Document 5.2.2.2

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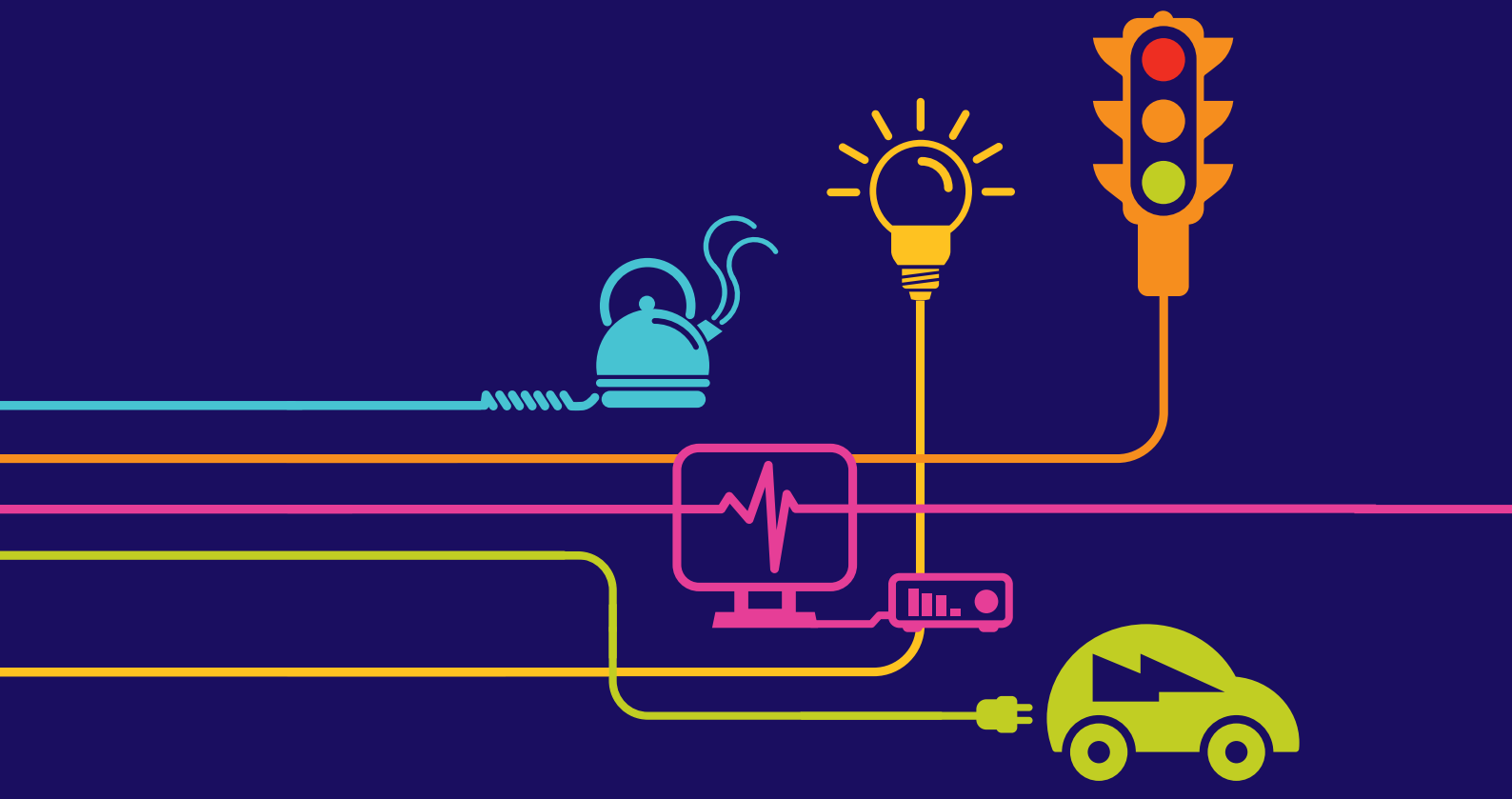
Environmental Statement Project Need and Alternatives Appendices 2D to 2E

