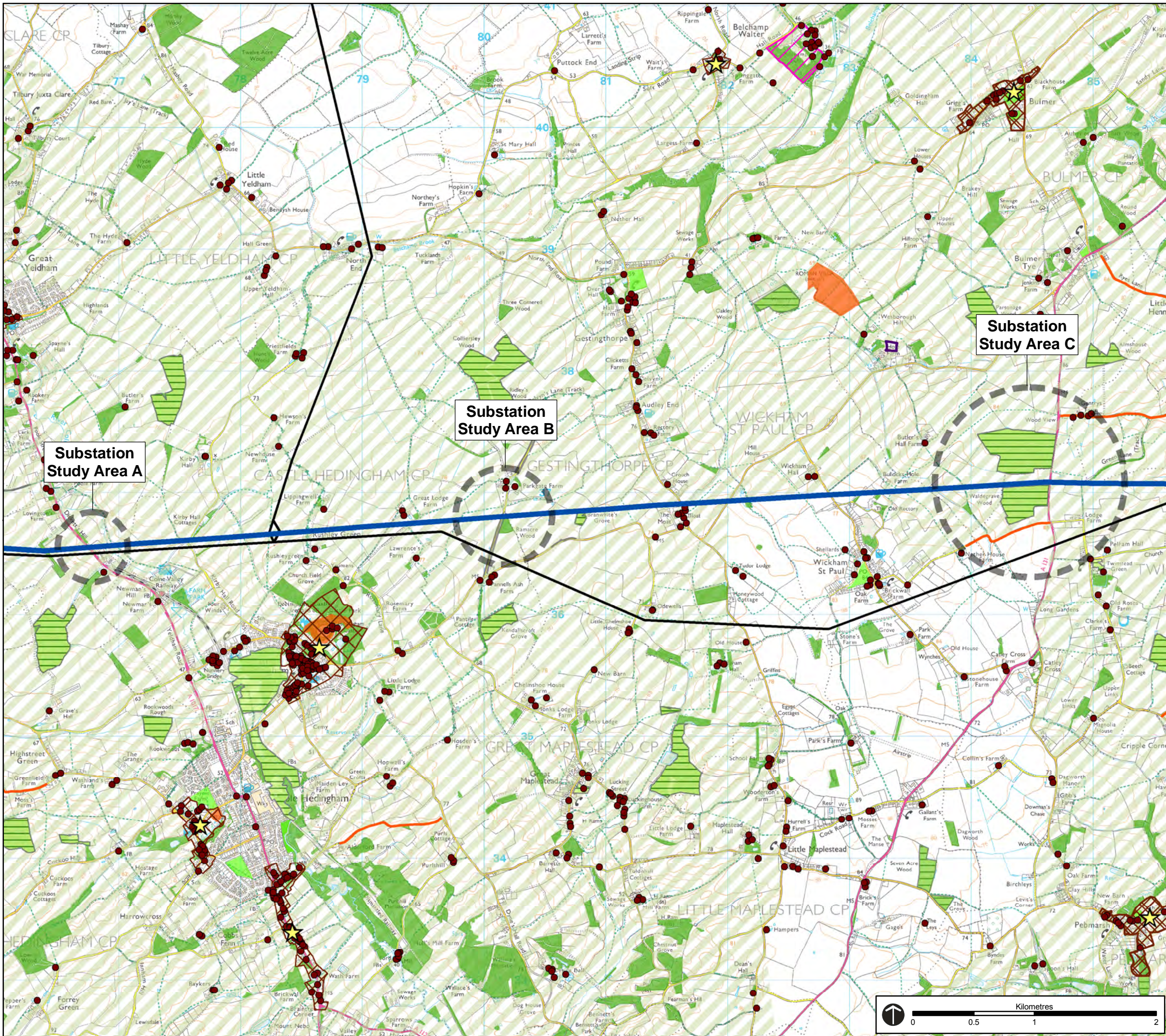
- National Grid
- Ordnance Survey
- Natural England - © Natural England [2013], reproduced with the permission of Natural England. <http://www.naturalengland.org.uk/copyright>.
- English Heritage
- Emap Site
- OS Open Data
- Babergh Local Plan Alteration No.2 (2006)
- Braintree Core Strategy (Adopted September 2011)

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The following environmental constraints considered in routing do not occur:

- World Heritage Sites
- National Parks
- Special Areas of Conservation
- Registered Battlefields
- Heritage Coasts
- Protected Wrecks





Key

- Existing Infrastructure**
- Existing 400kV Overhead Line
 - Existing 132kV Overhead Line
- Proposed Infrastructure**
- Substation Study Area
- Environmental Constraints**
- Scheduled Monument
 - Registered Park and Garden
 - Listed building (Grade I, II* and II)
 - Woodland
- Local Plan Allocations**
- Conservation Area
 - Former Braintree DC Special Landscape Area
 - Local Wildlife Site
 - Open Space Allocation
 - Employment Policy Area
 - Minerals Safeguarding Site
 - Protected Lane

The following environmental constraints considered in routing do not occur:

- World Heritage Sites
- National Parks
- Areas of Outstanding Natural Beauty
- Ramsar
- Special Protection Area
- Special Areas of Conservation
- Sites of Special Scientific Interest
- National Nature Reserve
- Local Nature Reserve
- Registered Battlefields
- Heritage Coasts
- Protected Wrecks
- Airport/Airfield

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- English Heritage
- Emap Site
- OS Open Data
- Braintree Core Strategy (Adopted September 2011)

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Project: **Bramford to Twinstead Tee Connection**

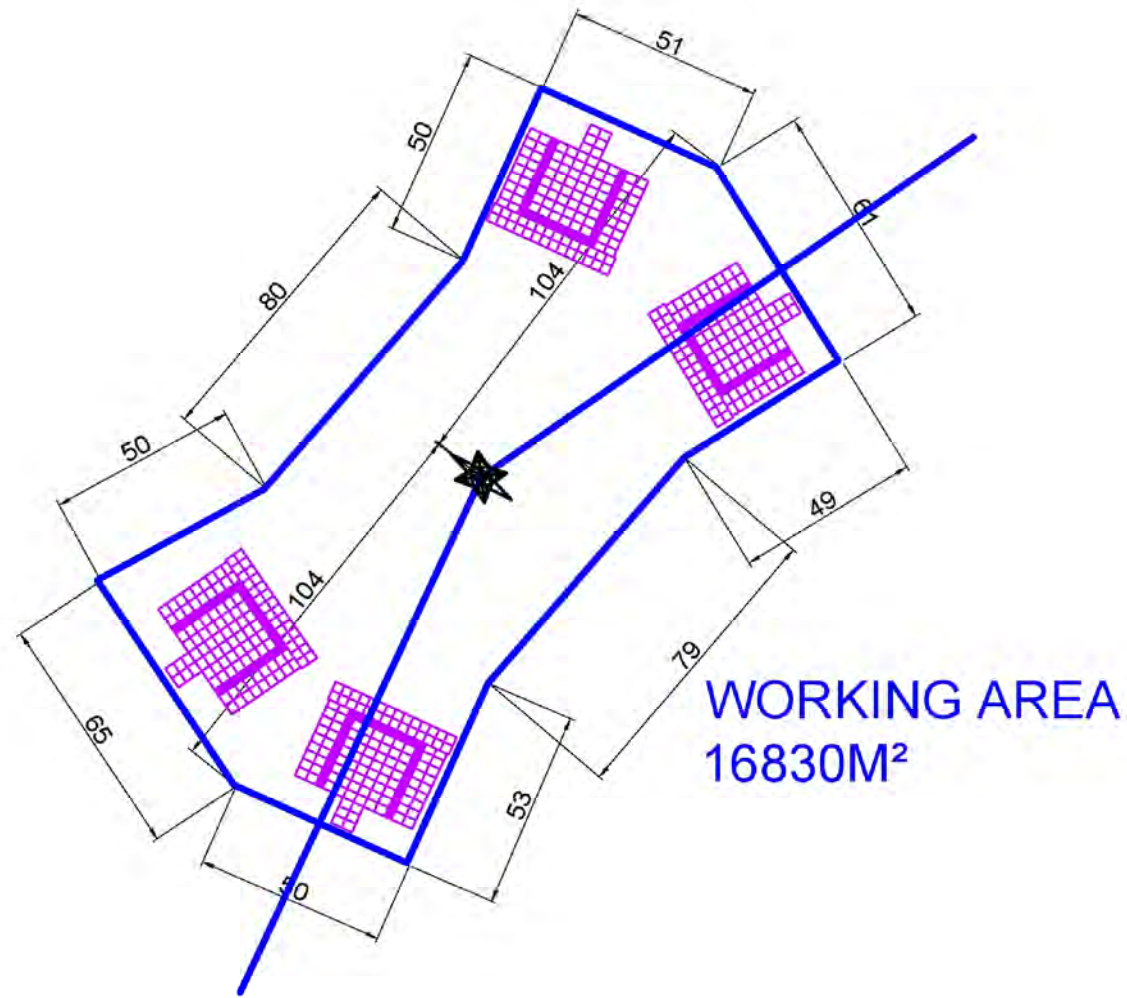
Title: **Substation Study Area Environmental Constraints**

Drawing No: **Figure 7**

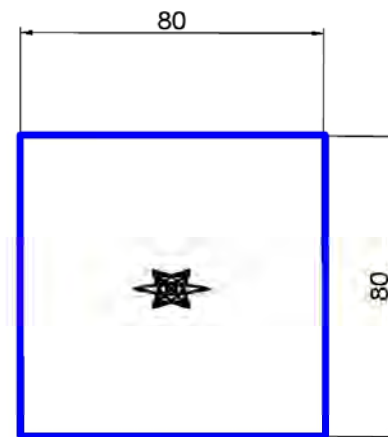
Date: 06-02-2013	TEP Ref No: G1980.1051c
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Drawn: CB	Checked: AL	Approved: CH
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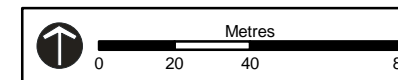
TYPICAL WORKING AREA OF A TENSION TOWER



TYPICAL WORKING AREA OF A SUSPENSION TOWER





**WORKING AREA
6400M²**



Key

Tension Tower Working Area

-  Machine Positions for Stringing Conductors
-  Typical Working Area around a Tower

This map includes data from the following sources:
- National Grid



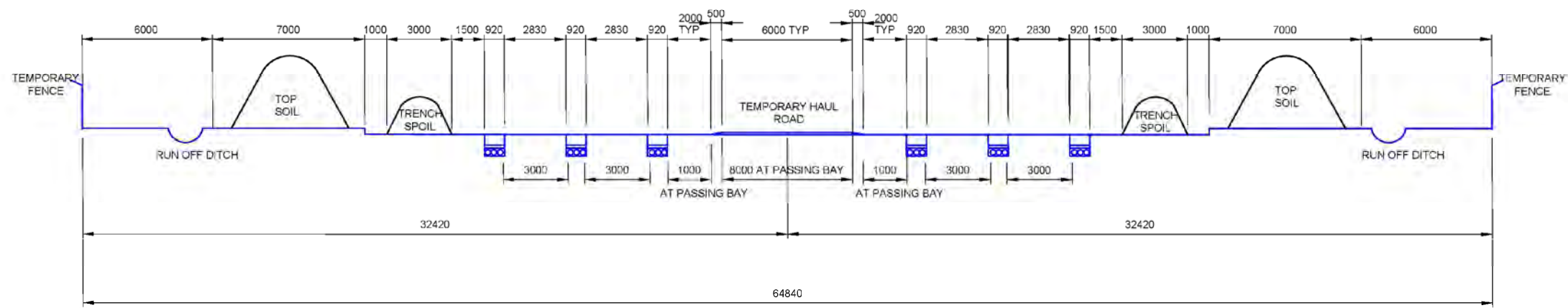
Project: **Bramford to Twinstead Tee Connection**

Title: **Typical working area of a tension tower and suspension tower**

Drawing No: **Figure 8**

Date: 06-02-2013	TEP Ref No: G1980.1079a
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Drawn: CB	Checked: AL	Approved: CH
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ALL DIMENSIONS ARE APPROXIMATE AND SUBJECT TO DETAILED DESIGN

This map includes data from the following sources:
- National Grid



Project: **Bramford to Twinstead Tee Connection**

Title: **Typical Cross-section of working area on underground cables route**

Drawing No: **Figure 9**

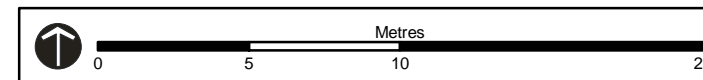
Date: 06-02-2013

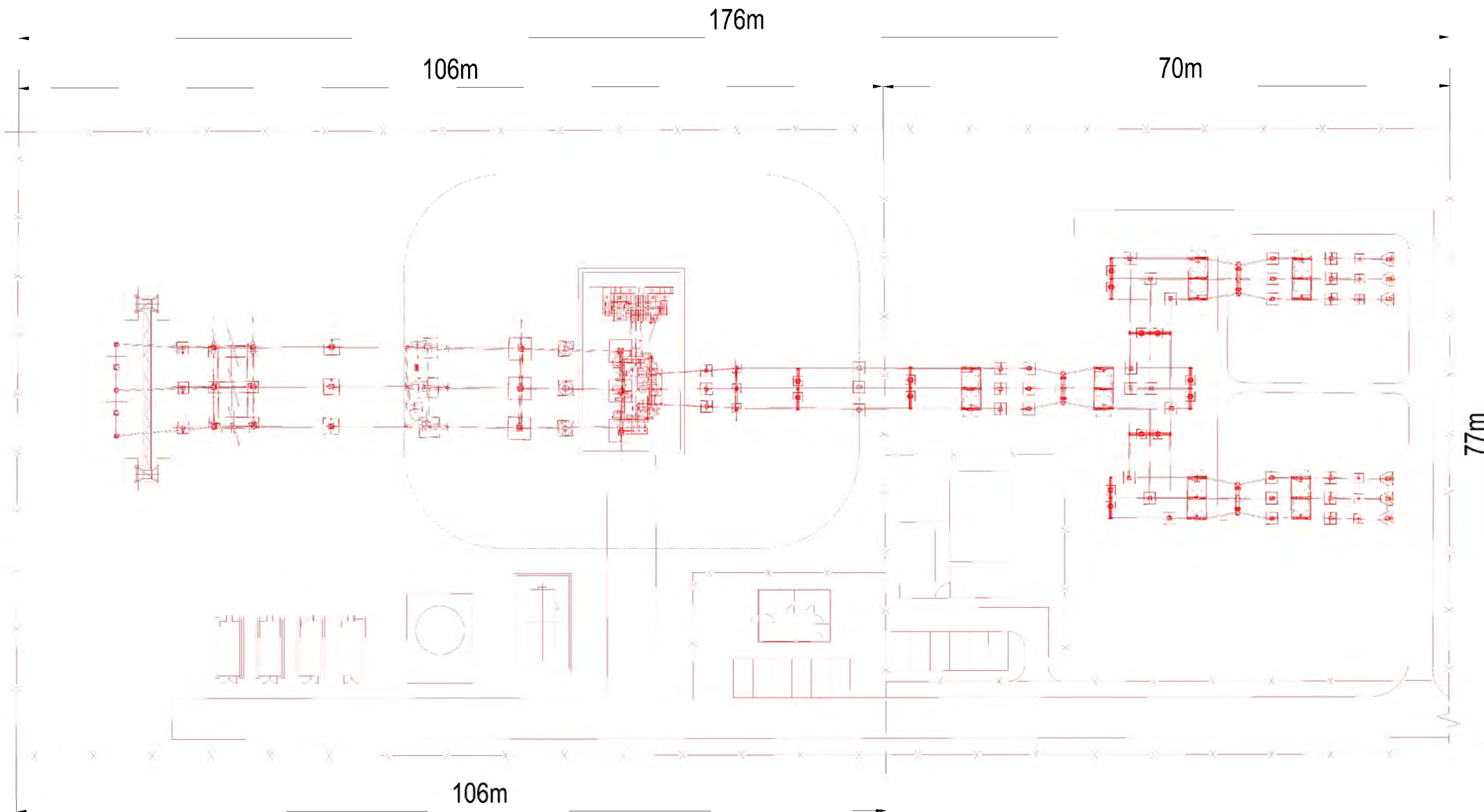
TEP Ref No: G1980.1069a

Drawn:
CB

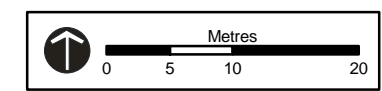
Checked:
AL

Approved:
CH





400kV AIS SUBSTATION GENERIC LAYOUT – FOR DISCUSSION ONLY



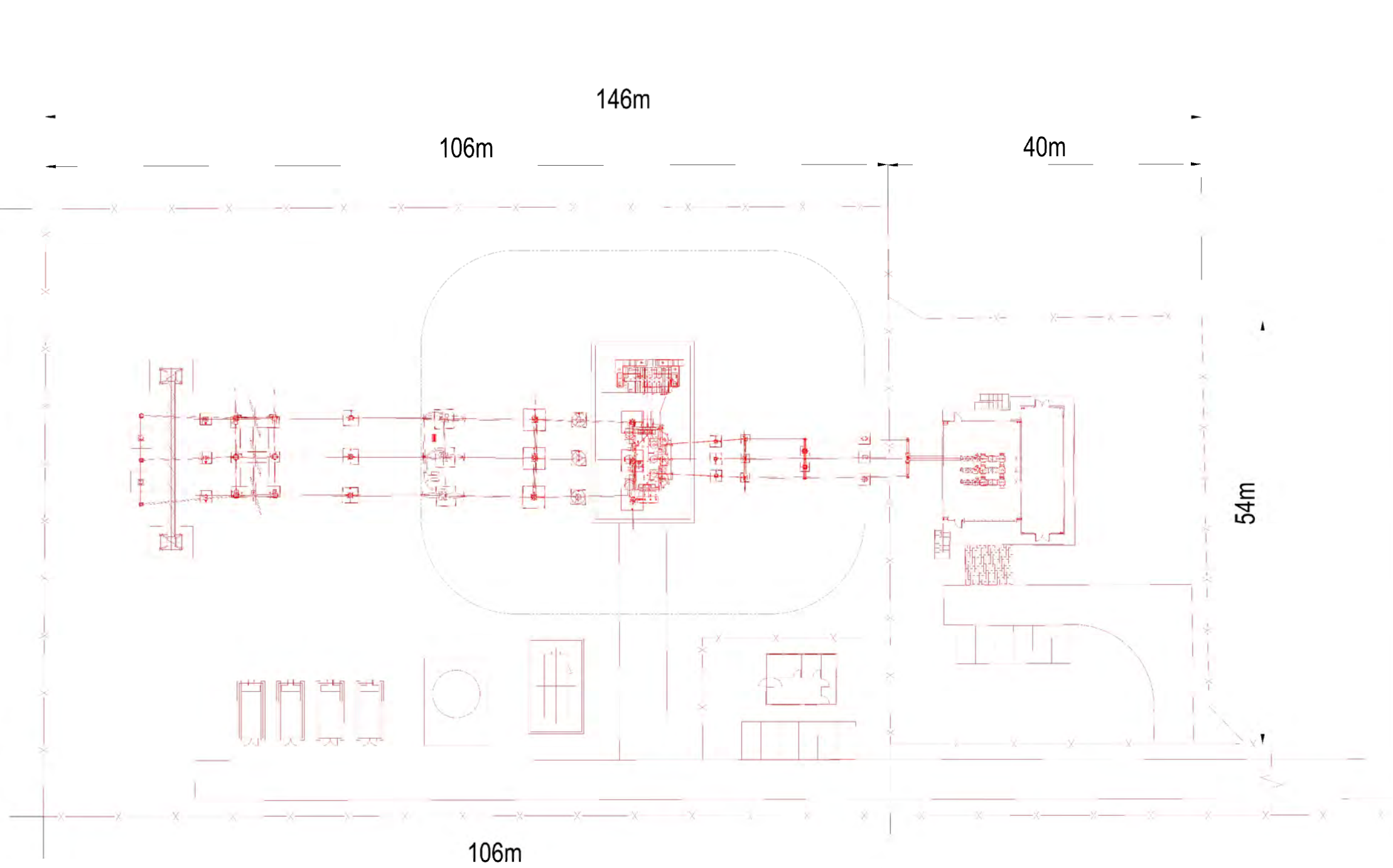
CAVEAT:

Please note that maximum dimensions for any particular location are dependent on a number of factors including how the incoming 400kV overhead line enters the substation. As such the generic layouts are not layouts indicating maximum dimensions for all circumstances, but rather, layouts of a typical substation configuration without applying any site specific constraints.

This map includes data from the following sources:
- National Grid

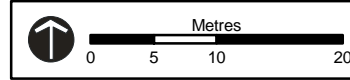


Project: Bramford to Twinstead Tee Connection		
Title: Generic Substation Layout 400kV AIS and 132kV AIS		
Drawing No: Figure 10		
Date: 06-02-2013	TEP Ref No: G1980.1070a	
Drawn: CB	Checked: AL	Approved: CH



1:250 0 12.5m 25m @ A1

400kV GIS SUBSTATION GENERIC LAYOUT – FOR DISCUSSION ONLY

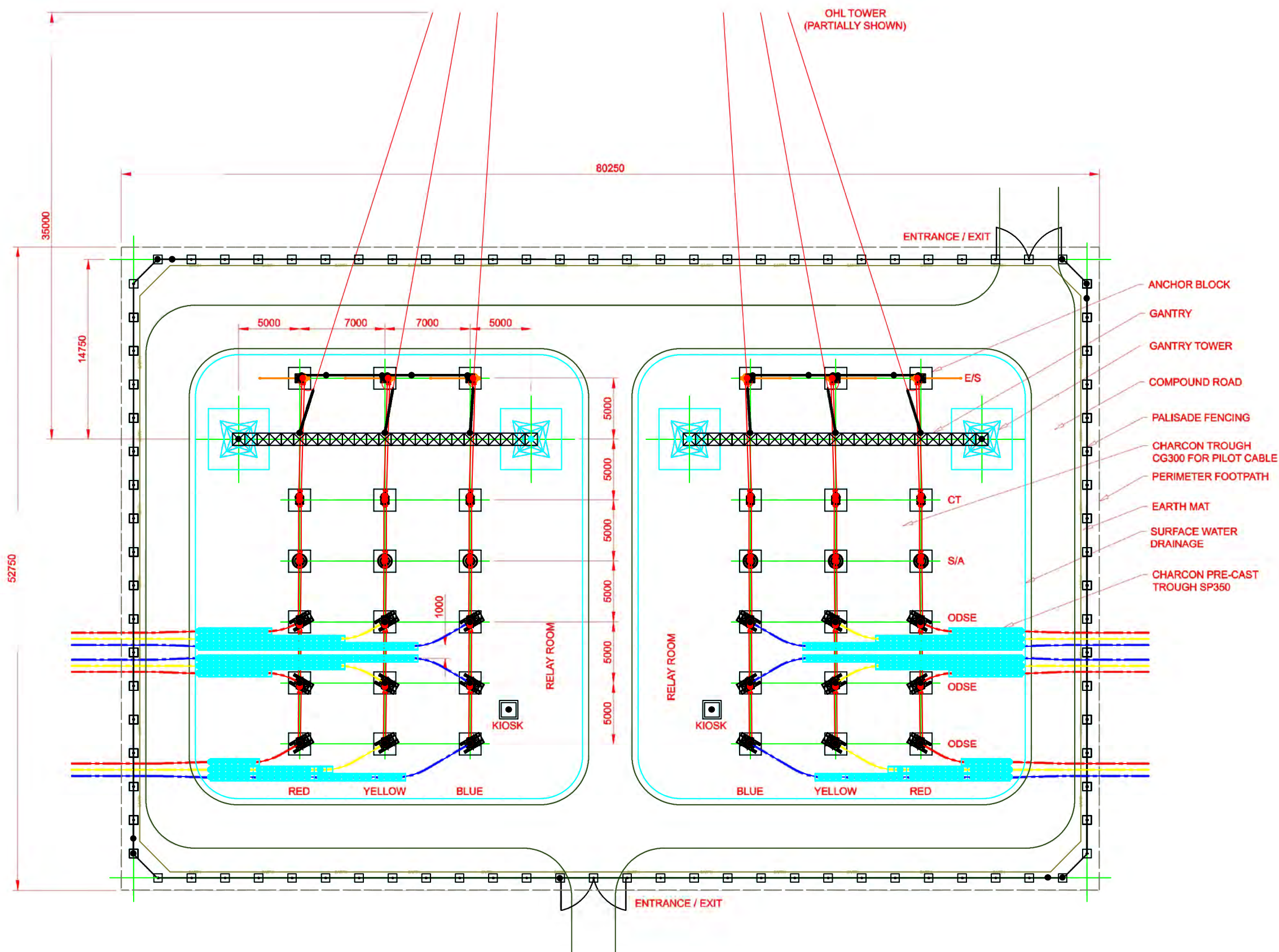


CAVEAT:
 Please note that maximum dimensions for any particular location are dependent on a number of factors including how the incoming 400kV overhead line enters the substation. As such the generic layouts are not layouts indicating maximum dimensions for all circumstances, but rather, layouts of a typical substation configuration without applying any site specific constraints.

This map includes data from the following sources:
 - National Grid



Project: Bramford to Twinstead Tee Connection		
Title: Generic Substation Layout 400kV AIS and 132kV GIS		
Drawing No: Figure 11		
Date: 06-02-2013	TEP Ref No: G1980.1071a	
Drawn: CB	Checked: AL	Approved: CH



- ANCHOR BLOCK
- GANTRY
- GANTRY TOWER
- COMPOUND ROAD
- PALISADE FENCING
- CHARCON TROUGH CG300 FOR PILOT CABLE
- PERIMETER FOOTPATH
- EARTH MAT
- SURFACE WATER DRAINAGE
- CHARCON PRE-CAST TROUGH SP350

CAVEAT:
 Please note that maximum dimensions for any particular location are dependent on a number of factors including how the incoming 400kV overhead line enters the cable sealing end compound. As such the generic layouts are not layouts indicating maximum dimensions for all circumstances, but rather, layouts of a typical cable sealing end compound configuration without applying any site specific constraints.

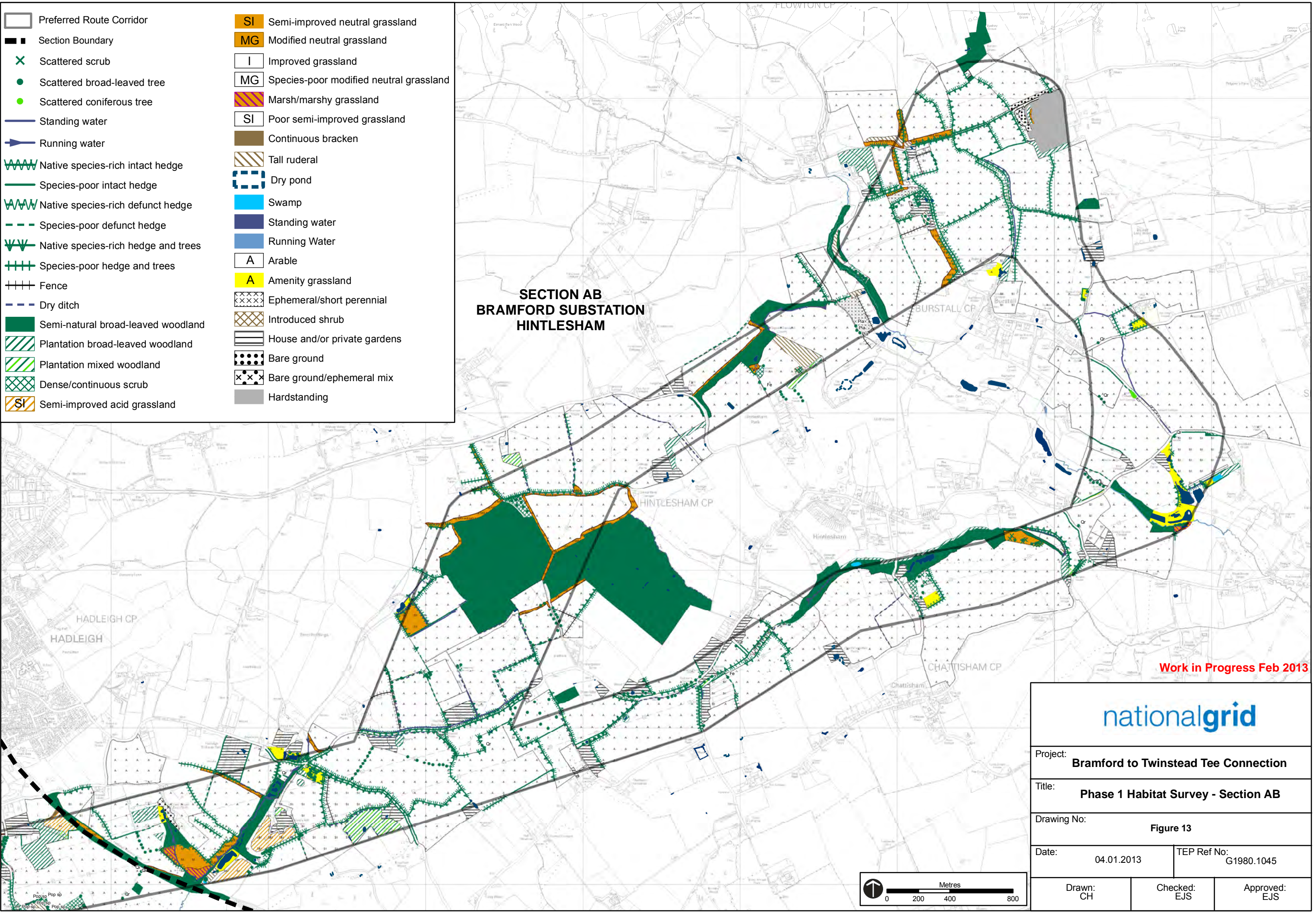
This map includes data from the following sources:
 - National Grid



Project: Bramford to Twinstead Tee Connection		
Title: Generic Cable Sealing End Compound Layout		
Drawing No: Figure 12		
Date: 11-02-2013	TEP Ref No: G1980.1181a	
Drawn: CB	Checked: AL	Approved: CH

	Preferred Route Corridor		Semi-improved neutral grassland
	Section Boundary		Modified neutral grassland
	Scattered scrub		Improved grassland
	Scattered broad-leaved tree		Species-poor modified neutral grassland
	Scattered coniferous tree		Marsh/marshy grassland
	Standing water		Poor semi-improved grassland
	Running water		Continuous bracken
	Native species-rich intact hedge		Tall ruderal
	Species-poor intact hedge		Dry pond
	Native species-rich defunct hedge		Swamp
	Species-poor defunct hedge		Standing water
	Native species-rich hedge and trees		Running Water
	Species-poor hedge and trees		Arable
	Fence		Amenity grassland
	Dry ditch		Ephemeral/short perennial
	Semi-natural broad-leaved woodland		Introduced shrub
	Plantation broad-leaved woodland		House and/or private gardens
	Plantation mixed woodland		Bare ground
	Dense/continuous scrub		Bare ground/ephemeral mix
	Semi-improved acid grassland		Hardstanding

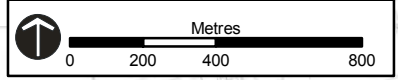
**SECTION AB
BRAMFORD SUBSTATION
HINTLESHAM**



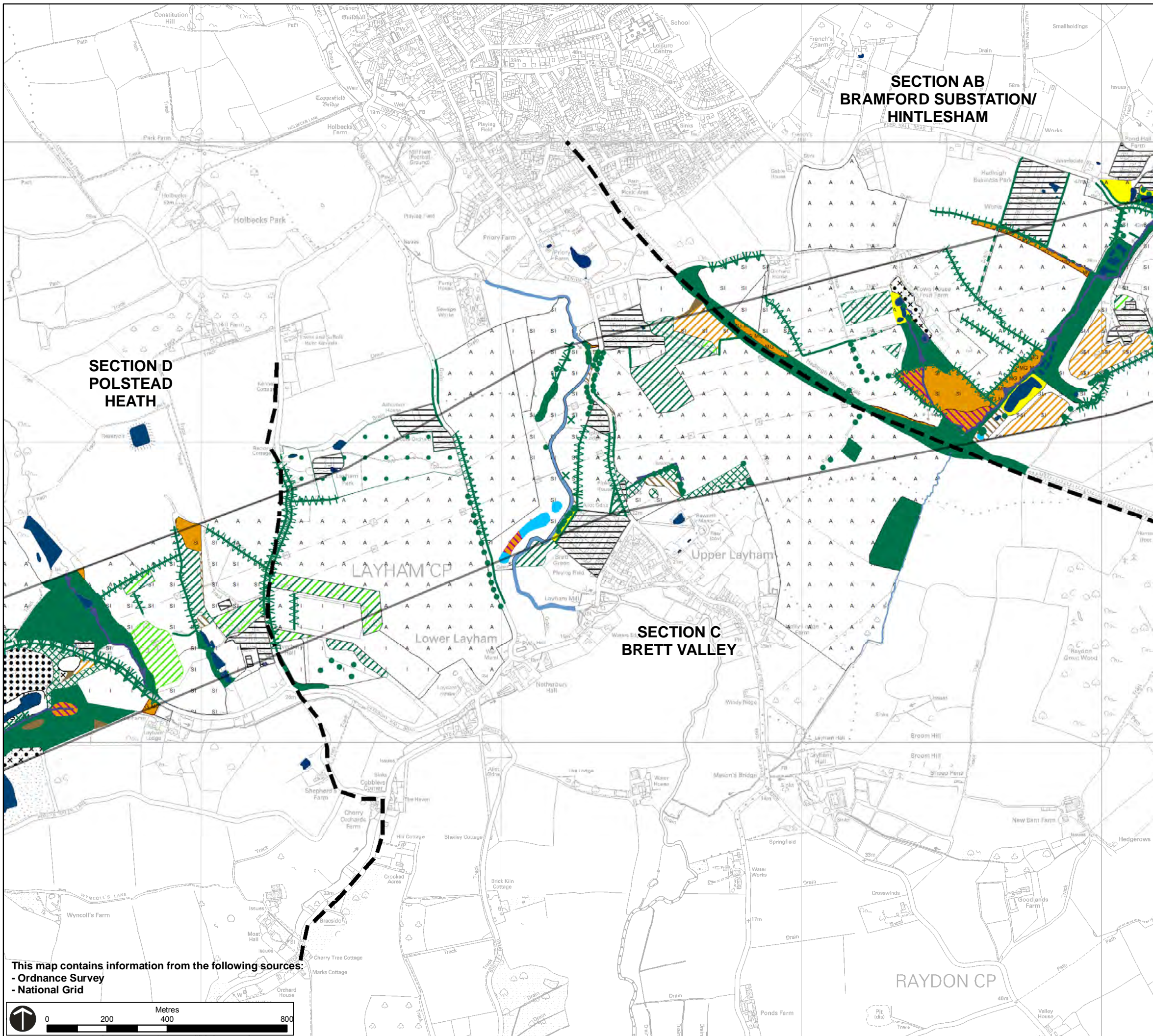
Work in Progress Feb 2013



Project:	Bramford to Twinstead Tee Connection	
Title:	Phase 1 Habitat Survey - Section AB	
Drawing No:	Figure 13	
Date:	04.01.2013	TEP Ref No: G1980.1045
Drawn:	CH	Checked: EJS
		Approved: EJS



