Document 5.2.2.5

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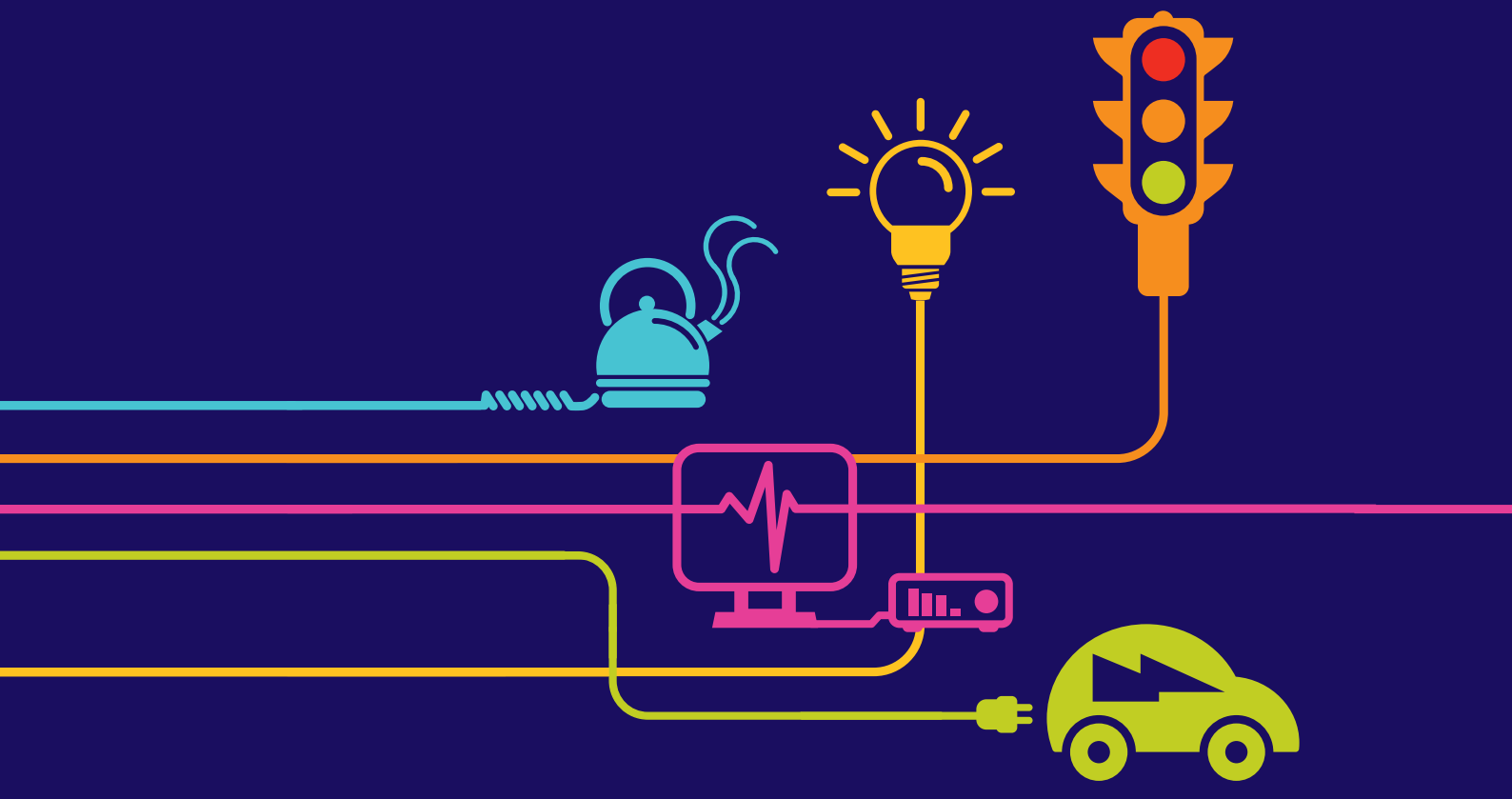
Environmental Statement Project Need and Alternatives Appendices 2H to 2J

Hinkley Point C Connection Project

Regulation 5(2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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May 2014

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Environmental Statement

Hinkley Point C Connection Project

5.2.2 – Project Need and Alternatives – Appendices (orange highlight indicates the contents of this Volume)

Appendix	Title
Volume 5.2.2.1	
2A	Hinkley Point C Connection Project Strategic Optioneering Report (2009)
2B	Hinkley Point C Connection Strategic Optioneering Report Additional Information (2010)
2C	Hinkley Point C Connection Project Strategic Optioneering Report (2011)
Volume 5.2.2.2	
2D	Hinkley Point C Connection Project Route Corridor Study (2009)
2E	Hinkley Point C Connection Project M5 Routeing Study (2012)
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2F	Hinkley Point C Connection Project Selection of Preferred Connection (2011)
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2H	Hinkley Point C Connection Project Changes to the Hinkley Point Transmission Line Entry Points: Technical and Environmental Appraisal (2012)
2I	Land Hinkley Point C Connection Project Environmental Review of Technical Options at Bridgwater Tee (2013)
2J	Hinkley Point C Connection Project Cable Sealing End Siting Study (2012)
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2N	Hinkley Point C Connection Project Local Electricity Network Substation Siting Appraisal (2012)
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2Q	Western Power Distribution Connection between the Proposed Sandford Substation and the Existing AT Route Connection Options Report (2013)
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2T	Western Power Distribution 132kV W Route Undergrounding Options Report (2013)
2U	Western Power Distribution Undergrounding Cable Sealing End Platform Pylon Location Technical and Environmental Appraisal (2013)
2V	Western Power Distribution Undergrounding of Sections of 132kV Overhead Lines G, BW Route and Seabank Line Entries Technical and Environmental Appraisal (2013)

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Appendix 2H – Hinkley Point C Connection Project Changes to the Hinkley Point Transmission Line Entry Points: Technical and Environmental Appraisal (2012)

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October 2012

Hinkley Point C Connection Project

Changes to the Hinkley Point Transmission Line Entry Points: Technical and Environmental Appraisal

Securing our energy supply for future generations.

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1. Introduction

1.1. This Technical and Environmental Appraisal (the "Report") is part of the pre-application procedures adopted by National Grid Electricity Transmission plc ("National Grid") for major infrastructure projects.

1.2. On 29th September 2011 National Grid announced its intention to proceed with the next phase of its proposed transmission connection between Bridgwater in Somerset, and Seabank Substation near Bristol (the Hinkley Point C Connection project).

1.3. At that time National Grid also published a Need Case document, which has been recently updated[1], that outlines the requirement for new transmission infrastructure in the region.

1.4. This Report appraises the options for modifying the existing transmission network in the vicinity of Hinkley Point, West Somerset and in particular transmission connections to a new 400kV substation which is required as part of the proposed EDF Energy Hinkley Point C Power Station.

1.5. In March 2012, National Grid met with the local planning authority and presented the configuration options. A draft of the initial Technical and Environmental Appraisal was issued for comment to core statutory consultees. A schedule of comments received, and how they have been taken into account in developing the project, is set out in the table in Appendix 1.

1.6. The report presents a number of stages of a multi-stage process with the purpose of identifying a preferred transmission line configuration, connection method and draft alignment. The structure of the Report is as follows:

- Section 1 provides an introduction and background to the proposal;
- Section 2 describes the need to change transmission line entry points into the proposed Hinkley Point C Power Station;

[1] Hinkley Point C Connection Project Need Case for the South West and the South Wales and Gloucestershire Regions, October 2012 http://www.hinkleyconnection.co.uk/library-project-need.aspx

- Section 3 presents options to resolve the need and identifies a preferred configuration;
- Section 4 provides an outline of the transmission line connection options appraisal methodology;
- Section 5 describes the appraisal of the connection options;
- Section 6 provides a summary of the options appraisal;
- Section 7 confirms overhead line as the preferred connection method;
- Section 8 outlines the factors considered in the appraisal of the overhead line alignments and identifies the draft alignment.

National Grid

1.7. National Grid is the operator of the high-voltage transmission system for the whole of Great Britain and the owner of the high-voltage transmission network in England and Wales.

1.8. National Grid's transmission system in England and Wales consists of approximately 7200km of overhead lines and a further 700km of underground cabling, operating at 400kV and 275kV. 400kV lines are at the higher voltage giving them a higher power carrying capability, while 275kV lines generally represent the older parts of the network which were established prior to the 400kV transmission system.

1.9. The overhead lines and underground cables connect around 340 substations to form a highly interconnected network. The substations provide points of connection for around 80 power stations and for connections to the local distribution networks, which operate at voltages from 132kV down to 240V (at which voltage, the power is distributed to domestic consumers). The distribution networks are owned by Distribution Network Operators (DNOs). In South West England and South Wales the DNO is Western Power Distribution.

1.10. National Grid has duties placed upon it by the Electricity Act 1989 and operates under the terms of its transmission licence. Those duties and terms are of particular relevance to the development of the transmission reinforcements described in this report and are set out below.

Duties under the Electricity Act 1989

1.11. Under Section 9(2) of the Electricity Act 1989 ('the Electricity Act'), National Grid has a duty:

- to develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and
- to facilitate competition in the supply and generation of electricity.

1.12. Section 38 and Schedule 9 of the Electricity Act requires National Grid, when formulating proposals for new lines and other works, 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".

1.13. In its Stakeholder Community and Amenity Policy[2], National Grid sets out how the company will meet the duty placed upon it by the aforementioned legislation. This includes:

- only seeking to build new lines and substations where the existing transmission infrastructure cannot be upgraded to meet transmission security standards;
- seeking to avoid nationally and internationally designated areas where new infrastructure is required; and
- minimising the effects of new infrastructure on other sites valued for their amenity.

1.14. The Stakeholder, Community and Amenity Policy also commits to the application of best practice methods, to assess the environmental impacts of

[2] National Grid's commitment when undertaking work in the UK: Our stakeholder community and amenity policy http://www.nationalgrid.com/NR/rdonlyres/21448661-909B-428D-86F0-2C4B9554C30E/39991/SCADocument6_2_Final_24_2_18.pd

proposals and identify appropriate mitigation measures, and to promoting effective stakeholder and community engagement.

Transmission Licence

1.15. Licence Condition C8 (Requirement to offer terms) sets out obligations on National Grid regarding provision of offers to provide connections to the transmission system. In summary, where any person applies for a connection, National Grid shall offer to enter into an agreement(s) to connect, or to modify an existing connection, to the transmission system and the offer shall make detailed provision regarding:

- the carrying out of works required to connect to the transmission system;
- the carrying out of works (if any) in connection with the extension or reinforcement of the transmission system; and
- the date by which any works required to permit access to the transmission system (including any works to reinforce or extend the transmission system) shall be completed.

1.16. Licence Condition C17 (Transmission system security standard and quality of service) requires National Grid to *"at all times: plan, develop and operate the licensee's transmission system … in accordance with the National Electricity Transmission System Security and Quality of Supply Standard version 2.1"* (NETS SQSS).

1.17. The NETS SQSS is a document that defines criteria which specify the robustness of the transmission system, in terms of the faults, and combinations of faults, that it must be able to withstand without any interruption of supplies, and the maximum interruption to supplies which is permitted under certain more onerous combinations of faults. The NETS SQSS is subject to updates through industry and regulatory working groups, with periodic review approved by the industry regulator, Ofgem.

2. The need to change transmission line entry points into Hinkley Point

Current position

2.1. National Grid's existing infrastructure at Hinkley Point consists of two substations, Hinkley Point 275kV Substation and Hinkley Point 400kV Substation. These substations were established to connect two nuclear power stations, namely Hinkley Point A and Hinkley Point B.

2.2. Hinkley Point A Power Station is currently decommissioning but is connected to Hinkley Point 275kV Substation. This substation is in turn connected to Hinkley Point 400kV Substation and to the wider transmission system by two interbus transformers. Hinkley Point 275kV Substation is also connected by a double circuit connection (VQ route), to Bridgwater 275kV Substation where it supplies the local distribution system, which is operated in this area by Western Power Distribution (WPD).

2.3. Hinkley Point B Nuclear Power Station is currently connected to the transmission system via Hinkley Point 400kV Substation and two 400kV double circuit overhead lines. These routes are described below.

2.4. The first route (400kV ZZ route) runs between Hinkley Point and National Grid's Taunton 400kV Substation in Somerset, passing to the west of Bridgwater, from Taunton the transmission system extends onto the south west peninsula, towards Exeter and then along the south coast.

2.5. The second route (400kV ZG route) runs between Hinkley Point and Melksham Substation in Wiltshire, passing to the north of Bridgwater and east of Frome in Somerset. Melksham Substation is a major transmission connection point linking multiple transmission connections with London, the Midlands and South Wales.

2.6. The drawings below, Figure 2.1 and Figure 2.2, show the existing line entry points into Hinkley Point with the ZZ, VQ and ZG routes indicated. The existing 275kV and 400kV substations are also highlighted.

Figure 2.1

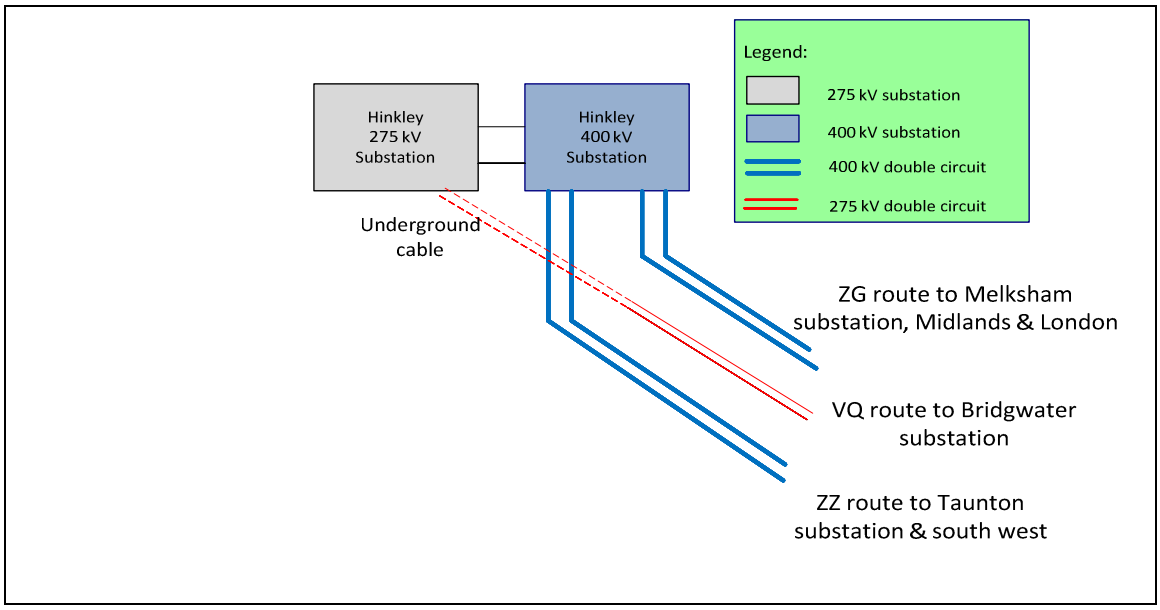
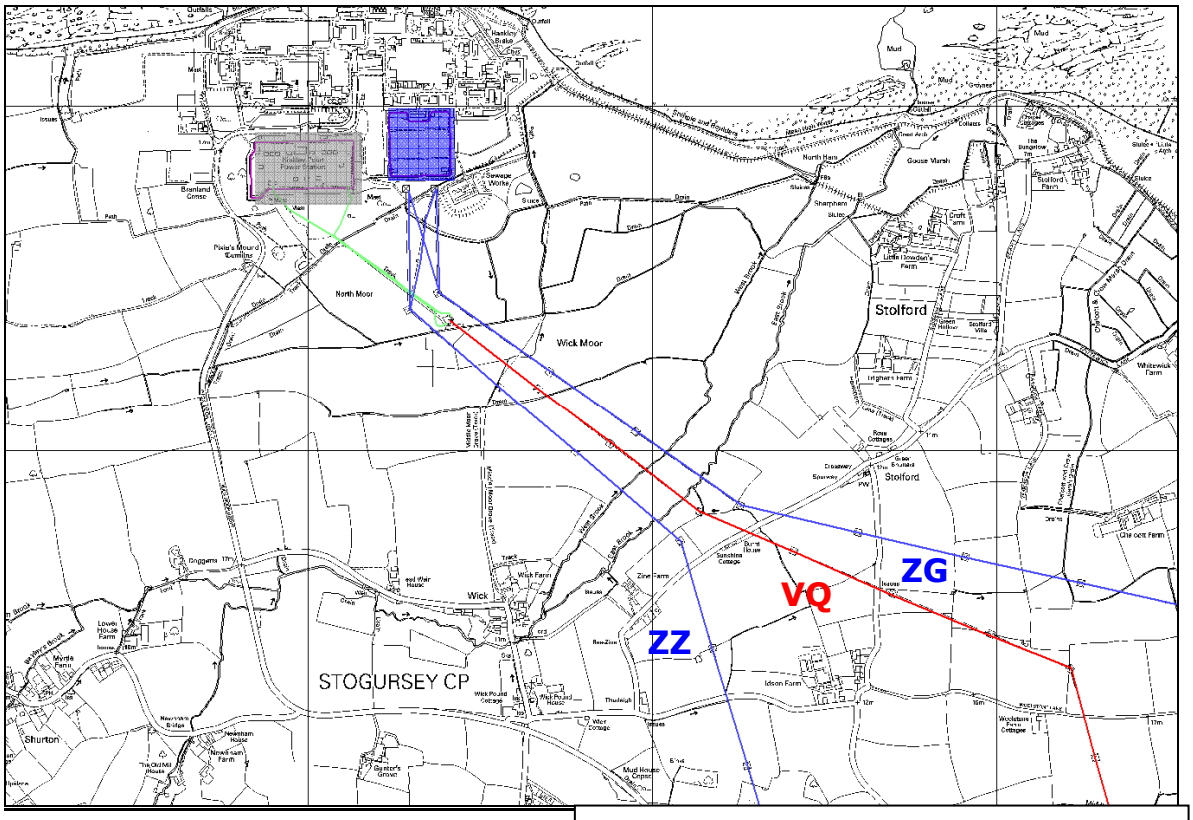


Figure 2.2



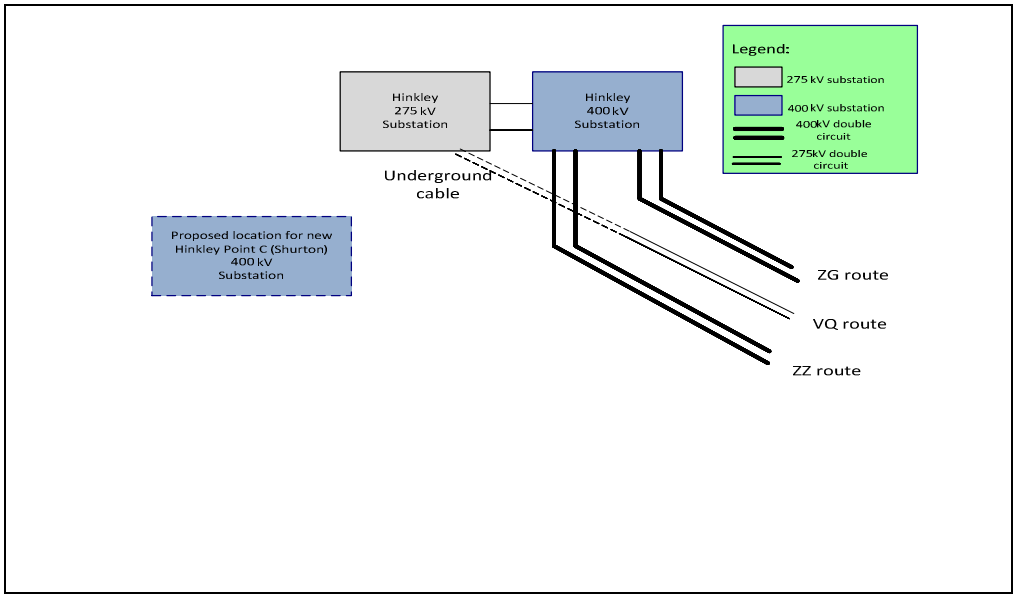
Future Requirements

2.7. In October 2011 EDF Energy submitted an application to the Planning Inspectorate (formerly the Infrastructure Planning Commission) for a Development Consent Order (DCO) for a new 3340MW nuclear power station at Hinkley Point. The proposed power station (Hinkley Point C) will be sited on land adjacent to the existing Hinkley A and B Power Stations.

2.8. To facilitate the connection of Hinkley Point C to the high voltage transmission network a new 400kV substation is required; this will be located within the Hinkley Point site to the south west of the proposed power station. The substation has been included within EDF's DCO application.

2.9. In 2007 British Energy (now part of EDF Energy) submitted an application to National Grid requesting connection of Hinkley Point C. In accordance with National Grid's licence obligations, a connection offer was made in October 2007. The location of the new 400kV substation, to be called Shurton Substation, in relation to the existing substations is shown in the figure 2.3 below:

Figure 2.3



2.10. The increased generating capacity of Hinkley Point C, and the need to maintain technical standards and compliance with NETS SQSS across the network, mean that the transmission network and connections in the region need to be

upgraded. Details of compliance standards and the transmission capacity deficit are provided in the Hinkley Point C Connection Project Need Case referenced in section 1.3 above.

2.11. The Hinkley Point C Connection Project Need Case identified the need for a minimum of three 400kV double circuits to connect the new power station to the National Grid transmission system. This means that the existing 275kV line between Hinkley Point and Bridgwater needs to be upgraded to 400kV in order to provide the third double circuit back to Hinkley Point. The section of 275kV underground cable within the existing circuit does not have sufficient capacity to operate at 400kV and therefore will not form part of the upgraded circuit.

Maintaining the connection to the existing Hinkley 275kV and 400kV substations

2.12. To meet the requirements of the NETS SQSS three double circuits will need to be connected to the new Shurton 400kV Substation, in addition a minimum of two double circuits will need to continue to connect to the existing 400kV Hinkley B Substation while it is operational and until it has been fully decommissioned. Likewise the interbus transformers connecting the 275kV substation to the 400kV substation are required until the Hinkley Point A Power Station has been fully decommissioned.

2.13. When the A and B power stations are fully decommissioned all three transmission line routes (ZZ, VQ, ZG) will need to connect to Shurton Substation. Full decommissioning is unlikely to be completed before 2030.

2.14. The next section of this Report assesses options for configuring the transmission circuits around Hinkley Point B and C in order to meet the requirements set out above.

3. Options for transmission line entry points into Hinkley Point

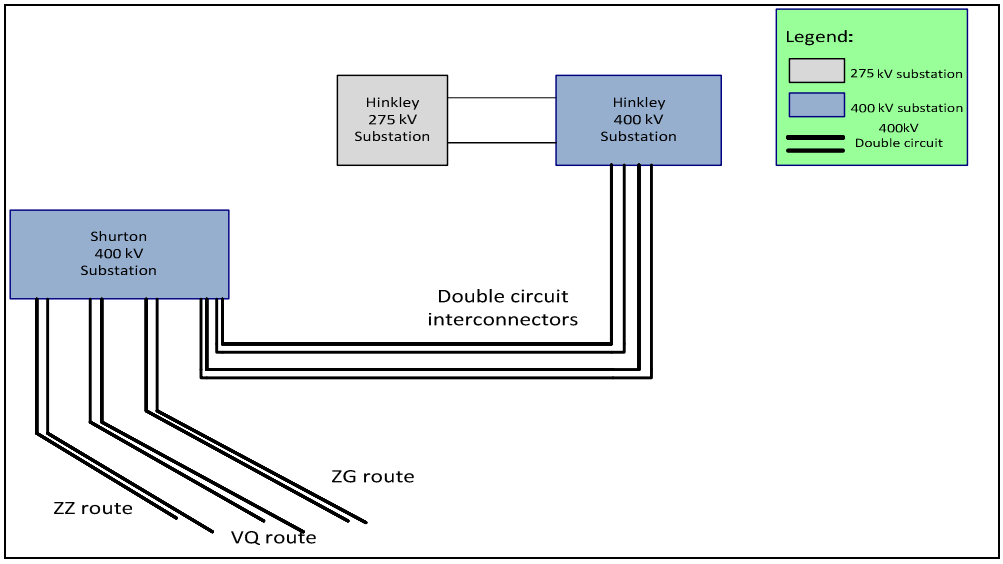
3.1. Three possible options have been identified to configure the transmission lines around the three substations in order to meet the requirements set out above. The three options are shown in the schematic diagrams below.

3.2. For each of the options, the diagrams show both the configuration upon commissioning of Hinkley C and the configuration following the decommissioning of Hinkley B, which is unlikely to be before 2030.

Option 1

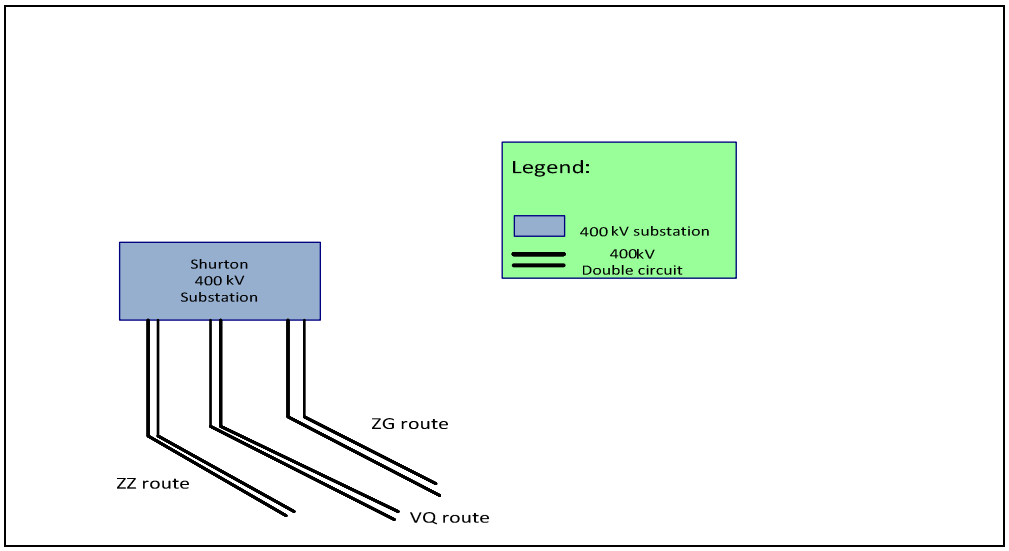
3.3. Option 1, outlined in Figure 3.1a below, shows the configuration following the commissioning of Hinkley C where each of the 400kV double circuit transmission routes are connected into the new Shurton Substation. Two new double circuit interconnectors will also be required to connect the new Shurton Substation with the existing substations until the Hinkley B power station is decommissioned to comply with NETS SQSS and Nuclear Site Licence requirements[3]. The configuration following decommissioning of Hinkley B is shown in Figure 3.1b below.

Figure 3.1a Option 1 – following commissioning of Hinkley C



[3] Office for Nuclear Regulation: Licence condition handbook October 2011

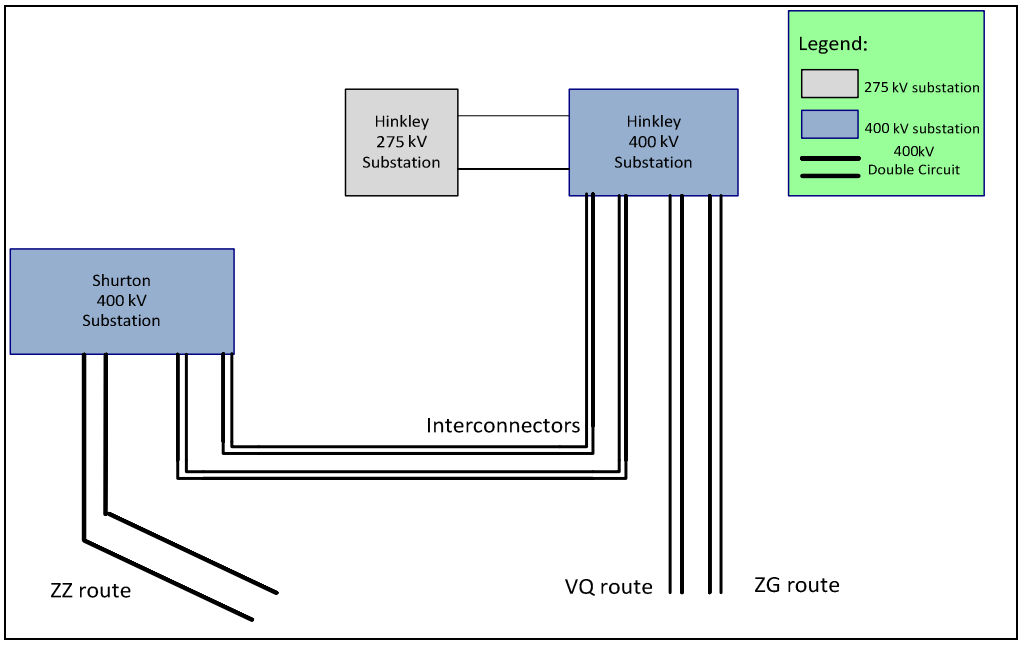
Figure 3.1b Option 1 - following decommissioning of Hinkley B



Option 2

3.4. Option 2 outlined in figure 3.2a below shows a configuration, following Hinkley C commissioning, where the ZG route continues to be connected into the existing Hinkley B Substation. The VQ route is upgraded to 400kV and is also connected into the Hinkley B 400kV Substation. Both of these routes would need connecting to the new Shurton Substation when the B power station is decommissioned.

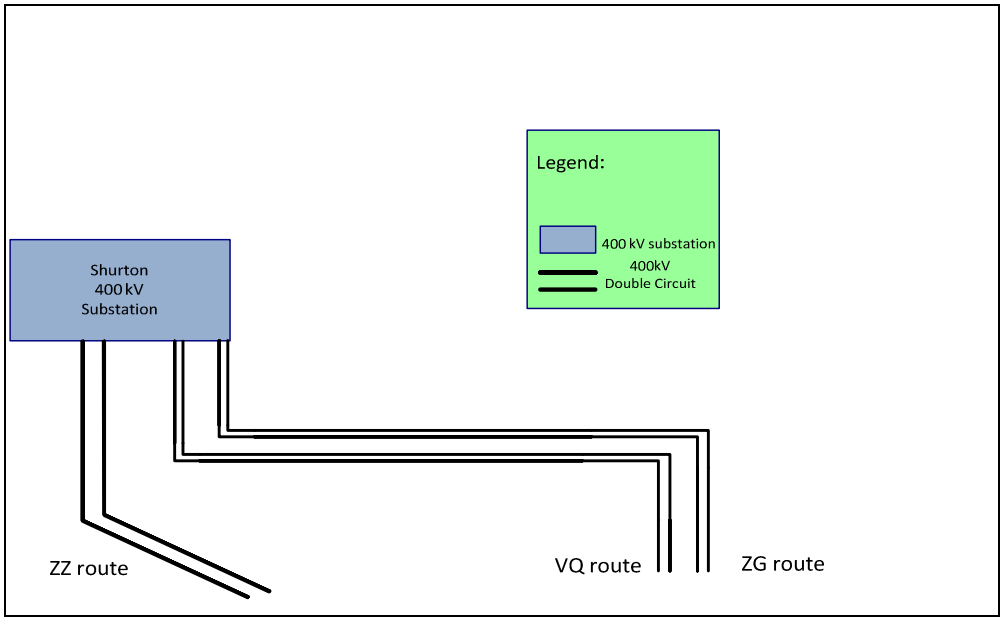
Figure 3.2a Option 2 - following commissioning of Hinkley C



3.5. The ZZ route would be connected to the new Shurton Substation and two new double circuit interconnectors would be required between the Hinkley B Substation and Shurton Substation to provide three double circuits for Hinkley Point C and meet the requirements of NETS SQSS and Nuclear Site Licence requirements.

3.6. The configuration for Option 2 following decommissioning of Hinkley B is shown in figure 3.2b below.

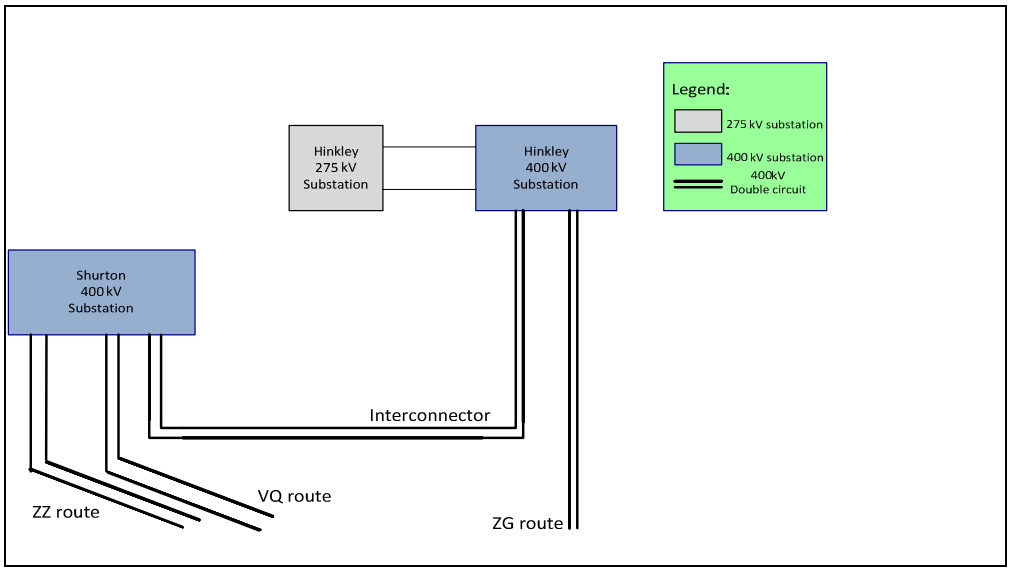
Figure 3.2b Option 2 – following decommissioning of Hinkley B



Option 3

3.7. Option 3 is outlined in figure 3.3a below (configuration following the commissioning of Hinkley C). This option requires realignment of the ZZ and VQ routes to the new Shurton Substation. The ZG route, in the short term, would remain connected to the Hinkley B Substation until such time as it is decommissioned.

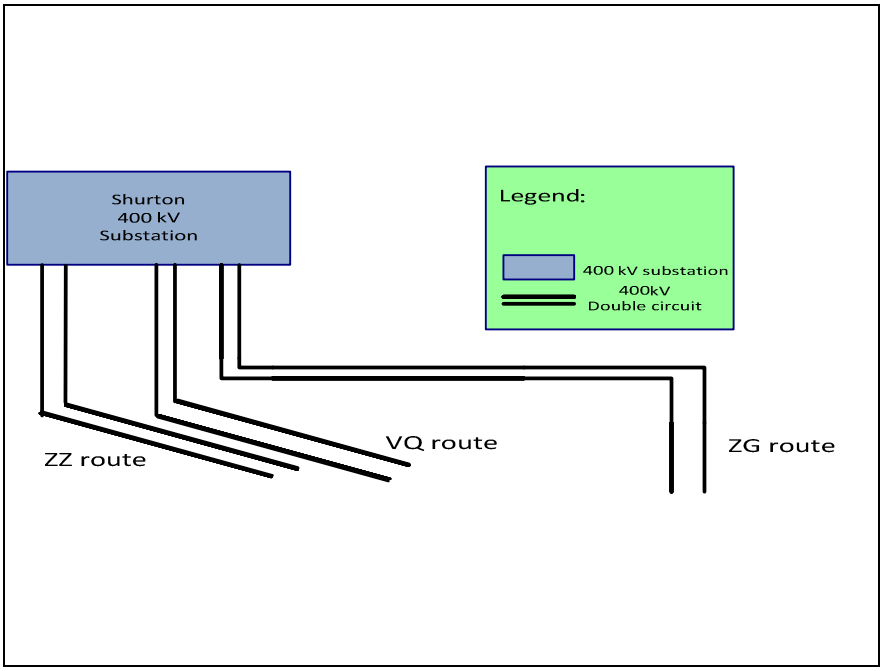
Figure 3.3a Option 3 – following the commissioning of Hinkley C



3.8. A new double circuit interconnector between the two substations is required to meet the NETS SQSS and Nuclear Site Licence requirements.

3.9. The ZG route could be routed to the new Shurton Substation using the infrastructure of the interconnector when Hinkley B Power Station is decommissioned as shown in figure 3.3b below.

Figure 3.3b Option 3 – following decommissioning of Hinkley B



Comparison of Options

3.10. All of the options are compliant with technical standards and would meet the need identified to connect the proposed new nuclear power station at Hinkley Point C whilst maintaining connection for the existing generation at Hinkley Point B to the high voltage transmission system.

3.11. Options 1 & 2 would result in a total of five double circuits in and around the Hinkley Point Power Station complex until Hinkley B is decommissioned. Three double circuits providing connection to the wider transmission system and two double circuits for interconnection between the existing Hinkley B and new Shurton Substations. Option 3 requires a total of four double circuits.

3.12. Options 1 & 2 would require additional transmission circuits and associated infrastructure. They would be more expensive and provide no benefit over option 3 (which only requires a total of four double circuits). They would also result in a greater level of environmental effect due to the requirement to construct extra infrastructure. As a result Options 1 and 2 were not taken forward for more detailed assessment.

3.13. Option 3 connects the ZZ and VQ routes to the new Shurton Substation and requires the creation of a single double circuit interconnector between the Hinkley B and Shurton Substations.

3.14. The ZG route would remain connected to the Hinkley B Substation until such time as it is decommissioned, minimal additional work would be required to re-route this circuit to Shurton Substation as the interconnector infrastructure could be used to make the connection.

3.15. Option 3 is therefore the preferred configuration to be taken forward for appraisal.

4. Appraisal of transmission line connection options - methodology

4.1. Three connection options are available for providing the new sections of transmission circuit as outlined in the preferred configuration (option 3), these are:

i. Overhead Line

ii. Underground Cable

iii. Gas Insulated Line

4.2. The realignment of the ZZ and VQ route will each require approximately 1.7km of new transmission circuit. The new interconnector will be approximately 1km in length. For the purposes of this appraisal it has been assumed that Option 3 will require approximately 4.4km of new transmission circuits.

Overview of Options Appraisal

4.3. Options appraisal is an analysis which considers relevant technical, environmental and socio-economic issues and the costs associated with each technology option. Analysis of these factors allows National Grid to assess which option best meets its various statutory and licence obligations.

Technical Appraisal

4.4. Option 3 has been assessed initially to ensure that it would comply with the standards set out in NETS SQSS. This means that the implications on both the local and wider transmission network are fully assessed before connection options are appraised.

4.5. It has been identified that the existing underground cable connection to the 275kV substation has insufficient capacity for future use and would need to be removed.

Economic Appraisal

4.6. Once the scope of works associated with each connection option is identified, an estimate of the capital cost of that scope of works is made.

4.7. Capital cost is an estimate of the cost of equipment and installation costs. These costs are provided in current financial year prices applicable at the time of publication of this Report. For the purposes of reviewing technical options, the cost estimates are based on generalised unit costs for the key elements of the option, reflecting recent contract values or manufacturers' or consultants' budget estimates. This is sufficient to allow a broad order of consistent costs to be established for the options, as necessary at the strategic level, and is not intended to provide a detailed cost for each option which can only be obtained at the detailed design stage.

4.8. The lifetime cost is an estimate of the capital cost, transmission losses, and maintenance costs for the new infrastructure over a 40 year lifetime. The costs for operation, maintenance and losses are calculated based on a net present value (NPV) discount rate of 3.5%. The 3.5% value is that recommended by Her Majesty's Treasury Green Book[4].

Environmental Appraisal

4.9. A high level planning and environmental appraisal (see Appendix 2), has been undertaken to consider environmental constraints of national and international importance for the three potential connection options (overhead line, underground cables or gas insulated lines).

4.10. The study area is relatively small because of the localised nature of the works proposed. It therefore focuses on the area where actual changes are required to the existing overhead lines to connect the proposed Shurton Substation. The existing line entries to Hinkley Point are an established feature in the local area. By seeking to locate the proposed works in close proximity to the area in

4 HM Treasury Green Book; Appraisal and Evaluation in Central Government; Guidance from HM Treasury to public bodies on how proposals should be appraised prior to significant commitment of funds. Reference Section 5.49 **http://www.hm-treasury.gov.uk/d/green_book_complete.pdf**

which the existing overhead lines are situated we are seeking to minimise the scale of change in the locality.

4.11. In accordance with National Policy Statement EN5[5], when siting new overhead lines, the principles of the Holford Rules[6] should be taken into account. For the options that involve an underground connection (cables or GIL), it is still appropriate to consider the environmental designations and constraints referred to in the Holford Rules.

4.12. The structure of the Environmental Appraisal which is presented at Appendix 2 is as follows :

- Section 1 is an introduction and lists the features considered as potential environmental constraints (Table 1.1). The table also summarises the legislation under which protection is conferred, the reference to the guidance which identifies the features and the data sources from which information (where applicable) was taken;
- Section 2 contains a drawing identifying the environmental constraints present in the area;
- Section 3 is a high level summary of the baseline environmental constraints in the study area and the potential implications these may have for routeing; and outlines potential environmental effects and mitigation requirements for each of the connection options.

4.13. Summaries of the environmental appraisals set out in Appendix 2 for each of the connection options are presented in section 5 below.

4.14. There are some environmental factors that do not influence the high-level strategic appraisal. The factors scoped out of the appraisal at this stage are: noise and vibration; air quality and soils and geology. These are not material factors in distinguishing between the options at this high level. Although these factors have been scoped out of the options appraisal process at this stage,

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5 Paragraph 2.8.7, National Policy Statement for Electricity Networks Infrastructure (EN-5), July 2011

[6] Holford Rules: Guidelines for the routeing of new high voltage overhead transmission lines

they may require consideration as part of detailed routeing studies and environmental assessment for whichever option is taken forward.

Socio-Economic Appraisal

4.15. Socio economic factors have been scoped out of the appraisal at this stage.

4.16. Economic activity such as impact on local tourism would not represent a significant factor in choosing between the different options given the scale and localised nature of works and their location close to the existing and proposed Hinkley Point Power Stations. Effects on views from properties are considered in the Environmental Appraisal.

4.17. The impacts on traffic and transport are not anticipated to differentiate between options at this stage of the appraisal given the scale and localised nature of the works. The options under consideration would have no impact on aviation or defence in the area. Potential effects on public rights of way including the West Somerset Coastal Path will be considered at the next stage of assessment. Works to the line entries would not directly impact upon the West Somerset Coastal Path, which runs along the coast approximately 700m north of the new line entries into the proposed Shurton Substation. The proposed power station (Hinkley Point C) will be situated between the new line entries to the south and the West Somerset Coastal Path to the north. Potential effects on more distant views from the West Somerset Coastal Path from further along the coast (west and north east) will be considered at the next stage of assessment.

5. Appraisal of connection options

5.1. Option 3 has been taken forward for appraisal. This option only requires four double-circuit connections, whereas Options 1 and 2 both involve five double-circuit connections.

i) Overhead Lines

Technical Considerations

5.2. Standard 400kV double circuit overhead line would consist of steel lattice pylons. Each pylon would typically have three arms on two opposite sides, with between 2 and 3 sets of conductors (wires) suspended from each of the six side arms of each tower.

5.3. The height of the pylons would be driven by safety associated with providing the clearance needed to prevent the electricity jumping between the lines, or to the ground, buildings or structures. Pylons for a 400kV double circuit overhead line would be, typically, 47m high, spaced at approximately 300 – 400m apart and with a standard base footprint of 10m by 10m.

5.4. Where an overhead line changes direction and where lines terminate at substations, stronger pylons are required which have heavier steelwork and larger footprints than the standard pylons. Longer and shorter spans are likely to be needed in some locations, with longer spans often required to span potential obstacles. Where this is required, shorter spans are needed either side of the longer spans.

Environmental Factors

Landscape and Views

5.5. There are no landscape designations in the study area. The Quantock Hills AONB is approximately 5km west of the study area. No significant adverse effects are anticipated on the purposes of the Quantock Hills AONB designation or views from it, due to the nature of the modifications proposed, the distance of the works from the AONB and the presence of existing electrical infrastructure. However, this would be considered as part of a landscape and visual assessment at a later and more detailed stage of assessment.

5.6. A belt of woodland surrounds the existing power stations at their southern, eastern and western boundaries. Tree removal in the woodland areas could be avoided or minimised by careful pylon siting.

5.7. There are no settlements in the study area. The nearest settlement is the hamlet of Wick, approximately 400m south west of the existing 400kV and 275kV (ZZ, ZG and VQ) overhead lines. Shurton village is approximately 1.5km west of the Hinkley Point - Taunton 400kV overhead line. Stogursey is approximately 1.8km south of the study area.

5.8. If new overhead line connections were taken forward, the properties likely to be most affected by a change in view are those closest to the southern boundary of the study area in the area of Wick. These include Doggetts, Head Weir House, Wick Farm, Zine Farm, Sunshine Cottage and Burnt House.

5.9. The significance of any landscape and visual effects would be reduced by the existing influence of electricity generation/transmission infrastructure in the area and would depend on the exact alignment of the overhead lines. However, the modifications are likely to bring the overhead line infrastructure closer to properties south of the study area at Wick and Shurton than the existing overhead lines. Routeing would seek to maximise the distance of the overhead lines from residential receptors to minimise the significance of adverse visual effects. Potential mitigation requirements would be considered during the identification of route alignments through a landscape and visual assessment.

5.10. The potential effects on views from other receptors, e.g. footpaths would be taken into account at a later and more detailed stage of assessment.

Ecology

5.11. Bridgwater Bay SSSI includes land to the north, east and south of the existing Hinkley Point power stations. Bridgwater Bay forms part of the Severn Estuary SPA, SAC and Ramsar site and comprises a range of habitats including extensive intertidal mudflats, sandflats, saltmarsh, shingle beach and marsh intersected by networks of ditches. These habitats support a number of internationally and nationally important over-wintering and passage migrant waders and waterfowl. The site forms an integral part of the Severn Estuary system and is ecologically linked to the Somerset Levels which provide alternative winter feeding grounds for waders and wildfowl. The Ramsar

designation also extends to cover fish populations of the estuarine and river system which is one of the most diverse in Britain.

5.12. The existing overhead lines and underground cables in the study area travel through the Bridgwater Bay SSSI and the Severn Estuary SPA/Ramsar sites south of the Hinkley Point Power Stations. Removing the existing infrastructure (cables and pylons) from within the designated sites is likely to result in disturbance and temporary loss of habitat. There is potential for adverse effects on internationally important bird species which may use the study area for high tide roosting or foraging during construction. There is also potential for adverse effects on watercourses (e.g. pollution or sedimentation) within the study area as a result of construction activities which could lead to effects on aquatic ecology and fish.

5.13. Siting new infrastructure in SSSIs, SPAs and Ramsar sites should be avoided where possible. Routeing along the southern and western boundary of the study area would minimise the requirement to site new pylons in the area protected under these designations. Potential effects on bird flight paths would also require consideration.

5.14. The potential effects on the special interest and qualifying features of these designated sites would require detailed consideration. An Appropriate Assessment in accordance with the Conservation of Habitats and Species Regulations 2010 may be required to identify any potential direct or indirect effects on the integrity of the Severn Estuary SPA and Ramsar site. Mitigation would depend on the results of field surveys carried out in consultation with Natural England and the local authority, but could include restrictions on the timing of certain works to reduce potential effects on birds, or the selection of construction methods or particular plant/machinery to minimise disturbance.

5.15. The Severn Estuary SAC and Bridgwater Bay NNR are approximately 450m east of the study area. The potential for indirect effects on the integrity of these sites and their qualifying features would be considered at the next stage of assessment.

5.16. Land immediately south and west of the power stations is designated as Hinkley Local Wildlife Site and Hinkley Point Nature Reserve. The potential effects on these sites would be taken into account at the next stage of

assessment in consultation with Natural England, the planning authority and the local wildlife trust.

5.17. No indirect effects are anticipated on the Exmoor and Quantock Oakwoods SAC which is approximately 6km west of the proposed works and supports Barbastelle and Bechstein's bats. This would be considered at the next stage of assessment.

Historic Environment

5.18. Wick Barrow Scheduled Monument (known as Pixies Mound) is in the north of the study area, approximately 150m south of the existing power stations and could be avoided by careful routeing. However an assessment to identify any indirect effects on the feature or its setting would be required due to its proximity to the proposed works, particularly the interconnector circuit. Effects could be minimised by maximising the distance between the Scheduled Monument and the new connections.

5.19. Other unknown archaeological assets could be affected by ground disturbance associated with removal of existing equipment and installation of new pylons. Effects are unlikely to be significant in areas where existing cables and pylons need to be removed as the ground has been previously disturbed. The installation of overhead lines would be less invasive than underground connections. An assessment of the potential for archaeological remains and any direct/indirect effects during construction would be required. Mitigation would depend on the findings of the archaeological assessment, but could be minimised through careful routeing/pylon siting.

5.20. No significant adverse effects are anticipated on the setting of Fairfield House Registered Park and Garden (approximately 2.2km west of the study area) due to the nature of the modification works proposed, the distance of the works from the site and the presence of existing electrical infrastructure. This would be confirmed at the next stage of assessment.

Water

5.21. The existing connections in the study area cross two areas of land in Environment Agency Flood Zone 3. Flood risk would not be a key consideration for overhead lines. The presence of pylons in areas of flood risk has a negligible

effect on the risk of displacement of water as the pylon construction poses no material changes to surface water flow.

5.22. The study area is approximately 450m west of the Severn Estuary. Several watercourses (drains and brooks) are identifiable on OS mapping in the study area. There is potential for adverse effects (e.g. water pollution, sedimentation and risks to aquatic ecology) on these watercourses as a result of construction activities and accesses for work. The potential for effects would be less than for underground connections which involve a more invasive nature of construction. Pollution prevention/mitigation measures would be required to prevent potential effects on the watercourses and subsequent indirect effects on the nearby Severn Estuary which may be hydrologically linked.

Capital & lifetime costs

5.23. Capital costs have been estimated based on a cost per kilometre of new medium capacity transmission lines required. The cost of building a 400kV double circuit overhead line is £1.6 million per km. Based on 4.4km of new circuit required the cost of using overhead lines for the preferred configuration is £7 million.

5.24. The lifetime costs for overhead lines including capital cost, operation, maintenance and transmission losses over a 40 year period are set out in the table below:

	Overhead lines – lifetime cost
Capital Cost	£7m
Transmission Loss Cost	£13.7m
Operation & Maintenance Cost	£0.2m
Lifetime Cost	**£20.9m**

ii) Underground Cables

Technical Considerations

5.25. Underground cable circuits require significant civil works associated with installation. These make the construction times for cable circuits longer than for overhead lines. The construction swathe likely to be required for 400kV double circuit underground cables is up to 65m wide.

5.26. Underground cable circuits are made up of two main component types which are underground cable and cable joints which connect one cable to another.

5.27. A cable sealing end (CSE) compound is used to transfer connections from an overhead line to underground cables. A double circuit CSE compound typically covers an area of approximately 70 metres by 40 metres. To transfer connections from the existing overhead line to underground cables a new CSE compound would be required for each of the circuits.

Environmental Factors

Landscape and Views

5.28. There are no landscape designations in the study area. The Quantock Hills AONB is approximately 5km west of the study area. There would be no significant adverse effects on the purposes of the Quantock Hills AONB designation (or views from it) from the installation of new underground cables and cable sealing end (CSE) compounds.

5.29. A belt of woodland surrounds the existing power stations at their southern, eastern and western boundaries. Some permanent tree removal may be necessary to achieve the working corridor and operational easement required to install the underground cables and permanent restrictions on what may be planted above would apply.

5.30. There are no settlements in the study area. The nearest settlement is the hamlet of Wick, approximately 400m south west of the existing 400kV and 275kV overhead lines. Shurton village is approximately 1.5km west of the Hinkley Point - Taunton 400kV overhead line. Stogursey is approximately 1.8km south of the study area.

5.31. Properties close to the southern boundary of the study area in the area of Wick) are likely to experience an improvement in views due to the removal of existing overhead lines and their replacement with underground cables. However CSE compounds would result in localised adverse landscape and visual effects in the area east of Wick.

5.32. Routeing would seek to maximise the distance between CSE compounds and residential receptors to minimise adverse visual effects. The overall significance of any landscape and visual effects would be reduced by the existing influence of electricity generation/transmission infrastructure in the area. Potential mitigation requirements for CSE compounds would be considered at a later stage of assessment, which would also consider potential effects on views from other receptors including footpaths.

Ecology

5.33. Bridgwater Bay SSSI includes land to the north, east and south of the existing Hinkley Point Power Stations. Bridgwater Bay forms part of the Severn Estuary SPA, SAC and Ramsar site and comprises a range of habitats including extensive intertidal mudflats, sandflats, saltmarsh, shingle beach and marsh intersected by networks of ditches. These habitats support a number of internationally and nationally important over-wintering and passage migrant waders and waterfowl. The site is also ecologically linked to the Somerset Levels which provide alternative winter feeding grounds for waders and wildfowl. The Ramsar designation extends to cover fish populations of the estuarine and river system which is one of the most diverse in Britain.

5.34. The existing overhead lines and underground cables in the study area travel through the Bridgwater Bay SSSI and the Severn Estuary SPA/Ramsar sites south of the power stations. Removing the existing infrastructure (cables and pylons) from within the designated sites is likely to result in disturbance and temporary loss of habitat. There is potential for adverse effects on internationally important bird species which may use the study area for high tide roosting or foraging during construction. There is also potential for adverse effects on watercourses (e.g. pollution or sedimentation) within the study area as a result of construction activities which could lead to effects on aquatic ecology and fish.

5.35. Siting new infrastructure in SSSI's, SPAs and Ramsars should be avoided where possible. Cable routeing along the southern and western boundary of the study area would minimise the extent of new infrastructure in the area protected under these designations. The construction of new underground cables through the designated sites would be more invasive than the equivalent length of overhead lines, and would cause greater disturbance and temporary loss of habitat which may have effects on the special interest or qualifying features of the sites. Potential effects would require detailed consideration and an Appropriate Assessment in accordance with the Conservation of Habitats and Species Regulations 2010 may be required to identify any potential direct or indirect effects on the integrity of the Severn Estuary SPA and Ramsar site.

5.36. Mitigation would depend on the results of field surveys carried out in consultation with Natural England and the local authority, but could include restrictions on the timing of certain works to reduce potential effects on birds, or the selection of construction methods or particular plant/machinery to minimise disturbance.

5.37. The Severn Estuary SAC and Bridgwater Bay NNR are approximately 450m east of the study area. The potential for indirect effects on the integrity of these sites and their qualifying features would be considered at the next stage of assessment.

5.38. Land immediately south and west of the power stations is designated as Hinkley Local Wildlife Site and Hinkley Point Nature Reserve. The potential effects on these sites would be taken into account at a later and more detailed stage of assessment in consultation with Natural England, the planning authority and the local wildlife trust. No effects on the Exmoor and Quantock Oakwoods SAC (approximately 6km west of the proposed works) are anticipated. This would be considered at the next stage of assessment if this option is taken forward.

Historic Environment

5.39. Wick Barrow Scheduled Monument (known as Pixies Mound) is in the north of the study area, approximately 150m south of the existing power stations and could be avoided by careful routeing. However an assessment to identify any indirect effects on the feature would be required due to its proximity to the proposed works, particularly the interconnector circuit. Effects could be

minimised by maximising the distance between the Scheduled Monument and the new connections. Underground cables would not have any permanent effects on the setting of the Scheduled Monument.

5.40. Other unknown archaeological assets could be affected by ground disturbance associated with the removal of existing equipment and installation of new cables. Effects are unlikely to be significant in areas where existing cables and pylons need to be removed as the ground has been previously disturbed. The installation of underground cables would be more invasive than overhead lines and is likely to have a greater scale of effect on any buried archaeology. An assessment of the potential for archaeological remains and any direct/indirect effects during construction would be required. Mitigation would depend on the findings of the archaeological assessment, but could be minimised through careful routeing.

5.41. There would be no adverse effects on the setting of Fairfield House Registered Park and Garden (approximately 2.2km west of the study area).

Water

5.42. The existing connections in the study area cross two areas of land in Environment Agency Flood Zone 3. The presence of underground cables in areas of flood risk would not affect the circuit's operation and would have a negligible effect on the risk or displacement of water as underground circuits pose no material changes to water flow.

5.43. However, two CSE compounds would be required in the area east of Wick. CSE compounds should ideally be located outside areas at risk of flooding and if this option was taken forward the location of the potential compounds would require further consideration and assessment in accordance with the National Planning Policy Framework (NPPF). Evidence would be required as part of this assessment to demonstrate that the sequential and exception tests outlined in the NPPF could be satisfied.

5.44. The study area is approximately 450m west of the Severn Estuary. Several watercourses (drains and brooks) are also identifiable on OS mapping in the study area. There is potential for adverse effects (e.g. water pollution, sedimentation and risks to aquatic ecology) on these watercourses as a result of construction activities and accesses for work. The potential for effects would

be greater for underground connections due to the invasive nature of construction and the requirement to cross the watercourses, rather than oversail them with overhead lines.

5.45. Pollution prevention/mitigation measures would be required to prevent potential effects on the watercourses and subsequent indirect effects on the nearby Severn Estuary which may be hydrologically linked. Potential effects on watercourses during the installation of cables would be minimised through the identification of appropriate crossing methods to minimise disturbance.

Capital & lifetime costs

5.46. Capital costs have been estimated based on a cost per kilometre of new medium capacity transmission lines required. The cost of building a 400kV double circuit underground cable is £18 million per km. Based on 4.4 km of new circuit required the cost of using underground cable is £79.2 million.

5.47. The lifetime costs for underground cables including capital cost, operation, maintenance and transmission losses over a 40 year period are set out in the table below:

	Underground cables – lifetime cost
Capital Cost	£79.2m
Transmission Loss Cost	£4.9m
Operation & Maintenance Cost	£0.4m
Lifetime Cost	**£84.5m**

iii) Gas Insulated Lines

Technical Considerations

5.48. Gas insulated transmission lines (GIL) are a developing alternative to conventional underground cables for high voltage transmission. GIL uses a mixture of insulating gas to provide the electrical insulation, whereas in underground cables the special polymer material provides insulation. The GIL is constructed from welded or flanged tube structures with a copper or aluminium conductor running through the centre. Three tubes are required per circuit, one tube for each phase. Six tubes are therefore required for a double circuit connection.

5.49. The installation widths of land can also be smaller than cable installations. The installation needs to be broken into gas zones where the gas can be isolated these zones need to be every few kilometres with access to the GIL available. A GIL compound is used to transfer connections from an overhead line to GIL.

Environmental Factors

Landscape and Views

5.50. There are no landscape designations in the study area. The Quantock Hills AONB is approximately 5km west of the study area. There would be no significant adverse effects on the purposes of the Quantock Hills AONB designation (or views from it) from the installation of new underground Gas Insulated Line (GIL) circuits and GIL compounds.

5.51. A belt of woodland surrounds the existing power stations at their southern, eastern and western boundaries. Some permanent tree removal may be necessary to achieve the working corridor and operational easement required to install the underground GIL circuits and permanent restrictions on what may be planted above would apply.

5.52. There are no settlements in the study area. The nearest settlement is the hamlet of Wick, approximately 400m south west of the existing 400kV and 275kV overhead lines. Shurton village is approximately 1.5km west of the Hinkley Point - Taunton 400kV overhead line. Stogursey is approximately 1.8km south of the study area.

5.53. Properties close to the southern boundary of the study area in the area of Wick are likely to experience an improvement in views due to the removal of existing overhead lines and their replacement with underground GIL circuits. However GIL compounds would result in localised adverse landscape and visual effects in the area east of Wick.