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)

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2B	Hinkley Point C Connection Strategic Optioneering Report Additional Information (2010)
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2D	Hinkley Point C Connection Project Route Corridor Study (2009)
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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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2S	Western Power Distribution Connection between the Proposed Sandford Substation and the Existing N Route Overhead Line Technical and Environmental Appraisal (2013)
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 2D – Hinkley Point C Connection Project Route Corridor Study (2009)

HINKLEY C
ROUTE CORRIDOR STUDY
FOR PUBLIC CONSULTATION

October 2009

(Report Ref: 1979.016 r04)

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Copies of this Route Corridor Study can be purchased from National Grid at a cost of £30.00 for the printed document and £15.00 for a CD-Rom from:

TEL: 0800 377 7347
EMAIL: hinkleyconnection@uk.ngid.com

1.0 INTRODUCTION

1.1 This Route Corridor Study (RCS) has been produced by TEP–The Environment Partnership LLP (TEP) for National Grid Electricity Transmission plc (National Grid). The study focuses on a potential 400kV double circuit connection between Bridgwater, Somerset and Seabank substation northwest of Bristol to connect the proposed Hinkley Point C Power Station to the national grid high voltage electricity transmission system.

Background

The Required Connection

1.2 In September 2007 National Grid received an application from British Energy Generation Limited (now part of EDF Energy) for a connection to the national grid high voltage electricity transmission system for a new 3600MW nuclear power station at Hinkley Point, Somerset. The proposed power station will comprise 2 X 1800MW European Pressurised Reactors (EPR) to be built adjacent the existing Hinkley Point Power Stations. The new power station would be known as Hinkley Point C.

1.3 Under the terms of its licence, National Grid is obliged to make an offer of connection in response to each valid application made. National Grid has to respond within 3 months of receiving the application.

1.4 Prior to making an offer of connection, National Grid undertakes initial studies to identify the likely network reinforcement and route options and the conditions which are suited to attach to any offer. As a result of the short timescale to make the connection offer, the works which can be undertaken to respond to an application are at a high level. The offer reflects this situation and can be amended subsequently in the light of additional information or changed circumstances.

1.5 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 electricity transmission system:

- **Section 9** - to '*develop and maintain an efficient, co-ordinated and economical system of electricity transmission*'; 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.*'

Identification of Initial Options

1.6 After receiving the application for a connection, National Grid identified a series of possible methods of connecting the proposed Hinkley C power station in accordance with its licence obligations. National Grid identified potential technology options and connection points on the high voltage transmission system and considered these in the context of its statutory duties.

1.7 The initial assessment of options identified three potential connections which were most consistent with National Grid's obligations for operation of the electricity transmission system:

- An overhead line between Hinkley Point and Seabank 400kV substation, approximately 5km northwest of Bristol (indicative length 50km);
- An overhead line between Hinkley Point and Melksham 400kV substation, approximately 15km east of Bath (indicative length 76km); and
- An overhead line between Hinkley Point and Nursling 400kV substation, approximately 2km northwest of Southampton (indicative length 120km).

1.8 Each of these options would involve a reconfiguration of the existing overhead lines which run from the existing Hinkley Point substation east to Bridgwater. One line presently connects to Bridgwater 275kV substation; one continues east to Melksham; and one connects to Taunton to the southwest. These lines would be reconfigured so that any new connection would involve a new line commencing in the vicinity of Bridgwater.

National Grid's Connection Offer

1.9 Following its consideration of the options, National Grid's offer of connection was a new overhead line between a substation to be built adjacent Hinkley Point C and Seabank substation. In addition to the reconfiguration of existing lines described above and a new overhead line, the following works were identified to make the connection:

- New 400kV substation in the locality of Aust;
- New 400kV substation at Hinkley Point;
- New 400kV substation at Bridgwater;
- Installation of 2no. Quadrature Boosters at Fawley;
- Reconfiguration of existing overhead lines at Melksham; and
- Extension of Seabank substation.

1.10 The assessment of options showed that this appeared the option most consistent with National Grid's licence obligations because it would be most economic and would be anticipated to have no greater levels of environmental effects than the other options.