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- Preferred Route Corridor
- Section Boundary
- Scattered scrub
- Scattered broad-leaved tree
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Native species-rich defunct hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Dry ditch
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation coniferous woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Broad-leaved parkland/scattered trees
- Orchard
- Unimproved acid grassland
- Semi-improved acid grassland
- Semi-improved neutral grassland
- Modified neutral grassland
- Species-poor modified neutral grassland
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Standing water
- Running Water
- Arable
- Amenity grassland
- House and/or private garden
- Bare ground
- Bare ground/ephemeral mix
- Dry pond

Work in Progress Feb 2013



Project: **Bramford to Twinstead Tee Connection**

Title: **Phase 1 Habitat Survey - Section C**

Drawing No: **Figure 14**

Date: 13.02.2013

TEP Ref No: G1980.1046a

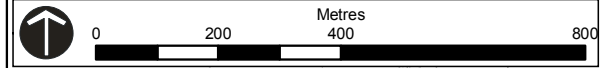
Drawn: CH

Checked: EJS

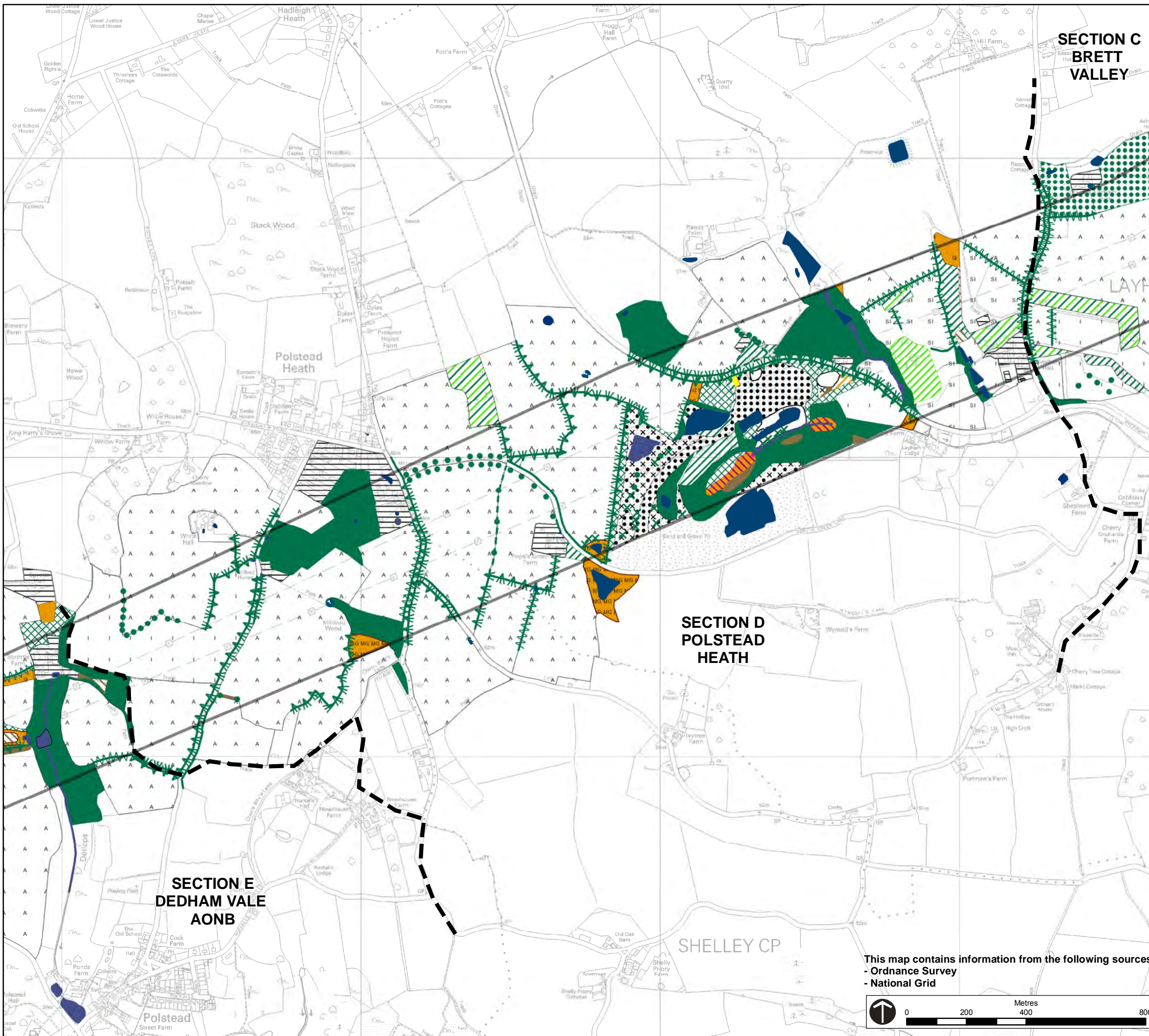
Approved: EJS

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This map contains information from the following sources:
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- Preferred Route Corridor
- Section Boundary
- Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation coniferous woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Broad-leaved parkland/scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- SI Semi-improved neutral grassland
- MG Modified neutral grassland
- MG Species-poor modified neutral grassland
- I Improved grassland
- Marsh/marshy grassland
- SI Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid/neutral flush
- Standing water
- Running Water
- Dry pond
- A Arable
- A Amenity grassland
- Houses and/or gardens
- Bare ground
- Bare ground/ephemeral mix

Work in Progress Feb 2013



Project: **Bramford to Twinstead Tee Connection**

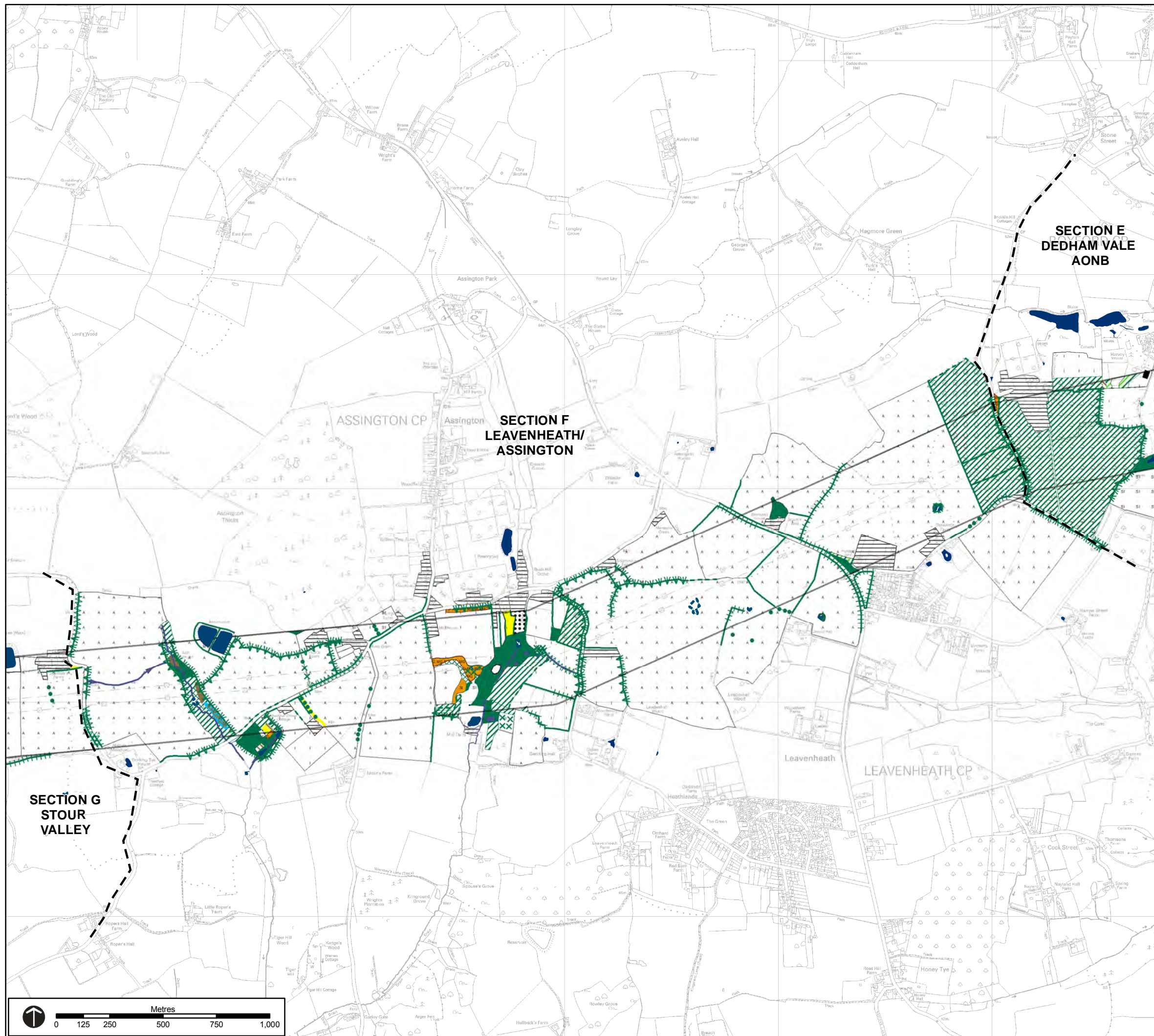
Title: **Phase 1 Habitat Survey - Section D**

Drawing No: **Figure 15**

Date: 13.02.2013 TEP Ref No: G1980.1047a

Drawn: CH	Checked: EJS	Approved: EJS
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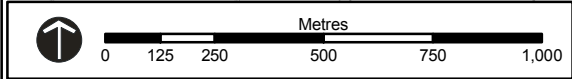


- Preferred Route Corridor
 - Section Boundary
 - Scattered scrub
 - Scattered broad-leaved tree
 - Scattered bracken
 - Standing water
 - Running water
 - Native species-rich intact hedge
 - Species-poor intact hedge
 - Species-poor defunct hedge
 - Native species-rich hedge and trees
 - Species-poor hedge and trees
 - Semi-natural broad-leaved woodland
 - Plantation broad-leaved woodland
 - Plantation mixed woodland
 - Dense/continuous scrub
 - Orchard
 - SI Semi-improved neutral grassland
 - MG Modified neutral grassland
 - MG Species-poor modified neutral grassland
 - I Improved grassland
 - SI Poor semi-improved grassland
 - Continuous bracken
 - Tall ruderal
 - Swamp
 - Standing water
 - Dry pond
 - A Arable
 - A Amenity grassland
 - Buildings
 - Houses and/or gardens
 - Bare ground
 - Bare ground/ephemeral mix
- This map includes data from the following sources:
 - National Grid
 - Ordnance Survey

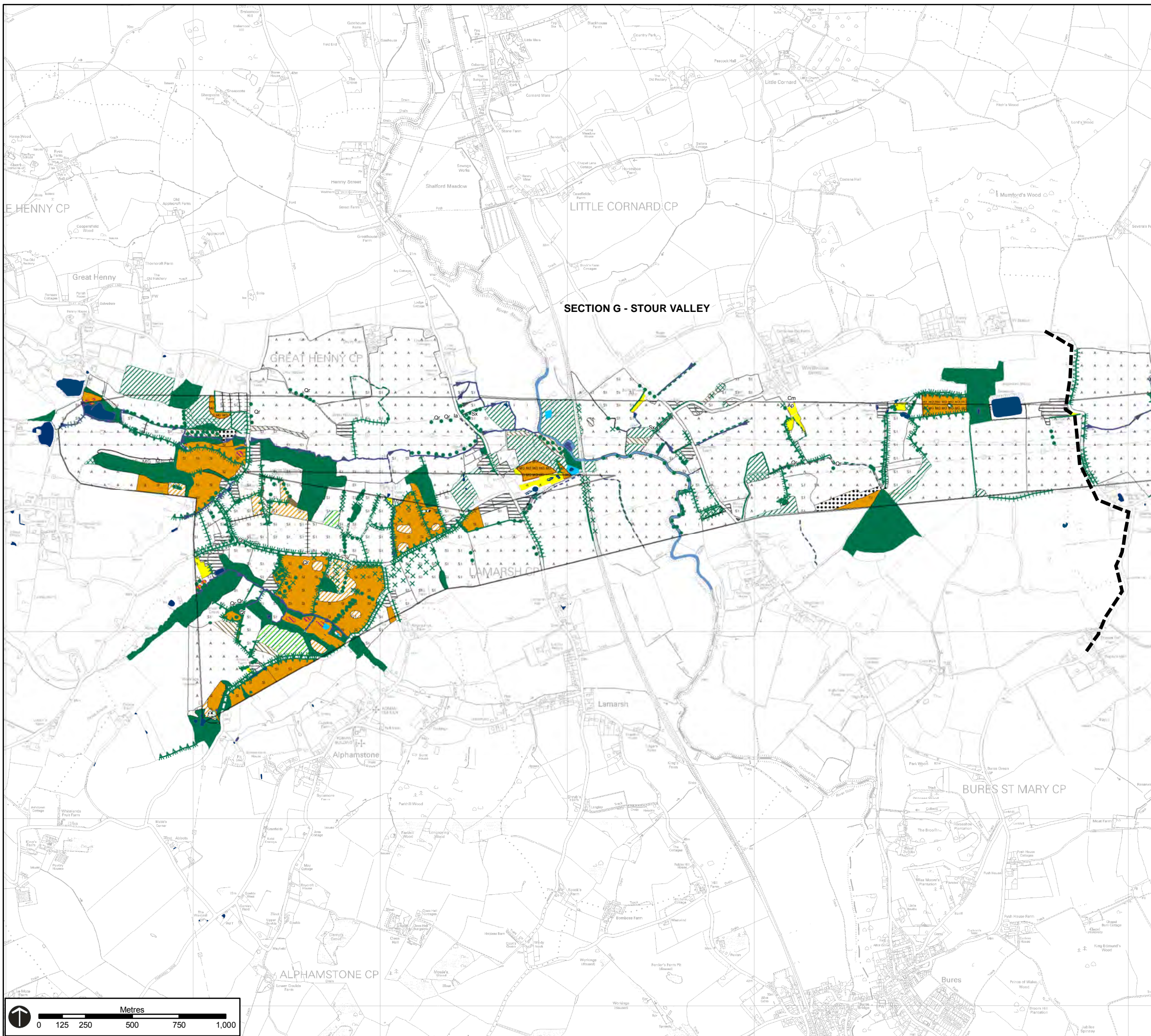
Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Phase 1 Habitat Survey - Section F		
Drawing No:		Figure 17
Date:	13.02.2013	TEP Ref No: G1980.1049a
Drawn: CH	Checked: EJS	Approved: EJS



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- Preferred Route Corridor
- Section Boundary
- Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Native species-rich defunct hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Fence
- Dry ditch
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Scattered scrub
- Orchard
- Semi-improved acid grassland
- Unimproved neutral grassland
- Semi-improved neutral grassland
- Modified neutral grassland
- Species-poor modified neutral grassland
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Standing water
- Running Water
- Dry pond
- Arable
- Amenity grassland
- Introduced shrub
- House and/or private gardens
- Bare ground

This map includes data from the following sources:
 - National Grid
 - Ordnance Survey

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Phase 1 Habitat Survey - Section G		
Drawing No: Figure 18		
Date: 12.02.2013	TEP Ref No: G1980.1050a	
Drawn: CH	Checked: CH	Approved: EJS

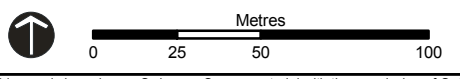


- Key**
- Substation study area
 - Species-rich intact hedge
 - Species-rich defunct hedge
 - Species-rich hedge with trees
 - Scattered scrub
 - Scattered broad-leaved tree
 - Species-poor intact hedge
 - Species-poor defunct hedge
 - Dry ditch
 - Plantation broad-leaved woodland
 - Plantation mixed woodland
 - Dense/continuous scrub
 - MG Species-rich modified neutral grassland
 - SI Poor semi-improved grassland
 - Tall ruderal
 - Running Water
 - Arable
 - A Amenity grassland
 - MG Species-poor modified neutral grassland
 - Buildings
 - Private house and/or garden
 - Hardstanding

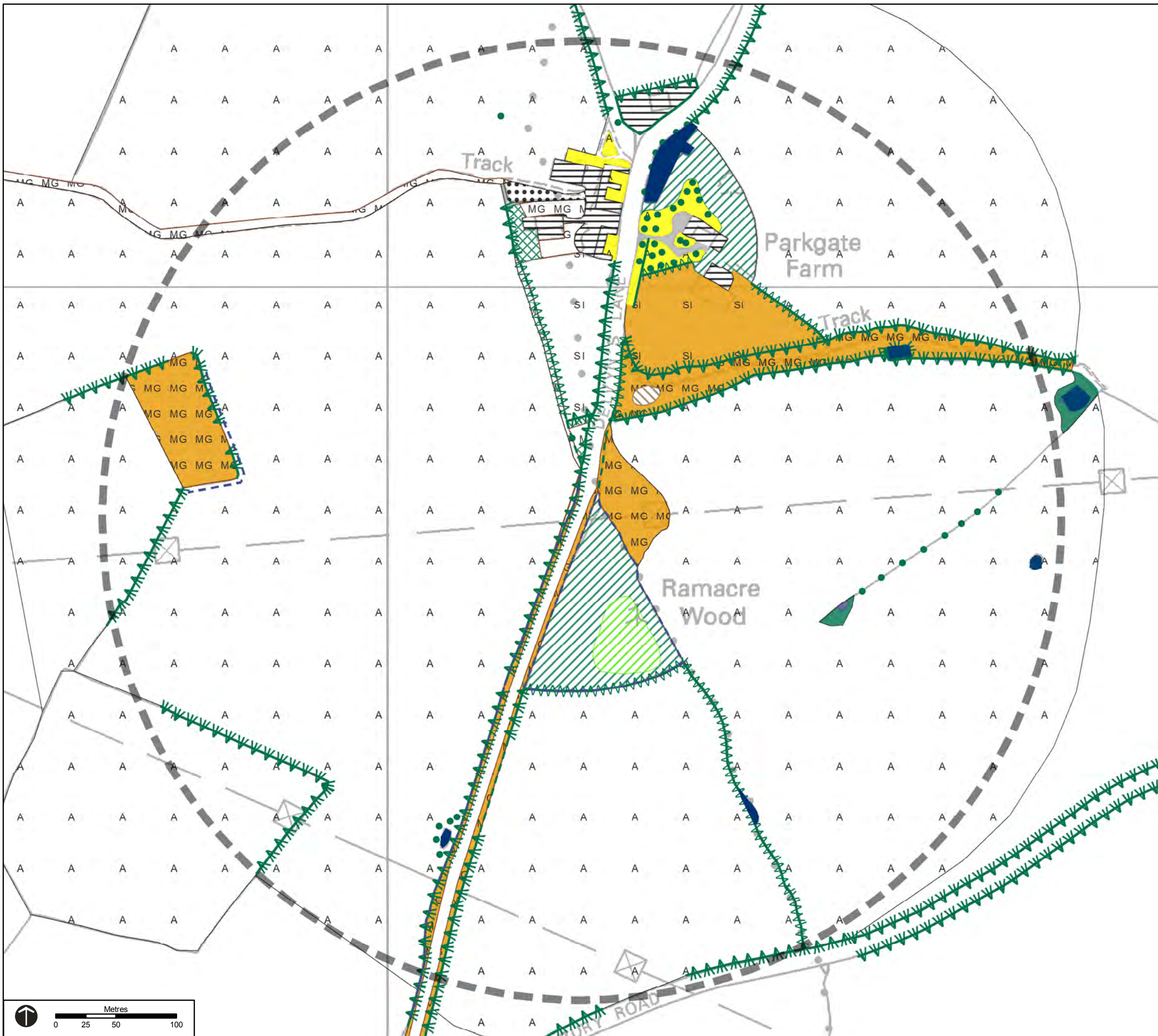
Work in Progress Feb 2013



Project: Route Corridor Study - Bramford to Twinstead		
Title: Phase 1 Substation Study Area A		
Drawing No: Figure 19		
Date: 13-12-2012	TEP Ref No: G1980.1003a	
Drawn: CH	Checked: CM	Approved: EJS



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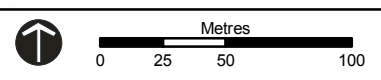


- ### Key
- Substation study area
 - Scattered broad-leaved tree
 - ▬▬▬▬ Native species-rich intact hedge
 - ▬▬▬▬ Species-poor intact hedge
 - ▬▬▬▬ Native species-rich defunct hedge
 - - - - Species-poor defunct hedge
 - ▬▬▬▬ Native species-rich hedge and trees
 - - - - Dry ditch
 - Semi-natural broad-leaved woodland
 - Plantation broad-leaved woodland
 - Plantation coniferous woodland
 - Dense/continuous scrub
 - SI Semi-improved neutral grassland
 - MG Modified neutral grassland
 - MG Species-poor modified neutral grassland
 - SI Poor semi-improved grassland
 - Tall ruderal
 - Standing water
 - A Arable
 - A Amenity grassland
 - Private house and/or garden
 - Bare ground
 - Hardstanding

Work in Progress Feb 2013



Project: Route Corridor Study - Bramford to Twinstead		
Title: Phase 1 Substation Study Area B		
Drawing No: Figure 20		
Date: 13-12-2012	TEP Ref No: G1980.1004	
Drawn: CH	Checked: CM	Approved: EJS



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- Key**
- Substation Study Area
 - Scattered broad-leaved tree
 - Native species-rich intact hedge
 - Species-poor intact hedge
 - Native species-rich defunct hedge
 - Species-poor defunct hedge
 - Native species-rich hedge and trees
 - Species-poor hedge and trees
 - Dry ditch
 - Semi-natural broad-leaved woodland
 - Plantation broad-leaved woodland
 - SI Semi-improved neutral grassland
 - MG Species-rich modified neutral grassland
 - SI Poor semi-improved grassland
 - Continuous bracken
 - Standing water
 - Dry pond
 - Arable
 - Amenity grassland
 - Private house and/or garden

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Phase 1 Substation Study Area C		
Drawing No: Figure 21		
Date: 13-12-2012	TEP Ref No: G1980.1005	
Drawn: CH	Checked: CM	Approved: EJS

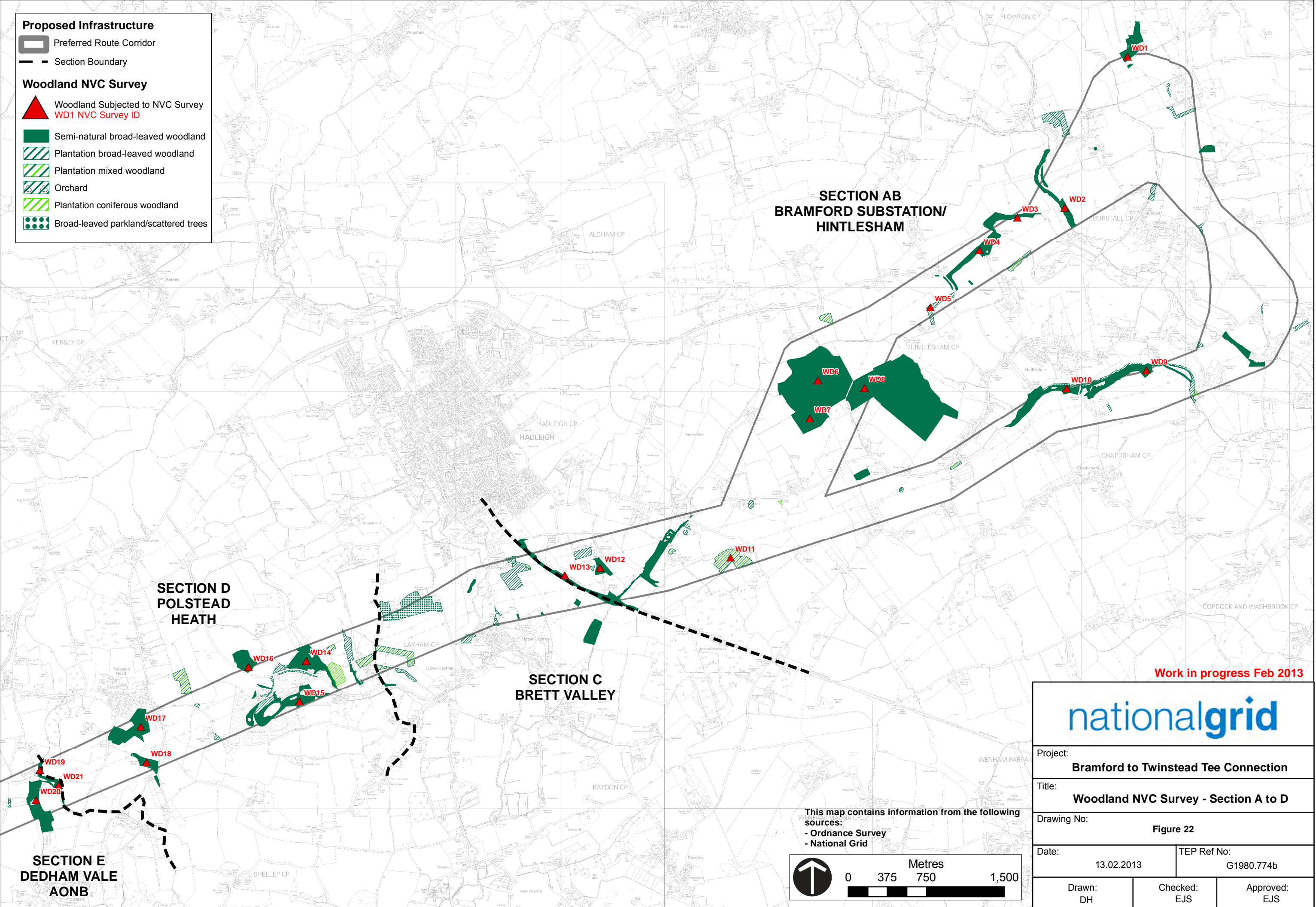
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Proposed Infrastructure

- Preferred Route Corridor
- Section Boundary

Woodland NVC Survey

- Woodland Subjected to NVC Survey
WD1 NVC Survey ID
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation mixed woodland
- Orchard
- Plantation coniferous woodland
- Broad-leaved parkland/scattered trees

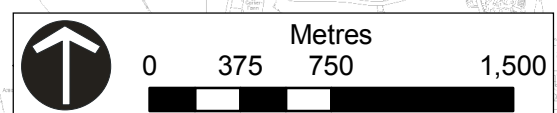










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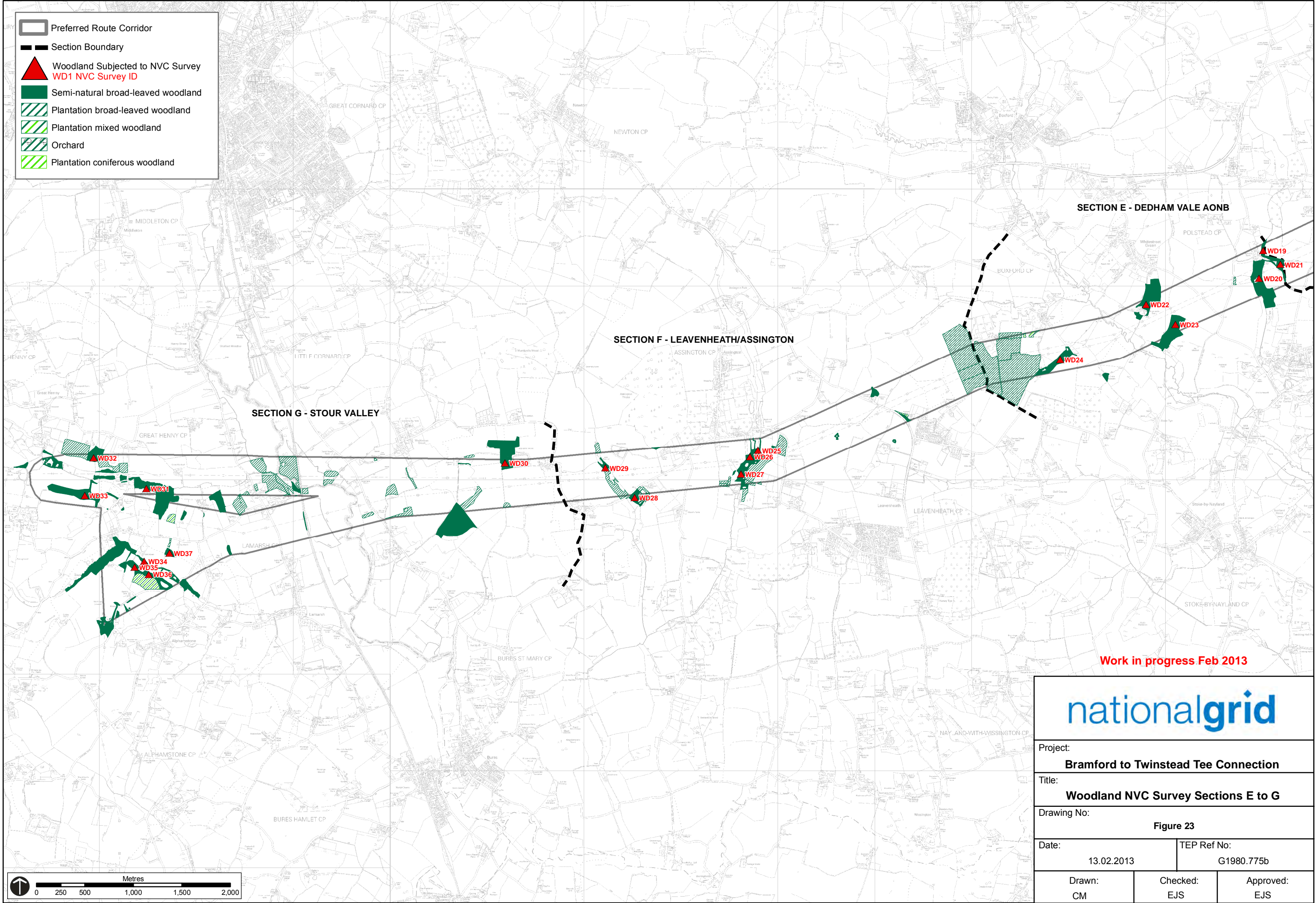
nationalgrid

Project: Bramford to Twinstead Tee Connection		
Title: Woodland NVC Survey - Section A to D		
Drawing No: Figure 22		
Date: 13.02.2013	TEP Ref No: G1980.774b	
Drawn: DH	Checked: EJS	Approved: EJS

This map contains information from the following sources:
- Ordnance Survey
- National Grid



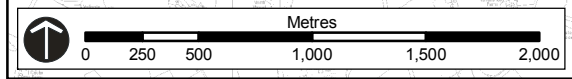
 Preferred Route Corridor
 Section Boundary
 Woodland Subjected to NVC Survey
WD1 NVC Survey ID
 Semi-natural broad-leaved woodland
 Plantation broad-leaved woodland
 Plantation mixed woodland
 Orchard
 Plantation coniferous woodland



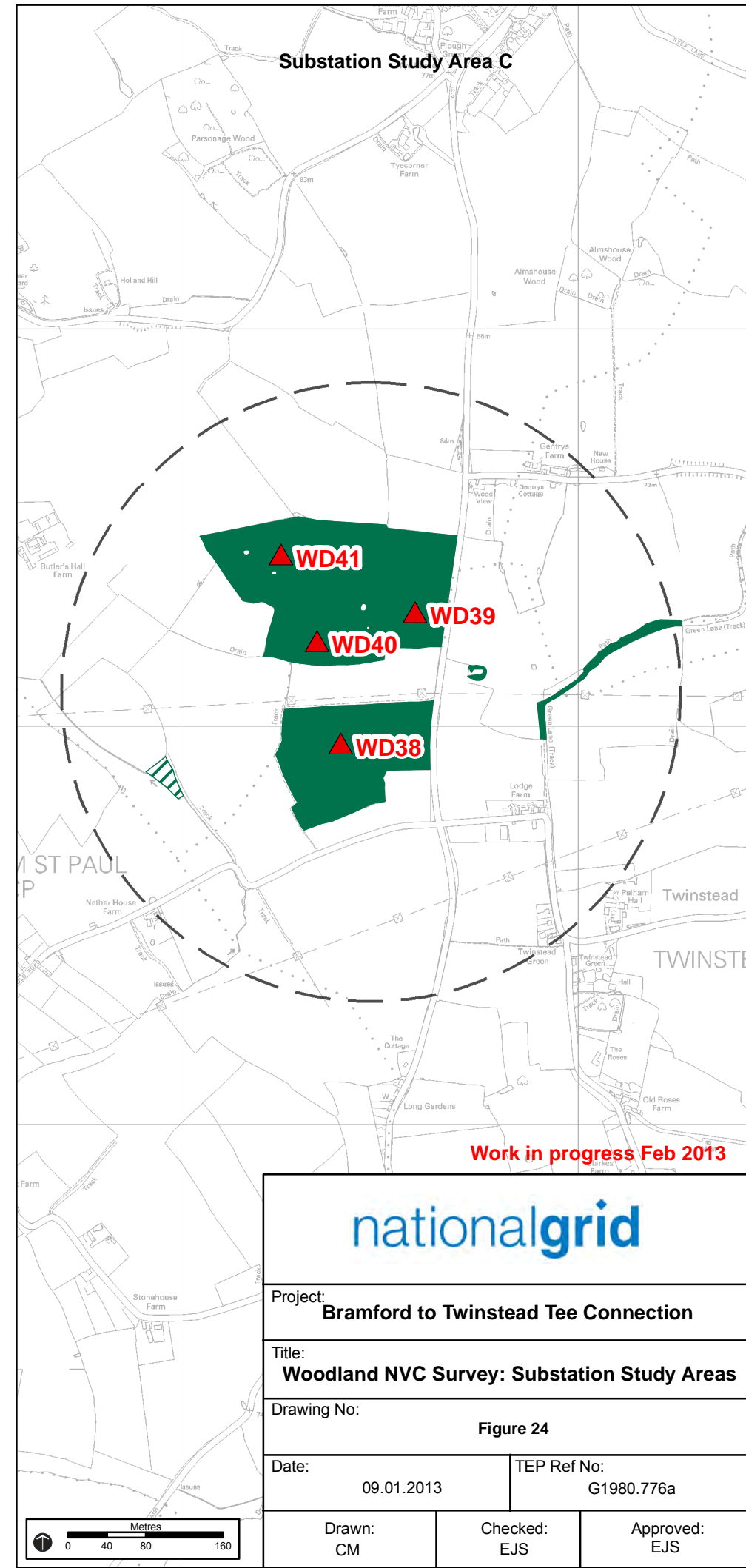
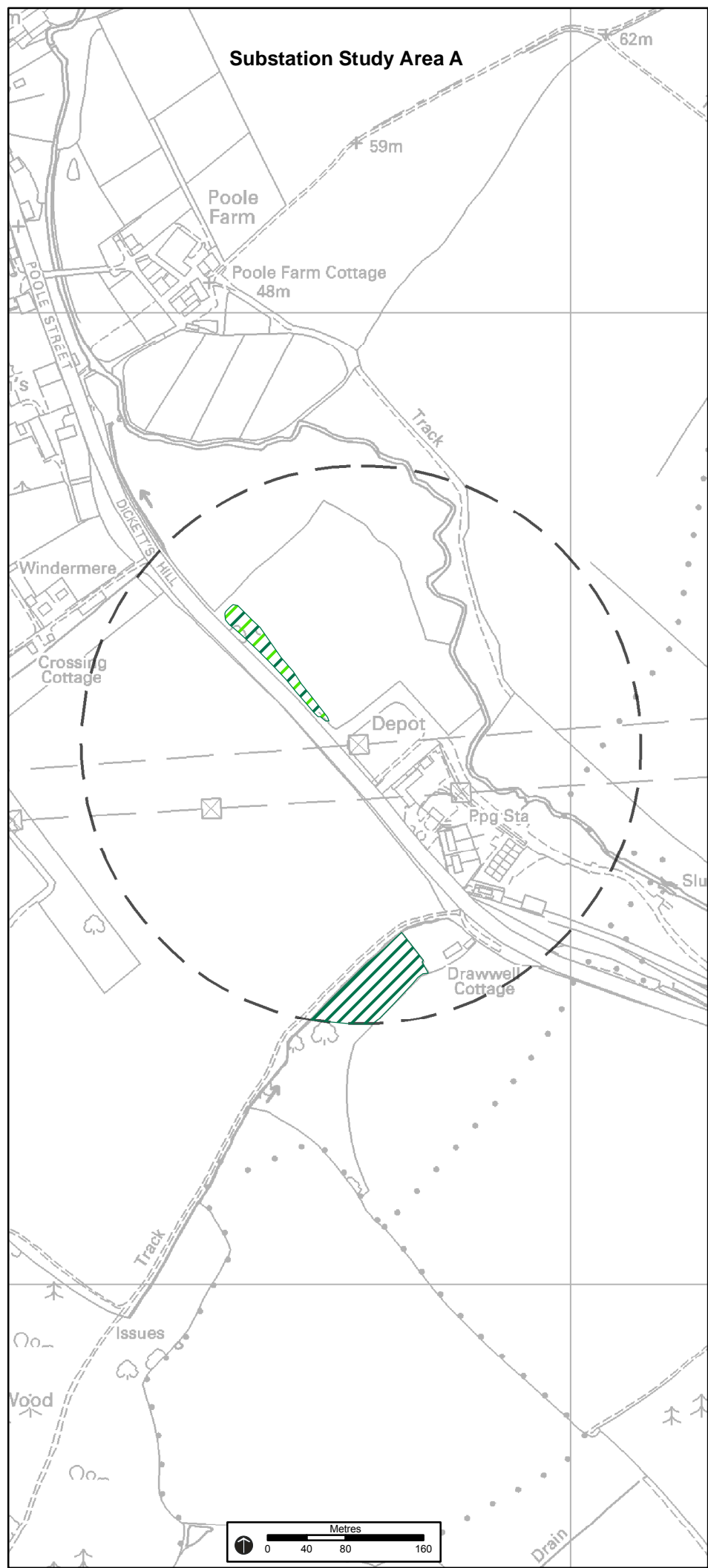
Work in progress Feb 2013

nationalgrid













Project:		
Bramford to Twinstead Tee Connection		
Title:		
Woodland NVC Survey Sections E to G		
Drawing No:		
Figure 23		
Date:	TEP Ref No:	
13.02.2013	G1980.775b	
Drawn:	Checked:	Approved:
CM	EJS	EJS