5.54. Routeing would seek to maximise the distance between GIL compounds and residential receptors to minimise adverse visual effects. The overall significance of any landscape and visual effects would be reduced by the existing influence of electricity generation/transmission infrastructure in the area. Potential mitigation requirements for GIL compounds would be considered at a later stage of assessment, which would also consider potential effects on views from other receptors including footpaths.

Ecology

5.55. Bridgwater Bay SSSI includes land to the north, east and south of the existing Hinkley Point Power Stations. Bridgwater Bay forms part of the Severn Estuary SPA, SAC and Ramsar site, and comprises a range of habitats including extensive intertidal mudflats, sandflats, saltmarsh, shingle beach and marsh intersected by networks of ditches. These habitats support a number of internationally and nationally important over-wintering and passage migrant waders and waterfowl. The site is also ecologically linked to the Somerset Levels which provide alternative winter feeding grounds for waders and wildfowl. The Ramsar designation extends to cover fish populations of the estuarine and river system which is one of the most diverse in Britain.

5.56. The existing overhead lines and underground cables in the study area travel through the Bridgwater Bay SSSI and the Severn Estuary SPA/Ramsar sites south of the power stations. Removing the existing infrastructure (cables and pylons) from within the designated sites is likely to result in disturbance and temporary loss of habitat. There is potential for adverse effects on internationally important bird species which may use the study area for high tide roosting or foraging during construction. There is also potential for adverse effects on watercourses (e.g. pollution or sedimentation) within the study area as a result of construction activities which could lead to effects on aquatic ecology and fish.

5.57. Siting new infrastructure in SSSI's, SPAs and Ramsars should be avoided where possible. GIL routeing along the southern and western boundary of the study area would minimise the extent of new infrastructure in the area protected under these designations. The installation of GIL circuits through the designated sites would be more invasive than the equivalent length of overhead lines, and would cause greater disturbance and temporary loss of habitat which may have effects on the special interest or qualifying features of the sites. Potential effects would require detailed consideration and an Appropriate Assessment in accordance with the Conservation of Habitats and Species Regulations 2010 may be required to identify any potential direct or indirect effects on the integrity of the Severn Estuary SPA and Ramsar site.

5.58. Mitigation would depend on the results of field surveys carried out in consultation with Natural England and the local authority, but could include restrictions on the timing of certain works to reduce potential effects on birds, or the selection of construction methods or particular plant/machinery to minimise disturbance.

5.59. The Severn Estuary SAC and Bridgwater Bay NNR are approximately 450m east of the study area. The potential for indirect effects on the integrity of these sites and their qualifying features would be considered at the next stage of assessment.

5.60. Land immediately south and west of the power stations is designated as Hinkley Local Wildlife Site and Hinkley Point Nature Reserve. The potential effects on these sites would be taken into account at a later and more detailed stage of assessment in consultation with Natural England, the planning authority and the local wildlife trust. No effects on the Exmoor and Quantock Oakwoods SAC (approximately 6km west of the proposed works) are anticipated. This would be considered at the next stage of assessment if this option is taken forward.

Historic Environment

5.61. Wick Barrow Scheduled Monument (known as Pixies Mound) is in the north of the study area, approximately 150m south of the existing power stations and could be avoided by careful routeing. However an assessment to identify any indirect effects on the feature would be required due to its proximity to the proposed works, particularly the interconnector circuit. Effects could be

minimised by maximising the distance between the Scheduled Monument and the new connections. Underground GIL circuits would not have any permanent effects on the setting of the Scheduled Monument.

5.62. Other unknown archaeological assets could be affected by ground disturbance associated with the removal of existing equipment and installation of new GIL circuits. Effects are unlikely to be significant in areas where existing cables and pylons need to be removed as the ground has been previously disturbed. The installation of GIL circuits would be more invasive than overhead lines and is likely to have a greater scale of effects on any buried archaeology. An assessment of the potential for archaeological remains and any direct/indirect effects during construction would be required. Mitigation would depend on the findings of the archaeological assessment, but could be minimised through careful routeing.

5.63. There would be no adverse effects on the setting of Fairfield House Registered Park and Garden (approximately 2.2km west of the study area).

Water

5.64. The existing overhead line and underground connections in the study area cross two areas of land in Environment Agency Flood Zone 3. The presence of GIL circuits in areas of flood risk would not affect the circuit's operation and would have a negligible effect on the risk or displacement of water as underground circuits pose no material changes to water flow.

5.65. However two GIL compounds would be required in the area east of Wick. GIL compounds should ideally be located outside areas at risk of flooding and if this option was taken forward the location of the potential compounds would require further consideration and assessment in accordance with the National Planning Policy Framework (NPPF). Evidence would be required as part of this assessment to demonstrate that the sequential and exception tests outlined in the NPPF could be satisfied.

5.66. The study area is approximately 450m west of the Severn Estuary. Several watercourses (drains and brooks) are also identifiable on OS mapping in the study area. There is potential for adverse effects (e.g. water pollution, sedimentation and risks to aquatic ecology) on these watercourses as a result of construction activities and accesses for work. The potential for effects would

be greater for underground connections due to the invasive nature of construction and the requirement to cross the watercourses, rather than oversail them with overhead lines.

5.67. Pollution prevention/mitigation measures would be required to prevent potential effects on the watercourses and subsequent indirect effects on the nearby Severn Estuary which may be hydrologically linked. Potential effects on watercourses during the installation of GIL circuits would be minimised through the identification of appropriate crossing methods to minimise disturbance.

Capital & lifetime costs

5.68. The capital cost of building a 400kV medium capacity double circuit Gas Insulated Line is £15.2 million per km. Based on 4.4 km of new circuit required the cost of using GIL for Option 3 is £66.9 million

5.69. The lifetime costs for Gas Insulated Lines including capital cost, operation, maintenance and transmission losses over a 40 year period is set out in the table below:

	Gas Insulated Line – lifetime cost
Capital Cost	£66.9m
Transmission Loss Cost	£6.4m
Operation & Maintenance Cost	£0.2m
Lifetime Cost	**£73.5m**

6. Summary of options appraisal

6.1. The table below provides a summary of the key factors to be considered in appraising each of the connection options:

Table 6.1: Options Summary

Delivery Option	Technical	Environmental	Economic	
			Capital Cost	Lifetime Cost
Overhead Lines	Double circuit overhead lines would be supported by standard lattice pylons similar to those used for existing line entries. Height of pylons would need to be finalised when route is confirmed. Several potential direction changes will be needed to avoid, as far as possible, designated areas.	Potential for disturbance and loss of habitat when removing infrastructure within designated ecological sites (SSSI/SPA/Ramsar) and effects on internationally important bird species. An Appropriate Assessment may be required in accordance with the Conservation of Habitats and Species Regulations 2010. Potential effects on bird flight paths from new overhead lines. Careful siting could largely avoid the requirement for new towers in designated areas. New overhead line connections may result in adverse visual effects from residential properties, particularly in the Wick area. Potential effects on the setting of the Pixies Mound Scheduled Monument (Wick Barrow) and Fairfield House Registered Park and Garden to be considered.	£7m	£20.9m

Underground Cable	Civil works could be significant and need to take account of low-lying wet areas, watercourses and ditches. Construction swathe would be up to 50 metres in width. An area of 80 metres by 30 metres would be required for a new CSE compound at the point where the underground cable is connected to the existing overhead line route.	Potential for disturbance and loss of habitat when removing infrastructure within designated ecological sites (SSSI/SPA/Ramsar) and effects on internationally important bird species. New cables required through designated areas which would be more invasive than overhead lines. An Appropriate Assessment may be required in accordance with the Conservation of Habitats and Species Regulations 2010. Routeing in the south west of the study area would minimise the extent of installation in designated areas but would increase the length of the routes. New cables would be required through watercourses and ditches and some permanent tree removal is likely. CSE compounds would result in localised adverse landscape and visual effects, particularly for properties east of Wick. The location of CSE compounds would require careful consideration and assessment in accordance with the NPPF. Some properties may experience an improvement in views due to the removal of existing overhead lines. Potential adverse effects on unknown archaeological features during cable installation. Permanent effects on Pixies Mound Scheduled Monument and its setting (Wick Barrow) could be avoided. The installation of underground cables would mitigate the majority of permanent effects on landscape and views that could potentially arise from new overhead lines.	£79.2m	£84.5m

Gas Insulated Lines	Gas zone access points would need to be identified when the route is confirmed. Civil works could be significant and need to take account of low-lying wet areas, watercourses and ditches. A site would be required for a new GIL compound at the point where the underground cable is connected to the existing overhead line route	Potential for disturbance and loss of habitat when removing infrastructure within designated ecological sites (SSSI/SPA/Ramsar) and effects on internationally important bird species. New GIL required through designated areas which would be more invasive than overhead lines. An Appropriate Assessment may be required in accordance with the Conservation of Habitats and Species Regulations 2010. Routeing in the south west of the study area would minimise the extent of installation in designated areas but would increase the length of the routes. New cables would be required through watercourses and ditches and some permanent tree removal is likely. GIL compounds or would result in localised adverse landscape and visual effects, particularly for properties east of Wick. The location of GIL compounds would require careful consideration and assessment in accordance with the NPPF. Some properties may experience an improvement in views due to the removal of existing overhead lines. Potential adverse effects on unknown archaeological features during GIL installation. Permanent effects on Pixies Mound Scheduled Monument and its setting (Wick Barrow) could be avoided. The installation of GIL circuits would mitigate the majority of permanent effects on landscape and views that could potentially arise from new overhead lines.	£66.9m	£73.5m

7. Identification of overhead line as the preferred connection method

7.1. As outlined in section 3 of this Report, Option 3 is the preferred option and our appraisal considered the three technologies applicable to deliver this. (The combination of Option 3 with the technology options are described below as 3i, 3ii and 3iii)

7.2. The respective costs of the different technologies are set out below:

Option 3i (Overhead Line)	Capital Cost £7m, Lifetime Cost £20.9m
Option 3ii (Underground cable)	Capital Cost £79.2m, Lifetime Cost £84.5m
Option 3iii (GIL)	Capital Cost £66.9m, Lifetime Cost £73.5m

7.3. Our appraisal also considered the environmental effects of these technologies. The overhead lines constructed for Option 3i would replace existing overhead lines in the vicinity of the existing power stations which would be removed. Effects on landscape and visual receptors would be reduced in significance due to the influence of existing power stations and overhead lines. Potential impacts on land protected by ecological and historic environment designations could be minimised through careful routeing.

7.4. Having regard to its statutory duties and all the factors considered as part of the appraisal process, National Grid considers that the additional cost of developing an underground solution rather than an overhead line is not justified in this instance as the benefits of an underground option are not significant in this location and do not outweigh the significant additional cost. Accordingly, Option 3i (overhead line) is the preferred option.

7.5. The next section of this Report assesses the alternatives available for routing the overhead lines within the proposed configuration outlined under option 3. It outlines the appraisal process that has been undertaken by National Grid and identifies the most appropriate solution within the study area.

8. Identification of the draft alignment

8.1. Following the identification of the preferred connection method (Option 3i – overhead line) National Grid's technical and environmental specialists identified technically feasible overhead line routes. Three technically feasible overhead line alignments (Options A, B & C) were identified and are shown in Appendix 3. The initial views of local stakeholders were sought on potential alignments and key issues raised include:

- need to route overhead lines as far as possible from the villages of Wick and Shurton;
- effect on important local views in the area including those from the Quantocks, Knighton Lane in Burton, Wick and Stolford;
- effect of pylons and access across Wick Moor, and associated ecological designations;
- impact on Pixies Mound Scheduled Monument (Wick Barrow);
- effect on local bridleways and footpaths, in particular the West Somerset Coast Path, during construction;
- traffic disruption caused by the works; and
- opportunities for landscape mitigation to screen views to overhead lines.

8.2. These alignments were subject to an options appraisal following the same method as that used for the proposed 400kV connection between Bridgwater and Seabank. In order to inform this options appraisal, National Grid's consultants have undertaken additional desk studies and field surveys relating to landscape, visual amenity, ecology, heritage and socio-economic factors. The appraisal of possible overhead line alignments included a number of stages:

- Identification of potential overhead line alignments within the study area;
- Assessment of overhead line alignments; and
- Drawing conclusions on the draft alignment.

8.3. The appraisal is presented in full at Appendix 3.

8.4. The key considerations in each of the appraisals include:

Landscape

- Effects on designated landscapes including Exmoor National Park approximately 15km south west of the Study Area and The Quantock Hills AONB approximately 5km south west of the Study Area;
- Landscape value and condition in the study area, and the capacity to accommodate the proposed works.

Visual Amenity

- Effects on public views of the proposed works including long distance footpaths, open access land on Wick Moor, public rights of way and a permissive footpath (Hinkley Point Nature Trail) and bridleway;
- Effects on private views from individual residential properties and settlements including Wick, Sturton, Burton, Knighton, Gunter's Grove, Farringdon Hill and Stolford; and
- Effects on views from a number of longer distance receptors, including residential properties, public rights of way and the Quantock Hills.

Historic Environment

- Effects on Listed Buildings and a Registered Park and Garden at Fairfield House, approximately 3km south west of the Study Area;
- Effects on Pixies Mound (Wick Barrow) Scheduled Monument, approximately 150m south of the existing power stations;
- Effects on undesignated heritage receptors in the Study Area; and
- Effects on the historic landscape of the study area and the potential for undiscovered archaeological remains.

Ecology

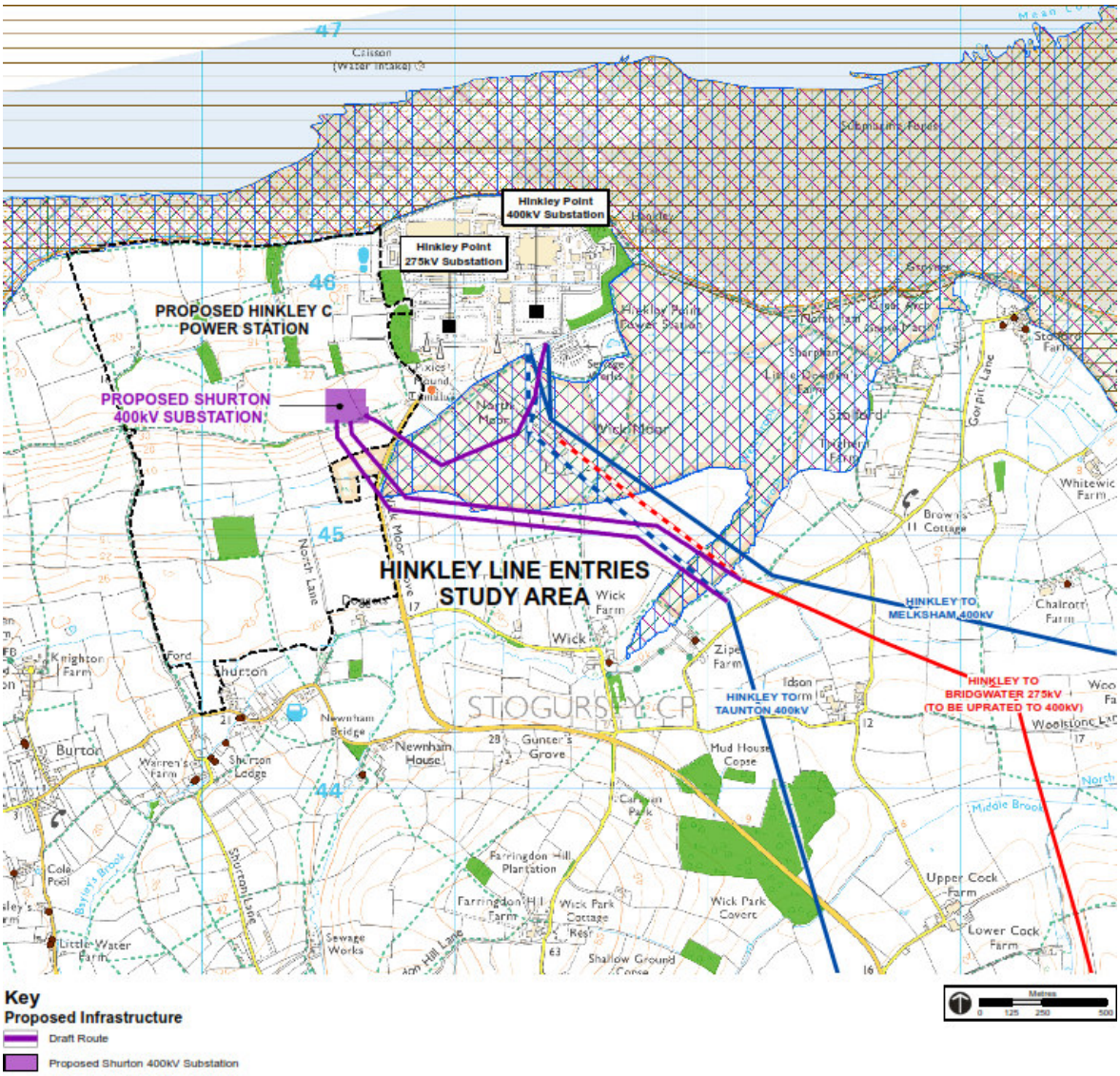
- Effects on wildlife designations including the Severn Estuary Special Protection Area, Ramsar and Special Area of Conservation sites, the Bridgwater Bay Site of Special Scientific Interest and National Nature Reserve, Hinkley Point County Wildlife Site and the Exmoor and Quantock Oakwoods SAC; and
- Effects on woodland, hedgerows, ditches and wetland habitats in the Study Area.

Socio-economic – Economic Activity

- Effects on tourism, business and recreational resources. ; and
- Effects on public rights of way.

8.5. The options appraisal recommends that the overhead line alignment (described as option C) and shown in purple in figure 8.1 below is taken forward as the draft alignment. This option best balances potential effects on landscape, views, ecology, historic environment and socio-economics with feedback received from local stakeholders during consultation.

Figure 8.1 – Recommended Overhead Line Alignment



8.6. Comments received on this report and responses to the specific consultation will help to refine the detailed connection design. Following this, the detailed connection design will be further developed and subject to an environmental impact assessment. National Grid will then formally publicise and consult in accordance with the Planning Act 2008 requirements. An application for an Order granting Development Consent will be finalised, having regard to consultation feedback, and submitted to the Planning Inspectorate.

Glossary

GW	Gigawatt
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
kV	Kilovolt
MW	Megawatt
Km	Kilometre
CSE	Cable Sealing End
GIL	Gas Insulated Line
OAST	Options Appraisal Table
SM	Scheduled Monument
SSSI	Site of Special Scientific Interest
SPA	Special Protection Area
NNR	National Nature Reserve
SAC	Special Area of Conservation
Ramsar	An area of wetland protected by the Ramsar Convention (1971)
AONB	Area of Outstanding Natural Beauty

Appendix 1 – Schedule of comments from core statutory consultees

Hinkley Point C Connection Technical & Environmental Appraisal

Statutory Consultee Reponses

Organisation/ Contact	Topic	Comment	Response
West Somerset Council	General Comment	The Study Area boundary is described, but it would be helpful to clarify how it has been established. The delineation of the southern extent is unclear.	Additional information has been included in the report. The study area is limited by the area where line entry changes are required.
	General Comment	Would be useful to see the area of search in the context of the site boundary of the EDF proposals for Hinkley C in order to understand the development context and cumulative implications.	This boundary has been added to the environmental constraints plan.
	General Comment	Hinkley Point Nature Reserve and Hinkley Point Local Wildlife Site are identified in text, but not on the constraints plan.	Noted. Local constraints not identified at the high level stage.
	General Comment	Recommend the text is clearer around the description of works required for each option including demolition/decommissioning; suggest two schematics for each option (one to show the initial connection requirement upon commissioning of Hinkley C and a second to show the arrangement upon decommissioning of Hinkley B) would give a better understanding of each option.	Additional information has been included in the report.
	General Comment	The arrangement for Option 3 post decommissioning of Hinkley B is not fully described until the comparison of options we suggest further detail is provided.	Additional information has been included in the report.
	General Comment	Appraisal Methodology: acknowledged that consideration of the environmental topics identified here would identify any significant differences between the options at this high level assessment, but – as stated – they would need to be considered for any more detailed environmental assessment.	Noted.

Organisation/ Contact	Topic	Comment	Response
	General Comment	Suggest 'Study Area' is better termed as 'Area of Search' for the options infrastructure requirements and the term 'Study Area' is used for the area that is actually considered for potential impacts (which is wider than the actual area of search).	Noted. Term "Study Area" retained as this more clearly reflects the localised area being considered for the line entry changes.
	Landscape & Visual	Clarification should be sought of how the appraisal of overhead power lines vs. undergrounding can be undertaken comprehensively without consideration of potential effects that changes to the visual amenity and landscape character may have on tourism. Wick Barrow Scheduled Monument and a number of public rights of way from which views are not considered at this stage either are supporting the tourism offer in this area.	Noted. Socio-economic issues (including public rights of way) were scoped out at the high level stage. Reference to the West Somerset Coastal Path has been added at paragraph 4.17. Further detailed assessments will be undertaken when considering alignment options during later stages.
	Landscape & Visual	The report states that 'The overhead lines constructed for Option 3i would replace existing overhead lines in the vicinity of the existing power station which would be removed.' National Grid should confirm that there would be no additional overhead lines / give a clear description of all works for each option. We understand that overhead lines would not exactly be replaced as they would be aligned and VQ route would in addition change in appearance due to bigger pylons structures.	Additional information has been included in the report. Specific information on exact numbers or towers to be removed/ replaced and their size and type will not be available until the next stage when detailed alignment options will be considered.
	Landscape & Visual	In certain circumstances potential impacts on landscape and visual amenity can be considered limited if the proposed development is of similar/same type as already existing in the surrounding. However, we suggest that the risk of the proposed works contributing to a change in overall landscape character from predominantly rural to increasingly disturbed should not be discounted. This is particularly important in light of likely cumulative impacts in the area.	Noted. Will be considered further at next stage of the process.

Organisation/ Contact	Topic	Comment	Response
	Ecology & Biodiversity	Hinkley Point Nature Reserve and Hinkley Point Local Wildlife Site are identified in the text, but are not considered in the options appraisal. As a material consideration in local planning policy, it would be helpful at this level to understand the potential effects on these designations and whether there are any significant differences between the options.	Noted. Local constraints not identified at the high level stage.
Natural England	Landscape & Visual	It is NE's opinion that Option 3 appears, at this stage, to be the best option to avoid/reduce potential significant impact on natural environment/landscape.	Noted.
	Ecology & Biodiversity		
	General Comment	NE reserve comment on whether and where undergrounding is appropriate until detailed impact assessment have been undertaken of National Grid's 'preferred' overhead line option (3i).	Noted.
	Landscape & Visual	NE would not want any works (e.g. tree removal etc.) that might compromise/effect agreed Landscape restoration/enhancement strategy for Hinkley C.	Noted. To be given consideration during development of detailed alignment options.
	General Comment	NE are concerned that the document makes conclusions on the significance of impact, without detailed assessments having been undertaken. NE don't agree with statements such as 'no significant adverse effects are anticipated' as these are baseless and cannot be reached in the absence of evidence/detailed assessments. Relating to Exmoor and Quantocks SAC, Fairfield House, and the AONB in particular.	Noted. At this stage a high level assessment has been undertaken. Further detailed assessments will be undertaken when considering alignment options during later stages.
	Landscape & Visual	NE does not agree with the presumption that impacts are reduced because of the presence of existing infrastructure, this is considered a subjective view. NE argues that impacts are increased due to the presence of existing infrastructure (cumulative impact).	Noted.

Organisation/ Contact	Topic	Comment	Response
	General Comment	It is important that the potential impact on the West Somerset Coast Path (of national significance) and its users is fully assessed.	Noted. Socio-economic issues (including public rights of way) were scoped out at the high level stage. Reference to the West Somerset Coastal Path has been added at paragraph 4.17. Further detailed assessments will be undertaken when considering alignment options during later stages.
	Ecology & Biodiversity	NE agrees that the removal of existing infrastructure within or near designated ecological sites could potentially significantly impact on the special interest features of those sites. Also, we would endorse the avoidance of siting new infrastructure in or near protected sites, wherever possible.	Noted. To be given consideration during development of detailed alignment options.
		The document fails to address the impact on Wick Moor SSSI.	Information relating to potential effects on the Bridgwater Bay SSSI, of which Wick Moor is a component part, and options that could minimise effects are included in Section 5 and at Appendix 2 (paragraphs 3.17 – 3.24)
Environment Agency	Flooding and Hydrology	The proposed Shurton 400Kv Substation will be located on a new platform on the main site well above any direct fluvial or tidal flood risks.	Noted.
		Option 3 cable routing provides an opportunity to move the ZZ and VQ lines slightly further inland (west) into the Wick Moor flood cell, which should not compromise any future plans for flood risk management infrastructure provision, maintenance, or realignment of the Stolford sea defences to the east.	Noted. Further detailed assessments will be undertaken when considering alignment options during later stages.
		National Grid is advised to consult the Internal Drainage Boards (IDB) directly regarding tower footprint proximity to top of bank, or overhead vertical clearances to get plant underneath for watercourse maintenance. Flood Defence Consent will be under IDB or LLFA (Somerset Council) jurisdiction.	Noted. Further consultation to support our detailed assessments will be undertaken when considering alignment options during later stages.

Organisation/ Contact	Topic	Comment	Response
		Tower bases located in tidal defended area will be subject to future flood risk management strategies. The probability of the bases getting inundated more frequently or to a greater depth could increase following any change in the management programme of the existing Stolford sea defences protecting them. Whether this necessitates a more robust foundation design for towers crossing the Wick Moor flood cell, or whether they need to be specified for a 'marine' environment to avoid saline damage, is currently not clear.	Noted. Further detailed assessments will be undertaken when considering alignment options and construction techniques during later stages.
Somerset County Council/English Heritage	Historic Environment	Further information of the option of undergrounding the connections to HP rather than using overhead lines and the potential impacts should be provided. A large structure bringing the cables out of the ground may have a greater impact on the setting of Wick Barrow than pylons. The two options (pylon overground and underground with end structure) be put on the 3D model so that we can see the impacts.	Noted. The report concludes that developing an underground solution rather than an overhead line is not justified in this instance as the benefits of an underground option are not significant in this location and do not outweigh the significant additional cost.

Appendix 2 - Environmental appraisal

1 INTRODUCTION

1.1 The following high-level planning and environmental appraisal has been produced by TEP for National Grid Electricity Transmission plc (National Grid). The appraisal considers the planning and environmental constraints associated with three technical options being considered by National Grid to reconfigure the existing overhead transmission line entry points into Hinkley Point. This will facilitate the connection of the proposed Hinkley Point C Power Station to the high voltage electricity transmission system.

1.2 This appraisal focuses on the three potential technical solutions (overhead lines, underground cables or Gas Insulated Lines (GIL)) possible for Option 3 which is the preferred configuration taken forward for assessment (see paragraph 5.1 of the main Report).

1.3 The environmental appraisal has considered environmental constraints of international and national importance. Features considered as potential constraints to each technical option are presented in Table 1.1. The table also summarises the legislation under which protection is conferred, refers to the relevant guidance and the data sources from which information (where applicable) was taken.

1.4 In accordance with National Policy Statement EN5[7], when siting new overhead lines, the principles of the Holford Rules should be taken into account. For the options that involve an underground connection (underground cables or GIL) it is still appropriate to consider the environmental designations and constraints referred to in the Holford Rules.

[7] Paragraph 2.8.7, National Policy Statement for Electricity Networks Infrastructure (EN-5), July 2011

1.5 There are some environmental factors that have not influenced this high-level strategic appraisal. The factors scoped out of the appraisal at this stage are: noise; air quality; soils and geology; resources and waste, greenhouse gases and energy efficiency; and climate change vulnerability. These are not material factors in distinguishing between the three technology options at this high level. Although these factors have been scoped out of the options appraisal process at this stage, they may require consideration as part of detailed routeing studies and environmental assessment of whichever option is taken forward.

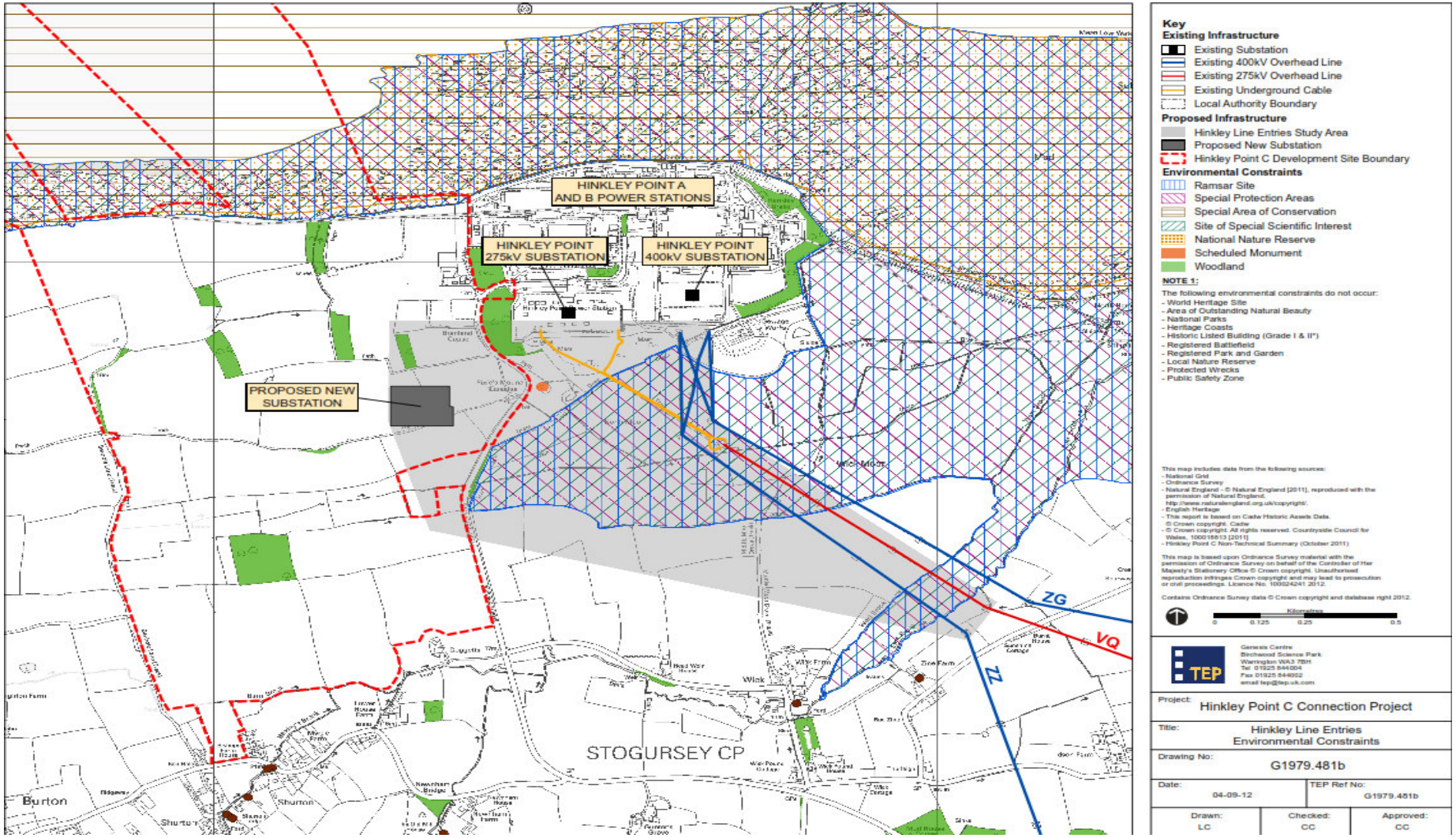
Appendix Table 1.1- Environmental constraints and data sources

Feature	Legislation	Routeing Response (and Reference)	Data Sources
National Parks	National Parks and Access to the Countryside Act 1949	Seek to avoid (Schedule 9[8]/ Holford Rule 1)	magic.gov.uk
Areas of Outstanding Natural Beauty	National Parks and Access to the Countryside Act 1949/ Countryside and Rights of Way Act 2000	Seek to avoid (Schedule 9/ Holford Rule 1)	magic.gov.uk
Heritage Coasts	n/a	Seek to avoid (Schedule 9/ Holford Rule 1)	magic.gov.uk
World Heritage Sites	1972 World Heritage Convention	Seek to avoid (Schedule 9/ Holford Rule 1)	english-heritage.org.uk
Sites of Special Scientific Interest	Wildlife and Countryside Act 1981 Countryside and Rights of Way Act 2000	Seek to avoid (Schedule 9/Note to Holford Rule 2)	gis.naturalengland.org.uk
Special Protection Areas	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (birds interest) (Schedule 9/Note to Holford Rule 2)	gis.naturalengland.org.uk
Special	The Conservation of	Seek to avoid	gis.naturalengland.org.uk

[8] National Grid's commitments under Schedule 9 of the Electricity Act (1989) are set out in the following document 'National Grid's commitments when undertaking work in the UK: Our Stakeholder, Community and Amenity Policy'.

Feature	Legislation	Routeing Response (and Reference)	Data Sources
Areas of Conservation	Habitats and Species Regulations 2010	(Note to Holford Rule 2)	
Ramsar sites	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (birds interest) (Schedule 9/Note to Holford Rule 2)	gis.naturalengland.org.uk
National Nature Reserves	National Parks and Access to the Countryside Act 1949	Seek to avoid (Schedule 9/Note to Holford Rule 2)	gis.naturalengland.org.uk
Scheduled Monuments	Ancient Monuments and Archaeological Areas Act 1979	Seek to avoid (Schedule 9/Note to Holford Rule 2)	english-heritage.org.uk
Settlements	n/a	Seek to avoid (Holford Rules - Supplementary Note on Residential Areas)	Digitised from Ordnance Survey
Historic buildings (Listed I, II and II*)	The Town and Country Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to minimise effects (Schedule 9/Note to Holford Rule 2)	english-heritage.org.uk
Conservation Areas	The Town and Country Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to minimise effects (Schedule 9/Note to Holford Rule 2)	Development plans
Registered Parks and Gardens	n/a	Seek to minimise effects (Schedule 9/Note to Holford Rule 1)	magic.gov.uk
Registered Battlefields	n/a	Seek to minimise effects (Schedule 9/Note to Holford Rule 2)	english-heritage.org.uk
Woodlands	n/a	Seek to minimise effects (Note to Holford Rules 4 and 5)	National Inventory of Woodlands
Flood Risk	n/a	NPPF	www.environment-agency.gov.uk

Drawing of Study Area



2 STUDY AREA

2.1 The study area is illustrated on Drawing G1979.481b above and is relatively small because of the localised nature of the works proposed. The study area therefore focuses on the area where actual changes are required to the existing overhead lines to connect the new Shurton Substation. The existing line entries to Hinkley Point are an established feature in the local area. By seeking to locate the proposed works in close proximity to the area in which the existing overhead lines are situated we are seeking to minimise the scale of change in the locality. Its south eastern corner is a point east of the settlement of Wick, Somerset, where two 400kV overhead lines (ZZ and ZG routes) and one 275kV overhead line (VQ route) converge before crossing the study area towards the existing Hinkley Point A and B Power Stations. The study area extends in a north westerly direction across Wick Moor and North Moor. Its northern extent is formed by the proposed Hinkley Point C 400kV Substation site in the north west corner and the existing 400kV substation in the north east.

2.2 The 400kV ZZ overhead line route connects Hinkley Point with National Grid's 400kV substation at Taunton, Somerset. The 275kV VQ route runs between Hinkley Point and Bridgwater 275kV Substation using a combination of both overhead line and underground cable though the study area. The 400kV ZG route connects Hinkley Point and Melksham 400kV Substation in Wiltshire, passing to the north of Bridgwater. Further information on the existing transmission network in the study area is presented in Section 4 of the main report.

2.3 There are no settlements within the study area. The nearest settlement to the proposed modifications is the rural hamlet of Wick which is a small settlement approximately 400m south west of the existing 400kV and 275kV (ZZ, ZG and VQ) overhead lines. The village of Shurton is approximately 1.5km west of the Taunton 400kV overhead line. Stogursey is south of Shurton and Wick, approximately 1.8km from the study area.

3 BASELINE ENVIRONMENTAL CONSTRAINTS

3.1 A description of the study area in relation to the baseline environmental constraints outlined in Table 1.1 and the implications of these constraints for routeing overhead lines or underground connections (cable or GIL) are presented below and illustrated at Drawing G1979.481b.

3.2 The following are not present within the study area:

- National Parks;
- Area of Outstanding Natural Beauty;
- Heritage Coasts;
- World Heritage Sites;
- Special Areas of Conservation;
- National Nature Reserves;
- Settlements;
- Historic Buildings;
- Conservation Areas;
- Registered Parks and Gardens; and
- Registered Battlefields.

Landscape and Views

Areas of Outstanding Natural Beauty (AONB)

Quantock Hills AONB

3.3 There are no landscape designations in the study area. The Quantock Hills AONB is approximately 5km west. It covers 99 square kilometres running north west from the Vale of Taunton Deane to the Bristol Channel Coast and consists of large areas of heathland, oak woodlands, ancient parklands and agricultural land.

Implications for Overhead Line/Underground Cables/GIL Routeing

AONBs are designated under the National Parks and Access to the Countryside Act 1949 (as amended) for the purpose of conserving and enhancing the natural beauty of the area. National Grid's guidance advises that it should seek to avoid AONBs when siting new transmission infrastructure. The Overarching National Policy Statement for Energy (EN1) highlights that the '*natural beauty of the landscape and countryside should be given substantial weight by the IPC* (now the National Infrastructure Division) *in deciding on*

applications for development consent in these areas'. EN1 also states that consideration should be given to the purposes of nationally designated areas when siting development in close proximity to the boundaries of an AONB designation and that '*the aim should be to avoid compromising the purposes of designation and such projects should be designed sensitively given the various siting, operational, and other relevant constraints'*.

3.4 Adverse effects on the purposes of the Quantock Hills AONB designation are not anticipated from overhead lines or underground connections due to the nature of the modifications proposed, the distance of the works from the AONB and the presence of existing electrical infrastructure. However this would be considered as part of a landscape and visual assessment at a later and more detailed stage of assessment.

Woodland

3.5 A belt of woodland surrounds the existing power stations at their southern, eastern and western boundaries. Parts of this woodland fall in the north of the study area.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.6 Installing overhead lines or underground connections through woodland would result in its permanent loss along the length of the connection. Permanent restrictions on what may be planted above underground connections or below overhead lines would apply. Holford Rules 4 and 5 refer to woodlands and their value in providing background to views and advise to avoid cutting extensive swathes through woodland blocks wherever possible.

3.7 Tree removal in the woodland areas could be avoided or minimised by careful pylon siting if overhead line connections were taken forward.

3.8 Some permanent tree removal may be necessary to achieve the working corridor and operational easement required for underground connections.

Views

3.9 There are no settlements in the study area. The nearest settlement to the study area is the rural hamlet of Wick which lies approximately 400m south west of the existing 400kV and 275kV (VQ, ZZ and ZG route) overhead lines which connect to the existing power stations. Wick consists of a small number

of residential properties and farms. The village of Shurton is approximately 1.5km west of the Hinkley Point - Taunton 400kV overhead line (ZZ route). Stogursey is south of Shurton and Wick, approximately 1.8km from the study area.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.10 If overhead line connections were taken forward, the properties likely to be most affected by a change in view are those closest to the southern boundary of the study area in the area of Wick. These include Doggetts, Head Weir House, Wick Farm, Zine Farm, Sunshine Cottage and Burnt House.

3.11 The significance of any landscape and visual effects would depend on the exact alignment of the overhead lines but would be reduced by the existing influence of electricity generation (power stations) and transmission infrastructure (overhead lines) in the area. However, the modifications are likely to bring the overhead line infrastructure closer to properties south of the study area at Wick and Shurton than the existing overhead lines.

3.12 Overhead line routeing would seek to maximise the distance of the overhead lines from residential receptors to minimise the significance of adverse visual effects.

3.13 For underground connections, some properties closest to the eastern boundary of the study area in the area of Wick (including, Wick Farm and Zine Farm) are likely to experience an improvement in views due to the removal of existing overhead lines and their replacement with underground cables/GIL. However cable sealing end (CSE)/GIL compounds would be required to facilitate the transition from overhead lines to underground cables in the area east of Wick. which would result in localised adverse landscape and visual effects. Routeing would seek to maximise the distance between CSE/GIL compounds and residential receptors east of Wick to minimise adverse visual effects.

3.14 No significant adverse effects on views from the Quantock Hills AONB are anticipated from an overhead line or underground connection due to the nature of the modifications proposed, the distance of the works from the AONB and the presence of existing electrical infrastructure. The potential effects on views from other receptors, e.g. footpaths would be taken into account at a later and more detailed stage of assessment.

3.15 Potential mitigation requirements for overhead line or underground connection options (including CSE/GIL compounds) would be considered during the identification of route alignments and siting studies and determined through a landscape and visual assessment.

Ecology

Sites of Special Scientific Interest (SSSI)

3.16 SSSIs are designated for their biodiversity or geological interest and are protected from development and operations likely to damage their special interest.

Bridgwater Bay SSSI

3.17 The Bridgwater Bay SSSI includes land to the north, east and south of the existing Hinkley Point Power Stations. The 400kV Hinkley to Melksham overhead line, 400kV Hinkley to Taunton overhead line and 275kV Hinkley to Bridgwater underground cable/overhead line travel through the SSSI south of the Hinkley Point Power Stations. Several existing pylons and an underground cable circuit are present within this designated site.

3.18 Bridgwater Bay forms part of the Severn Estuary SPA, SAC and Ramsar site and comprises a range of habitats including extensive intertidal mudflats, saltmarsh, shingle beach and marsh intersected by networks of ditches. These habitats support a number of internationally and nationally important over-wintering and passage migrant waders and waterfowl. The site forms an integral part of the Severn Estuary system and is ecologically linked to the Somerset Levels which provide alternative winter feeding grounds for waders and wildfowl.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.19 SSSIs are protected under the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2004. The potential effect of an overhead line or underground connection on a SSSI would vary depending on the nature of the effect caused and the special interest of the site. Underground connections are more invasive than the equivalent length of overhead line as the land disturbance is greater during construction and there are permanent restrictions on tree planting and land use during operation.

Consultation with Natural England would be required before consent could be granted for any development or operations likely to damage the SSSI interest.

3.20 The Overarching National Policy Statement for Energy (EN1) states at paragraph 5.3.11 that:

> *Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on a SSSI (either individually or in combination with other developments) development consent should not normally be granted. Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs.*

3.21 This is reinforced further in the National Planning Policy Framework (NPPF) which advises local authorities on preparing policies and exercising development control.

3.22 All options involve removing existing infrastructure (cables and pylons) within the SSSI, which is likely to result in disturbance and temporary loss of habitat in an area known to support internationally and nationally important birds. There is also potential for adverse effects on watercourses (e.g. pollution or sedimentation) within the study area as a result of construction activities which could lead to effects on aquatic ecology in the SSSI.

3.23 Siting new infrastructure in SSSI's should be avoided where possible. For new overhead lines, routes along the southern and western boundary of the study area would minimise the requirement to site new pylons within the SSSI. Potential effects on bird flight paths would also require consideration.

3.24 For new underground connections (cable or GIL), routeing along the southern and western boundary of the study area would also minimise the extent of new infrastructure with the SSSI. The construction of new underground connections through the SSSI would be more invasive than overhead lines, and would cause disturbance and temporary loss of habitat which may have effects on the sites special interest or qualifying features.

3.25 The potential effects on the SSSIs special interest and qualifying features would require detailed consideration for whichever technical option is taken forward. Mitigation would depend on the results of field surveys carried out in consultation with Natural England and the local authority.

Special Protection Areas (SPA) and Ramsar sites

Severn Estuary SPA and Ramsar

3.26 The Severn Estuary SPA includes land to the north, east and south of the existing Hinkley Point Power Stations. The full extent of the designation covers an area of approximately 24,000ha. The Estuary is the largest coastal plain estuary in the UK with extensive mudflats and sandflats, rocky shore platforms, shingle and islands. The Estuary's unique funnel shape means it has a high tidal range which results in a variety of plant and animal communities typical of liquid mud and tide-swept sand and rock.

3.27 The site qualifies as an SPA under Article 4.1 of the Birds Directive (79/409/EEC) by supporting bird populations of European importance that are listed on Annex I of the Directive and under Article 4.2 by regularly supporting at least 20,000 waterfowl.

3.28 The Ramsar designation also extends to cover fish populations of the estuarine and river system which is one of the most diverse in Britain with over 110 species recorded.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.29 SPAs and Ramsar sites are afforded protection under the Conservation of Habitats and Species Regulations 2010. The Regulations only permit development in the first instance on such sites where it is directly connected with or necessary to site management for nature conservation; or where the proposal would not be likely to have a significant effect on the conservation objectives of the site, alone or in combination with other plans and projects.

3.30 Where there are likely to be significant effects, consent for development can only be granted where it would not adversely affect the integrity of the site, taking into account the manner in which the development will be carried out and any conditions that might be imposed on the consent or, where there are no alternative solutions and the development must be carried out for

imperative reasons of overriding public interest relating to human health, public safety or benefits of primary importance to the environment.

3.31 All options involve removing existing infrastructure (cables and pylons) within the SPA and Ramsar, which is likely to result in disturbance and temporary loss of habitat. There is potential for adverse effects on internationally important bird species which may use the study area for high tide roosting or foraging during construction. There is also potential for adverse effects on watercourses (e.g. pollution or sedimentation) within the study area as a result of construction activities which could lead to effects on fish.

3.32 Siting new infrastructure in SPA and Ramsar sites should be avoided where possible. For new overhead lines, routes along the southern and western boundary of the study area would minimise the requirement to site new pylons in the area protected under the SPA/Ramsar designation. Potential effects on bird flight paths would also require consideration.

3.33 For new underground connections (cable or GIL), routeing along the southern and western boundary of the study area would also minimise the extent of new installation with the SPA/Ramsar. The construction of new underground connections through the sites would be more invasive than an overhead line, and would cause disturbance and temporary loss of habitat.

3.34 The potential effects on the integrity of the SPA/Ramsar sites (e.g. disturbance to bird movements or foraging habitat) would require detailed consideration for whichever technical option is taken forward. An Appropriate Assessment may be required in accordance with the Conservation of Habitats and Species Regulations 2010 to identify any potential direct or indirect effects on the integrity of the sites.

3.35 Mitigation would depend on the results of field surveys carried out in consultation with Natural England and the local authority, but could include restrictions on the timing of certain works to reduce potential effects on birds, or the selection of construction methods or particular plant/machinery to reduce effects and minimise disturbance.

Special Areas of Conservation (SAC)

Severn Estuary SAC

3.36 The Severn Estuary SAC is approximately 450m east of the study area and covers an area of approximately 73,000ha. The SAC was confirmed in 1995 and further amended in 2000. The site is designated for important populations of fish and the natural habitats present within the Estuary.

Exmoor and Quantock Oakwoods SAC

3.37 The Exmoor and Quantock Oakwoods SAC is approximately 6km west of the study area and comprises areas of old sessile oak woods and alluvial forests. The site supports a maternity colony of Barbastelle bats that use the trees for roosting. Barbastelle bats are an Annex ll species that are a primary reason for the SAC's designation and Bechstein's bat also form a qualifying feature.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.38 Like SPAs and Ramsar sites, SACs are afforded protection under the Conservation of Habitats and Species Regulations 2010 and development is strictly controlled (see paragraphs 3.28 and 3.29). None of the technical options would have a direct impact on the SAC sites, but the potential for indirect effects on the sites and their integrity and qualifying features would be considered at the next stage of assessment.

<u>National Nature Reserves (NNRs)</u>

Bridgwater Bay NNR

3.39 The Bridgwater Bay NNR is approximately 450m east of the study area and consists largely of intertidal mudflats with saltmarsh, sandflats and shingle ridges, some of which are vegetated. The Bristol Channel has the second largest tidal range in the world and this exposes huge mudflats and sand banks in the area. The site has an important bird population with approximately 190 species recorded on the reserve.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.40 NNRs are designated by Natural England under the National Parks and Access to the Countryside Act 1949 and are primarily SSSIs (see above). National Grid's guidance advises that it should seek to avoid NNRs when siting infrastructure.

3.41 None of the technical options would have a direct impact on the NNR, but the potential for indirect effects on the sites qualifying features (e.g. disturbance to

bird movements through removal of foraging habitat or effects on flights paths for overhead lines) would be considered at the next stage of assessment.

Hinkley Local Wildlife Site and Hinkley Point Nature Reserve

3.42 Land immediately south of the power stations is designated as the Hinkley Local Wildlife Site and Hinkley Point Nature Reserve. The potential effects on these sites would be taken into account at a later and more detailed stage of assessment in consultation with Natural England, the planning authority and the local wildlife trust.

Historic Environment

Scheduled Monuments (SMs)

3.43 The only SM in the study area is Wick Barrow (known as Pixies Mound) which lies approximately 150m south of the existing Hinkley Point Power Stations. The monument dates back to the Neolithic and Bronze Age. It consists of a round mound approximately 25m in diameter and 1.5m high built predominantly of large stones up to 1m long with a walled enclosure within.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.44 SMs are nationally important monuments and archaeological remains which are protected under the provisions of the Ancient Monuments and Archaeological Areas Act 1979. Consent is required from English Heritage, the statutory advisor on the historic environment, under the 1979 Act before works directly affecting an SM may be carried out.

3.45 Direct effects on Pixies Mound (Wick Barrow Scheduled Monument) could be avoided by careful routeing.

3.46 Although it would be possible to avoid the SM, an assessment to identify any indirect effects on the feature or its setting would be required due to its proximity to the proposed works, particularly the interconnector circuit between the existing and proposed substations. Underground connections would have less effect on the setting of the SM in comparison with overhead lines as any impacts would be temporary during construction. Effects could be minimised by maximising the distance between the SM and the interconnector circuit.

3.47 There may be other unknown archaeological assets which could be affected by ground disturbance associated with the removal of existing equipment and the installation of new pylons or underground cables/GIL. Effects are unlikely to be significant in the areas where existing cables and pylons need to be removed as the ground has been previously disturbed. The installation of underground connections would be more invasive than overhead lines and is likely to have a greater scale of effects on any buried archaeology. An assessment of the potential for archaeological remains and any direct and indirect effects from construction and installation would be required. Mitigation would depend on the findings of the archaeological assessment, but could be minimised through careful routeing/siting.

Registered Park and Gardens

3.48 There are no Registered Park and Gardens within the Study area. Fairfield House Registered Park and Garden is approximately 2.2km west of the study area. It is a Grade ll medieval site with features including 18th century walled gardens, a late 18th century landscaped park and pleasure grounds around a country house.

Implications for Overhead Line Routeing/Underground Cables/GIL Routeing

3.49 The English Heritage 'Register of Historic Parks and Gardens of special historic interest in England' (compiled under powers contained in Historic Buildings and Ancient Monuments Act 1953) identifies sites assessed to be of national importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the landscapes' special character.

3.50 No significant adverse effects are anticipated on the setting of Fairfield House Registered Park and Garden due to the nature of the modification works proposed, the distance of the works from the site and the presence of existing electrical infrastructure. This would be confirmed at the next stage of assessment.

Water Resources

Flood Risk

3.51 The Environment Agency uses the following flood zones in England:

- Flood Zone 1: Land which has a low probability of flooding;
- Flood Zone 2: Land which has a medium probability of flooding; and
- Flood Zone 3: Divided into 3A (land which has a high probability of flooding) and 3B (the functional floodplain).

3.52 Land to the east and south of the power stations is in Environment Agency Flood Zone 3. This includes two areas of Flood Zone 3 in the study area that the existing overhead line and underground cable connections cross.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.53 It is relatively straightforward to build flood resilience into overhead lines by addressing safety clearances from anticipated flood levels in the overhead line design. The presence of overhead line pylons in areas of flood risk has a negligible effect on the risk of displacement of water as the pylon construction poses no material changes to surface water flow. Flood risk would not be a key consideration if an overhead line solution was taken forward.

3.54 The presence of an underground cable/GIL circuit in areas of flood risk would not affect the circuit's operation and has a negligible effect on the risk or displacement of water as underground circuits pose no material changes to water flow.

3.55 However if underground cable/GIL connections were taken forward two CSE/GIL compounds would be required to facilitate the transition from overhead lines to underground cables or GIL to the east of Wick. CSE/GIL compounds should ideally be located outside areas at risk of flooding and if this option was taken forward the location of the potential CSE/GIL compounds would require further consideration and assessment in accordance with the NPPF.

3.56 The NPPF states that authorities should steer new development to Flood Zone 1, in which the chance of flooding each year is 0.1% (1 in 1000) or less. National Grid would seek to identify sites for the CSE/GIL compounds outside of Flood Zones 2 and 3. However if there were no reasonably alternative sites in Flood Zone 1, National Grid may consider the suitability of sites in Flood Zone 2 and then Flood Zone 3. A Flood Risk Assessment (FRA) would be

necessary to demonstrate that any proposed development within Flood Zones 2 and 3 could operate safely and effectively in the event of a flood and would not increase flood risk elsewhere. Evidence would be required as part of the FRA to demonstrate that the sequential and exception tests outlined in the NPPF could be satisfied.

Watercourses

3.57 The study area is approximately 450m west of the Severn Estuary. Several watercourses (drains and brooks) are identifiable on OS mapping in the study area.

Implications for Overhead Line/Underground Cables/GIL Routeing

3.58 There is potential for adverse effects on several watercourses in the study area as a result of construction activities and accesses for work. Potential adverse effects could include water pollution, sedimentation and risks to aquatic ecology. The potential for effects would be greater for underground connections due to the invasive nature of construction and the requirement to cross the watercourses, rather than oversail them with overhead lines. Some of the watercourses may have hydrological links to the nearby designated Severn Estuary which could give rise to indirect effects on a greater scale.

3.59 Pollution prevention/mitigation measures would be required to prevent potential effects on watercourses in the study area and subsequent indirect effects on the nearby Severn Estuary. Potential effects on watercourses during the installation of underground connections would be minimised through the identification of appropriate crossing methods to minimise disturbance.

Appendix 3 – Appraisal of possible overhead line alignments

1 Introduction & Background

1.1 Following the identification of the preferred connection option (Option 3i – overhead line) National Grid's technical and environmental specialists identified technically feasible overhead line routes. In order to inform its appraisal of the options, National Grid's consultants have undertaken additional desk studies and field surveys relating to landscape, visual amenity, ecology, heritage and socio-economic factors. These surveys have been informed by inputs from the Thematic Groups, Community Forums and other consultees. In addition, a range of engineering studies have been undertaken to identify feasible technical options.

1.2 The overall approach to the appraisal has been guided by National Policy Statements EN-1 (Overarching Energy) and EN-5 (Electricity Networks), relevant planning policies at national and local level and by National Grid's Approach to the Design and Routeing of New Electricity Transmission Lines and the Approach to Options Appraisal which were published in August 2012.

1.3 The appraisal has been co-ordinated by the project team with inputs from the Electricity Alliance (technical issues), TEP (environmental issues) and ERM (socio-economic issues).

1.4 The approach adopted for the alignment options appraisal has included a number of stages:

- identification of potential overhead line alignments within the study area;
- assessment of overhead line alignments; and
- drawing conclusions on the most appropriate solution within the study area (the 'draft alignment').

1.5 This follows the approach adopted for options appraisal for the proposed connection between Bridgwater and Seabank. The approach and methodology adopted for each of the assessments is presented in the Hinkley Point C Connection Project – Connection Option Report October 2012.

1.6 This Appraisal contains the following sections:

Section 1 - Introduction & Background

Section 2 - Environment – Landscape

Section 3 - Environment – Visual Amenity

Section 4 - Environment – Historic Environment

Section 5 - Environment – Ecology

Section 6 - Socio-Economic Economic Activity

Section 7- Cost

Section 8 – Draft Alignment

Section 9 – Study Area Conclusion.

Study area boundaries

1.7 The Study Area for the Hinkley Point transmission line entry modifications extends from pylon ZZ007 on the existing 400kV Hinkley Point to Taunton 400kV ZZ overhead line ("400kV ZZ route") and pylon VQ004 on the existing 275kV Hinkley Point to Bridgwater VQ overhead line ("275kV VQ route") to the proposed National Grid 400kV Shurton Substation. In addition to these two overhead lines, the study area is also traversed by the 400kV ZG overhead line which runs from Hinkley Point to Melksham ("400kV ZG route"). The 400kV overhead lines provide a connection to the Hinkley Point 400kV Substation. The 275kV VQ route provides a connection to the Hinkley Point 275kV Substation. A section of the 275kV VQ route is provided by underground cable to enable it to pass beneath the 400kV ZZ route. It will be upgraded to operate at 400kV as part of the Hinkley Point C Connection project.

Local representations

1.8 Indicative route alignments were prepared to support the cumulative impact assessment of the proposed Hinkley Point C Power station Environmental Impact Assessment (EIA). These were discussed with stakeholders including the Environment Agency, Natural England, English Heritage, West Somerset Council and Stogursey Parish Council. A number of meetings and a site visit has also been held with Stogursey Parish Council. The key issues raised by stakeholders are:

- the need to route overhead lines as far as possible from the villages of Wick and Shurton;
- effects on important local views in the area including those from the Quantocks, Knighton Lane in Burton, Wick and Stolford;

- effect of pylons and access across Wick Moor, and associated ecological designations;
- concerns about impact on Pixies Mound Scheduled Monument (Wick Barrow);
- concerns about effects on local bridleways and footpaths, in particular the West Somerset Coast Path, during construction;
- potential additional traffic disruption the works will cause; and
- opportunities for landscape mitigation to screen views to overhead lines.

Definition of options

1.9 The alignment options for this Study Area are illustrated in Figures 1.1 to 1.3 below. The context for these options is described in Section 3 of this Report. All three alignment options involve constructing a connection between the existing and proposed substations.

Alignment Option A

1.10 Alignment Option A would involve diverting the 275kV VQ route and 400kV ZZ route to the west following their crossing of West Brook. The lines would then turn north west to enter the proposed substation. A 400kV interconnector connection would run from the proposed Shurton Substation to the east of and parallel to these lines before turning through ninety degrees. It would then run across North Moor before turning north to enter the existing Hinkley B 400kV Substation.

Alignment Option B

1.11 Alignment Option B is a variant of Option A. It would also involve the diversion of the 275kV VQ route and 400kV ZZ route. The 400kV interconnector connection would run east from the proposed Shurton Substation to North Moor. It would then turn north to enter the existing Hinkley B 400kV Substation.

Alignment Option C

1.12 Alignment Option C is also a variant of Option A. It would also involve the diversion of the 275kV VQ route and 400kV ZZ route. The 400kV interconnector connection would run south east from the proposed Shurton Substation to a Wick Moor. From here the line would turn north east to North Moor before turning north to enter the existing Hinkley B 400kV Substation.