Additional Assessment

1.11 Following the offer of connection and its acceptance by British Energy (now EDF Energy), National Grid undertook additional assessment of the potential options and commissioned TEP to produce this RCS. TEP also provided information on the high level environmental constraints that would apply to a connection from Hinkley Point to Melksham and Hinkley Point to Nursling.

1.12 National Grid's further assessment and the information on the high level environmental constraints applying to other options not taken forward confirmed its view that Bridgwater to Seabank was the best option in light of its licence obligations. The factors which confirmed this view included the following:

- The Electricity Networks Strategy Group (ENSG) report '*The Electricity Transmission Network: Our Vision for its Future*';
- Identification of additional works required to make a connection between Hinkley Point and Melksham and Hinkley Point and Nursling; and

- Environmental constraints identified associated with possible routes from Hinkley Point to Melksham and Nursling.

1.13 These factors are discussed in turn below.

ENSG Report

1.14 In March 2009 the Electricity Networks Strategy Group published its report '*The Electricity Transmission Network: Our Vision for Its Future'*. This document has been produced in response to requests from the Office of the Gas and Electricity Markets (Ofgem) and Government for transmission companies to identify transmission reinforcements needed to support the achievement of the government's 2020 renewable targets and ensure that electricity supply remains secure and affordable. ENSG was invited to provide critical industry-wide input to this work.

1.15 ENSG's report identified a '**strong need case**' for a new 400kV circuit between Hinkley Point and Seabank in the South West region. This was identified as a proposed reinforcement to accommodate the agreed 2020 scenarios. The ENSG report also identifies the need for reconductoring works on the lines between Hinkley Point, Melksham and Bramley. The future changes in generation in this region which were identified as driving the need for additional transmission capacity include the potential for new gas-fired generation and possible nuclear replanting at Hinkley Point and/or Oldbury-on-Severn. Additionally, there is significant potential for offshore wind generation through the current Crown Estate Round 3 offshore wind leasing process, in this area.

Works Associated with Hinkley Point-Melksham

1.16 System design work identified that a connection between Hinkley Point and Melksham, only partially satisfies system needs. Any future development at Oldbury-on-Severn would require the replacement of the existing Iron Action–Melksham 275kV double circuit overhead line with a new 400kV double circuit overhead line and a new 400kV substation at Iron Acton.

1.17 The indicative length of overhead line between Hinkley Point and Melksham would be approximately 50% greater than that for a connection to Seabank. This additional length of overhead line and the further works would make the cost of a connection to Melksham unreasonably disproportionate in comparison to the equivalent connection to Seabank. It would not be economical or efficient to use this option.

Works Associated with Hinkley Point-Nursling

1.18 System design work identified that a connection between Hinkley Point and Nursling would also require the replacement of the existing Iron Action–Melksham 275kV double circuit overhead line with a new 400kV double circuit overhead line and a new 400kV substation at Iron Acton for any generation development at Oldbury-on-Severn. This option also requires the replacement of the cables and cable tunnel beneath Southampton Water; a rebuild of the existing Nursling substation to a double busbar design would take the place of an extension to Seabank substation.

1.19 The indicative length of overhead line between Hinkley Point and Nursling would be approximately 140% greater than that for a connection to Seabank. This additional length of overhead line would make the cost of a connection to Nursling unreasonably disproportionate in comparison to the equivalent connection to Seabank.

1.20 In light of the very high additional costs of connections between Hinkley Point and Melksham and Hinkley Point and Nursling, together with the absence of strategic benefit identified for the connection between Hinkley Point and Seabank (as identified by the ENSG report), the option to connect to Seabank remained the preferred option taken forward as the focus of the RCS.

Environmental Constraints Associated with Less Preferred Connections

1.21 It is generally the case that the shortest route length and an option with the least requirements for additional development on the wider transmission network (such as new substations and other overhead lines or underground cables) will result in least environmental effects.

1.22 However it is acknowledged that different types and levels of environmental constraints are presented in different areas. A longer route may avoid areas of high environmental sensitivity and works at different locations on the transmission network have different environmental effects.