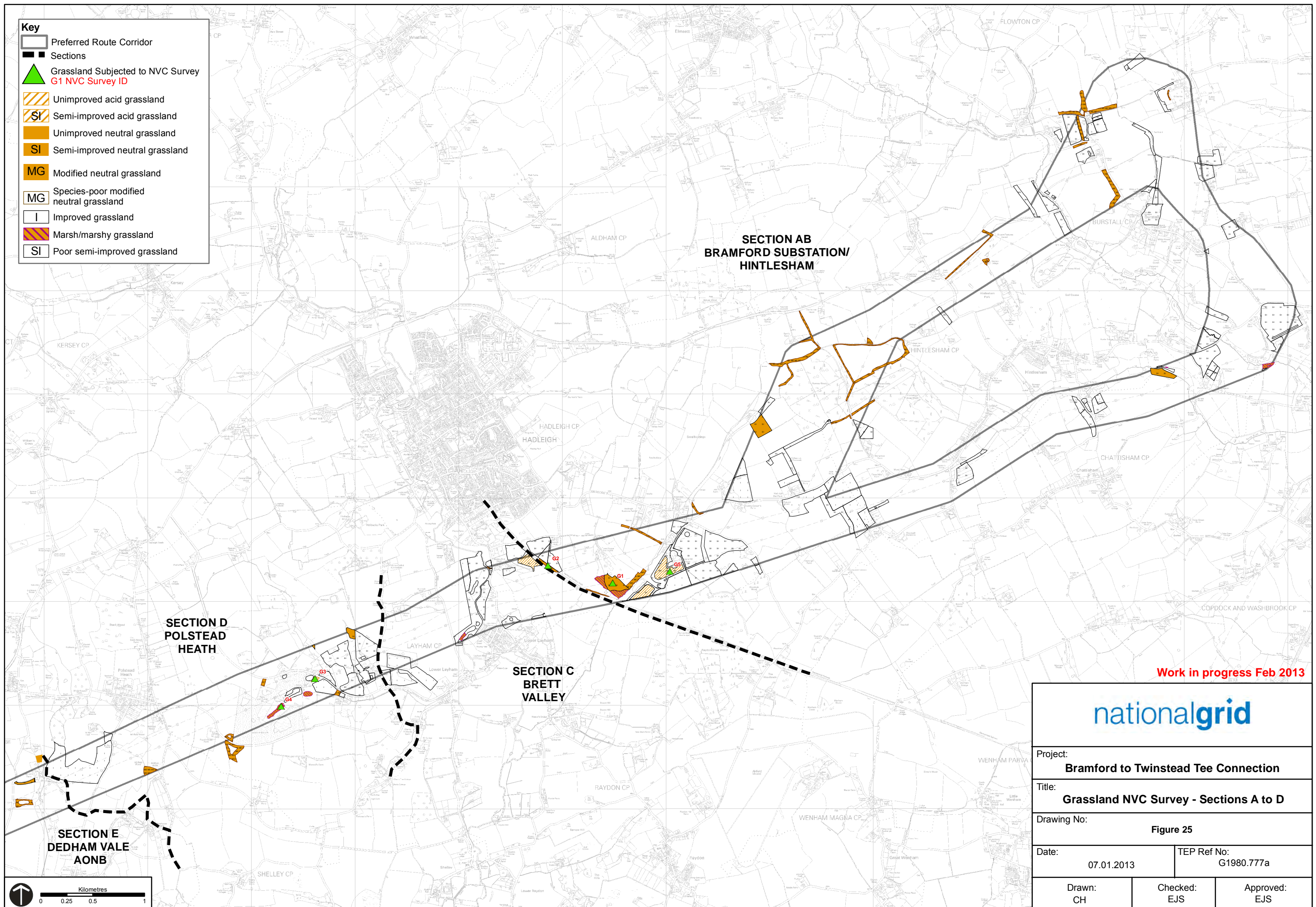


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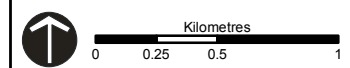
Key

-  Preferred Route Corridor
-  Sections
-  Grassland Subjected to NVC Survey
G1 NVC Survey ID
-  Unimproved acid grassland
-  SI
-  Unimproved neutral grassland
-  SI
-  MG
-  MG
-  I
-  Marsh/marshy grassland
-  SI

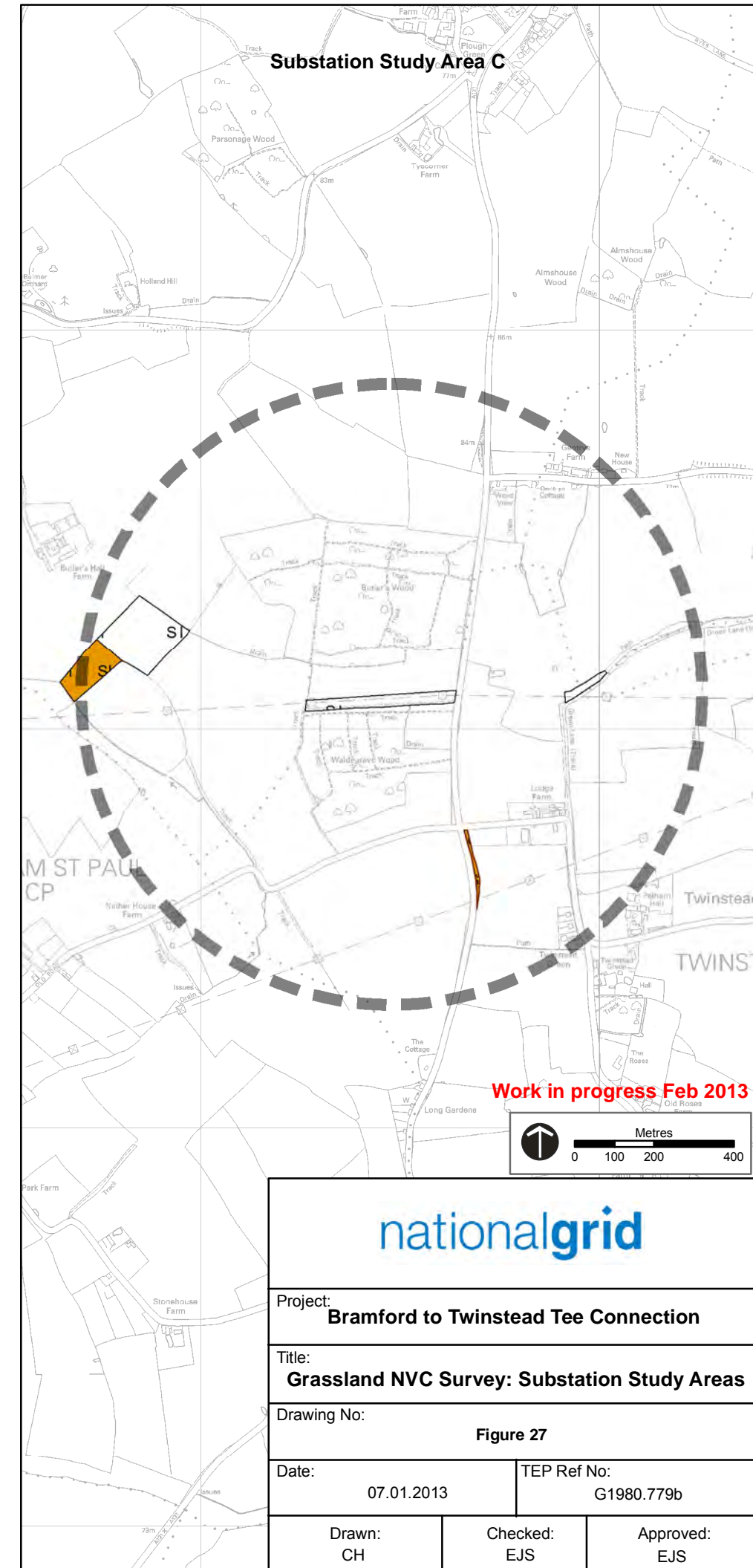
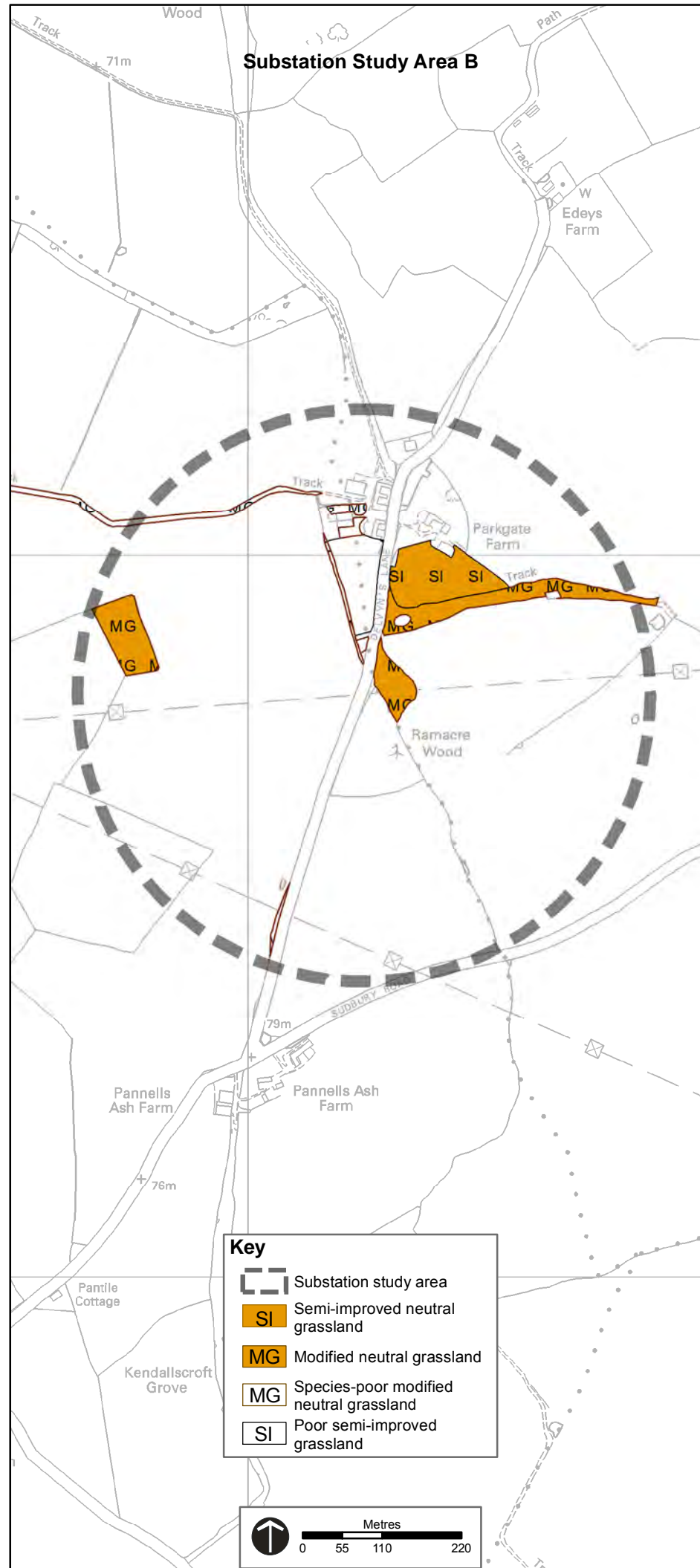
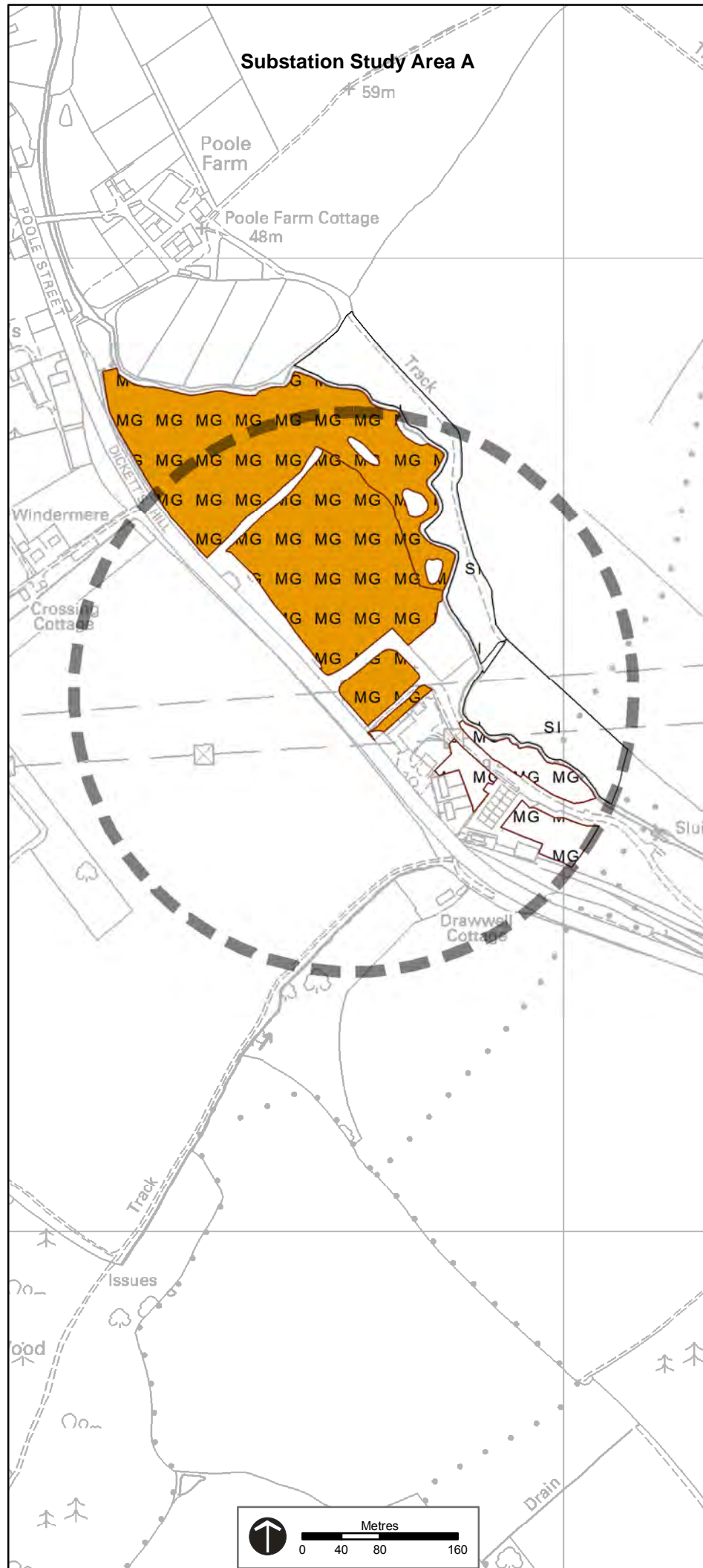


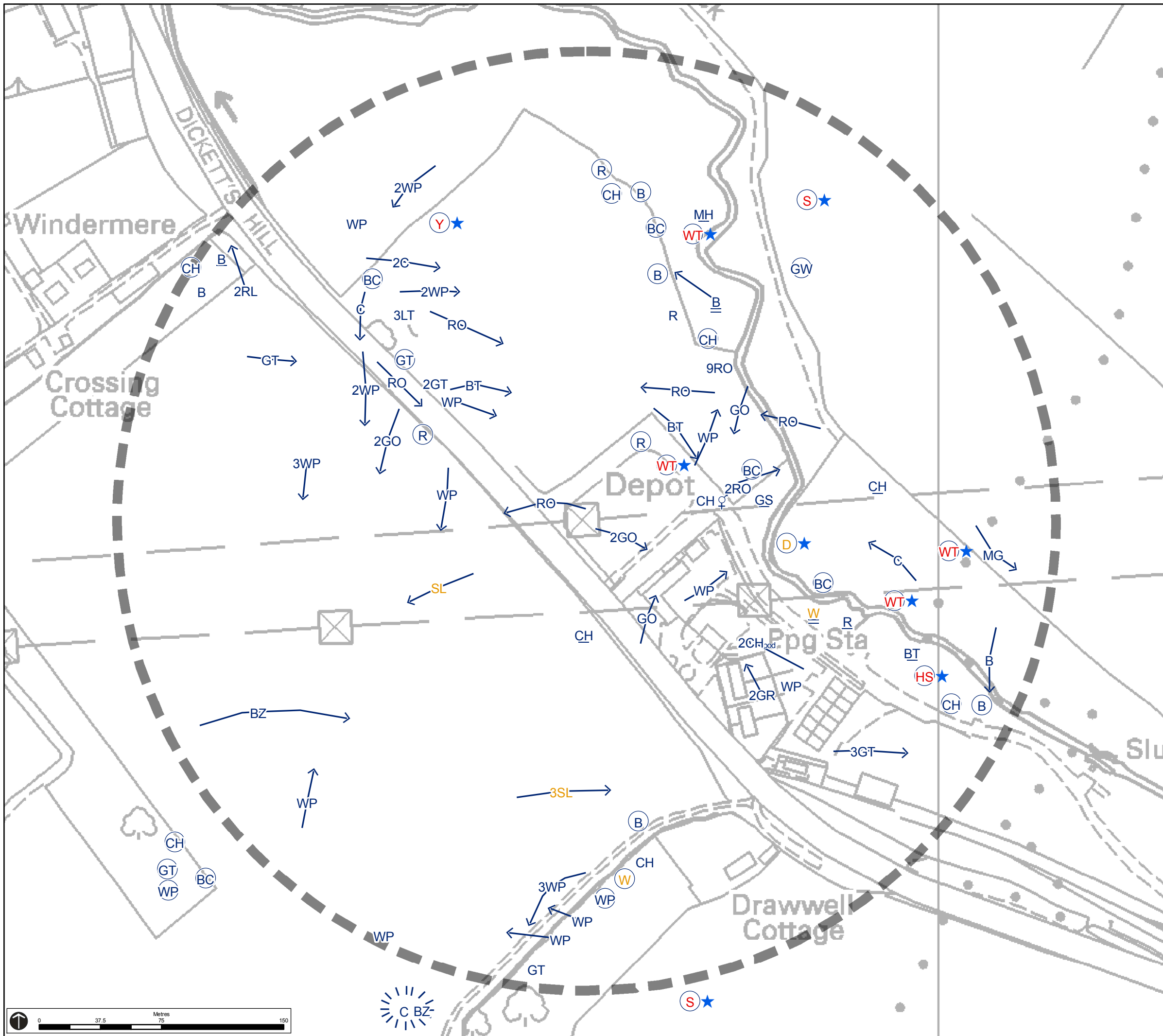
Work in progress Feb 2013

		
Project: Bramford to Twinstead Tee Connection		
Title: Grassland NVC Survey - Sections A to D		
Drawing No:		Figure 25
Date:	07.01.2013	TEP Ref No: G1980.777a
Drawn: CH	Checked: EJS	Approved: EJS



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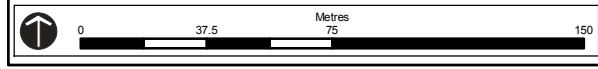
Key

- Substation study area
- ★ UKBAP
- RED UK Red List Species
- AMBER UK Amber List Species
- Aggressive Encounter
- Alarm call
- Calling
- food Food
- Singing
- ♂ Male and Female
- Directional flight line

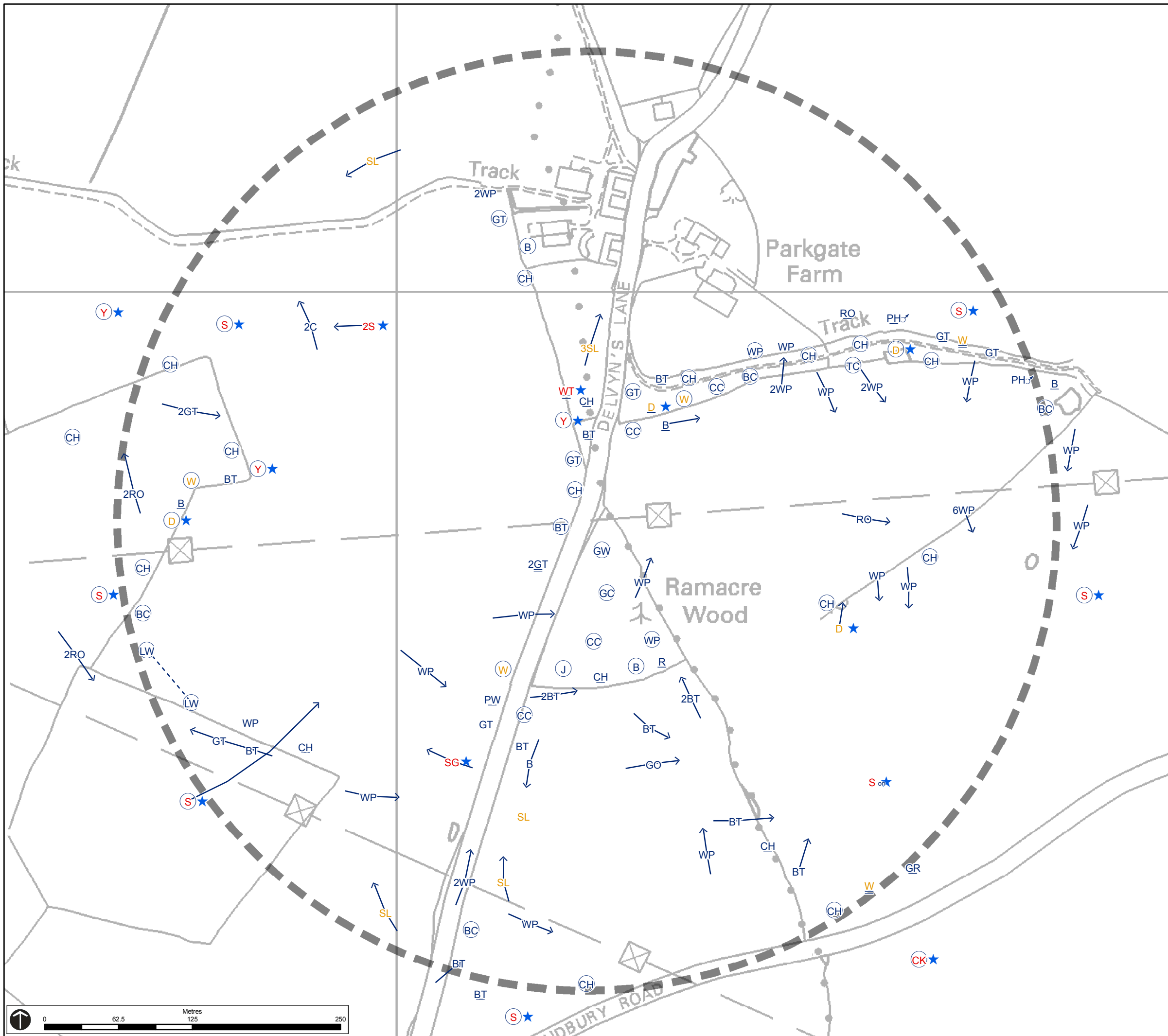
B Blackbird	LT Long-tailed Tit
BC Blackcap	MG Magpie
BT Blue Tit	MH Moorhen
BZ Buzzard	R Robin
C Carrion Crow	RL Red-legged Partridge
CH Chaffinch	RO Rook
D Dunnock	S Skylark
GO Goldfinch	SL Swallow
GR Greenfinch	W Wheatear
GS Great Spotted Woodpecker	WP Woodpigeon
GT Great Tit	WT Willow Tit
GW Garden Warbler	Y Yellowhammer
HS House Sparrow	

Work in Progress Feb 2013

Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Substation Study Area A Visit 1		
Drawing No: Figure 28		
Date: 13.02.2013	TEP Ref No: G1980.1091b	
Drawn: CM	Checked: EJS	Approved: EJS



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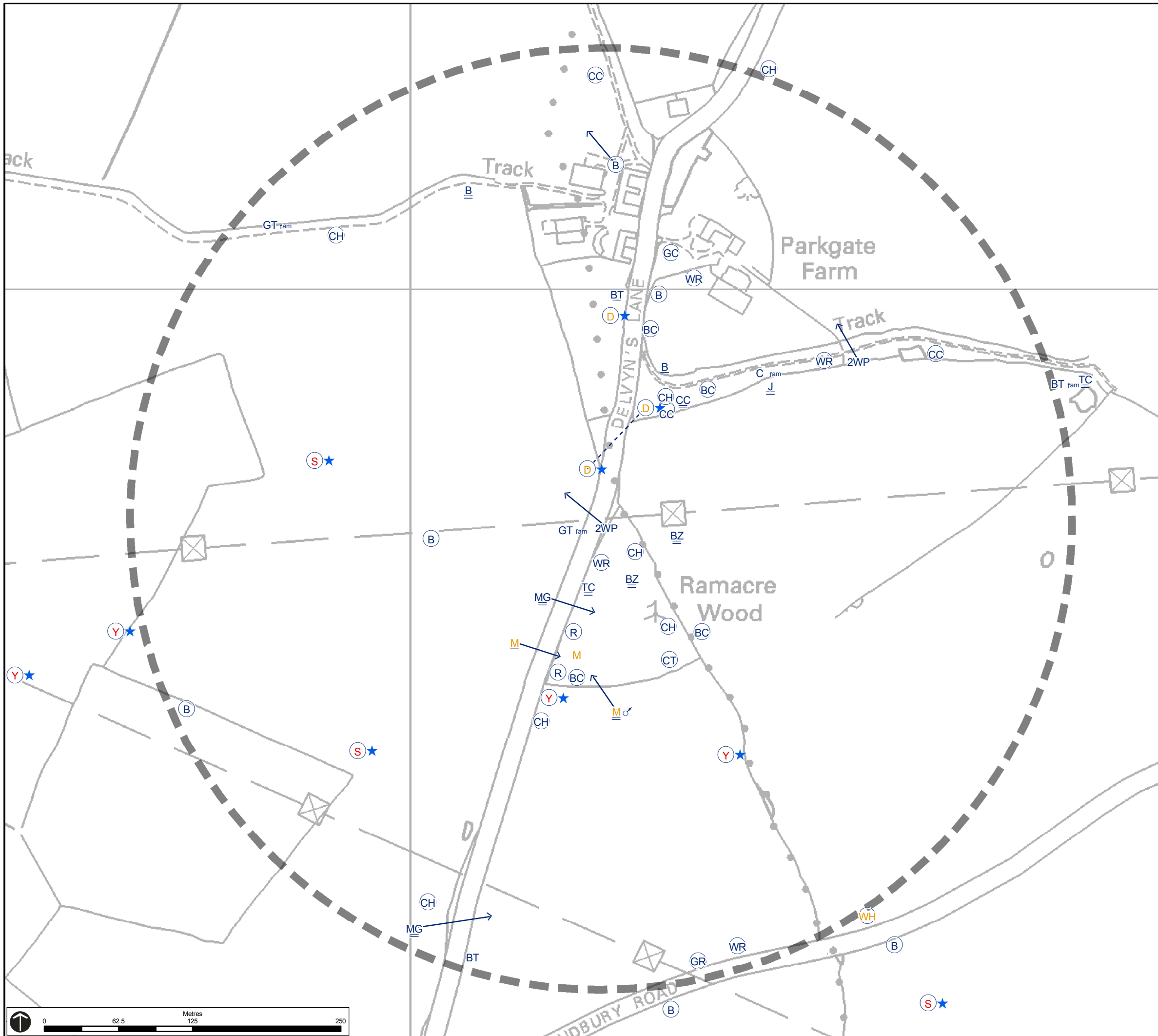
- Key**
- Substation study area
 - ★ UKBAP
 - ★ UK Red List Species
 - ★ UK Amber List Species
 - = Alarm call
 - Calling
 - on On Nest
 - Singing
 - ♂ Male
 - ♂ Male, Calling
 - Directional flight line
 - - - - Simultaneous registration (different birds)

B	Blackbird	LW	Lesser Whitethroat
BC	Blackcap	PH	Pheasant
BT	Blue Tit	PW	Pied Wagtail
C	Carrion Crow	R	Robin
CC	Chiffchaff	RO	Rook
CH	Chaffinch	S	Skylark
CK	Cuckoo	SG	Starling
D	Dunnock	SL	Swallow
GC	Goldcrest	TC	Treecreeper
GO	Goldfinch	W	Wheatear
GR	Greenfinch	WP	Woodpigeon
GT	Great Tit	WT	Willow Tit
GW	Garden Warbler	Y	Yellowhammer
J	Jay		

Work in Progress Feb 2013

Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Substation Study Area B Visit 1		
Drawing No: Figure 30		
Date: 13.02.2013	TEP Ref No: G1980.1093a	
Drawn: CM	Checked: EJS	Approved: EJS

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Key

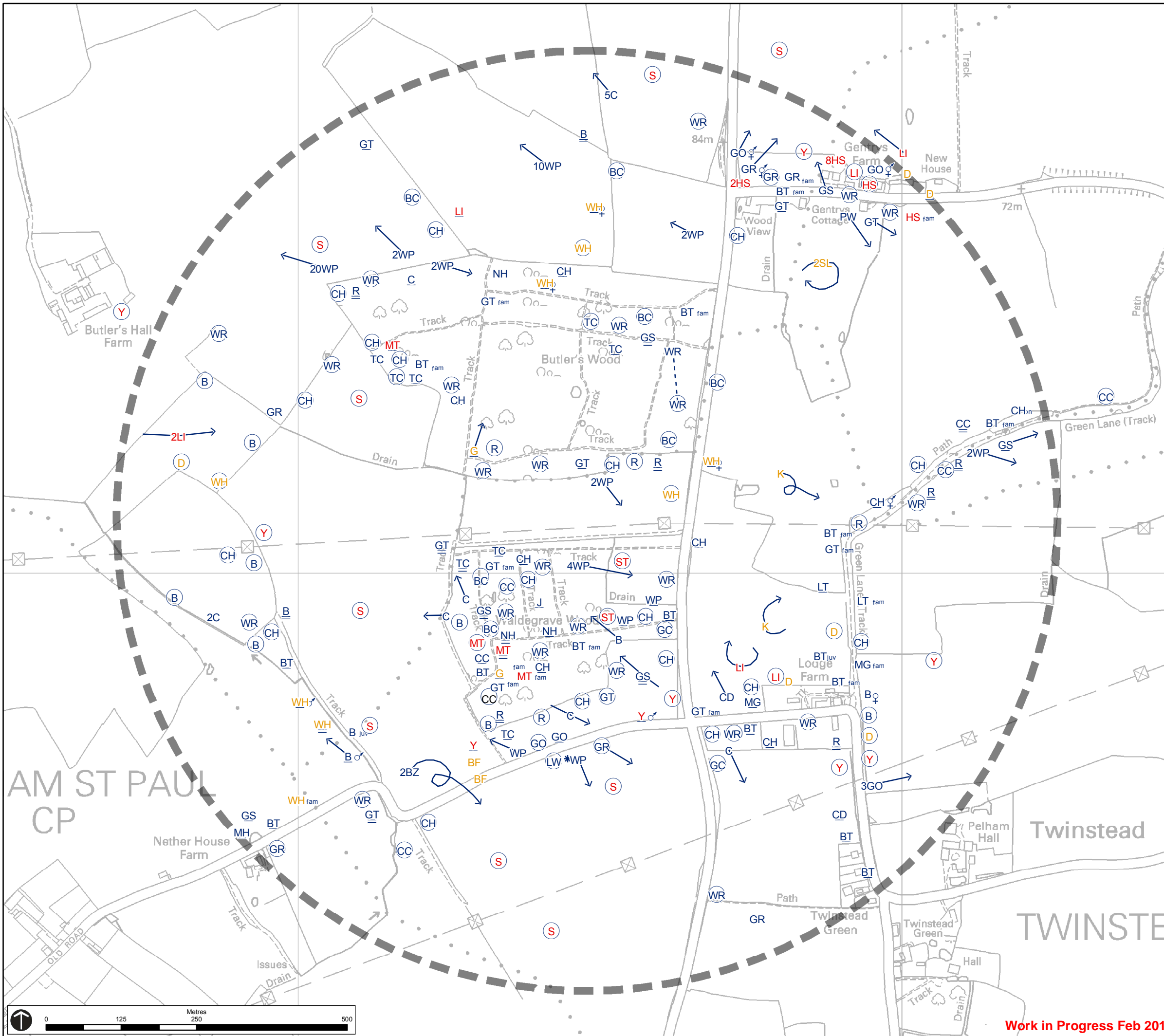
- Substation study area
- ★ UKBAP
- Red UK Red List Species
- Amber UK Amber List Species
- Alarm call
- Calling
- Singing
- fam Family
- ♂ Male, Alarm call
- Directional flight line
- Simultaneous registration (different birds)