Figure 1.1 – Study Area – Alignment Option A

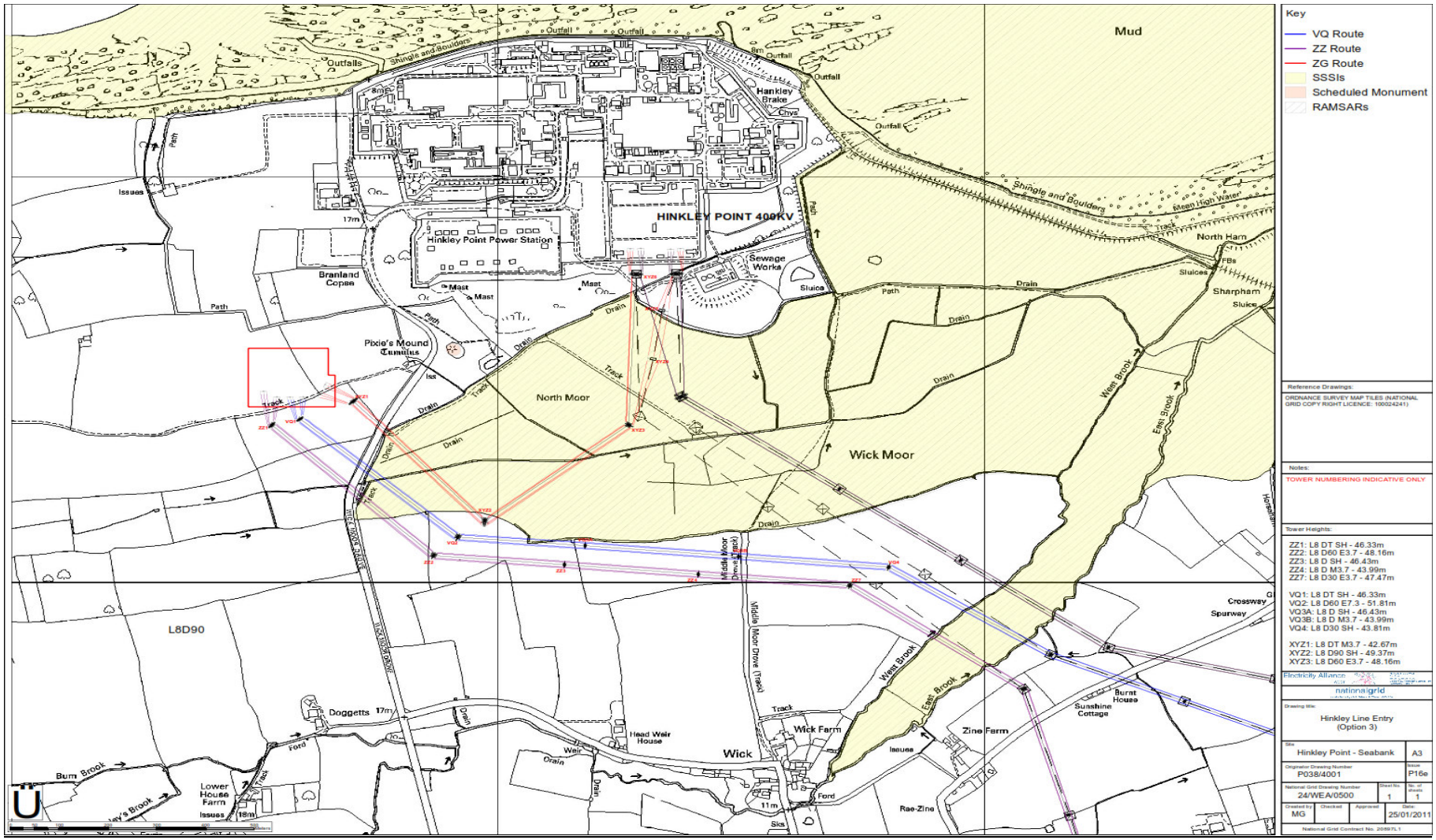


Figure 1.2 – Study Area - Alignment Option B

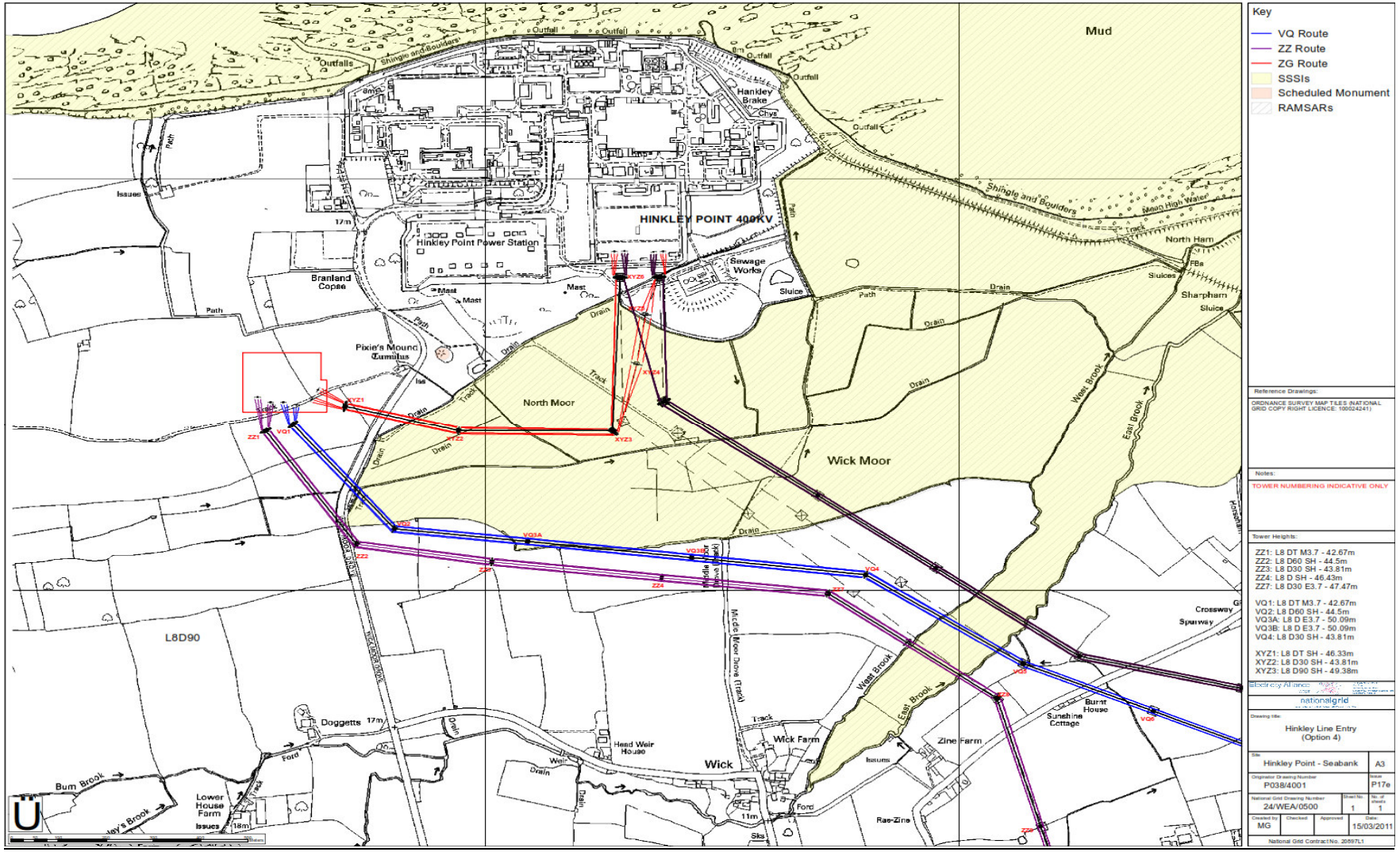
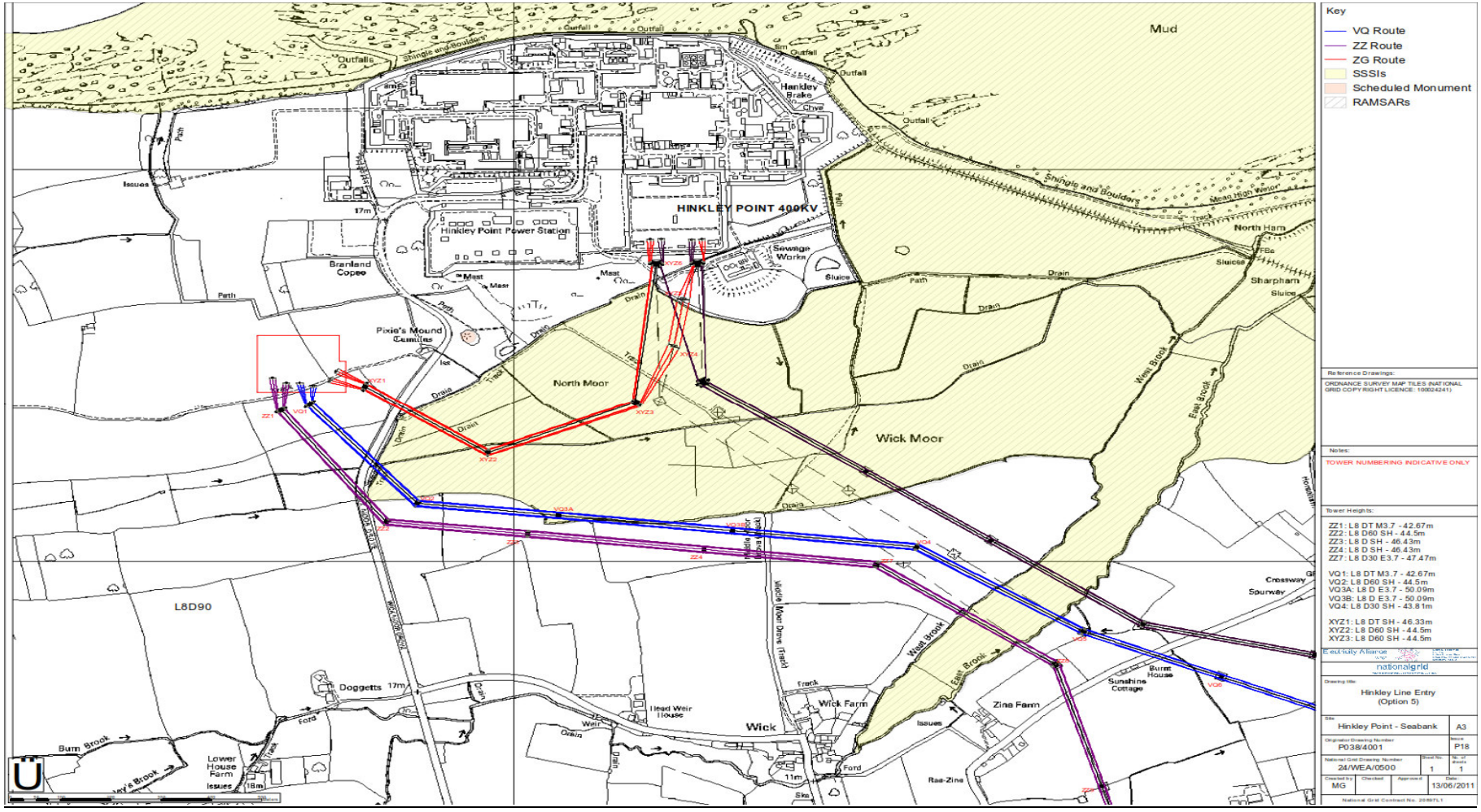


Figure 1.3 – Study Area - Alignment Option C



Holford Rules

1.13 All three alignment options would be similarly compliant in terms of the Holford Rules. In Option A, the 400kV XYZ route would run on the least direct overhead line route and involve the sharpest change of direction compared to other overhead line options. It would be least preferred in terms of Holford Rule 3.

1.14 Option A would, however, have the least effect on the Severn Estuary nature conservation designations and on the setting of Pixies Mound Scheduled Monument. It would therefore be more compliant with Rule 2, though the sharp change of direction would also need to be taken into account in considering overall compliance.

2 Environment – Landscape

Baseline conditions

Designated landscapes

2.1 Exmoor National Park is approximately 15km south-west of the Study Area. National Parks are of national importance and were designated under the 1949 National Parks and Access to the Countryside Act, the primary purpose of which is to conserve and enhance the natural beauty of the landscape.

2.2 Exmoor National Park comprises gently rolling open heather clad hills contrasting with deep secluded wooded valleys or combes. The northern edge of Exmoor National Park is defined by dramatic high coastal cliffs and the Park's eastern boundary is partly defined by the small village of Elworthy near the West Somerset border.

2.3 The Quantock Hills Area of Outstanding Natural Beauty (AONB) is approximately 5km south-west of the Study Area, with Exmoor National Park further west. Like National Parks, AONB's are of national importance and were designated under the 1949 National Parks and Access to the Countryside Act.

2.4 The Quantock Hills (National Landscape Character Area 144) stretch south-eastwards from the Bristol Channel as a 19km long ridge standing high above the surrounding agricultural plain. Extensive views are possible from the open moorland and heath covered ridge across the surrounding landscape.

National Landscape Character Assessment

2.5 The Study Area comprises the Somerset Levels and Moors and the Vale of Taunton and Quantock Fringes National Landscape Character Areas (NLCA 142 and 146), as characterised by the former Countryside Agency (now Natural England) in 2005.

2.6 The Study Area is approximately 9.5km north-west of Bridgwater, and comprises agricultural land to the south and south-east of Hinkley Point power station. The closest hamlets of Stolford and Wick are to the east and south of the power stations respectively. Stockland Bristol is approximately 2km to the south-east, Shurton, Burton and Knighton approximately 1.5km south-west and Stogursey village lies further south approximately 2km to the south-west.

2.7 The eastern part of the Study Area is in the Somerset Levels and Moors Character Area (NLCA 142) and the western part in the Vale of Taunton and Quantock Fringes Character Area (NLCA 146).

2.8 The Somerset Levels and Moors Character Area (NLCA 142) is described as a broad area of low-lying farmland and wetland surrounded and divided by low hills and ridges which form the Mid Somerset Hills (NLCA 143). The Study Area is at the western extent of the Somerset Levels and Moors (NLCA 142) and is distant from the Mid Somerset Hills (NLCA 143) which are further inland.

2.9 The Somerset Levels and Moors (NLCA 142) are described as a flat open landscape of wet grassland, arable and wetland divided by wet ditches or deep, wide, wet 'rhynes' which have a strong unity and distinctive character.

2.10 Woodland is relatively sparse within the Levels and Moors, although pollarded willows are widespread along the 'rhynes' and there are occasional shelterbelts around farmsteads.

2.11 The Levels and Moors are a highly managed yet wild/tranquil landscape. Hinkley Point Power Station is a dominant feature in the West Somerset Coast landscape, where the Levels and Moors meet Bridgwater Bay.

2.12 The Vale of Taunton and Quantock Fringes Character Area (NLCA 146) is described as comprising low-lying fields surrounded by upland landscapes including the Quantock Hills. To the east this character area extends between the Quantock Hills and the Somerset Levels and Moors.

2.13 Along the coast, north of the A39, the Quantock Fringes (NLCA 146) are described as a belt of rolling, open windswept landscape with a few scattered trees and small villages surrounded by a rectilinear field pattern. The main

settlements lie away from the sea. This landscape is noted as being broken up by low-lying wet pasture where meandering streams meet the coast. Parts of the coastline are described as remote and bleak, incorporating low cliffs, with the existing Hinkley Point Power Station noted as being prominent in the east. Views are described as extending from the coastline towards the Welsh Coast.

2.14 The Vale of Taunton and Quantock Fringes (NLCA 146) is also described as comprising mixed farmland generally bound by thick hedgerows commonly on top of banks, and forming irregular, medium-sized fields. Woodland is noted as being sparse and the distribution of hedgerow trees variable.

Local Landscape Character Assessment

2.15 The 'West Somerset Landscape Character Assessment' was produced in 1999 on behalf of West Somerset Council. It characterises the Study Area as Quantock Vale Landscape Character Area (LCA 3) with Wick Moor and Coast; Eastern Lowlands; and Wall Common and Coast forming Sub-Character Areas within it.

2.16 The Quantock Vale Character Area (LCA 3) is described as a flowing lowland landscape of wide valleys and gentle hills, a cliffed coastline (from St Audries to Hinkley Point), and with areas of marsh and salt marsh. Vegetation across this area comprises mixed species hedges, hedgerow trees, limited small and medium sized deciduous woodlands and copses, grazing marsh and pasture fields. Built settlement includes the historic village of Stogursey, Holford and numerous small hamlets.

2.17 Beyond the Quantock Vale Character Area (LCA 3) is the Doniford Stream and Quantock Fringe Character Area (LCA 5) and the Central Quantocks Character Area (LCA 4) approximately 3.5km and 6.5km south-west of the study area.

2.18 Hinkley Point Power Station is within the Eastern Lowlands Sub-Character Area and the overhead line entry modification options are predominantly within the Wick Moor and Coast Sub-Character Area. The Wall Common and Coast Sub-Character Area is to the east and is separated from Wick Moor by the Eastern Lowlands which extend around Wick Moor.

2.19 The Wick Moor and Coast Sub-Character Area includes coastal marsh below 10m AOD, subject to flooding and covered with recent alluvial deposits. Marsh is noted as being used for grazing in the summer and is not divided into fields. Scrubby vegetation exists along drainage ditches. The area is

described as being open and bleak and visually dominated by the existing Hinkley Point Power Station.

2.20 The Wall Common and Coast Sub-Character Area has similar characteristics to the Wick Moor and Coast Sub-Character Area but is separated from Wick Moor in the west by slightly higher land referred to as the Stolford ridge. The Wall Common and Coast Sub-Character Area includes low-lying land below 10m AOD and pasture fields used as grazing marsh in the summer divided by drainage ditches. The area is also described as being open and bleak.-

2.21 The Eastern Lowlands surround Wick Moor and comprise low rolling hills to about 70m AOD. In the south-west the gently sloping landform rises to the Quantock Hills. Medium-size deciduous woodlands and copses are noted as being scattered throughout the area. The visual dominance of Hinkley Point Power Station in the area is noted as being less than might be expected due to the area's rolling landform and woodland and hedgerow screening. The power station is however noted as a significant feature in views of the area from the Quantock Hills. Overhead lines in the east are noted as being locally dominant features.

2.22 Fairfield House is a Grade II Registered Park and Garden approximately 2.5km south-west of the Study Area and is recorded on the Parks and Gardens Register as "a medieval site with 18th century walled gardens in a late 18th century landscape park, and 19th/early 20th century pleasure grounds around a country house".

2.23 The Sedgemoor District boundary is just under 3km to the south east of the power station. Sedgemoor is characterised into landscape character areas in Sedgemoor District Council's 'Sedgemoor Landscape Assessment and Countryside Design Summary', Revised Edition 2003.

2.24 To the east the Wall Common and Coast Sub-Character Area within West Somerset become the Estuarine Levels Sub-Character Area within Sedgemoor.

2.25 The Estuarine Levels partly comprises the open and windswept landscape surrounding the Parrett Estuary, and is described as comprising largely flat lowland areas where alluvial and marine clay or gravel deposits have created land slightly above the low-lying Moors. The area's field pattern is defined by ditches and 'rhynes'. Tree (and hedgerow) cover is noted as influencing the extent of views in this flat landscape.

2.26 To the south-east and south the Eastern Lowlands in West Somerset become the Stockland Hills in Sedgemoor. The Stockland Hills are described as rising gently above the Levels of the Steart peninsula and comprise a series of small hills rising from 10m AOD to an average of 50-60m AOD. Higher ground includes Pinnacle Hill at 95m AOD and the hill fort site of Cannington Park at 80m AOD. The Stockland Hills have a close association with the estuarine and coastal areas of the Parrett and Bridgwater Bay.

2.27 The Stockland Hills include small pasture fields and larger arable fields, unmanaged hedgerows and small woodlands, with a dispersed settlement pattern. Much of the area is described as having an undeveloped remote character, but features such as pylons are noted as bringing modern development into the landscape. Copses, coverts and other woodland blocks are noted across this area.

Landscape Value, Condition and Capacity

2.28 There are no national level landscape designations within the Study Area. The study area comprises Wick Moor and part of the Eastern Lowlands, which are valued locally. The value of the landscape in this study area is considered to be moderate.

2.29 Wick Moor and the Eastern Lowland are considered to be generally well maintained and in good condition, although hedgerow is fragmented in places. The area is dominated by Hinkley Point Power Station in the north.

2.30 Wick Moor is a medium scale flat low-lying predominantly marsh and pastoral landscape. Compared to the low rolling hills of the Eastern Lowlands and the Stockland Hills further south, Wick Moor is considered to have more capacity to accommodate larger structures such as overhead lines and industrial development as these are already influencing features on the landscape.

2.31 A Development Consent Order (DCO) for the proposed Hinkley Point C Power Station has not been granted at the time of writing. However, for the purpose of this assessment, the new Hinkley Point C Power Station is considered as part of baseline conditions. The 'Landscape Restoration Plan' included as Figure 21.50 in Volume 2 of EDF Energy's Hinkley Point C Environmental Statement, has been considered as part of baseline conditions.

2.32 Landscape Restoration Proposals associated with Hinkley Point C Power Station include a Country Park/Nature Reserve south of the new power station and west of the proposed overhead line options. This Country Park/Nature Reserve includes a new broad-leaved woodland (Bishop's Wood),

which would cover the slopes of new gently rolling hills reflecting the landscape character in the surrounding area. Hill tops would remain open with semi-improved grassland/grazing land with scattered native trees.

2.33 On lower ground north of Bishop's Wood, the character of the Holford valley and the prominence of Green Lane ridge in the north would be maintained. The valley floor is proposed to be raised and divided by native hedgerows into a regular field pattern linking and replicating adjacent field patterns. Fields would comprise arable farmland and semi-improved grassland/grazing land across the majority of the raised valley floor, and calcareous grassland would extend across the northern valley slope rising to Green Lane ridge.

2.34 The proposed Shurton 400kV Substation will be built on arable land adjacent Green Lane ridge, north-west of Wick Moor Drove. The proposed substation is part of the Hinkley Point C Power Station DCO application and does not form part of the alignment options assessed below.

2.35 The landscape capacity of the Study Area to accommodate the proposed overhead line entry modification works including the diversion of the 400kV ZZ route and 275kV VQ route to connect to Hinkley C Substation and the introduction of a new 400kV overhead line between Hinkley B and C Substations is high, due to the presence of the power station and existing overhead lines.

Assessment of effects

2.36 The diversion of the 400kV ZZ route and 275kV VQ route to connect to the proposed Shurton Substation, and the introduction of a new 400kV overhead line (XYZ Route) between the existing Hinkley B and proposed Shurton Substations would have no effect on Exmoor National Park and a negligible effect on the Quantock Hills AONB, due to the distance of approximately 15km and 5km respectively between the Study Area and the designated landscapes. The existing overhead lines are visible in some views from the Quantock Hills, however the reconfiguration would be barely distinguishable over this distance.

2.37 For all alignment options, existing overhead lines up to and including the pylons immediately south of East Brook would remain unchanged, and the 400kV ZG Route would remain in situ.

2.38 All alignment options would involve diverting the 400kV ZZ route and 275kV VQ route west and north-west to Hinkley Point C Substation, and would

include a new 400kV overhead line (XYZ Route) between the existing Hinkley Point B and proposed Shurton Substations.

2.39 For all alignment options, the existing infrastructure on the 275kV underground cable route beneath North Moor and Hinkley Point A Substation would be removed. The removal of the 275kV underground cable route would have a moderate negative magnitude of effect (scale of change) on the landscape during removal work as it would result in temporary disturbance to affected land and would result in a small loss of scrub woodland. Negative effects would reduce to a low negative magnitude of effect (scale of change) on the landscape following reinstatement and re-establishment. These negative effects on landscape would be short term. The removal of the existing 275kV underground cable route would result in a minor negative effect on landscape prior to mitigation.

2.40 The overhead line diversion and a new 400kV overhead line within the Study Area would have a direct negative effect on Wick Moor and on a part of the Eastern Lowlands in the south and west.

2.41 Negative effects would result from the diversion of existing overhead lines to the west and north-west towards the proposed Shurton Substation, and the introduction of a new 400kV overhead line between the existing Hinkley Point B and the proposed Shurton Substations. The presence of existing overhead lines, together with Hinkley Point Power Station, would reduce the magnitude of effect (scale of change) of proposed line entry modification options in the Study Area.

2.42 Hinkley Point Power Station (including woodland to the south and east within the power station site) would provide backgrounding to the new 400kV overhead line and diverted overhead lines when viewed from the south. The gently undulating landform surrounding the Study Area would provide some backgrounding and the Quantock Hills would also provide some distant backgrounding to the diverted overhead lines and a new 400kV overhead line when viewed from the coast.

2.43 Hedgerow and trees across Wick Moor and the Eastern Lowlands provide some filtering and partial screening, which would reduce the influence of diverted overhead lines and a new 400kV overhead line on the local landscape.

2.44 A new 400kV overhead line would likely have some negative effects on trees and hedgerows along field boundaries, ditches or 'rhynes' and a track within

the Study Area due to the electricity safety clearances required. Hedgerows and ditches or 'rhynes' are a component of the landscape character of the Study Area and the surrounding area.

Option A

2.45 Option A would divert the 400kV ZZ route and 275kV VQ route on parallel alignments approximately 800m west of the existing overhead lines, and would introduce a short length (approximately 1km) of 400kV XYZ Route between the existing Hinkley Point B and proposed Shurton Substations. As part of Option A, the 400kV XYZ Route would change direction twice and would run north-west over Wick Moor Drove. The pylon referenced XYZ2 would be sited south of North Moor on higher ground closest to two pylons (referenced VQ2 and ZZ2) on the diverted overhead line routes. Option A would site pylon XYZ2 the furthest south of all overhead line options (A, B and C), south of Pixies Mound Scheduled Monument and Hinkley Point A Substation.

2.46 Option A would have a low negative magnitude of effect (scale of change) on Wick Moor and on part of the Eastern Lowlands. Due to the flat low-lying and generally open nature of Wick Moor it is considered preferable to take as straight and as direct a route as possible. It would also be preferable to route overhead lines on lower ground on North Moor avoiding higher ground further south within the Eastern Lowlands, minimising negative effects on the surrounding landscape.

Option B

2.47 As with Option A, the 400kV XYZ Route would change direction twice and would run north-west over Wick Moor Drove, however the second change of direction (at pylon XYZ2) would be slighter and would result in pylon XYZ2 being sited on the low-lying North Moor, reducing its influence on the local landscape, in particular to the south.

2.48 As with Option A, Option B would have a low negative magnitude of effect (scale of change) on Wick Moor and on part of the Eastern Lowlands.

2.49 Option B would have a slightly lower negative magnitude of effect (scale of change) than other overhead line route options, as the new 400kV overhead line between the existing Hinkley Point B and proposed Shurton Substations follows the most direct route and would involve a smaller change in direction south of Hinkley Point A Substation. Due to the flat generally open nature of

the Moors it is considered preferable to take as straight and as direct a route as possible. Pylon XYZ2 would be sited on lower ground on North Moor, north of a field boundary and stream with hedgerow and tree cover providing filtering and screening minimising the influence of this pylon on the surrounding landscape, in particular from the south.

Option C

2.50 As with Options A and B, the 400kV XYZ Route would change direction twice and would run north-west over Wick Moor Drove. The second change of direction (at pylon XYZ2) would not be as sharp as Option A and would result in pylon XYZ2 being sited on the low-lying North Moor, reducing its influence on the local landscape, in particular to the south.

2.51 As with Options A and B, Option C would have a low negative magnitude of effect (scale of change) on Wick Moor and on part of the Eastern Lowlands.

2.52 Option C would have a slightly higher negative magnitude of effect (scale of change) than Option B and a lower negative magnitude of effect (scale of change) than Option A. Due to the flat generally open nature of the Moors it is considered preferable to take as straight and as direct a route as possible. A pylon would be sited on slightly lower ground on North Moor, minimising the influence of this pylon in the surrounding landscape in particular to the south.

Potential for mitigation

2.53 It is not possible to avoid direct negative effects on the landscape of Wick Moor and on part of the Eastern Lowlands. However, siting pylons on lower ground and avoiding or minimising sharp changes in direction would assist in reducing potential negative effects. All alignment options in the Study Area site pylons on rising ground in the south. Additional mitigation by way of hedgerow and tree planting in the vicinity of diverted overhead lines or the new overhead line (subject to land owners' consent being granted), would be in keeping with the existing landscape character and could also assist in reducing potential effects.

3 Environment - Visual Amenity

Baseline conditions

3.1 The Study Area comprises the flat low-lying coastal marsh of Wick Moor surrounded by undulating farmland, rising up to elevated hills to the south of

Wick. There are open views across Wick Moor with some filtering provided by hedgerows and trees to field boundaries (albeit fragmented in places) and by ditch vegetation, in particular south of the power station site.

3.2 Hinkley Point Power Station, including the proposed Hinkley Point C Power Station, is on the West Somerset Coast and forms a characteristic feature in views. Views also include three existing overhead lines in close proximity which run south-east into the distance.

3.3 The power station and mature woodland to the south and east of Hinkley Point A and B, provides backgrounding in views from the south. Farringdon Hill in the south provides local backgrounding. The Quantock Hills provide distant backgrounding in views to the south and south-west.

3.4 The extent and nature of views in the area are influenced by local landform and landscape features including hedgerow and trees along field boundaries, ditches and local watercourses which screen and filter views in places. Woodland in the surrounding landscape varies in size and includes Farringdon Hill Plantation, Mud House Copse and Wick Park Covert, and woodland in the south-east and Honibere Wood, Great Plantation, Fairfield Wood and Kennel Copse and Waltham's Copse further to the south-west. Bishop's Wood is proposed as part of the Hinkley Point C restoration scheme to the south of the proposed power station.

3.5 The landform is flat and low-lying across Wick Moor and North Moor. Hinkley Point Power Station (A and B) is on higher ground north of North Moor, and the proposed Hinkley Point C Power Station would be on land to the west adjacent to the existing power stations. To the south of Wick Moor the land gently rises and falls south of a minor road towards a tree lined watercourse. Land then rises more steeply at Farringdon Hill. To the east the landform gently rises east of Wick Moor, south of Stolford and then falls to lower lying coastal marsh towards Wall Common and Steart.

3.6 In the west the landform would be raised as part of the proposed Hinkley Point C Power Station works; however the character of the existing valley would be retained, and would comprise rising ground to Green Lane along a ridge, and rising ground to the south comprising low hills planted with new woodland. A new road off Wick Moor Drove would provide access to the proposed Hinkley Point C Power Station and would be built on an embankment west of Wick Moor.

3.7 Existing overhead lines visible in the area include two 400kV overhead lines running south and south-east of Hinkley Point B Substation. These overhead lines include the 400kV ZG Route (the most northerly overhead line) and the 400kV ZZ route (the most southerly overhead line). The 275kV VQ route runs south-east between the ZG and ZZ Routes. These three routes run parallel and in close proximity across Wick Moor.

3.8 The VQ Route initially runs as an underground cable south-east beneath North Moor before being carried above ground as an overhead line from the south of Hinkley Point B Power Station.

Public Views

3.9 There are public views of the proposed line entry modification options from long distance footpaths; open access land on Wick Moor; public rights of way, a permissive footpath and a bridleway in this study area. These receptors generally have open views across flat low-lying coastal marsh or farmland with filtering in places by hedgerows. Some public rights of way (PROW) on Wick Moor and North Moor pass directly beneath the existing overhead lines.

3.10 The West Somerset Coast Path is a long distance recreational footpath that runs for approximately 25 miles from the hamlet of Steart in the east to the coastal resort of Minehead in the west. Section 2 of this PROW runs along the West Somerset Coast between Stolford (east of Wick Moor) and Lilstock in the west. Views from this footpath to the east of Hinkley Point Power Station are open and include existing overhead lines on the flat coastal marsh. The Quantock Hills in the distance provide backgrounding to overhead lines. Further west views south are obscured by the existing Hinkley Point Power Station and locally higher ground.

3.11 There are some distant open views south-west across the marsh towards the power station and existing overhead lines from section 1 of the West Somerset Coast Path further east.

3.12 The Hinkley Point Nature Trail is a permissive path that runs through the southern part of the power station site (south of Hinkley Point A Substation) and is usually open daily to the public. This footpath runs south through woodland and includes a circular route through open meadow that passes Pixies Mound, a Scheduled Monument. Views are generally open with some partial screening by intervening tree cover towards Wick Moor and existing overhead lines in the south-east.

3.13 There are several PROWs on Wick Moor, some of which pass beneath the existing overhead lines. The existing Hinkley Point Power Station and overhead lines are visible in many views, for example in the foreground of the view where these footpaths run underneath the existing overhead lines and are visible running north east to the power station and south-east into the distance. Views along Middle Moor Drove (north of Wick) are partly screened and filtered in places by hedgerow and trees. Open views are possible at field openings and through gaps in hedgerow.

3.14 Wick Moor is designated as open access land under the Countryside and Rights of Way Act 2000, which grants open access to this land for walkers in addition to the PROWs which cross this area.

3.15 South of Wick Moor a PROW runs across higher ground and has open views north towards the power station and existing overhead lines, with partial filtering by field boundary hedgerows and trees in places and by landform in the south.

3.16 To the west a PROW runs along Wick Moor Drove and has open views north and east with some views filtered and screened in places by roadside hedgerow and trees. The power station and overhead lines are visible.

3.17 The PROW along the southern boundary of the existing power station site has open views to the south and east which include the existing overhead lines on Wick Moor and beyond. Views from part of this PROW in the west are heavily filtered and screened by intervening hedgerows and trees, although the existing overhead lines do cross over this public footpath running towards Hinkley Point B Substation.

3.18 The PROW on Green Lane along the ridge west of Wick Moor Drove has some open elevated views, where not restricted by hedgerow, south east towards Wick Moor and the existing overhead lines. This PROW is proposed to be upgraded to a bridleway as part of the proposed Hinkley Point C Restoration Scheme.

3.19 PROWs in the proposed Country Park/Nature Reserve to the south of the Hinkley Point C Power Station have some open and some filtered views east, although these will become increasingly filtered and screened overtime by maturing proposed woodland.

3.20 PROWs on farmland to the east of Shurton have limited views north-east towards the proposed line entry modification options due to intervening landform and trees and hedgerows although the existing Hinkley Point Power

Station is partly visible. The proposed Hinkley Point C Restoration Scheme is anticipated to further screen any open views from these footpaths.

3.21 Mature trees and shrubs along the watercourse and minor road running east to Wick heavily filter and screen views north from the PROW to the south.

3.22 There are PROWs on Farringdon Hill in the south. There are open views north towards the existing Hinkley Point Power Station and overhead lines from this elevated ground, although views are partly backgrounded by mature trees and the power station. From the lower ground, views of the power station and existing overhead lines are partly filtered by intervening mature trees.

3.23 Views from PROWs in the south-east and east in the vicinity of Idson Farm, Chalcott Farm and Woolstone Farm are generally filtered or screened by intervening hedgerows. There are occasional views along the overhead lines running towards the existing Hinkley Point Power Station.

3.24 There are a number of PROWs near Stolford to the east. These PROWs have open and filtered views due to intervening hedgerows and trees. The existing overhead lines and the power station are visible across Wick Moor.

3.25 There is a bridleway which runs north-east from Shurton to Wick Moor Drove and then east along a minor road to Wick. Views north are screened by mature hedgerows in the west and are more open to the north and north-east where this bridleway meets Wick Moor Drove. East of Wick Moor Drove, views north are generally screened by roadside hedgerows and rising ground in the vicinity of Head Weir House. Open views north are limited to field openings, hedgerow gaps and where roadside hedgerow is lower. The power station and the existing overhead lines are visible to varying extents where there are views from the bridleway.

Private Views

3.26 Residential properties with open views towards the proposed line entry modification options include Head Weir House in the south, Doggetts and Newnham House in the south-west, and a limited number of properties on the north-eastern and northern edge of Shurton. Open views are also possible from a limited number of properties on the eastern edge of Burton and Knighton further to the south-west, however the existing Hinkley Point Power Station and overhead lines in close proximity are partly screened by mature trees and landform in the distance. The proposed Hinkley Point C Restoration Scheme is anticipated to screen the majority of views (if not all)

north-east from Knighton, Burton and Shurton, particularly as proposed tree planting matures.

3.27 On the higher ground to the south, open views are possible from Gunter's Grove at the foot of Farringdon Hill, from Wick Park Cottage on the eastern slope of Farringdon Hill and from residential properties at the top of Farringdon Hill, north of Farringdon Hill Farm. The existing overhead lines and the power station are visible from these receptors to varying extents.

3.28 Views from the northern edge of Wick are generally filtered or screened by intervening trees and shrubs or obscured by adjacent property. Open and filtered views north are possible from a number of properties south, south-east and east of Wick. These properties include Wick Pound Cottage, Wick Pound House, Wick Cottage, Thurleigh and Zine Farm. Where views are possible the overhead lines are visible running north-west to the power station. Hinkley Point Power Station and existing overhead lines are partially screened in places by intervening mature trees.

3.29 There are open views north-west from Sunny Cottage and Idson Farm to the south-east. These views include the overhead lines running north-west towards Hinkley Point Power Station.

3.30 There are limited open and filtered views from properties at the southern end of Stolford towards the existing overhead lines and Hinkley Point Power Station beyond Wick Moor.

3.31 A number of properties at Stolford have filtered views west and south-west across Wick Moor towards the existing overhead lines. A limited number of properties at the northern extent of Stolford close to the coast have open views towards the existing overhead lines crossing Wick Moor. The Quantock Hills provide distant backgrounding to these views.

Long Distance Views

3.32 Long distance views towards the proposed line entry modification options are possible from a number of longer distance receptors. There are open views north-west from Upper Cock Farm and several other receptors on the western edge of Stockland Bristol including PROWs and residential properties. These distant views include the concentration of existing overhead lines and Hinkley Point Power Station in the distance.

3.33 Locally high ground screens many long distance views. For example, views north from Stogursey village to the south-west are screened by the higher ground of Farringdon Hill.

3.34 The locally high ground does however also provide some open long distance views from several PROWs and properties. There are also long distance panoramic views north-east and north from the Quantock Hills which include the power station and existing overhead lines.

3.35 Hinkley Point Power Station is visible in a number of long distance views. The existing overhead lines are also visible however they are backgrounded by Hinkley Point Power Station and become less discernible with distance.

3.36 Given the qualities of the landscape in area and the commonplace nature of the views, views are generally of local value and of moderate importance.

Assessment of effects

3.37 The diversion of the 400kV ZZ route and 275kV VQ route to connect to the proposed Shurton Substation, and the introduction of the 400kV XYZ Route between the existing Hinkley B Substation and proposed Shurton Substation would have a negative effect on public and private visual receptors in the local area.

3.38 The greatest effects on views would be experienced by high sensitivity visual receptors in close proximity to line entry modification options including walkers on open access land on Wick Moor, users of PROWs , a permissive footpath and bridleway and residential properties. The majority of views do however already include the existing power station and overhead lines.

3.39 The effect on views beyond the immediate locality would be reduced due to the prominence of Hinkley Point Power Station, other overhead lines in foreground views, the effects of distance and increasing filtering by intervening trees and hedgerows. The undulating landform and high ground, for example Farringdon Hill, further restricts some views from the surrounding landscape.

3.40 The greatest scale of change in views would be from high sensitivity visual receptors passing beneath or in close proximity to the diverted overhead lines or the new overhead line proposed as part of all options.

3.41 All alignment options would divert two parallel overhead lines which currently pass over a PROW running north-east across Wick Moor. These overhead lines would continue to cross this PROW at a point further south from where they presently do, where the footpath runs along the northern part of Middle Moor Drove. From here views are filtered by hedgerows with mature trees on

both sides of the track. This would result in a negligible magnitude of effect (scale of change) on this PROW overall.

3.42 All alignment options would introduce the diverted overhead lines closer in views from the southern most parts of PROWs running north-east between Wick and Stolford. Further north the diverted overhead lines would be further away but still discernible in views. The 400kV ZG Route would remain closer in the view as presently. All alignment options would generally have a negligible magnitude of effect (scale of change) on views from PROWs.

3.43 From the north-east and north the diverted overhead lines would be further south in views across marshland. The retained 400kV ZG Route would remain visible closer in the view in front of diverted overhead lines.

3.44 The overhead line diversions (and the new section of 400kV overhead line in some views) would be introduced into distant views from properties further south including Gunter's Grove at the foot of Farringdon Hill, Newnham House off Wick Moor Drove, Wick Park Cottage on the eastern slope of Farringdon Hill, and properties at the top of Farringdon Hill. The overhead lines would be partly filtered by hedgerow and trees and would be partly backgrounded by Hinkley Point Power Station. These receptors would experience a low negative magnitude of effect (scale of change) as a result of all options.

3.45 There would be negligible effects on views from the Quantock Hills AONB due to the distance between the line entry modification options and the designated landscape, which is approximately 5km in the south-east at its closest point, and the relatively small scale of change.

3.46 All alignment options would include the removal of the 275kV underground cable route beneath North Moor and Hinkley Point A Substation. The removal of the 275kV underground cable route would have a moderate negative magnitude of effect (scale of change) on views in the short term and a negligible magnitude of effect (scale of change) on views in the long term. This scale of change would be experienced by visual receptors of high sensitivity including the permissive footpath within the southern part of the power station site and PROWs along the southern boundary of the power station site and across Wick Moor, on Wick Moor Drove and on higher ground to the south.

Option A

3.47 The greatest negative magnitude of effect (scale of change) on public views would be from open access land and PROWs where the proposed 400kV

overhead line and 275kV overhead line (on 400kV pylons) would be closer in views, and where an additional 400kV overhead line would be introduced into the view.

3.48 This occurs on open access land across Wick Moor and on several PROWs including along Middle Moor Drove, across farmland on higher ground south of Wick Moor, along Wick Moor Drove, along Green Lane and along the southern boundary of the Hinkley Point Power Station site and the permissive footpath around Pixies Mound.

3.49 Two sections of parallel overhead lines would be diverted onto higher ground further south. The 400kV XYZ Route would also be introduced across a different part of Wick Moor. The majority of views across or from Wick Moor are however already influenced by Hinkley Point Power Station and overhead lines. Option A would result in a low negative magnitude of effect (scale of change) on views rising to a moderate magnitude of effect in a small number of places.

3.50 The greatest negative magnitude of effect (scale of change) on private views would be from properties in the south where the diverted overhead lines would run in closer proximity and on higher ground. These include properties closest to the diverted overhead lines and on higher ground in the south, including Head Weir House, Doggetts west of Wick Moor Drove and a limited number of properties at Wick.

3.51 These receptors would experience a low to moderate negative magnitude of effect (scale of change) dependent on the extent of visibility from individual properties.

3.52 The 400kV XYZ Route proposed as part of Option A takes an alignment furthest south away from high sensitivity receptors using the PROW along the southern boundary of the power station site and the permissive footpath compared to the other options. This alignment would however bring a new 400kV overhead line closer to the PROWs running across farmland on the higher ground south of Wick Moor and running north-east across Wick Moor, and running closer to properties in the south including Head Weir House and Doggetts.

3.53 Option A would generally have a minor negative effect on views in the long term. A small number of visual receptors would experience a moderate negative effect where the diverted overhead lines would be introduced into or in closer proximity in views from sensitive receptors in close proximity.

These receptors include walkers on open access land and on PROWs and a permissive footpath close to the proposed line entries and individual properties to the south, south-west and south-east.

Option B

3.54 Option B would follow a similar alignment to Option A, resulting in the same magnitude of effect (scale of change) on receptor views.

3.55 The main difference would result from the 400kV XYZ Route running on an almost direct route west further north across North Moor. This would bring an overhead line closer in views from the PROW along the southern boundary of the Hinkley Point Power Station site and the permissive footpath within the southern part of the power station site in particular. This option would however minimise effects on views from the south including from the PROW running on higher ground and from private receptors including Head Weir House and Doggetts.

3.56 As with Option A, the greatest negative magnitude of effect (scale of change) on views would be from receptors closest to the proposed line entries. This is considered to be a low magnitude of effect (scale of change) from most public and private receptors.

3.57 As with Option A, Option B would generally have a minor negative effect on views in the long term. A number of visual receptors would experience a moderate negative effect where the diverted overhead lines or the new 400kV overhead line would be introduced into views from sensitive receptors in close proximity where the existing overhead lines are presently further away or not visible. These receptors are mainly walkers on open access land and along PROWs and a permissive footpath close to the proposed line entries and individual properties to the south, south-west and south-east.

Option C

3.58 Option C would follow similar alignment to the other options, in particular Option B, resulting in the same magnitude of effect (scale of change) on views.

3.59 The main difference would result from the 400kV XYZ Route being further south than Option B across North Moor. This would reduce negative effects in views experienced by walkers on open access land across Wick Moor and from the PROW along the southern boundary of the power station site and the permissive footpath within the southern part of the power station site. This option does not bring an overhead line as far south as Option A and

would therefore have fewer negative effects on receptors in the south including the PROW on higher ground and private receptors including Head Weir House and Doggetts.

3.60 As with Option A, the greatest negative magnitude of effect (scale of change) on views would be from receptors closest to the proposed line entries. This is considered to be a low magnitude of effect (scale of change) from most public and private receptors.

3.61 As with Options A and B, Option C would generally have a minor negative effect on views in the long term. A number of visual receptors would experience a moderate negative effect where the diverted overhead lines or the 400kV XYZ Route would be introduced into views from sensitive receptors in close proximity where the existing overhead lines are presently further away or not visible.

3.62 For Option C the 400kV XYZ Route would run slightly further south away from high sensitivity receptors using the PROW along the southern boundary of the power station site and the permissive footpath within the southern part of the power station site, and is therefore slightly preferred from a visual perspective.

Potential for mitigation

3.63 For all of the overhead line options (A, B and C) it would be possible to minimise negative effects on views through careful planning of access to avoid the need for road improvements to the local lane network, by utilising existing gaps in hedgerows and by reinstating roads to their original condition once construction is complete. Some short term negative visual effects would be unavoidable until re-establishment.

3.64 Mitigation by way of additional hedgerow and tree planting in the vicinity of diverted overhead lines and the new overhead line, subject to landowner agreement, would be in keeping with the existing landscape character and could assist in reducing potential effects on views.

4 Environment – Historic Environment

Baseline conditions

4.1 There are no Listed Buildings within 1km of the Study Area.

4.2 One Grade II* Listed Building has a setting that includes the proposed new overhead line entry modifications. Fairfield House is approximately 3km to

the southwest, at 45m AOD (40m above the ground level at Hinkley Point Power Station). This building is medieval in origin, although rebuilt in the late C16th and enlarged in the C18th. This receptor is of very high sensitivity. The site is also a Registered Park and Garden (below). Three Grade II Listed receptors within the site (a granary, mounting block, and stables and dovecote) share a setting with this receptor but do not have views of the proposals.

4.3 There are no Grade II Listed Buildings further afield whose settings would be affected by the proposals.

4.4 One Scheduled Monument would be affected by the proposals. Pixies Mound is a Bronze Age round cairn funerary monument, approximately 150m south of the existing power station. This receptor comprises a circular stone and earth mound up to 27m in diameter and 1.7m high, covered with scrub vegetation, within an irregular field crossed by the power station access road. The power station is visible above a plot of mature trees adjacent to this field, as are three overhead lines that pass approximately 375m to the east. This receptor is of high sensitivity.

4.5 No other Scheduled Monuments would be affected by the proposals.

4.6 One Registered Park and Garden has a setting that includes the proposed development: the grounds of Fairfield House (above), approximately 3km away. This receptor is of moderate sensitivity.

4.7 No Conservation Areas or Registered Battlefields would be affected by the proposals.

4.8 No receptors have been identified within 1km of the proposals that may be of equivalent sensitivity to designated heritage assets (i.e. potentially of Listable/Schedulable quality).

4.9 The study area contains 17 known undesignated heritage receptors, listed in the National Monument Record and/or Somerset Historic Environment Record. These receptors are of moderate, low and negligible sensitivity. Although the vicinity of the power station has been subject to several archaeological investigations, the potential for undiscovered archaeological remains to still be present is high.

4.10 The study area around Hinkley Point Power Station is a complex and varied historic landscape. The power station occupies an industrial zone, and is part of the setting of the surrounding zones. The existing VQ, ZG and ZZ overhead lines exit the power station across a small zone defined by the presence of a

water works. It then crosses a zone of 'anciently enclosed land modified C17-19th: previously wetland', and then Wick Moor (mud flats: 'enclosed land C17-18th'), and extending south-east across smaller fields of 'recently enclosed land C17-18th'. The proposed Shurton Substation would be constructed west of the existing power station. These historic landscape zones are of low sensitivity.

4.11 Hedgerows or earthworks associated with any of the undesignated heritage receptors described above may be regarded as 'important' (cf. Hedgerow Act, 1997). 'Important' hedgerows are receptors of low sensitivity.

Assessment of effects

4.12 All options would result in a negative effect on the setting Fairfield House Grade II* Listed Building and Registered Park and Garden, due to construction of new infrastructure in the view north to the Bristol Channel. However, the magnitude of effect would be reduced by the distance of separation, the small scale of the proposals compared with the adjacent power station, and the industrial character of the area, such that the overall magnitude of effect would be neutral.

4.13 For all options, there is potential for negative effects on buried archaeological remains at pylon and ancillary work locations (including access tracks). The magnitude of effect would be high - low on receptors of moderate - negligible sensitivity.

4.14 All options would result in a negligible negative effect on the comprehensibility and appreciation of the historic landscape. The 400kV ZG Route would be removed where it crosses part of Wick Moor, and new infrastructure would be constructed running west across Wick Moor to the new substation. The 275kV VQ route would be removed where it runs across Wick Moor, and new, longer lines constructed for it and the 400kV ZZ route running west to the new substation. This increase in the quantity of pylons and length of overhead lines would detract from the North Moor historic landscape zone. The magnitude of effect would be reduced by the dominant presence of the neighbouring industrial zone and existing overhead lines on Wick Moor.

4.15 For all options, creation of access tracks could cause negative effects to historic landscape elements such as 'important' hedgerows and historic lanes. The magnitude of these effects would be low on receptors of low sensitivity.

Option A

4.16 Option A would result in a low magnitude negative effect on the setting of Pixies Mound Scheduled Monument. The 400kV XYZ Route would be constructed crossing Wick Moor on a south-westerly alignment, then turning north-west to connect with the new substation. Three new towers would be constructed. One (XYZ3) would be constructed within approximately 25m of an existing pylon to be removed, resulting in no effect. A second (XYZ2) would be approximately 225m to the west, adjacent to the substation, beyond a road and two hedges, and partly screened by a building. The third pylon would be constructed approximately 400m to the south, beyond three hedgerows. The magnitude of effect would be reduced by vegetation screening and due to the dominance in the setting of the existing power station. The substation is outside the scope of this assessment, but the magnitude of effect of the line entry construction is increased as it would be a cumulative effect above that of the substation's construction.

4.17 There is potential for Option A to result in negative effects on one known site of undesignated buried archaeological remains. The VQ, ZG and ZZ Routes would all cross the site of a group of enclosures and circular features located by geophysical survey in the small field south of the proposed substation; a pylon base would be constructed in this vicinity. The magnitude of effect is likely to be moderate on this receptor of moderate - low sensitivity.

Option B

4.18 Option B would result in a moderate magnitude negative effect on the setting of Pixies Mound Scheduled Monument. The 400kV XYZ Route would be constructed crossing Wick Moor on a westerly alignment to connect with the proposed substation. Three new pylons would be constructed. One (XYZ3) would be constructed within approximately 25m of an existing pylon to be removed, resulting in no effect. A second (XYZ2) would be approximately 225m to the west, adjacent to the substation, beyond a road and two hedges, and partly screened by a building. The third pylon would be constructed approximately 150m to the south, beyond a hedgerow. The magnitude of effect would be reduced by vegetation screening and due to the dominance in the setting of the existing power station.

4.19 There is potential for Option B to result in negative effects on two known sites of undesignated buried archaeological remains. The 400kV ZZ route and 275kV VQ route would cross the site of a group of enclosures and circular features located by geophysical survey in the small field south of the proposed substation; a pylon base would be constructed in this vicinity. In

addition, the 275kV ZG Route would cross a Roman settlement in a triangular field south of the Scheduled Monument; construction works may affect this receptor. For both receptors, the magnitude of effect is likely to be moderate - low on receptors of moderate - low sensitivity.

Option C

4.20 Option C would result in a low magnitude negative effect on the setting of Pixies Mound Scheduled Monument. The 400kV XYZ Route would be constructed crossing Wick Moor on a west-south-westerly alignment, then turning west-north-west to connect with the proposed substation. Three new pylons would be constructed. One (XYZ3) would be constructed within approximately 25m of an existing pylon to be removed, resulting in no effect. A second (XYZ2) would be approximately 225m to the west, adjacent to the substation, beyond a road and two hedges, and partly screened by a building. The third pylon would be constructed approximately 275m to the south, beyond two hedgerows. The magnitude of effect would be reduced by vegetation screening and due to the dominance in the setting of the existing power station. The substation is outside the scope of this assessment, but the magnitude of effect of the line entry construction is increased as it is a cumulative effect above that of the substation's construction.

4.21 There is potential for Option C to result in negative effects on two known sites of undesignated buried archaeological remains. The VQ, ZG and ZZ Routes would all cross the site of a group of enclosures and circular features located by geophysical survey in the small field south of the proposed substation; a pylon base would be constructed in this vicinity. In addition, the 275kV ZG Route would cross a Roman settlement in a triangular field south of the Scheduled Monument; construction works may affect this receptor. For both receptors, the magnitude of effect is likely to be moderate - low on receptors of moderate - low sensitivity.

<u>Potential for mitigation</u>

4.22 For all options, a programme of archaeological monitoring and investigation would be required to mitigate effects on buried archaeological remains. The programme would be proportionate to the level of ground disturbance and the archaeological potential of the areas where work is taking place. It is assumed that an effective programme of archaeological mitigation can be implemented as part of the project.

4.23 For all options, physical effects on historic landscape elements (i.e. physical features) could be avoided, or mitigated through archaeological recording, careful reinstatement and, in the case of some hedgerow loss, translocation or replanting.

5 Environment - Ecology

Baseline conditions

5.1 The Study Area is northwest of Bridgwater, and encompasses agricultural land south of Hinkley Point A and B Power Stations between the hamlets of Stolford in the east and Wick in the south.

5.2 The Study Area encompasses a number of overlapping wildlife designations associated with the Severn Estuary. These are the Severn Estuary Special Protection Area (SPA), Ramsar and Special Area of Conservation (SAC) sites and the Bridgwater Bay Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). These designations cover a range of factors including coastal and intertidal habitats, migratory fish, brackish and freshwater invertebrates, internationally important populations of Annex 1 bird species, spring and autumn migratory bird species and wader and waterfowl assemblages. Overall the Severn Estuary site is valued at the international level. The designations exclude the power station land but extend north into the estuary and east and south into the farmland.

5.3 The land immediately south and west of the power station (and outside the Severn Estuary and Bridgwater Bay designations) is Hinkley Point County Wildlife Site (CWS). The site contains species-rich hedgerows, neutral and unimproved grassland with interesting floristic and butterfly communities and scrub habitats with an interesting bird assemblage. This site is valued at the county level.

5.4 Further afield lies the Exmoor and Quantock Oakwoods SAC, this site is designated in part for the presence of Barbastelle and Bechstein's bats and is valued at the European level. Although the SAC is over 5km from the Study Area, Barbastelle bats have been recorded in the landscape surrounding Hinkley Point Power Station, as such there is potential for impacts on bat species associated with the SAC.

5.5 The Study Area is largely devoid of woodland except for small areas within Hinkley Point CWS and Branland Copse in the northwest. The value of the

former is considered under the CWS designation and the latter is valued at the district level due to its potential to support bats associated with the Exmoor and Quantocks Oakwoods SAC.

5.6 The field boundaries within the Study Area are a mix of hedgerow and ditches, many comprising both. The hedgerows range from species-poor to species-rich and are likely to have a connective function within the local landscape. Bats have been recorded in the area and use these habitats along with a range of farmland birds. Many of the hedgerows fall within either the designated Severn Estuary or Hinkley Point CWS and their value is considered under these designations. Outside of these designations the network of hedgerows is valued at the district level, but the value of individual hedgerows will vary depending on composition and association with other species.

5.7 There are a range of wetland habitats within the Study Area including swamp, ponds and field ditches ('rhynes'). These habitats fall within either the designated Severn Estuary or Hinkley Point CWS and their value is considered under these designations.

5.8 The study area is dominated by arable, improved and semi-improved fields. The pasture fields largely fall within the Severn Estuary SPA, Ramsar, SAC, SSSI designations due to their use by birds associated with the estuary and are therefore valued under these designations. The intrinsic value of arable habitat (which lies adjacent to these designations) is generally low but is increased by their potential to be used by SPA/Ramsar bird species. These grassland habitats are valued at the district level.

Assessment of effects

5.9 There are currently two 400kV and one 275kV overhead lines connecting to the Hinkley Point Power Station from the southeast. The new connections for Hinkley Point C Power Station require that one of the 400kV and the 275kV line are diverted to a new substation in the west of the Study Area and a new overhead line connection will be constructed between the new substation and an existing 400kV substation adjacent to the power station.

5.10 The new substation will be built southwest of Hinkley Point A and B Power Stations within the boundary of the proposed Hinkley Point C Power Station site. The construction of the substation is part of the Hinkley Point C Power Station DCO application and is not part of the options assessed.

5.11 The overhead lines up to and including the pylons immediately south of East Brook will remain unchanged, as will the northern 400kV ZG Route. The diverted overhead lines will require ten new pylons (five for each line). Six pylons (three for each line) will be removed and four of these are within the Severn Estuary designation. The 400kV XYZ Route will require three new pylons whichever option is chosen.

5.12 The 275kV VQ route currently travels underground beneath North Moor (within the Severn Estuary designations) up to the 275kV substation north of Pixies Mound. For all options, this existing underground cable infrastructure will be removed. These works will result in temporary loss of improved pasture within the Severn Estuary designation and could also result in temporary disturbance to SPA/Ramsar birds using the fields in the area. These works will also result in a small loss of linear scrub woodland within the CWS and this may affect breeding birds and Barbastelle bats. Although not directly affected by the works, there is potential for a reduction in water quality within adjacent ditch habitats which could affect the invertebrate communities mentioned in the Severn Estuary citations. These works are likely to result in a high negative, short to medium-term magnitude of effect on the Severn Estuary and a moderate negative, permanent magnitude of effect on the CWS.

5.13 Under Option A, none of the ten pylons required for the diverted line are within the Severn Estuary designation, but one of the three pylons required for the new line are within the designation.

5.14 Under Option B and Option C, one of the ten pylons required for the diverted line is inside the Severn Estuary designation as are two of the three pylons required for the new line.

5.15 A small loss of pasture and arable habitat is required to construct the new pylons, some of the affected habitat is within the Severn Estuary designations. There will be very small permanent habitat losses for the pylon foundations and temporary habitat loss for the construction areas. These will result in a low negative, medium-term magnitude of effect.

5.16 In addition to habitat loss, impacts on Severn Estuary sites may occur during the construction period through a reduction in water quality (from run-off and pollution events) and disturbance (from construction activities) to birds feeding on the pasture. This will result in a moderate negative, medium-term magnitude of effect.

5.17 Constructing a new overhead line into an area used by SPA/Ramsar birds can introduce a risk of bird collision and have a displacement effect on the birds. The Study Area already has two large power stations (Hinkley Point A and B) and three overhead lines in the landscape. The proposals will only move two of these lines slightly west (approximately 800m) and introduce only a short length (approximately 1km) of new overhead line. This would not markedly change current conditions in relation to the amount of infrastructure present in the immediate landscape. However, there may be a slight increased risk of collision and/or displacement as the new lines effectively create a triangle enclosing several fields within the Severn Estuary designations. Bird collision and displacement impacts on SPA/Ramsar birds are likely to be moderate negative, long-term effects.

5.18 The overhead lines will oversail three ditches within the Severn Estuary designation. However, there is potential during the construction period for habitat loss (from temporary ditch crossing points), a reduction in water quality (from run-off and pollution events) and disturbance to species using the wetland habitats (from construction activities). Such impacts are likely to result in a low negative, medium-term magnitude of effect.

5.19 No hedgerow losses are predicted although the permanent loss of individual trees to achieve electrical safety clearances cannot be ruled out. Such losses would result in a low negative, long-term magnitude of effect.

5.20 Outside of the designations, grassland habitats and their associated species are likely to experience a low negative, temporary magnitude of effect during construction from ground disturbance and disturbance to fauna from construction activities.