1.23 A high level review identifying environmental constraints of potential connections between the proposed line reconfigurations and Melksham and Nursling respectively has been undertaken. The purpose of this exercise was to identify if there were likely to be demonstrable environmental benefits from a connection to Melksham or Nursling as compared to a connection to Seabank. The environmental constraints identified to these routes are set out below.

Bridgwater to Melksham

1.24 The existing 400kV overhead line between Hinkley Point and Melksham poses a constraint to routeing. To avoid crossings of the existing line a new route would have to travel south of the existing Hinkley Point to Melksham route. This would require a considerably longer overhead line route than a connection between Hinkley Point and Seabank.

1.25 The Mendip Hills Area of Outstanding Natural Beauty (AONB) extends east from Weston–Super–Mare and comprises a series of limestone hills covering an area of approximately 200km^2. The Cotswolds AONB lies to the north and south of Bath and is an extensive range of hills covering an area of 2,038km^2. These designated areas present a significant constraint to direct overhead line routeing between Bridgwater and Melksham. To avoid these areas a route corridor would need to travel south of the settlement of Wells.

1.26 Cranborne Chase and West Wiltshire Downs AONB lies east of Bridgwater and is an extensive belt of chalkland covering approximately 980km^2. To avoid the AONB a route corridor would need to travel to the east of Frome parallel to the existing 400kV Hinkley Point to Melksham route.

1.27 The Catcott, Edington and Chilton Moors, Tealham and Tadham Moors and Westhay Moors Sites of Special Scientific Interest (SSSIs) are a collection of adjoining moors to the north east of Bridgwater. These sites comprise diverse habitats which provide feeding and nesting sites for a wide range of birds such as Golden Plover and Lapwing. The existing 400kV Hinkley Point to Melksham overhead line passes through this area close to development at Burtle and Westhay and a direct route would follow a similar alignment.

1.28 Longleat Woods SSSI lies within the Cranbourne Chase and West Wiltshire Downs AONB to the south of Frome and is a large, ancient, semi-natural, broadleaved woodland. Overhead line routeing through this area is constrained to the east by the AONB and to the west by the existing 400kV Hinkley Point to Melksham overhead line.

Bridgwater to Nursling

1.29 There are scattered environmental constraints throughout the Bridgwater to Nursling study area, with a greater concentration in the type and number of constraints in the area surrounding Warminster. This makes an overhead line route difficult to achieve without affecting areas of high constraint, notably the New Forest National Park to the west of Nursling substation. Routeing from the west is highly constrained by Cranbourne Chase and West Wiltshire Downs Areas of Outstanding Natural Beauty (AONB) and the existing 400kV 4YB overhead line whereas a route to the north by settlement at Salisbury and the Salisbury Plain and West Wiltshire Downs. The Cranborne Chase and West Wiltshire Downs AONB lies between Bridgwater and Nursling and is an extensive belt of chalkland. This presents a significant constraint to overhead line routeing between Hinkley Point and Nursling. To avoid the AONB a route corridor would need to travel north east between the settlements of Frome and Warminster.

1.30 Longleat Woods SSSI lies within the Cranbourne Chase and West Wiltshire Downs AONB to the south of Frome and is a large, ancient, semi-natural, broadleaved woodland. Routeing through this area is constrained to the east by the AONB and to the west by the existing 400kV Hinkley Point to Melksham overhead line. Salisbury Plain SSSI covers an area of approximately 20,000ha and lies to the north east of Warminster. A route corridor in this area would be highly constrained by the SSSI in the north and the settlement of Warminster and Cranbourne Chase and West Wiltshire Downs AONB in the south.

1.31 Porton Down SSSI lies to the north east of Salisbury and comprises the largest uninterrupted tract of semi-natural chalk grassland in Britain. A route corridor in this area would be constrained between the SSSI and the settlement of Salisbury.