- | | |
|----------------|-----------------|
| B Blackbird | GT Great Tit |
| BC Blackcap | J Jay |
| BT Blue Tit | M Mistle Thrush |
| BZ Buzzard | MG Magpie |
| C Carrion Crow | R Robin |
| CC Chiffchaff | S Skylark |
| CH Chaffinch | TC Treecreeper |
| CT Coal Tit | WH Whitethroat |
| D Dunnock | WP Woodpigeon |
| GC Goldcrest | WR Wren |
| GR Greenfinch | Y Yellowhammer |

Work in Progress Feb 2013

Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Substation Study Area B Visit 2		
Drawing No: Figure 31		
Date: 13.02.2013	TEP Ref No: G1980.1094a	
Drawn: CM	Checked: EJS	Approved: EJS

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Key

- Substation study area
- ★ UKBAP
- UK Red List Species
- UK Amber List Species
- = Alarm call
- Calling
- * Occupied nest
- on On Nest
- Singing
- fam Family
- ♀ Female
- juv Juvenile
- ♂ Male and Female
- ♂ Male, Calling
- Directional flight line
- Simultaneous registration (different birds)

B Blackbird	K Kestrel
BC Blackcap	LI Linnet
BF Bullfinch	LT Long-tailed Tit
BT Blue Tit	LW Lesser Whitethroat
BZ Buzzard	MG Magpie
C Carrion Crow	MH Moorhen
CC Chiffchaff	MT Marsh Tit
CD Collared Dove	NH Nuthatch
CH Chaffinch	PW Pied Wagtail
D Dunnock	R Robin
G Green Woodpecker	S Skylark
GC Goldcrest	SL Swallow
GO Goldfinch	ST Song Thrush
GR Greenfinch	TC Treecreeper
GS Great Spotted Woodpecker	WH Whitethroat
GT Great Tit	WP Woodpigeon
HS House Sparrow	WR Wren
J Jay	Y Yellowhammer

Work in Progress Feb 2013

Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Substation Study Area C Visit 2		
Drawing No: Figure 33		
Date: 13.02.2013	TEP Ref No: G1980.1096a	
Drawn: CM	Checked: EJS	Approved: EJS

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Key

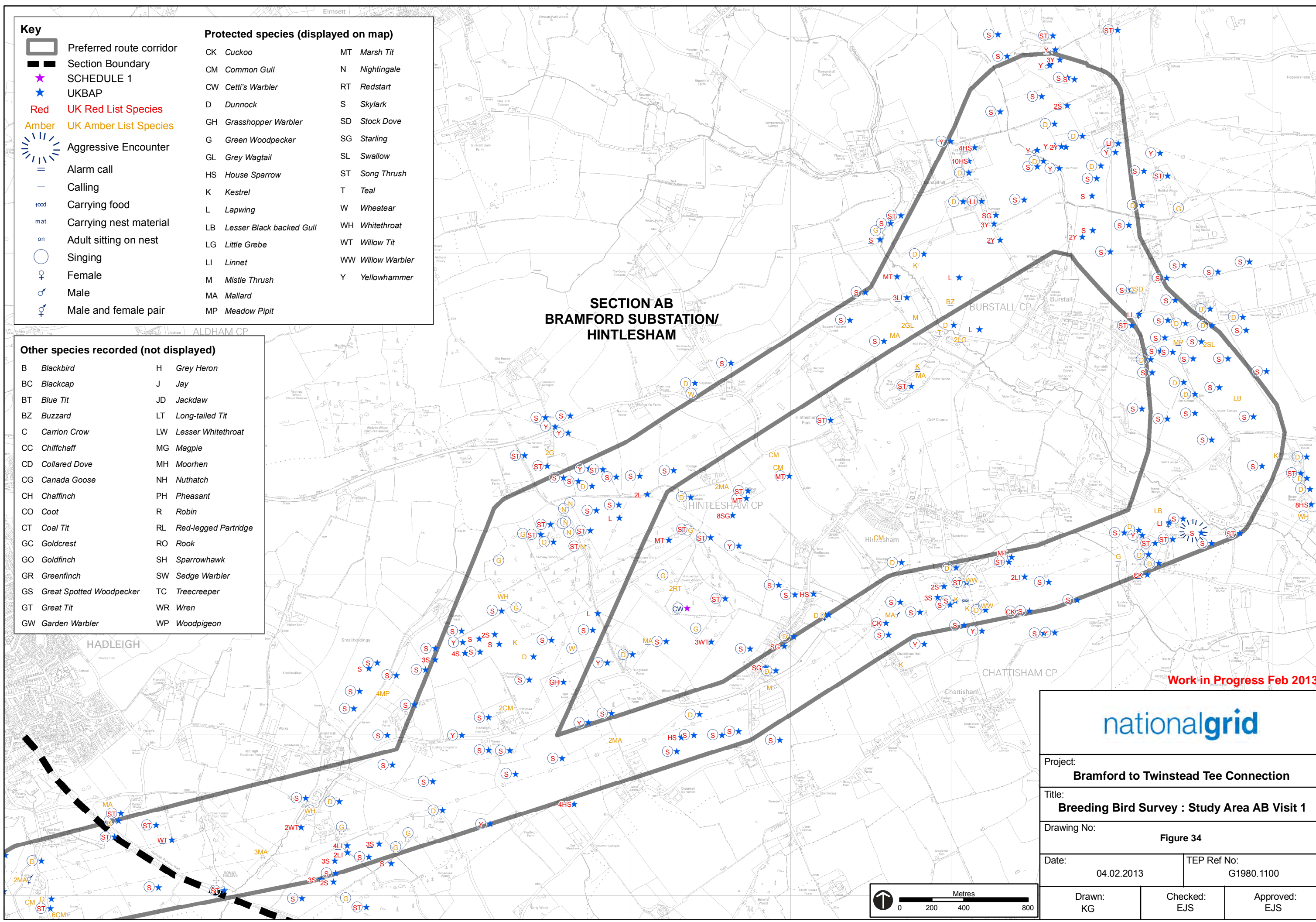
- Preferred route corridor
- Section Boundary
- SCHEDULE 1
- UKBAP
- UK Red List Species
- UK Amber List Species
- Aggressive Encounter
- Alarm call
- Calling
- Carrying food
- Carrying nest material
- Adult sitting on nest
- Singing
- Female
- Male
- Male and female pair

Protected species (displayed on map)

CK Cuckoo	MT Marsh Tit
CM Common Gull	N Nightingale
CW Cetti's Warbler	RT Redstart
D Dunnock	S Skylark
GH Grasshopper Warbler	SD Stock Dove
G Green Woodpecker	SG Starling
GL Grey Wagtail	SL Swallow
HS House Sparrow	ST Song Thrush
K Kestrel	T Teal
L Lapwing	W Wheatear
LB Lesser Black backed Gull	WH Whitethroat
LG Little Grebe	WT Willow Tit
LI Linnet	WW Willow Warbler
M Mistle Thrush	Y Yellowhammer
MA Mallard	
MP Meadow Pipit	

Other species recorded (not displayed)

B Blackbird	H Grey Heron
BC Blackcap	J Jay
BT Blue Tit	JD Jackdaw
BZ Buzzard	LT Long-tailed Tit
C Carrion Crow	LW Lesser Whitethroat
CC Chiffchaff	MG Magpie
CD Collared Dove	MH Moorhen
CG Canada Goose	NH Nuthatch
CH Chaffinch	PH Pheasant
CO Coot	R Robin
CT Coal Tit	RL Red-legged Partridge
GC Goldcrest	RO Rook
GO Goldfinch	SH Sparrowhawk
GR Greenfinch	SW Sedge Warbler
GS Great Spotted Woodpecker	TC Treecreeper
GT Great Tit	WR Wren
GW Garden Warbler	WP Woodpigeon



Work in Progress Feb 2013

nationalgrid

Project:
Bramford to Twinstead Tee Connection

Title:
Breeding Bird Survey : Study Area AB Visit 1

Drawing No:
Figure 34

Date:
04.02.2013

TEP Ref No:
G1980.1100

Drawn:
KG

Checked:
EJS

Approved:
EJS

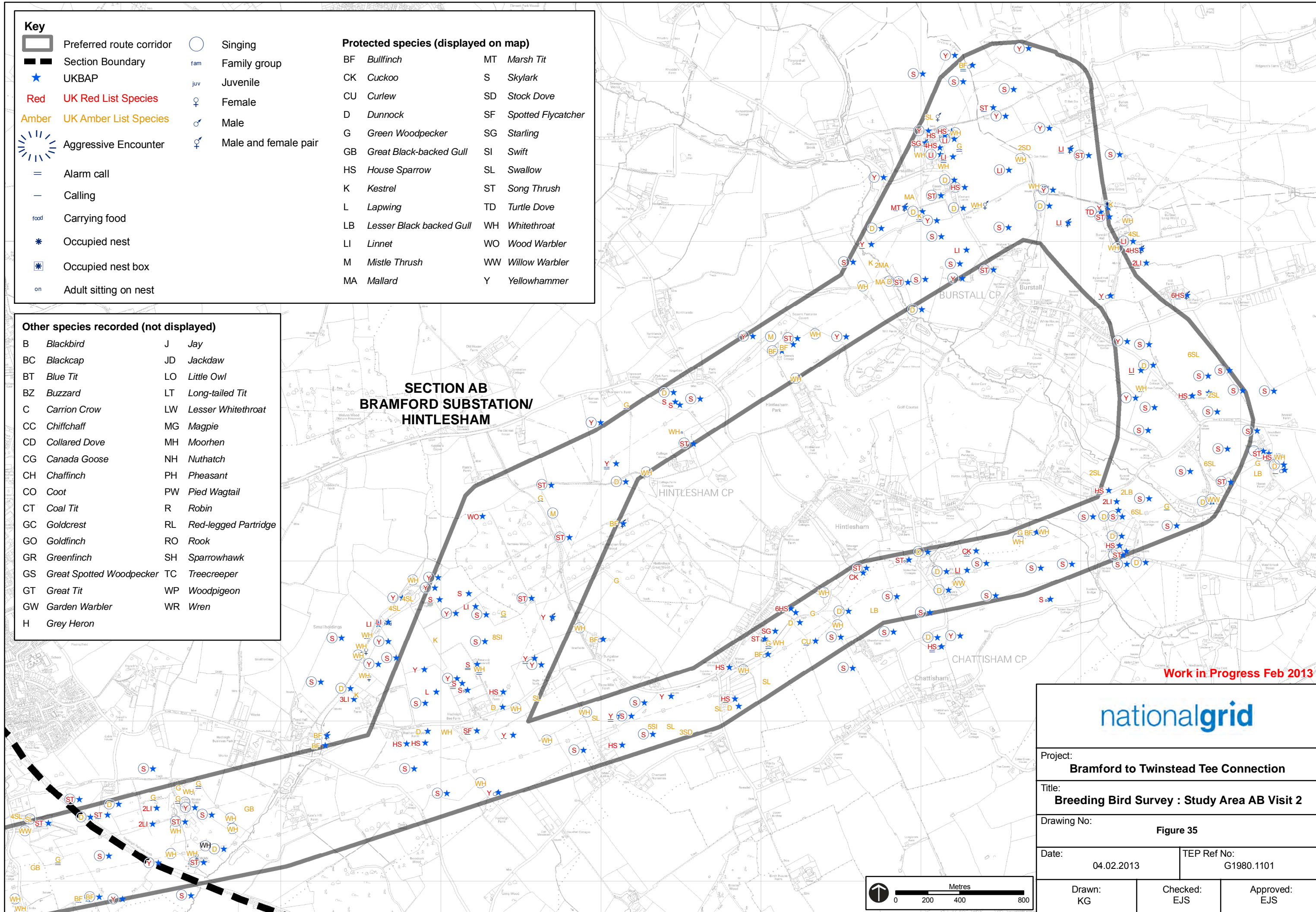
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Key	
	Preferred route corridor
	Section Boundary
	UKBAP
	UK Red List Species
	UK Amber List Species
	Aggressive Encounter
	Alarm call
	Calling
	Carrying food
	Occupied nest
	Occupied nest box
	Adult sitting on nest
	Singing
	Family group
	Juvenile
	Female
	Male
	Male and female pair

Protected species (displayed on map)	
BF	Bullfinch
CK	Cuckoo
CU	Curllew
D	Dunnock
G	Green Woodpecker
GB	Great Black-backed Gull
HS	House Sparrow
K	Kestrel
L	Lapwing
LB	Lesser Black backed Gull
LI	Linnet
M	Mistle Thrush
MA	Mallard
MT	Marsh Tit
S	Skylark
SD	Stock Dove
SF	Spotted Flycatcher
SG	Starling
SI	Swift
SL	Swallow
ST	Song Thrush
TD	Turtle Dove
WH	Whitethroat
WO	Wood Warbler
WW	Willow Warbler
Y	Yellowhammer

Other species recorded (not displayed)	
B	Blackbird
BC	Blackcap
BT	Blue Tit
BZ	Buzzard
C	Carrion Crow
CC	Chiffchaff
CD	Collared Dove
CG	Canada Goose
CH	Chaffinch
CO	Coot
CT	Coal Tit
GC	Goldcrest
GO	Goldfinch
GR	Greenfinch
GS	Great Spotted Woodpecker
GT	Great Tit
GW	Garden Warbler
H	Grey Heron
J	Jay
JD	Jackdaw
LO	Little Owl
LT	Long-tailed Tit
LW	Lesser Whitethroat
MG	Magpie
MH	Moorhen
NH	Nuthatch
PH	Pheasant
PW	Pied Wagtail
R	Robin
RL	Red-legged Partridge
RO	Rook
SH	Sparrowhawk
TC	Treecreeper
WP	Woodpigeon
WR	Wren

**SECTION AB
BRAMFORD SUBSTATION/
HINTLESHAM**

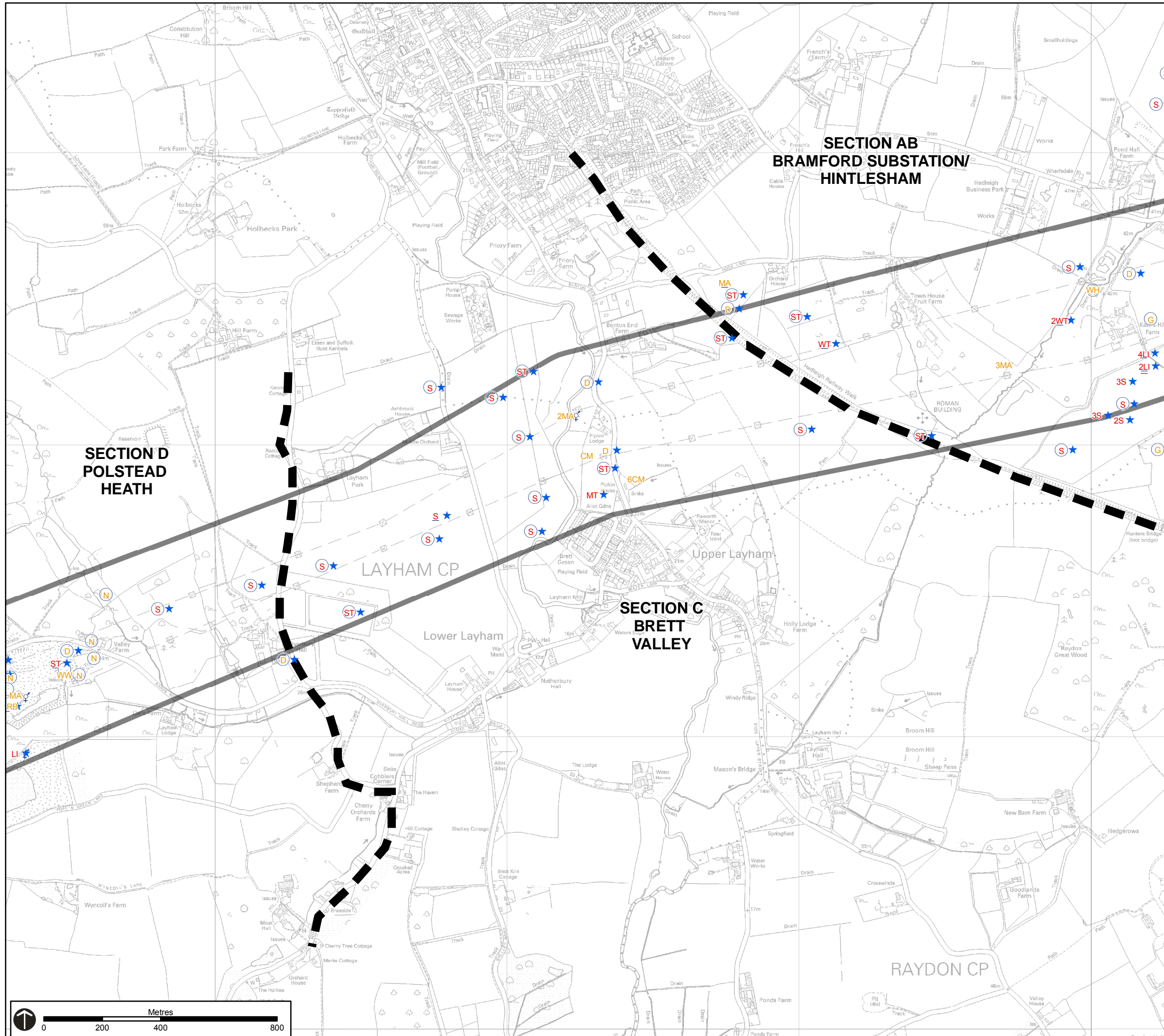


Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Study Area AB Visit 2		
Drawing No: Figure 35		
Date: 04.02.2013	TEP Ref No: G1980.1101	
Drawn: KG	Checked: EJS	Approved: EJS

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Key

- Preferred route corridor
- Section Boundary
- UKBAP
- UK Red List Species
- UK Amber List Species
- Alarm call
- Calling
- Singing
- Carrying nest material
- Female
- Male
- Male and female pair

Protected species (displayed on map)

CM Common Gull	RB Reed Bunting
D Dunnock	S Skylark
G Green Woodpecker	ST Song Thrush
LI Linnet	WH Whitethroat
MA Mallard	WT Willow Tit
MT Marsh Tit	WW Willow Warbler
N Nightingale	

Other species recorded (not displayed)

B Blackbird	GT Great Tit
BC Blackcap	GW Garden Warbler
BT Blue Tit	JD Jackdaw
C Carrion Crow	LT Long-tailed Tit
CC Chiffchaff	MG Magpie
CH Chaffinch	MH Moorhen
CT Coal Tit	PH Pheasant
GC Goldcrest	R Robin
GO Goldfinch	RL Red-legged Partridge
GS Great Spotted Woodpecker	RO Rook
WP Woodpigeon	WR Wren

Work in Progress Feb 2013

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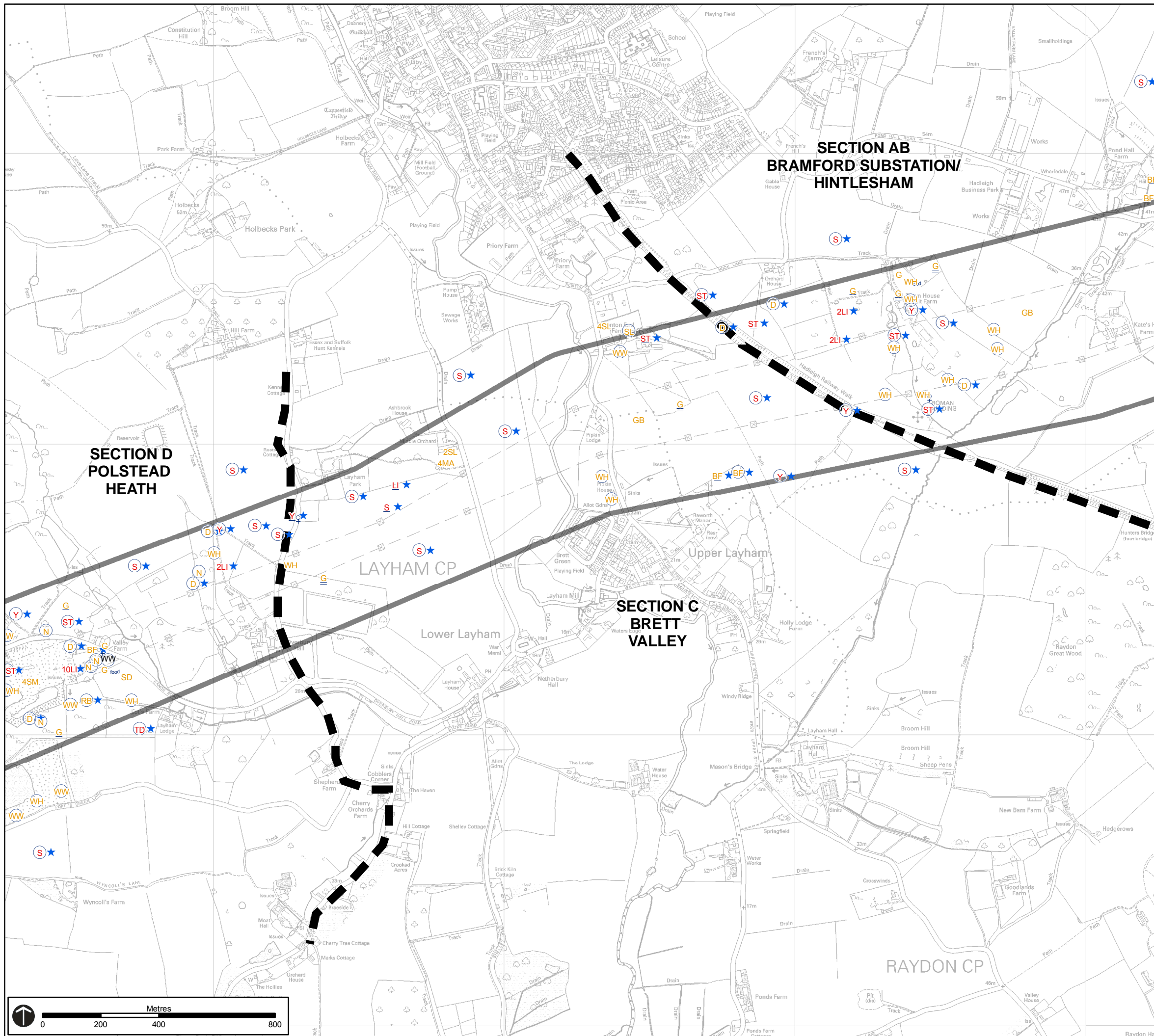
Project: **Bramford to Twinstead Tee Connection**

Title: **Breeding Bird Survey : Study Area C Visit 1**

Drawing No: **Figure 36**

Date: 04/02/2013	TEP Ref No: G1980.1102	
Drawn: KG	Checked: EJS	Approved: EJS

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Key

- Preferred route corridor
- Section Boundary
- UKBAP
- UK Red List Species
- UK Amber List Species
- Aggressive Encounter
- Alarm call
- Calling
- Carrying food
- Adult sitting on nest
- Singing
- Carrying nest material
- Juvenile
- Family group
- Female
- Male
- Male and female pair

Protected species (displayed on map)

BF Bullfinch	SL Swallow
D Dunnock	SM Sand Martin
G Green Woodpecker	ST Song Thrush
GB Great Black-backed Gull	SW Sedge Warbler
LI Linnet	TD Turtle Dove
MA Mallard	W Wheatear
N Nightingale	WH Whitethroat
RB Reed Bunting	WW Willow Warbler
S Skylark	Y Yellowhammer
SD Stock Dove	

Other species recorded (not displayed)

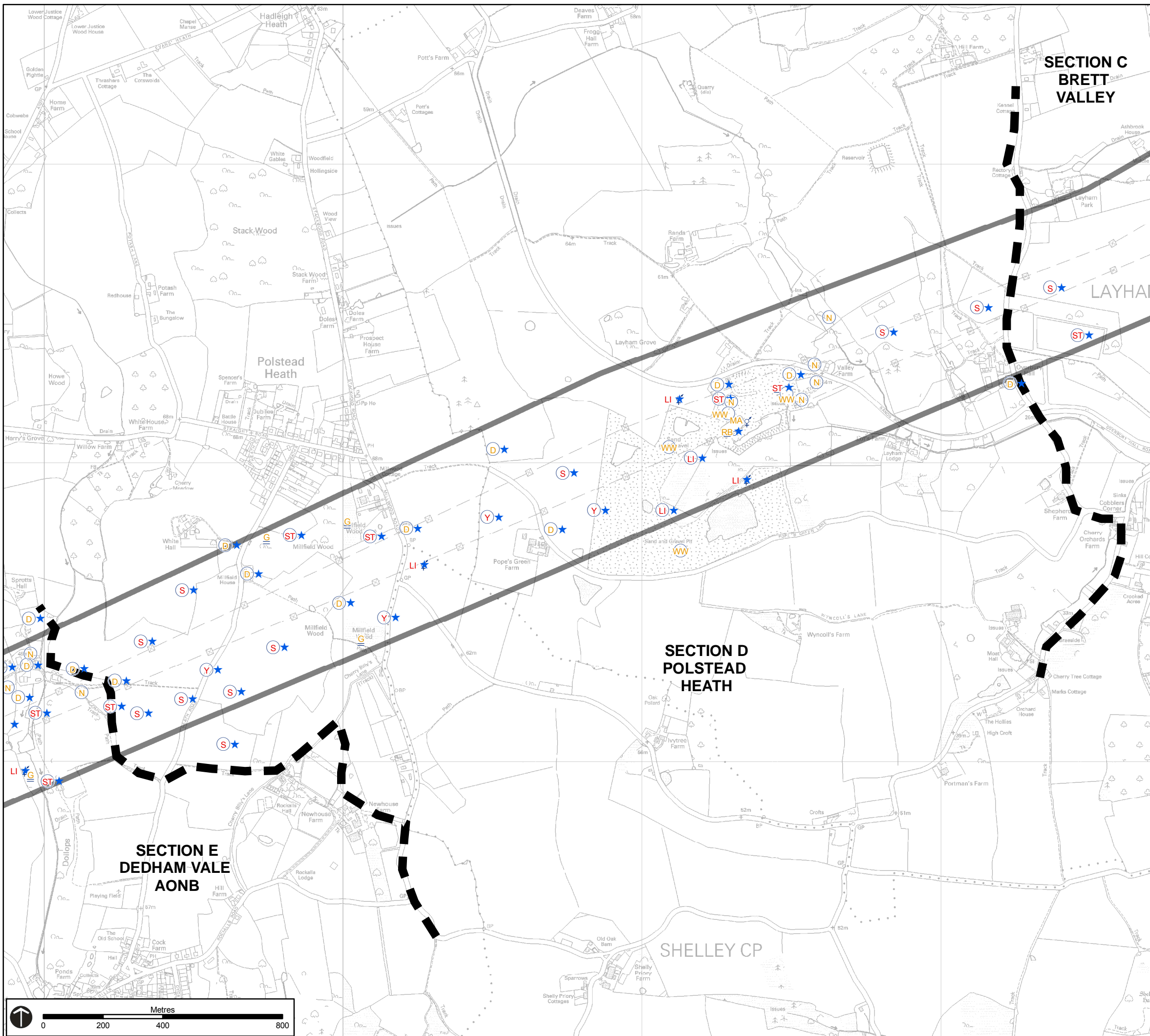
B Blackbird	H Grey Heron
BC Blackcap	J Jay
BT Blue Tit	JD Jackdaw
BZ Buzzard	LO Little Owl
C Carrion Crow	LT Long-tailed Tit
CC Chiffchaff	MG Magpie
CD Collared Dove	MH Moorhen
CG Canada Goose	PH Pheasant
CH Chaffinch	PW Pied Wagtail
CT Coal Tit	R Robin
GC Goldcrest	RL Red-legged Partridge
GO Goldfinch	RO Rook
GR Greenfinch	TC Tree Creeper
GS Great Spotted Woodpecker	WP Woodpigeon
GT Great Tit	WR Wren
GW Garden Warbler	

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Study Area C Visit 2		
Drawing No: Figure 37		
Date: 04/02/2013	TEP Ref No: G1980.1103	
Drawn: KG	Checked: EJS	Approved: EJS

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- Key**
- Preferred route corridor
 - Section Boundary
 - UKBAP
 - UK Red List Species
 - UK Amber List Species
 - Alarm call
 - Calling
 - Singing
 - Male
 - Male and female pair

Protected species (displayed on map)

- | | | | |
|----|-------------------------|----|-----------------------|
| D | <i>Dunnock</i> | RB | <i>Reed Bunting</i> |
| G | <i>Green Woodpecker</i> | S | <i>Skylark</i> |
| LI | <i>Linnet</i> | ST | <i>Song Thrush</i> |
| MA | <i>Mallard</i> | WW | <i>Willow Warbler</i> |
| N | <i>Nightingale</i> | Y | <i>Yellowhammer</i> |

Other species recorded (not displayed)

- | | | | |
|----|---------------------------------|----|-----------------------------|
| B | <i>Blackbird</i> | NH | <i>Nuthatch</i> |
| BC | <i>Blackcap</i> | PH | <i>Pheasant</i> |
| BT | <i>Blue Tit</i> | R | <i>Robin</i> |
| C | <i>Carrion Crow</i> | RL | <i>Red-legged Partridge</i> |
| CC | <i>Chiffchaff</i> | WP | <i>Woodpigeon</i> |
| CH | <i>Chaffinch</i> | WR | <i>Wren</i> |
| CT | <i>Coal Tit</i> | GT | <i>Great Tit</i> |
| GC | <i>Goldcrest</i> | GW | <i>Garden Warbler</i> |
| GO | <i>Goldfinch</i> | JD | <i>Jackdaw</i> |
| GR | <i>Greenfinch</i> | J | <i>Jay</i> |
| GS | <i>Great Spotted Woodpecker</i> | | |

Work in Progress Feb 2013



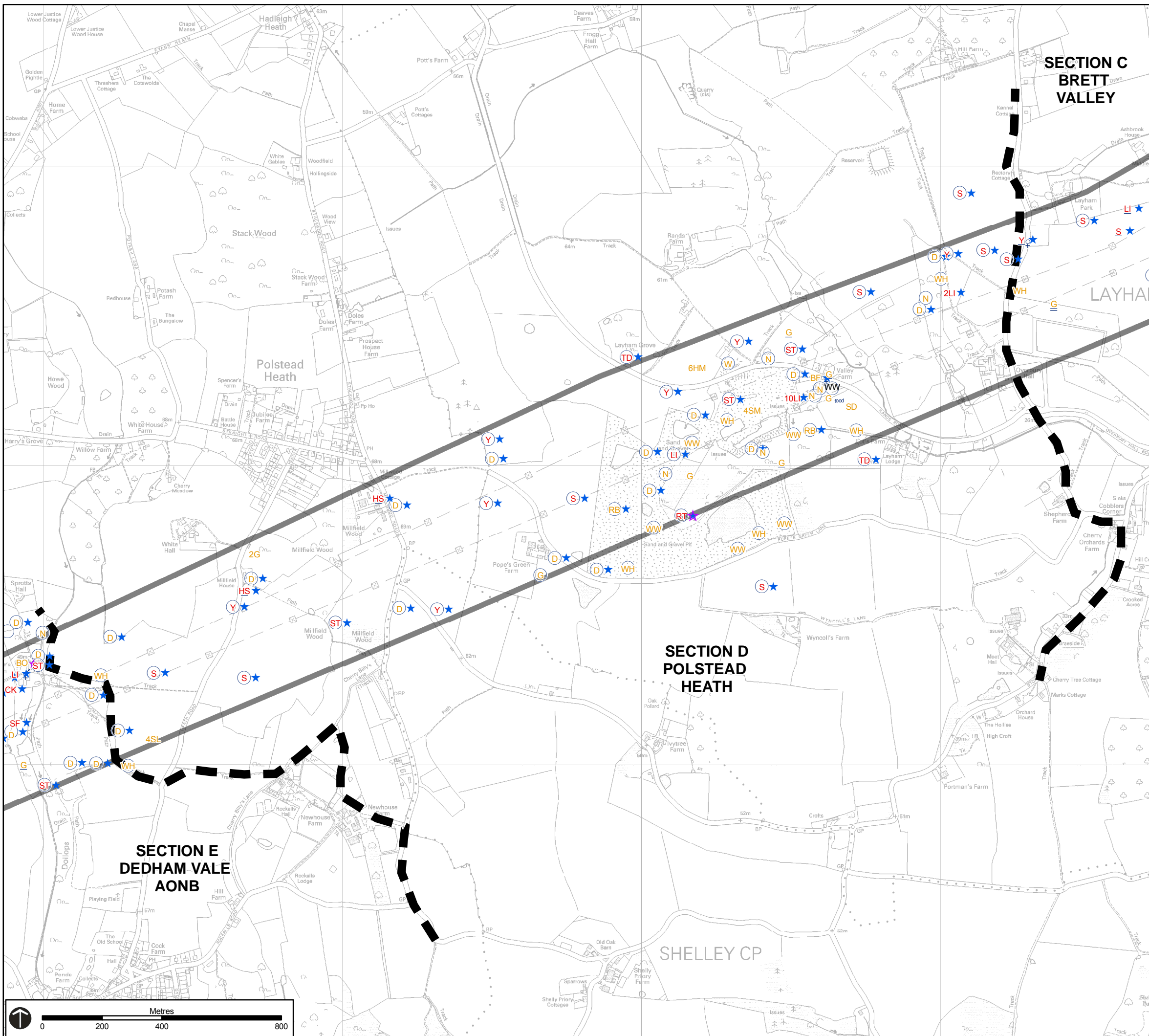
Project: **Bramford to Twinstead Tee Connection**

Title: **Breeding Bird Survey : Study Area D Visit 1**

Drawing No: **Figure 38**

Date: 04.02.2013 TEP Ref No: G1980.1104

Drawn: KG	Checked: EJS	Approved: EJS
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Key