5.21 In combination the low to moderate magnitude of effects on receptors of district to European value would lead to an overall major negative effect on ecology as a result of any of the overhead line options prior to mitigation.

Potential for mitigation

5.22 For all options, existing field access points and watercourse crossings would be used for works traffic wherever possible and standard environmental protection measures implemented including the timing of works to avoid sensitive periods, the prevention of encroachment of traffic onto retained habitats and implementation of pollution control methods. This is particularly important for construction works within the SPA, Ramsar, SAC, SSSI

designations, but also for any works affecting habitats that are hydrologically linked to these sites.

5.23 Where appropriate, prior to habitat clearance works, licensed temporary exclusion methods would be used to prevent death or injury to protected species if present.

5.24 All options (including the cable removal works) will result in the loss of a low number of trees. Replacement tree planting once the cables have been removed could be used to mitigate effects, although any mature tree loss cannot be mitigated within a reasonable timeframe and replacement planting would be considered as compensation.

5.25 A reduction in disturbance/displacement of SPA/Ramsar bird species during construction works would be achieved by ensuring the pylon construction works in these areas are undertaken outside the most sensitive season and kept to the shortest timescale.

5.26 A reduction in collision risk to SPA/Ramsar birds flying between the Severn Estuary and the pasture fields could be achieved by installing bird deflectors on the new overhead lines.

6 Socio-economic – Economic activity

Baseline conditions

6.1 The area around Hinkley Point is rural and coastal in nature. Stogursey and Combwich are the largest towns within 5km of Hinkley Point. The larger towns of Bridgwater and Burnham-on-Sea are both approximately 10km away and provide concentrations of local employment opportunities. The Quantock Hills AONB is over 5km to the west of the study area and beyond this lies Exmoor National Park.

6.2 The study area includes the Hinkley Point Power stations which provide a regionally valuable employment source. West Somerset Council has developed a Supplementary Planning Document (SDP) to guide development at Hinkley Point. EDF has committed to enhancing the tourism offering of Hinkley Point and investing in the local community as part of its development proposals. The power stations include a visitor centre and a nature trail adjacent to the site. The Steart Habitat Creation Scheme at Steart Point is anticipated to be completed by 2014 and may become an attraction for recreation and tourist activities.

6.3 Tourism, business and recreational resources are sparsely located within the study area. Those of greatest relevance to the study area are Fairfield House Stately Home (approximately 3km from the site) and Coleridge Cottage and Bridgwater College and the Walled Garden in Cannington (all approximately 7km from the site).

6.4 The South West Coast long distance walking path passes directly alongside Hinkley Point, the River Parrett Trail passes within 4km, but no national or regional cycle routes pass through the study area. Many local PROWs traverse the whole study area and temporary diversion of some PROWs is currently in place as a result of the Hinkley Point C enabling works.

Assessment of effects

6.5 None of the route options conflict with the planning or economic policy context of the study area. Modifying the overhead lines into the Hinkley Point power stations will provide crucial capacity for ongoing and future activities at Hinkley Point, thereby contributing to supporting employment at the power station site. Impacts on employment opportunities within Bridgwater and Burnham-on-Sea are not anticipated as a result of the National Grid project.

6.6 Long distance visual connections exist between the existing wirescape in the vicinity of Hinkley Point and the Quantock Hills AONB and Exmoor National Park. However, impacts on the amenity value, popularity and viability of these nationally and regionally important tourism resources, are not anticipated given the distance of these from the Hinkley Point and the very small scale of change associated with realignment of the existing overhead lines into the substation. The proposed changes to the existing overhead lines are not considered likely to have a noticeable impact on visitor numbers to these resources or the study area.

6.7 Construction activities are likely to present temporary minor negative impacts through reduced local amenity value from elevated noise levels and visual intrusion. These impacts are considered to be very minor given the relatively small amount of construction required for the proposed overhead lines and the low density of development and socio-economic resources in proximity to Hinkley Point. Construction activities are not anticipated to directly affect users of the South West Coastal Path or River Parrett Trail but temporary diversion of local PROWs could be required.

6.8 Post-construction impacts are not anticipated to affect the existing viability or popularity of socio-economic resources within the study area. Open and

filtered views of the overhead lines are anticipated from the walking paths and PROWs. Given the dominance of the multiple existing overhead lines and the power station itself on the local landscape context and the short section of the overall walking routes which are proximal to the overhead lines, visual connectivity between walkers and the proposed overhead line routes are not anticipated to affect the viability or popularity of these paths.

6.9 Impacts on the number of visitors to the visitor centre and nature trail at Hinkley Point itself are not anticipated, given the localised attraction of these resources and the current presence of multiple overhead lines and the substations themselves.

6.10 Any loss of BMV agricultural land would be associated with the footprint of the pylons in areas of higher quality Grade 3 agricultural land. Impacts are anticipated to be minor, given the likely area of land lost within the overall agricultural context of the area.

6.11 Due to the presence of the overhead lines into Hinkley Point, impacts on socio-economic resources are not anticipated to vary markedly from the current situation. Likely impacts on these resources are anticipated to be the same for all overhead line routes. Socio-economic considerations therefore do not offer a significant differentiator between the proposed overhead line options.

Potential for mitigation

6.12 Careful implementation of mitigation measures would be required to ensure that conflicts with West Somerset's policies relating to the preservation of BMV agricultural land and development at Hinkley Point C are avoided.

6.13 There are a number of measures that can be put into place to mitigate the temporary construction impacts on socio-economic receptors in the area. These include programming construction and routeing construction traffic to minimise disruption to local businesses, including agricultural operations, and to visitors particularly to the visitor centre and nature trail at Hinkley Point.

6.14 During operation, visual screening of surface infrastructure could reduce the potential for visual connections between tourism, recreation and economic activities. Where possible surface infrastructure should be located in areas of poorer quality Grade 3 land to satisfy local planning policy in relation to protection of BMV agricultural land. Restoration and mitigation techniques should ensure that, post construction, the land is restored to the same quality as prior to construction. National Grid has a mechanism to appropriately

compensate individuals for temporary loss of crops and for permanent easements for its infrastructure.

7 Capital and Lifetime Costs

7.1 Although there are some minor differences in costs for each of the options, the estimated costs are in line with those stated in section 5 of this Report. The cost differences are not considered material and therefore do not provide a basis for distinguishing between the options.

8 Draft alignment

8.1 Hinkley Point Power Station would provide backgrounding to the new 400kV overhead line and the diverted overhead lines. The gently undulating landform surrounding the study area would provide some backgrounding and the Quantock Hills in the south-west and south would also provide distant backgrounding to the proposed line entries. The reconfiguration of overhead lines and the section of new overhead line would be almost indistinguishable in the wider landscape due to the presence of the existing infrastructure, including the power station and overhead lines.

8.2 There is little to differentiate between the landscape impacts of the three alignment options. However, Options B and C would result in a slightly lower negative magnitude of effect (scale of change) compared to Option A. All alignment options would have a minor negative effect on Wick Moor and part of the Eastern Lowland landscape which is valued locally, is in a generally good condition and has a high capacity to accommodate this change.

8.3 Option A would have a slightly higher negative effect on the local landscape, in particular to the south, as the new 400kV overhead line between Hinkley Point B and C Substations ("the XYZ route") runs on the least direct overhead line route and involves the sharpest change of direction compared to other overhead line options. It would be least preferred in terms of Holford Rule 3. A third pylon (pylon XYZ2) east of Wick Moor Drove would be also sited on higher ground compared to Options B and C and would result in a slightly greater influence on the surrounding local landscape.

8.4 Option C would run slightly further south away from high sensitivity receptors using the PROW along the southern boundary of the power station site and the permissive footpath within the southern part of the power station site. The option would also utilise slightly lower ground distant from residential properties and is therefore slightly preferred from a visual perspective.

8.5 The removal of the existing 275kV underground cable route would result in a neutral effect on the local landscape in the long term.

8.6 All options would have a neutral overall scale of effect on the settings of a Grade II* Listed Building and Registered Park and Garden.

8.7 All three options would have a negative effect on the setting of Pixies Mound Scheduled Monument. Option B would result in the greatest scale of effect (moderate). Options A and C would both result in a minor negative scale of effect. Option A would have the least effect, due to its greater vegetation screening and distance from one pylon.

8.8 All three options would result in a minor negative scale of effect on undesignated buried archaeological remains. For all options the potential to encounter previously unknown buried archaeological remains is high.

8.9 Of the three options, Option B would have the greatest negative effect on the historic environment, and Option A would have the least negative effect.

8.10 Ecological impacts across the three overhead line options would be broadly similar. All overhead line routes avoid substantial impacts on designated sites and the species they support. No significant difference to potential displacement, disturbance or collision risk impacts on SPA/Ramsar species can be identified between the options and none of the impacts are considered to affect the integrity of the designated sites.

8.11 It should be noted that under the requirements of the Habitats Regulations, National Grid will need to consider if an Appropriate Assessment is required for any development works within the Severn Estuary SPA, Ramsar, SAC designation.

8.12 Cost differences and effects on socio-economic receptors are not such that this factor should influence the selection of overhead line option.

8.13 Overall there is little to differentiate between the options in terms of their environmental effects. However on balance it is considered that Option C is slightly preferred. This option would minimise effects on Pixies Mound Scheduled Monument compared with Option B whilst allowing the overhead lines to utilise lower ground and maximise distance from residential properties compared with Option A.

8.14 It is therefore recommended that Option C is taken forward as the draft preferred overhead alignment.

Undergrounding

8.15 As noted in Section 7 of this Report the use of underground cables and GIL was rejected at an earlier stage in the options appraisal process because of the additional costs which would be incurred (approximately £78m). Having regard to its statutory duties and all the factors considered as part of the options appraisal process, National Grid considered that the additional cost of developing an underground solution rather than an overhead line is not justified in this instance as the benefits of an underground option are not significant in this location and do not outweigh the significant additional cost.

9 Conclusion

9.1 It is recommended that Option C is taken forward as the draft alignment for the Hinkley Point line entries Study Area.

9.2 Subject to representations received during consultation, this is the alignment which National Grid should take forward to the next stage in the design process.

Appendix 2I – Land Hinkley Point C Connection Project Environmental Review of Technical Options at Bridgwater Tee (2013)

nationalgrid

Hinkley Point C Connection Project:

Environmental Review of Technical Options at Bridgwater Tee

National Grid
National Grid House
Warwick Technology Park
Gallows Hill
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TEP Document Ref: 1979.322

Version 4.0

December 2013

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APPENDICES

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1 INTRODUCTION AND BACKGROUND

1.1.1 This environmental appraisal has been produced by TEP for National Grid Electricity Transmission plc. (National Grid). It considers the environmental constraints associated with four options for siting a cable sealing end (CSE) compound and underground cables near to Puriton.

1.1.2 National Grid proposes to undertake network modifications to existing overhead line routes VQ and ZG as part of the Hinkley Point C Connection Project and in order to comply with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS). This environmental review provides supporting information to the Hinkley Point C Connection Project about the siting of CSE compounds to enable a connection between ZG and VQ overhead lines.

1.1.3 The CSE compound options considered are described at Section 4 of this report and are presented at **Figures 1 - 4**.

1.2 Background

1.2.1 Three 400kV double circuit connections are required as part of the Hinkley Point C Connection Project to comply with the NETS SQSS. This includes the upgrading of the existing National Grid 275kV VQ Route to 400kV and the connection of both circuits to Melksham Substation. The Hinkley Point C Connection Project proposes to upgrade this line to operate as a 400kV double circuit and to build a new section of 400kV line to the ZG Route that will connect to the upgraded VQ Route at a double circuit tee.

1.2.2 The connection between the VQ Route and the ZG Route is proposed at a location on the east/west section of the existing VQ Route to the north of Manor Farm on the Horsey Levels. This is referred to as the 'Bridgwater Tee'.

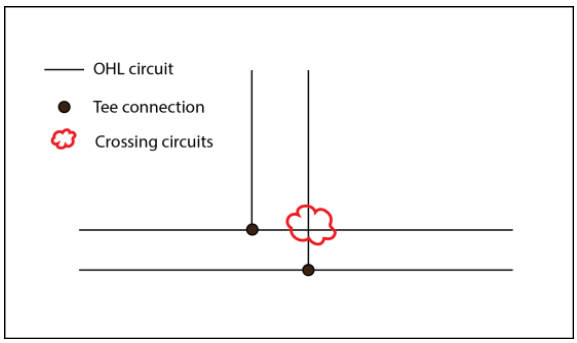
1.2.3 The proposed corridor for this new section of the ZG route that was identified as it maximises the distance from properties in the area and utilises land with a more gradual sloping gradient which may offer opportunities for backgrounding. The proposed route would run further away from Bawdrip and Woolavington and enable removal of the existing 132kV overhead line which runs close to Knowle, Bawdrip and Woolavington.

1.2.4 National Grid has undertaken technical studies to consider works and modifications in this area and concluded that CSE compounds and a short section of 400kV underground cable would be an appropriate technical solution to connect ZG and VQ double circuit overhead lines. The rationale for this approach is described at **Appendix A**.

A Double Circuit Tee

1.2.5 Where a 400kV double circuit overhead line connects to another, as in the case of the Bridgwater Tee where VQ and ZG Routes would connect, one circuit would connect to the nearest circuit while the other must 'duck under' and cross the other circuit to connect to the CSE compound (see **Inset 4.1** below). For system security and safety reasons this is best achieved using underground cables.

Inset 4.1: Double Circuit Tee



1.2.6 An overhead line 'duck under' where one overhead circuit over sails the other was also considered by National Grid. However, this option would not comply with National Grid system security, safety and operating requirements (see **Appendix A, section 3** for further details) and has not been considered further.

1.2.7 The technical options considered in this report are based on a double tee connection that would connect VQ Route (Hinkley Point to Bridgwater) with a new section of ZG route.

1.3 Existing Electrical Infrastructure in the Local Area

1.3.1 National Grid currently operates the double circuit 275kV VQ Route overhead line which provides a connection between Hinkley Point 275kV substation and Bridgwater 275kV substation. National Grid currently operates VQ Route at 275kV however the existing pylons used on this route are sufficient to support operation at 400kV without significant change the route also has consent to operate at 400kV.

1.3.2 National Grid's existing 400kV Hinkley Point to Melksham overhead line runs approximately 1.5km north of Puriton extending east to west. The northern end of the new section of ZG Route would connect with this existing Hinkley to Melksham line at a tee junction the 'Huntspill Junction' near to Huntspill River. The southern end of the new section of overhead line would connect to the existing VQ Route north of Manor Farm on the Horsey Levels, the 'Bridgwater Tee'.

1.3.3 There is an existing 132kV overhead line (F Route) owned and operated by Western Power Distribution to the east of Horsey Level and VQ Route. This existing overhead line extends approximately northeast to southwest and would be removed as part of the proposed Hinkley Point C Connection Project.

1.4 Purpose of Study

1.4.1 The purpose of the study includes objectives to:

- examine the available options for locating new CSE compound to connect ZG Route with VQ Route northeast of Bridgwater;
- describe the high level environmental constraints affecting the options; and
- assess the options in terms of these constraints and identify the least environmentally constrained option(s) for the new CSE compounds.

1.5 Structure of the Report

1.5.1 This report is structured as follows:

- Section 2 describes the approach used to appraise the options;
- Section 3 sets out the proposed options;
- Section 4 describes the study area and parameters;
- Section 5 describes the baseline environmental conditions and constraints;
- Section 6 assesses each option in relation to environmental topics; and
- Section 7 provides conclusions.

2 APPROACH FOR ENVIRONMENTAL ASSESSMENT

2.1 General Approach

2.1.1 Effects on the environment as a result of constructing a new CSE compound are likely to relate to visual amenity, historic environment and ecology. There would likely be a variation of effect from different options depending on for example, landscape character. The different options could also have a varying effect on heritage assets, buried archaeology and on habitats.

2.1.2 This study includes assessments of the proposed options in relation to effects on:

- historic environment;
- landscape character and views; and
- ecology.

2.1.3 There are some environmental factors that do not influence the high-level strategic appraisal. Whilst there is a potential for different effects on other environmental topics from the options, the differences are considered to be insufficient for them to be material differentiators in the decision of the preferred option and are not included. The factors scoped out of the appraisal at this stage include: noise; air quality; resources and waste, greenhouse gases and energy efficiency and climate change vulnerability. Although these factors have been scoped out of the options appraisal process at this stage, they may require consideration as part of future detailed design and environmental assessment (whichever option is taken forward).

2.1.4 The appraisal for each of the options has considered environmental constraints of international and national importance for each topic area. Features considered as potential environmental constraints are presented in **Table 3.1**. The table also summarises the legislation under which protection is conferred, the reference to the guidance which identifies the features and the data sources from which information was taken.

Table 3.1 Environmental Constraints and Data Sources

Feature	Legislation	Siting Response (and Reference)	Data Sources
National Parks	National Parks and Access to the Countryside Act 1949	Seek to avoid Schedule 9[1]/Horlock Rules	magic.gov.uk
Areas of Outstanding Natural Beauty	National Parks and Access to the Countryside Act 1949/ Countryside and Rights of Way Act 2000	Seek to avoid Schedule 9/Horlock Rules	magic.gov.uk
Heritage Coasts	n/a	Seek to avoid Schedule 9/Horlock	magic.gov.uk

[1] National Grid's commitments under Schedule 9 are set out in the following document:

"National Grid's commitments when undertaking work in the UK: Our Stakeholder, Community and Amenity Policy"

Feature	Legislation	Siting Response (and Reference)	Data Sources
		Rules	
World Heritage Sites	1972 World Heritage Convention	Seek to avoid Schedule 9/Horlock Rules	english-heritage.org.uk cadw.wales.gov.uk
Sites of Special Scientific Interest	Wildlife and Countryside Act 1981 Countryside and Rights of Way Act 2000	Seek to avoid Schedule 9/Horlock Rules	gis.naturalengland.org.uk
Special Protection Areas	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (birds interest) Schedule 9/Horlock Rules	gis.naturalengland.org.uk
Special Areas of Conservation	The Conservation of Habitats and Species Regulations 2010	Seek to avoid Schedule 9/Horlock Rules	gis.naturalengland.org.uk
Ramsar sites	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (birds interest) Schedule 9/Horlock Rules	gis.naturalengland.org.uk
National Nature Reserves	National Parks and Access to the Countryside Act 1949	Seek to avoid Schedule 9/Horlock Rules	gis.naturalengland.org.uk
Scheduled Monuments	Ancient Monuments and Archaeological Areas Act 1979	Seek to avoid Schedule 9/Horlock Rules	english-heritage.org.uk
Settlements	n/a	Seek to avoid	Digitised from Ordnance Survey
Historic buildings (Listed I, II and II*)	Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to minimise effects Schedule 9/Horlock Rules	english-heritage.org.uk cadw.wales.gov.uk
Conservation Areas	Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to minimise effects Schedule 9/Horlock Rules	Development plans
Registered Parks and Gardens	n/a	Seek to avoid Schedule 9/Horlock Rules	magic.gov.uk
Registered Battlefields	n/a	Seek to minimise effects Schedule 9/Horlock Rules	english-heritage.org.uk cadw.wales.gov.uk
Woodlands	n/a	Seek to minimise effects Schedule 9/Horlock Rules	National Inventory of Woodlands
Flood Risk	n/a	NPPF Paragraphs 100 to 104	www.environment-agency.gov.uk

2.1.5 A search has been undertaken for the following environmental designations. These are not present in the study area used for any of the environmental topics and for that reason they are not referred to further in this study.

- National Parks;
- Areas of Outstanding Natural Beauty;
- Heritage Coasts;
- World Heritage Sites;
- Sites of Special Scientific Interest (SSSI);
- Special Protection Areas (SPA);
- Special Areas of Conservation (SAC);
- Ramsar Sites;
- National Nature Reserves;
- Conservation Areas;
- Registered Parks and Gardens; and
- Registered Battlefields.

2.2 Landscape and Views

Landscape Character

2.2.1 To appraise baseline landscape character a review of national and local level landscape character data was undertaken. At the national level this included review of the new Natural England National Character Area (NCA) profiles which replace the previously published Joint Character Areas (JCAs) and Countryside Character Area descriptions (1998-1999 by the Countryside Agency). These JCAs are available for reference as part of the overall body of evidence behind the NCA profiles. Where available the NCA profiles are the principle reference documents.

2.2.2 Local level landscape character assessments were also reviewed. Relevant documents include:

- Sedgemoor District Council's "Sedgemoor Landscape Assessment and Countryside Design Summary" Revised Edition, 2003.

2.2.3 In carrying out the assessment consideration is given to the sensitivity of the landscape. Important designated landscapes such as National Parks and Areas of Outstanding Natural Beauty (AONB) would be assigned high sensitivity. The potential effects of development proposals on the setting of designated landscapes are also considered. However the nearest landscape designation is more than 10km distant, the Quantock Hills AONB and such distance its setting would be very unlikely to be significantly affected by any of the proposed options.

2.2.4 There are no designated landscapes in the study area or designated landscapes near to the study area where setting could be affected by the options considered in this assessment. It is assumed that the landscape potentially affected by the options is of local importance and would not be of high sensitivity.

Views

2.2.5 TEP has undertaken extensive field survey of the preferred route corridor for the Hinkley Point C Connection Project. This field survey together with OS mapping and on line aerial photography formed the basis of the high level assessment of potential effects on views.

2.2.6 For the purposes of this report, judgements are not made about visual receptor sensitivity and the significance of effects on views. The assessment considers the

receptor locations and the extent of potential changes in views as a consequence of each option.

2.3 Ecology

2.3.1 The ecological appraisal has given consideration to desk study records obtained from a number of sources and comprised a review of wildlife site designation data and pre-existing species and habitat records.

2.3.2 An extended Phase 1 habitat survey was undertaken in 2012 during the optimum survey season. Target Notes were used to record plant species and detail any features of interest and any incidental species observations. The survey was undertaken by experienced botanists in line with JNCC guidelines and included initial habitat assessments for protected and S41 NERC Act priority species.

2.3.3 There are no statutory sites designated for their ecological interest within 1km of the ESA which could be affected by the CSE compound options considered in this assessment.

2.3.4 The specific approach to be used in the Ecological Impact Assessment (EcIA) follows guidelines issued by the Chartered Institute of Ecology and Environmental Management (CIEEM) (July 2006).

2.3.5 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.

2.3.6 It is assumed that all of the CSE compound options considered within this appraisal will have similar potential effects on all of the receptors identified given the relatively small geographic scale between each of the proposed locations and the similarity of habitats at each site.

2.4 Historic Environment

2.4.1 The historic environment appraisal has considered information from the Somerset Historic Environment Record, the National Monuments Record and English Heritage. In addition, selected historic mapping was consulted and a review of modern vertical aerial photography was undertaken.

2.4.2 Site survey work was undertaken from publically accessible vantage points.

2.4.3 Planning policy (EN-1) states that non-designated archaeological receptors that are 'demonstrably of equivalent significance' to Scheduled Monuments should be considered subject to the same policy considerations as those that apply to designated heritage receptors. This has been taken into account in undertaking this assessment.

2.4.4 Under the Planning (Listed Buildings and Conservation Areas) Act 1990, buildings of special architectural or historic interest are added to a list of buildings protected. Planning authorities are required to consult with English Heritage on planning applications which may affect a Grade I and Grade II* Listed Building outside Greater London and Listed Building consent is required for any works likely to affect a Listed Building. The setting of Listed Buildings is also important when considering the potential effects of new development.

2.4.5 To determine the likely and relative effects of the connection options on cultural heritage assets, and in line with the above, the relative significance of the various heritage assets has been categorised as follows:

- Very high sensitivity: Grade I and II* Listed Buildings, Scheduled Monuments;
- High sensitivity: Grade II Listed Buildings, Conservation Areas, Registered Parks and Gardens, Registered Battlefields, and some known non-designated heritage assets;
- Moderate/low sensitivity: Non-designated heritage assets and landscape features; and
- Negligible: Historic Environment and National Monument Record entries of limited or no archaeological or cultural heritage value.

2.5 Hydrology and Flood Risk

2.5.1 National Grid considers flood risk very carefully when siting new installations including CSE compounds. It is not always possible to locate electrical infrastructure outside of flood zones because there are typically required at specific points on the transmission system meaning that locations in other areas would not be suitable. National Grid would consider each individual case and include 'in built' flood resilience into designs where appropriate and where equipment would be required in locations where there is high risk of flooding.

2.5.2 Construction of the proposed CSE compounds and underground cables could affect hydrology and flooding. Design and site layouts of CSE compounds would seek to minimise effects and avoid as far as possible existing features such as watercourses ditches and ponds. Effects on hydrology and flood risk are likely to be generally similar for each option.

2.5.3 Greater risks in relation to flooding may arise where sites are in areas where there is a higher probability of flooding. These higher risk areas are shown on the Environment Agency (EA) flood maps available on-line. The EA defines flood zones in England as:

- Flood Zone 1: Land which has a low probability of flooding;
- Flood Zone 2: Land which has a medium probability of flooding; and
- Flood Zone 3: Divided into 3A (high probability of flooding) and 3B (functional floodplain).

2.5.4 A search has been undertaken to check EA flood maps in relation to the options considered in this assessment (see Appendix 1). All options including each of the CSE compound sites considered is within the Horsey Levels and Flood Zone 3 which means that according to EA there is a greater than 1 in 200 annual chance of flooding in the area. There may be local flood alleviation and prevention measures in place which reduces these risks and would need to be appraised for the option taken forward.

2.5.5 As all CSE compound sites are in the same flood zone and it can be reasonably assumed that potential effects on hydrology and flood risk for all options would likely be similar, this topic would not be significant in defining a preferred option. This topic area is not considered further in this report. However National Grid would be consider this further and undertake assessments as required in consultation with EA for the option taken forward. A Flood Risk Assessment (FRA) would be undertaken where required with evidence provided to satisfy sequential and exception tests.

3 PROPOSED OPTIONS FOR CABLE SEALING END COMPOUND SITING

3.1 Option 1

3.1.1 An indicative layout of Option 1 is shown at **Figure 1**. It includes a new section of the ZG route connecting near to existing pylon VQ43. This pylon would be replaced with a new terminal pylon (VQ43R) and a CSE compound would be built adjacent to it to the north of VQ Route.

3.1.2 Down-leads would connect the southern circuit of VQ Route from VQ43R to the CSE compound and approximately 350m of underground cable crossing land underneath the new ZG Route to a second CSE compound adjacent to VQ44. Similarly VQ44 would be replaced with a terminal pylon (VQ44R) adjacent, which would connect the southernmost circuit of VQ Route via down-leads to the second CSE compound and underground cables north of the line.

3.1.3 The other northern circuit conductors and earth wire would remain between pylons VQ43R and VQ44R. VQ Route remains on its existing alignment.

3.1.4 For this option both CSE compounds would be approximately 25m x 25m.

3.2 Option 2

3.2.1 An indicative layout of Option 2 is shown at **Figure 2**. Option 2 includes re-alignment of VQ Route between pylons VQ43 and VQ45, to connect to the new ZG Route at new pylon ZG01. This section of VQ Route would be re-aligned to the north.

3.2.2 Three replacement pylons would be required on VQ Route, (VQ43R, VQ44R and VQ45R). VQ43R and VQ45R would be adjacent to the pylons that they replace. VQ44R would be approximately 200m to the northeast of existing pylon VQ44, which would be removed.

3.2.3 The realignment of VQ Route would enable CSE compounds to be constructed approximately 425m north of the existing alignment.

3.2.4 The new section of the ZG route connects to VQ Route near to VQ43 and this pylon would be replaced with a tension pylon VQ43R. VQ44R would be on a new alignment to the north and would be a suspension pylon. VQ45 would be replaced with a tension pylon (VQ45R) slightly to the north of the existing. Two spans of the existing VQ route between VQ43 and VQ45 would be removed.

3.2.5 The re-aligned VQ Route between VQ43R and VQ45R would connect with the new section of ZG Route one span north at a new terminal junction pylon ZG01. The southern circuit of VQ Route would be connected overhead with the southern circuit of ZG Route at the junction pylon ZG01.

3.2.6 The northern circuit (Bridgwater circuit) of VQ Route would be connected to ZG Route via a terminal pylon at VQ44R, a CSE compound to the north and approximately 300m of underground cables to a second CSE compound to the northwest at ZG01.

3.2.7 For this option both CSE compounds would be approximately 25m x 25m.

3.3 Option 3

3.3.1 An indicative layout of Option 3 is shown at **Figure 3**. This option would involve a new section of ZG route to be built connecting to VQ Route near to existing pylon VQ43 and retaining VQ Route on its current alignment as for Option 1.

3.3.2 Pylon VQ43 would be replaced with a new terminal pylon (VQ43R) and a CSE compound would be built adjacent to it to the south of VQ Route. Down-leads would connect the southern circuit (to Melksham) of VQ Route from VQ43R to the CSE compound and crossing land underneath the existing VQ Route for approximately 400m using underground cables to a second CSE compound adjacent to ZG01 (a terminal pylon). The second terminal pylon at ZG01 and CSE compound would be one span north on the new section of the ZG route from VQ43R.

3.3.3 The conductors and earth wire of a single circuit (northern Melksham circuit), would extend overhead between ZG01 and VQ43R.

3.3.4 This option replaces one pylon (VQ43) on VQ route and retains the alignment with both of its circuits retained existing overhead.

3.3.5 For this option both CSE compounds would be 25m x 30m.

3.4 Option 4

3.4.1 An indicative layout of Option 4 is shown at **Figure 4**. This option would be similar to Option 2 in that it would involve realignment of VQ route on a similar alignment to Option 2 between pylons VQ43 and VQ45.

3.4.2 Pylon VQ43 would be replaced by a tension pylon (VQ43R), pylon VQ44R would be a new suspension pylon approximately 210m northeast of the existing VQ44 pylon. VQ45 would be replaced by and new tension type pylon (VQ45R) adjacent to and slightly to the north of the existing pylon.

3.4.3 The ZG Route would connect with the re-aligned VQ Route at a new junction pylon ZG01. Both of the VQ Route circuits would extend southeast from this pylon overhead line. The northern ZG Route (Melksham) circuit would connect by overhead line between ZG01 and VQ43R. The southern ZG Route (Melksham) circuit would cross land under the VQ route via approximately 400m of underground cable between a CSE compound south of ZG01 and a second to the south of ZG02 further north.

3.4.4 This option would remove two spans of the existing VQ route although this would be replaced further north on a different alignment.

3.4.5 For this option both CSE compounds required would be 25m x 30m.

4 STUDY AREA AND STUDY PARAMETERS

4.1 The Study Area

4.1.1 Study areas are defined for landscape and views, ecology and for historic environment assessments. The extent of the study areas is shown at **Figure 1** and is slightly different for each topic area as explained in this section below. For clarity this report refers to study areas as follows:

- Landscape Study Area (LSA);
- Ecology Study Area (ESA); and
- Historic Environment Study Area (HESA).

Landscape Study Area

4.1.2 The LSA has been defined by combining assessment areas for landscape effects and effects on views.

4.1.3 Data regarding landscape character at national and local levels has been gathered to enable review of current conditions. Each of the options could have direct effects on the site it is built and indirect effects on the character of the surrounding landscape. The extent of direct effects relates to the proposed development sites i.e. the CSE compounds. A distance of 3km from the options is used for assessment of indirect effects on the wider landscape as the developments are of relatively small scale and effects are not likely to extend over longer distances.

4.1.4 For assessment of views an area of 1km from the options was used. This judgement is made by TEP chartered landscape Architects from the knowledge and understanding of the nature and extent of views obtained during survey for the Hinkley Point C Connection Project.

Ecology Study Area

4.1.5 The ESA has been defined by considering the results of the Extended Phase 1 habitat survey in combination with the data obtained during the desk study and presented on **Figure 10**.

4.1.6 A buffer of 1km from the extent of all options locations was used. This has taken into account the scale and extent of the proposed works in relation to the types of habitat features within the area and the mobile nature of a number of species which may be associated with these features.

Historic Environment Study Area

4.1.7 In appraising the effects on cultural heritage, baseline data has been gathered from study areas that vary in size according to the sensitivity (i.e. 'heritage significance') of the receptors (i.e. 'heritage assets').

4.1.8 Data regarding Scheduled Monuments, Grade I and II* Listed Buildings, and Grade I Registered Parks and Gardens has been gathered from within 10km of the Options. Data regarding Grade II Listed Buildings, Grade II* and II Registered Parks and Gardens, Conservation Areas, and Registered Battlefields has been gathered from within 2km of the Options. Data regarding non-designated heritage receptors has

been gathered from within 100m of the Options. Together the combination of these study areas has defined the HESA boundary shown at **Figure 14**.

4.2 Cable Sealing End Compound Siting, Design and Layout

Design

4.2.1 CSE compounds are required at the interface between overhead lines and underground cables. A CSE compound usually comprises an overhead line terminal pylon inside a level compound area and enclosed by security fencing. The compound usually contains cable terminations (cable sealing ends), electrical equipment and support structures. The terminal pylon acts as a support for the conductor system and 'down-leads', that feed each circuit onto the cable sealing ends. A connection is provided to the electrical equipment via landing structures designed to take the tension force.

4.2.2 The CSE compound would contain equipment that would be monitored remotely. Routine visits would be required to visually inspect condition of non-mechanical equipment, structures and buildings. Mechanical (manual operated) earth switches would require inspection and servicing as part of these visits.

4.2.3 CSE compounds should ideally be close to the local road network to allow easy access for construction and maintenance.

Dimensions

4.2.4 For the purposes of this study it has been assumed that each CSE compound would require a total footprint measuring either 25m x 25m or 25m x 30m, depending on which option is selected.

4.2.5 Equipment in CSE compounds (not including terminal pylon where enclosed within the compound) would typically be a maximum of 13-14m in height. Security fencing and a gate 2.4m in height would enclose the CSE compound.

4.2.6 The exact dimensions of the CSE compounds would depend on a number of factors including site specific constraints that could affect layout and design, specification of equipment and landscaping requirements. Additional land may be needed on a temporary basis for construction related requirements such as laydown areas.

Topography

4.2.7 Level ground is preferred for siting a CSE compound, although gently sloping sites where earthworks could create a suitably level platform are also acceptable.

Drainage

4.2.8 If possible, the CSE compound sites would avoid the need to divert and/or modify any watercourses. Surface water drainage may be required and would be assessed for any site taken forward. National Grid would consider the use of sustainable drainage systems for a new CSE compound when preparing designs.

Foundations

4.2.9 Construction of the CSE compounds will require foundations, and also excavations to create stable and level platforms for equipment. Previously developed land can sometimes comprise areas of contamination, mineshafts, buried tanks or areas of made-ground (the result of infilling) which may need investigation and the use of

special foundation methods. This would be assessed for the site taken forward to detailed design stage.

Access

4.2.10 Permanent vehicular access would be required to any new CSE compound and may be via existing roads or by creating new access points off the local road network.

5 BASELINE ENVIRONMENTAL CONDITIONS

5.1 Landscape Character and Views

Baseline Landscape Character

5.1.1 A review of national level landscape character data was undertaken which included relevant Natural England National Character Area profiles (NCAs).

5.1.2 The LSA as shown at **Figure 6** includes part of the Somerset Levels and Moors and Mid Somerset Hills (NLCA 142 and 143). The Somerset Levels and Moors Character Area (NLCA 142) is described as a broad area of flat low-lying farmland and wetland surrounded and divided by low hills and ridges characterised as the Mid Somerset Hills. The western most extent of the Polden Hills (part of the Mid Somerset Hills) is known as the Puriton Ridge. Part of Puriton Ridge is included in the northern part of the Study Area. There is a close visual association between the Somerset Levels and Moors and Mid Somerset Hills. The hills and ridges form a distinct and varied backdrop and skyline to the lower lying Levels and Moors with expansive views from the higher ground across the Levels and Moors.

5.1.3 Sedgemoor District Council's "Sedgemoor Landscape Assessment and Countryside Design Summary" Revised Edition, 2003, characterises the Study Area as the Levels and the Polden Hills (Lowland Hills). The Levels are recorded as a largely flat landscape around 6mAOD. Field patterns are irregular and defined by sinuous drainage ditches or 'rhynes'. The Polden Hills are described as a strong landscape feature with visual prominence from the lowland wetland landscape. The southern side of Puriton Ridge (Polden Hills) has steeper slopes and hillocks than the northern side. Woodland is a feature of Puriton Ridge with much of the remaining land in agricultural use.

5.1.4 The LSA comprises low-lying farmland and wetland with an irregular field pattern divided by ditches and rhynes as described in published landscape assessments. Hedgerows also define field boundaries, and are generally intact. Some hedgerow field boundaries are overgrown with gaps in places and some are low and maintained in particular running northwest of the A39 Bath Road. There are mature hedgerows and trees along field boundaries surrounding Manor Farm, along Horsey Lane (track) extending northwest of Manor Farm, and along the dismantled railway running southwest from the A39. There is also young tree planting adjacent Horsey Lane and along the east side of the M5 motorway. There is an area of 'man made' raised ground, scattered scrub and a pond in the field approximately 300m north of Horsey Manor Farm and Coach House. There is also a water-body named 'Withy Pool' with mature trees around in a large flat field south of King's Sedgemoor Drain.

5.1.5 There are existing overhead lines in the LSA including the VQ Route to the west and F Route 132kV overhead line to the east and southeast. Other features in the local landscape include the M5 motorway, the large Morrison's distribution centre, and the new King's Down housing estate on the edge of Bridgwater, all are in the western part of the LSA.

Visual Receptors

5.1.6 Visual receptors for the purposes of the assessment are assumed to include walkers, motorists and residents who would likely experience open views towards the proposed CSE compounds.

5.1.7 The main publicly accessible receptor locations in the locality of the options include four public rights of way (PRoW); two on Puriton Ridge and two running across low-lying farmland on the Horsey Levels south of the ridge.

Baseline Views

5.1.8 Views from locations within 1km of the options typically comprise farmland which is low-lying and flat across Horsey Level. The landscape is typically divided by a network of ditches and hedgerows.

5.1.9 From the top of Puriton Ridge views are possible over longer distances across the flat Levels landscape, backgrounded by the Quantock Hills in the distance. Extensive views are possible from the open moorland and heath covered-ridge across the surrounding landscape. Puriton Ridge is a characteristic feature in views, and provides backgrounding to existing electrical infrastructure in views northwards. The VQ route is visible in most views across the Levels extending above hedgerows and trees.

5.1.10 Two PROW are along the top of Puriton Ridge, between Home Covert and Chisland Covert. From these paths, views southwards are generally unrestricted and downwards from the ridge to lower adjacent ground. There are also two PRoW across flat fields along King's Sedgmoor Drain and between Bradney Bridge and the A39 Bath Road near Horsey Lane. Views from these paths are filtered by field hedgerows and trees and include VQ Route extending above.

5.1.11 Visual receptors at residential properties include:

- Horsey Manor Farm and Coach House approximately 300m south of the VQ Route;
- properties along the A39 Puriton Hill and Bath Road;
- properties on Horsey Lane south of VQ Route;
- properties at Crandon Bridge in the northeast of VQ Route;
- Peasey Farm on Peasey Hill to the southeast; and
- new housing at the King's Down housing estate to the southwest beyond VQ Route and the M5 motorway.

5.1.12 Field hedgerows, trees and shrubs filter and screen most views from the majority of properties. Many houses are enclosed by mature garden trees and shrubs which restrict views. The upper parts of pylons on the VQ Route are typically visible above hedgerows and trees. Tree planting along Horsey Lane, at Horsey Manor Farm and Coach House, and along the dismantled railway, largely screens views from properties to the south of the VQ Route on Horsey Lane and properties to the south of the A39 Bath Road at the junction with Bradney Lane. Residents of properties on the A39 Bath Road near Crandon Bridge experience open views across fields and hedgerows in a south westerly direction.

5.1.13 Views are expansive from elevated positions on Puriton Ridge including two residential properties on the lane off the A39 on South Hills, two residential properties near Home Covert and one property at Knowle Park.

5.1.14 Knowle Hall is currently occupied by the charity Bibic and is located on the lower slopes of Puriton Hill. Views from Knowle Hall are from an elevated position and are partly filtered views in a southwest direction. The majority of views from private houses on Puriton Ridge include VQ Route distantly and partly visible above hedgerows and trees.

5.2 Baseline Ecology

5.2.1 There are no wildlife site designations within or adjacent to the ESA. There are four Local Wildlife Sites (LWS) within 1km of the Study Area:

- South Hills Wood LWS is a mix of ancient woodland and species-rich grassland and lies west of the Study Area along the north bank of the King's Sedgemoor Drain;
- New Ground Covert LWS is an ancient woodland block west of the Study Area adjacent to the A39;
- Little Wall LWS supports water vole and is east of the Study Area on the outskirts of Knowle; and
- Orchard at Bawdrip LWS is a traditional orchard with a notable invertebrate assemblage location east of the Study Area.

5.2.2 South of the King's Sedgemoor Drain the land is dominated by arable, improved and semi-improved fields bordered by heavily managed hedgerows and ditches. Ditches will have potential to support water vole and otter.

5.2.3 The majority of hedgerows are species-poor. The hedges areas are likely to have a connective function and could support a range of species including birds, bats and dormice. The network of hedgerows is valued at the district level, but the value of the individual hedgerows will vary depending on composition and association with other species.

5.2.4 Outside the ESA to the west is Withy Pool which has the potential to support Great Crested Newts (GCN). GCN has a terrestrial range of 500m from a breeding pond. There is also a small pool in the south of the Study Area to the north east of the Horsey Deserted Medieval Village (DMV).

5.2.5 Ponds and ditches within the ESA may also support fish and aquatic invertebrate assemblages.

5.2.6 A number of mature trees are present within the ESA however none were identified within any of the four option locations. As such, the potential for bat roosts within mature trees will only require consideration if the locations of the proposed works changes.

5.3 Baseline Historic Environment

5.3.1 The Historic Environment receptors are shown on **Figure 14**. Most of the HESA consists of fairly low-lying and level farmland with field patterns defined by drainage ditches. There are two farms to the south of the HESA one of which is a Listed Building.

5.3.2 There are two statutorily designated receptors that may be affected by the options within the HESA. These are one Grade II Listed Building (Horsey Manor Farm, English Heritage ref. 1393414) and one Scheduled Monument (Horsey DMV, EH ref. 1020438).

5.3.3 There are two non-designated archaeological receptors within the HESA that are assessed as being of Schedulable importance (Crandon Bridge Roman settlement, Somerset Historic Environment Record ref. PRN10039, and Crook DMV; PRN10042), as described at section 2.5, and the Scheduled Monument may be present over a wider area than the curtilage of the designation (PRN10215). There are also three

other non-designated archaeological receptors in the HESA (PRN10223, PRN29181, and PRN17044) both of which are of low sensitivity.

5.3.4 The historic landscape of the HESA is characterised as a zone of post-17th century enclosure. Any hedgerows associated with Horsey or Crook DMV, would all be regarded as 'important' (cf. Hedgerow Act, 1997), i.e. low sensitivity receptors.

Listed Buildings (Grade I, II* and II)

5.3.5 Horsey Manor Farm (English Heritage ref. 1393414) is a Grade II Listed Building that stands on the southern end of the HESA, south of the VQ Route, and is part of a group of buildings partly enclosed by tall trees. The Listed Building dates largely from the late 16th century, with early 19th century alterations, and has associated buildings dating from the 17th century onwards. It is of high sensitivity (i.e. heritage significance), and its setting is a principal contributor to that sensitivity.

Scheduled Monuments (SMs)

5.3.6 Horsey DMV (EH ref. 1020438) is a Scheduled Monument adjacent to Horsey Manor Farm, at the southern end of the HESA, south of VQ Route. The curtilage of the scheduled area encloses two fields south of Horsey Lane and a small square field on the opposite side of that track. The scheduled area is of very high sensitivity.

Non-designated Archaeological Remains

5.3.7 Three areas may contain non-designated archaeological remains of equivalent sensitivity to Scheduled Monuments. Two areas adjacent to Horsey DMV may contain remains associated with it. The first such area is an irregular field north of the VQ Route, and approximately 170m north of Horsey DMV, which contains a second DMV called Crook (PRN10042). This may be a satellite settlement of Horsey, or they may not be contemporary, or alternatively they may be parts of a single settlement that straddled the intervening field. The second such area (PRN10215) is a broad area recorded on the Somerset HER as being associated with Horsey DMV Scheduled Monument; this includes fields west of the Scheduled Monument towards Bath Road, and north to Crook DMV and across part of Horsey Level. These two areas contain extensive medieval settlement remains, including earthworks of house platforms, although some of the remains may be later (18-19th century) and consequently of much lower sensitivity. The third area of equivalent sensitivity to Scheduled Monuments (i.e. very high sensitivity) is a Roman port, located west of Knowle Hall in Bawdrip, straddling the Kings Sedgemoor Drain (PRN10039). Any remains that are associated with the port or either DMV may be of equal sensitivity to SMs.

5.3.8 In the northeast of the HESA, linear crop marks (PRN10223) have been observed south of Kings Sedgemoor Drain, on the Horsey Level. A duck decoy (PRN29181) is present at Withy Pool in the west of the HESA, and to the east there is a sheep pen (PRN17044). Both of these last two sites are heritage receptors that owe a substantial proportion of their sensitivity to their setting; however, their sensitivity is low or negligible in both cases.

5.3.9 Roman pottery mounds (which may be of moderate or low sensitivity, depending on their level of survival) have also been located slightly further west at Chilton and Shapwick Moor and along the Huntspill River. Similar receptors may exist in the intervening area, along Kings Sedgemoor Drain, and there is the possibility that any remains in that area will be of unusually good archaeological condition and survival. In the southern part of the HESA, there may be as-yet undiscovered archaeological

remains present including Medieval or Post-medieval remains associated with the two DMVs.

6 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

6.1 Effects on Landscape Character and Views

Effects on Landscape Character

6.1.1 Each of the options would include building new CSE compounds which would potentially have negative direct and indirect effects on landscape character. Effects could be direct on the character of the site on which the CSE compounds are located and indirectly on the character of the surrounding area.

6.1.2 The landscape character for each of the CSE compound options is similar in that it comprises undeveloped agricultural fields. Direct effects of the options would include effects on existing field pattern through removal of sections of hedgerow and trees for access and construction of the CSE compounds and underground cables.

6.1.3 All options would introduce two terminal pylons to the local Levels landscape. Indirect effects would be on the same character area, the Horsey Levels and the wider Somerset Levels. Negative effects could result from the introduction of electrical infrastructure to a predominantly rural, flat and open landscape. The landscape is already affected by the existing VQ Route overhead line which would typically restrict the overall effect of the options on the landscape.

6.1.4 The VQ Route is proposed to be upgraded to a 400kV line. It currently operates at 275kV and the existing supporting pylons are sufficient for a 400kV line and would not need to be changed. This would limit effects on the landscape because construction work to replace pylons would not be needed and minor modifications such as replacement conductors and insulators would result in less construction activity.

6.1.5 A new section of 400kV overhead line is also proposed in this landscape, the new section of ZG Route would run to the north of the VQ Route across Horsey Level and extend northeast over Puriton Ridge.

6.1.6 The proposed terminal pylons would replace those existing pylons on the VQ Route or would be new pylons on the proposed ZG Route. The location of these new terminal pylons varies between options. Terminal pylons are anticipated to be more dominant in the local landscape compared to existing pylons. However new terminal lattice pylons would be seen within the context of the existing 275kV overhead line and the new 400kV overhead line proposed on the ZG Route.

6.1.7 All proposed CSE compound options would result in the long term loss of farmland (the footprint of proposed CSE compounds), as well as the temporary loss of farmland across construction access routes and the proposed working area. On completion, construction access routes and working areas would be reinstated as farmland. During construction, there would be hedgerow loss; however following construction gaps in hedgerow would be replanted. Mature hedgerow and field tree loss during construction would be avoided as far as possible.

6.1.8 The anticipated effect of proposed CSE compound options on landscape character is discussed below.

Option 1

6.1.9 The route of the existing 275kV overhead line (VQ Route) would be retained as existing as part of Option 1. The single circuit on the north side of the existing VQ

Route between pylons VQ043R and VQ044R would be replaced with underground cables.

6.1.10 Option 1 would result in both CSE compounds being sited to the immediate north of existing pylons VQ043R and VQ044R. These pylons would be replaced with larger terminal pylons.

6.1.11 Option 1 would retain the existing 275kV overhead line similar to existing and would contain negative effects (associated with proposed CSE compounds) on the Levels landscape adjacent existing electricity infrastructure. This would avoid direct negative effects on the Horsey Level landscape elsewhere in the LSA.

Option 2

6.1.12 The existing 275kV overhead line (VQ Route) between pylons VQ043R and VQ045R would be removed as part of Option 2. This section of overhead line would be realigned (and upgraded to a 400kV line) further north on the flat Horsey Level landscape. Pylon VQ044R would be replaced with a larger terminal pylon approximately 185m further north on the new alignment. The existing pylon VQ045R would be replaced with another pylon immediately adjacent.

6.1.13 The single circuit on the north side of the realigned VQ Route, between pylon VQ044R and a new 400kV pylon would be replaced with underground cables.

6.1.14 A CSE compound would be sited north of the new terminal pylon VQ044R and the second CSE compound would be sited northeast of a new terminal pylon on the proposed ZG Route.

6.1.15 Option 2 would result in the removal of part of the existing 275kV overhead line and the introduction of a new section of 400kV overhead line ZG Route, (including two terminal pylons and CSE compounds), to part of the Horsey Levels landscape previously unaffected by an overhead line. The proposed electricity installations would be seen in the context of the existing 275kV overhead line and the new ZG Route in the wider landscape.

6.1.16 The underground cable route proposed as part of this option would be anticipated to result in a greater loss of hedgerow field boundary compared to other CSE compound options. The hedgerow affected to a greater extent by this option than others is that along the field boundary extending in a northwest-southeast direction to the southeast of Withy Pool.

Option 3

6.1.17 The existing VQ Route would be retained as existing as part of Option 3. The single circuit on the south side of the new 400kV overhead line (ZG Route) between pylon VQ043R and a new 400kV pylon to the north would be replaced with underground cables.

6.1.18 Option 3 would result in a CSE compound being sited south of the existing pylon VQ043R and a CSE compound south of a proposed 400kV pylon on the ZG Route. These pylons would be replaced with terminal pylons.

6.1.19 There would be little or no change associated with this option in relation to VQ Route as it is retained on its current alignment. The installation of the southern CSE compound would result in some negative effects on the Levels landscape in the context of existing electricity infrastructure.

Option 4

6.1.20 Option 4 is similar to Option 2 as the existing VQ Route between pylons VQ043R and VQ045R would be removed and re-aligned further north on the flat Levels landscape. This option would replace pylon VQ044R as a 400kV suspension pylon on the realigned VQ Route, and include a larger terminal type pylon on the new ZG Route. This terminal pylon would also provide the connection between the realigned VQ Route and the new ZG Route. The existing pylon VQ045R would be replaced with another pylon immediately adjacent.

6.1.21 The single circuit on the east side of part of the new 400kV overhead line (ZG Route) would be replaced with underground cables between proposed terminal pylons. Proposed terminal pylons are anticipated to be more dominant in the local landscape compared to existing 400kV pylons further south in the Levels landscape.

6.1.22 Option 4 would result in both CSE compounds being sited south-east and south of the terminal pylons proposed on the new ZG Route. CSE compounds would be introduced into a more open part of the Horsey Level landscape currently unaffected by existing electricity infrastructure. Proposed electricity works would be seen in the context of the existing 275kV overhead line and the new 400kV overhead line proposed on the ZG Route running across the wider landscape.

Effects on Views

6.1.23 All proposed CSE compound options (including terminal pylons) would have a negative effect on views from public and private receptors in the local area. Proposed CSE compound compound options on Horsey Level would be visible in views from receptors on the low-lying Levels and particularly from elevated ground on Puriton Ridge in the north.

Public Views

6.1.24 Proposed CSE compound options are anticipated to have the greatest negative change in views from four public rights of way (PRoW); two on Puriton Ridge and two running across low lying farmland south of the ridge. Elevated open views from the Ridge would include CSE compound options adjacent the existing 275kV overhead line and or proposed 400kV overhead line. Pedestrians walking on the PRoW along King's Sedgemoor Drain and the PRoW between Bradney Bridge and the A39 Bath Roadse PRoWs would have CSE compound options introduced into views across fields towards Horsey Level with new terminal pylons and CSE compound visible above trees and built form. Users of the two PRoW across flat fields along King's Sedgmoor Drain and between Bradney Bridge and the A39 Bath Road near Horsey Lane would experience views that are filtered by field hedgerows and trees and include VQ Route extending above and glimpses of CSE compounds.

6.1.25 The new 400kV overhead line on the proposed ZG route across Horsey Level and Puriton Ridge is anticipated to be visible in these footpath views, filtered and screened by intervening trees and hedges. The proposed new 400kV ZG Route would also be visible in the majority, if not all views. Views would include the new 400kV overhead line extending south from Puriton Ridge.

Private Views

6.1.26 The greatest negative changes in views private viewpoints would be from residential properties within 1km of proposed CSE compound options (see **Figure 8**) including:

- Horsey Manor Farm and Coach House 300m south of VQ Route;
- residential properties along the A39 Puriton Hill near Home Covert;
- Knowle Hall approximately 500m to 1km from the nearest proposed CSE Compound Option 4;
- fifteen properties on the A39 Bath Road between Crandon Bridge and Horsey approximately 400m to 700m from the nearest proposed CSE compound Options 1 and 2;
- approximately 26 properties on Horsey Lane 600m south of the nearest CSE compound Options 1 and 3; and
- Bradney House and Bradney Cottage on Bradney Lane approximately 900m from the nearest proposed CSE compound Options 1 and 3.

6.1.27 Terminal pylons proposed as part of options would be introduced in views from the edge of the new Kings Down housing estate west of the M5; however views of the CSE compounds would be filtered and/or screened by trees alongside the M5 and Horsey Lane track.

Temporary Construction Effects

6.1.28 All CSE compound options would result in negative effects in views during construction. Minimising the extent of land take for construction activities, the amount of materials stored on site and in the vicinity of proposed CSE compounds would assist in lessening overall temporary negative effects on visual amenity.

Potential for Mitigation

6.1.29 The relatively small scale of the proposals would mean that visual effects would generally be restricted to a localised area around the site of the CSE compounds under either of the options. It would not be possible to avoid long-term negative effects entirely on the local visual amenity as a result of any of the options as they would involve the installation of 400kV pylons which are tall (approximately 50m) and typically visible in some views over long distances (up to 10km).

6.1.30 There would be scope to include mitigation by way of new and replacement hedgerow and tree planting in the vicinity of proposed CSE compounds which would lessen the negative effects by providing long term screening and would be in keeping with existing landscape character. Mitigation planting would be subject to the agreement of the landowner and would require further consideration. Proposed planting would also need to be managed and monitored to ensure successful establishment.

6.1.31 The anticipated effect on views of proposed CSE compound options is discussed briefly below and is based on the descriptions of proposed CSE compound options provided at Chapter 3.

Option 1

6.1.32 This option would result in both CSE compounds being sited to the immediate north of the existing 275kV overhead line pylons VQ043R and VQ044R, approximately 340m apart. These pylons would be replaced with larger terminal pylons that would likely appear more prominent in views than those existing. For example in those views from Horsey Manor Farm and Coach House approximately 300m to the south of the existing VQ Route.

6.1.33 A CSE compound would be near to the existing mature field hedgerows on the northern boundary of the Horsey DMV site and would benefit from partial screening and backgrounding provided by existing trees to the south on Horsey Lane.

6.1.34 Option 1 would retain the existing VQ Route on its current alignment in views and would remove some conductors (a single circuit) from the north side of the line in views.

Option 2

6.1.35 Option 2 would remove a section of the existing VQ Route and would realign it approximately 185m to the north across Horsey Level. As a result both proposed CSE compounds would be further north adjacent the re-alignment and approximately 220m apart, in an open location in the Levels landscape. This would result in the loss of part of an existing mature field hedgerow that would reduce existing screening in views from Puriton Hill.

6.1.36 This option would introduce new terminal pylons and CSE compounds closer in views from receptors on Puriton Hill and at Crandon Bridge, with limited screening in the open flat landscape. It is also anticipated that both CSE compounds would be visible from Kings Down housing estate west of the M5 motorway. CSE compounds would be further north from properties south of the existing VQ Route than options 1 and 3 and would be appear filtered in views.

Option 3

6.1.37 Option 3 would include a CSE compound adjacent to existing pylon VQ043R and a second to the south of a new pylon ZG01 further north at Horsey Level. These would be terminal pylons. As with option 2 this option would introduce a CSE compound in an open location in the flat Levels landscape with limited screening and backgrounding. This would likely result in greater visibility of CSE compounds extending above hedgerows, particularly from locations at Puriton Hill, Crandon Bridge and at Kings Down housing estate.

Option 4

6.1.38 Option 4 is similar to Option 2 and includes CSE compounds and terminal pylons further north in the flat Horsey Level landscape. CSE compounds would be adjacent to the new 400kV ZG Route, with one CSE compound approximately 300m further north than Option 2 or 3 and closer to King's Sedgmoor Drain. Proposed terminal pylons are anticipated to be more notable in views compared to existing pylons on VQ Route to the south. CSE compounds would be introduced into a more open part of the Horsey Level landscape where there is limited tree and hedgerow coverage and benefit from screening. This part of the levels landscape is currently unaffected by electricity infrastructure.

6.1.39 This option would introduce a terminal pylon and CSE compound to views from properties at Crandon Bridge and closer in views from locations on Puriton Ridge. There is limited screening and backgrounding in these views that would be beneficial in minimising effects as a result of the CSE compound installations.

6.2 Effects on Ecology

Designations, Protected and Priority Species, Flora and Fauna, and Habitats

6.2.1 The ESA is not protected by any ecological designations; a Phase 1 habitat survey has indicated that it does not appear to have any special habitat value. The area lies

adjacent to the King's Sedgemoor Drain which supports otters. The fields of the ESA are bordered by drains which may also offer suitable habitat for otter and water vole. The hedges which border the drains may offer suitable habitat for dormouse. The presence of protected species would be confirmed by ecological surveys as part of detailed studies if any option is taken forward.

6.2.2 A number of ponds are situated within the ESA. These will require further survey to confirm their suitability and potential to support amphibians, particularly great crested newt (GCN). Habitat within 500m of these ponds will also require consideration with regard to its potential to support GCN in their terrestrial habitat.

6.2.3 An assessment of the potential effects of the CSE compounds, with particular regard to the removal of hedges or trees on bat flight patterns would be required as part of detailed studies for any of the options taken forward.

6.2.4 Some species are protected by statute and may also be listed in the UK Biodiversity Action Plan as being of conservation priority. At the next stage of assessment field surveys will be carried out for protected species, and external parties contacted for historic records. The nature and extent of any surveys undertaken will depend upon the location of the substation site taken forward by National Grid, but will usually involve surveys of hedges, trees, ditches and ponds as well as desktop record searches. Typical surveys may include:

- habitat based survey/assessment for protected species;
- amphibian survey of ponds;
- bat roost and barn owl inspections of mature trees within the Study Area;
- bat activity surveys of trees, hedges and ponds on and around the sites to understand
- flight patterns and species;
- water vole survey of ditches on site;
- otter survey;
- breeding bird surveys; and
- other surveys as identified following habitat survey/assessment and consultation.

6.2.5 The extent to which fauna would be affected by development varies between species. European Protected Species are required to be sustained in 'favourable conservation status'. It is often the case that mitigation during construction is sufficient to mitigate effects. In other instances, mitigation may involve modification of designs and/or establishing an equivalent habitat for the species elsewhere if a site or part of a site is lost to development.

6.2.6 The installation of underground cables is more invasive and is likely to have a greater scale of effects (at least during construction) when compared with an overhead line due to the higher level of ground disturbance.