1.32 Bentley Wood SSSI covers an area of 665ha to the east of Salisbury. Routeing through this area is constrained by the woodland within the SSSI and a number of other blocks of woodland surrounding the villages of Pitton, Middle Winterslow and Farley. The remainder of the study area comprises scattered constraints which are not of a density to suggest that a route is unfeasible.

1.33 These constraints indicate that both the Nursling and Melksham longer route options did not offer environmental benefits that would outweigh the additional costs associated with each of the longer routes. The RCS has therefore considered the connection from Bridgwater to Seabank.

Process to Application for Consent

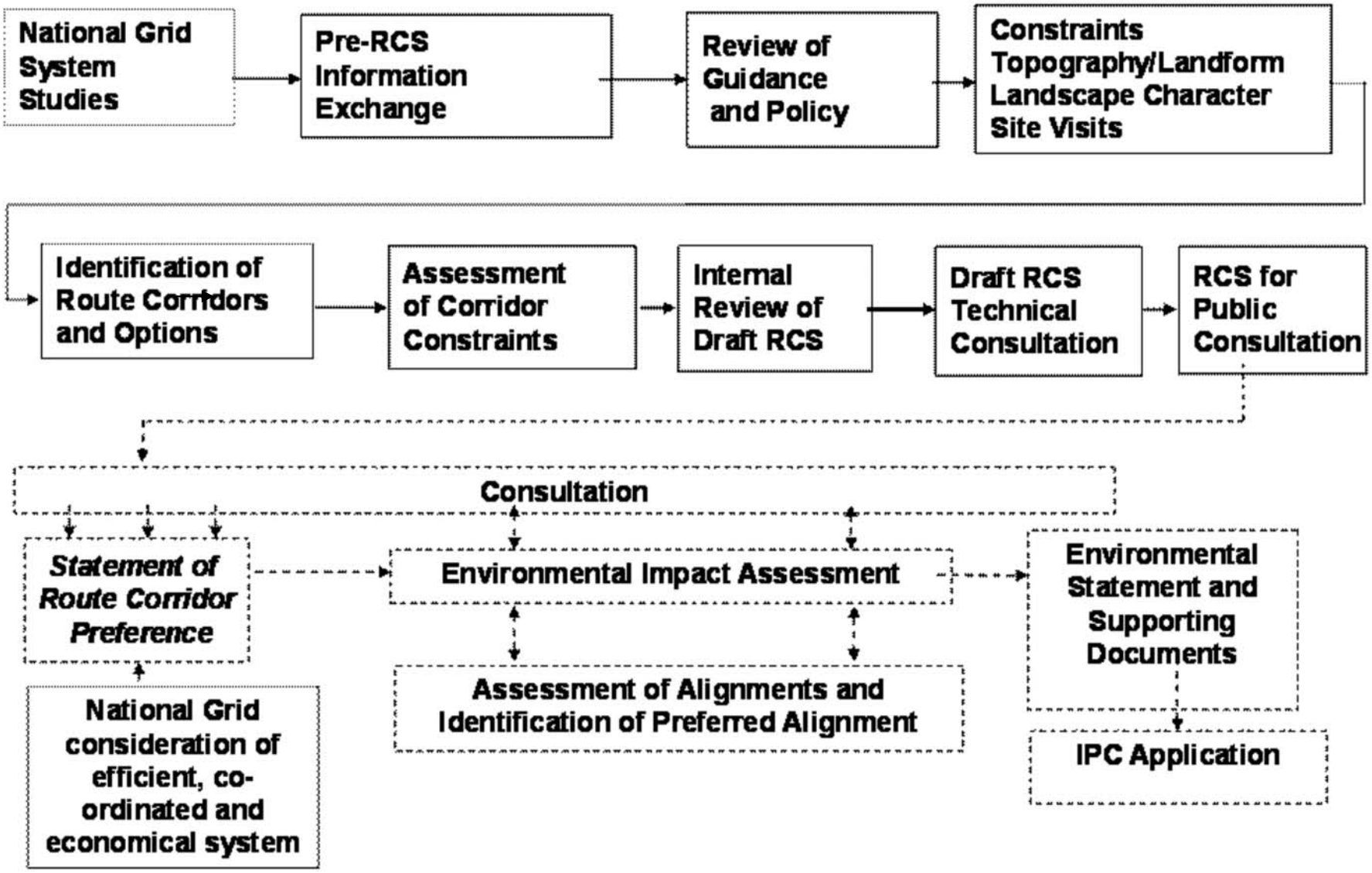
1.34 The connection of a new Hinkley Point C nuclear power station to the national grid high voltage electricity transmission network is a nationally significant infrastructure project under the Planning Act 2008.