- Preferred route corridor
- Section Boundary
- UKBAP
- SCHEDULE1
- UKBAP & SCHEDULE1
- UK Red List Species
- UK Amber List Species
- Aggressive Encounter
- Alarm call
- Calling
- Carrying food
- Adult sitting on nest
- Singing
- Family group
- Female
- Male
- Male and female pair

Protected species (displayed on map)

BF Bullfinch	S Skylark
BO Barn Owl	SD Stock Dove
CK Cuckoo	SF Spotted Flycatcher
D Dunnock	SL Swallow
G Green Woodpecker	SM Sand Martin
HM House Martin	ST Song Thrush
HS House Sparrow	TD Turtle Dove
LI Linnet	W Wheatear
N Nightingale	WH Whitethroat
RB Reed Bunting	WW Willow Warbler
RT Redstart	Y Yellowhammer

Other species recorded (not displayed)

B Blackbird	J Jay
BC Blackcap	JD Jackdaw
BT Blue Tit	LT Long-tailed Tit
BZ Buzzard	MG Magpie
C Carrion Crow	MH Moorhen
CC Chiffchaff	NH Nuthatch
CD Collared Dove	PH Pheasant
CH Chaffinch	R Robin
CT Coal Tit	RL Red-legged Partridge
GC Goldcrest	RO Rook
GO Goldfinch	SW Sedge Warbler
GR Greenfinch	TC Tree Creeper
GS Great Spotted Woodpecker	WP Woodpigeon
GT Great Tit	WR Wren
GW Garden Warbler	

Work in Progress Feb 2013

nationalgrid

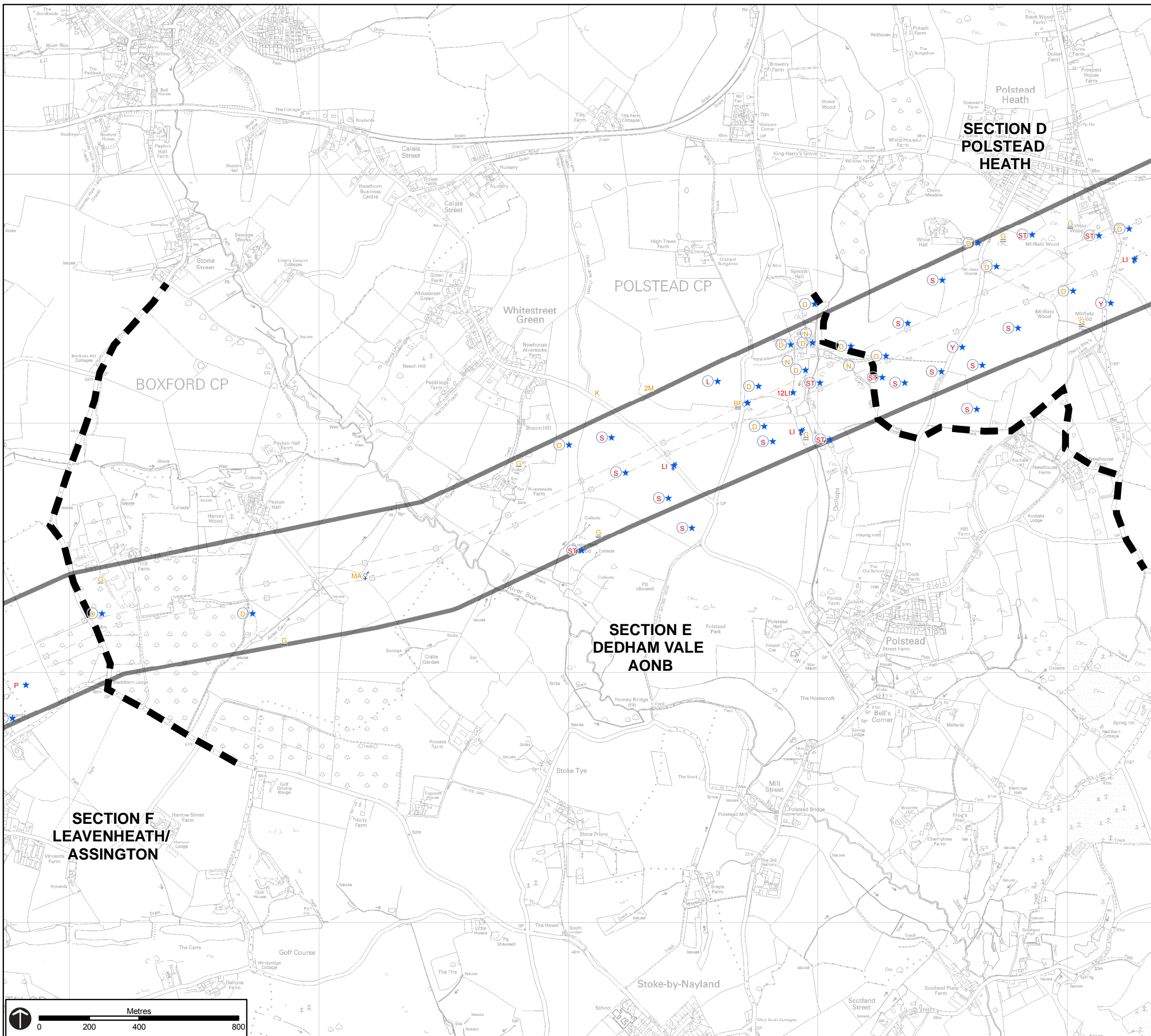
Project: **Bramford to Twinstead Tee Connection**

Title: **Breeding Bird Survey : Study Area D Visit 2**

Drawing No: **Figure 39**

Date: 04.02.2013	TEP Ref No: G1980.1105	
Drawn: KG	Checked: EJS	Approved: EJS

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- Key**
- Preferred route corridor
 - Section Boundary
 - UKBAP
 - UK Red List Species
 - UK Amber List Species
 - Alarm call
 - Calling
 - Singing
 - Family group
 - Male
 - Male and female pair

- Protected species (displayed on map)**
- | | |
|---------------------------|-------------------------|
| BF <i>Bullfinch</i> | MA <i>Mallard</i> |
| D <i>Dunnock</i> | N <i>Nightingale</i> |
| G <i>Green Woodpecker</i> | P <i>Grey Partridge</i> |
| K <i>Kestrel</i> | S <i>Skylark</i> |
| L <i>Lapwing</i> | ST <i>Song Thrush</i> |
| LI <i>Linnet</i> | Y <i>Yellowhammer</i> |
| M <i>Mistle Thrush</i> | |

- Other species recorded (not displayed)**
- | | |
|------------------------|------------------------------------|
| B <i>Blackbird</i> | GS <i>Great Spotted Woodpecker</i> |
| BC <i>Blackcap</i> | GT <i>Great Tit</i> |
| BT <i>Blue Tit</i> | GW <i>Garden Warbler</i> |
| BZ <i>Buzzard</i> | LT <i>Long-tailed Tit</i> |
| C <i>Carrion Crow</i> | MH <i>Moorhen</i> |
| CC <i>Chiffchaff</i> | NH <i>Nuthatch</i> |
| CG <i>Canada Goose</i> | PH <i>Pheasant</i> |
| CH <i>Chaffinch</i> | R <i>Robin</i> |
| CT <i>Coal Tit</i> | RL <i>Red-legged Partridge</i> |
| GC <i>Goldcrest</i> | RO <i>Rook</i> |
| GO <i>Goldfinch</i> | WP <i>Woodpigeon</i> |
| GR <i>Greenfinch</i> | WR <i>Wren</i> |

Work in Progress Feb 2013



Project: **Bramford to Twinstead Tee Connection**

Title: **Breeding Bird Survey : Study Area E Visit 1**

Drawing No: **Figure 40**

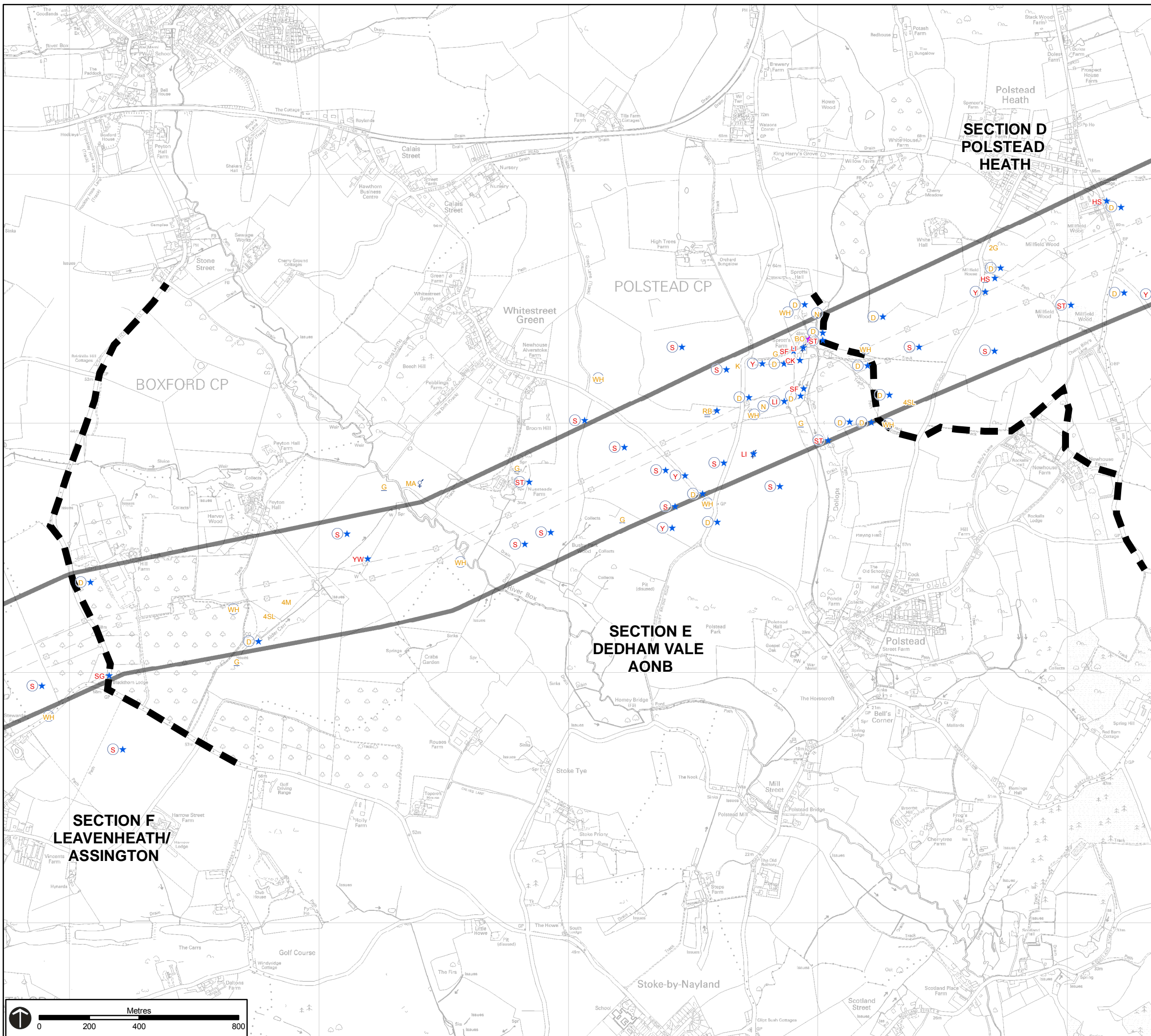
Date: **04.02.2013**

TEP Ref No: **G1980.1106**

Drawn: **KG**

Checked: **EJS**

Approved: **EJS**

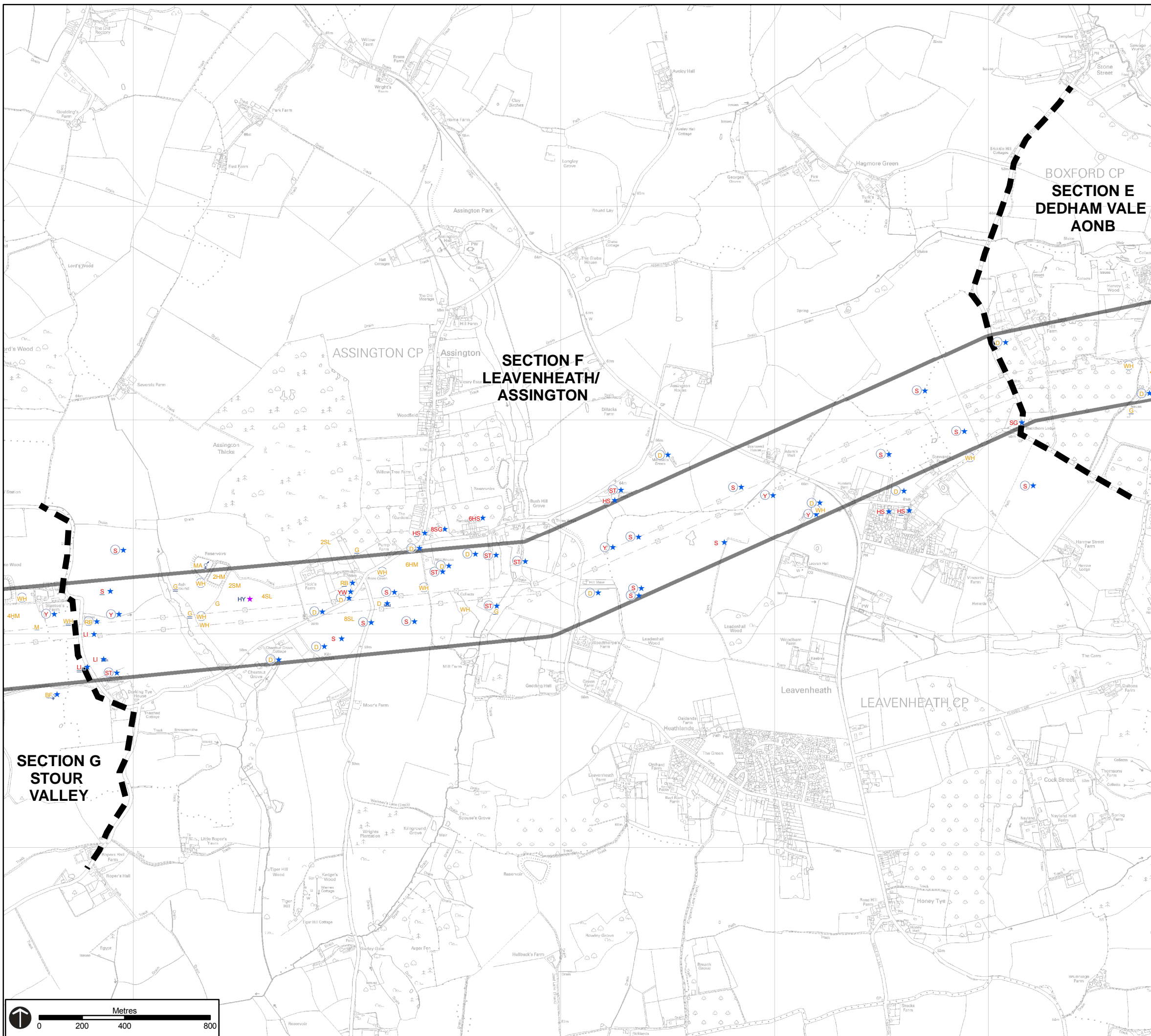


Key	
	Preferred route corridor
	Section Boundary
	UKBAP
	SCHEDULE 1
	UK Red List Species
	UK Amber List Species
	Alarm call
	Calling
	Carrying food
	Adult sitting on nest
	Singing
	Family group
	Male
	Male and female pair
Protected species (displayed on map)	
BO	Barn Owl
CK	Cuckoo
D	Dunnock
G	Green Woodpecker
HS	House Sparrow
K	Kestrel
LI	Linnet
M	Mistle Thrush
MA	Mallard
N	Nightingale
RB	Reed Bunting
S	Skylark
SF	Spotted Flycatcher
SG	Starling
SL	Swallow
ST	Song Thrush
WH	Whitethroat
Y	Yellowhammer
YW	Yellow Wagtail
Other species recorded (not displayed)	
B	Blackbird
BC	Blackcap
BT	Blue Tit
BZ	Buzzard
C	Carrion Crow
CC	Chiffchaff
CH	Chaffinch
CT	Coal Tit
GC	Goldcrest
GO	Goldfinch
GR	Greenfinch
GS	Great Spotted Woodpecker
GT	Great Tit
GW	Garden Warbler
J	Jay
JD	Jackdaw
LT	Long-tailed Tit
MG	Magpie
MH	Moorhen
NH	Nuthatch
PH	Pheasant
PW	Pied Wagtail
R	Robin
RL	Red-legged Partridge
RO	Rook
SW	Sedge Warbler
TC	Treecreeper
WP	Woodpigeon
WR	Wren

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Study Area E Visit 2		
Drawing No: Figure 41		
Date: 04.02.2013	TEP Ref No: G1980.1107	
Drawn: KG	Checked: EJS	Approved: EJS



Key

- Preferred route corridor
- Section Boundary
- SCHEDULE 1
- UKBAP
- UK Red List Species
- UK Amber List Species
- Alarm call
- Calling
- Carrying food
- Occupied nest
- Adult sitting on nest
- Singing
- Family group
- Female
- Male
- Male and female pair

Protected species (displayed on map)

BF Bullfinch	RB Reed Bunting
D Dunnock	S Skylark
G Green Woodpecker	SG Starling
HM House Martin	SL Swallow
HS House Sparrow	SM Sand Martin
HY Hobby	ST Song Thrush
LI Linnet	WH Whitethroat
M Mistle Thrush	YW Yellow Wagtail
MA Mallard	Y Yellowhammer

Other species recorded (not displayed)

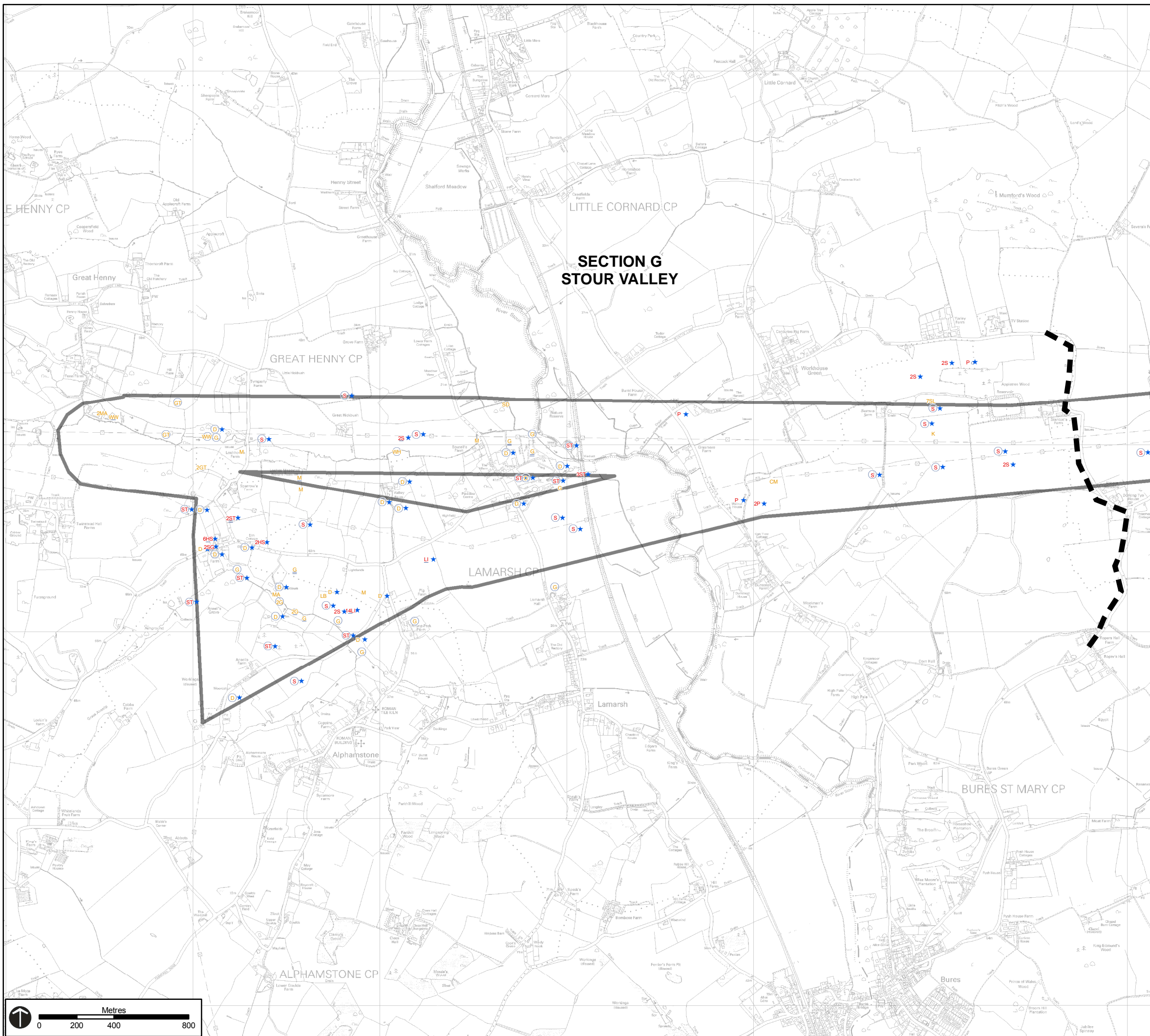
B Blackbird	GT Great Tit
BC Blackcap	GW Garden Warbler
BT Blue Tit	J Jay
BZ Buzzard	JD Jackdaw
C Carrion Crow	LT Long-tailed Tit
CC Chiffchaff	MG Magpie
CD Collared Dove	PH Pheasant
CH Chaffinch	PW Pied Wagtail
CT Coal Tit	R Robin
GC Goldcrest	RL Red-legged Partridge
GO Goldfinch	RO Rook
GR Greenfinch	WP Woodpigeon
GS Great Spotted Woodpecker	WR Wren

Work in Progress Feb 2013














Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Study Area F Visit 2		
Drawing No: Figure 43		
Date: 04.02.2013	TEP Ref No: G1980.1109	
Drawn: KG	Checked: EJS	Approved: EJS

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Key

-  Preferred route corridor
-  Section Boundary
-  UKBAP
-  UK Red List Species
-  UK Amber List Species
-  Alarm call
-  Calling
-  Carrying food
-  Singing
-  Male
-  Male and female pair

Protected species (displayed on map)

- | | | | |
|----|--------------------------|----|----------------|
| CM | Common Gull | P | Grey Partridge |
| D | Duncock | S | Skylark |
| G | Green Woodpecker | SD | Stock Dove |
| HS | House Sparrow | SG | Starling |
| K | Kestrel | SL | Swallow |
| LB | Lesser Black backed Gull | ST | Song Thrush |
| LI | Linnet | WH | Whitethroat |
| M | Mistle Thrush | WW | Willow Warbler |
| MA | Mallard | | |

Other species recorded (not displayed)

- | | | | |
|----|--------------------------|----|----------------------|
| B | Blackbird | GW | Garden Warbler |
| BC | Blackcap | H | Grey Heron |
| BT | Blue Tit | J | Jay |
| BZ | Buzzard | JD | Jackdaw |
| C | Carrion Crow | LT | Long-tailed Tit |
| CC | Chiffchaff | MG | Magpie |
| CD | Collared Dove | MH | Moorhen |
| CG | Canada Goose | MS | Mute Swan |
| CH | Chaffinch | PH | Pheasant |
| CO | Coot | R | Robin |
| GC | Goldcrest | RL | Red-legged Partridge |
| GO | Goldfinch | RO | Rook |
| GR | Greenfinch | SH | Sparrowhawk |
| GS | Great Spotted Woodpecker | WR | Wren |
| GT | Great Tit | WP | Woodpigeon |

Work in Progress Feb 2013



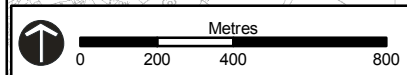
Project:
Bramford to Twinstead Tee Connection

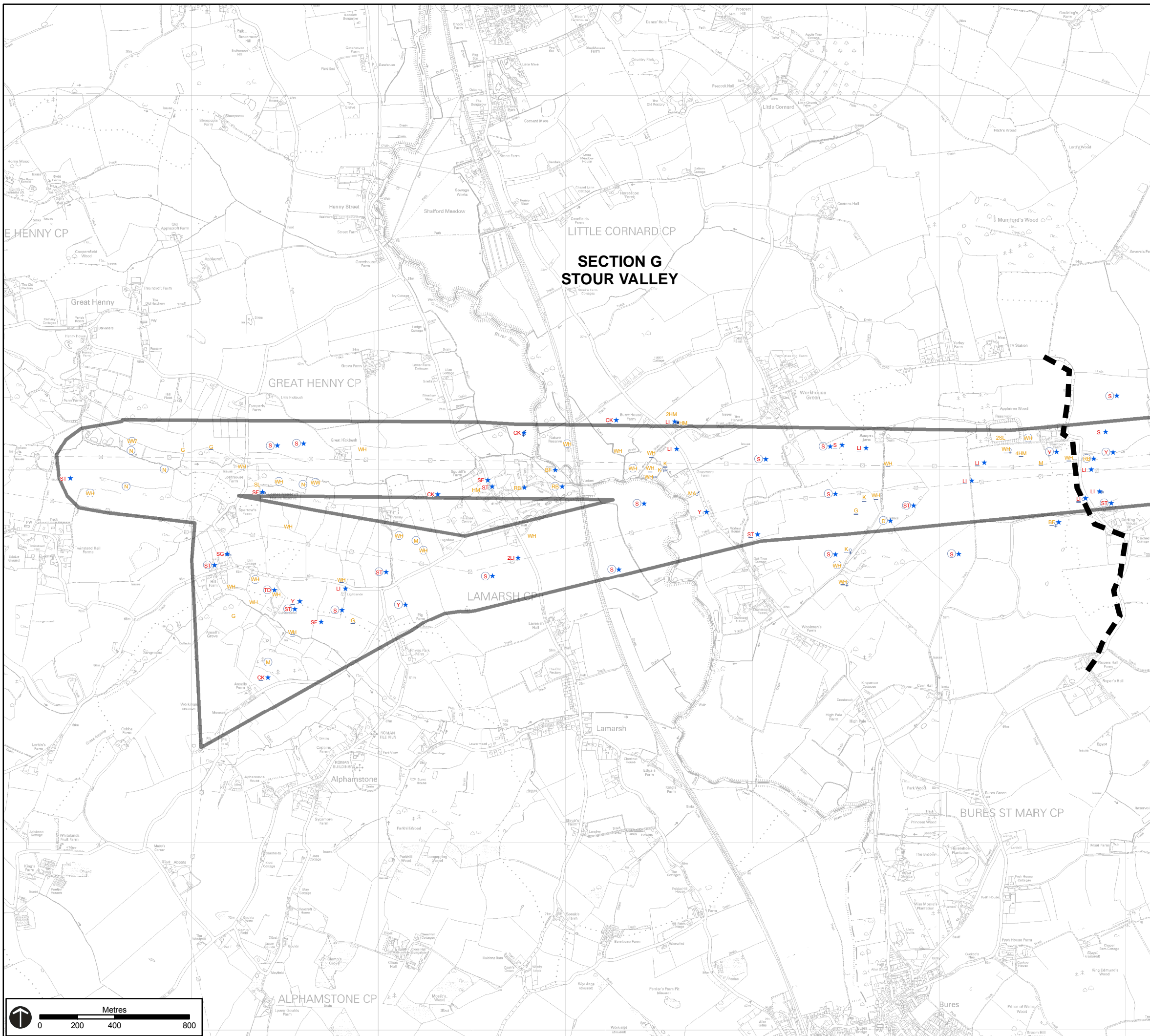
Title:
Breeding Bird Survey : Study Area G Visit 1

Drawing No:
Figure 44

Date: 04.02.2013	TEP Ref No: G1980.1110
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Drawn: KG	Checked: EJS	Approved: EJS
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Key

- Preferred route corridor
- Section boundary
- UKBAP
- UK Red List Species
- UK Amber List Species
- Alarm call
- Calling
- Carrying food
- Occupied nest
- Adult sitting on nest
- Singing
- Family group
- Female
- Male
- Male and female pair

Protected species (displayed on map)

BF <i>Bullfinch</i>	RB <i>Reed Bunting</i>
CK <i>Cuckoo</i>	S <i>Skylark</i>
D <i>Dunnock</i>	SF <i>Spotted Flycatcher</i>
G <i>Green Woodpecker</i>	SG <i>Starling</i>
HM <i>House Martin</i>	SL <i>Swallow</i>
K <i>Kestrel</i>	ST <i>Song Thrush</i>
LI <i>Linnet</i>	TD <i>Turtle Dove</i>
M <i>Mistle Thrush</i>	WH <i>Whitethroat</i>
MA <i>Mallard</i>	WW <i>Willow Warbler</i>
N <i>Nightingale</i>	Y <i>Yellowhammer</i>

Other species recorded (not displayed)

B <i>Blackbird</i>	LO <i>Little Owl</i>
BC <i>Blackcap</i>	LT <i>Long-tailed Tit</i>
BT <i>Blue Tit</i>	LW <i>Lesser Whitethroat</i>
BZ <i>Buzzard</i>	MG <i>Magpie</i>
C <i>Carrion Crow</i>	MH <i>Moorhen</i>
CC <i>Chiffchaff</i>	NH <i>Nuthatch</i>
CD <i>Collared Dove</i>	PH <i>Pheasant</i>
CH <i>Chaffinch</i>	PW <i>Pied Wagtail</i>
GC <i>Goldcrest</i>	R <i>Robin</i>
GO <i>Goldfinch</i>	RL <i>Red-legged Partridge</i>
GR <i>Greenfinch</i>	RO <i>Rook</i>
GS <i>Great Spotted Woodpecker</i>	RW <i>Reed Warbler</i>
GT <i>Great Tit</i>	TO <i>Tawny Owl</i>
J <i>Jay</i>	WP <i>Woodpigeon</i>
JD <i>Jackdaw</i>	WR <i>Wren</i>

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Breeding Bird Survey : Study Area G Visit 2		
Drawing No: Figure 45		
Date: 04.02.2013	TEP Ref No: G1980.1111	
Drawn: KG	Checked: EJS	Approved: EJS

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Key

Preferred Route Corridor
 Section Boundary

Dormouse Survey

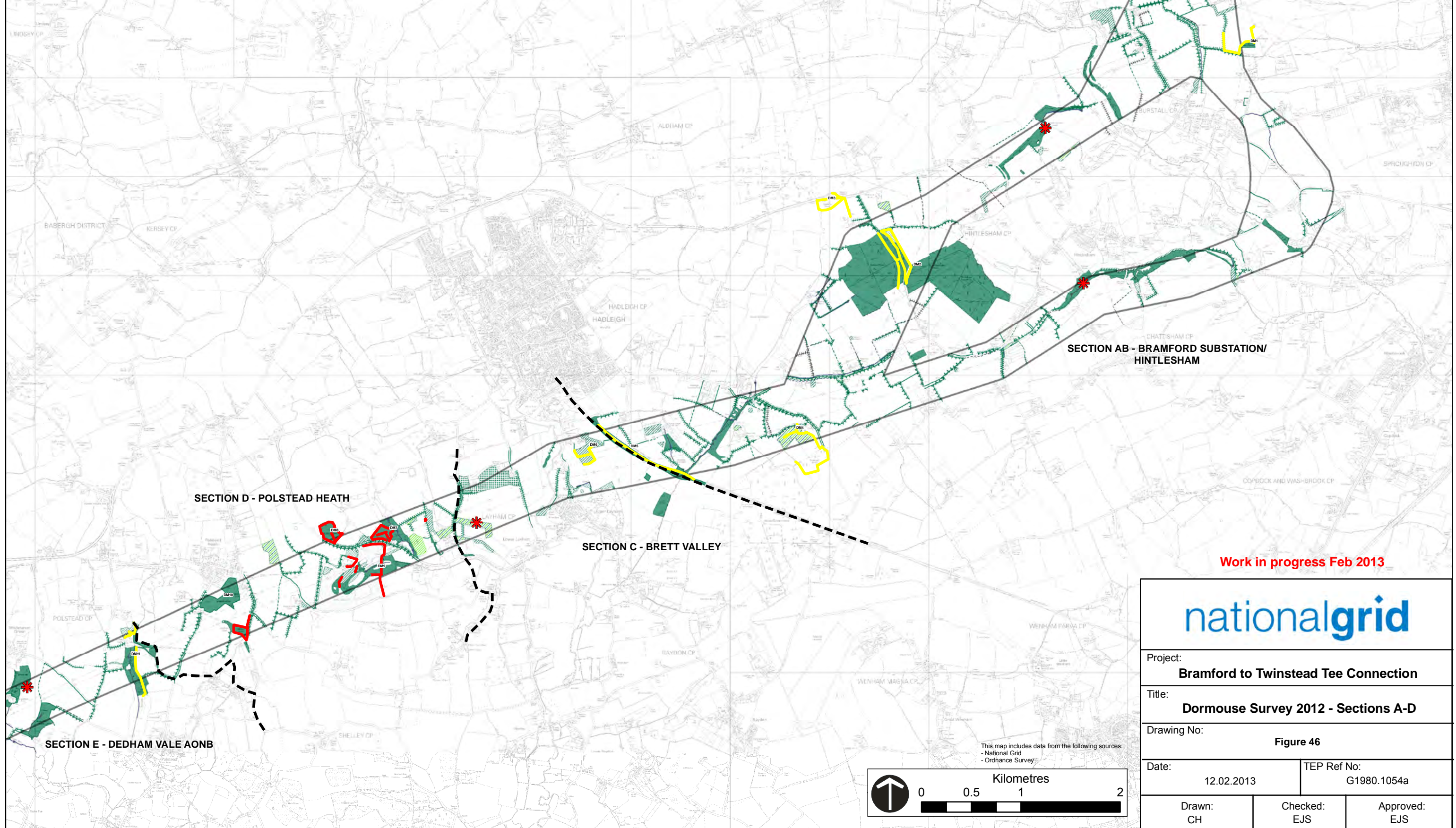
Habitats assessed as not requiring nest tube survey
 Evidence of dormice (nest, nut or sighting) within survey area
 No evidence of dormice detected

Phase 1 Habitat Survey

Standing water
 Running water
 Native species-rich intact hedge
 Species-poor intact hedge
 Native species-rich defunct hedge

Species-poor defunct hedge
 Native species-rich hedge and trees
 Species-poor hedge and trees
 Fence
 Dry ditch

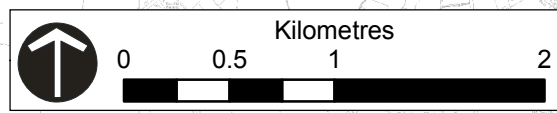
Semi-natural broad-leaved woodland
 Plantation broad-leaved woodland
 Plantation coniferous woodland
 Plantation mixed woodland
 Dense/continuous scrub
 Broad-leaved parkland/scattered trees
 Orchard



Work in progress Feb 2013

nationalgrid

Project: Bramford to Twinstead Tee Connection		
Title: Dormouse Survey 2012 - Sections A-D		
Drawing No: Figure 46		
Date: 12.02.2013	TEP Ref No: G1980.1054a	
Drawn: CH	Checked: EJS	Approved: EJS