6.2.7 All options should adhere to the relevant guidance with regard to pollution prevention near watercourses.

Option 1

6.2.8 Option 1 would cross one ditch and intersect one species-poor hedge. This option may have potential impacts on otter, water vole and aquatic species within the ditch.

6.2.9 This option would involve undergrounding works within an arable field and a field of semi-improved neutral grassland. Vegetation clearance to facilitate installation of the CSE compounds would be localised to these two habitat types.

6.2.10 Option 1 would impact upon 'distant' terrestrial habitat i.e. between 250-500m from the nearest pond if GCN were found to be present. This could constitute an impact of moderate effect in the absence of mitigation.

6.2.11 No mature trees would be affected by this option. Removal of one 10m section of species-poor hedge may affect dormouse, bat commuting corridors and food and nesting habitat for a range of bird species.

Option 2

6.2.12 Option 2 would cross three ditches and would also intersect one species-rich hedgerow. This option may have potential impacts on otter, water vole and aquatic species within the ditch.

6.2.13 This option would limit the undergrounding works to within a field of semi-improved neutral grassland with a very small section located within an arable field.

6.2.14 Option 2 would impact upon 'intermediate' terrestrial habitat i.e. between 50-250m from the nearest pond if GCN were found to be present. This could constitute an impact of moderate-high effect in the absence of mitigation.

6.2.15 Removal of one 10m section of species-rich hedgerow may affect dormouse, bat commuting corridors and food and nesting habitat for a range of bird species.

Option 3

6.2.16 Option 3 would cross three ditches and one species-poor hedge.

6.2.17 This option would comprise undergrounding works mostly within an arable field with a shorter section in an area of semi-improved neutral grassland.

6.2.18 Option 3 would impact upon 'distant' terrestrial habitat i.e. between 250-500m from the nearest pond if GCN were found to be present. This could constitute an impact of moderate effect in the absence of mitigation.

6.2.19 The removal of one 10m section of species-poor hedge may affect dormouse, bat commuting corridors and food and nesting habitat for a range of bird species.

Option 4

6.2.20 Option 4 would cross 2 ditches and may have potential impacts on otter, water vole and aquatic species within the ditch. This option also intersects one species-rich hedge and one species poor hedge.

6.2.21 This option would limit the undergrounding works equally to within a field of semi-improved neutral grassland and an arable field.

6.2.22 Option 4 would impact upon 'intermediate' terrestrial habitat i.e. between 50-250m from the nearest pond if GCN were found to be present. This could constitute an impact of moderate-high effect in the absence of mitigation.

6.2.23 The removal of two 10m sections of hedge may affect dormouse, bat commuting corridors and food and nesting habitat for a range of bird species. There is a slightly increased risk (compared to other Options) a fragmentation of habitat given the proximity of these two hedges to each other.

6.3 Effects on Historic Environment

6.3.1 CSE compounds and underground cables may have permanent physical negative effects on buried archaeological remains. These effects may be partially mitigated through investigation and recording. The presence of underground cables may have negative effects on the historic landscape by removal of hedgerows, some of which may be unable to be mitigated during the lifetime of the infrastructure. CSE compounds may have negative effects on the settings of heritage receptors during the lifetime of the infrastructure. Negative effects to setting are in some circumstances able to be mitigated through screening.

6.3.2 No options would have direct physical effects on designated receptors; however, all have the potential to affect archaeological remains that may be associated with (and therefore of equivalent sensitivity to) the Scheduled Monument, and all have potential to affect the setting of the Listed Building. For all options, effects on the setting of the Listed Building caused by construction of the CSE compounds would be reduced by the presence of the existing VQ Route and its impact on the setting of designated receptors.

6.3.3 All options would have no direct effects on the crop marks to the northwest. All options would affect the settings of the duck decoy, sheep pen and the historic landscape character, but these effects would be insufficient to influence option selection.

Option 1

6.3.4 Option 1 would have high potential to affect remains associated with the SM and/or the non-designated but very similar receptor Crook DMV. This option is located entirely within the area recorded on the HER as comprising these receptors. A CSE compound would be constructed in both Crook DMV and the non-designated area of Horsey DMV, and underground cabling would be constructed between them. At this stage, it is not possible to predict accurately the magnitude of effect on archaeological remains.

6.3.5 Option 1 would also have the greatest negative effect on the setting of the Listed Building, due to construction of CSE compounds approximately 400m and 300m away. This would result in a negative effect of low magnitude to the setting of this high sensitivity receptor.

Option 2

6.3.6 Option 2 would have moderate potential to affect remains associated with the Scheduled Monument, since one CSE compound and a very short section of underground cable would pass through the area where such remains have been indicated. This option would have high potential to affect Crook DMV, although the effect would be more limited (one CSE compound, a short length of underground cable and one pylon) than Options 1 and 3. It is likely, however, that archaeological remains associated with that settlement are not restricted to the modern field, so the underground cable may cause additional effects to associated remains further north. At this stage, it is not possible to predict accurately the magnitude of effect on archaeological remains.

6.3.7 Option 2 would affect the Listed Building through construction of both CSE compounds and a new pylon approximately 500m to the north. This would be a negative effect of low magnitude to the setting of this high sensitivity receptor.

Option 3

6.3.8 Option 3 would have the highest potential to affect remains associated with the Scheduled Monument, due to construction of one CSE compound and the underground cable in close proximity to it (and within the area outlined on the HER). Option 3 would also have substantial effects on archaeological remains of Crook DMV (due to construction of one CSE compound and the underground cable within its area), which may be regarded as associated with the Scheduled Monument and therefore also of very high sensitivity. At this stage, it is not possible to predict accurately the magnitude of effect on archaeological remains. At this stage, it is not possible to predict accurately the magnitude of effect on archaeological remains.

6.3.9 Option 3 would affect the Listed Building through construction of one CSE compound approximately 500m to the north and one approximately 400m to the north-west. This would result in a negative effect of low magnitude to the setting of this high sensitivity receptor.

Option 4

6.3.10 Option 4 would have very low potential to affect remains associated with the Scheduled Monument, since it is located on the other side of Crook DMV to that receptor. However, this option has high potential to affect Crook DMV due to construction of a sealing end compound, a pylon and length of underground cable. Any such remains could be associated with the Scheduled Monument and therefore also of very high sensitivity. At this stage, it is not possible to predict accurately the magnitude of effect on archaeological remains.

6.3.11 Option 4 is sufficiently close to the crop marks located in the north-western part of the HESA that it may affect as-yet undiscovered archaeological remains associated with them. Option 4 also has potential to affect as-yet undiscovered Roman archaeological remains located in the vicinity of the Kings Sedgemoor Drain. Any such receptors are likely to be of very high - negligible sensitivity. If such impacts occur, they are likely to be of moderate - negligible magnitude.

6.3.12 Option 4 would have the lowest negative effect on the setting of the Listed Building. The CSE compounds would be constructed approximately 500m and 950m away, although an additional pylon would also be required, approximately 500m away. This would result in a negative effect of negligible magnitude to the setting of this high sensitivity receptor.

6.4 Further Work

6.4.1 Archaeological field assessment (geophysical survey and/or trial trenching) is strongly recommended to help determine the sensitivity of the areas proposed for works that would affect any archaeological remains.

7 CONCLUSIONS

7.1.1 The environmental topics considered to have the potential to show differentiation between the options are landscape, views, ecology and historic environment; the conclusions for each are outlined below.

7.2 Landscape

7.2.1 Options 1 and 3 would retain the existing VQ Route and would contain negative effects resulting from the proposed CSE compounds on the local landscape adjacent existing electricity infrastructure. However the northern CSE compound proposed as part of Option 3 would be approximately 180m further north of the existing VQ Route resulting in direct negative effects on a different part of Horsey Level; although seen in the context of the existing 275kV overhead line (on 400kV pylons) and the proposed 400kV overhead line.

7.2.2 Options 2 and 4 would remove a section of the existing 275kV overhead line between pylons VQ043R and VQ045R. This section of overhead line would be realigned (and upgraded to a 400kV line) further north introducing an overhead line to a different part of the flat Horsey Level landscape. Options 2 and 4 would introduce CSE compounds into the Horsey Level landscape further north from the existing 275kV overhead line and new CSE compounds particularly as part of Option 4 would be introduced into a more open part of the Horsey Level landscape.

7.2.3 The underground cable route proposed as part of Option 2 is anticipated to result in a greater loss of hedgerow field boundary compared to other CSE compound options.

7.2.4 Option 1 is anticipated to have a lower negative effect on local landscape character compared to other Options.

7.3 Views

7.3.1 Options 2, 3 and 4 would introduce new electrical infrastructure closer to some receptors where there is limited screening and backgrounding present in the landscape. This includes from:

- receptors to the north, views from high ground on public rights of way at Puriton Ridge, properties at Knowle Park, on the A39 Puriton Hill;
- receptors to the east at Crandon Bridge and further south on the A39 Bath Road; and
- King's Down housing estate and the M5 motorway to the west.

7.3.2 Option 1 is preferred, there would be less adverse effects associated with this option as it would not require realignment of VQ Route and would include replacements pylons. CSE compounds would be adjacent to existing electrical infrastructure which form part of baseline conditions and there is greater potential for screening and backgrounding provided by existing trees and hedges in the local area.

7.4 Ecology

7.4.1 Options 2, 3 and 4 would each require more ditch crossings than Option 1. The network of ditches and drains within the ESA is considered to provide suitable habitat for otter and water vole and as such, works which limit the impacts on ditch habitats are preferable. In addition, otter are known to be present within the King's Sedgemoor

drain to the north of the ESA and as such, their presence cannot be ruled out within adjacent watercourses.

7.4.2 There are a number of ponds within the ESA. Options 2 and 4 would entail works within intermediate terrestrial habitat i.e. within 50-250m of a pond for GCN. As such, works that are located at a distance greater than 250m away from potential breeding ponds are preferable.

7.4.3 None of the options require the removal of important hedgerows; however, Options 1 and 3 cross species-poor hedges. Whilst such hedges are likely to provide habitat for birds and potential commuting corridors for bats, they represent less favourable habitat for dormouse as foraging opportunities are likely to be more restricted.

7.4.4 Overall preference is therefore, for Option 1 as this option is considered to pose the least disturbance to habitats and risk to associated species therein.

7.5 Historic Environment

7.5.1 The most important factor in determining which option would have the least significant effect on the historic environment is the potential to affect archaeological remains associated with, and therefore of equivalent sensitivity to, Horsey DMV Scheduled Monument.

7.5.2 In general, the options decrease in potential to result in significant negative effects the further they are to the north. However, Option 4 is sufficiently far north that it may affect as yet undiscovered Roman archaeological remains that the other options would not.

7.5.3 The option likely to cause the least effects is therefore Option 2.

7.5.4 The difference between options in magnitude of effect on the setting of Grade II Listed Horsey Manor Farm is not so great as to be a deciding factor.

7.6 Summary

7.6.1 The option that is least constrained in terms of landscape and views is Option 1 which envisages a layout where the proposed infrastructure is installed close to the existing VQ overhead line and therefore minimises effects on landscape and views.

7.6.2 The option that is least constrained in terms of ecology is Option 1 as this option is considered to pose the least disturbance to habitats and risk to associated species therein and therefore minimises effects on ecology.

7.6.3 The option that is least constrained in terms of historic environment is Option 2 as the proposed infrastructure would have less effect on existing receptors.

7.6.4 Balancing all of the information available at this time, Option 1 is the most appropriate option to take forward. However, additional mitigation measures should be considered (where appropriate) to reduce any adverse effects on the Horsey and Crook DMVs.

APPENDIX A – NATIONAL GRID TECHNICAL OPTIONS REPORT: CONNECTION OPTIONS AT THE BRIDGWATER TEE

nationalgrid

Technical Options Report:

Connection Options at the Bridgwater Tee

In support of Hinkley Point C Connection Project

August, 2013

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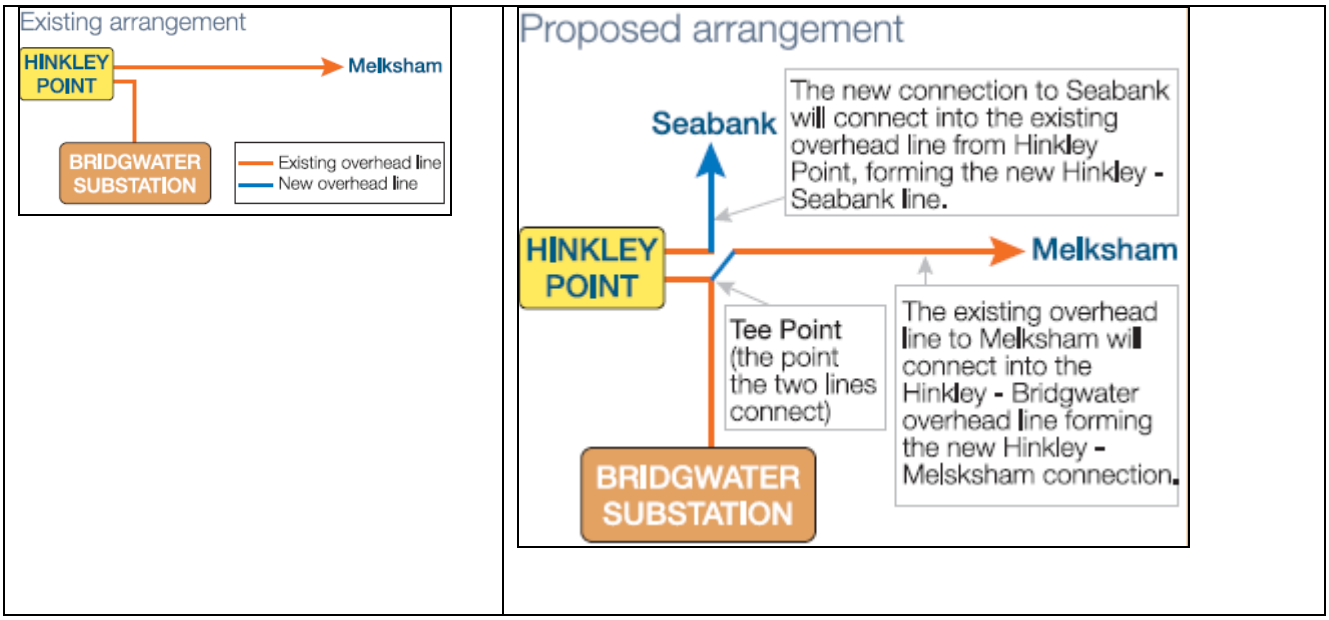
1. Introduction

1.1. Three 400kV double circuit transmission connections are required as part of the Hinkley Point C Connection Project in order to comply with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS). The required 400kV circuit connections are:

- A new connection to Seabank Substation.
- The existing ZZ route connection to Taunton Substation.
- The existing 275kV VQ route to Bridgwater Substation will need to be upgraded to 400kV and both circuits are required to be connected to the existing Melksham Substation using the existing Hinkley - Melksham ZG route 400kV line via a double tee connection.

1.2. To facilitate the connection to Melksham substation the existing Hinkley to Melksham ZG route will be split north of Woolavington, and a new section of transmission line will be routed south to connect with the existing VQ route via a “tee” connection at a location to the north of Bridgwater on Horsey Level.



1.3. The disconnected section of the ZG that continues to Hinkley Point will connect with the proposed new double circuit line to Seabank, north of Puriton Energy Park.

1.4. This report outlines the technical options that have been considered to provide the double circuit 'tee' connection that will connect the Hinkley Point to Bridgwater VQ route with the new section of ZG Route that ultimately runs to Melksham.

1.5. The structure of this document is as follows:

- Section 1 provides an introduction;
- Section 2 identifies a proposed location for the Tee and summarises the reasons for this location being chosen;
- Section 3 provides an outline of the possible technical options available to make a double tee transmission connection;
- Section 4 provides a narrative of the options developed for Bridgwater Tee;
- Section 5 provides an initial assessment of the technical options.
- Section 6 identifies the preferred technical option

2. Considerations when identifying the proposed location for the tee connection

2.1. The Hinkley Point C Preferred Connection Report[1] proposes retaining the existing 275kV overhead line VQ route and upgrading it to 400kV. As stated in the introduction it is proposed that a new section of the ZG Route will need to connect with the upgraded VQ route at a double circuit 'tee' connection. (see figure 2.1)

2.2. It is proposed that the northern end of the new section will connect with the existing ZG route north of Woolavington near the Huntspill River.

2.3. The connection at the southern end of the new section is proposed at a location on the east/west section of the existing VQ Route to the north of Manor Farm on the Horsey Levels. This point of connection is referred to throughout this report as the 'Bridgwater Tee'.

2.4. The proposed route for the new section of overhead line that connects with the existing ZG route that leads from the Bridgwater Tee to north of Woolavington was identified as it maximises the distance from properties along the A39 and in the settlement of Knowle and utilises land with a more gradual sloping gradient which may offer opportunities for backgrounding across Puriton Ridge. The proposed route would run further away from Bawdrip and Woolavington and enable the removal of the existing 132Kv overhead line that connects to Bridgwater substation which runs close to Knowle, Bradney and Slape Cross.

2.5. English Heritage has identified potential impacts on Horsey Medieval settlement as a concern and the design of any tee point would need to respect this feature and its setting in views from the M5 motorway.

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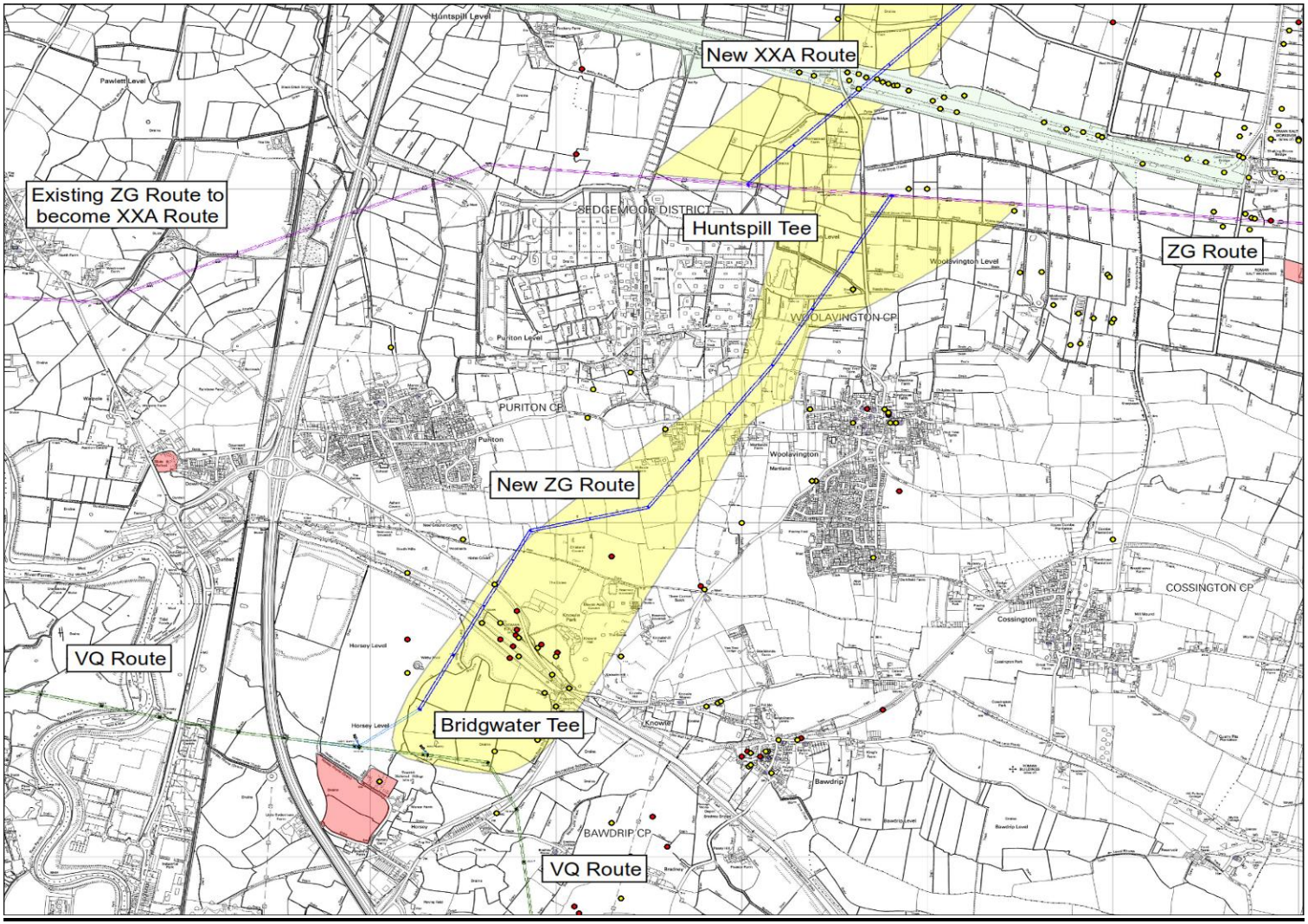
[1] Hinkley Point C Connection Project 'Selection of Preferred Connection' http://www.nationalgrid.com/NR/rdonlyres/E332E76E-16D3-4C01-B9DB-61F26AFCB2F1/49283/Selection_of_Preferred_Connection_Aug_2011_FINAL.pdf

2.6. When assessing the technical options to make the tee connection flood risk will need to be considered. The Horsey Levels lie within Flood Zone 3 as designated by The Environment Agency which means there is a greater than 1 in 200 annual chance of flooding in the area (see appendix 1).

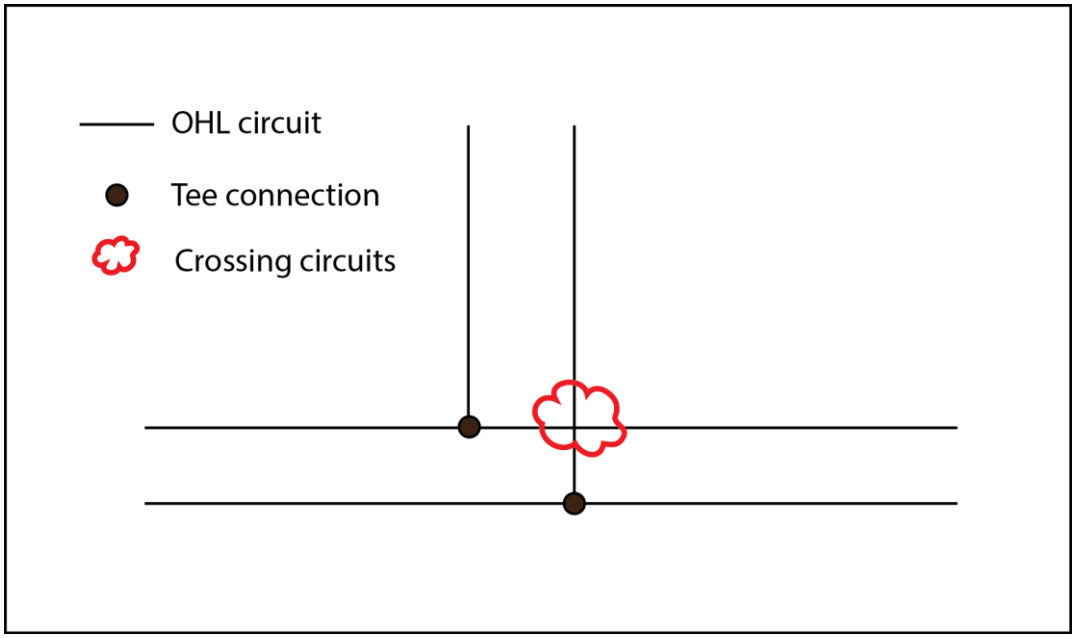
Figure 2.1 – VQ route, Bridgwater Tee and new ZG route



3. Options available to make the tee connection

Factors to be considered when identifying technical options

3.1. To facilitate a double circuit 'tee' at least one circuit will need to cross underneath the other circuit (as shown in the Figure below).



3.2. When designing tee and crossover connections National Grid considers two main technical options:

- An overhead line duck under where one overhead circuit oversails the other. This arrangement brings an inherent maintenance constraint which, depending on the criticality of the specific circuits, may not be appropriate in all cases (see para 3.3 below).

- Underground cable which avoids any operational constraints associated with having one overhead line oversailing another but at a cost premium.

3.3. National Grid safety rules state that an overhead line duck under design can only be considered in locations where both the oversailing circuit and the circuit passing underneath can be switched off at the same time (a double circuit outage) during maintenance or emergency repair of the upper circuit. This is to prevent the upper circuits making contact with live conductors below.

3.4. The National Grid policy statement on overhead line tees, turn-ins and crossovers[2] requires that the impact on system security of future outages is considered when designing an overhead line duck-under and recommends that where there are security implications an alternative design is used if possible.

3.5. The transmission system from Hinkley Point requires 6 circuits in order to provide a stable and secure connection for Hinkley Point C. During planned maintenance of the oversailing circuit, an outage of the duck-under circuit will also be required. If a further emergency outage was to occur on a circuit on the local transmission system this would mean the loss of 3 circuits around Hinkley Point C. Under these conditions the system would not comply with operating standards and in order to maintain compliance Hinkley Point C would have to be constrained off.

3.6. The costs of constraining off Hinkley Point in this situation would be considerable and would far outweigh the costs associated with using an underground cable design to facilitate the double tee and as a result an overhead line duck under option is not being considered at Bridgwater Tee.

3.7. The main factors to be considered when designing an underground cable crossover at the Bridgwater Tee are:

- Proximity to the scheduled monument sites adjacent to Horsey Manor Farm and Crook.

[2] PS(T)047 – Issue 2 – Overhead Line Circuit Tees, Turn-ins and Crossovers

- The location and constructability of the larger junction pylons and cable sealing end (CSE) compounds that are required at each end of the cable section.

- The required capacity of the cabled section, which will require either one or two cables per phase, and hence its cost and scale of construction impact.

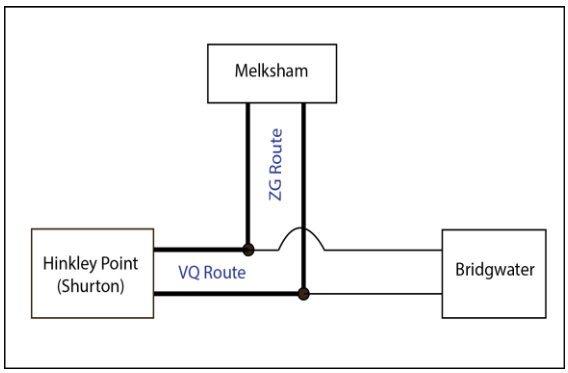
3.8. At lower voltages (275kV and 132kV) it is possible to construct platforms on the pylon to support the cable sealing ends and avoid the need for fenced compounds at the base of the pylon. However, at 400kV the size and weight of CSEs and the associated equipment necessary for operation of the circuit precludes the use of pylon-supported platforms and would require an elevated free standing structure. This would introduce an additional 'working at height' risk and would place a larger visual intrusion in an otherwise relatively flat landscape.

3.9. The Bridgwater Tee creates a 3-ended circuit. The main connection is between Hinkley and Melksham and the electrical rating of this through connection is such that 2 cables are required per phase. The third end, or teed circuit, which connects to Bridgwater substation and subsequently to the WPD distribution system does not need to have such a high rated capacity. Here, only a single cable per phase would be required, resulting in a narrower construction swathe.

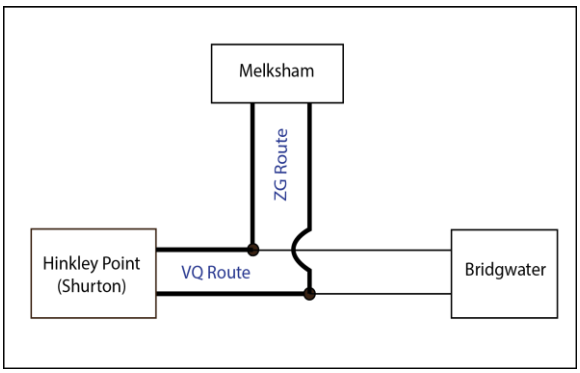
4. Options developed for the Bridgwater Tee.

4.1. Two options have been considered, one which undergrounds the Bridgwater leg which requires a lower cable rating and only one cable per phase and one which undergrounds the Melksham leg which is a higher cable rating and will require two cables per phase. Within each option there are two sub options: one which seeks to minimise changes to the existing VQ route alignment; and one which re-aligns the VQ route and locates the CSEs and cable section further north and away from the scheduled

monument. The four options are shown in the following diagrams and described below.



Options 1 & 2



Options 3 & 4

Option 1 - Bridgwater circuit underground, CSEs adjacent to scheduled monument (figure 4.1)

Option 1 – Description

4.2. Option 1 is an option where the new section of the ZG route connects near pylon VQ43 on the existing VQ route (see figure 4.1 below). One of the circuits to Bridgwater (coloured red) crosses under the ZG route by underground cable. Approximately 350 metres of cabling would be required between CSEs. A single circuit (three phases, 6 wires) and earthwire remains overhead between VQ43R & VQ44R.

4.3. This options retains the alignment of the VQ route but replaces two suspension pylons with larger terminal structures and associated sealing end compounds. The CSEs are located adjacent to but on the north side of the VQ route.

Option 1 – Constructability

4.4. This option undergrounds the Bridgwater circuit, which is a lower capacity circuit, as a result only one cable per phase is required which will mean that the construction swathe required for the underground cable is minimised (approximately 30m wide).

4.5. Two suspension pylons on the existing VQ route will need to be replaced by new larger tension/terminal pylons capable of carrying the additional downlead connections to the cable sealing end compounds. The existing VQ 45 remains unchanged.

4.6. Downleads from new pylon VQ43R are on the ‘inside’ of the deviation angle at this pylon where it will be slightly more difficult to achieve wire clearance. This may preclude the option to use anchor blocks, pushing the design towards use of a gantry within the CSE.

4.7. At new pylon VQ44R the downlead arrangement is standard and here it could benefit from use of anchor blocks, avoiding the need for a line landing gantry but at the visual cost of extended top crossarms on one side of the pylon to achieve wire clearance between the downleads.

4.8. Pylon replacement is facilitated by a temporary diversion of the southern circuit (Hinkley – Bridgwater 1) over approximately 1.2 km using two temporary structures. Pylons can be dismantled and built during a subsequent outage of the northern circuit. This temporary diversion will be in place for a minimum of 20 weeks bringing the line temporarily closer to the scheduled monument for this period.

4.9. The sealing end compound will be approximately 25 m x 25 m to accommodate one cable sealing end per phase, earth switches, surge arrestors and the gantry which receives downlead connections from the pylon. All high voltage connections within the compound are above ground to maintain electrical clearances with most equipment mounted on steel structures. The electronic control equipment will also be mounted on steel structures to reduce risks associated with flooding. A right of access to the CSE will be required.

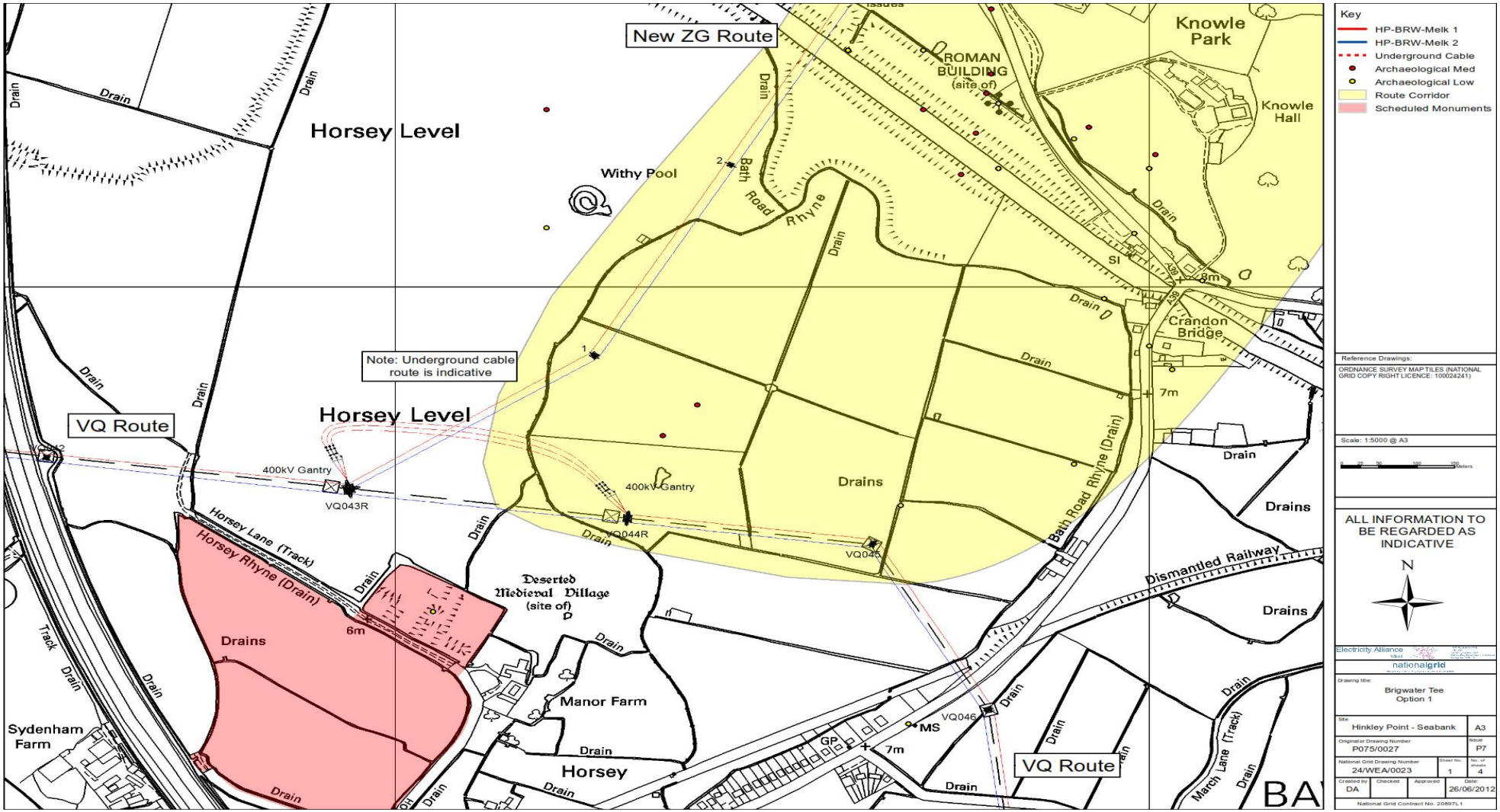
4.10. The cable section and sealing end compounds with gantries can be constructed off-line (pre-outage), however, construction of the terminal pylons and downleads are outage dependent.

Option 1 - Summary

4.11. The new section of line between Huntspill and the double tee point is required for all options therefore this sections merely summarises the impact/changes to the VQ route:

- No change to VQ route alignment
- 2 x suspension pylons on VQ route replaced by 2 x terminal (DJT/DT) pylons. No additional pylons required.
- 1.2 km long temporary diversion required for min. 20 weeks
- Pylon construction is outage dependent.
- Lower rated circuit is under-grounded benefiting from a smaller 30 m construction swathe than options 3 & 4 and hence reducing the construction time and environmental impact during construction.
- CSE compounds smaller than options 3 & 4 sized at approximately 25 m x 25 m. Cable and CSEs and can be built off line.

Figure 4.1 Option 1 proposed layout



Option 2 - Bridgwater circuit underground. Cable section and CSEs moved north away from scheduled monument (figure 4.2)

Option 2 – Description

4.12. Option 2 is an option where the VQ route is realigned to locate the proposed sealing end compounds further north of the existing route and approximately 425 metres away from the scheduled monument (see figure 4.2 below). It also avoids any oversail of the site of a non designated medieval village as two spans of the current VQ route would be relocated.

4.13. The new section of the ZG route connects the VQ near existing VQ43 replacing this pylon with a standard D60 or D90 tension pylon. Two spans of the existing VQ route are removed and the route re-aligned to connect with the new section of the ZG route one span north at a new terminal or junction pylon (DT or DJT). One circuit is connected overhead while the other circuit is connected by underground cable between the new junction pylon and a second terminal pylon on the re-aligned VQ route located to the north of the new pylon. Approximately 300 metres of cabling would be required between CSE compounds. At the eastern end of the realignment pylon VQ45 may need to be replaced to accommodate the revised angle of deviation.

4.14. As with option 1 this option undergrounds the Bridgwater circuit which is a lower capacity circuit, as a result only one cable per phase is required. Each CSE will be approximately 25 m x 25 m to accommodate the three cable sealing ends, earth switches, surge arrestors and a gantry for the downleads from the pylons.

Option 2 – Constructability

4.15. As with option 1 the reduced number of cables per phase means that the construction swathe required for the underground cable is minimised (approximately 30 m wide).

4.16. In addition to the two terminal pylons required to facilitate the cable connection, two pylons (VQ43 & VQ45) on the existing VQ route will need to be replaced and one (VQ44) removed altogether. The replacement pylons will be tension pylons to facilitate moving the route away from the scheduled monument.

4.17. Pylon replacement is facilitated by a temporary diversion of the southern circuit (Hinkley – Bridgwater 1) over approximately 1.3 km using three temporary structures one of which may need to be a D30 tension pylon. Pylons can then be dismantled/built during a subsequent outage of the northern circuit. The temporary diversion will be in place for a minimum of 20 weeks bringing the line closer to the scheduled monument for this period. Scaffold over the A39 (Bath Road) will be required if VQ45 is replaced.

4.18. The west terminal pylon will be L8c DJT, the east terminal pylon will be an L8c DT. Downleads to anchor blocks are possible at both locations but at the visual cost of extended top crossarms on one side of the pylon.

4.19. The pylons and sealing end compounds are standard arrangements and can be build entirely off-line (pre-outage) including installation of the cable section and downlead connections from the pylons.

4.20. The upgraded Bridgwater - Hinkley circuits will initially be re-energised on the new alignment, inclusive of the cable section on one of the circuits. Therefore the cable needs to be installed and commissioned by week 39 of 2018. The double tee connection with the new section of the ZG route will be created the following year.

Option 2 – Summary

4.21. The new section of line down to the double tee point is required for all options therefore this sections merely summarises the impact/changes to the VQ route:

- 1.3 km long temporary diversion required with three structures for min 20 weeks (one may need to be a D30). This could be improved to 800 m and only two structures if VQ45 is retained).

- VQ route re-aligned. No oversail of medieval village (site of).

- 2 x suspension pylons removed on VQ route, one replaced by tension pylon installed within 150 m of the scheduled monument.

- 2 x terminal pylons (DJT/DT) located away from scheduled monument

- No net increase of pylons, however there will be more angle pylons in the final arrangement.

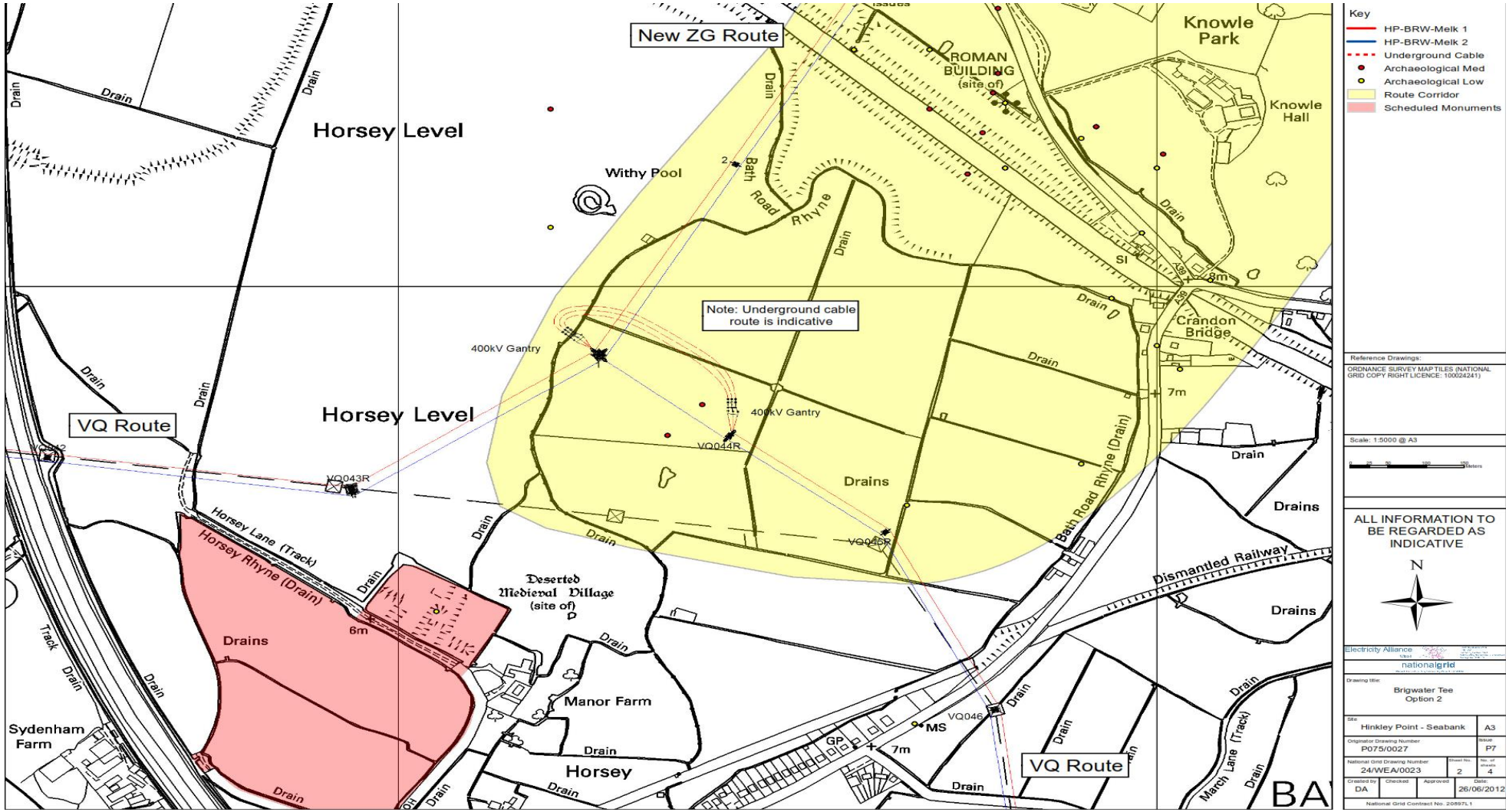
- Terminal pylons, CSEs and downlead connections can all be built pre-outage.

- Construction of replacement tension pylons VQ43 (& VQ45) is outage dependent.

- Lower rated circuit is under-grounded benefiting from smaller construction swathe (30 m) and reduced environmental impact during construction..

- CSE compounds sized at approximately 25 m x 25 m

Figure 4.2 Option 2 proposed layout



Option 3 - Melksham circuit underground. One CSE Compound adjacent to scheduled monument (figure 4.3)

Option 3 – Description

4.22. Option 3 is an option where the ZG route connects at/near existing pylon VQ43 on the Hinkley – Bridgwater route (see figure 4.3 below). One of the circuits to Melksham (coloured blue) crosses under the VQ route by underground cable. Approximately 400 metres of cabling would be required between CSE compounds.

4.23. This option replaces only one pylon (VQ43) on the VQ route and retains the existing alignment with both circuits retained overhead.

4.24. The replacement pylon will be a terminal type pylon (L8c DT or DJT) with downleads off the southern circuit to a gantry or anchor blocks located within the sealing end compound which is located just to the north of the scheduled monument, potentially within 100 m. The second terminal pylon and CSE is located one span north on the new section of the ZG route.

4.25. This option undergrounds the Melksham circuit which is a higher capacity circuit, as a result two cables per phase will be required and hence a larger CSE compound than required by options 1 & 2. The size of the compound will be approximately 25 m x 30 m to accommodate the six sealing ends, earth switches, surge arrestors and the gantry.

Constructability

4.26. As a result of requiring two cables per phase the construction swathe required for the underground cable is broader than that required for options 1 & 2 at approximately 60 m. Construction duration will also be slightly longer.

4.27. The cable section, being part of the Melksham circuit, is not required until the summer of 2019 allowing a longer construction programme or reducing

programme pressures. Construction of the CSEs and installation of the cables can be completed entirely pre-outage, however, while construction of the northern terminal pylon and CSE are well away from the live circuits, construction of the southern CSE and gantry may be hindered by the location of the temporary diversion of Hinkley – Bridgwater 1 until end of week 43, 2018. After this date construction should take account of the adjacent live circuit. Connection of the downleads in 2019 will be outage dependent.

4.28. Replacement of pylon VQ43 is facilitated by a temporary diversion of the southern circuit (Hinkley – Bridgwater 1) over approximately 800 m between pylons VQ42 & VQ44 using one temporary structure . The temporary diversion will be in place for a minimum of 20 weeks bringing the line closer to the scheduled monument for that period.

4.29. The second terminal pylon, located on the new section of the ZG route, will be an L8c DT with one circuit strung through and the other circuit terminating at the pylon with downlead connections to the CSE. This arrangement is standard and could benefit from use of anchor blocks within the compound but at the visual cost of extended top crossarms on one side to achieve wire clearance between downleads.

Option 3 Summary

4.30. The new section of line down to the double tee point is required for all options therefore this sections merely summarises the impact/changes to the VQ route:

- Shorter temporary diversion required for minimum 20 weeks. Length - approximately 800 m incorporating one temporary structure

- VQ alignment unchanged. Existing oversail of medieval village (site of) remains.

- One suspension pylon (VQ43) replaced by terminal pylon & CSE compound located potentially within 100 m of scheduled monument. Pylon replacement is outage dependent.

- No net increase of pylons overall.

- The northern terminal pylon, CSE and downlead connections can all be built pre-outage.

- Cable installation can be entirely pre-outage. Not required until summer 2019. Proximity to temporary diversion may mean construction of the southern CSE compound is delayed until after week 43, 2018.

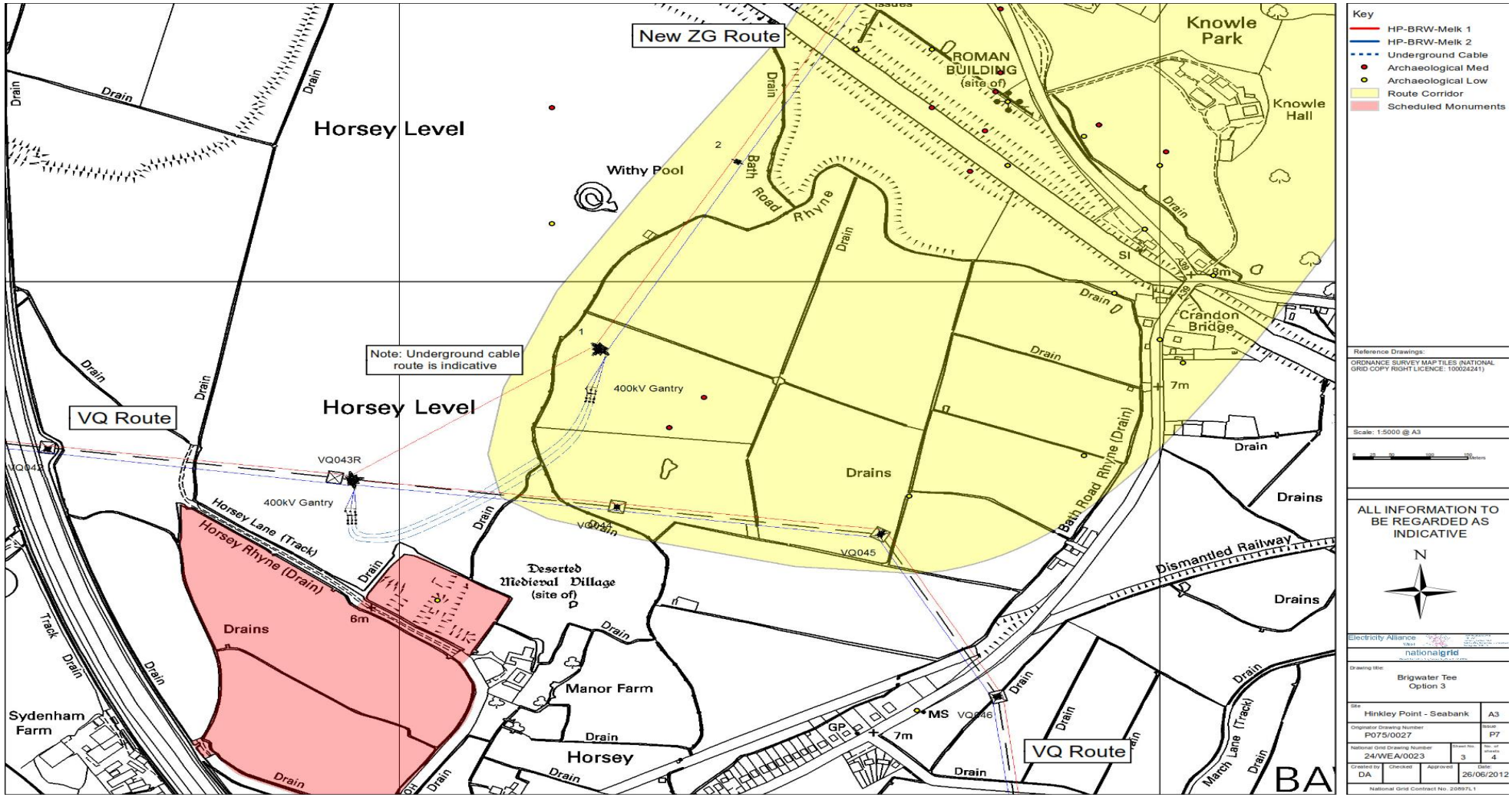
- Higher rated circuit is under-grounded therefore larger construction swathe required (approximately 60 m) than for options 1 & 2 hence having an increased environmental impact during construction.

- Two cables per phase requires slightly longer construction programme

- Larger CSE compounds required - sized at approximately 25 m x 30 m

    - Option 3 requires construction access to ZG43R on the existing line, and has the least impact of the 4 options.

Figure 4.3 Option 3 proposed layout



Option 4 - Melksham circuit underground. Cable section and CSEs moved north away from scheduled monument (figure 4.4)

Option 4 – Description

4.31. Option 4 is an option where the VQ route is moved one span north (approximately 350 metres) away from the scheduled monument (see figure 4.4 below).

4.32. The ZG route connects with the re-aligned VQ route at a new junction pylon. Both of the VQ route circuits run south east from this pylon via overhead line. One of the ZG (Melksham) circuits connects by overhead line the other Melksham circuit (coloured blue) crosses under the VQ route by underground cable. Approximately 400 metres of cabling would be required between CSE compounds.

4.33. This option removes two spans of the current VQ route, and with it an existing oversail of the medieval village (site of). Two pylons, VQ43 and possibly VQ45, are replaced with new tension pylons to accommodate the re-alignment of the route.

4.34. The second terminal pylon on the ZG route is located much further north, closer to the Huntspill river.

4.35. This option undergrounds the Melksham circuit which is a higher capacity circuit, as a result two cables per phase will be required.

Option 4 - Constructability

4.36. As a result of requiring two cables per phase the construction swathe required for the underground cable is broader than that required for options 1 & 2 at approximately 60 m.

4.37. The cable section, being part of the Melksham circuit, is not required until the summer of 2019 allowing a longer construction programme or reducing

programme pressures. Construction of the pylons, CSEs and installation of the cables can be completed entirely pre-outage, however, while construction of the northern terminal pylon can be completed at any time, construction of the southern terminal carries the Hinkley – Bridgwater circuits which will be re-energised in week 29, 2018. The CSE and gantry would benefit from construction prior to re-energisation of the Bridgwater circuits to avoid/minimise construction activity in proximity to live circuits. Connection of the downleads in 2019 will be outage dependent.

4.38. The terminal pylon at the 'Tee' will be L8c DJT to accommodate the large deviation of the VQ alignment at this point. Downleads off the southern circuit will terminate on a gantry within a sealing end compound. The acute angle at this pylon with downleads on the 'inside' of the angle is least preferred in terms of phase to phase clearance. The configuration at this pylon is non-standard and orientation of the pylon will need to be carefully designed to ensure clearances are achieved.

4.39. The northern terminal pylon will be a standard L8c DT. The pylon and CSE arrangement is standard and could benefit from use of downleads to anchor blocks but at the visual cost of extended top crossarms on one side of the pylon.

4.40. Two pylons (VQ43 & VQ45) on the existing VQ route will need to be replaced and one removed altogether. The replacement pylons will be tension pylons to facilitate moving the route away from the scheduled monument. Note – it may be possible to retain existing pylon VQ45 but it will require modification to accommodate the change in angle.

4.41. Pylon replacement is facilitated by a temporary diversion of the southern circuit (Hinkley – Bridgwater 1) over approximately 1.3 km using three temporary structures one of which may need to be a D30. Pylons can then be dismantled/built during a subsequent outage of the northern circuit. The temporary diversion will be in place for a minimum of 20 weeks bringing the

line closer to the scheduled monument for this period. Scaffold over the A39 will be more extensive if VQ45 is replaced.

4.42. Note - If existing VQ45 can be retained (to be confirmed during further engineering study) this will simplify the temporary diversion, requiring just one temporary structure and being approximately 800 m in length. Minimal scaffold will be required over A39 while conductors are lowered off and pylon VQ45 modified to accommodate the revised deviation angle. Modification of this pylon will need to take place while the temporary diversion is dismantled in weeks 40-42, 2018.

Option 4 - Summary

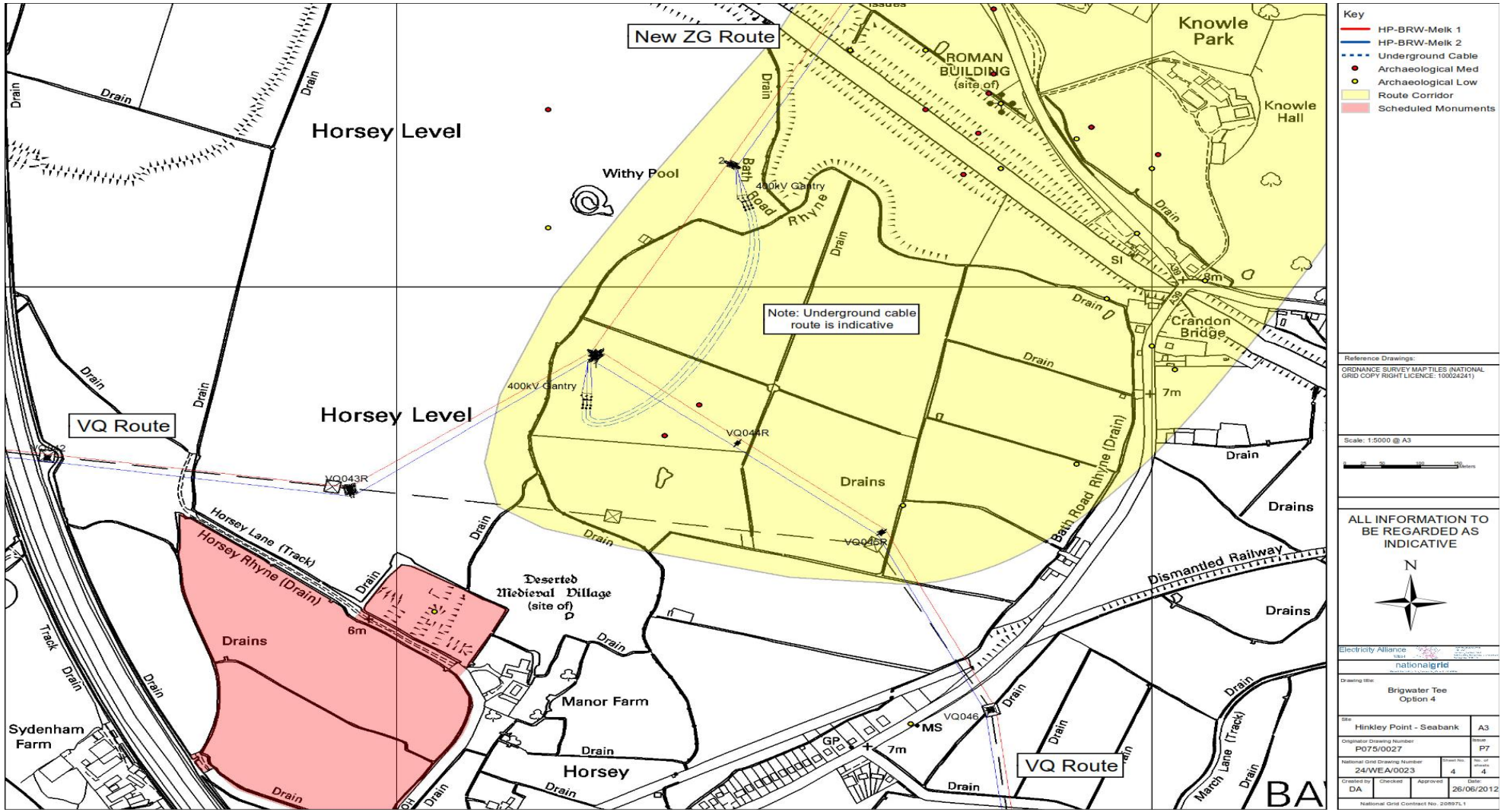
4.43. The new section of line down to the double tee point is required for all options therefore this sections merely summarises the impact/changes to the VQ route:

- As with option 2 a 1.3 km long temporary diversion is required with three structures for min 20 weeks (one may need to be a D30). This could be improved to 800 m and one structures if VQ45 is retained)
- VQ route re-aligned. No oversail of medieval village (site of).
- 2 x suspension pylons removed on VQ route, one replaced by tension pylon installed within 130 m of the scheduled monument.
- 2 x terminal pylons (DJT/DT) located well away from scheduled monument
- No net increase of pylons.
- Terminal pylons, cable and CSEs can all be built pre-outage.
- Construction of replacement tension pylons VQ43 (& VQ45) is outage dependent.

- Higher rated circuit is under-grounded requiring larger construction swathe than options 1 & 2 (60 m) and hence increased environmental impact during construction.

- Cable section not required until summer of 2019, allowing longer construction programme or relieving programming issue.

Figure 4.4 Option 4 proposed layout



5. Initial assessment of the technical options.

5.1. The initial assessment of all options is a technical assessment which covers technical performance, constructability & programme issues and future maintenance. SHES is considered here only in terms of H&S. A separate environmental impact assessment of the preferred technical option will be required.

Technical Performance

5.2. All options are technically compliant.

Constructability / Programme

5.3. Options 1 & 2 require a smaller CSE Compound and a smaller cable swathe therefore requiring a potentially shorter construction programme and an expected reduction in impact on the environment.

5.4. Assuming a need to replace VQ45, Option 2 requires more work to replace or modify pylons on the existing VQ alignment and results in an increased number of heavier angle, or terminal type pylons to be constructed. However current outage durations are ample for replacement and/or construction of pylons.

Maintenance

5.5. Options 1 & 2 have fewer assets to maintain therefore would be preferred.

SHES

5.6. Options 1 & 4, where downleads are taken off the ‘inside’ of the deviation angle will provide less space around the CSE for maintenance when the ‘teed’ circuit is disconnected for maintenance and the through circuit remains live. This will merely require additional care when working in the compound and would not necessarily be a blocker to these options.

6. Preferred technical options.

6.1. Options 1 & 2 are preferred due to the need for fewer assets in the ground, smaller cable footprint, and a reduced construction period. Of these two options, on balance Option 1 is considered the preferred technical solution as this retains the existing, straight alignment of VQ route, eliminating the need for additional heavier angle towers on this route; avoids the longer more complicated temporary diversion; and eliminates the need for additional scaffold over A39 Bath Road. up. However, this does not detract from the technically preferred option 1.