1.35 The details of intended procedures to be followed for applications made to the Infrastructure Planning Commission (IPC) for such projects, stages, consultations, information and evidence required with an application were subject to consultation by the government until 19th June 2009. National Grid will revise its programme of activities to comply with the requirements established by the Planning Act, associated secondary legislation and in guidance issued by the government and the IPC, notably on consultation and engagement with stakeholders, communities and individuals.

1.36 An outline of National Grid's intended procedure from its review of options to application is presented at Diagram 1 overleaf. This version of the RCS (Consultation Draft) is part of the refinement of the preference of the route corridors shown on Diagram 1. National Grid will review the responses received and will consider the route corridors in light of its statutory obligation to '*develop and maintain an efficient, co-ordinated and economical system of electricity transmission'* (see paragraph 1.5 above). National Grid will then state its preferred route corridor which will be subject to further and wider consultations.

1.37 Following further and wider consultations on the route corridors, a review of responses received will be undertaken. A Statement of Route Corridor Preference will be prepared which summarises the responses received, considers the representations made and explains actions which have been taken. It will confirm the preferred route corridor taken forward to the EIA stage where alignments will be considered and a preferred alignment identified following consultation. The Environmental Statement will form an important part of the application to the IPC.

DIAGRAM 1: SUMMARY FLOW CHART OF ROUTE CORRIDOR STUDY AND APPLICATION PROCESS



2.0 CONSULTATIONS

Pre-Study Information Exchange (March – May 2009)

2.1 In advance of the RCS, National Grid commenced an exercise to give awareness of the connection requirements and the imminent RCS to key stakeholder agencies and to seek any initial responses. The following organisations were contacted with regard to the Bridgwater to Seabank connection:

- Natural England;
- English Heritage;
- Environment Agency;
- Royal Society for the Protection of Birds (RSPB);
- Potentially affected local planning authorities for connections to Seabank. These comprised Strategic Officers Group from Somerset County Council, Sedgemoor District Council and West Somerset District Council;
- Bristol Port Authority; and
- South West Regional Development Agency and South West Department of Communities and Local Government.

2.2 Information on the proposed connection studies was provided and local planning authorities were invited to respond if they wished to meet to discuss issues. A meeting was held with the Strategic Officers Group of Somerset County Council, West Somerset and Sedgemoor District Councils. Meetings were arranged with Natural England, English Heritage, Environment Agency and RSPB. The key outcomes of these meetings are summarised below.

Environment Agency

2.3 The Environment Agency (EA) sought and received confirmation that National Grid is responding to the recommendations of the Pitt Report (2008) on lessons learned from the severe flood events of the previous year. EA advised that National Grid should consider flood risk and effects of river crossings at an early stage. EA also alerted National Grid to the proposal for 'managed retreat' on the Parrett estuary and Steart Peninsula east of Hinkley Point A and B power stations and west of the proposed reconfiguration of lines near Bridgwater. National Grid has existing overhead lines which cross this area and is assessing the implications, but these would be the same for any options.

English Heritage

2.4 English Heritage (EH) confirmed that its definition of historic environment is broad and goes beyond scheduled and designated sites, also covering historic landscapes and their preservation

2.5 EH highlighted that special recognition of the Somerset Levels and Moors is being sought through designation as a UNESCO World Heritage Site. The boundaries of the candidate area have not yet been confirmed but will include much of the moors because of the area's rich archaeological heritage ranging from waterlogged prehistoric remains, to medieval canals and reclaimed wetlands. The Abbeys of Glastonbury, Athelney and Muchelney and the Cathedral and Bishop's Palace at Wells will also be included because of their extensive landholdings on the moors.