Key

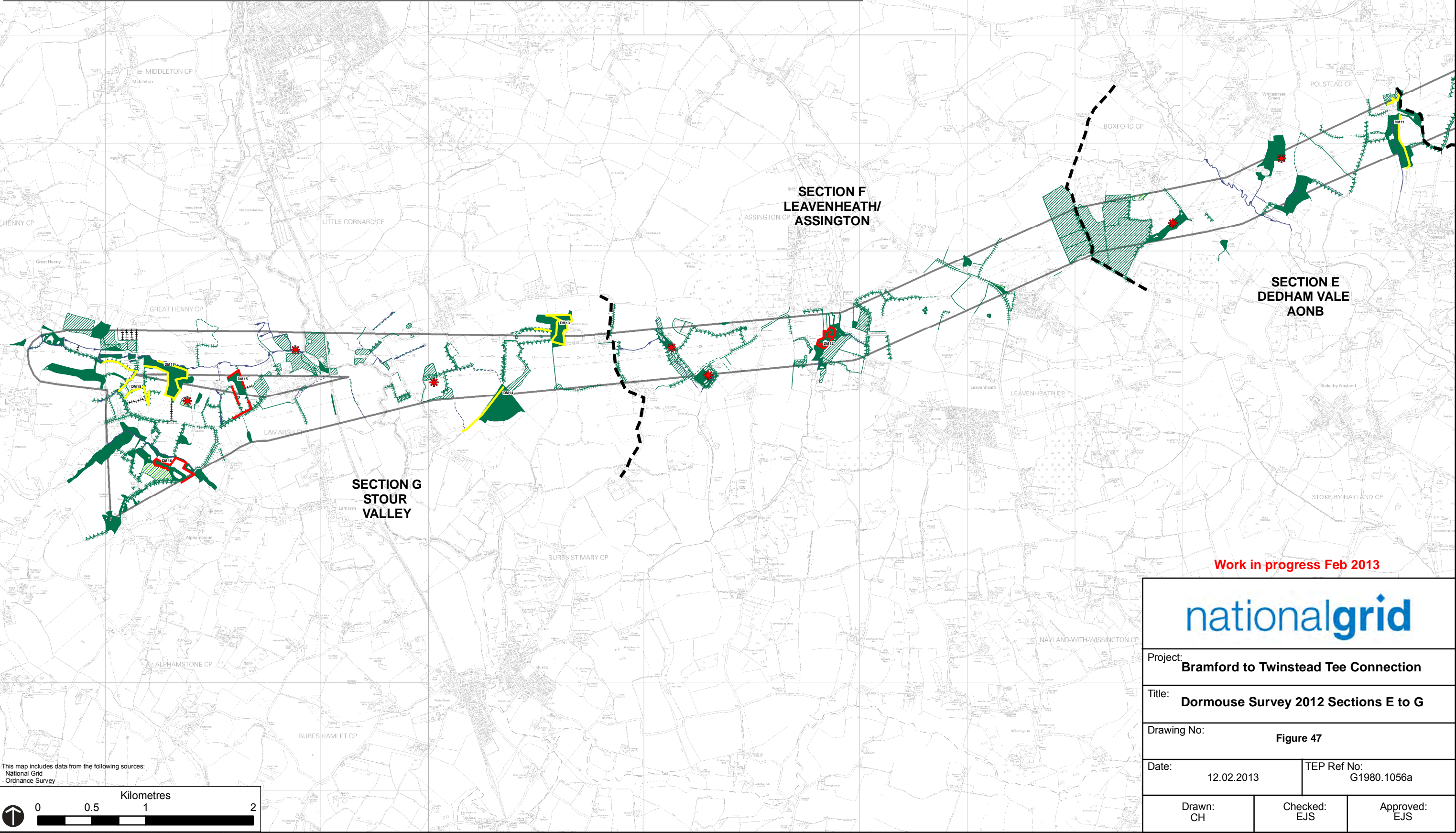
- Preferred Route Corridor
- Section boundary

Dormouse Survey

- Habitats assessed as not requiring nest tube survey
- Evidence of dormice (nest, nut or sighting) within survey area
- No evidence of dormice detected

Phase 1 Habitat Survey

- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Native species-rich defunct hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Fence
- Dry ditch
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Orchard



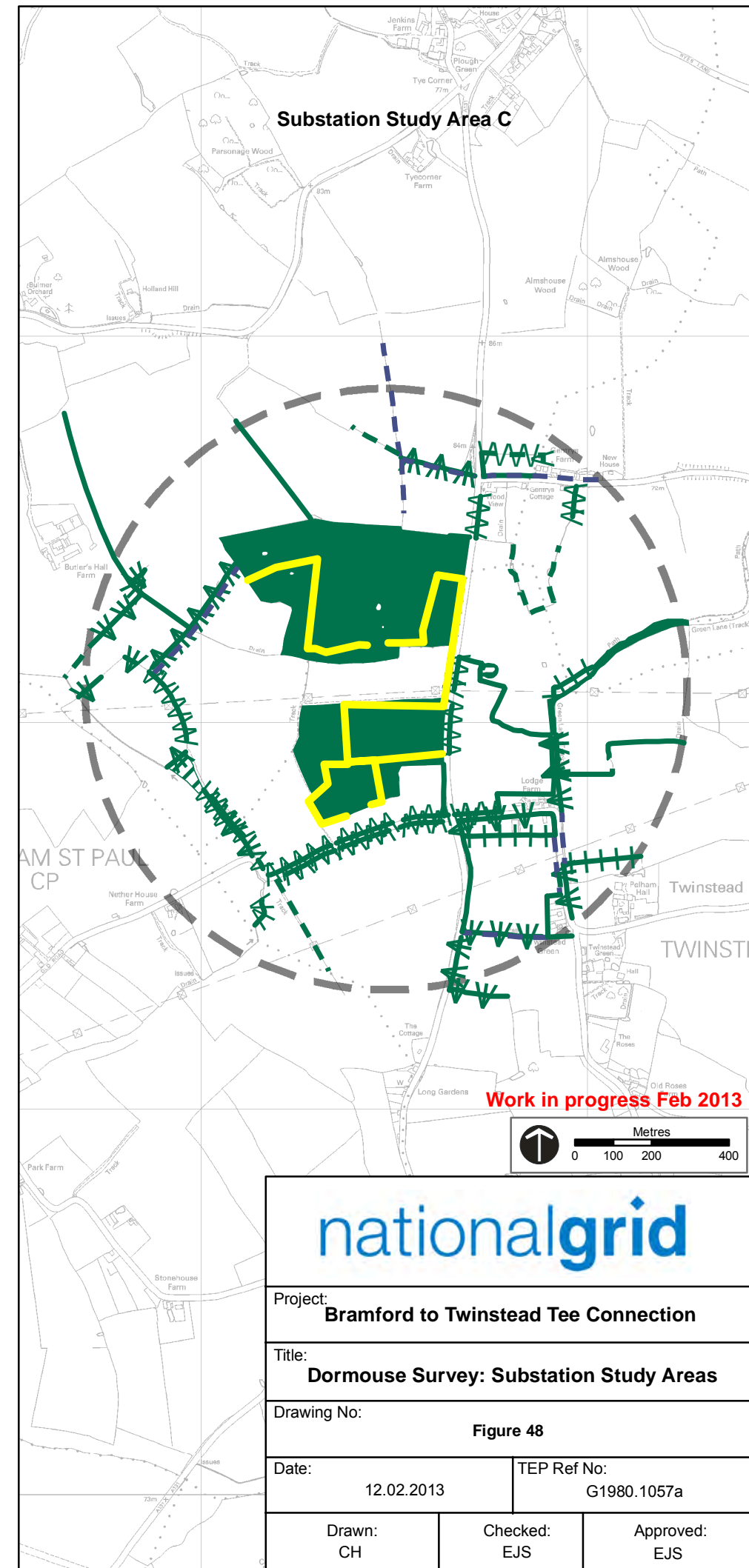
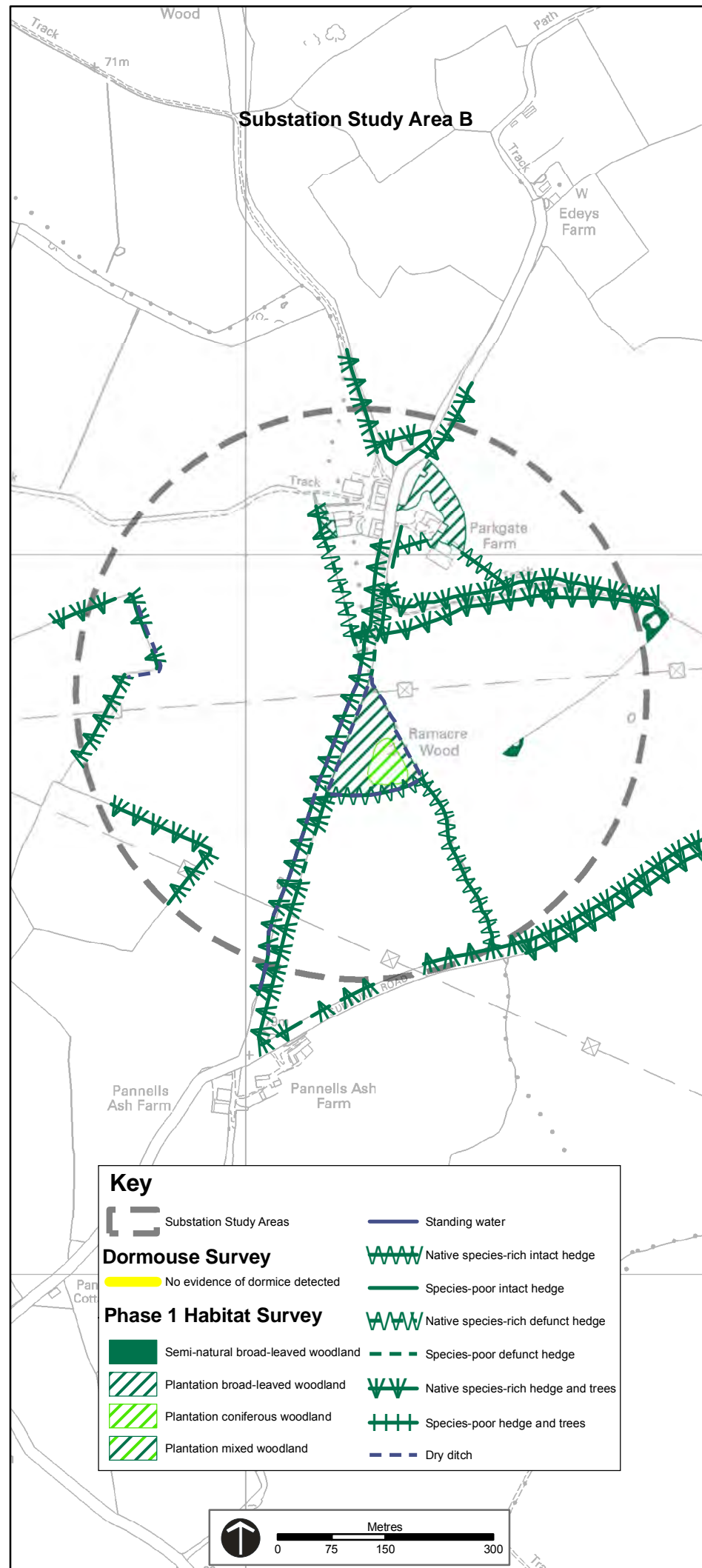
Work in progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Dormouse Survey 2012 Sections E to G		
Drawing No: Figure 47		
Date: 12.02.2013	TEP Ref No: G1980.1056a	
Drawn: CH	Checked: EJS	Approved: EJS

This map includes data from the following sources:
 - National Grid
 - Ordnance Survey

Kilometres
 0 0.5 1 2



Key	
	Substation Study Areas
	No evidence of dormice detected
	Semi-natural broad-leaved woodland
	Plantation broad-leaved woodland
	Plantation coniferous woodland
	Plantation mixed woodland
	Standing water
	Native species-rich intact hedge
	Species-poor intact hedge
	Native species-rich defunct hedge
	Species-poor defunct hedge
	Native species-rich hedge and trees
	Species-poor hedge and trees
	Dry ditch

nationalgrid

Project: **Bramford to Twinstead Tee Connection**

Title: **Dormouse Survey: Substation Study Areas**

Drawing No: **Figure 48**

Date: 12.02.2013

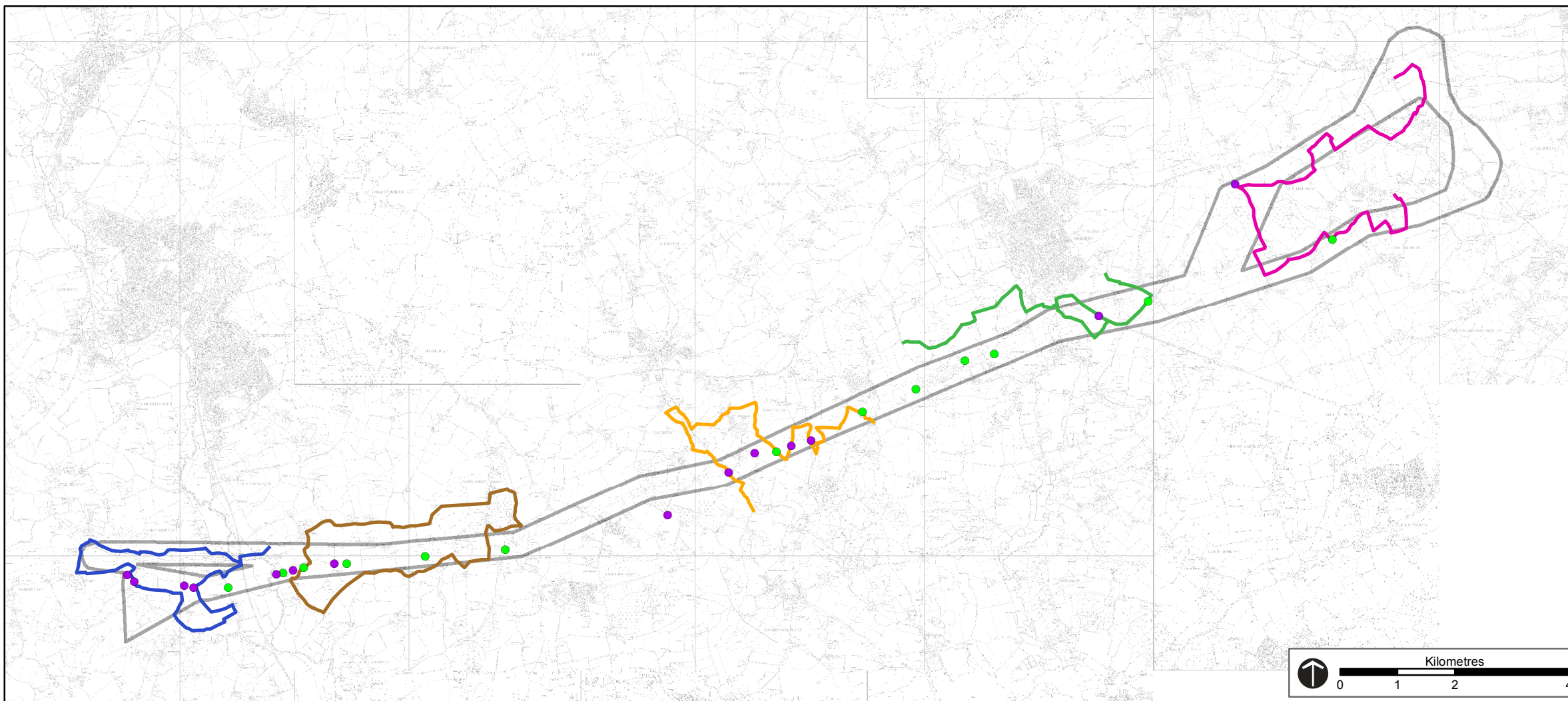
TEP Ref No: G1980.1057a

Drawn: CH










Checked: EJS

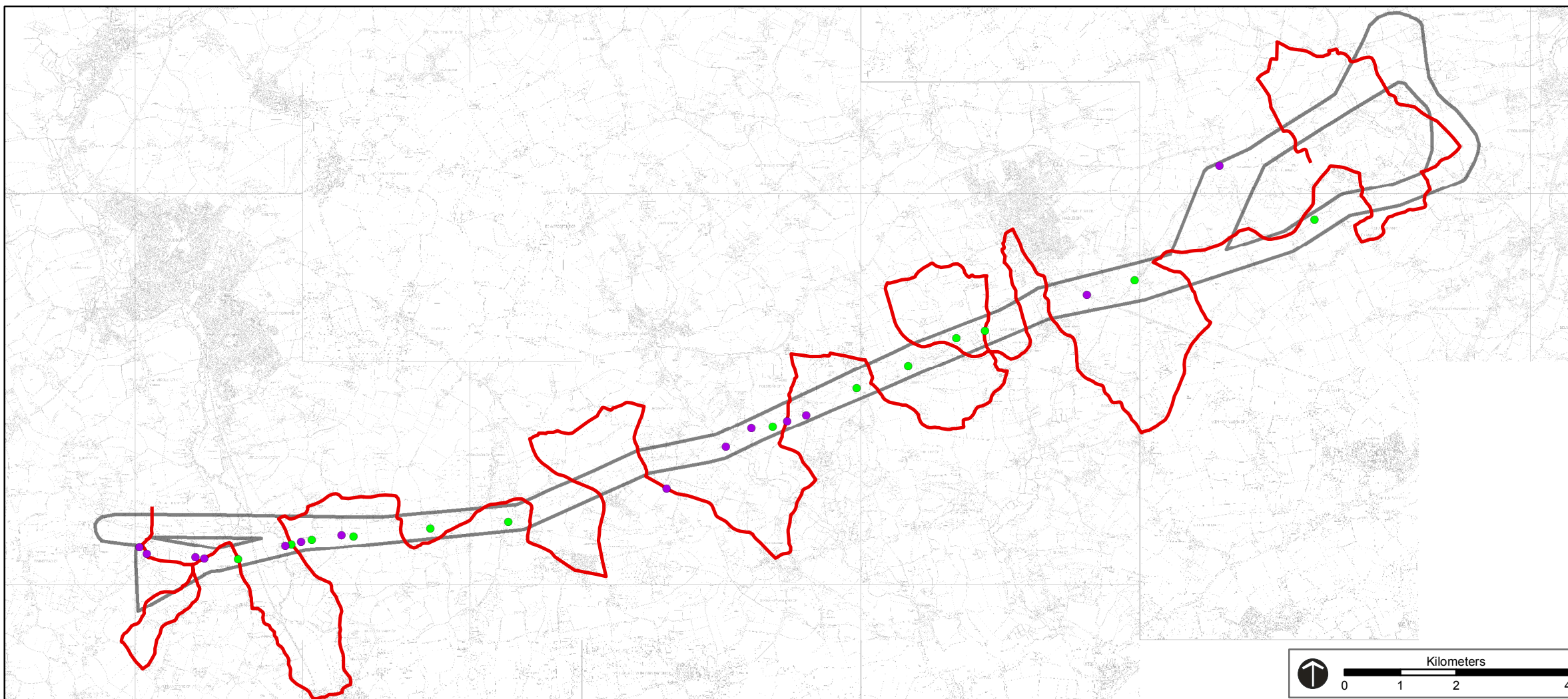
Approved: EJS

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Key

-  Preferred route corridor
- Static Bat Detector Survey Points**
-  Survey Frequency - Once a Month
-  Survey Frequency - Twice a Month
- Bat Survey Transects**
-  Transect 1 - Walking
-  Transect 2 - Walking
-  Transect 3 - Walking
-  Transect 4 - Walking
-  Transect 5 - Walking
-  Transect 9 - Driving



Work in Progress Feb 2013



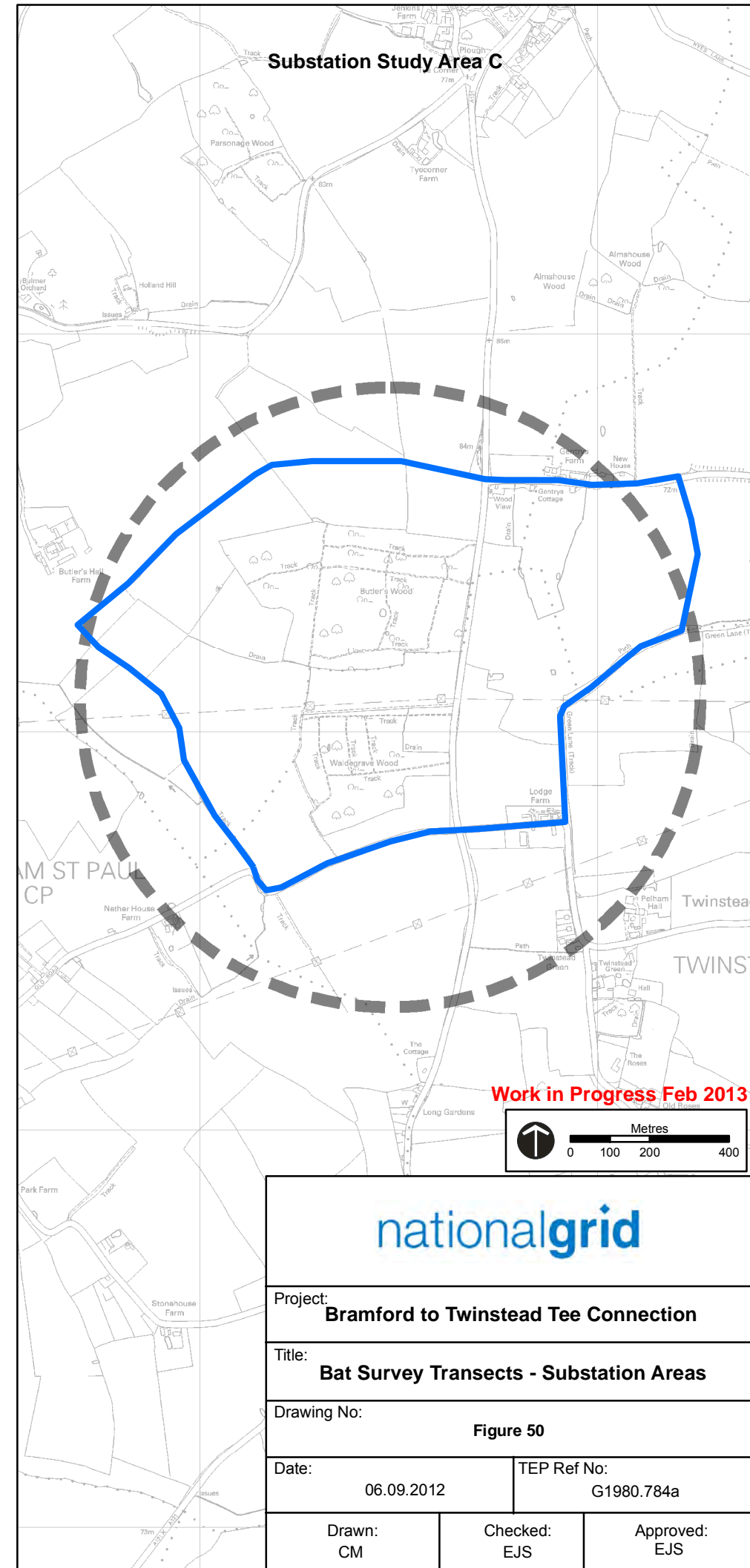
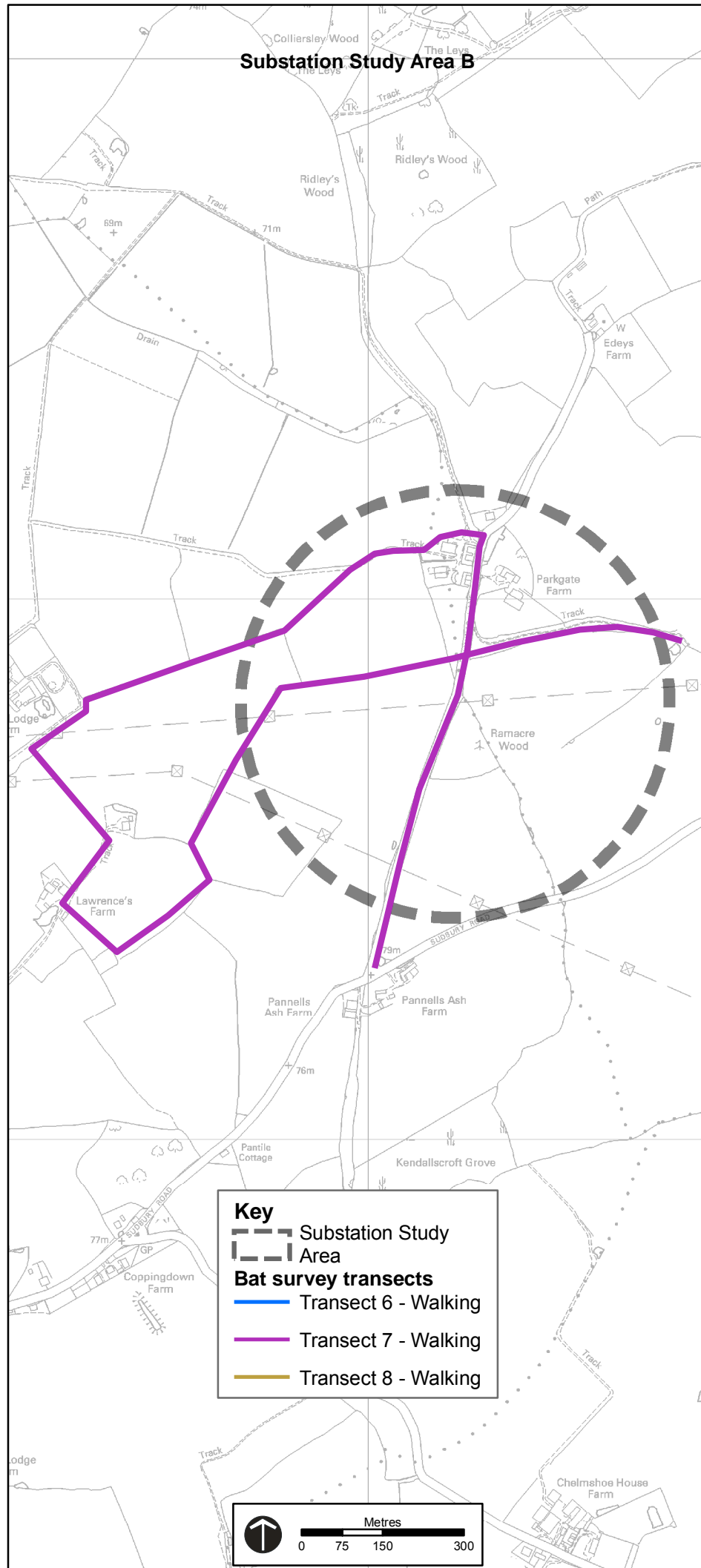
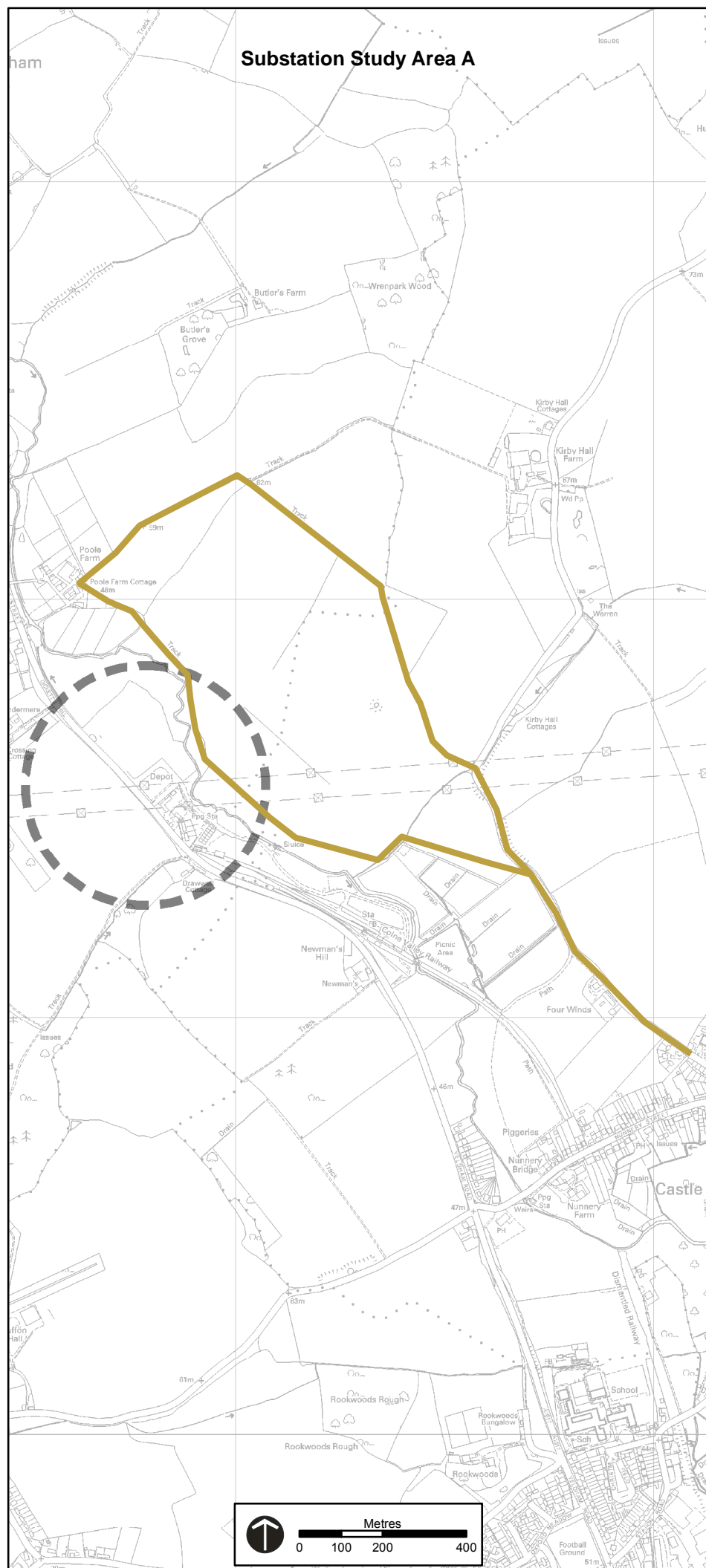
Project: **Bramford to Twinstead Tee Connection**