6.2. An environmental appraisal of all options is required to confirm this conclusion.

Glossary

NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
kV	Kilovolt
MW	Megawatt
M	Metre
Km	Kilometre
CSE	Cable Sealing End Compound
WPD	Western Power Distribution

APPENDIX B – FLOOD RISK

Map legend

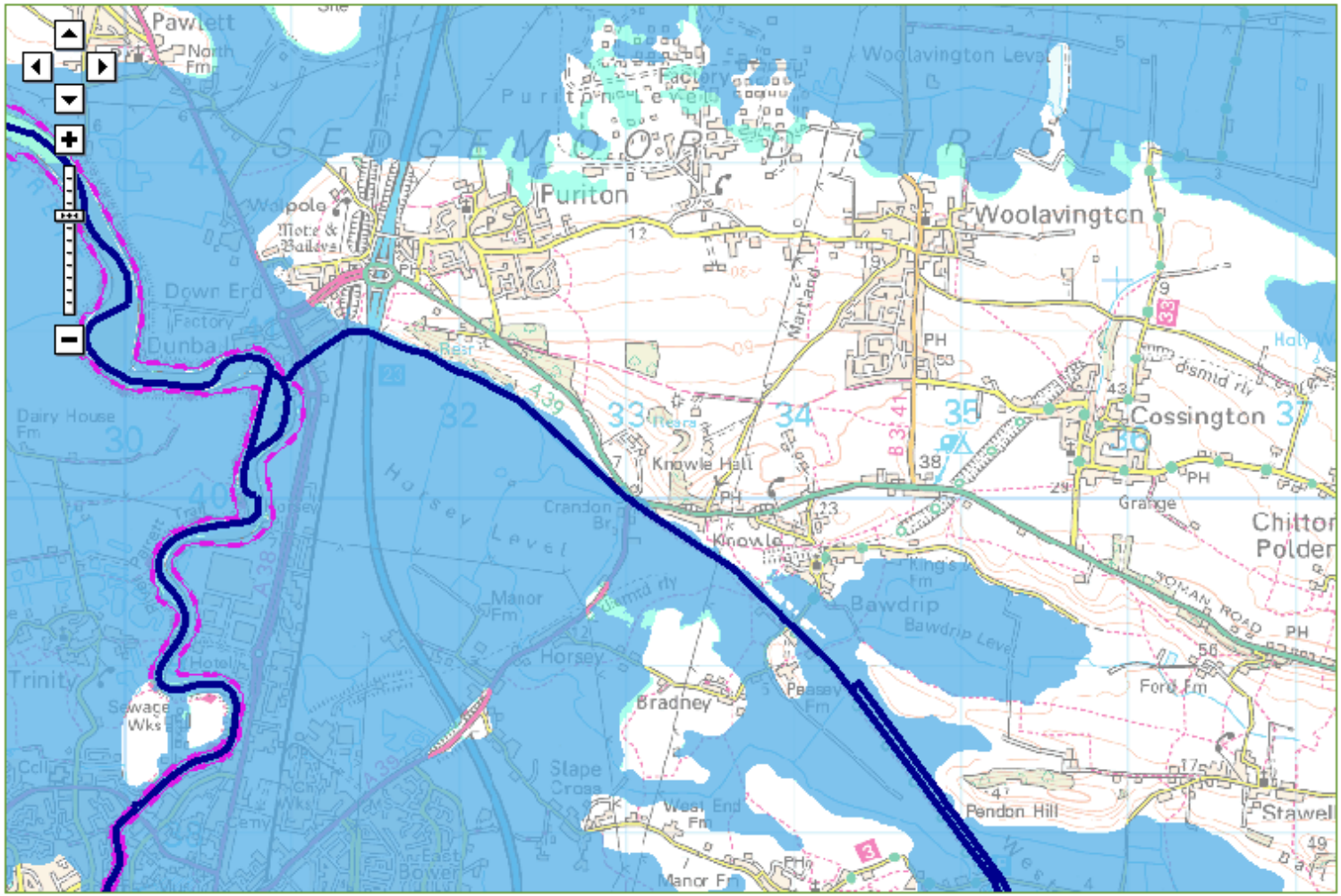
Click on the map to see what is the Risk of Flooding at a particular location.

Flood Maps

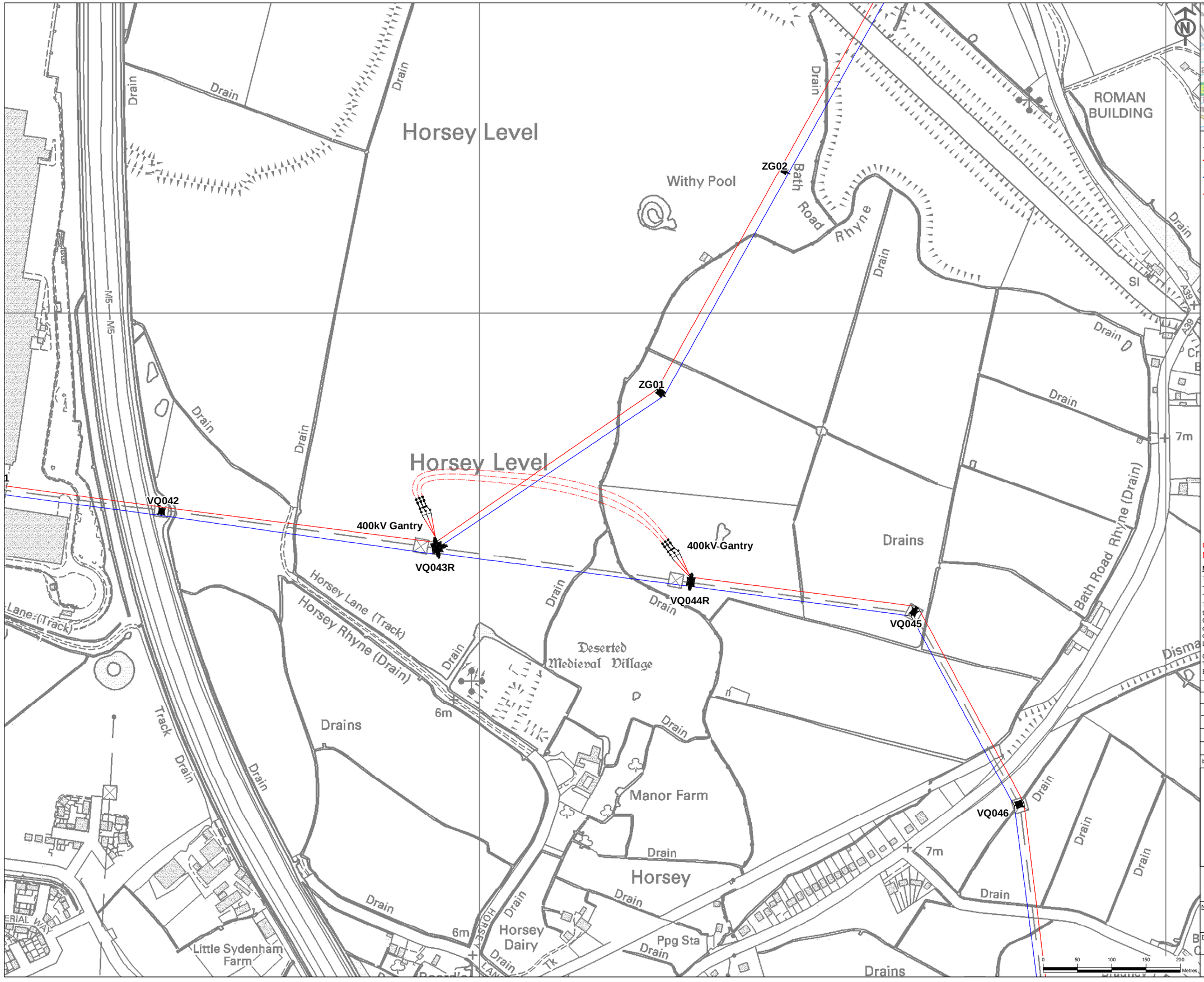
- Flooding from rivers or sea without defences
- Extent of extreme flood
- Flood defences (Not all may be shown*)
- Areas benefiting from flood defences (Not all may be shown*)
- Main rivers

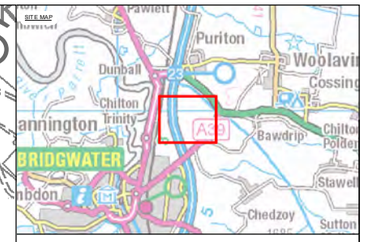
Puriton, Somerset at scale 1:40,000

Data search Text only version



FIGURES 1- 14





Key

- HP-BRW-Melk 1
- HP-BRW-Melk 2
- Underground Cable

Option 1 references National Grid Drawing Number 24/WEA/0023 - Sheet Number 1

NOTE

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ISSUE	DATE	COMMENTS	DRAW	CHK'D	APP'D

Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)

BRIDGWATER TEE OPTIONS
OPTION 1 INDICATIVE LAYOUT
FIGURE 1

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.		GIS
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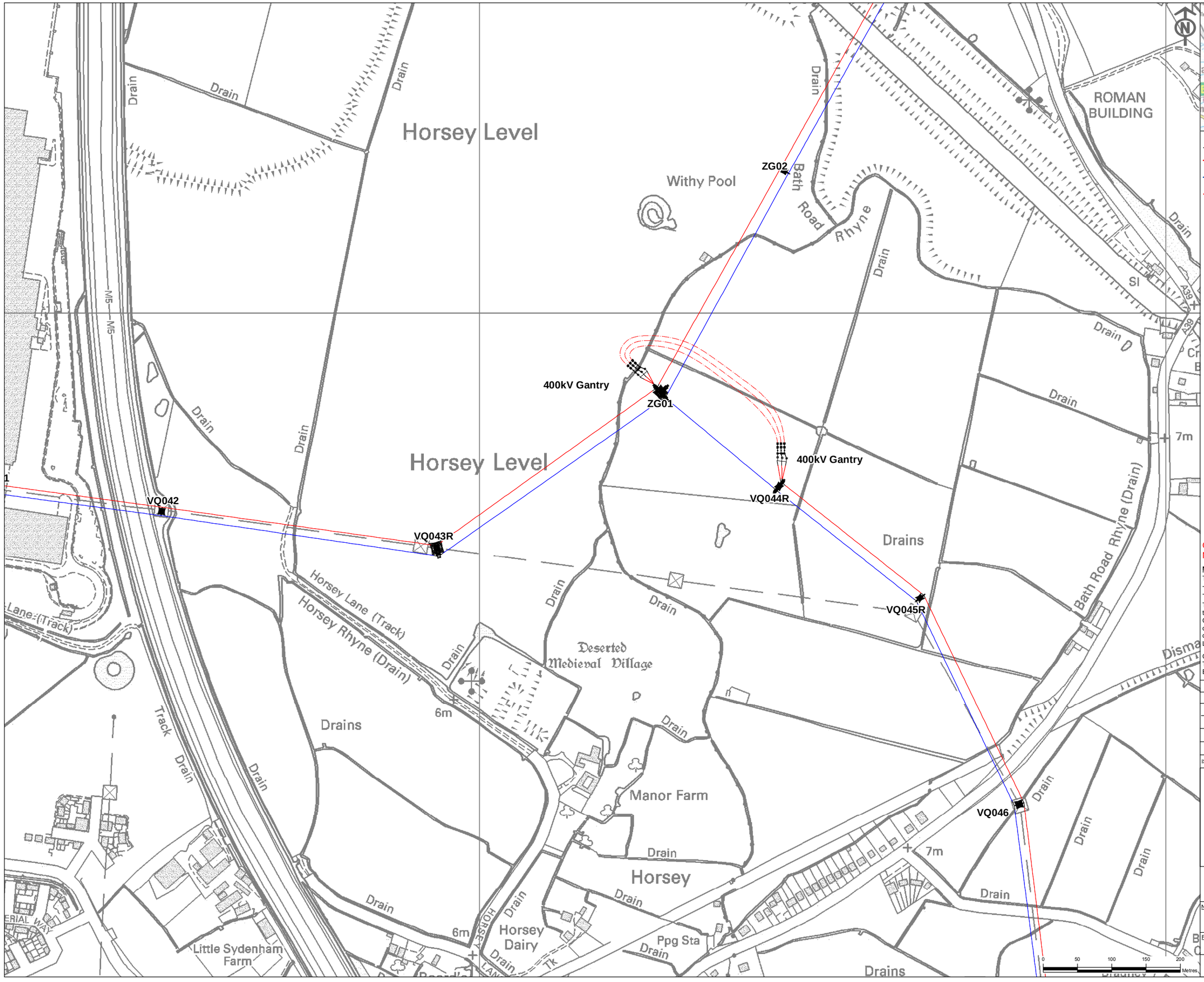
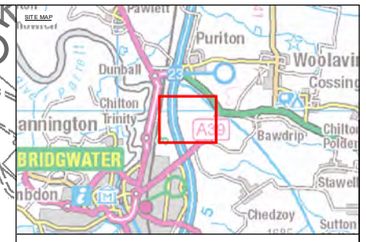
FIGURE No. Figure 1	DRAWING No. G1979.2017.1A		SCALE 1:5,000
SHEET 1 of 4			ISSUE A





Key

- HP-BRW-Melk 1
- HP-BRW-Melk 2
- Underground Cable

Option 1 references National Grid Drawing Number 24/WEA/0023 - Sheet Number 2

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Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)

BRIDGWATER TEE OPTIONS
OPTION 2 INDICATIVE LAYOUT - FIGURE 2

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.		GIS
20897		TEP	A3
FIGURE No. Figure 2	DRAWING No. G1979.2017.2A		SCALE 1:5,000
SHEET 2 of 4			ISSUE A

Key

- HP-BRW-Melk 1
- HP-BRW-Melk 2
- Underground Cable

Option 3 references National Grid Drawing Number 24/WEA/0023 - Sheet Number 3

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Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)

BRIDGWATER TEE OPTIONS
OPTION 3 INDICATIVE OPTION
- FIGURE 3

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No. 20897	APPLICATION No.	TEP	GIS A3
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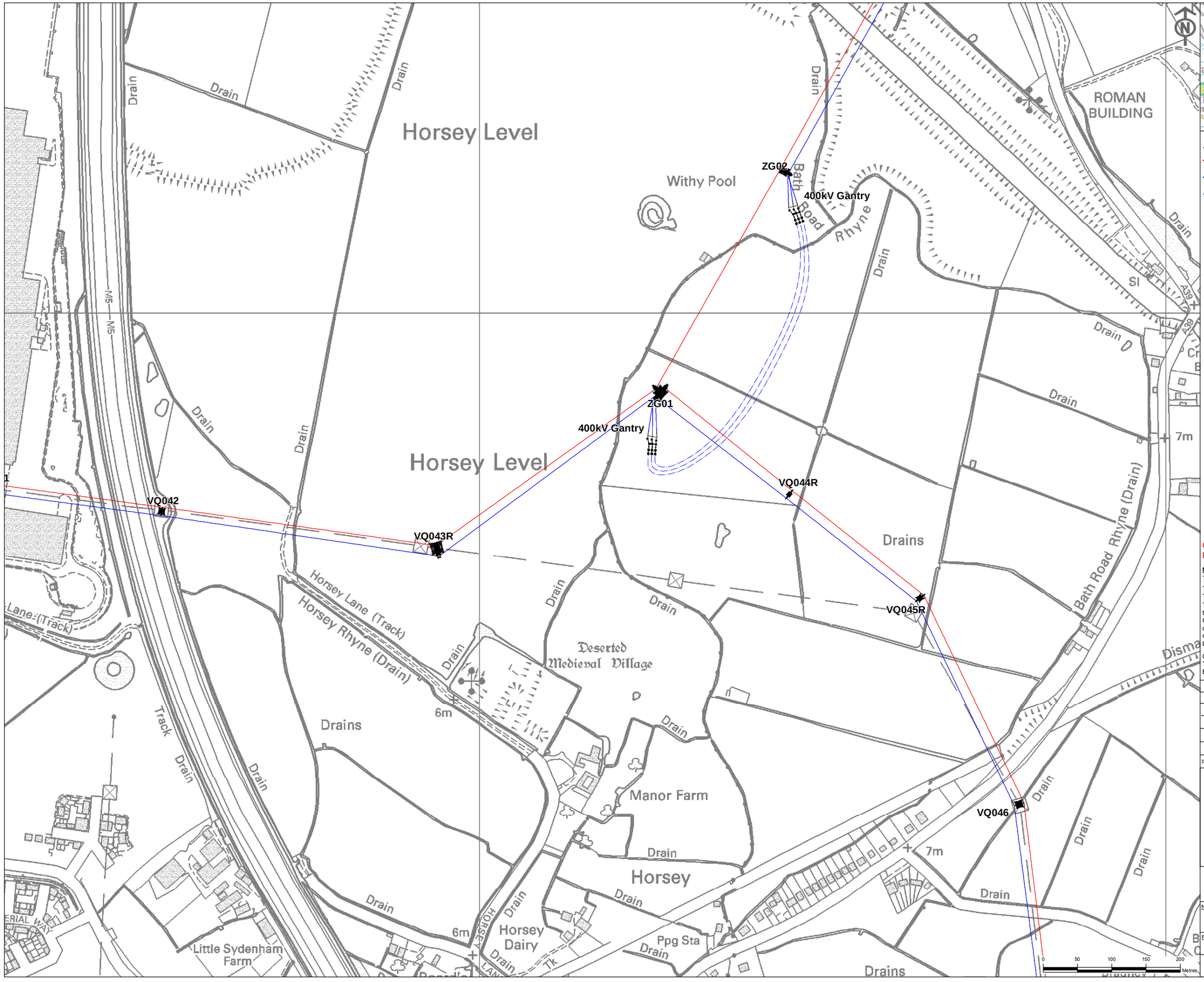
SHEET 3 of 4			ISSUE A



Key

- HP-BRW-Melk 1
- HP-BRW-Melk 2
- Underground Cable

Option 4 references National Grid Drawing Number 24/WEA/0023 - Sheet Number 4

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A	02/12/2013	INITIAL ISSUE	CB	CG	BC

Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)

BRIDGWATER TEE OPTIONS
OPTION 4 INDICATIVE LAYOUT
- FIGURE 4

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

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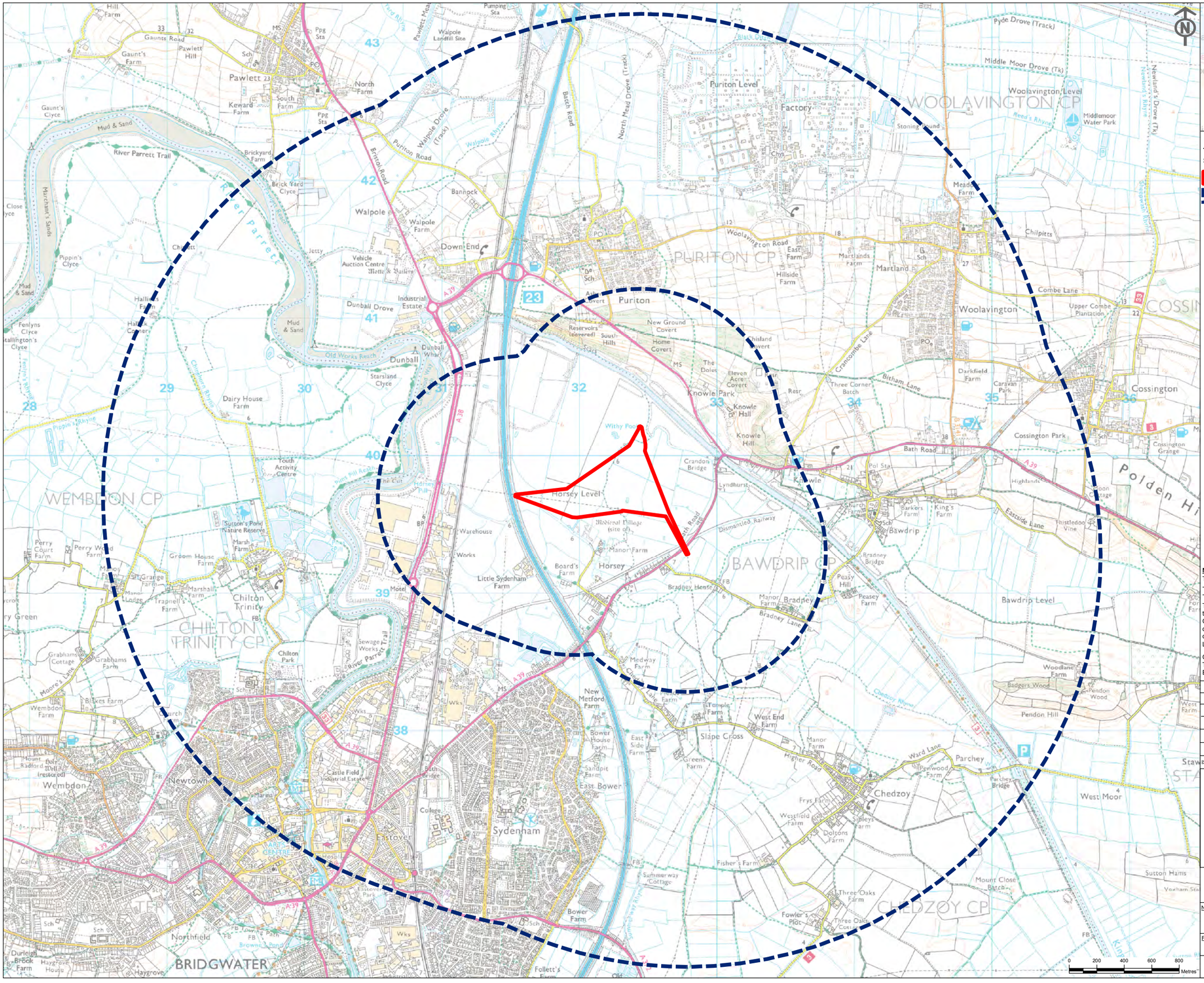
SHEET 4 of 4			ISSUE A



SITE MAP

Key

Study Areas

- Extent of All Options
- Landscape Study Area

NOTE

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Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
LANDSCAPE STUDY AREA
FIGURE 5

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.		GIS
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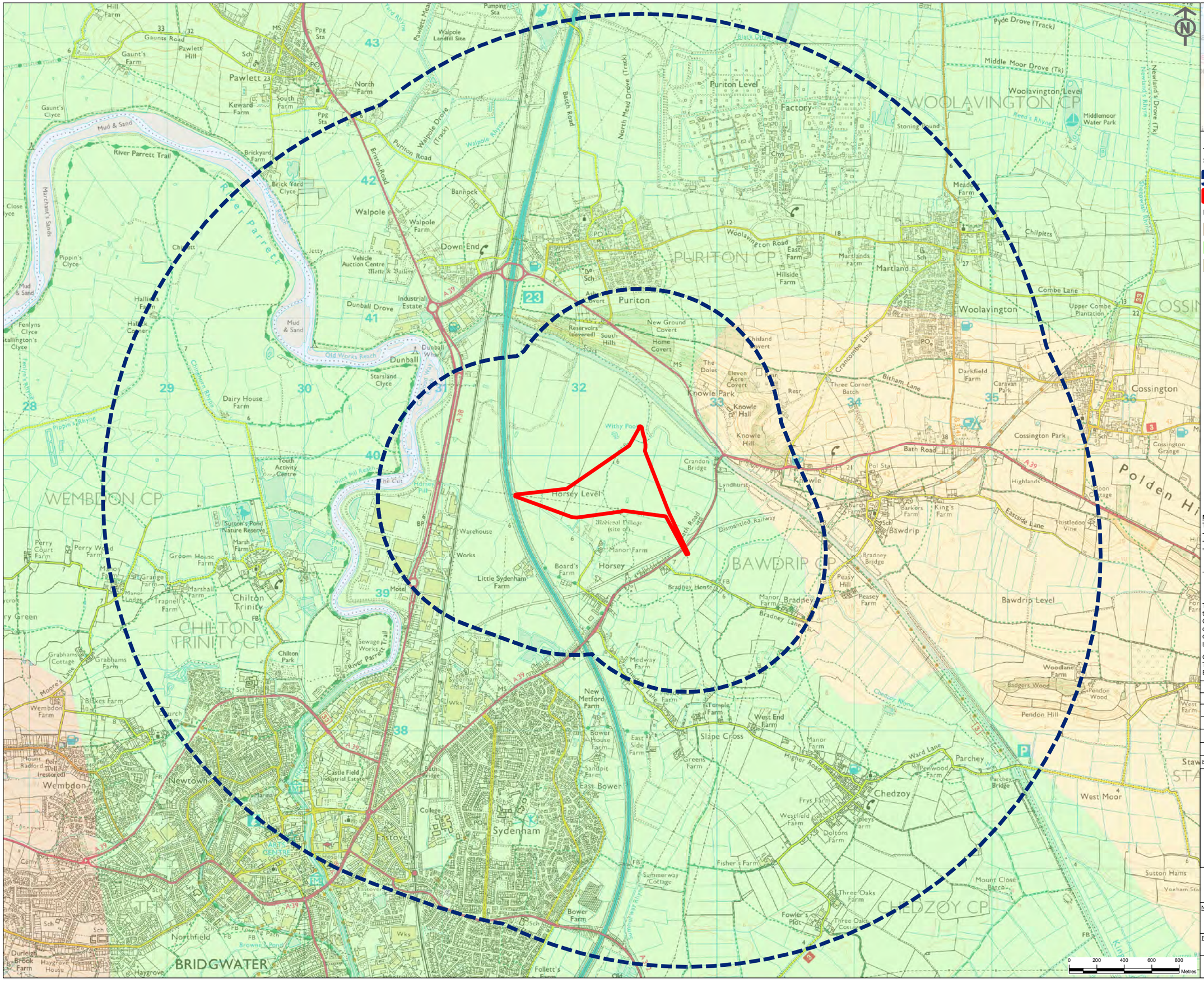
FIGURE No. Figure 5	DRAWING No. G1979.2023.2A		SCALE 1:25,000
SHEET 2 of 3			ISSUE A



Key

Study Areas

- Landscape Study Area
- Extent of All Options

National Landscape Character Areas

- Vale of Taunton and Quantock Fringes
- Somerset Levels and Moors
- Mid Somerset Hills

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ISSUE	DATE	COMMENTS	DRAW	CHK'D	APP'D

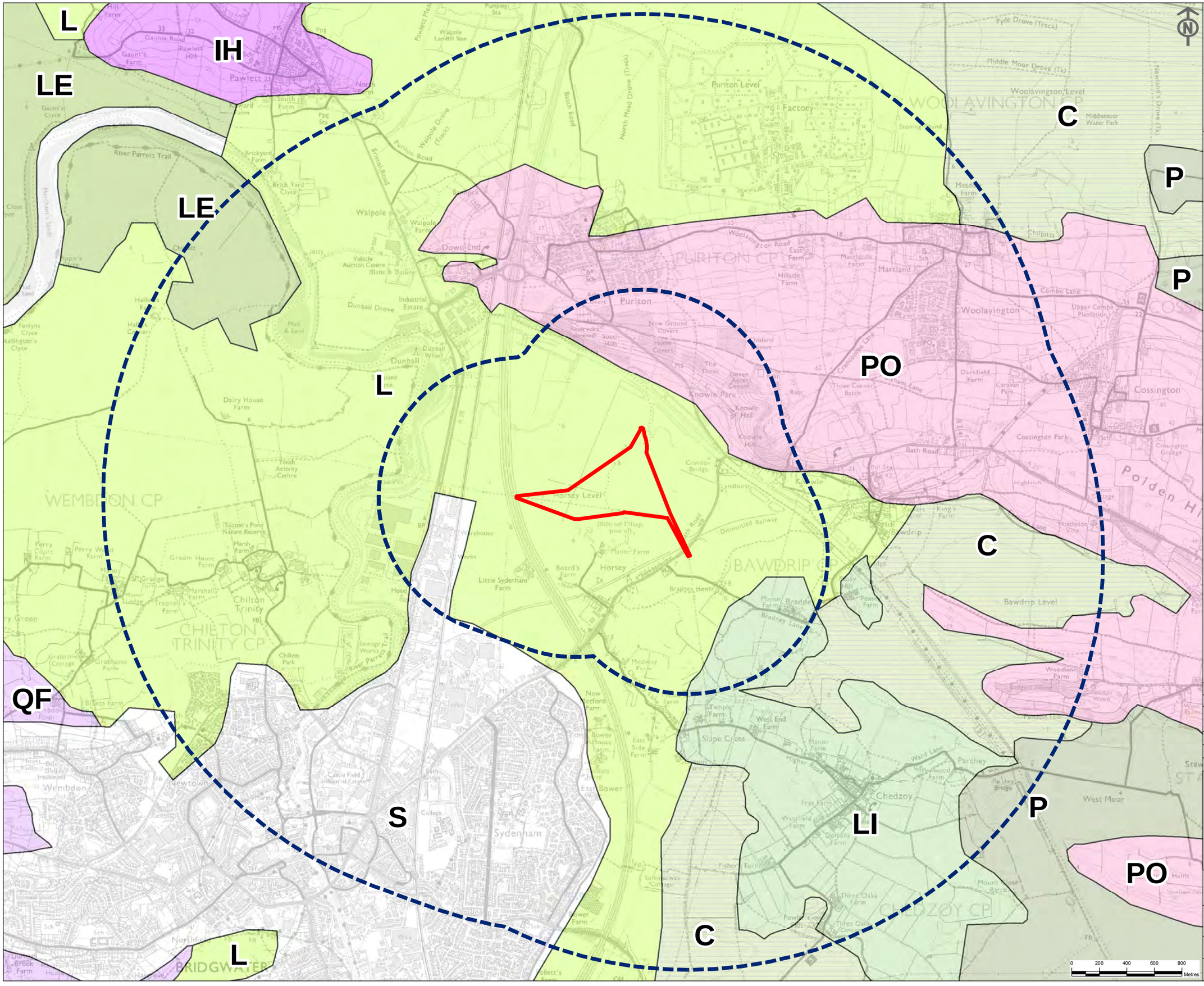
Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
LANDSCAPE CHARACTER AREA
FIGURE 6

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.		GIS
20897		TEP	A3
FIGURE No.	DRAWING No.		SCALE
Figure 6	G1979.2067A		1:25,000
SHEET 1 of 1			ISSUE A



Key

Study Areas

- Landscape Study Area
- Extent of All Options

Sedgemoor Local Landscape Character Areas

Levels & Moors

- C, Clay Moors
- L, Levels
- LE, Levels - Estuarine
- LI, Levels - Islands
- P, Peat Moors
- IH, Isolated Hills
- PO, Polden Hills
- QF, Quantock Foothills
- S, Significantly Built Up Areas

NOTE

This map contains information from the following sources:
- National Grid
- Ordnance Survey
- Sedgemoor District Council's 'Sedgemoor Landscape Assessment and Countryside Design

ISSUE	DATE	COMMENTS	DRAW	CHK'D	APP'D

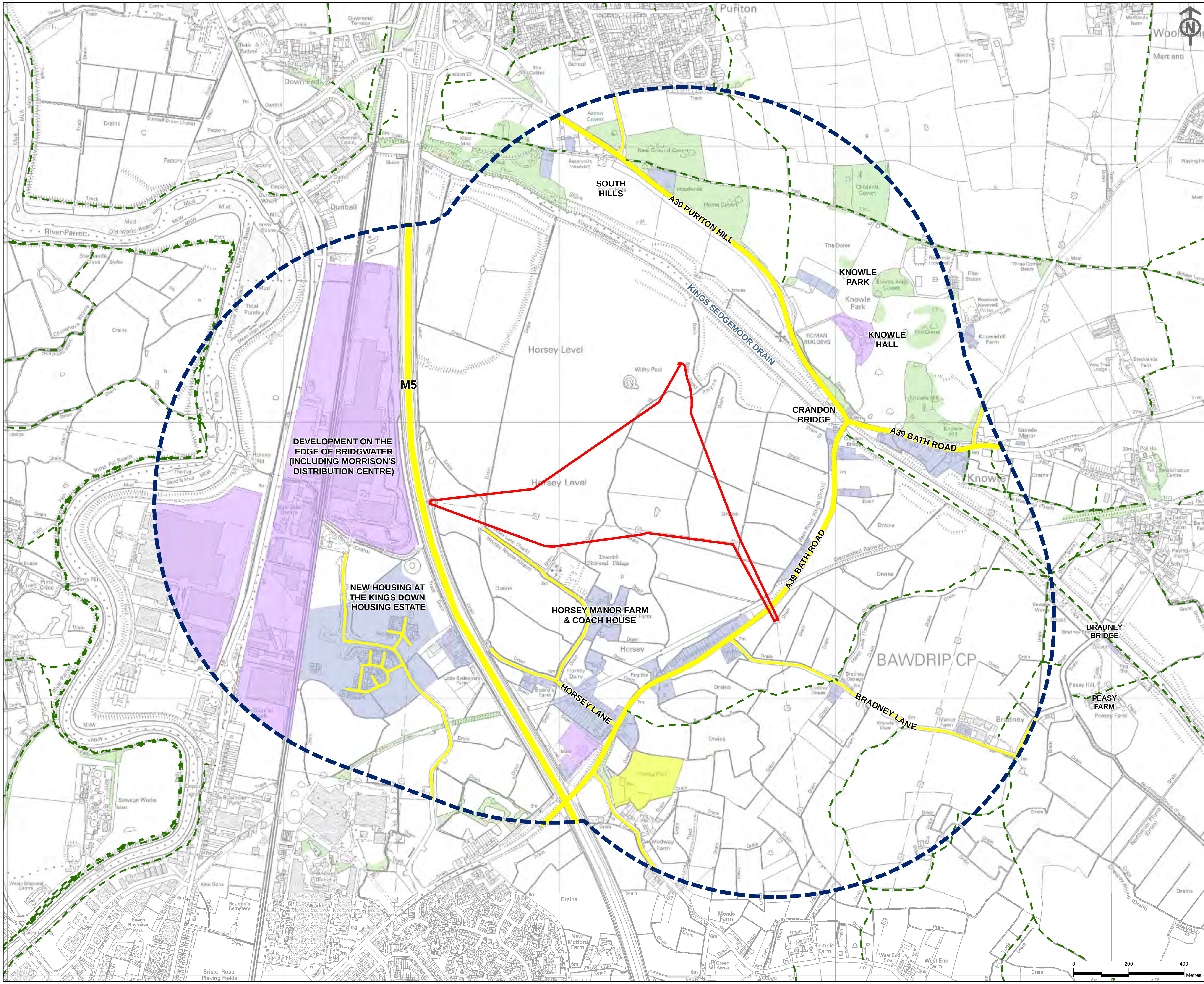
Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
LOCAL LANDSCAPE CHARACTER AREA
FIGURE 7

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.		GIS
20897		TEP	A3
FIGURE No. Figure 7	DRAWING No. G1979.2072A		SCALE 1:25,000
SHEET 1 of 1			ISSUE A



Key

Study Areas

- Visual Effects Study Area
- Extent of all Options

Potential Receptor

- Long distance footpath
- Public Right of Way
- Motorway
- A Road
- Minor Road
- Business
- Sports Pitch
- Residential Property

Existing Woodland

- Existing Woodland

NOTE

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Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
POTENTIAL VISUAL RECEPTOR LOCATIONS
FIGURE 8

nationalgrid

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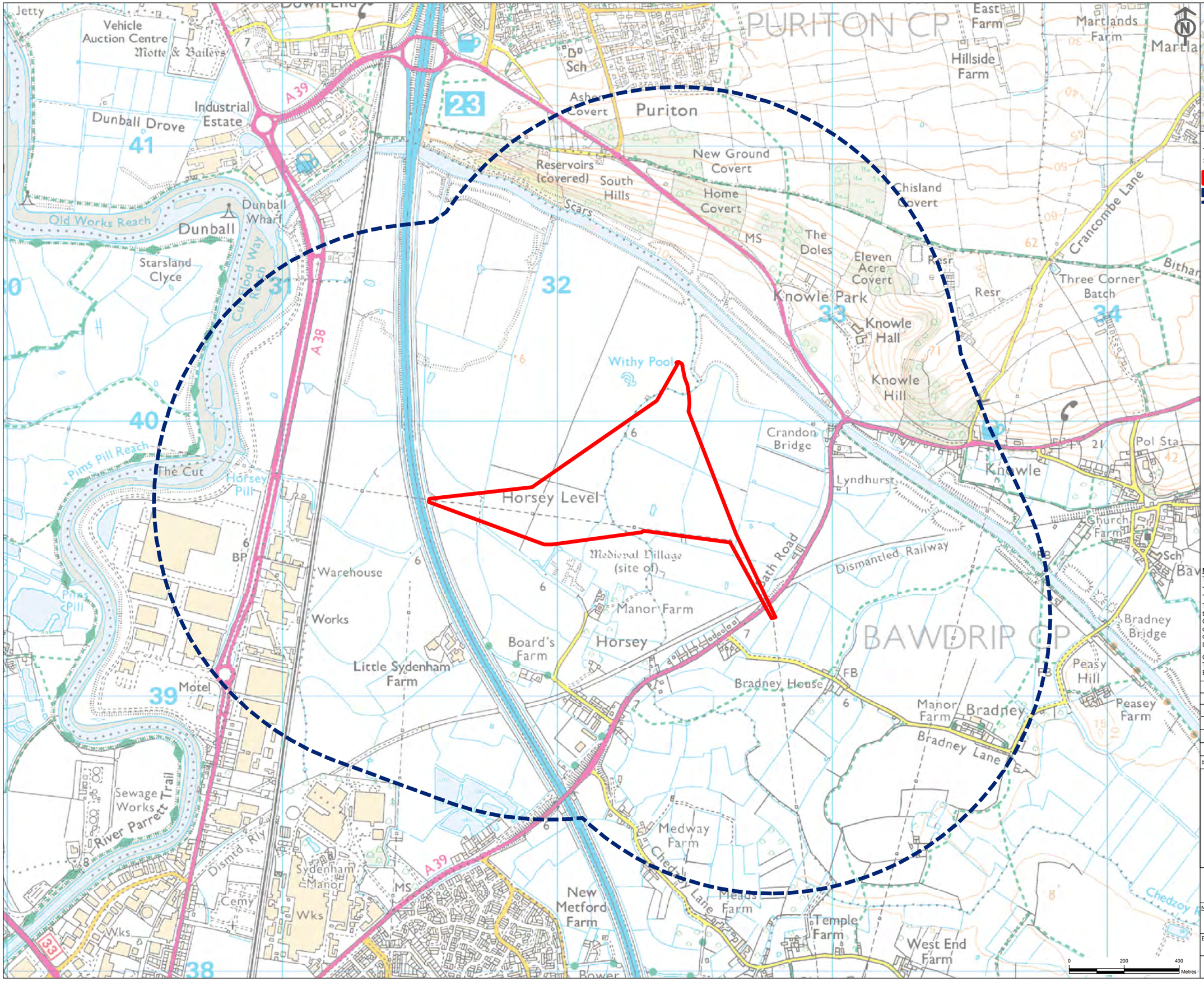
NG INVESTMENT No.	APPLICATION No.	TEP	GIS A3
20897			
FIGURE No. Figure 8	DRAWING No. G1979.2068A		SCALE 1:12,500
SHEET 1 of 1			ISSUE A



Key

Study Areas

- Extent of All Options
- Ecology Study Area

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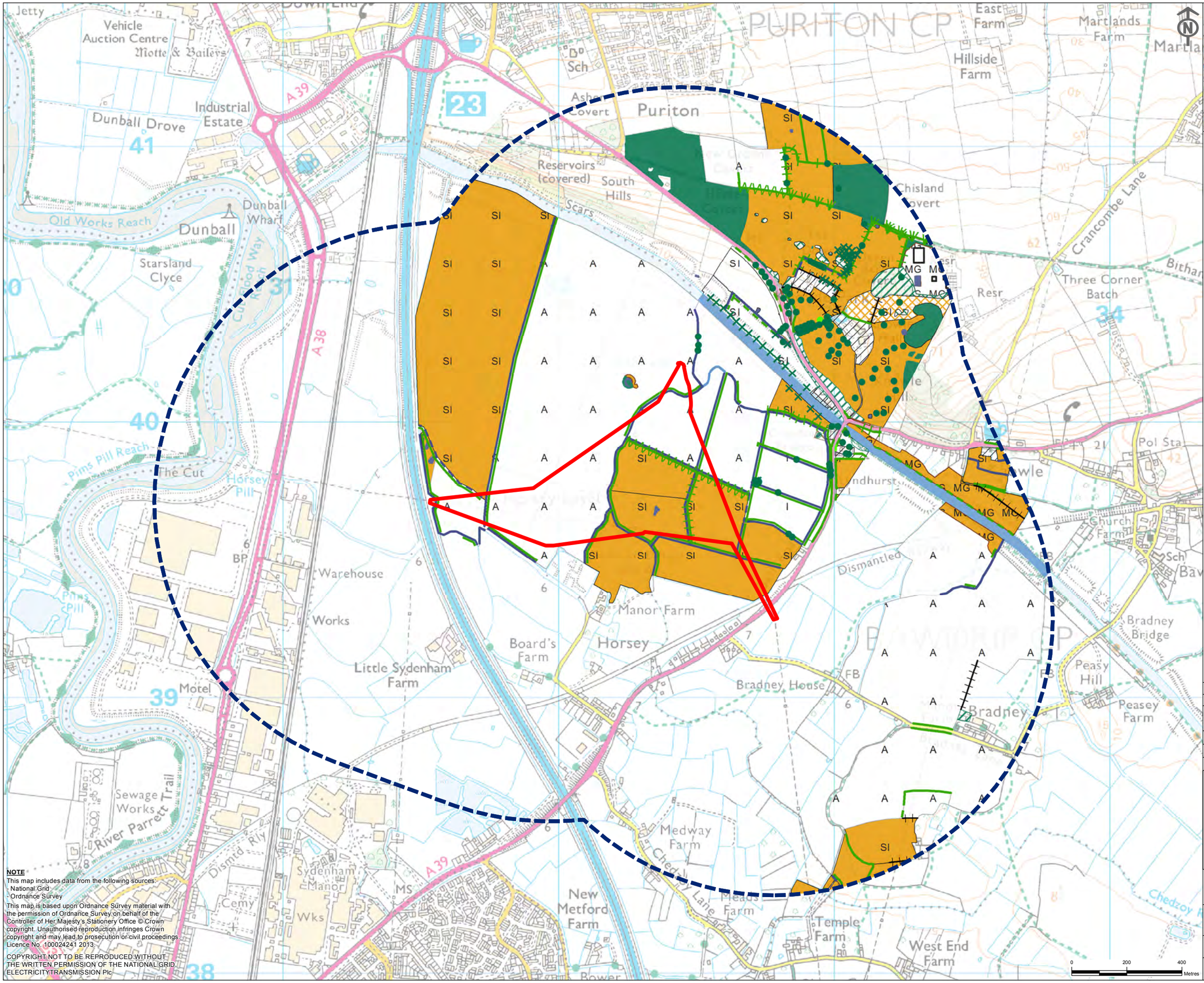
Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
ECOLOGY STUDY AREA
FIGURE 9

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.		GIS
20897		TEP	A3
FIGURE No.	DRAWING No.		SCALE
Figure 9	G1979.2023.3A		1:12,500
SHEET 3 of 3			ISSUE A



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Key

Study Areas
- Ecology Study Area
- Extent of All Options

Phase 1 Habitat Survey
- Scattered Scrub
- Scattered Broad-Leaved Tree
- Scattered Coniferous Tree
- Standing Water
- Running Water
- Native Species-Rich Intact Hedge
- Native Species-Rich Intact Hedge & Ditch
- Species-Poor Intact Hedge
- Conifer Hedge
- Species-Poor Intact Hedge & Ditch
- Species-Poor Intact Hedge & Dry Ditch
- Species-Poor Defunct Hedge
- Species-Poor Defunct Hedge & Ditch
- Species-Poor Defunct Hedge & Dry Ditch
- Native Species-Rich Hedge & Trees
- Species-Poor Hedge & Trees
- Species-Poor Hedge & Trees & ditch
- Fence
- Dry Ditch
- Semi-Natural Broad-Leaved Woodland
- Plantation Broad-Leaved Woodland
- Dense/Continuous Scrub
- Scattered Scrub
- Orchard
- Semi-Improved Neutral Grassland
- Species-Rich Modified Neutral Grassland
- Species-Poor Modified Neutral Grassland
- Semi-Improved Calcareous Grassland
- Improved Grassland
- Poor Semi-Improved Grassland
- Tall Ruderal
- Standing Water
- Running Water
- Arable
- Private House/Garden/Farmyard
- Bare Ground
- Other Habitat
- Hardstanding

ISSUE	DATE	COMMENTS	DRAW	CHK'D	APP'D

Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
PHASE 1 HABITAT SURVEY
FIGURE 10

nationalgrid

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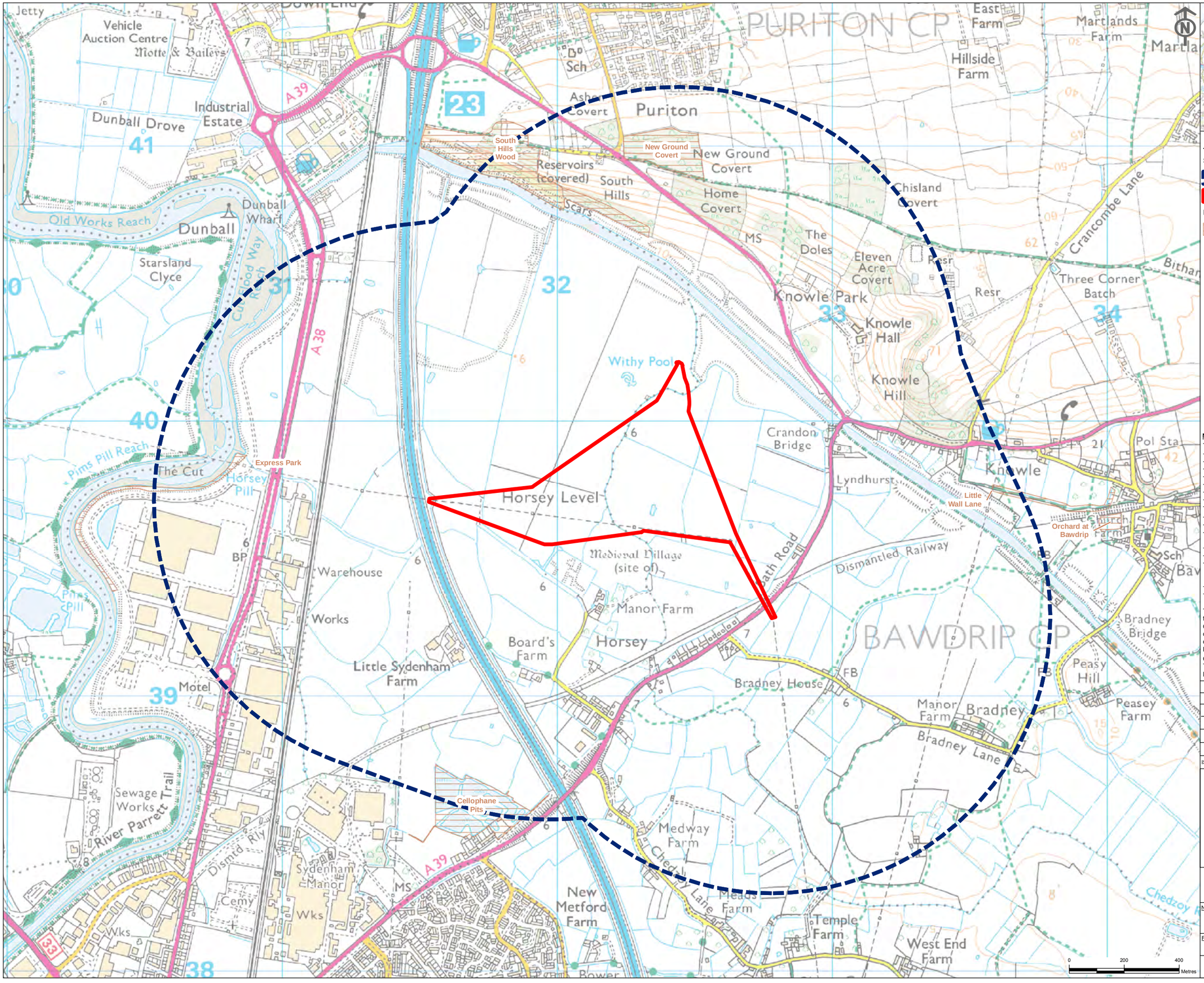
NG INVESTMENT No.	APPLICATION No.		GIS
20897		TEP	A3
FIGURE No. Figure 10	DRAWING No. G1979.2069A		SCALE 1:12,500
SHEET 1 of 1			ISSUE A



Key

Study Areas

- Ecology Study Area
- Extent of All Options

Ecological Designations

- Local Wildlife Site

NOTE

The following ecological constraints do not occur:
- Ramsar
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest
- National Nature Reserve
- Local Nature Reserve
- Site of Nature Conservation Importance

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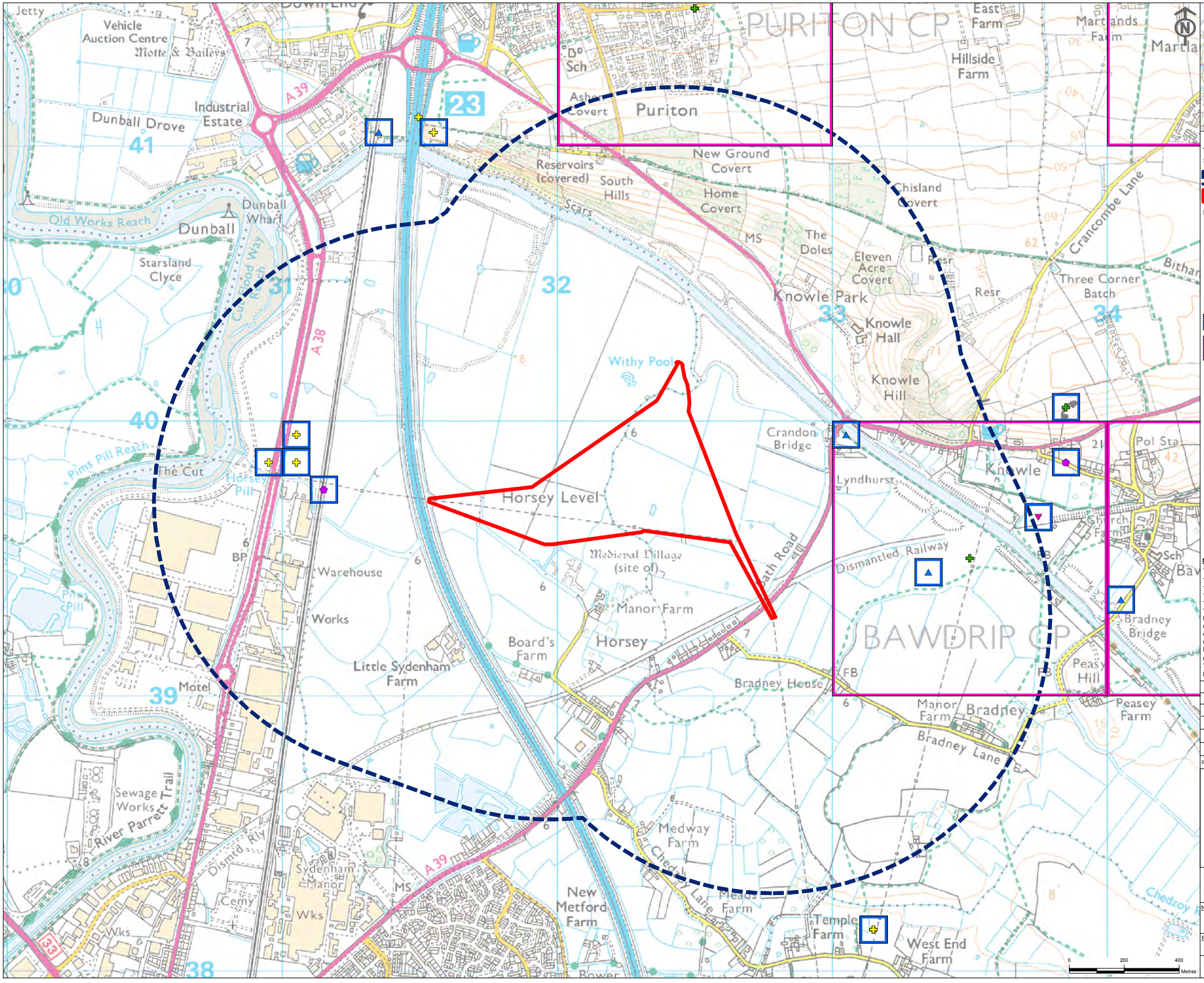
Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
ECOLOGICAL DESIGNATIONS
FIGURE 11

nationalgrid

National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.		GIS
20897		TEP	A3
FIGURE No. Figure 11	DRAWING No. G1979.2070A		SCALE 1:12,500
SHEET 1 of 1			ISSUE A



Key

Study Areas

- Ecology Study Area
- Extent of All Options

Desktop Records

- Kingfisher
- Otter
- Vespertilionidae
- Water Vole
- Whiskered/Brandt's Bat
- Records Accurate to 100m
- Records Accurate to 1km

NOTE

This map includes data from the following sources:
- National Grid
- Ordnance Survey
- Bristol Regional Environmental Records Centre (2013)
- Somerset Environmental Records Centre (2013)

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Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
KEY PROTECTED SPECIES
FIGURE 12

nationalgrid
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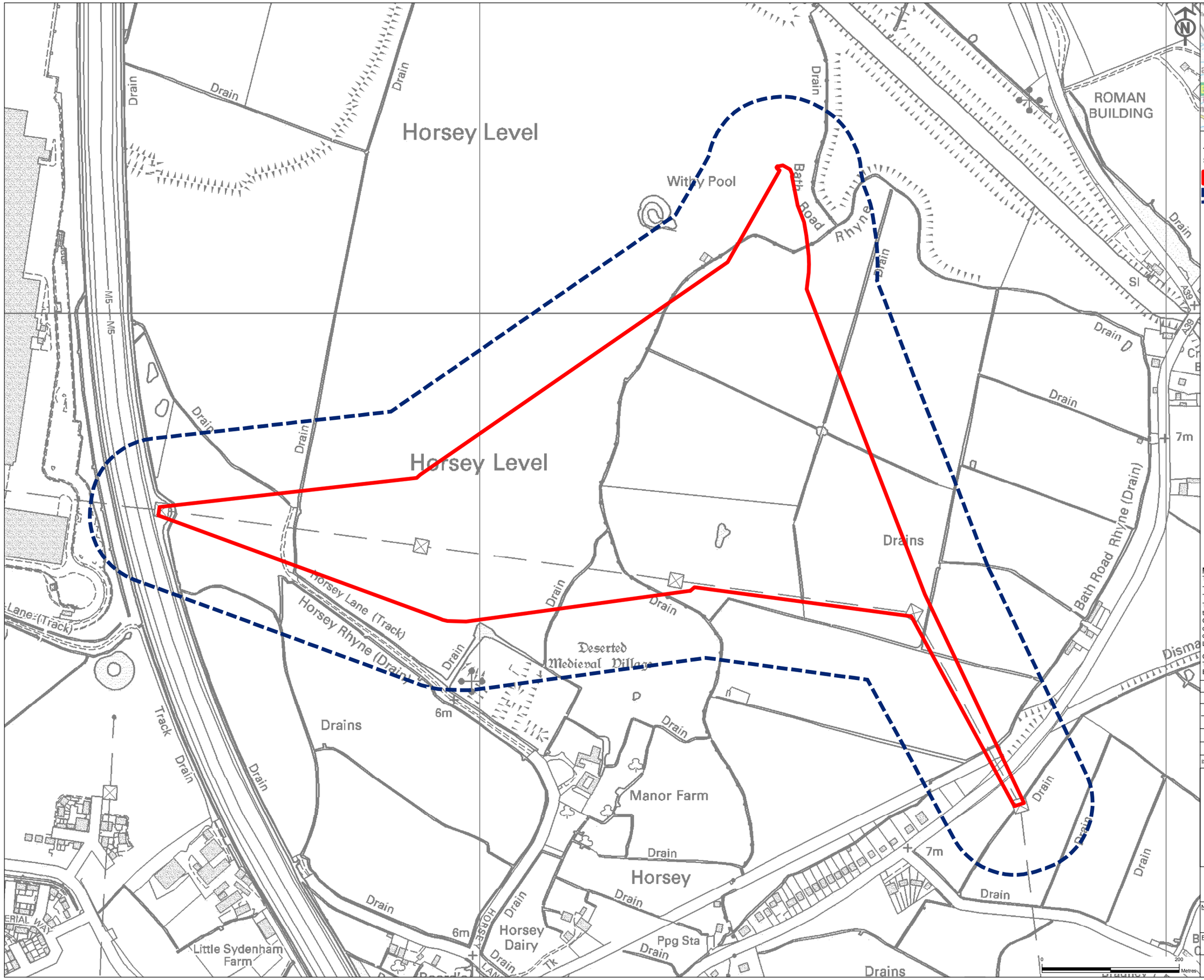
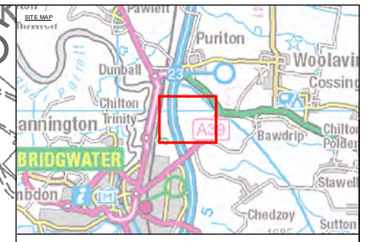
NG INVESTMENT No.	APPLICATION No.		GIS
20897		TEP	A3
FIGURE No.	DRAWING No.		SCALE
Figure 12	G1979.2071A		1:12,500
SHEET 1 of 1			ISSUE A





Key

Study Areas

- Extent of All Options
- Historic Environment Study Area

NOTE

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- National Grid
- Ordnance Survey

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Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
HISTORIC ENVIRONMENT STUDY AREA
FIGURE 13

nationalgrid
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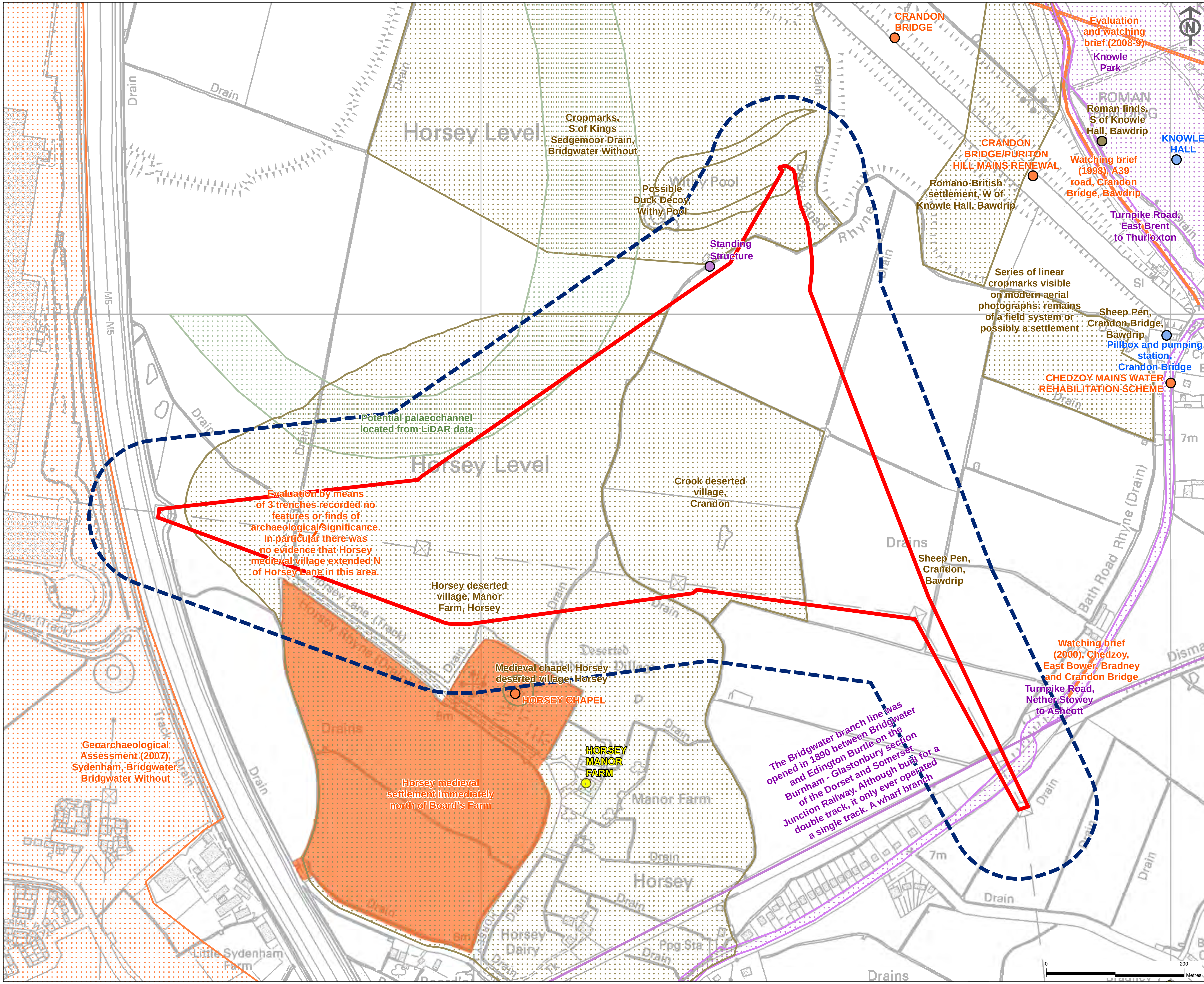
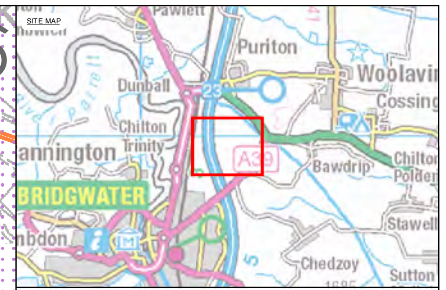
NG INVESTMENT No.	APPLICATION No.	GIS
20897		A3
FIGURE No.	DRAWING No.	SCALE
Figure 13	G1979.2023.1A	1:5,000
SHEET 1 of 3		ISSUE A


Horsey Level
Cropmarks, S of Kings Sedgemoor Drain, Bridgwater Without
Possible Duck Decoy, Withy Pool
Withy Pool
Standing Structure
CRANDON BRIDGE
Evaluation and watching brief (2008-9)
Knowle Park
ROMAN
Roman finds, S of Knowle Hall, Bawdrip
KNOWLE HALL
CRANDON BRIDGE/PURITON HILL MAINS RENEWAL
Romano-British settlement, W of Knowle Hall, Bawdrip
Watching brief (1998), A39 road, Crandon Bridge, Bawdrip
Turnpike Road, East Brent to Thurloxton
Series of linear cropmarks visible on modern aerial photographs: remains of a field system or possibly a settlement
Sheep Pen, Crandon Bridge, Bawdrip
Pillbox and pumping station, Crandon Bridge
CHEDZOY MAINS WATER REHABILITATION SCHEME
Potential palaeochannel located from LiDAR data
Horsey Level
Evaluation by means of 3 trenches recorded no features or finds of archaeological significance. In particular there was no evidence that Horsey medieval village extended N of Horsey Lane in this area.
Crook deserted village, Crandon
Drains
Sheep Pen, Crandon, Bawdrip
Horsey deserted village, Manor Farm, Horsey
Horsey Lane (Track)
Horsey Rhyne (Drain)
Bath Road Rhyne (Drain)
Lane (Track)
Watching brief (2000), Chedzoy, East Bower, Bradney and Crandon Bridge
Turnpike Road, Nether Stowey to Ashcott
Medieval chapel, Horsey deserted village, Horsey
HORSEY CHAPEL
Deserted Village
Geoarchaeological Assessment (2007), Sydenham, Bridgwater, Bridgwater Without
Horsey medieval settlement immediately north of Board's Farm
HORSEY MANOR FARM
Manor Farm
The Bridgwater branch line was opened in 1890 between Bridgwater and Edington Burtle on the Burnham - Glastonbury section of the Dorset and Somerset Junction Railway. Although built for a double track, it only ever operated a single track. A wharf branch
Horsey
Horsey Dairy
Little Sydenham Farm
Drain
Drains
7m
6m
8m
0
200
Metres



Key

Study Areas

- Historic Environment Study Area
- Extent of All Options

Non-Designated Heritage Assets

- Buried Archaeological Remains [AR]
- Built Heritage [BH]
- Previous Archaeological Event Or Investigation [EV]
- Historic Landscape Component [HL]
- Previous Archaeological Event Or Investigation [EV]
- Historic Landscape Component [HL]
- Buried Archaeological Remains [AR]
- Previous Archaeological Event Or Investigation [EV]
- Historic Landscape Component [HL]
- Paeleoenvironmental Deposits [PE]

Designated Heritage Assets

- Grade II Listed Building
- Scheduled Monument

NOTE

This map includes data from the following sources:
- National Grid
- Ordnance Survey
- South Gloucestershire Council Historic Environment Record (HER),
- Bristol HER
- North Somerset Council HER
- Somerset County Council HER
- English Heritage National Monuments Record (NMR)
- Historic Ordnance Survey mapping
- Data from Somerset County Council historic farmstead surveys
- English Heritage
- LiDAR sourced from the Environment Agency

ISSUE	DATE	COMMENTS	DRAW	CHK'D	APP'D

Title

NATIONAL GRID (HINKLEY POINT C CONNECTION PROJECT)
ENVIRONMENTAL REVIEW OF TECHNICAL OPTIONS AT BRIDGWATER TEE
DESIGNATED AND NON-DESIGNATED HERITAGE ASSETS
FIGURE 14

nationalgrid
National Grid plc, Warwick Technology Park, Gallows Hill, Warwick, CV34 6DA

NG INVESTMENT No.	APPLICATION No.	TEP	GIS
20897			A3
FIGURE No.	DRAWING No.		SCALE
Figure 14	G1979.2025A		1:5,000
SHEET 1 of 1			ISSUE A

Appendix 2J – Hinkley Point C Connection Project Cable Sealing End Siting Study (2012)

nationalgrid

October 2012

Hinkley Point C Connection Project

The Cable Sealing End Siting Study

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1 INTRODUCTION AND BACKGROUND

1.1 Purpose of the Report

1.1.1 This report has been produced by TEP for National Grid Electricity Transmission plc (National Grid) to consider the feasibility of options for siting two 400,000 volt (400kV) cable sealing end (CSE) compounds in the vicinity of the Mendip Hills Area of Outstanding Natural Beauty (AONB).