2.6 EH also confirmed its available data sets and that local planning authorities also hold useful information on registers. EH emphasised the need for specialist archaeological advice from the earliest stage of the project.

Natural England

2.7 Natural England (NE) referred to sea level change and its anticipated influence in the Pawlett Hams and other areas in that locality over the next 2 - 3 decades. Reference was made to the managed retreat project on the Steart Peninsula. The importance of the Severn Estuary and Somerset Levels for birds was emphasised and the potential for existing and new overhead lines to cause obstacles. This may be exacerbated if additional areas flood and become of greater value for birds. NE is undertaking research and will be able to give greater information when its studies are complete.

2.8 The sensitivity of groundwater on the Somerset Levels was noted although the small footprint of overhead line towers (pylons) was considered unlikely to introduce high risk.

2.9 NE confirmed its responsibility for protection of areas of landscape and biodiversity value. A new overhead line heading north from Hinkley Point should seek to avoid the Mendip Hills AONB. A line running west should seek to avoid SPAs, SSSIs and NNR on the Somerset Levels.

Royal Society for the Protection of Birds

2.10 Royal Society for the Protection of Birds (RSPB) is not a statutory consultee but was consulted due to the presence of internationally important areas for birds (Special Protection Areas (SPAs)). RSPB noted concern regarding the potential effect of a new overhead line on the feeding grounds and flight paths of birds associated with the Severn Estuary SPA and Somerset Levels and Moors. The RSPB questioned whether a new overhead line corridor could follow the route of the M5 as closely as possible and avoid the Steart Peninsula managed retreat.

Strategic Officer's Group

2.11 Officers alerted National Grid to the Steart Realignment Project (see notes on Environment Agency and RSPB above).

2.12 National Grid was asked approximately how many towers would be built for a new line to connect Hinkley Point to Seabank and it was explained that the route subject to the corridor study would be approximately 40km long, and would consist of around 120 towers.

2.13 Officers noted that building a new overhead line parallel to an existing overhead line would be an option to consider as compared to building a new overhead line in an area presently without a line, although any new overhead line would be likely to face opposition from local communities.

Bristol Port Authority

2.14 The Bristol Port Authority alerted National Grid to extensive development proposals within the port complex (including a deep sea container terminal) and noted concern over new overhead line development within the port complex.

South West Regional Development Agency (RDA) and South West Department of Communities and Local Government (DCLG)

2.15 The South West RDA and DCLG noted concern over the level of consultation already undertaken in the region in relation to large infrastructure projects. The RDA and DCLG also enquired about the financial costs of the connection and the how options for the connection were assessed and clarified.

Summary of Information Exchange Responses

2.16 Although this pre-study information exchange was primarily to give awareness of the project and to receive very initial responses, it proved useful in confirming that there are areas of high environmental value within study areas for connections and that these should be considered carefully in any connection proposal.

2.17 The area of managed retreat east of Hinkley Point is presently crossed by existing overhead lines. Any new connection from Hinkley C avoiding this area (rather than re-using existing lines) would need to be routed south of the Peninsula and north of Bridgwater.

Statutory Consultees and Local Planning Authorities Consultation Draft RCS

2.18 Following production of the Statutory Consultees and Local Planning Authorities Consultation Draft RCS, TEP and National Grid consulted with key stakeholder agencies and local planning authorities in July 2009 to obtain technical feedback and guidance on the RCS. The following organisations were consulted:

- Natural England;
- English Heritage;
- Environment Agency;
- Royal Society for the Protection of Birds (RSPB);
- Forestry Commission;
- Mendip Hills AONB Unit; and
- Potentially affected local planning authorities for connections to Seabank. These comprised Somerset County Council, Sedgemoor District Council, North Somerset Council, West Somerset District Council, Bristol City Council and South Gloucestershire Council;

2.19 Officers from statutory consultees and local planning authorities were invited to attend workshop events during July 2009 at which the method and findings of the RCS were presented and key issues discussed. Attendees were provided with copies of the draft RCS and a briefing pack and asked to provide technical feedback and officer opinions on the work done to date. The outcomes of these consultations are detailed at Appendix 5 with the key issues addressed below. The comments received are officers' technical and initial responses and do not form an official response or view of any of the organisations or planning authorities on the proposed connection.