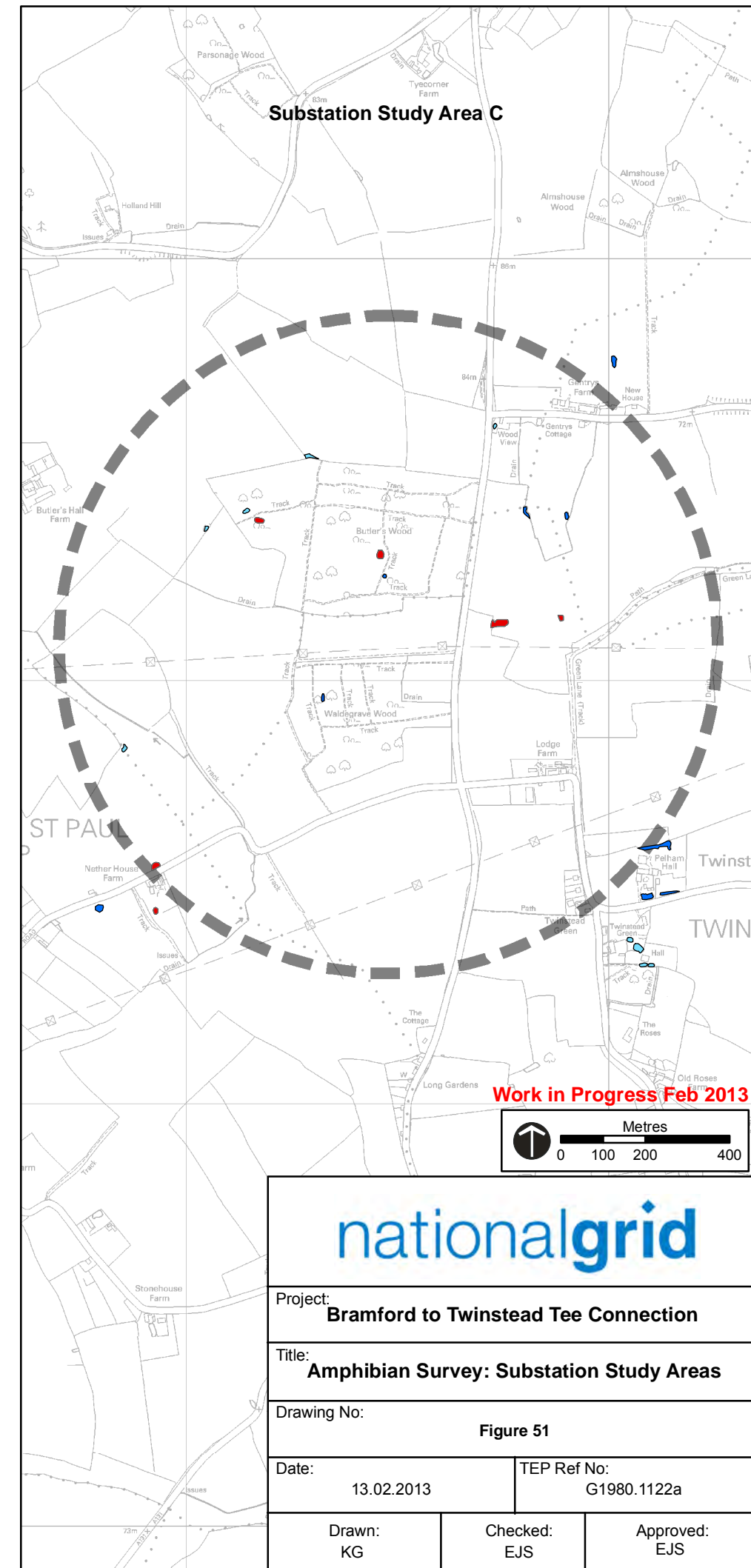
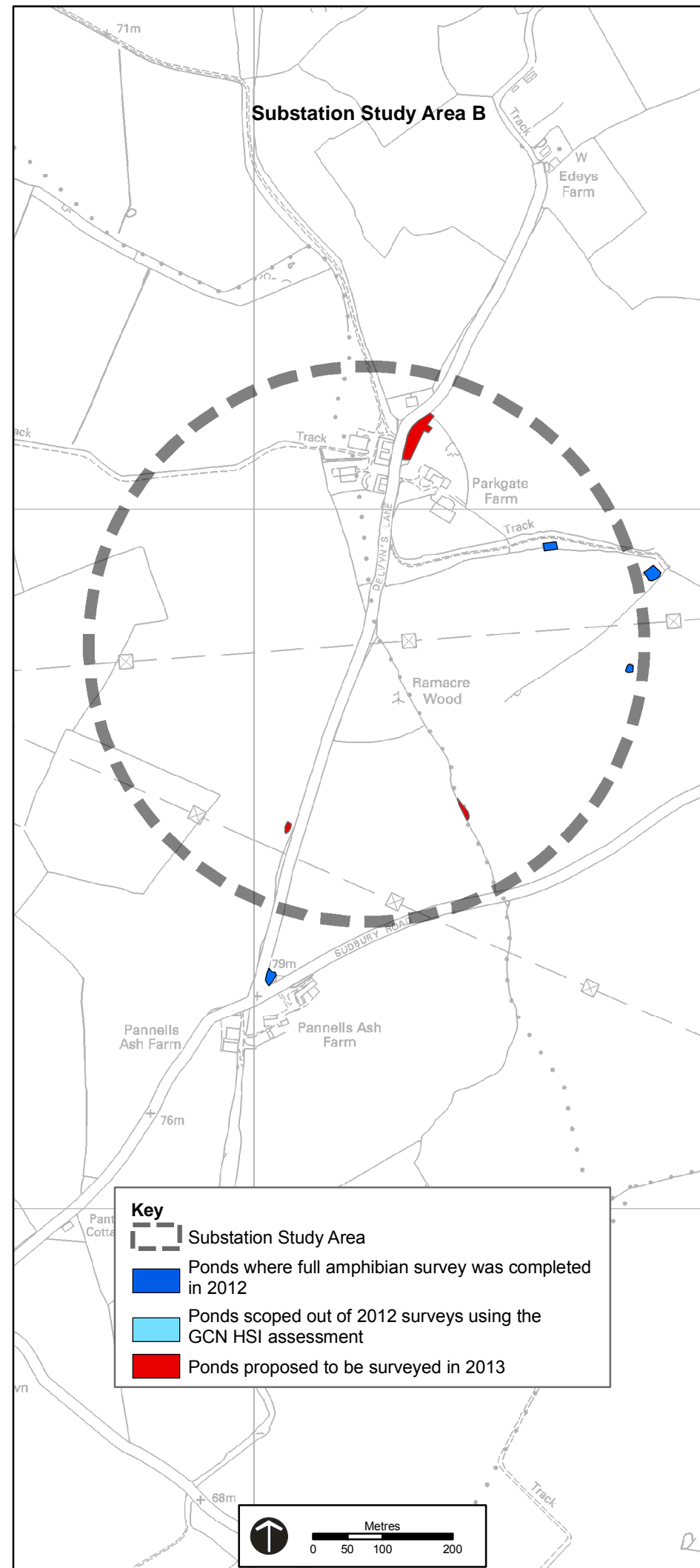
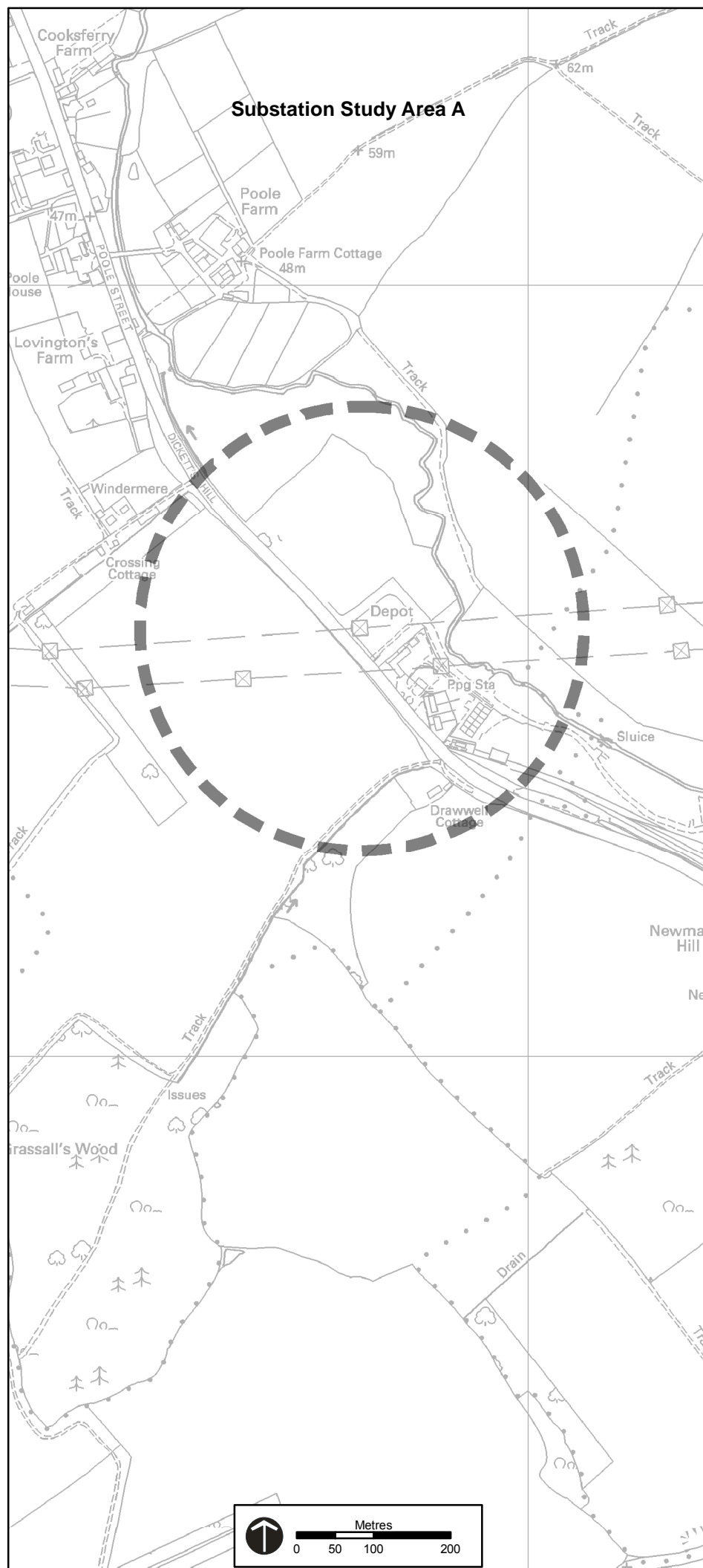
Title: **Bat Survey Transects & Static Detector Locations**

Drawing No: **Figure 49**





Date: 23-07-2012 | TEP Ref No: G1980.783a

Drawn: CM	Checked: EJS	Approved: EJS
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Key

-  Substation Study Area
-  Ponds where full amphibian survey was completed in 2012
-  Ponds scoped out of 2012 surveys using the GCN HSI assessment
-  Ponds proposed to be surveyed in 2013

nationalgrid

Project: **Bramford to Twinstead Tee Connection**






Title: **Amphibian Survey: Substation Study Areas**

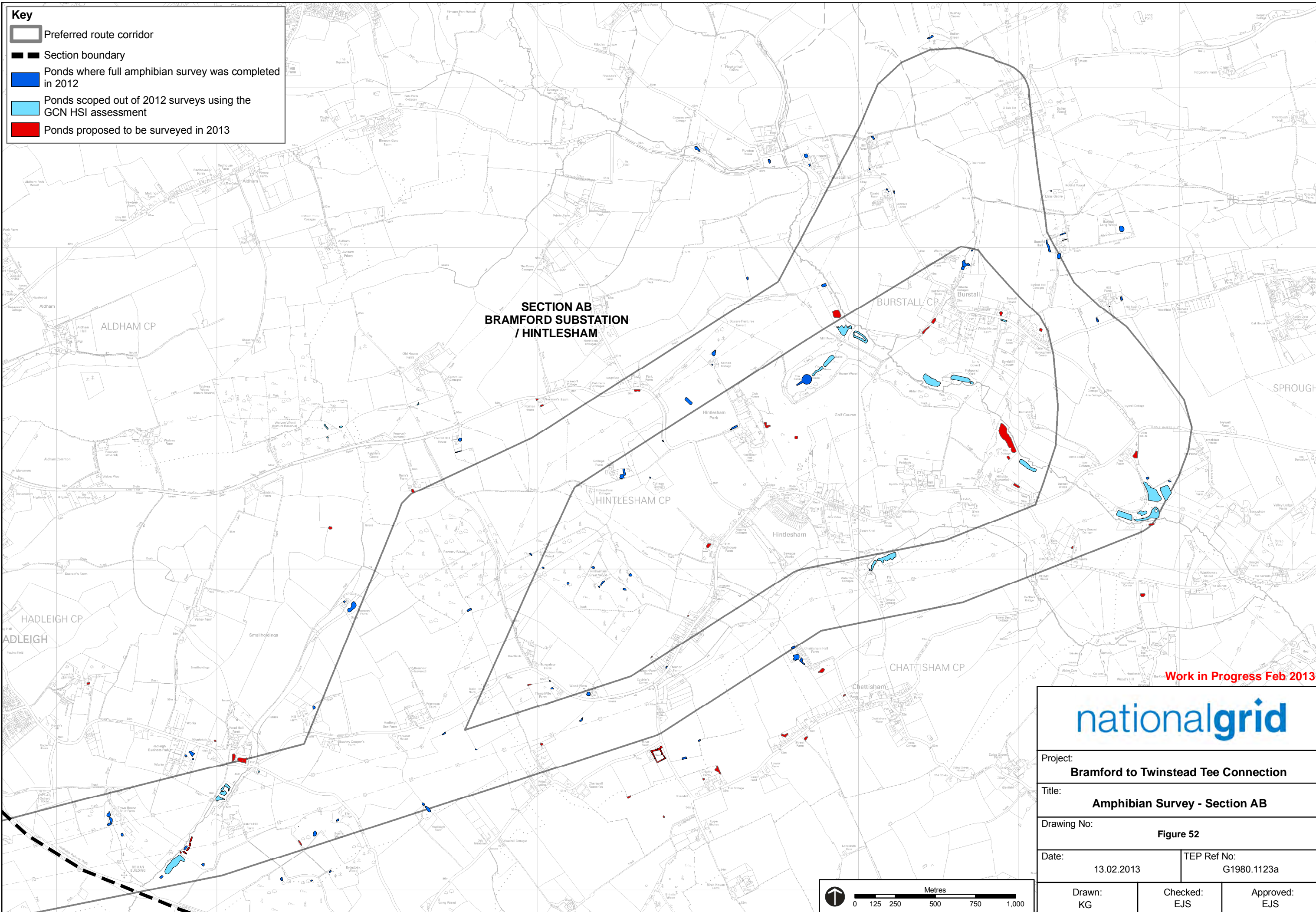
Drawing No: **Figure 51**

Date: 13.02.2013 TEP Ref No: G1980.1122a


Drawn: KG	Checked: EJS	Approved: EJS
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Key

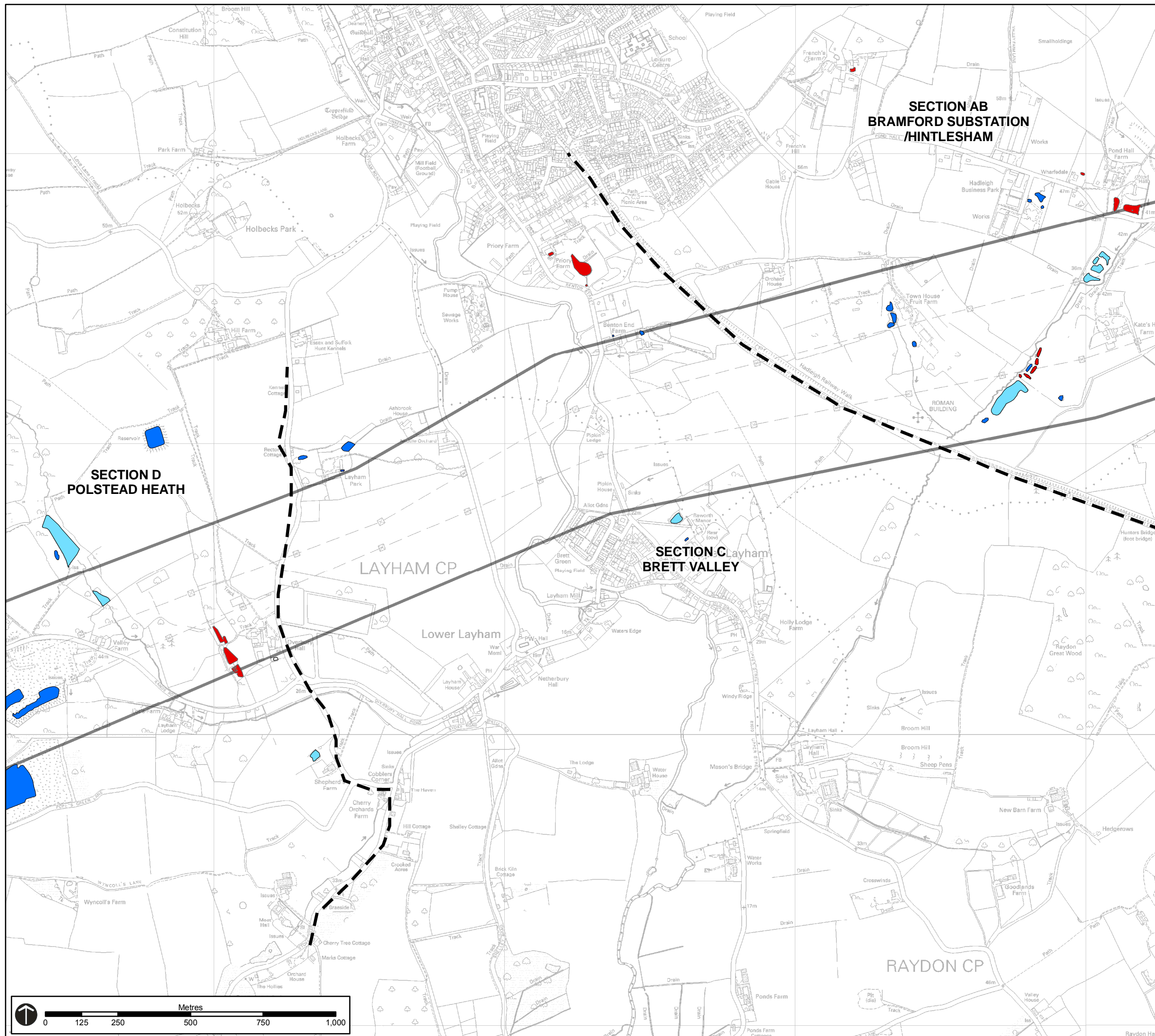
-  Preferred route corridor
-  Section boundary
-  Ponds where full amphibian survey was completed in 2012
-  Ponds scoped out of 2012 surveys using the GCN HSI assessment
-  Ponds proposed to be surveyed in 2013








Work in Progress Feb 2013

		
Project: Bramford to Twinstead Tee Connection		
Title: Amphibian Survey - Section AB		
Drawing No: Figure 52		
Date: 13.02.2013	TEP Ref No: G1980.1123a	
Drawn: KG	Checked: EJS	Approved: EJS

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Key

-  Preferred route corridor
-  Section boundary
-  Ponds where full amphibian survey was completed in 2012
-  Ponds scoped out of 2012 surveys using the GCN HSI assessment
-  Ponds proposed to be surveyed in 2013

This map includes data from the following sources:
 - National Grid
 - Ordnance Survey
Work in Progress Feb 2013



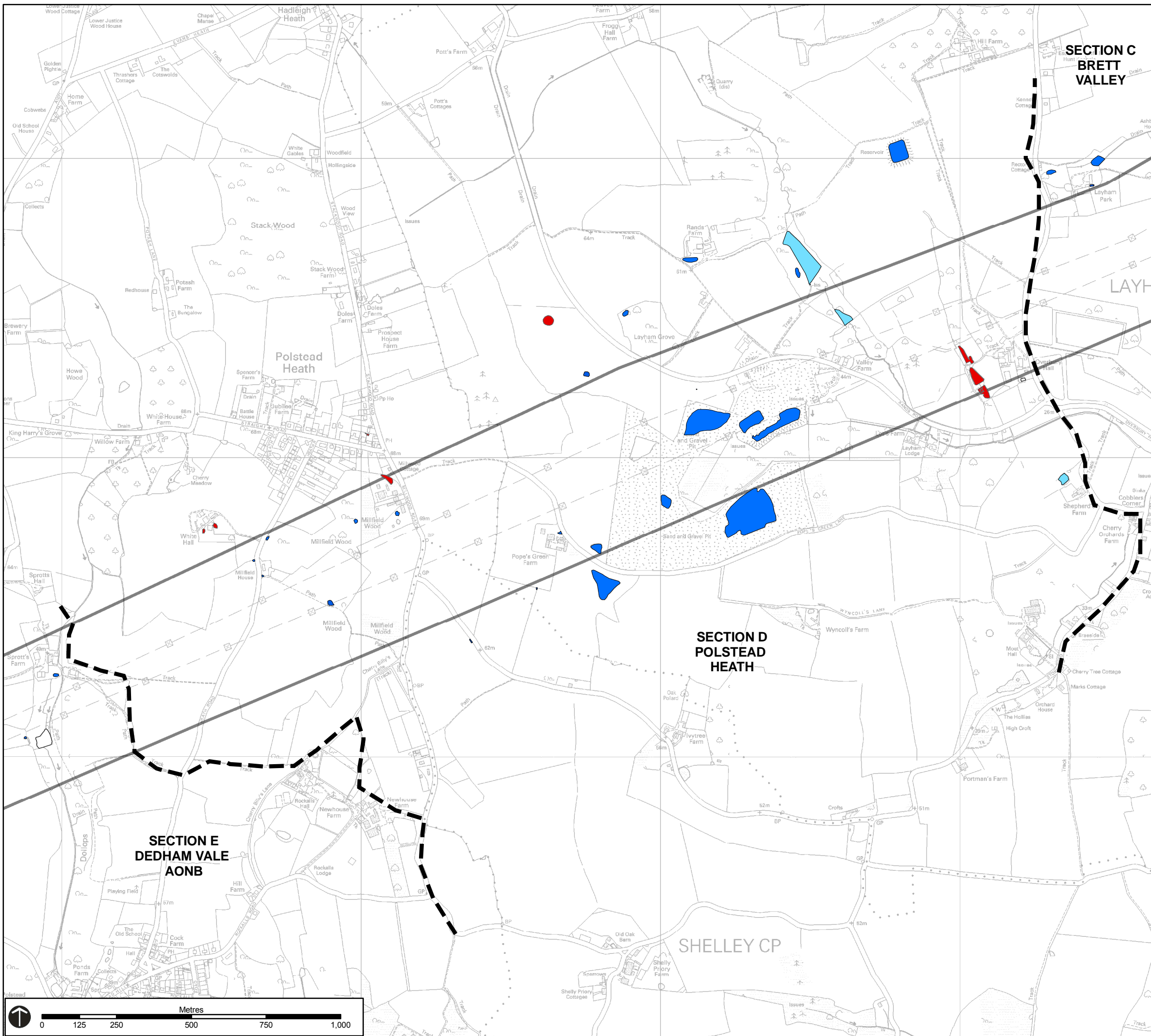
Project:
Bramford to Twinstead Tee Connection

Title:
Amphibian Survey - Section C

Drawing No:
Figure 53

Date: 13/02/2013	TEP Ref No: G1980.1124a
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Drawn: KG	Checked: EJS	Approved: EJS
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Key

- Preferred route corridor
- Section boundary
- Ponds where full amphibian survey was completed in 2012
- Ponds scoped out of 2012 surveys using the GCN HSI assessment
- Ponds proposed to be surveyed in 2013

This map includes data from the following sources:
 - National Grid
 - Ordnance Survey

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Project:
Bramford to Twinstead Tee Connection

Title:
Amphibian Survey - Section D

Drawing No:
Figure 54

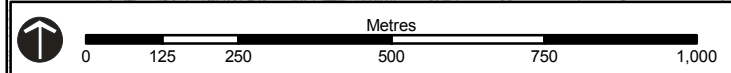
Date:
 13.02.2013

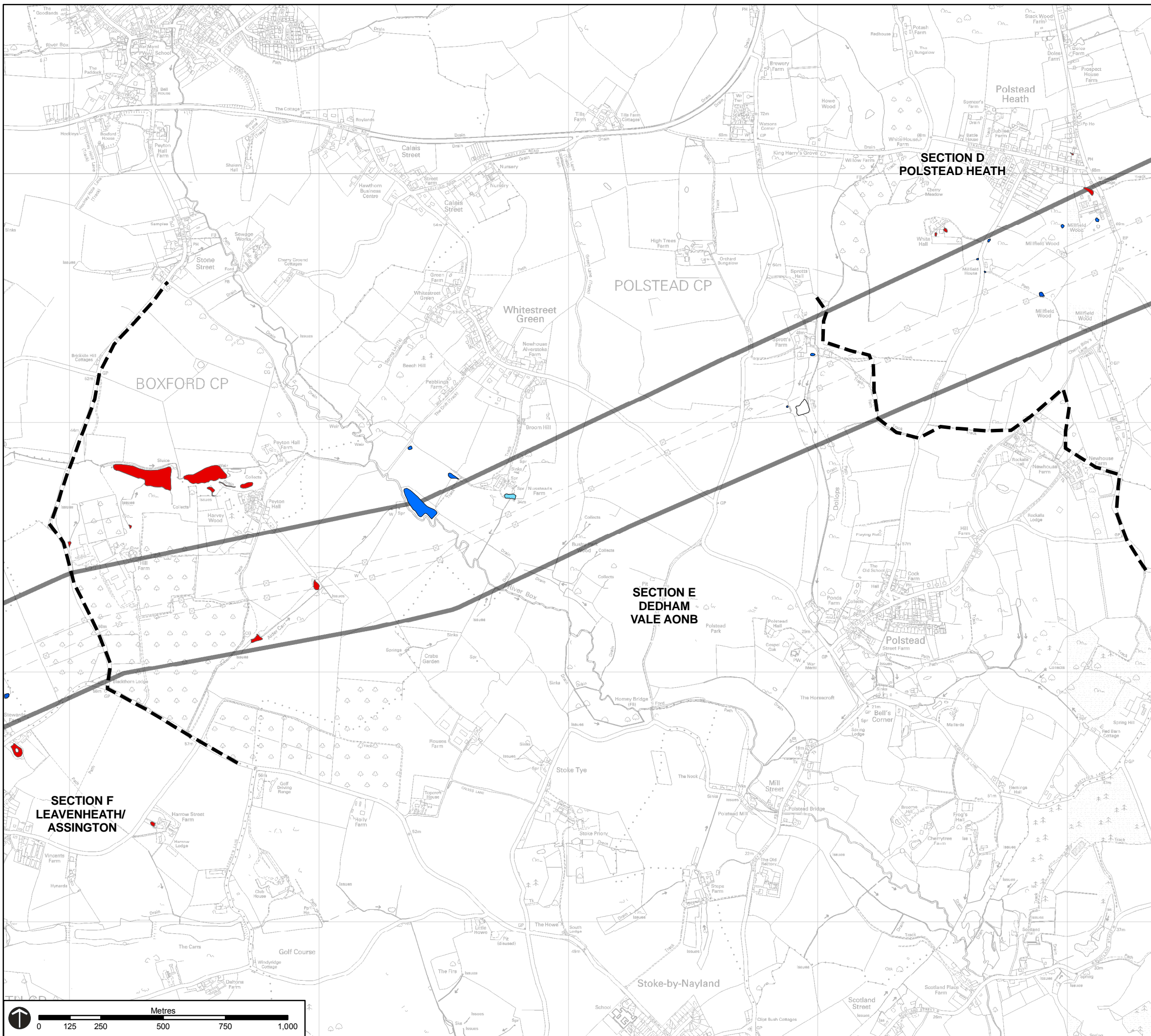
TEP Ref No:
 G1980.1125b

Drawn:
 KG






Checked:
 EJS

Approved:
 EJS





Key

-  Preferred route corridor
-  Section boundary
-  Ponds where full amphibian survey was completed in 2012
-  Ponds scoped out of 2012 surveys using the GCN HSI assessment
-  Ponds proposed to be surveyed in 2013

This map includes data from the following sources:
 - National Grid
 - Ordnance Survey
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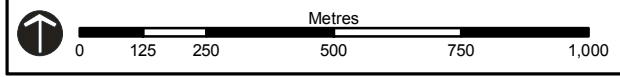
Project: **Bramford to Twinstead Tee Connection**

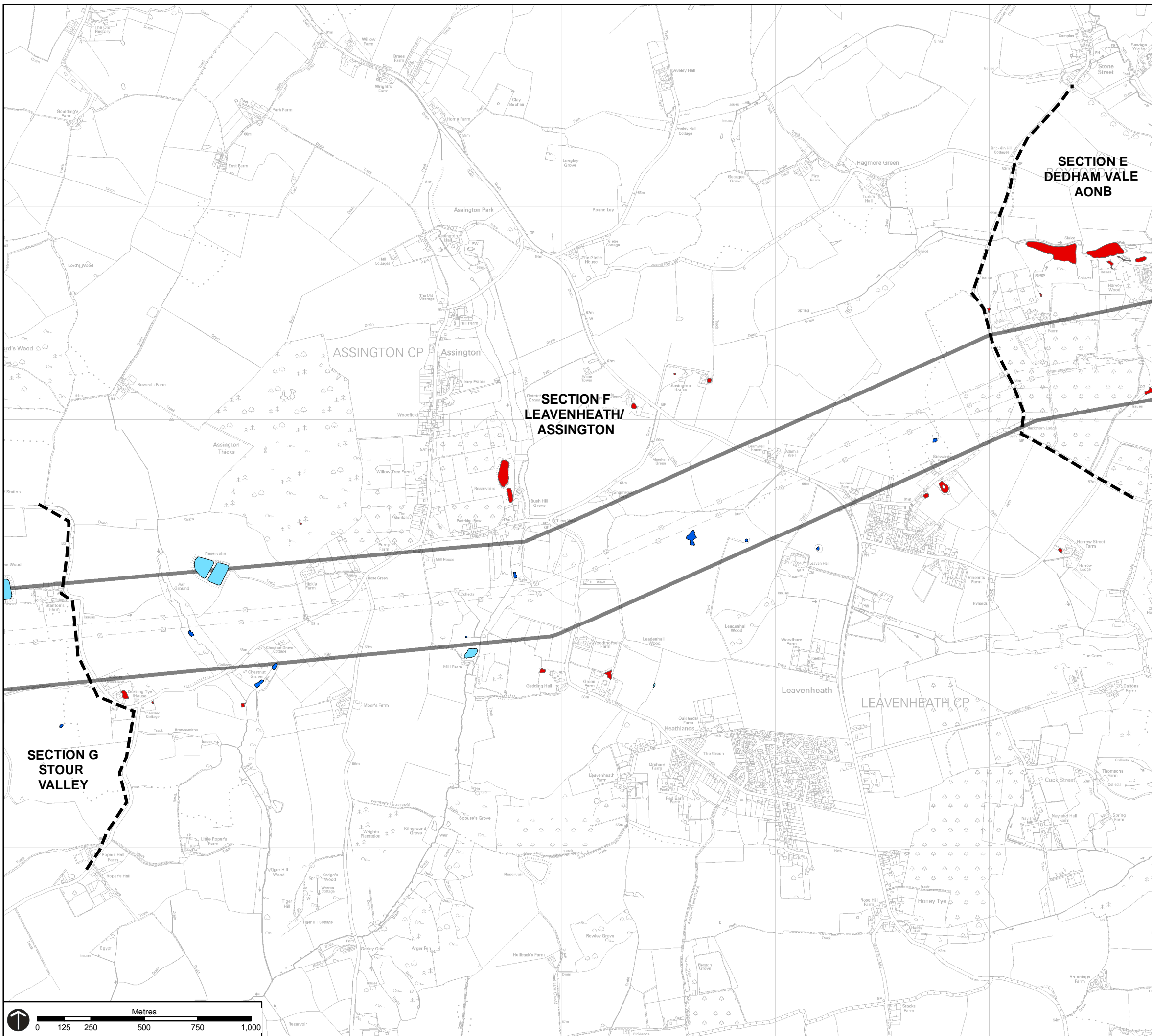
Title: **Amphibian Survey - Section E**

Drawing No: **Figure 55**

Date: 13.02.2013	TEP Ref No: G1980.1126a
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Drawn: KG	Checked: EJS	Approved: EJS
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- Key**
- Preferred route corridor
 - Section boundary
 - Ponds where full amphibian survey was completed in 2012
 - Ponds scoped out of 2012 surveys using the GCN HSI assessment
 - Ponds proposed to be surveyed in 2013

This map includes data from the following sources:
 - National Grid
 - Ordnance Survey **Work in Progress Feb 2013**



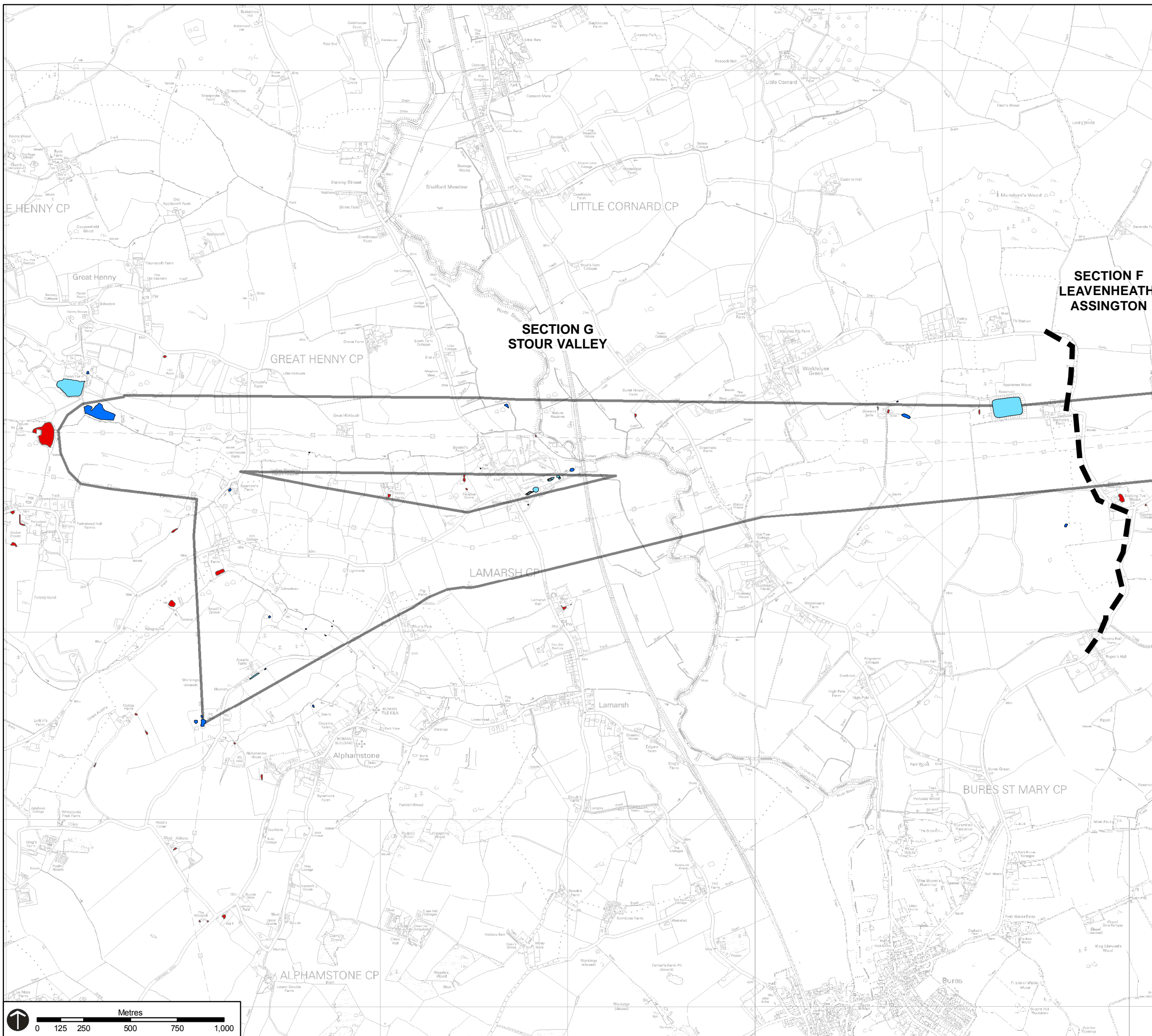
Project:
Bramford to Twinstead Tee Connection

Title:
Amphibian Survey - Section F






Drawing No:
Figure 56

Date: 13.02.2013	TEP Ref No: G1980.1127a
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Drawn: KG	Checked: EJS	Approved: EJS
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Key

-  Preferred route corridor
-  Section boundary
-  Ponds where full amphibian survey was completed in 2012
-  Ponds scoped out of 2012 surveys using the GCN HSI assessment
-  Ponds proposed to be surveyed in 2013

This map includes data from the following sources:
 - National Grid
 - Ordnance Survey
Work in Progress Feb 2013



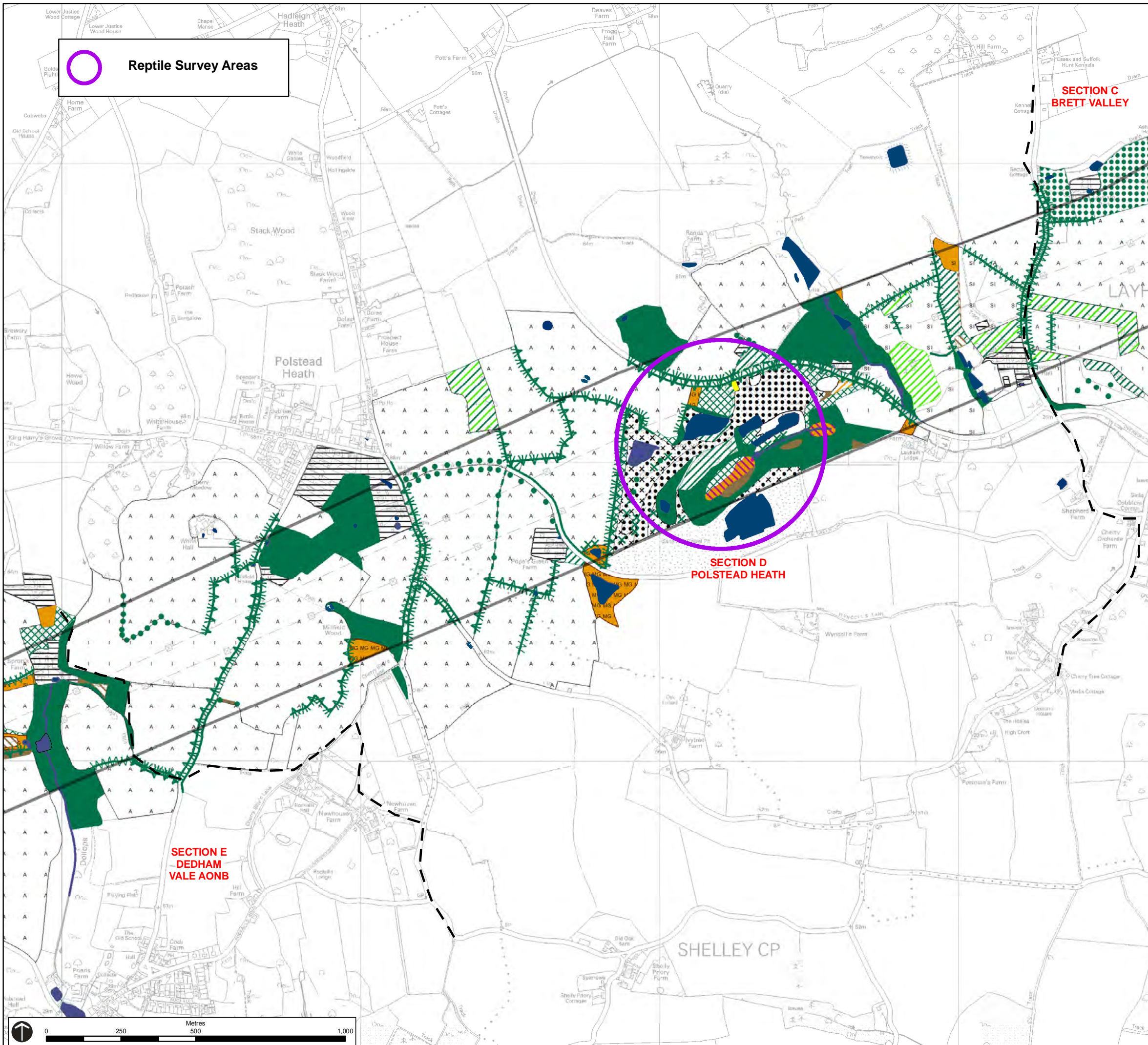
Project:
Bramford to Twinstead Tee Connection