1.2 Background

1.2.1 National Grid is the operator of the high-voltage electricity transmission system for the whole of Great Britain and the owner of the high voltage transmission network in England and Wales[1].

1.2.2 National Grid's transmission system in England and Wales consists of approximately 7,200km of overhead lines and a further 700km of underground cables, operating at 400kV and 275kV. 400kV overhead lines have a higher power carrying capability, while 275kV overhead lines generally represent the older parts of the network which were established prior to the 400kV transmission system.

1.2.3 The overhead lines and cables connect around 340 substations to form a highly interconnected network. The substations provide points of connection for around 80 power stations and for connections to the local distribution networks, which operate at voltages from 132kV down to 240V (the voltage at which power is distributed to domestic consumers). The distribution networks are owned by Distribution Network Operators (DNOs), including Western Power Distribution (WPD) in South West England.

1.2.4 In addition to the obligation to make an offer of connection to an applicant, National Grid has the following statutory duties (under the Electricity Act 1989) which apply to its operation of the high voltage transmission system:

- **Section 9** – 'to develop and maintain an efficient, co-ordinated and economical system of electricity transmission'; and 'to facilitate competition in the supply and generation of electricity.'
- **Section 38 and Schedule 9** – when formulating proposals 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.'

Need for the Connection

1.2.5 In September 2007 National Grid received an application for the connection of a new nuclear power station at Hinkley Point (Hinkley Point C) to the high voltage electricity transmission system. Under the terms of its transmission licence National Grid is obliged to make an offer of connection in response to each valid application made.

1.2.6 The Need Case[2] explains that the existing high voltage electricity transmission system will not be sufficient to accommodate the higher levels of forecast generation in the South

[1] The transmission network in Scotland is owned by Scottish Power Transmission Limited in southern and central Scotland and by Scottish Hydro-Electric Transmission Limited in the north of Scotland.

West, South Wales and Gloucestershire regions and that as a result additional transmission capacity in the region is required.

1.2.7 The assessment of potential connection options identified a new 400kV overhead line between Bridgwater and Seabank as the option most consistent with National Grid's licence obligations because it would be the most economic and would be anticipated to have no greater levels of environmental effects than the other options[3].

Route Corridor Study

1.2.8 Having identified that the preferred connection would be based on a new 400kV overhead line between Bridgwater and Seabank a Route Corridor Study (RCS) was commissioned from environmental consultants TEP to identify possible route corridors between these locations and to assess how these corridors performed against National Grid's statutory environmental obligations. A detailed desk based assessment, supplemented with site visits, was used to generate potential route corridors, in particular considering the potential impacts on key environmental constraints within the study area.

1.2.9 The RCS (which formed the basis of an extensive consultation exercise between October 2009 and July 2010) concluded that Corridor 1 Option 1A was the least environmentally constrained corridor as it would result in the replacement of an existing 132kV overhead line with a higher voltage 400kV overhead line. The relatively wide corridor identified for much of the route would also allow an alignment to be identified to minimise the scale of change and effects on the environment. The RCS is separately reported[4].

Preferred Route Corridor

1.2.10 The Selection of Preferred Connection Report[5] considers the relative merits of each of the potential route corridors against a range of factors including: representations to the Stage 1 public consultation; National Grid's statutory duties; national and local policy; and environmental issues. The report concludes that Corridor 1 Option 1A should form the basis for developing an overhead line connection between Bridgwater and Seabank with the following exceptions:

- Horsey to Woolavington (Corridor 2);
- Tickenham Ridge to Portishead (Corridor 2); and
- Avonmouth substation and Seabank substation (Corridor 1B/Corridor 2).

1.2.11 Selecting Corridor 1 Option 1A as the basis of the connection means that the existing WPD 132kV overhead line between Bridgwater and Avonmouth substation will be removed and its corridor used for a new 400kV overhead line. The removal of the 132kV line results in the need for additional works to the 132kV distribution network to maintain supplies.

[2] National Grid: Hinkley Point C Connection Need Case for the South West and the South Wales and Gloucestershire Regions (August 2011).

[3] National Grid: Hinkley Point C Connection Strategic Optioneering Report (December 2009) and (August 2011).

[4] TEP: Route Corridor Study for Public Consultation (October 2009).

[5] National Grid: Hinkley Point C Connection Project Selection of Preferred Connection Report (August 2011).

Distribution System Options Report and Substation Siting Study

1.2.12 To consider the various options for maintaining supplies to the distribution network National Grid and WPD produced a Distribution System Options Report[6]. The Report concluded that an option which incorporates a new 400/132kV GSP substation in the Churchill/Sandford area best meets the range of technical, economic and environmental criteria and should be taken forward for further investigation. The Report proposed that detailed studies should be undertaken to identify potential locations for a new 400/132kV GSP substation in the area between Sandford and Churchill, but focussed close to the corridor of the proposed 400kV connection to minimise the amount of additional infrastructure required.

1.2.13 In response to the findings of the Distribution System Options Report a Substation Siting Study[7] was produced to identify options for siting the 400/132kV GSP substation in the Churchill/Sandford area of North Somerset. This Study concludes that a new GSP substation in an area of search to the West of Nye Road in the vicinity of Sandford represents the least environmentally constrained option primarily because it would minimise the extent of new 400kV connections and infrastructure required. The findings of these studies were subject to public consultation between 5th June and the 23rd July 2012.

Connection Options Report

1.2.14 Following the preferred route corridor announcement in September 2011, National Grid has been undertaking further technical and environmental studies to identify and evaluate potential route alignments and identify whether the undergrounding of sections of the proposed 400kV overhead line may be appropriate. The Connection Options Report (COR)[8] considers the relative merits of different alignment options against a range of factors including representations received from public consultation, National Grid's statutory duties, national and local policy and environmental issues.

1.2.15 The COR concludes that underground cables should form the basis for developing a connection within the Mendip Hills AONB as an overhead line would result in a major negative effect on the Mendip Hills AONB landscape and would not positively contribute to the purpose of the AONB designation to conserve and enhance natural beauty. The COR also concludes that the benefits of undergrounding in this nationally designated landscape will clearly outweigh any extra economic, social and environmental impacts. A CSE compound would be required outside the boundary of the AONB at either end of the underground cables connection to facilitate the transition between overhead lines and underground cables.

1.3 Purpose of Study

1.3.1 This siting study has been produced in response to the findings of the COR. The study has been prepared with the following objectives:

- To examine the available options for locating a new CSE compound to the north and south of the Mendip Hills AONB;
- To describe the high level environmental and planning constraints affecting the choice of options; and

[6] National Grid and Western Power Distribution: Hinkley Point C Connection Project Distribution System Options Report (December 2011).

[7] TEP: Hinkley Point C Connection Project Churchill/Sandford Grid Supply Point Substation Siting Study (May 2012).

[8] National Grid: Hinkley Point C Connection Project Connection Options Report (November 2012).

- To assess the options in terms of these constraints and identify the least environmentally constrained options for the new CSE compounds.

1.3.2 The study has been undertaken primarily using publicly available datasets. Some of the publicly available datasets used (notably Flood Zones, Conservation Areas and public footpaths) are not mapped with the precision that would be needed if National Grid proceeded with an application for consent. The report does not provide detailed designs or costs in respect of any option.

1.4 Structure of the Report

1.4.1 The remainder of this report is structured as follows:

- Chapter 2 – sets out the assumptions of the study;
- Chapter 3 - describes the approach and method used to identify potential areas for the CSE compounds;
- Chapter 4 – describes the environmental constraints that have been considered in the identification of CSE compounds;
- Chapter 5 - identifies and assesses the potential CSE areas identified; and
- Chapter 6 - provides a comparative summary of the options and a conclusion.

2 STUDY ASSUMPTIONS

2.1 Introduction

2.1.1 This siting study has been based on information provided by National Grid on the anticipated works required for the construction of a 400kV CSE compound. The following paragraphs summarise the general siting, design and layout parameters for a new National Grid CSE compound.

2.2 Siting, Design and Layout Parameters

Design

2.2.1 CSE compounds are required at the interface between overhead lines and underground cables. A CSE compound usually comprises an overhead line terminal tower (pylon) set within a relatively flat area surrounded by security fencing. The compound usually contains cable terminations (cable sealing ends), electrical equipment, support structures and a small control building. These would be to a maximum 16m in height. The overhead line terminal tower acts as a support for the conductor system and downleads, these downleads feed each circuit on to the able sealing ends. A connection is provided to the electrical equipment via landing structures designed to take the tension force.

2.2.2 The CSE compound would contain equipment that would be monitored remotely. Routine visits would be required to visually inspect condition of non-mechanical equipment, structures and buildings. Mechanical (manual operated) earth switches would require inspection and servicing as part of these visits.

2.2.3 CSE compounds should ideally be positioned on the line of the new overhead line route and be close to the local road network.

Dimensions

2.2.4 For the purposes of this siting study it has been assumed that each CSE compound would require a total footprint of approximately 70m x 40m.

2.2.5 The exact dimensions of the CSE compounds would depend on a number of factors including site specific constraints that could affect layout and design, specification of equipment and landscaping requirements. For each of the above, additional land may be required for landscape mitigation works and to install connections to the transmission network. Additional land may also be needed on a temporary basis for construction related requirements such as laydown areas.

Topography

2.2.6 Level ground is preferred, although gently sloping sites where earthworks could create a suitably level platform are also acceptable.

Flooding

2.2.7 National Grid considers flood risk very carefully when siting new installations including CSE compounds. This study has sought to identify potential CSE compound sites in areas with the lowest probability of flooding (Flood Zone 1) in accordance with the National Planning Policy Framework (NPPF) (see paragraph 4.4.41 for further details).

Drainage

2.2.8 If possible, the CSE compound sites should avoid the need to divert any watercourses.

Foundations

2.2.9 Construction of the CSE compounds will require foundations, and also excavations to create stable and level platforms for equipment. Previously developed land can sometimes

comprise areas of contamination, mineshafts, buried tanks or areas of made-ground (the result of infilling) which may need investigation and the use of special foundation methods.

Access

2.2.10 Permanent vehicular access will be required to the CSE compound site. Access could be via existing roads or by creating new access points off the local road network.

Electrical connections to the 400kV Network

2.2.11 To minimise the extent of additional connections required, the optimal location for the new CSE compounds would be within or immediately adjacent to the preferred route corridor of Bridgwater to Seabank connection. It would be possible to site the CSE compound away from the preferred route corridor if no suitable site can be found close by. However, this would require a diversion to the route of the overhead line which could introduce additional environmental and amenity effects that would need to be assessed against the perceived benefits of a site remote from the transmission network.

Landownership

2.2.12 National Grid holds areas of land often adjacent to existing transmission installations throughout England and Wales. Much of this land was acquired during the 1950s and 1960s for potential future transmission use. If land owned by National Grid is not available at the potential locations proposed within this report, it is assumed for the purposes of this study that it would be possible to acquire sites through negotiation or, as a last resort, using compulsory purchase powers.

'Brownfield' land and contamination

2.2.13 The National Planning Policy Framework (NPPF) encourages the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value. If available, such sites may be contaminated by former uses and remediation may be required prior to their use.

3 APPROACH AND METHOD

3.1 Introduction

3.1.1 This Chapter presents the approach and method followed for the identification of CSE compounds in the vicinity of the Mendip Hills AONB. The study has been undertaken using desk-based information supplemented by site visits. The main sources of information were:

- www.magic.gov.uk – internet based interactive map showing geographic information on key environmental designations;
- Google Earth;
- Environment Agency Flood Risk Maps (internet based);
- Ordnance Survey Explorer and Landranger 1:25,000 mapping; and
- Sedgemoor District Council Core Strategy (2011), North Somerset Council Core Strategy (2012), Sedgemoor District Local Plan (1991-2011), North Somerset Council Replacement Local Plan (2007).

3.1.2 The assessment of environmental and planning feasibility has been informed by:

- National Grid guidance on the siting and routeing of infrastructure;
- National Policy Statements (NPS);
- National Planning Policy Framework (NPPF);
- The adopted development plan allocations for the study area and emerging Local Development Framework;
- Environmental designations in the study area; and
- Other environmental and planning related matters that affect siting such as landscape character, flood risk, proximity to settlements etc.

3.1.3 The report also notes other local issues where relevant to siting such as site access, and land ownership where information is known.

3.2 National Grid's Environmental Guidance

3.2.1 As outlined at paragraph 1.2.4 National Grid has a two-fold duty placed on it under Section 38 and Schedule 9 of the Electricity Act 1989:

- To have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or geophysical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and

- To 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.

3.2.2 There is also an obligation for National Grid to publish a statement presenting how it will comply with this duty.

National Grid's Stakeholder, Community and Amenity Policy

3.2.3 National Grid's Stakeholder, Community and Amenity Policy[9] includes 10 commitments linked to its environmental obligations under Schedule 9 of the Electricity Act 1989. The following are of particular relevance to the identification of potential CSE compound sites:

[9] National Grid Plc: National Grid's commitments when undertaking works in the UK - our Stakeholder, Community and Amenity policy: February 2010

- **Commitment 3** – Seeking to avoid areas which are nationally or internationally designated for their landscape, wildlife or cultural significance;

- **Commitment 4** – Minimising the effects of works and new infrastructure on communities, by having particular regard to safety, noise and construction traffic, and on areas which are nationally or internationally designated for their landscape, wildlife or cultural significance and other sites valued for their amenity such as Listed Buildings, Conservation Areas, areas of archaeological interest, local wildlife sites, historic parks and gardens and historic battlefields (taking into account the significance of these and other areas through consultation with local authorities and other stakeholders with particular interests in such sites); and

- **Commitment 5** – Mitigating the adverse effects of works through the application of best practice environmental assessment techniques.

The Holford Rules

3.2.4 In addition to the above guidance on siting all infrastructure, specific guidance on routeing overhead lines is provided by the 'Holford Rules'[10]. This guidance was reviewed by National Grid in 1992 and has become accepted within the electricity industry as the basis for overhead line routeing. Its use is supported in the adopted National Policy Statement for Electricity Networks Infrastructure (EN-5)[11]. The 7 rules on minimising landscape effects in routeing overhead lines are summarised below:

- **Rule 1** - Avoid altogether, if possible, the major areas of highest amenity value.
- **Rule 2** – Avoid smaller areas of high amenity value, or scientific interests by deviation; provided that this can be done without using too many angle pylons.
- **Rule 3** - Other things being equal, choose the most direct line, with no sharp changes of direction and thus fewer angle pylons.
- **Rule 4** – Choose tree and hill backgrounds in preference to sky backgrounds wherever possible.
- **Rule 5** – Prefer moderately open valleys with woods where the apparent height of pylons will be reduced, and views of the line will be broken by trees.
- **Rule 6** - In country which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables so as to avoid a concatenation or 'wirescape'.
- **Rule 7** - Approach urban areas through industrial zones where they exist.

3.2.5 Three general supplementary notes to the rules advise avoidance of routeing close to residential areas as far as possible on grounds of general amenity; identifying routes which minimise the effect on designations of County, District and local value; and evaluating where appropriate the use of alternative pylon designs where these would be advantageous visually, and where the extra cost can be justified.

The Horlock Rules

3.2.6 In addition to the above guidance National Grid has specific guidance relevant to the siting of substations, referred to as the 'Horlock Rules'[12], but developed into a guidance note.

[10] National Grid Plc: The National Grid Company plc and new high voltage transmission lines - guidelines for line routeing (the Holford Rules) and undergrounding: March 2003

[11] Department of Energy and Climate Change: National Policy Statement for Electricity Networks Infrastructure (EN-5): July 2011.

[12] National Grid plc: NGC Substations and the environment – Guidelines on siting and design.

This guidance is specific to substations but is appropriate to consider when seeking potential CSE compound areas.

3.2.7 The Horlock Rules refer to the following key considerations in substation siting:

- Consider environmental issues from the earliest stage to balance technical benefits and capital costs;
- As far as reasonably practical, seek to avoid altogether internationally and nationally designated areas of highest amenity, cultural or scientific value;
- Protect as far as reasonably practicable possible areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water resources and nature conservation areas;
- Keep visual, noise and other environmental effects to a reasonably practicable minimum; and
- Consider land use effects when planning siting of substations or extensions, including nationally important land such as Grade 1 agricultural land and sites of nationally scarce minerals.

3.2.8 Three further items refer to matters of design to keep effects to a reasonable minimum. These are options for equipment; effective use of space; and design of access roads, fencing, earth shaping and planting to assist integrating development into its surroundings. Two further notes make reference to overhead line entries and reducing the effects of overhead lines.

Summary of National Grid's Guidance

3.2.9 National Grid's guidance on overhead line routeing and substation siting identifies areas which it seeks to avoid and areas on which it seeks to minimise effects. These are summarised in Table 3.1 with reference to the legislation under which protection is inferred, and the aspect of National Grid's guidance that identifies them.

Table 3.1 - Environmental aspects considered in routeing and siting

Feature	Legislation	Routeing/Siting Response (and reference)
National Parks	National Parks and Access to the Countryside Act 1949	Seek to avoid/consider undergrounding (NG Commitments/ Holford & Horlock Rules)
Areas of Outstanding Natural Beauty	National Parks and Access to the Countryside Act 1949/ Countryside and Rights of Way Act 2000	Seek to avoid/consider undergrounding (NG Commitments/ Holford & Horlock Rules)
Heritage Coasts	n/a	Seek to avoid (NG Commitments/ Holford & Horlock Rules)
World Heritage Sites	1972 World Heritage Convention	Seek to avoid (NG Commitments/ Holford & Horlock Rules)
Sites of Special Scientific Interest	Wildlife and Countryside Act 1981	Seek to avoid/verify potential effects (NG Commitments/ Holford & Horlock Rules)
Special Protection Areas	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (NG Commitments/ Holford & Horlock Rules)
Special Areas of Conservation	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (NG Commitments/ Holford & Horlock Rules)

Feature	Legislation	Routeing/Siting Response (and reference)
Ramsar sites	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (NG Commitments/ Holford & Horlock Rules)
National Nature Reserves	National Parks and Access to the Countryside Act 1949	Seek to avoid/verify potential effects (NG Commitments/ Holford & Horlock Rules)
Scheduled Monuments	Ancient Monuments and Archaeological Areas Act 1979	Seek to avoid/consider effect on setting (NG Commitments/ Holford & Horlock Rules)
Historic buildings (Listed I, II and II*)	Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to avoid/consider effect on setting (Holford & Horlock Rules)
Conservation Areas	Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to avoid/consider effect on setting (Holford & Horlock Rules)
Settlements	n/a	Seek to avoid (Holford & Horlock Rules)
Registered Parks and Gardens	n/a	Seek to avoid (NG Commitments/ Holford & Horlock Rules)
Registered Battlefields	n/a	Minimise effects (NG Commitments)
Woodlands	n/a	Seek to avoid (Holford & Horlock Rules)
Landform	n/a	(Holford Rules)
Landscape Character	n/a	Minimise effects

3.3 National Policy Statements

3.3.1 The construction of the proposed 400kV overhead line between Bridgwater and Seabank is classified as a nationally significant infrastructure project (NSIP) under the Planning Act 2008, for which a Development Consent Order (DCO) application will be made to the Planning Inspectorate. The CSE compounds and any related connections to the transmission network will form part of this consent application as 'associated development'.

3.3.2 The Planning Inspectorate must take into account the relevant National Policy Statements in its consideration of the scheme. The National Policy Statements were adopted by parliament in July 2011 and set out the national need for particular types of development. The energy related National Policy Statements relevant to this project are referred to throughout this document and comprise:

- **EN-1**: Overarching National Policy Statement for Energy (July 2011); and
- **EN-5**: National Policy Statement for Electricity Networks Infrastructure (July 2011).

3.4 National Planning Policy Framework

3.4.1 The National Planning Policy Framework[13] (NPPF) sets out the Government's planning policies and provides guidance on how these should be applied. The NPPF promotes the principles of sustainable development and whilst it does not contain specific policies for

[13] Department for Communities and Local Government: National Planning Policy Framework: March 2012

NSIPs it may be considered as an 'important and relevant'[14] matter to be considered in decision making. The NPPF was adopted by parliament in March 2012 and whilst it does not include policies specifically related to electricity transmission infrastructure, it does include policies for conserving and enhancing the natural and historic environment which have been taken into account in and are referred to throughout this document.

[14] National Planning Policy Framework, Paragraph 3

4 CONSTRAINTS WITHIN THE STUDY AREA

4.1 Introduction

4.1.1 The development of a CSE compound and associated overhead line infrastructure within the boundaries of the AONB would be visually prominent and would be likely to have a significant adverse effect on landscape character and views. This would conflict with the primary purpose of the AONB designation, to conserve and enhance natural beauty, and would reduce the benefits provided by using underground cables in this area. As a result the identification of potential CSE compound areas has focussed on areas outside of the AONB boundaries between the A38 and Webbington Road south of the AONB and between the A368 and the point where the preferred route corridor crosses Nye Road to the north.

4.1.2 To the south of the AONB the study area lies within the administrative boundary of both Sedgemoor District Council (SDC) and North Somerset Council (NSC). To the north of the AONB the study area lies entirely within the administrative boundary of NSC.

4.1.3 An existing 132kV overhead line owned and operated by WPD travels through the study area in a south-north alignment between WPD's existing substations at Bridgwater and Portishead (F Route). As outlined at paragraph 1.2.11 this line is proposed for removal as part of the Hinkley Point C Connection project.

4.1.4 To the north and south of the AONB land is largely rural with a low-lying marshy landscape, typical of the Somerset Levels and Moors. Within this Moors landscape, roads tend to be narrow and are lined by ditches or hedges. Fields are damp, with relatively few mature trees in the boundary hedges.

4.1.5 This contrasts with the landscape of the Mendip Hills AONB which rise steeply from the Levels and Moors and extend from the Severn Estuary in an easterly direction.

4.2 Environmental Constraints

4.2.1 A description of the environmental constraints listed in Table 2.1 that have been considered in the identification of potential CSE compound areas is presented below and illustrated at Figure 1.

4.3 Constraints not present within the study area

4.3.1 The following environmental constraints are not present within the study area:

- National Parks;
- Heritage Coasts;
- World Heritage Sites;
- Special Protection Areas;
- Ramsar sites;
- National Nature Reserves;
- Registered Parks and Gardens; and
- Registered Battlefields.

4.4 Constraints present within the study area

Areas of Outstanding Natural Beauty (AONB)

4.4.1 Areas of Outstanding Natural Beauty (AONBs) are areas of high landscape quality designated under the National Parks and Access to the Countryside Act 1949 (as amended) for the purpose of conserving and enhancing the natural beauty of the area. The Overarching National Policy Statement for Energy (EN1) highlights that the 'natural beauty of the landscape and countryside should be given substantial weight by the Planning Inspectorate (formerly the IPC) in deciding on applications for development

consent in these areas'. EN1 also states that consideration should be given to the purposes of nationally designated areas when siting development in close proximity to the boundaries of an AONB designation and that 'the aim should be to avoid compromising the purposes of designation and such projects should be designed sensitively given the various siting, operational, and other relevant constraints'.

4.4.2 The NPPF provides guidance on the matters that would normally need to be assessed in the consideration of proposals for major developments in AONBs. These include:

- the need for the development in terms of national considerations;
- the impact of permitting it or refusing it on the local economy;
- the cost of and scope for developing elsewhere outside the area;
- meeting the need in some other way; and
- consideration of any detrimental effect on the environment, the landscape, and recreational opportunities, and the extent to which that should be moderated.

4.4.3 The Mendip Hills AONB lies in the centre of the study area and the hills of the AONB form prominent landmarks. The only natural gap in the hills is the valley of the Lox Yeo River through which the M5 motorway and the existing WPD 132kV overhead line pass.

Sites of Special Scientific Interest (SSSI)

4.4.4 SSSIs are sites designated for their biodiversity or geological interest and are protected under the Wildlife and Countryside Act 1981 as amended by the Countryside and Rights of Way Act 2000. SSSIs are protected from development, and operations which are likely to damage their special interest. Consultation with Natural England is required before consent can be granted for any development operations likely to damage the SSSI interest.

4.4.5 The nature of the interest for each site varies. The risk of harm to a SSSI from a CSE compound and associated overhead line infrastructure adjacent or close to its boundaries would depend on the nature of the effect considered in light of the special interest of that designated site. The Overarching National Policy Statement for Energy (EN1) states at paragraph 5.3.11 that:

> *Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on a SSSI (either individually or in combination with other developments) development consent should not normally be granted. Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs.'*

4.4.6 This is reinforced further in the NPPF which advises local authorities on preparing policies and exercising development control.

4.4.7 To the south of the Mendip Hills AONB there are no SSSIs within the study area. Within the Mendip Hills AONB there are numerous SSSIs, many of which are on higher ground and form part of wider designations. These include Banwell Ochre Caves and Banwell Caves SSSIs which form component sites of the North Somerset and Mendip Bats Special Area of Conservation (SAC), Crook Peak to Shute Shelve Hill SSSI which forms a component site of the Mendip Limestone Grasslands SAC, Shiplate Slait SSSI and Bleadon Hill SSSI.

4.4.8 To the north of the Mendip Hills AONB there is one SSSI (Yanal Bog) within the study area. Yanal Bog is adjacent to Green Farm, north east of Sandford and is a calcicolous lowland mire which supports a diverse range of plant species.

4.4.9 SSSIs could be avoided in CSE compound siting.

Special Areas of Conservation (SAC)

4.4.10 Special Areas of Conservation (SACs) are areas of land or water of international (European) conservation importance as designated by European Member States under the EU Habitats Directive (Directive 92/43/EC), and are afforded protection under The Conservation of Habitats and Species Regulations 2010 (The Habitats Regulations). In the UK all SACs are also designated as Sites of Special Scientific Interest (SSSI).

4.4.11 The Habitats Regulations give a very high degree of protection to these designated areas and only permit development in the first instance on such sites where it is directly connected with or necessary to site management for nature conservation; or where the proposal would not be likely to have a significant effect on the conservation objectives of the site, alone or in combination with other plans and projects.

4.4.12 The process for the consideration of development proposals likely to affect a European designated site is set out in ODPM Circular 6/2005. As the proposed CSE compounds are not necessary for management of the designated sites, the first test that would apply is whether the project 'is likely to have a significant effect on the sites'. This is a 'filtering test', intended to avoid the need for detailed assessment of projects which are unlikely to have significant effect. Case law has clarified that mitigation and design measures can be considered. For example, if a project might affect breeding birds in a SPA (if carried out in the breeding season), then it would be possible to avoid the likelihood of effect by imposing a condition restricting the timing of works. The filtering test can consider this mitigation measure and conclude that the works are unlikely to have a significant effect.

4.4.13 If the likelihood of significant adverse effects cannot be ruled out, or if there is uncertainty, then the competent authority must carry out an 'appropriate assessment' to test the effect of the project on the integrity of the designated sites. Subject to a defined exception being established, an authority may only grant consent for a project where 'appropriate assessment' shows that it will not adversely affect the integrity of the designated European site.

4.4.14 An authority may exceptionally grant consent for a project which will adversely affect the integrity of a designated site where there is an absence of alternative solutions and the project must be carried out for imperative reasons of overriding public interest, including those of a social or economic nature.

4.4.15 Within the study area there are two SACs both of which lie within the Mendip Hills AONB. The North Somerset and Mendip Bats SAC comprises a number of component sites in and around the study area. The SAC is a cluster of caves and woodlands which are of European level importance for greater and lesser horseshoe bats. It is a composite site, including Banwell Caves and Banwell Ochre Caves in the Mendip Hills and a large block of woodland at King's Wood and Urchin Wood to the north of the study area. Natural England and North Somerset Council have identified a 5km 'consultation zone' covering important bat feeding grounds surrounding the SAC component sites. Within this zone proposals for change are subject to particular scrutiny for potential effects on the designated sites. The majority of the study area lies within 5km of the component SSSI/SAC sites.

4.4.16 The Mendip Limestone Grasslands SAC comprises three separate SSSIs totalling approximately 417ha. Brean Down SSSI and Uphill Cliff SSSI are south of Weston-super-Mare, contiguous with the Severn Estuary SAC. Crook Peak to Shute Shelve SSSI lies on higher ground within the study area in the Mendip Hills AONB.

Scheduled Monuments

4.4.17 Scheduled Monuments are nationally important monuments and archaeological remains which are protected under the provisions of the Ancient Monuments and Archaeological Areas Act 1979. Consent is required from English Heritage, the statutory advisor on the historic environment, under the 1979 Act before works directly affecting a Scheduled Monument may be carried out. National Policy Statement EN1 and the NPPF highlight the

importance of Scheduled Monuments and set out a presumption in favour of their conservation.

4.4.18 The south west of England is a region of high archaeological and historical importance containing over a third of all Scheduled Monuments in England. There are no Scheduled Monuments within the study areas to the south and north of the AONB. However, there are a number of Scheduled Monuments higher ground and close to or within settlements in the Mendip Hills including the shrunken medieval village of Christon, Banwell Camp Hillfort and a Roman settlement north east of Winthill Farm. These sites would not be directly affected by the proposed works.

4.4.19 Brent Knoll Scheduled Monument is an Iron Age Hill Fort with multiple ramparts. The Scheduled Monument lies approximately 2km south west of the study area but is a prominent feature within the predominantly flat landscape of the Somerset Levels and has panoramic views across the surrounding landscape.

Listed Buildings

4.4.20 Buildings of special architectural or historic interest are added to a list of buildings protected under the Planning (Listed Buildings and Conservation Areas) Act 1990. Planning authorities are required to consult with English Heritage on planning applications which may affect a Grade I and Grade II* listed building outside Greater London and listed building consent is required for any works likely to affect a listed building. The primary aim of recognition is to ensure that the buildings are preserved. National Policy Statement EN1 and the NPPF highlight the importance of listed buildings as a non-renewable resource and set out a presumption in favour of their conservation.

4.4.21 There are 7 Grade II and 2 Grade II* Listed Buildings within the study area to the south of the AONB and 12 Grade II Listed Buildings within the study area to the north of the AONB. They are often clustered within settlements and there are particular clusters of Listed Buildings in Biddisham, Sandford and Banwell. There are some individual Listed Buildings in more rural areas; these are generally farmsteads and country houses.

Conservation Areas

4.4.22 Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 gives local authorities the power to designate Conservation Areas, defined as ‘areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance’. The importance of these designated sites and the presumption in favour of their conservation is set out in National Policy Statement EN1 and the NPPF.

4.4.23 The Conservation Areas at Weare, Loxton, Christon and Banwell lie just outside the study areas to the north and south of the AONB. These are in settlements which would be avoided and are therefore not likely to be affected by the development of a CSE compound.

Settlements

4.4.24 The key settlements within the study area are within or in close proximity to the boundaries of the Mendip Hills AONB and include Loxton, Sandford and Banwell.

4.4.25 There are numerous other villages dispersed throughout the study area, the larger of which are along classified roads (e.g. Rooks Bridge, Biddisham and Tarnock). Smaller villages and hamlets are linked by the minor road systems.

Individual Properties

4.4.26 Individual properties outside settlements are dispersed throughout the study area. Individual properties are typically found off networks of narrow lanes and in the study area often comprise farmhouses surrounded by areas of moorland.

Public Rights of Way (PROW)

4.4.27 PROWs are afforded legal protection under the Countryside Rights of Way Act 2000 and Highways Act 1980. There is a network of Public Rights of Way (PROWs) in the study area as illustrated on the Ordnance Survey base of Figure 1.

4.4.28 Footpaths would be avoided wherever possible in siting a CSE compound, although where a diversion is possible this is not necessarily a key constraint. Recognised recreational paths such as National Trails and National Cycle Routes should also be avoided where possible.

Woodlands

4.4.29 The Holford and Horlock Rules refer to woodlands and their value in providing background to views and advise avoiding cutting extensive swathes through woodland blocks where possible.

4.4.30 Any form of woodland generally has landscape value whereas ecological value can vary greatly between different types of woodland. Woodland with relatively low ecological value may perform the same screening or backgrounding function in the landscape as one with very high ecological value. However ancient woodland is an irreplaceable nature conservation asset. Much ancient woodland is SSSI and is afforded protection by that designation.

4.4.31 National Policy Statement EN1 highlights the importance of ancient woodland as a non-renewable resource. Paragraph 5.3.14 of EN1 states that '*the IPC should not grant development consent for any development that would result in its loss or deterioration unless the benefits (including need) of the development, in that location outweigh the loss of the woodland habitat.*'

4.4.32 There are numerous blocks of woodlands interspersed throughout the study area. These include a number of small woodlands adjacent to the M5 motorway and a number of orchards associated with the Thatchers Cider Factory to the north of the Mendip Hills at Sandford. All woodland has been considered in this siting study, noting that woodland may also screen the proposed development.

Landform

4.4.33 The Holford Rules refer to aspects of topography and physiography such as hills, ridges, dips, open valleys and flat land in considering overhead line routeing. For example, the Rules advise on exploiting the 'backgrounding' effect of high land and seeking to avoid ridges.

4.4.34 To the north and south of the AONB land generally comprises low lying moorland (approximately 6m AOD) which forms part of a wider area known as the Somerset Levels and Moors. The AONB rises steeply from the Levels and Moors to a maximum height of approximately 300m AOD at Black Down. The only natural break in the hills is the valley of the Lox Yeo River through which the M5 motorway and the existing WPD 132kV overhead line pass.

Landscape Character

National Landscape Character

4.4.35 The study areas fall within the former Countryside Agency (now Natural England) countryside character areas 142 (the Somerset Levels and Moors) and 141 (The Mendip Hills) (see Figure 2).

4.4.36 The Somerset Levels and Moors comprises a broad area of low lying farmland and wetland surrounded and divided by low hills and ridges which form the Mid Somerset Hills. The character description notes that the landscape is predominantly characterised by networks

of ditches and rhynes which divide peat moors and clay levels towards the coast. Important features include prominent hills such as Brent Knoll (designated as a Scheduled Monument) which rise above the Levels and Moors.

4.4.37 The character description also notes that settlement is concentrated on hills, ridges and islands with only a handful of dispersed farmsteads.

4.4.38 The Mendip Hills are a chain of prominent limestone hills extending inland from the coast and rising up sharply from surrounding lowlands. The character description notes that the landscape is characterised by an open, largely treeless, limestone plateau with karst features, cave systems, dry stone walls and sparse settlement. The character description notes the sharp contrast between the open plateau and steep escarpment slopes of the karst landscape and the more complex, gentler landforms in the east.

4.4.39 The character description also notes that compact villages are focussed around the edges of the slopes with larger villages and towns such as Axbridge and Cheddar close to watercourses.

Local Landscape Character

4.4.40 The study area is also covered by the Sedgemoor Landscape Assessment and Countryside Design Summary[15] and the North Somerset Landscape Character Assessment[16]. There are nine local landscape character areas within the study area. The character areas are summarised in Table 4.1 and illustrated at Figure 3.

Table 4.1 Local Landscape Character Areas

Landscape Character Type	Landscape Character Area	Landscape Character Summary
Sedgemoor Landscape Character Areas		
Levels and Moors	Levels	The Levels comprise lowland areas slightly above the low-lying Moors. Most of the area is a coastal belt of clay several miles wide at around 6m AOD. There are several separate islands of land which sit above the level of surrounding Moors. The Levels comprise a largely flat landscape, with a pattern of fields defined by a combination of drainage channels and hedges. Unlike the Moors, the field pattern on the Levels is much less regular and it is notable that many of the major local drainage channels or rhynes take a sinuous course. The area is mostly used for pasture for dairy cattle, with some arable cropping, especially for animal feeds.

[15] Sedgemoor District Council: Sedgemoor Landscape Assessment and Countryside Design Summary: Revised Edition 2003.

[16] North Somerset Council: Landscape Character Assessment Supplementary Planning Document: Adopted December 2005.

Landscape Character Type	Landscape Character Area	Landscape Character Summary
Mendips	Strawberry Belt and Footslope Villages	The Strawberry Belt and Footslope Villages character area comprises a fertile agricultural band at the foot of the scarp slope. The band of agricultural land varies in width from about 1km to about 200m at the western edge of the character area. The character description notes that the pattern of the landscape is largely determined by the nature of horticultural and other farming activities, with a pattern of small fields enclosed by hedgerows or dry stone walls. Topography within the character area is typically gently sloping which contrasts with the steeper slopes above and the flat land of the Levels and Moors.
Mendips	Scarp slope, West Mendip Summit and Cheddar George	The Scarp slope, West Mendip Summit and Cheddar George character area lies immediately above the fertile agricultural band of the Strawberry Belt and Footslope Villages character area. The relatively steep hillside land is cloaked by a mixture of open downland, heath, deciduous woodland and pasture. The character description notes that the underlying geology is mainly Carboniferous Limestone and that the extraction point at Batts Combe Quarry above Cheddar is a very obvious scar on the landscape.
North Somerset Landscape Character Areas		
Moors	Kingston Seymour and Puxton Moors	The Kingston Seymour and Puxton Moors character area is a flat lowland landscape at around 5m to 10m AOD. The area is based on beach and tidal flat deposits with a few isolated areas of varying geology. The area is predominantly pasture, consisting of improved grassland and marshy grassland grazed by cattle and sheep, there are also some small areas of arable farming. The character description notes the scattered settlement pattern of small villages and hamlets and highlights that the villages of Kenn, Kingston Seymour, Puxton and Wick St Lawrence are characterised by churches (often medieval in origin) and buildings of stone at their centres with more recent suburban style dwellings at the edges.
Moors	Locking and Banwell Moors	The Locking and Banwell Moors character area comprises a belt of low-lying beach and tidal deposits which form a flat pastoral/wetland landscape. The field pattern is regular and geometric which distinguishes this character area from the neighbouring Kingston Seymour and Puxton Moors. The character description notes that mature trees along the field boundaries are a prominent feature of this character area and that the area is almost devoid of settlement.
Moors	Bleadon Moor	The Bleadon Moor character area is a remote area separated from other moors by the Mendip Ridge. The character description notes the remote, rural and pastoral feel of the area and notes that a line of pylons is visually prominent in the flat landscape.

Landscape Character Type	Landscape Character Area	Landscape Character Summary
River Flood Plain	Lox Yeo River Floodplain	The Lox Yeo River Floodplain character area is a low lying floodplain (under 10m AOD) which follows the Lox Yeo River south to the River Axe. The open flat landform contrasts with the valley sides rising to limestone ridges. It is a rural landscape with large open fields bounded by low managed hedges. The M5 runs through the valley, although the area is noted as still retaining a remote feel. Views are generally channelled along the valley and up the valley sides.
Ridges and Combes	Mendip Ridges and Combes	The Mendip Ridges and Combes character area comprises a series of ridges with slightly varying characters which form part of the Mendip Hills. The Lox Yeo River runs between the ridges and the Bristol Channel is to the west. The steep slopes and summits of the ridges provide expansive views which extend to the sea across the Moors, and over river valleys to higher ground in the north. The character description notes the distinctive pattern of settlement with the majority of settlement in villages along the base of the slopes with little on the steep slopes themselves and scattered stone farmsteads on the plateau.
Rolling Valley Farmland	Lox Yeo Rolling Valley Farmland	The Lox Yeo Rolling Valley Farmland character area forms an undulating lowland with views of steep wooded ridges rising over the valley which provide a feeling of partial enclosure. The area is described as a pastoral landscape with views to the wooded ridges of the Mendip Hills. Fields are bounded by thick hedges with hedgerow trees and the area is divided by a complex network of winding rural roads and deep sunken lanes. The character description notes that settlement is concentrated to the east of the area at Winscombe where the rendered post war buildings on the edge of the village are highly visible. In other parts of the character area settlement is limited to dispersed farmsteads along winding rural roads.

Flood Risk

4.4.41 The importance of flood risk has been particularly emphasised since the severe floods of 2007 and is highlighted in National Policy Statement EN1 which states that:

> *'The aims of planning policy on development and flood risk are to ensure that flood risk from all sources of flooding is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new energy infrastructure is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, by reducing flood risk overall.'*

4.4.42 National Grid considers flood risk very carefully when siting new installations including CSE compounds. The Environment Agency uses the following Flood Zones in England:

- Flood Zone 1: Land which has a low probability of flooding;
- Flood Zone 2: Land which has a medium probability of flooding; and
- Flood Zone 3: Divided into 3A (land which has a high probability of flooding) and 3B (the functional floodplain).

4.4.43 The NPPF states that authorities should steer new development to Flood Zone 1 in which the chance of flooding each year is 0.1% (1 in 1000) or less. However, where there are no reasonably available sites in Flood Zone 1, National Grid may consider the suitability of sites in Flood Zone 2 and then Flood Zone 3. In accordance with the NPPF National Grid would need to provide evidence that the sequential and exception tests could be satisfied if proposing development in Flood Zone 3.

4.4.44 It is relatively straightforward to build flood resilience into CSE compounds and overhead lines by addressing safety clearances from anticipated flood levels in the design. The presence of a CSE compound in areas of flood risk has a negligible effect on the risk or displacement of water as the infrastructure poses no material changes to surface water flow.

4.4.45 This study has sought to identify potential CSE compound areas with the lowest probability of flooding (Flood Zone 1) in accordance with the NPPF. Where this is not possible National Grid would need to provide evidence as part of any application for consent that the sequential and exception tests could be satisfied.

4.4.46 Flood Zones 2/3 cover the majority of low lying land within the study area to the north and south of the Mendip Hills AONB with the exception of pockets of land around the settlements of Sandford and Banwell (north of the AONB) which lie in Flood Zone 1. Higher land within the AONB and the northern end of the Lox Yeo valley also lie within Flood Zone 1 (see Figure 4).

Local Plan Allocations

4.4.47 The town and country planning system in England is under reform. Previous planning systems are being replaced by a new regime introducing Local Development Frameworks (LDFs). Since September 2007 the former plans have ceased to have development plan status, except where the Secretary of State for the Department of Communities and Local Government (DCLG) has specifically 'saved' policies to continue beyond that date whilst the new style plans are under preparation.

4.4.48 As outlined at paragraph 4.1.2, the study area falls within the administrative boundary of NSC and SDC. Both authorities have started to introduce new planning documents under their LDF's, with NSC adopting its Core Strategy in April 2012 and SDC adopting its Core Strategy in October 2012. Although these strategies have become the principal planning documents for each administrative area, both NSC and SDC have yet to replace some previous 'saved' local plan policies and proposals maps which remain in use.

4.4.49 Local authority development plans allocate land for development. CSE compounds are classed as *sui generis* development and consequently no sites have been allocated across the study area for development of this nature. Searches for suitable land for CSE compounds are generally guided by factors such as the availability of land, amenity factors and where available the presence of existing development or proposed development (as a Plan allocation) that shares similar characteristics (i.e. industrial uses).

4.4.50 No industrial or employment land allocations have been identified in the study area that could be investigated for potential CSE compound areas in Sedgemoor District.

4.4.51 In North Somerset no allocations have been identified in the study area east of the M5 motorway (within 3.5km of the preferred route corridor) that could be investigated for potential CSE compound areas. However, an existing haulage yard off the A368 at Sandford in NSC has been identified as a potential CSE compound area (see Chapter 5).

Local Nature Reserves/Local Wildlife Sites

4.4.52 Sites of ecological interest at county, district and local level are areas on which National Grid typically seeks to minimise effects. Due to the 'high level' status of this study, only Local Nature Reserves (LNR) and Local Wildlife Sites have been considered during the identification and assessment of potential CSE compound areas.

4.4.53 National Policy Statement EN1 recognises that LNR's have a fundamental role to play in meeting biodiversity targets; contributing to quality of life and supporting research and education. The NPS states at paragraph 5.3.13 that '*the IPC should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse consent'*.

4.4.54 Policy ECH/14 of the NSC Replacement Local Plan re-affirms the statutory protection given to LNR's and remains a 'saved policy' designating non-statutory Wildlife Sites. Where the importance of development and its overriding need is considered to outweigh the ecological interests of a Wildlife Site, a mitigation strategy would be required as a condition of consent. Under NSC's biodiversity policy a full biodiversity impact assessment could also be potentially required. Policy CS4 of NSC's Core Strategy and Policy D14 of SDC's Core Strategy emphasise the importance of protecting local sites designated for their nature conservation value.

4.4.55 The Cheddar Valley Railway Walk LNR covers the majority of a dismantled railway line that runs through the study area through Winscombe and Sandford (see Figure 1). The LNR is known as the Strawberry Line and is also a Sustrans National Cycle Route (Route 26). The interest of the LNR is primarily recreational rather than due to rarity of flora and fauna. Parts of the line are however also designated as a Local Wildlife Site.

4.4.56 There are numerous Local Wildlife Sites/Sites of Nature Conservation Interest across the study area (see Figure 1).

Areas of Archaeological Interest

4.4.57 Above ground archaeological interest is addressed in identifying potential infrastructure sites by considering Listed Buildings, Scheduled Monuments and Conservation Areas. Development plans sometimes indicate Areas of Archaeological Potential/Interest. These are at the scale of a local authority's administrative area and typically refer to areas of below ground potential.

4.4.58 The construction of a CSE Compound within an Area of Archaeological Potential/Interest could cause adverse effects, the risk of which would need to be investigated, initially through an archaeological desk based assessment.

4.4.59 No Areas of Archaeological Interest have been identified within the study area in North Somerset.

4.4.60 The Sedgemoor Local Plan identifies numerous Archaeological Sites of County Importance within, and in close proximity, to the study area around Biddisham, Rooks Bridge, Weare and Cross.

4.4.61 The NPPF highlights the importance of the heritage resource stating 'The historic environment and its heritage assets should be conserved'. To achieve this Government objectives for planning in the historic environment are '*to deliver sustainable development by ensuring policies and decisions concerning the historic environment recognise that heritage assets are a non-renewable resource'*.

4.4.62 There may be other unknown archaeological assets which could be affected during ground disturbance for construction of the CSE compounds. An assessment of the potential for archaeological remains and any direct and indirect effects from construction would be required. In the first instance an archaeological assessment would be carried out at the CSE compound areas taken forward to the next stage of assessment.

4.4.63 Mitigation would depend on the findings of the archaeological assessment carried out in liaison with English Heritage. Negative effects on buried archaeological remains are due primarily to their loss of value in terms of their potential to contribute to people's understanding of the past (i.e. evidential value). This effect can be reduced, although not completely, through archaeological investigation and recording. However, because archaeological remains are a finite and non-renewable resource preservation in situ is preferred, where possible.

Green Belt / Countryside Policies

4.4.64 There are no Green Belt allocations within the study area. Outside of the main settlements, the majority of the study area is in open countryside.

4.4.65 Policy CS33 of NSC's Core Strategy refers to infill villages and smaller settlements in the countryside. It states that proposals for development within the rural areas outside service villages will be strictly controlled in order to protect their character, retain the openness of the countryside and prevent unsustainable development. Non-residential uses will be very carefully controlled within smaller settlements and the countryside. Small scale employment uses, retail or community uses may be permissible within settlement boundaries, subject to considerations relating to scale and impact.

4.4.66 Policy P6 of SDC's Core Strategy outlines its approach to development in the countryside and states that proposals for new development outside of identified settlements will be strictly controlled. Development will be supported where it accords with other relevant policies contained in the Core Strategy that provide, exceptionally, for development in the countryside. Where development proposals in the countryside are not addressed by other policies of the Core Strategy, new development must relate to specific countryside needs, such as those of the local agricultural industry and local food producers, enhancement of the environment or where a countryside location is essential or more sustainable. Policy P6 advises that in all cases development should benefit economic activity, maintain or enhance the environment, and provide opportunities for sustainable transport options where impacts are likely to be significant.

4.4.67 A consent application for a CSE compound would need to demonstrate high standards of environmental mitigation as appropriate to ensure any adverse effects are mitigated wherever possible.

5 IDENTIFICATION AND ASSESSMENT OF OPTIONS

5.1 Introduction

5.1.1 This Chapter identifies and describes potential CSE compound locations to the south and north of the Mendip Hills AONB. Potential areas are considered in light of the influences and constraints outlined in Chapter 3 and described in the study area in Chapter 4.

5.1.2 A desk-based assessment and site visits have been undertaken to consider and identify possible areas within which a CSE compound could be sited.

5.2 Potential CSE Areas

5.2.1 Three broad areas to the south of the Mendip Hills AONB and two to the north have been identified as potentially suitable for the construction of a CSE compound (see Figures 5 and 6). These areas are large enough to accommodate a CSE compound and associated overhead line infrastructure in a number of positions or orientations and are referred to as:

- Area A – Land to the north of the River Axe;
- Area B – Land adjacent to the M5 motorway south of the River Axe;
- Area C – Land to the north of Rooks Bridge;
- Area D – Haulage Yard to the south of the A368 at Sandford;
- Area E – Land to the West of Nye Road (Preferred Area of Search for 400/132kV GSP substation).

5.3 South of the Mendip Hills AONB

Area A - Land to the north of the River Axe

5.3.1 This option considers the siting of the CSE compound on farmland immediately north of the River Axe and east of the M5 motorway. The area is broad and extends north from the River Axe for approximately 500m towards the boundary of the AONB at the Webbington Road bridge across the M5. The existing 132kV F Route overhead line (which will be removed and replaced by a 400kV connection) travels through the area in a south – north alignment. There is an existing farm access in to the area off Webbington Road which could be used or modified for use if considered appropriate through an access study and liaison with the local highways authority.

5.3.2 The area contains newly planted trees in the centre and along the western boundary which provide a visual and acoustic screen to the motorway and also provide the north western part of the area with a sense of enclosure. A landscape mitigation scheme would be required to ensure the replacement of any hedges and trees lost to the new CSE compound or associated connections as well as to screen the proposed development.

5.3.3 The area is in Flood Zone 3a where there is a high probability of flooding. A Flood Risk Assessment (FRA) would be required to demonstrate that any proposed development within this area could operate safely and effectively in the event of a flood and would not increase flood risk elsewhere. Evidence would also be required as part of this assessment to demonstrate that the sequential and exception tests could be satisfied.

Ecology

5.3.4 The area is not protected by any ecological designations and a Phase 1 habitat survey has indicated that it does not appear to have any special habitat value. The area lies adjacent to the River Axe Wildlife Site which supports otters and is bordered on its northern bank by a tall dense scrubby hedge. The fields of the area are bordered by drains which may also offer suitable habitat for otter and water vole. The hedges which border the drains may offer suitable habitat for dormouse. The presence of protected species would be confirmed by ecological surveys as part of detailed studies if Area A is taken forward.

5.3.5 The area lies on the southern edge of the 5km consultation zone that surrounds the North Somerset and Mendip Bats SAC and within 5km of a component site of the Mendip Limestone Grasslands SAC. An assessment of the potential effects of the development, with particular regard to the removal of hedges or trees on bat flight patterns would be required as part of detailed studies if Area A is taken forward.

Historic Environment

5.3.6 There are no designated heritage assets within the area although there may be unknown archaeological assets which could be affected by ground disturbance. Loxton Conservation Area lies to the west of the M5 motorway approximately 300m north west of the area. It is considered unlikely that the setting of this Conservation Area would be adversely affected by a CSE compound in this area due to its distance from the settlement and the presence of intervening vegetation and development including the M5 motorway.

5.3.7 The Scheduled Monument of Brent Knoll is approximately 5km south west. Due to the elevated position of the monument above the flat lowland landscape of the Somerset Levels and Moors a CSE compound and the associated overhead line infrastructure is likely to be present in some long views from the monument but due to its distance and the presence of intervening vegetation and development including the M5 motorway it is considered unlikely that the setting of this feature would be adversely affected.

Landscape and Views

5.3.8 The area lies within the local landscape character area of the Levels which is described as being a largely flat landscape, with a pattern of fields defined by a combination of drainage channels and hedges. Within the Levels the character description notes that land is used largely for pasture, with some arable cropping. Within this area the landscape is broadly consistent with the written descriptions of character but has a more enclosed feel than other parts of the Levels due to its proximity to the M5 motorway and the raised landform of the Webbington Road bridge crossing and its associated trees. Siting a CSE compound in the north of the area would maximise the benefits of this existing screening.

5.3.9 Due to the proximity of the area to the boundary of the AONB (within 100m) the CSE compound and associated overhead line connection would be present in views from higher ground within the AONB such as Crook Peak and Compton Hill to the east and Loxton Hill and Bleadon Hill to the west. The existing bridge crossing of the M5 motorway at Webbington Road and its surrounding trees would assist in screening the CSE compound but due to its proximity to the AONB boundary the overhead line towers south of the CSE compound would form a prominent feature in views.

5.3.10 A landscape and visual assessment would be required to determine the potential effects of the CSE compound and associated overhead line and any mitigation requirements if Area A is taken forward.

Settlements and proximity to residential properties

5.3.11 There are no residential properties within Area A. The closest properties lie approximately 50m north along Webbington Road and approximately 150m east along Kennel Lane. The settlement of Loxton lies approximately 300m north west, properties at Crab Hole lie approximately 250m east and properties on Biddisham Lane on the northern edge of Biddisham lie approximately 500m south east.

5.3.12 A landscape and visual assessment would be required to consider the potential effects on views from residential properties in the surrounding area if Area A is taken forward.