Title:
Amphibian Survey - Section G

Drawing No:
Figure 57

Date: 13.02.2013	TEP Ref No: G1980.1128a
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Drawn: KG	Checked: EJS	Approved: EJS
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Reptile Survey Areas

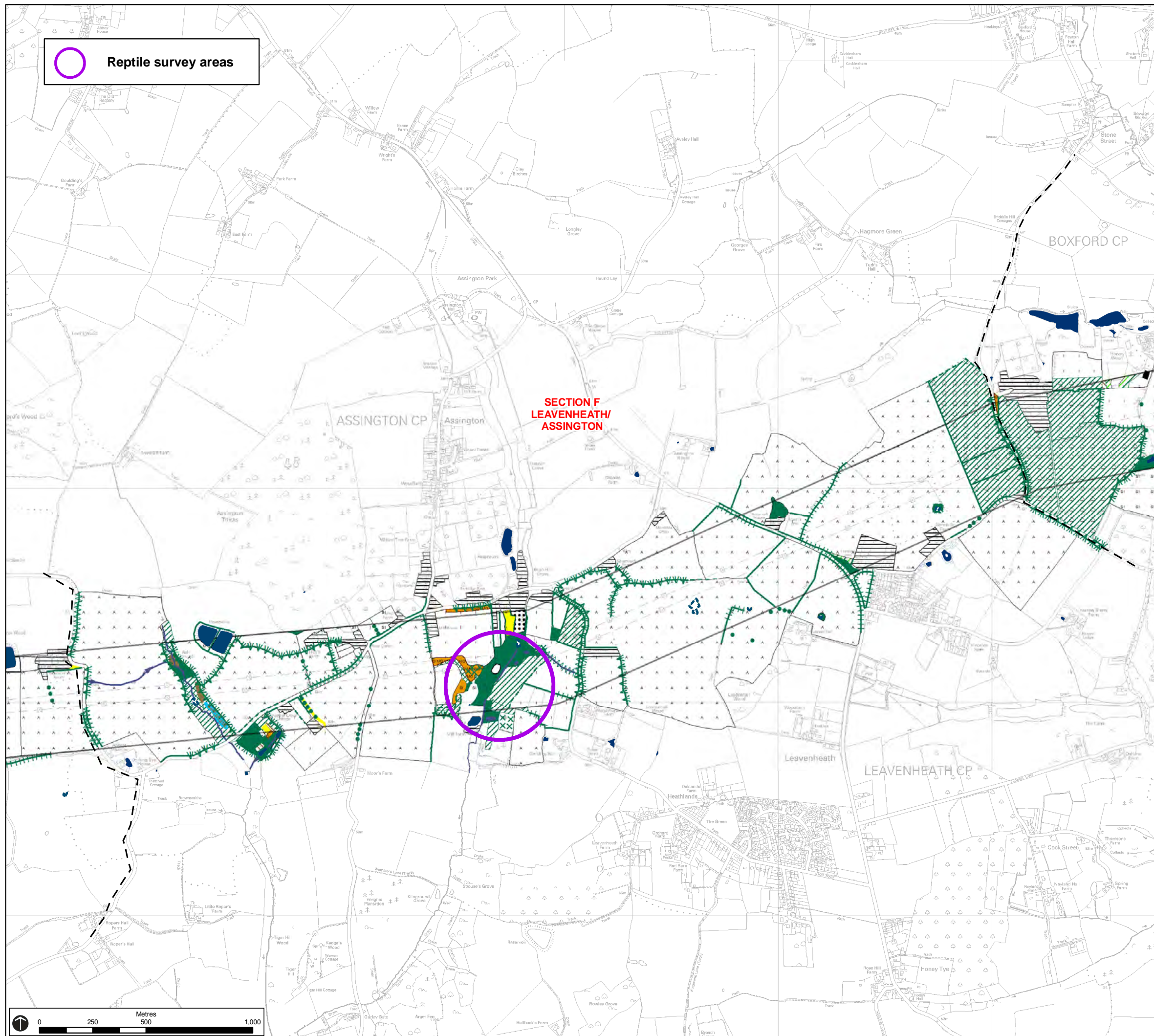
- Preferred Route Corridor
- Section Boundary
- × Scattered scrub
- Scattered broad-leaved tree
- Standing water
- ▶ Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation coniferous woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Broad-leaved parkland/scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- SI Semi-improved neutral grassland
- MG Modified neutral grassland
- MG Species-poor modified neutral grassland
- I Improved grassland
- Marsh/marshy grassland
- SI Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid/neutral flush
- Standing water
- Running Water
- Dry pond
- A Arable
- A Amenity grassland
- Houses and/or gardens
- Bare ground
- Bare ground/ephemeral mix

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Reptile Survey Areas - Section D		
Drawing No: Figure 58		
Date: 13.02.2013	TEP Ref No: G1980.1160a	
Drawn: CH	Checked: EJS	Approved: EJS

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Reptile survey areas

- Preferred Route Corridor
- Section Boundary
- Scattered scrub
- Scattered broad-leaved tree
- Scattered bracken
- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Orchard
- SI Semi-improved neutral grassland
- MG Modified neutral grassland
- MG Species-poor modified neutral grassland
- I Improved grassland
- SI Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Standing water
- Dry pond
- A Arable
- A Amenity grassland
- Buildings
- Houses and/or gardens
- Bare ground
- Bare ground/ephemeral mix

Work in Progress Feb 2013



Project: **Bramford to Twinstead Tee Connection**


Title: **Reptile Survey Areas - Section F**

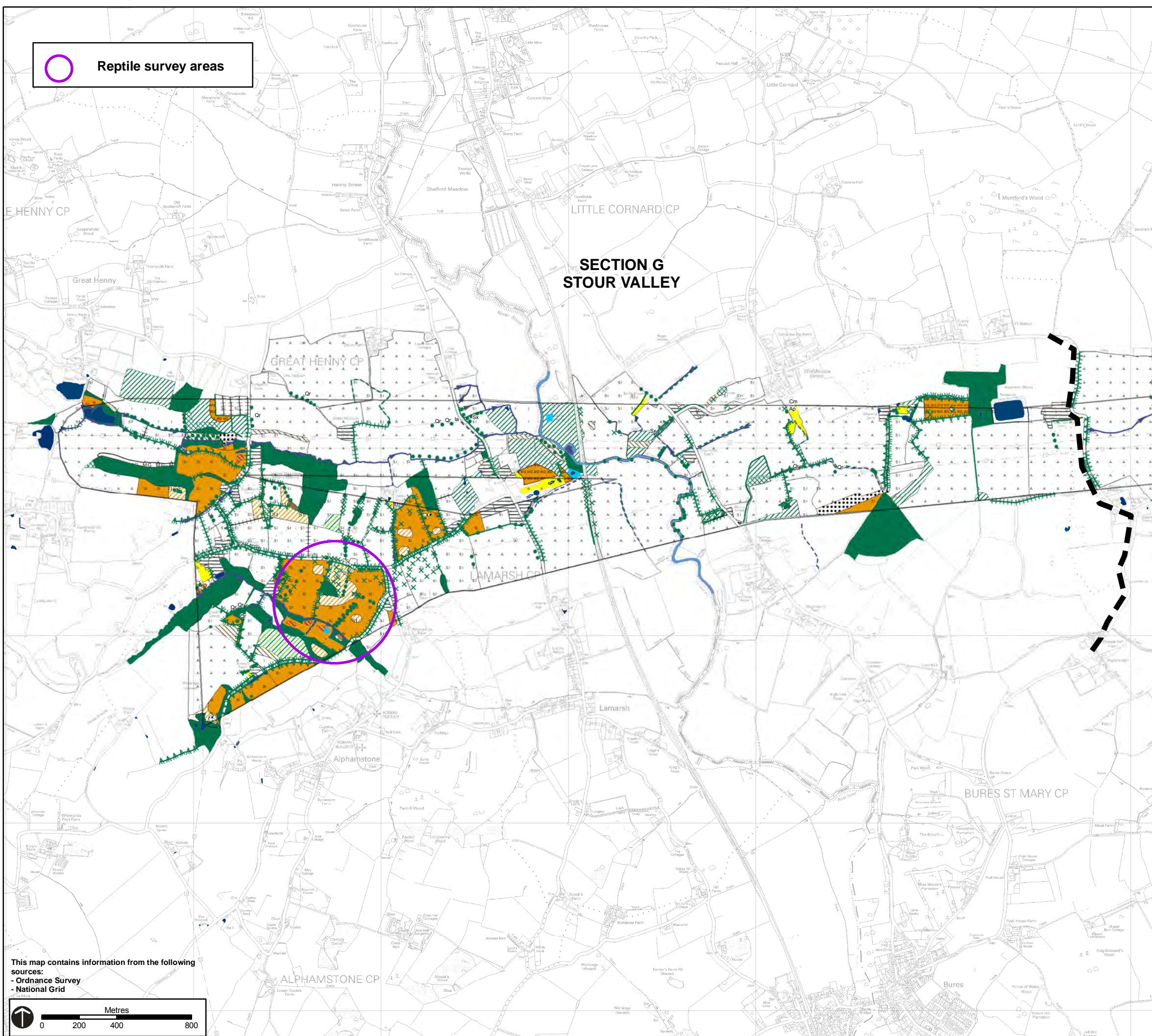
Drawing No: **Figure 59**

Date: 13.02.2013 TEP Ref No: G1980.1161a








































Drawn: CH	Checked: EJS	Approved: EJS
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 Reptile survey areas



**SECTION G
STOUR VALLEY**

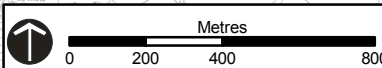
-  Preferred Route Corridor
-  Section Boundary
-  Scattered scrub
-  Scattered broad-leaved tree
-  Standing water
-  Running water
-  Native species-rich intact hedge
-  Species-poor intact hedge
-  Native species-rich defunct hedge
-  Species-poor defunct hedge
-  Native species-rich hedge and trees
-  Species-poor hedge and trees
-  Fence
-  Dry ditch
-  Semi-natural broad-leaved woodland
-  Plantation broad-leaved woodland
-  Plantation mixed woodland
-  Dense/continuous scrub
-  Scattered scrub
-  Orchard
-  Semi-improved acid grassland
-  Unimproved neutral grassland
-  Semi-improved neutral grassland
-  Modified neutral grassland
-  Species-poor modified neutral grassland
-  Improved grassland
-  Marsh/marshy grassland
-  Poor semi-improved grassland
-  Continuous bracken
-  Tall ruderal
-  Swamp
-  Standing water
-  Running Water
-  Dry pond
-  Arable
-  Amenity grassland
-  Introduced shrub
-  House and/or private gardens
-  Bare ground

Work in Progress Feb 2013

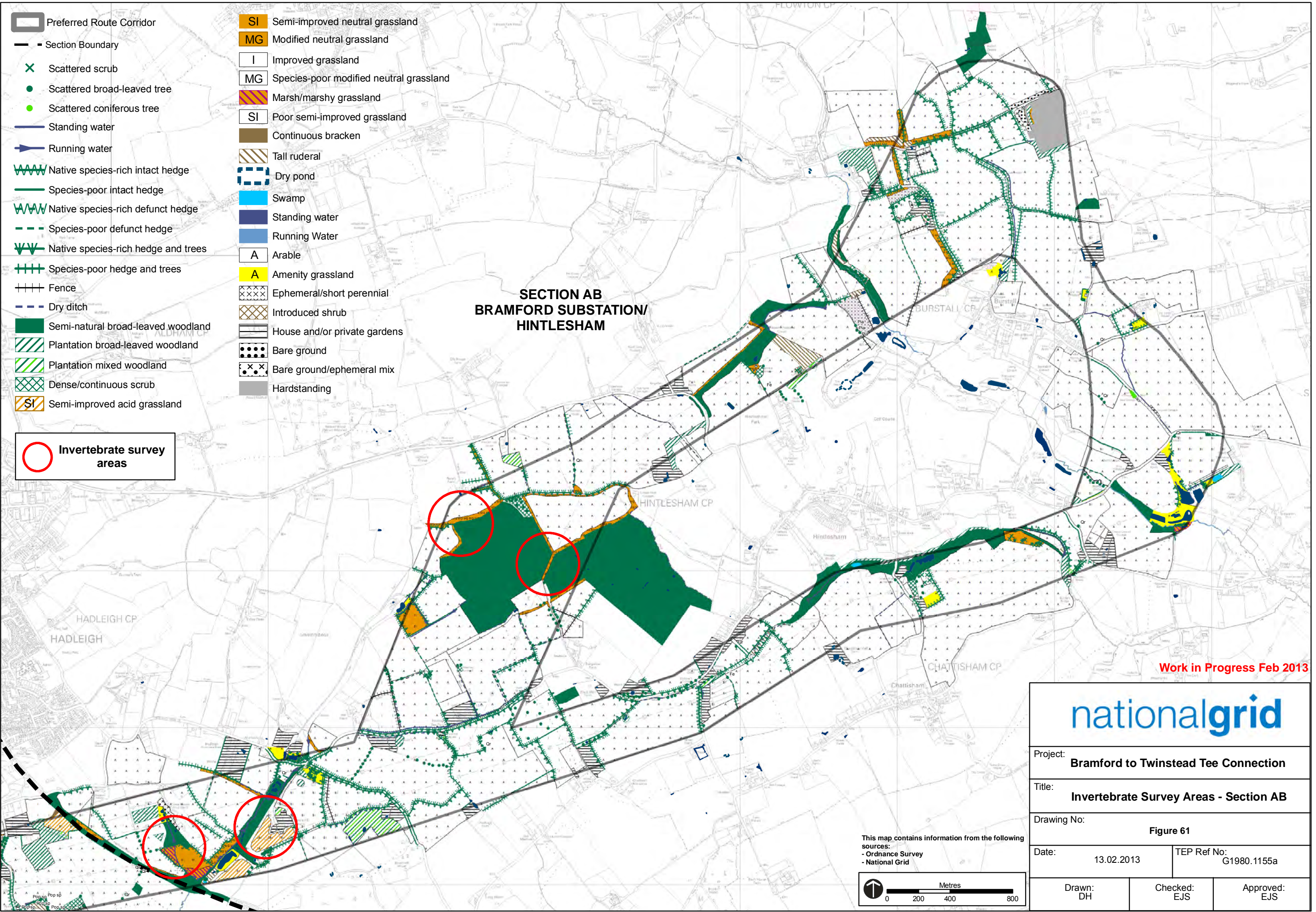


Project: Bramford to Twinstead Tee Connection		
Title: Reptile Survey Areas - Section G		
Drawing No: Figure 60		
Date: 13.02.2013	TEP Ref No: G1980.1162a	
Drawn: DH	Checked: CH	Approved: EJS

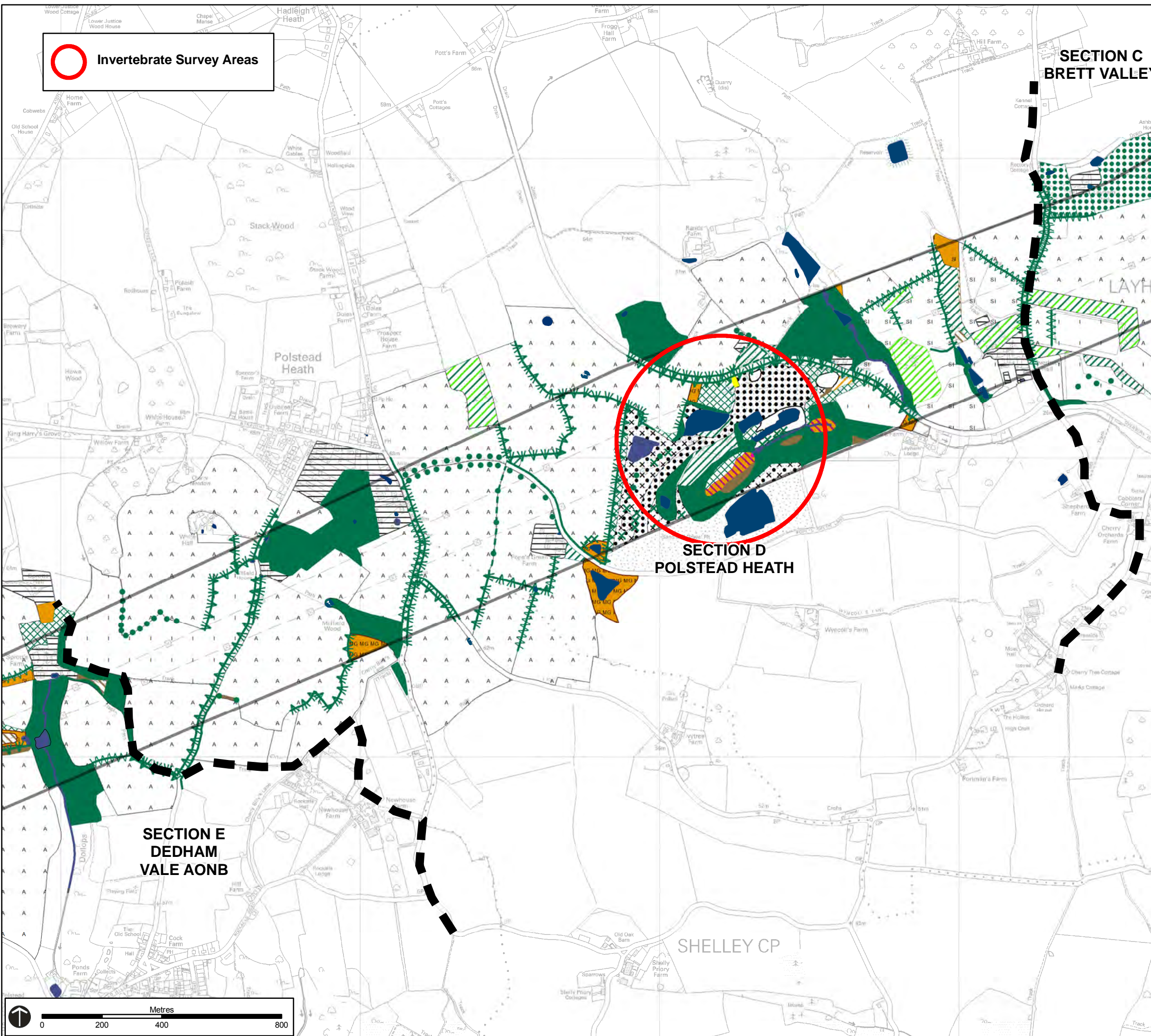
This map contains information from the following sources:
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- National Grid



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Invertebrate Survey Areas

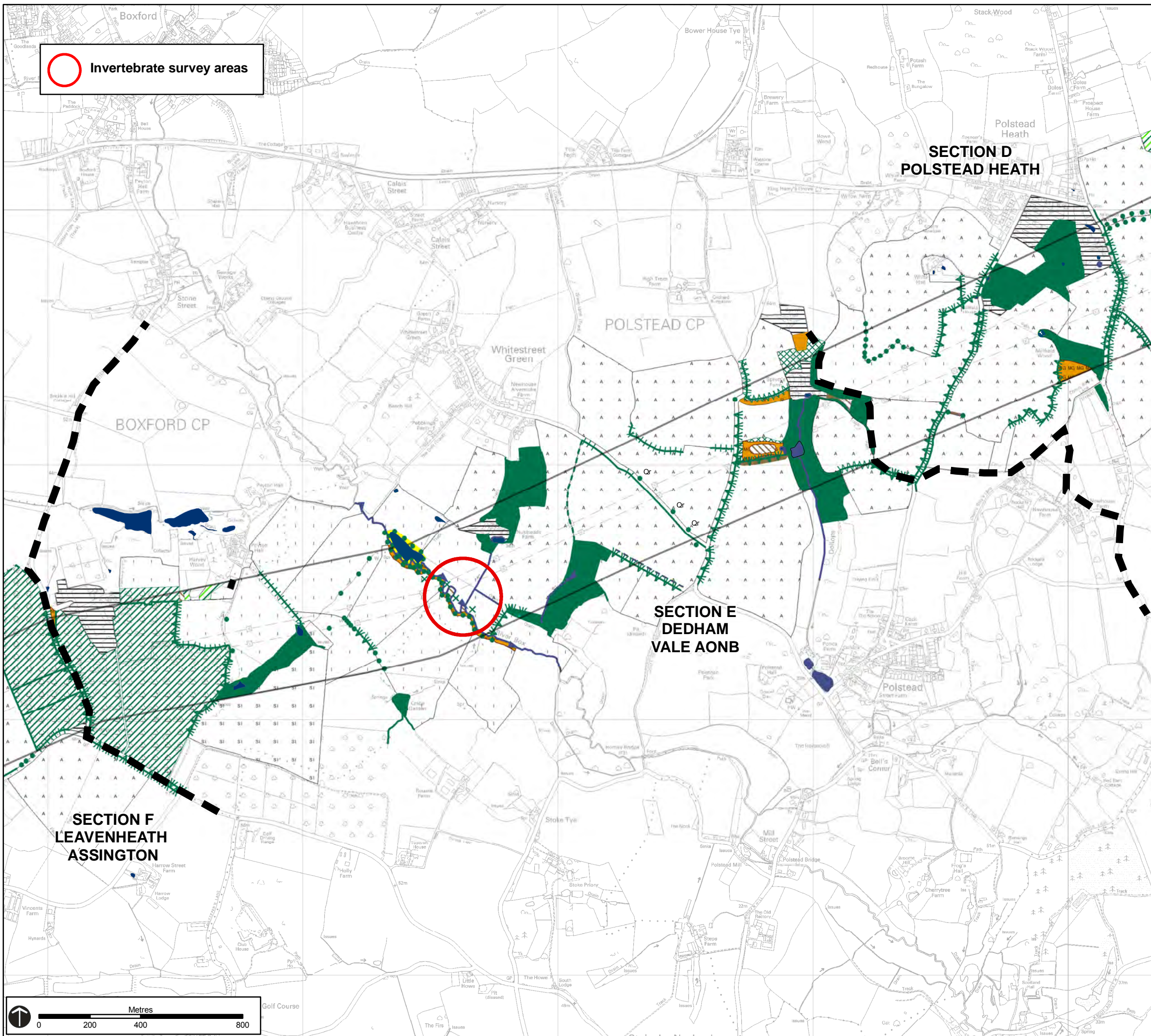
- Preferred Route Corridor
- Section Boundary
- Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation coniferous woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Broad-leaved parkland/scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- SI Semi-improved neutral grassland
- MG Modified neutral grassland
- MG Species-poor modified neutral grassland
- I Improved grassland
- Marsh/marshy grassland
- SI Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid/neutral flush
- Standing water
- Running Water
- Dry pond
- A Arable
- A Amenity grassland
- Houses and/or gardens
- Bare ground
- Bare ground/ephemeral mix

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Invertebrate Survey Areas - Section D		
Drawing No: Figure 62		
Date: 06.02.2013	TEP Ref No: G1980.1156	
Drawn: CH	Checked: EJS	Approved: EJS

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Invertebrate survey areas

- Preferred Route Corridor
- Section Boundary
- Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Dry ditch
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Orchard
- Unimproved neutral grassland
- SI Semi-improved neutral grassland
- MG Modified neutral grassland
- I Improved grassland
- SI Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Standing water
- Running Water
- Dry pond
- A Arable
- A Amenity grassland
- Buildings
- Houses and/or gardens

Work in progress Feb 2013



Project: **Bramford to Twinstead Tee Connection**

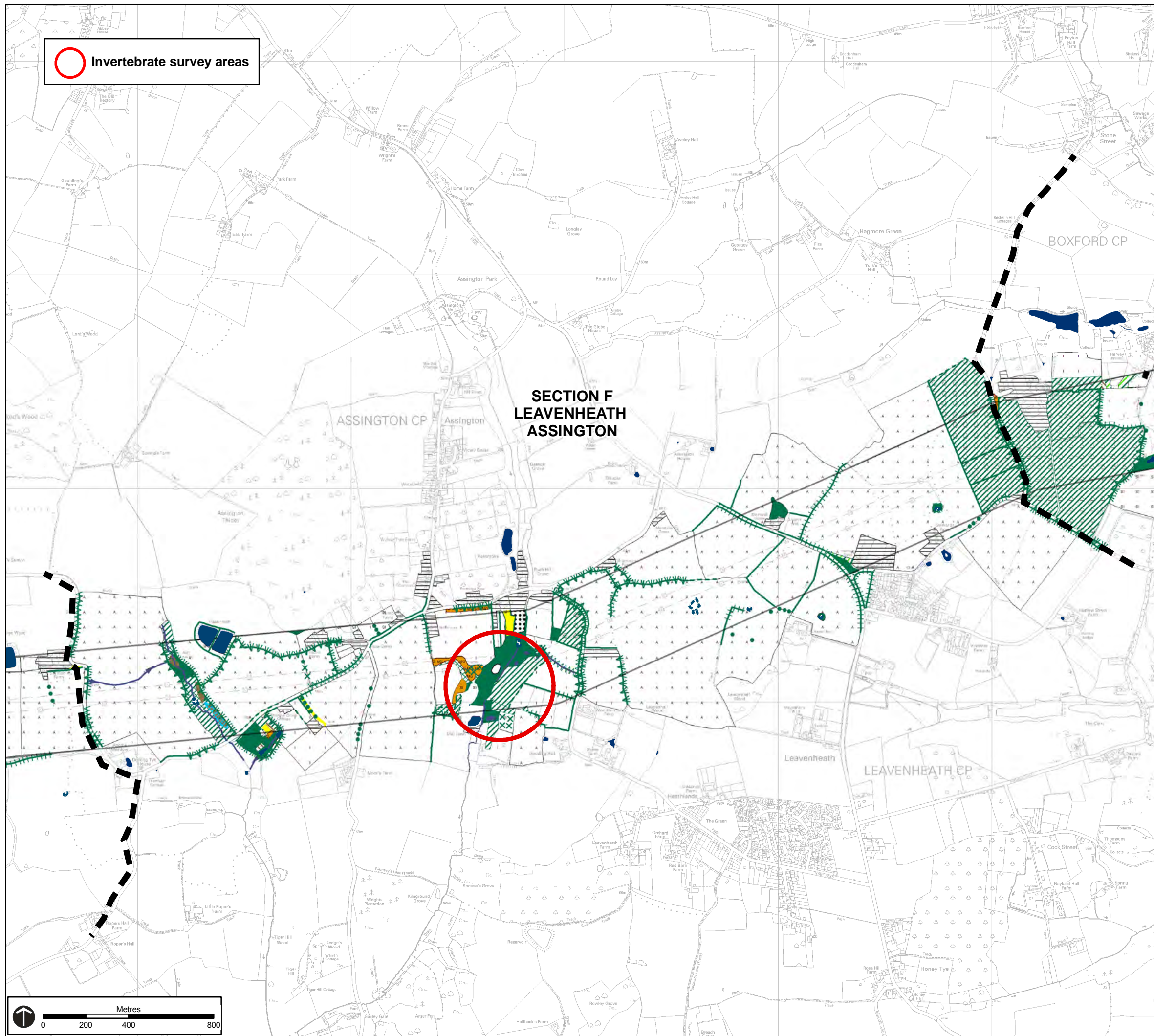
Title: **Invertebrate Survey Areas - Section E**


Drawing No: **Figure 63**

Date: 06.02.2013	TEP Ref No: G1980.1157
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





























Drawn: CH	Checked: EJS	Approved: EJS
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 Invertebrate survey areas

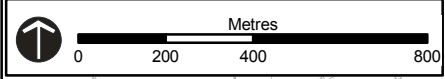
**SECTION F
LEAVENHEATH
ASSINGTON**

-  Preferred Route Corridor
-  Section Boundary
-  Scattered scrub
-  Scattered broad-leaved tree
-  Scattered bracken
-  Standing water
-  Running water
-  Native species-rich intact hedge
-  Species-poor intact hedge
-  Species-poor defunct hedge
-  Native species-rich hedge and trees
-  Species-poor hedge and trees
-  Semi-natural broad-leaved woodland
-  Plantation broad-leaved woodland
-  Plantation mixed woodland
-  Dense/continuous scrub
-  Orchard
-  SI Semi-improved neutral grassland
-  MG Modified neutral grassland
-  MG Species-poor modified neutral grassland
-  I Improved grassland
-  SI Poor semi-improved grassland
-  Continuous bracken
-  Tall ruderal
-  Swamp
-  Standing water
-  Dry pond
-  A Arable
-  A Amenity grassland
-  Buildings
-  Houses and/or gardens
-  Bare ground
-  Bare ground/ephemeral mix

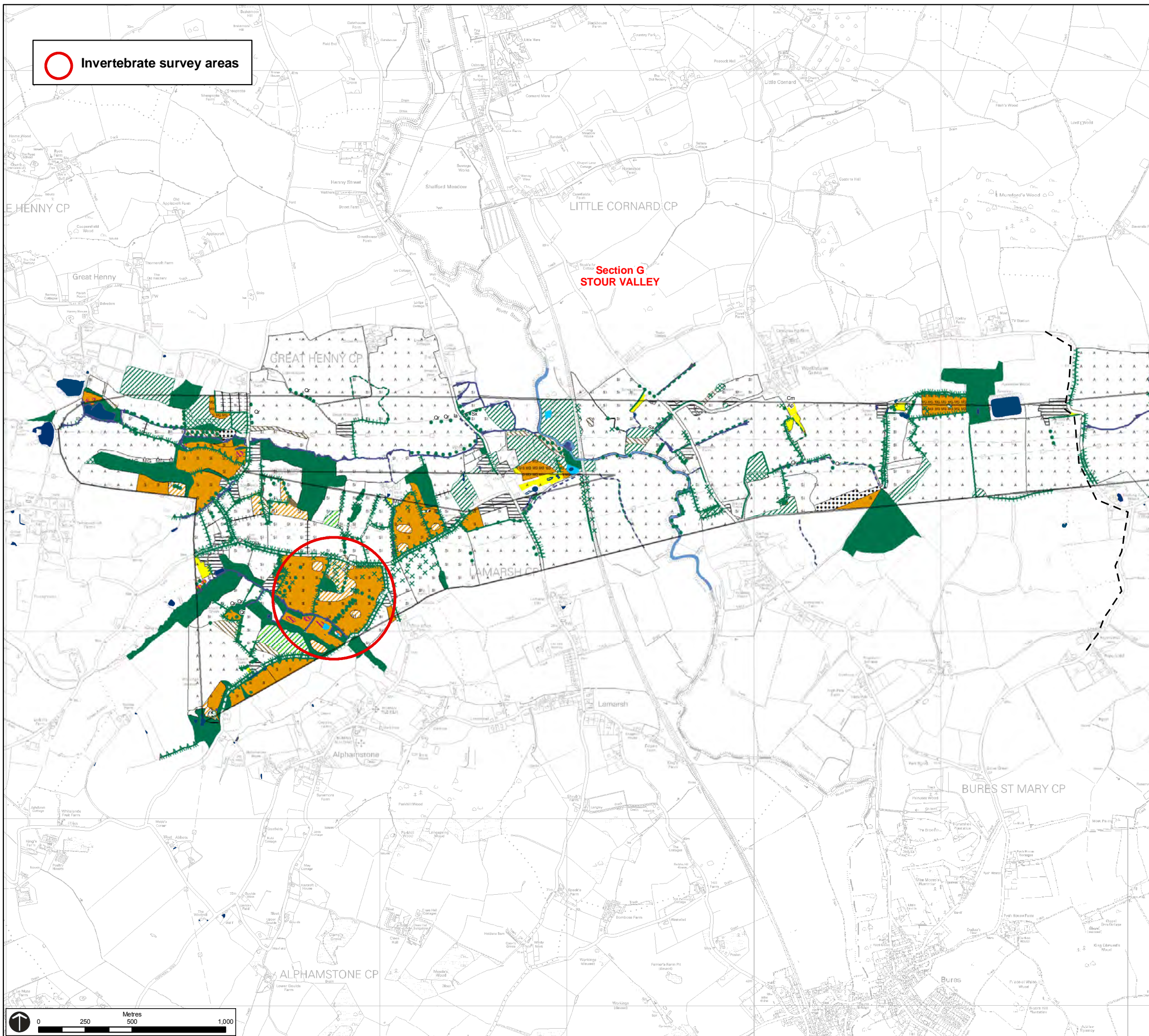
Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Invertebrate Survey Areas - Section F		
Drawing No:		Figure 64
Date:	06.02.2013	TEP Ref No: G1980.1158
Drawn: CH	Checked: EJS	Approved: EJS



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Invertebrate survey areas

- Preferred Route Corridor
- Section Boundary
- Scattered scrub
- Scattered broad-leaved tree
- Standing water
- Running water
- Native species-rich intact hedge
- Species-poor intact hedge
- Native species-rich defunct hedge
- Species-poor defunct hedge
- Native species-rich hedge and trees
- Species-poor hedge and trees
- Fence
- Dry ditch
- Semi-natural broad-leaved woodland
- Plantation broad-leaved woodland
- Plantation mixed woodland
- Dense/continuous scrub
- Scattered scrub
- Orchard
- Semi-improved acid grassland
- Unimproved neutral grassland
- Semi-improved neutral grassland
- Modified neutral grassland
- Species-poor modified neutral grassland
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Swamp
- Standing water
- Running Water
- Dry pond
- Arable
- Amenity grassland
- Introduced shrub
- House and/or private gardens
- Bare ground

Work in Progress Feb 2013



Project: Bramford to Twinstead Tee Connection		
Title: Invertebrate Survey Areas - Section G		
Drawing No:		Figure 65
Date:	13.02.2013	TEP Ref No: G1980.1159a
Drawn: CH	Checked: CH	Approved: EJS

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