Area B - Land adjacent to the M5 motorway south of the River Axe

5.3.13 This option considers the siting of the CSE compound on farmland to the south of the River Axe immediately east of the M5 motorway. The area lies approximately 1km south of the

Mendip Hills AONB at its closest point. It covers a broad area which extends north from the Mark Yeo River (a tributary of the River Axe) to the Hams Lane road bridge crossing of the M5 motorway and east from the M5 towards the existing WPD 132kV F Route overhead line. There is existing access in to the area via the Hams Lane road bridge and via a farm access which could be used or modified for use if considered appropriate through an access study and liaison with the local highways authority.

5.3.14 Area B contains a number of mature trees in the north and west which provide a visual and acoustic screen to the motorway and also provide the northern extent of the area with a sense of enclosure. A landscape mitigation scheme would be required to ensure the replacement of any hedges and trees lost to the new CSE compound or associated connections as well as to screen the proposed development.

5.3.15 The area is in Flood Zone 3a where there is a high probability of flooding. A FRA would be required to demonstrate that any proposed development within this area could operate safely and effectively in the event of a flood and would not increase flood risk elsewhere. Evidence would also be required as part of this assessment to demonstrate that the sequential and exception tests could be satisfied.

Ecology

5.3.16 Area B is not protected by any ecological designations and a Phase 1 habitat survey has indicated that the fields do not appear to have any special habitat value. The fields of the area appear to be improved grassland and are bordered by drains which may offer suitable habitat for water vole and otter. The hedges which border the drains may offer suitable habitat for dormouse. The presence of protected species would be confirmed by ecological surveys as part of detailed studies if Area B is taken forward.

5.3.17 The area lies outside the 5km consultation zone that surrounds the North Somerset and Mendip Bats SAC but is within 5km of the Mendip Limestone Grasslands SAC (for which the documentation refers to horseshoe bats). An assessment of the potential effects of the development, with particular regard to the removal of hedges or trees on bat flight patterns would be required as part of detailed studies if Area B is taken forward.

Historic Environment

5.3.18 There are no designated heritage assets within the boundary of the area although there may be unknown archaeological assets which could be affected by ground disturbance. Loxton Conservation Area lies approximately 1km north west of the area on the opposite side of the M5. A CSE compound in this area would not have any significant adverse effects on the setting of the Conservation Area due to its distance from the settlement and the presence of intervening vegetation and development including the motorway.

5.3.19 Brent Knoll Scheduled Monument is approximately 4km south west. Due to the elevated position of the monument above the flat lowland landscape of the Somerset Levels and Moors a CSE compound and the associated overhead line infrastructure is likely to be present in some long views from the monument but due to its distance and the presence of intervening vegetation and development including the M5 motorway it is considered unlikely that the setting of this feature would be adversely affected.

Landscape and Views

5.3.20 Like Area A, this area lies within the local landscape character area of the Levels. Within this area the landscape is broadly consistent with the written descriptions of character but has a more enclosed feel than other parts of the Levels due to the raised landform of the Hams Lane road bridge crossing and its associated trees.

5.3.21 The area lies just over 1km south of the AONB at its closest point and depending on its position within the area the CSE compound and associated overhead line connections would be present in some views from higher ground within the AONB such as Crook Peak

and Compton Hill to the east and Loxton Hill and Bleadon Hill to the west. From receptors on lower ground within and outside the AONB, a CSE compound in the north west of the area would be largely screened in views by the Hams Lane bridge and trees along the northern and western boundaries.

Settlements and proximity to residential properties

5.3.22 There are no residential properties within Area B. The closest properties are on Biddisham Lane approximately 550m to the east. A landscape and visual assessment would be required to consider the potential effects on views from residential properties in the surrounding area if Area B is taken forward.

Area C - Land to the North of Rooks Bridge

5.3.23 This option considers the siting of the CSE compound on farmland to the north of the A38 and the settlements of Rooks Bridge and Tarnock. The area lies approximately 2km south of the Mendip Hills AONB, at its closest point, and extends north from Fletchers Lane to the Old River Axe (drain). The existing 132kV F Route overhead line (which will be removed and replaced by a 400kV connection) travels through the area in a south – north alignment. There is an existing access in to the area via Fletchers Lane which could be used or modified for use if considered appropriate through an access study and liaison with the local highways authority.

5.3.24 Area C is relatively open but is bordered by hedgerows which contain some trees. A landscape mitigation scheme would be required to ensure the replacement of any hedges and trees lost to the new CSE compound or associated connections as well as to screen the proposed development.

5.3.25 The area is in Flood Zone 3a where there is a high probability of flooding. A FRA would be required to demonstrate that any proposed development within this area could operate safely and effectively in the event of a flood and would not increase flood risk elsewhere. Evidence would also be required as part of this assessment to demonstrate that the sequential and exception tests could be satisfied.

Ecology

5.3.26 Area C is not protected by any ecological designations and a Phase 1 habitat survey has indicated that the fields do not appear to have any special habitat value. The fields of the area appear to be improved grassland and are bordered by drains which may offer suitable habitat for water vole and otter. The hedges which border the drains may offer suitable habitat for dormouse. The presence of protected species would be confirmed by ecological surveys as part of detailed studies if Area C is taken forward.

5.3.27 Like Area B, the area lies outside the 5km consultation zone that surrounds the North Somerset and Mendip Bats SAC but is within 5km of the Mendip Limestone Grasslands SAC (for which the documentation refers to horseshoe bats). An assessment of the potential effects of the development, with particular regard to the removal of hedges or trees on bat flight patterns would be required as part of detailed studies if Area C is taken forward.

Historic Environment

5.3.28 There are no designated heritage assets within the boundary of Area C. There is an Archaeological Site of County Importance adjacent to the south western corner of the area. Maximising the distance of the CSE compound from this area would assist in minimising the potential for effects on this designation, but there may be unknown archaeological assets across the area which could be affected by ground disturbance.

5.3.29 The area is approximately 400m west of the settlement of Biddisham which contains a number of listed buildings. These include the Grade II* listed Church of St John the Baptist

and Churchyard Cross and the Grade II listed Old School, Manor Farmhouse and Gates of the Church. Approximately 500m south of the area there are further listed buildings between Chapel Road and the A368 at Rooks Bridge. A CSE compound and the associated overhead line connection would not have any direct effects on these listed buildings and significant adverse effects on these setting of the buildings are not anticipated due to their distance and the presence of intervening vegetation.

5.3.30 Loxton Conservation Area lies approximately 2km north west of the area on the opposite side of the M5. Due to its distance and the presence of intervening vegetation and development including the motorway no adverse effects on the setting of the Conservation Area are anticipated.

5.3.31 Brent Knoll Scheduled Monument is approximately 3.5km south west. Due to the elevated position of the monument above the flat lowland landscape of the Somerset Levels and Moors a CSE compound and the associated overhead line connection is likely to be present in some long views from the monument but due to its distance and the presence of intervening vegetation and development including the M5 motorway it is considered unlikely that the setting of this feature would be adversely affected.

Landscape and Views

5.3.32 Like Areas A and B this area lies within the local landscape character area of the Levels. Within this area the landscape is consistent with the written descriptions of character and as a result this area has a more open and rural feel than Areas A and B.

5.3.33 Area C lies just over 2km south of the AONB at its closest point. The CSE compound and associated overhead line connections would be present in views from higher ground within the AONB such as Crook Peak and Compton Hill to the east and Loxton Hill and Bleadon Hill to the west. Due to the open character of this area and the lack of trees and vegetation the CSE compound and associated overhead line connection are also likely to be present in views from locations on lower ground within the AONB and from some properties in the settlements of Biddisham, Tarnock and Rooks Bridge.

Settlements and proximity to residential properties

5.3.34 There are no residential properties within Area C. The closest properties are in the settlement of Biddisham (approximately 400m east along Biddisham Lane) and Rooks Bridge (approximately 300m south along the A38 and Chapel Road and 400m west along Rooksbridge Road).

5.3.35 A landscape and visual assessment would be required to consider the potential effects on residential properties in the surrounding area if Area C is taken forward.

5.4 North of the Mendip Hills AONB

Area D – Haulage Yard to the south of the A368 at Sandford

5.4.1 In seeking areas close to the corridor of the Bridgwater to Seabank connection and on previously developed land an existing haulage yard south of the A368 was identified. The area lies immediately east of the Mendip Hills AONB and adjacent to the A368 beneath the existing 132kV F Route overhead line (which will be removed and replaced by a 400kV connection). There is an existing access in to the area directly off the A368 which is suitable for HGVs and which appears suitable for the construction of a CSE compound.

5.4.2 The haulage yard comprises an area of hardstanding to the south of the A368 which is bordered to the west by Towerhead Brook and east by a residential property. Land to the rear of the haulage yard is undeveloped and contains a number of mature trees along the boundaries which provide the area with a sense of enclosure. A landscape mitigation scheme would be required to ensure the replacement of any hedges and trees lost to the new CSE compound or associated connections as well as to screen the proposed development.

5.4.3 The area is in Flood Zone 1 where there is a low probability of flooding, but adjacent to an area of Flood Zone 2. A FRA would be required to demonstrate that any proposed development within this area could operate safely and effectively in the event of a flood and would not increase flood risk elsewhere.

Ecology

5.4.4 Area D is not protected by any ecological designations but lies immediately east of Towerhead Brook Wildlife Site which contains a variety of species and habitats and may offer suitable habitat for water vole and otter. The northern part of the area comprises an area of hardstanding associated with the existing haulage yard. To the south of the haulage yard a Phase 1 habitat survey has indicated that the fields appear to be semi improved grassland with mature and species rich hedges along the boundaries. These hedges may offer suitable habitat for dormouse and may be used by bats as flight lines. The presence of protected species would be confirmed by ecological surveys as part of detailed studies if Area D is taken forward.

5.4.5 The area lies approximately 350m east of Banwell Ochre Caves SSSI (a component site of the North Somerset and Mendip Bats SAC) and within the 5km consultation zone that surrounds the SAC. An assessment of the potential effects of the development, with particular regard to the removal of hedges or trees on bat flight patterns would be required as part of detailed studies if Area D is taken forward.

Historic Environment

5.4.6 There are no designated heritage assets within the boundary of the area although there may be unknown archaeological assets which could be affected by ground disturbance.

5.4.7 Area D is approximately 150m east of two Grade II listed buildings and approximately 50m west of four Grade II listed buildings. These include Towerhead House and associated Gate Piers and various buildings associated with the former Sandford Railway Station. A CSE compound in this area would not have any direct effects on these listed buildings and effects on the setting of the buildings could be minimised through careful siting of the CSE compound.

5.4.8 Banwell Camp Scheduled Monument is approximately 550m south west. The monument is surrounded by the mature woodland of Banwell Wood which screens the monument from views. A CSE compound in this area is not anticipated to have any effects on the monument or its setting due to the presence of intervening vegetation.

Landscape and Views

5.4.9 The area falls within local landscape character area River Yeo Rolling Valley Farmland, which is described as being a peaceful pastoral landscape with the presence of waterways signalled by lines of willows. This character is being eroded in places by ribbon development. The northern extent of the area is characterised by low height buildings and hardstanding associated with the haulage yard. To the rear of the haulage yard the landscape is broadly consistent with the written descriptions of character.

5.4.10 The area and its surroundings are relatively open with mature trees generally in hedgerows and along drains. The area lies immediately adjacent to the Mendip Hills AONB and due to its proximity the CSE compound would be visually prominent particularly in views from higher ground on the edge of the AONB such as Sandford Hill. The associated 400kV overhead line that would exit the area in a northerly direction would be particularly prominent from higher ground within the AONB and from properties along the A368 and Mead Lane.

5.4.11 Due to its proximity to residential properties to the north, east and west a CSE compound and the associated overhead line infrastructure is likely to give rise to greater levels of

effect on views from residential properties than other options. This would be considered as part of the landscape and visual assessment if Area D is taken forward.

Settlements and proximity to residential properties

5.4.12 Area D is on the western edge of the village of Sandford. There are no residential properties within the area. However, a property thought to be associated with the haulage yard lies approximately 20m east of the boundary and further residential properties, to the south of the A368, are within 50m.

Area E – Land to the West of Nye Road (Preferred Area of Search for 400/132kV GSP substation)

5.4.13 As outlined at paragraph 1.2.13, National Grid and WPD have identified that the preferred option to maintain supplies on the distribution network as a result of the removal of the 132kV F Route overhead line is to construct a new 400/132kV substation within an area of search to the West of Nye Road in North Somerset. A CSE compound could be accommodated within the footprint of the proposed substation which would remove the requirement for a separate CSE compound and associated overhead line connection in this area.

5.4.14 The area lies to the north of the settlement of Sandford to the west of an unclassified road (known as Nye Road/Drove Way), which runs north from the A368 at Sandford to Nye. The majority of the area comprises pasture fields. The area is bound by clipped hedges and there are scattered mature trees in hedgerows across the area and in the middle of the fields. A landscape mitigation scheme would be required to ensure the replacement of any hedges and trees lost to the proposed development or associated connections as well as to mitigate potential visual impacts.

5.4.15 The proposed substation would require access suitable for abnormal indivisible loads (AILs). Initial investigations undertaken as part of the substation siting study identified that a new access road would be required to facilitate development in this area. This new access road could either utilise the existing Thatcher's Cider factory HGV access or a new access road from a point on the A368 to the west of Sandford opposite the haulage yard (Area D). An access road from a new junction off the A368 could also be used as an access road for the 400kV underground cable works, and a construction easement within which the cables would be routed. Using the same access point for the proposed substation would focus all development in one location and would remove the requirement to construct an additional access road through the cider factory.

5.4.16 The area is in Flood Zone 1 where there is a low probability of flooding but lies close to the boundaries of Flood Zones 2 and 3. A FRA would be required to demonstrate that any proposed development within this area could operate safely and effectively in the event of a flood and would not increase flood risk elsewhere.

Ecology

5.4.17 Area E is not protected by any ecological designations. The fields appear to comprise improved grassland bordered by drains with mature hedges which contain some mature trees. The drains may offer suitable habitat for water vole and otter. The hedges which border the drains may offer suitable habitat for dormouse and may be used by bats as flight lines. Phase 1 habitat surveys undertaken as part of the Hinkley Point C Connection project have identified the presence of two ponds within the area and one pond immediately adjacent to the area which may offer suitable habitat for great crested newts.

5.4.18 The area lies within the 5km consultation zone associated with the North Somerset and Mendip Bats SAC and is approximately 700m (at its closest point) north of the Banwell Ochre Caves SSSI (a component site of the SAC).

5.4.19 The results of bat surveys undertaken as part of the Hinkley Point C connection project survey give high confidence that it is unlikely that significant adverse effects would be likely on bats. However, studies on the use of the area by bats would be required, as well as an assessment into the potential effects of the development, with particular regard to the removal of hedges or trees on bat flight patterns.

5.4.20 The eastern boundary of the area lies adjacent to a section of the Cheddar Valley Railway Walk LNR. Another section of the LNR falls just within the area in land to the rear of Thatcher's Cider factory. Both areas could be avoided by a CSE compound in this area.

Historic Environment

5.4.21 There are no designated heritage assets within the area although there may be unknown archaeological assets which could be affected by ground disturbance. The closest Scheduled Monument is a moated house (Nye Hall) adjacent to Nye Road, approximately 850m north of the Area of Search. The distance between the area and the monument, and the existing screening that partially encloses the property should ensure adequate separation to avoid any significant adverse effects on its setting. Effects on the setting of a deserted medieval farmstead south of Gout House Farm (approximately 1.2km north west) are not anticipated. The area is separated from listed buildings at Sandford and Banwell Camp Scheduled Monument by development along the A368 and development in this area is not anticipated to have any effects on these features.

Landscape and Views

5.4.22 The area falls within local landscape character area River Yeo Rolling Valley Farmland, which is described as being a peaceful pastoral landscape with the presence of waterways signalled by lines of willows. This character is being eroded in places by ribbon development. The landscape within the area is divided in two by the disused railway known as the Strawberry Line. The majority of the area which lies to the north of the Strawberry Line is consistent with the published descriptions of a pastoral landscape with fields bounded by low clipped hedgerows with frequent scattered mature trees in hedgerows and within fields. Land to the south of the Strawberry Line is characterised by open land with young recently planted orchard which forms part of Thatcher's Cider Factory. Mature trees are present close to the factory buildings and along the Strawberry Line.

5.4.23 The area and its surroundings are relatively open with mature trees generally in hedgerows and along drains. The area is approximately 400m north of the Mendip Hills AONB at its closest point and development would be visible from higher ground on the edge of the AONB such as Sandford Hill, Banwell Hill and Dolebury Warren. Changes in ground levels within the area could be used to assist in screening development in this area by siting the substation on lower ground in the north.

Settlements and proximity to residential properties

5.4.24 The nearest properties to this area include those off Nye Road (Droveway Farm and Bridge Farm), properties off Mead Lane (including Mead Farm and West Leigh Farm) and properties close to the Thatcher's Cider factory including Station Road Farm.

5.4.25 A landscape and visual assessment would be required to consider the potential effects on residential properties in the surrounding area if Area E is taken forward.

6 COMPARISON OF OPTIONS AND CONCLUSIONS

6.1 Introduction

6.1.1 This Chapter provides a comparison and analysis of the potential CSE compound areas to the south and north of the Mendip Hills AONB in light of the influences and constraints outlined in Chapter 3 and described in the study area in Chapter 4.

6.2 Comparison of Areas to the South of the AONB

Mendip Hills AONB

6.2.1 A CSE compound within any of the three areas identified to the south of the AONB is likely to be present in some southerly views from the Mendip Hills AONB across the Somerset Levels and Moors. These views would be most apparent from areas of higher ground within the AONB such as Crook Peak, Compton Hill, Loxton Hill and Bleadon Hill.

6.2.2 A CSE compound within Area B would be preferable to Areas A and C with respect to effects on views from the AONB, its setting and the purposes of its designation. Area B is further away from the AONB than Area A and has a greater sense of enclosure and screening (provided by the Hams Lane bridge and trees along the northern and western boundaries) than either Area A or Area C which would be more visible in open farmland. Siting the CSE compound in the north western corner of Area B would maximise the benefits of the screening provided by the road bridge and vegetation.

6.2.3 The proximity of Area A to the AONB boundary (within 100m) and the open character of Area C would result in development in these areas being more prominent in views from the AONB.

6.2.4 The effect of a new CSE compound and the associated overhead line connections on the setting of the AONB would be assessed as part of detailed connection design studies.

Special Areas of Conservation

North Somerset and Mendip Bats SAC

6.2.5 All of the areas avoid the component SSSIs of the North Somerset and Mendip Bats SAC but Area A lies on the edge of the 5km consultation zone which surrounds the SAC.

6.2.6 It is not anticipated that there would be any direct impact on bat roosts from a proposed CSE compound within any of the areas identified. Any loss of foraging habitat within the areas identified could be minimised through scheme design. There would, therefore, be no substantial difference between the areas with regard to effects on this SAC.

Mendip Limestone Grasslands SAC

6.2.7 All of the areas avoid the component SSSIs of the Mendip Limestone Grasslands SAC but lie within 5km of the site. Whilst not designated specifically for bats, the documentation relating to the SAC refers specifically to the sites importance for horseshoe bats.

6.2.8 It is not anticipated that there would be any direct impact on bat roosts from a proposed CSE compound within any of the areas identified. Studies on the use of the area by bats would be required, as well as an assessment into the potential effects of the development, with particular regard to the removal of hedges or trees on bat flight patterns. There would be no substantial difference between the areas with regard to effects on this SAC. However maximising the distance between the areas and the SAC could minimise effects on bats using habitats closer to their roost for foraging and commuting.

Brent Knoll Scheduled Monument

6.2.9 Brent Knoll Scheduled Monument lies between 3.5km and 5km from all of the potential CSE compound areas. Due to the elevated position of the monument above the flat lowland landscape of the Somerset Levels and Moors a CSE compound and the associated overhead line infrastructure would be present in some views from the monument. There would be no substantial differences between the areas with regard to potential effects on the setting of the monument. Effects on this feature could be minimised through careful siting of the CSE compound within any of the areas identified and the use of vegetation and planting to screen the CSE compound.

Listed Buildings

6.2.10 The areas identified have sought to avoid Grade I, II and II* Listed Buildings wherever possible. Of the areas identified, Area C lies closest to a cluster of Listed Buildings within the settlement of Biddisham and at Rooks Bridge.

6.2.11 None of the areas identified would have any direct effects on Listed Buildings and effects on their setting could be minimised through careful siting of the CSE compound and the associated overhead line. There would, therefore, be no substantial difference between the areas with regard to effects on Listed Buildings.

Loxton Conservation Area

6.2.12 The three potential areas lie between 300m and 2km south east of Loxton Conservation Area. It is considered unlikely that the setting of the Conservation Area would be adversely affected by a CSE compound in any of the areas due to their distance from the settlement and the presence of intervening vegetation and development including the M5 motorway.

Areas of Archaeological Importance

6.2.13 There is an Archaeological Site of County Importance adjacent to the south western corner of Area C. Maximising the distance of the CSE compound from this archaeological site would assist in minimising the potential for effects on this designation. There may be unknown archaeological assets within any of the areas which could be affected by ground disturbance.

Settlements and proximity to residential properties

6.2.14 The areas identified have sought to avoid and maximise the distance from all settlements and individual properties where other constraints allow.

6.2.15 A CSE compound within Area B would be preferred to one within Areas A and C with respect to proximity to settlement and individual properties. Area A lies 50m south of a property along Webbington Road and 150m west of another property off Kennel Lane. It is also within 250m of properties at Crab Hole and 300m from the settlement of Loxton. Area C is within 400m of the settlements of Biddisham and Rooks Bridge.

6.2.16 Area B is the most distant from properties and the north western corner in particular is screened in the majority of views by raised landform and vegetation. Effects on properties along Webbington Road and Kennel Lane further north would be reduced by a CSE in Area B as the existing 132kV overhead line which passes close to these properties would be removed and replaced with underground cables.

Woodlands

6.2.17 The majority of woodlands in the study area are focussed along the M5 motorway and form a visual and acoustic screen between the motorway and residential properties.

6.2.18 There is little to differentiate between the areas with regard to effects on woodland as there would be opportunities to avoid woodland, individual trees and hedgerows within the areas by careful siting of the CSE compound and the associated overhead line. However, within

Areas A and B the woodland adjacent to the M5 motorway and present in the vicinity of the Hams Lane road bridge crossing of the M5 could be utilised and enhanced through mitigation to screen the proposed development. In comparison, Area C is in more open farmland where trees are mainly scattered and within hedgerows.

Landform

6.2.19 All of the potential CSE compound areas are on low lying land within the Somerset Levels and Moors.

6.2.20 The northern boundary of Areas A and B includes raised ground associated with road crossings of the M5 motorway which provides a visual barrier between the areas and the Mendip Hills AONB. Siting the CSE compound in close proximity to this raised ground would maximise the benefits of the screening provided.

Landscape Character

6.2.21 The three potential CSE compound areas are within the same national and local landscape character areas and are not differentiated by the character areas affected. However, the proximity to the M5 motorway together with the raised landform and vegetation present within both Areas A and B provide a sense of enclosure that differentiates them from other parts of the Levels and Moors and makes them preferable for a CSE compound.

6.3 Comparison of Areas to the North of the AONB

Mendip Hills AONB

6.3.1 A CSE compound within either of the areas identified to the north of the AONB is likely to be present in some northerly views from the Mendip Hills AONB. These views would be most apparent from areas of higher ground within the AONB such as Sandford Hill, Banwell Hill and Dolebury Warren.

6.3.2 A CSE compound within Area E would be preferable to one in Area D with respect to effects on views from the AONB and its setting, due to its distance from the boundary of the AONB and the screening provided by existing vegetation and natural variations in landform. Siting the development in the north eastern corner of the area (towards Nye Road) would further increase the benefit of the screening provided by vegetation and landform. The construction of the CSE compound in Area E would also have the benefit of focussing the CSE compound and the proposed 400/132kV substation developments in one location. It would therefore remove the requirement to construct an overhead line of between 750m and 1km long from a CSE compound in Area D to the proposed 400/132kV substation.

6.3.3 Although parts of Area D comprise previously developed land, the proximity of this area to the AONB boundary (immediately adjacent) would result in development being more prominent in views both to and from the designated site.

North Somerset and Mendip Bats SAC

6.3.4 Both areas avoid the component SSSIs of the North Somerset and Mendip Bats SAC but lie in close proximity to the Banwell Ochre Caves SSSI and within the 5km consultation zone which surrounds the SAC.

6.3.5 It is not anticipated that there would be any direct impact on bat roosts from a proposed CSE compound within either of the areas identified. Any loss of foraging habitat within the areas identified could be minimised through scheme design. The results from surveys undertaken as part of the Hinkley Point C Connection project give high confidence that it is unlikely that significant adverse effects would arise on bats. Area E would however maximise the distance between the CSE compound and the Banwell Ochre Caves SSSI, which could minimise effects on bats using habitats closer to their roost for foraging and commuting.

Listed Buildings

6.3.6 A CSE compound within Area E would be preferable to Area D with regard to effects on Listed Buildings. Area D lies approximately 150m east of two Grade II listed buildings and approximately 50m west of four Grade II listed buildings. Whilst development in this area would not have any direct effects on these features the CSE compound and associated overhead line are likely to result in effects on their setting. These effects could be minimised through careful siting of the CSE compound to utilise existing vegetation and landform to screen the development.

Settlements and proximity to residential properties

6.3.7 The areas identified have sought to avoid and maximise the distance from all settlements and individual properties where other constraints allow.

6.3.8 A CSE compound within Area E would be distinctly preferred to one within Area D with respect to proximity to settlement and individual properties. Area D lies within 20m of a residential property thought to be associated with the haulage yard and within 50m of a number of properties on the edge of the settlement of Sandford to the south of the A368. An overhead line connection north from this area would also need to pass within 100m of a number of properties along Mead Lane.

6.3.9 The closest properties to Area E are those along Nye Road, Mead Lane and close to the Thatcher's Cider factory. Distance to these properties could be maximised by siting the CSE compound in the northern part of the search area close to Nye Road. Effects on properties along Mead Lane would further be reduced as the existing 132kV overhead line which passes to the west of Mead Lane would be removed and replaced with underground cables.

Woodlands

6.3.10 Both areas largely avoid the orchards associated with the Thatchers Cider Factory, with the exception of a small part of Area E which includes part of the Thatchers Cider Factory planted with relatively young trees. This orchard could be avoided by siting the CSE compound in the northern part of the area to the west of the Strawberry Line.

6.3.11 Both areas include individual trees within boundary features but these could be avoided through careful siting of the CSE compound.

Landform

6.3.12 Both CSE compound areas are on low lying land within the Levels and Moors.

6.3.13 Within Area E landform varies from 19m AOD on land to the rear of Thatchers to 7m AOD at the northern extent of the site. Siting the CSE compound on the low lying land in the northern part of the site would maximise the benefits of the screening provided by landform.

Landscape Character

6.3.14 Both potential CSE compound areas are within the same national and local landscape character areas and are not differentiated by the character areas affected.

6.4 Conclusions

6.4.1 The assessment and comparison of the potential CSE compound areas north and south of the Mendip Hills AONB has considered the potential areas in relation to a range of environmental criteria.

6.4.2 Some potential environmental effects and constraints are common to all areas identified, or are not considered sufficiently significant to make them a differentiating factor in siting. The constraints and opportunities for other environmental factors (e.g. effects on landscape

and views and proximity to settlements) differ across the areas so professional judgement needs to be applied when making comparisons.

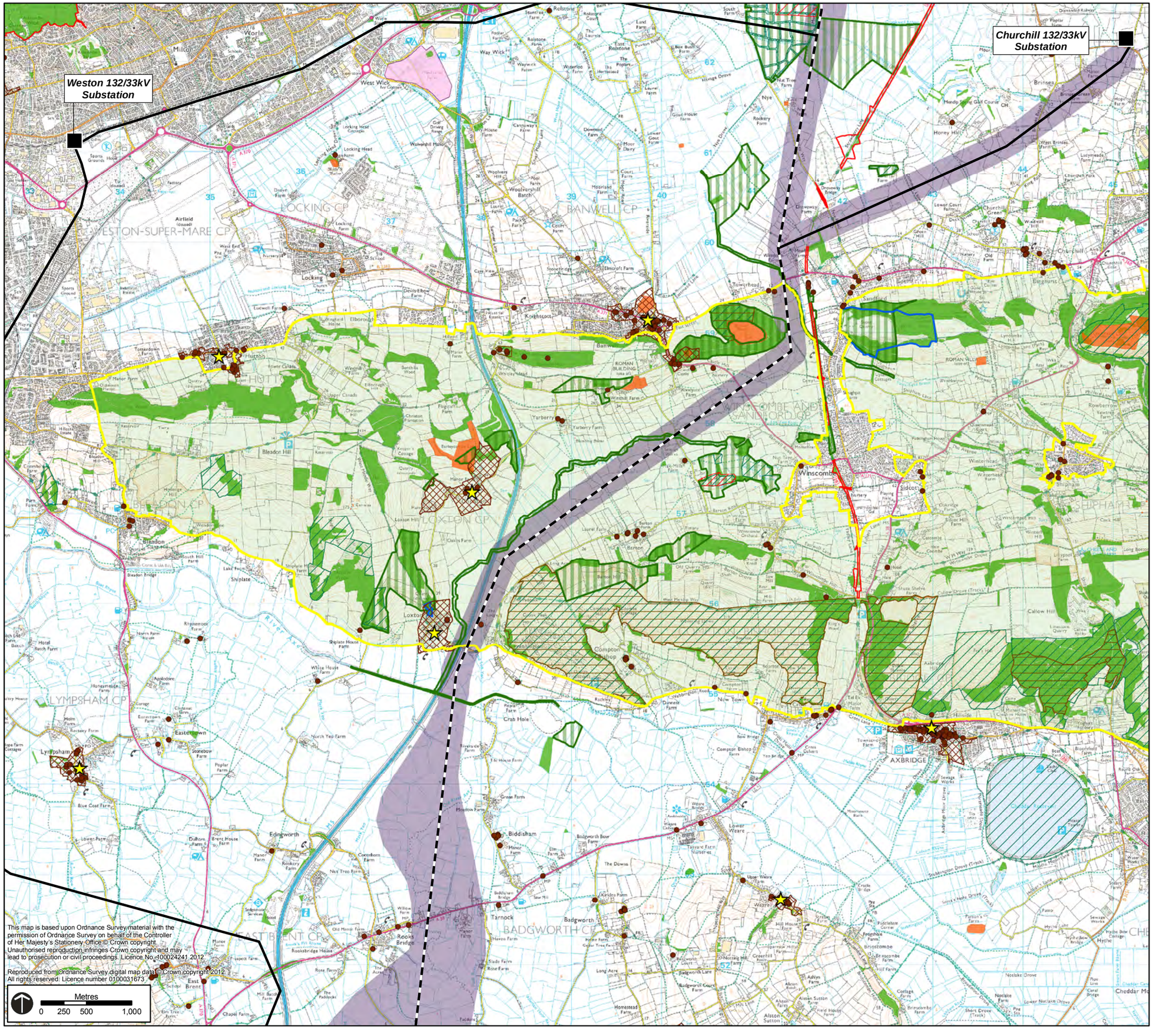
6.4.3 The greatest distinctions between the areas are with regard to their effects on the purpose of the Mendip Hills AONB designation, potential effects on landscape and views, and proximity to individual properties and settlements including Listed Buildings.

6.4.4 South of the Mendip Hills AONB Area B is considered to be the least environmentally constrained area for a CSE compound. The screening and sense of enclosure provided by the M5 motorway, the Hams Lane road bridge and trees along the north western boundary would allow a CSE compound to be sited to minimise effects on landscape character and views to and from the AONB. The proximity of Area A to the AONB boundary (within 100m) and the more open character of landscape within Area C would result in development in these areas being more prominent in views from the AONB than Area B. A CSE compound within Area B would also be preferred with respect to proximity to settlement and individual properties (including Listed Buildings).

6.4.5 North of the Mendip Hills AONB Area E is considered to be the least environmentally constrained area for a new CSE compound. Development in this area would focus the CSE compound and the proposed 400/132kV substation within one geographical area and would remove the requirement to develop two separate sites linked by between 750m and 1km of overhead line.

6.4.6 A CSE compound in Area E would be preferable to one in Area D with respect to effects on views from the AONB, due to its greater distance from the boundary of the designated site and the potential for screening to be provided by existing vegetation and natural variations in landform. Although parts of Area D comprise previously developed land, this area is immediately adjacent to the AONB boundary, and is within 150m of six Grade II listed buildings which could result in effects on their setting. A CSE compound within Area E would also be distinctly preferred to one within Area D with respect to proximity to settlement and individual properties. Area D lies within 20m of a residential property thought to be associated with the haulage yard and within 50m of a number of properties on the edge of the settlement of Sandford to the south of the A368.

FIGURE 1 – ENVIRONMENTAL CONSTRAINTS IN THE STUDY AREA



Key

Proposed Infrastructure

▬	Preferred Route Corridor

Existing Infrastructure

■	Existing Substation
━	Existing Western Power Distribution Overhead Line on Pylons
- - -	Existing Western Power Distribution 132kV Overhead Line for removal

Environmental Constraints

▭	Area of Outstanding Natural Beauty
▤	Special Area of Conservation
▨	Site of Special Scientific Interest
▦	Site of Special Scientific Interest (Ditches & Rhynes)
🟧	Scheduled Monument
●	Historic Buildings (Listed I, II* & II)
★	Conservation Areas
▭	Local Nature Reserve
🟩	Woodland
🟪	Housing Allocation

Ecological Records

▥	Local Wildlife Site / Site of Nature Conservation Interest
▨	Avon Wildlife Trust

NOTE 1:
Bristol ecological records 1km outside of the Preferred Route Corridor are not shown.

NOTE 2:
The following environmental constraints do not occur:
- World Heritage Site
- National Park
- Ramsar
- Special Protection Area
- National Nature Reserve
- Registered Battlefields
- Registered Park and Garden
- Heritage Coast
- Protected Wreck
- Airfield/Airport
- Public Safety Zone
- Housing and Open Space Allocation

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- English Heritage
- Local Constraints captured from South Gloucestershire Local Plan (2006), Bristol Local Plan (Adopted 1997), North Somerset Replacement local plan (Adoted 2007) and West of England Joint Waste Core Strategy - (Adopted March 2011) Adopted Mineral Working in Avon Local Plan (1993) Sedgemoor District Local Plan 1991-2011

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Project: **Hinkley Point C Connection Project**
Cable Sealing End Siting Study

Title: **Environmental Constraints**

Drawing No: G1979.966a

Date: October 2012

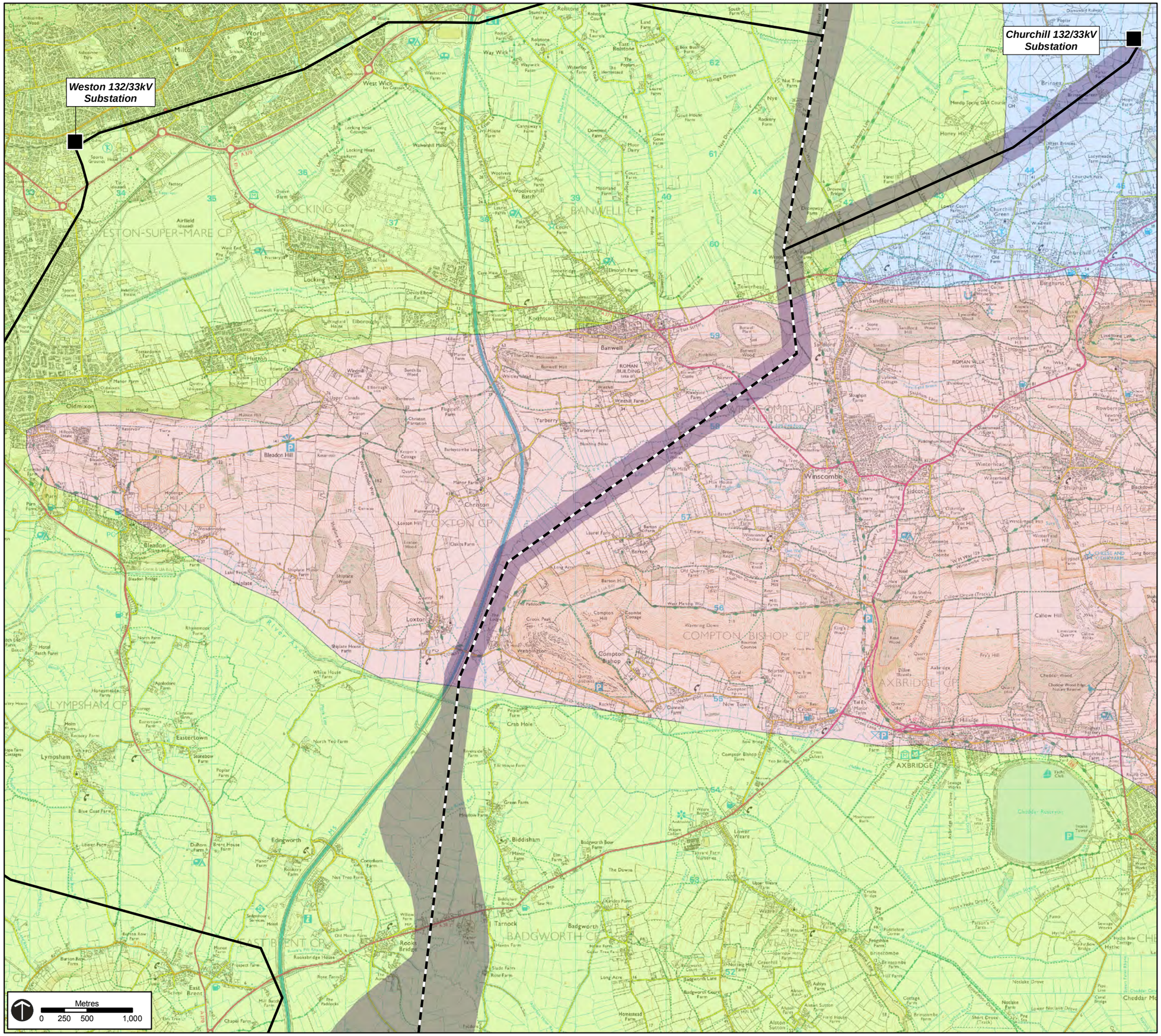
TEP Ref No: G1979.966a

Drawn: CB

Checked: CC

Approved: CC

FIGURE 2 – NATIONAL LANDSCAPE CHARACTER ASSESSMENT



Key

Proposed Infrastructure

- Preferred Route Corridor

Existing Infrastructure

- Existing Substation
- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution 132kV Overhead Line for removal

National Landscape Character Areas

- Bristol, Avon Valleys & Ridges
- Mendip Hills
- Somerset Levels & Moors

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Project: **Hinkley Point C Connection Project Cable Sealing End Siting Study**

Title: **Landscape Character Areas**

Drawing No: G1979.967a

Date: October 2012

TEP Ref No: G1979.967a

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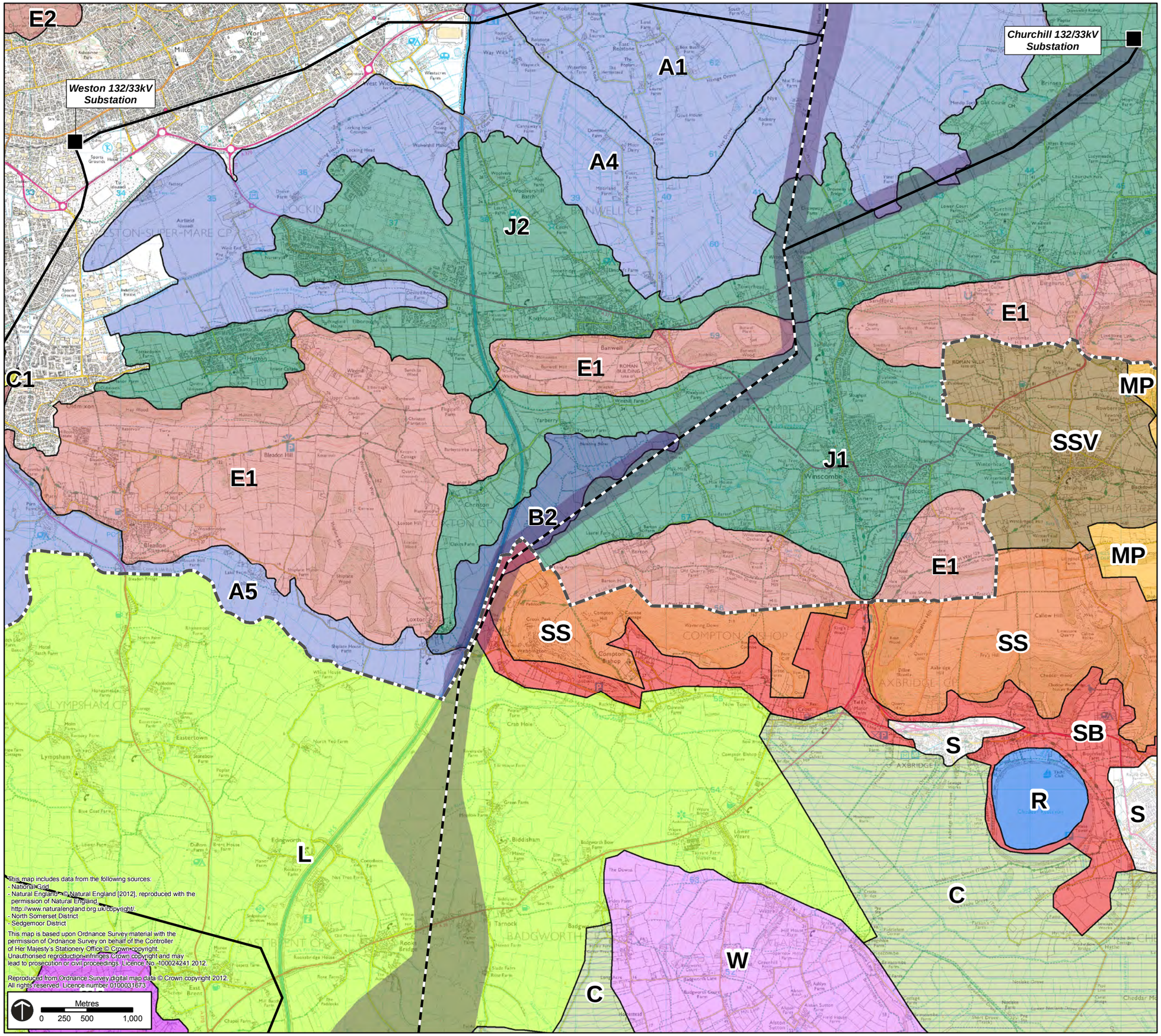
CB	CC	CC

FIGURE 3 – LOCAL LANDSCAPE CHARACTER ASSESSMENTS



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- North Somerset District
- Sedgemoor District

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Metres
0 250 500 1,000

Key

Proposed Infrastructure
- Preferred Route Corridor

Existing Infrastructure
- Existing Substation
- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution 132kV Overhead Line for removal
- Local Authority Boundary

North Somerset Landscape Character Areas
A: Moors
- A1 - Kingston, Seymour and Puxton Moors
- A4 - Locking and Banwell Moors
- A5 - Bleadon Moor

B: River Floodplains
- B2 - Lox Yeo River Floodplain

E: Limestone Ridges and Combes
- E1 - Mendip Ridge

J: Rolling Valley Farmland
- J1 - Lox Yeo Rolling Valley Farmland

Other
- Settlement

Sedgemoor Landscape Character Areas
Mendips
- MP - Mendip Plateau
- SB - Strawberry Belt and Footslope Villages
- SS - Scarp Slope, West Mendip Summits and Cheddar Gorge
- SSV - Shipham Slopes and Valleys

Levels and Moors
- C - Clay Moors
- L - Levels

Lowland Hills
- W - Isle of Wedmore
- IH - Isolated Hills

Other
- S - Significantly Built Up Areas
- R - Reservoir

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Project: **Hinkley Point C Connection Project Cable Sealing End Siting Study**

Title: **Local Landscape Character Areas**

Drawing No: G1979.968a

Date: October 2012

TEP Ref No: G1979.968a

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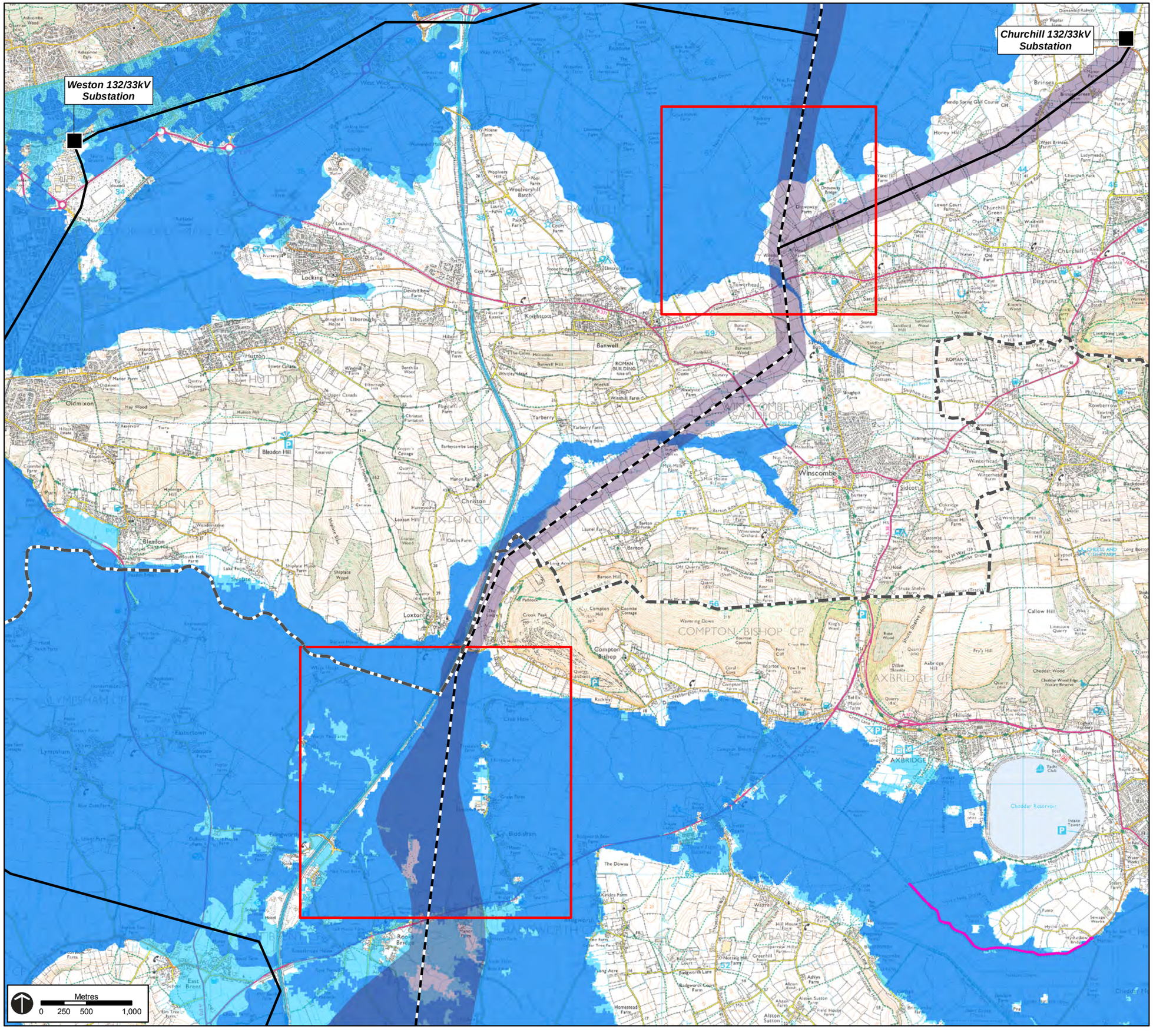
CB	CC	CC

FIGURE 4 – FLOOD ZONES



Key

Study Area

Cable Sealing End Siting - Study Area

Proposed Infrastructure

Preferred Route Corridor

Existing Infrastructure

Existing Substation

Existing Western Power Distribution Overhead Line on Pylons

Existing Western Power Distribution 132kV Overhead Line for removal

Local Authority Boundary

Flood Map

Flooding from Seas or Rivers without Defences

Extent of Extreme Flooding

Flood Defences (not all may be shown)

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Project: **Hinkley Point C Connection Project Cable Sealing End Siting Study**

Title: **Flood Risk Zones**

Drawing No: G1979.971

Date: October 2012

TEP Ref No: G1979.971

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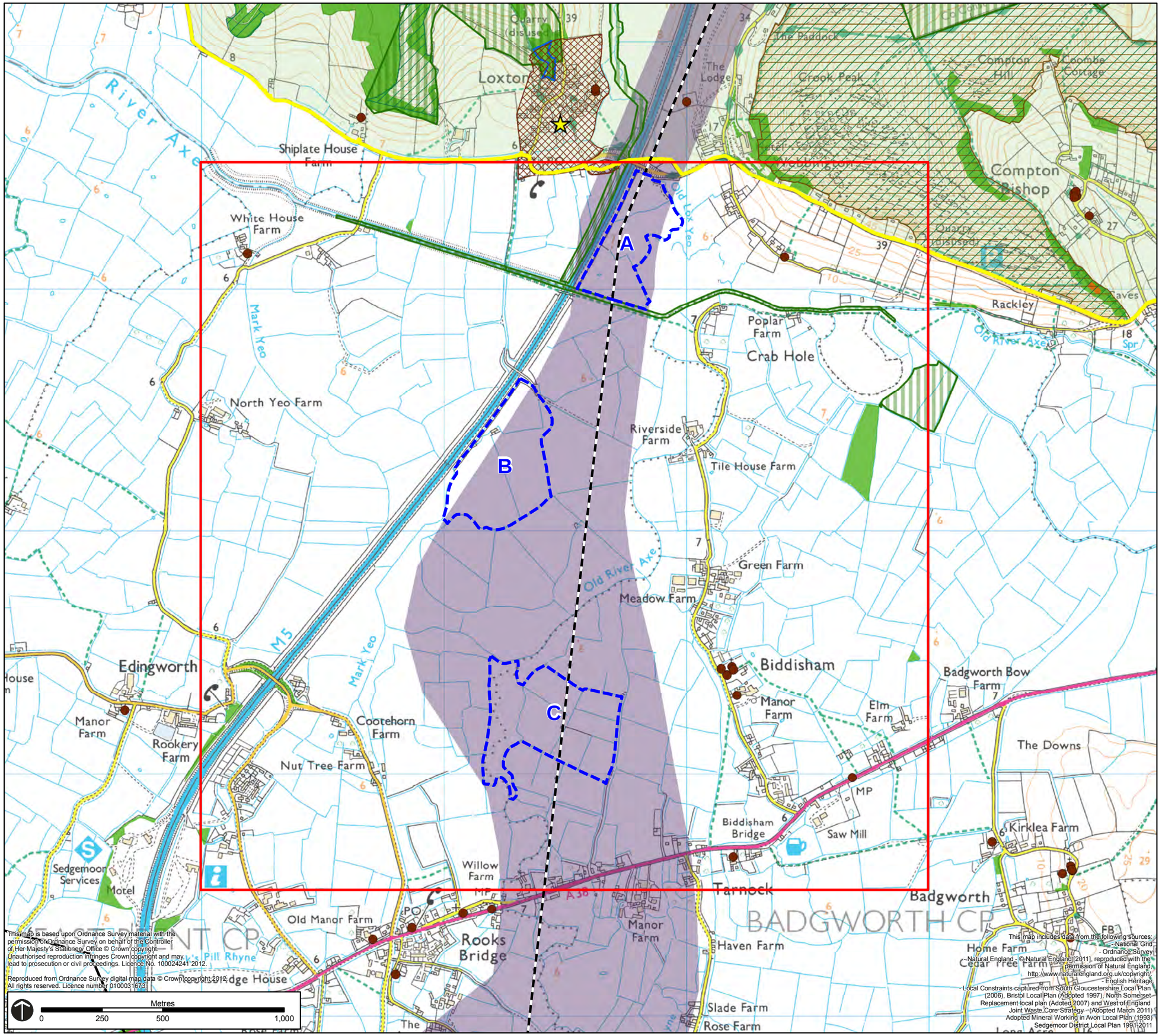
FIGURE 5 – POTENTIAL CSE AREAS TO THE SOUTH OF THE AONB



Key

Study Area

- Cable Sealing End Siting - Study Area (South)

Proposed Infrastructure

- Preferred Route Corridor
- Potential Cable Sealing End Compound Area

Site	Description
A	*Land to the north of the River Axe*
B	*Land adjacent to the M5 motorway south of the River Axe*
C	*Land to the North of Rooks Bridge*

Existing Infrastructure

- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution 132kV Overhead Line for removal

Environmental Constraints

- Area of Outstanding Natural Beauty
- Special Area of Conservation
- Site of Special Scientific Interest
- Scheduled Monument
- Historic Buildings (Listed I, II* & II)
- Conservation Areas
- Woodland

Ecological Records

- Local Wildlife Site / Site of Nature Conservation Interest

NOTE 1:
Bristol ecological records 1km outside of the Preferred Route Corridor are not shown.

NOTE 2:
The following environmental constraints do not occur:
- World Heritage Site
- National Park
- Ramsar
- Special Protection Area
- Site of Special Scientific Interest (Ditches & Rhynes)
- National Nature Reserve
- Local Nature Rserve
- Registered Battlefields
- Registered Park and Garden
- Heritage Coast
- Protected Wreck
- Airfield/Airport
- Public Safety Zone
- Housing and Open Space Allocation

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Project: **Hinkley Point C Connection Project Cable Sealing End Siting Study**

Title: **Potential Cable Sealing End Areas (South)**

Drawing No: G1979.977a

Date: October 2012

TEP Ref No: G1979.977a

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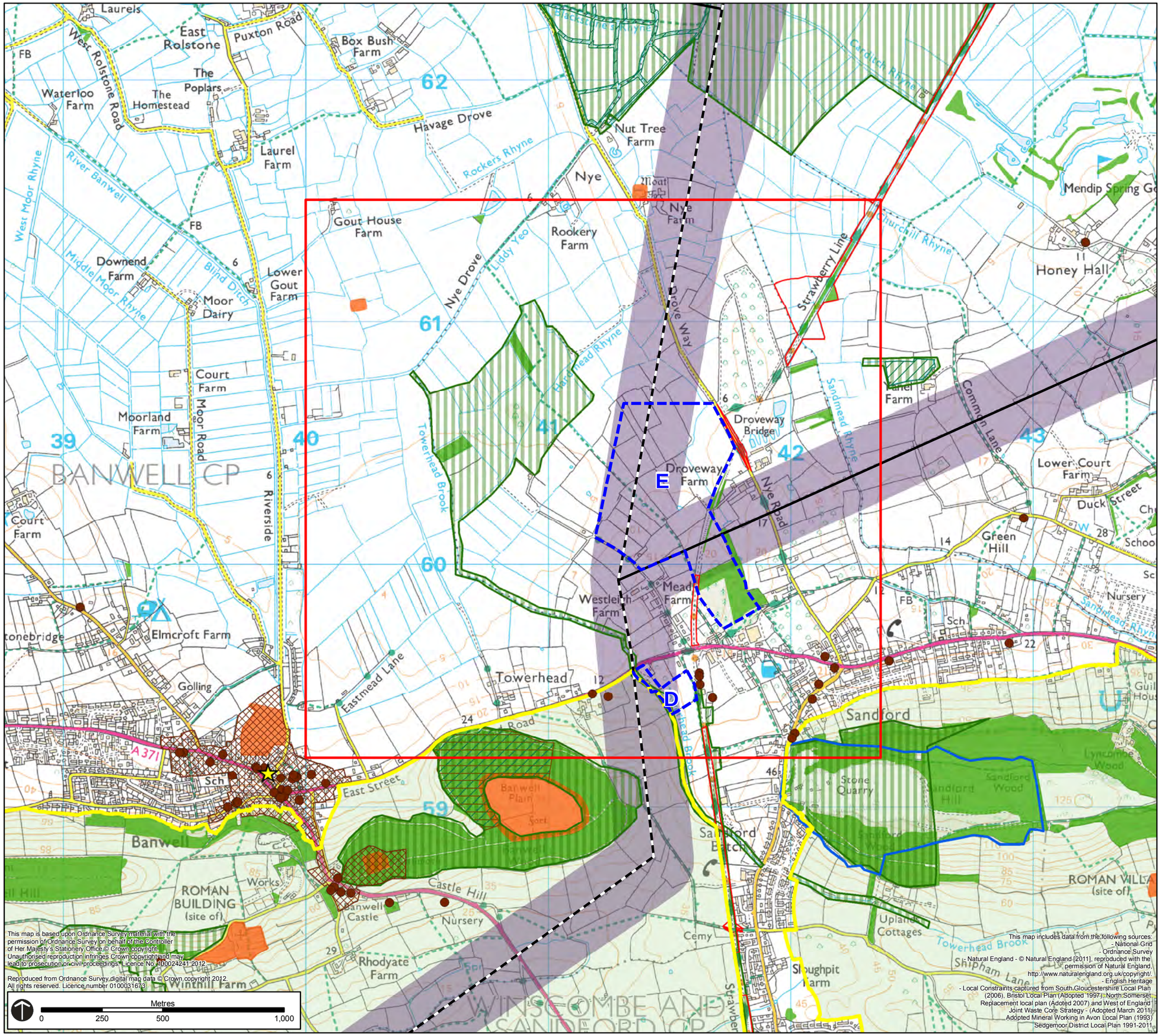
FIGURE 6 – POTENTIAL CSE AREAS TO THE NORTH OF THE AONB



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- National Grid - Ordnance Survey
- Natural England - © Natural England [2011], reproduced with the permission of Natural England, http://www.naturalengland.org.uk/copyright/.
- English Heritage
- Local Constraints captured from South Gloucestershire Local Plan (2006), Bristol Local Plan (Adopted 1997), North Somerset Replacement local plan (Adopted 2007) and West of England Joint Waste Core Strategy - (Adopted March 2011) Adopted Mineral Working in Avon Local Plan (1992) Sedgemoor District Local Plan 1991-2011

Key

Study Area

Cable Sealing End Siting - Study Area (North)

Proposed Infrastructure

Preferred Route Corridor

Potential Cable Sealing End Compound Area

Site	Description
D	*Haulage Yard to the south of the A368 at Sandford*
E	*Land to the West of Nye Road (Preferred Area of Search for 400/132kV GSP substation)*

Existing Infrastructure

Existing Western Power Distribution Overhead Line on Pylons

Existing Western Power Distribution 132kV Overhead Line for removal

Environmental Constraints

Area of Outstanding Natural Beauty

Special Area of Conservation

Site of Special Scientific Interest

Site of Special Scientific Interest (Ditches & Rhynes)

Scheduled Monument

Historic Buildings (Listed I, II* & II)

Conservation Areas

Local Nature Reserve

Woodland

Ecological Records

Local Wildlife Site / Site of Nature Conservation Interest

Regionally Important Geological Site

NOTE 1:
Bristol ecological records 1km outside of the Preferred Route Corridor are not shown.

NOTE 2:
The following environmental constraints do not occur:
- World Heritage Site
- National Park
- Ramsar
- Special Protection Area
- Site of Special Scientific Interest (Ditches & Rhynes)
- National Nature Reserve
- Local Nature Rserve
- Registered Battlefields
- Registered Park and Garden
- Heritage Coast
- Protected Wreck
- Airfield/Airport
- Public Safety Zone
- Housing and Open Space Allocation

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Project: **Hinkley Point C Connection Project Cable Sealing End Siting Study**

Title: **Potential Cable Sealing End Compound Area (North)**

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Drawn:	Checked:	Approved:
CB	CC	CC