2.20 The specific items raised and responses to these are set out below and comprise the main additions to the earlier draft route corridor study in this Consultation Version.

RSS Housing Allocations

2.21 Sedgemoor District Council highlighted that strategic housing allocations from the Draft Regional Spatial Strategy (RSS) for the South West 2006 - 2026 had been omitted from the environmental constraints used in the identification of overhead line corridors.

2.22 Strategic housing sites identified in the south west RSS largely comprise infill development within or on the edge of large settlements and do not pose a significant constraint to the identification of overhead line corridors where these avoid settlements. The largest of these allocations include: 310 dwellings per annum to the north east of Bridgwater; 600 dwellings per annum within and adjoining Weston-super-Mare's urban area; an urban extension accommodating up to 9,000 dwellings to the east of Weston-super-Mare; and an urban extension to south west of Bristol comprising 15,500 dwellings. These strategic housing sites are indicatively illustrated at Figure 2.

Further Information on Existing and Proposed Towers

2.23 Consultees including Natural England and North Somerset Council requested further information on the height and design of the towers (pylons) required for a 400kV overhead transmission line and identified the need to consider the use of alternative tower designs.

2.24 The existing 132kV overhead line is supported on lattice steel towers of L7 design approximately 27m high. The proposed 400kV overhead line would use towers of a new design, which are likely to be approximately 47m high. The new suite of towers will be specifically designed to support triple 'Araucaria' conductors (the bundle of wires on the line) and are likely to be similar in appearance to National Grid's existing L12 towers. Comparative elevations of L7 and L12 towers are presented at Figure 12. The use of alternative tower types and designs will be considered as part of detailed alignment and EIA studies.

'Mixing and Matching' of Corridors

2.25 Natural England questioned whether corridors could be 'mixed and matched' to achieve the optimal overhead line route for the Hinkley C connection as the RCS had considered and compared each potential route in isolation rather than considering if an optimal route would contain elements of different corridors.

2.26 Linking sections of different corridors across large parts of the route between Bridgwater and Seabank would introduce a greater scale of change from the existing situation and increased environmental effects. However, at particular areas of constraint on the route, parts of corridors could be used to identify an overhead line route with the least environmental effects. These areas of constraint and the potential for using parts of different corridors to identify an optimal corridor are considered in Chapter 8.0 of this report.

Corridor along the route of the M5

2.27 During pre-study information exchange with the RSPB and consultation with the EA on the RCS National Grid was asked to consider the feasibility of an overhead line route corridor that follows the route of the M5 motorway as closely as possible.

2.28 The M5 motorway runs through the study area between Bridgwater and Seabank in a north–south direction. Due to the proximity of large settlements at Burnham-on-Sea, Weston-super-Mare and Clevedon any potential overhead corridor would be restricted to the eastern side of the motorway.

2.29 To the east of the M5, a number of environmental constraints makes a closely parallel corridor difficult to achieve. However, potential opportunities for utilising the M5 corridor have been explored throughout the route and are discussed in Chapter 8.0 of this report.

Potential Links between Severn Estuary and Somerset Levels and Moors SPAs

2.30 Consultees including Natural England, the Environment Agency and RSPB identified an increasing awareness of the relationship and potential linkages between the Severn Estuary SPA and the Somerset Levels and Moors SPA for wintering and migratory bird populations.

2.31 The extent of these linkages and the key navigation routes between these sites is subject to ongoing research and study. However, the SPAs have been designated and are of their present relative values with the existing overhead lines present. A connection option which adopted the route of the Western Power Distribution (WPD) 132kV overhead line would not add substantially to the potential obstacle to flyways which presently exists. An assessment of the potential effects of a new 400kV overhead line on breeding, wintering and migratory birds will be undertaken as part of detailed alignment and EIA studies.

3.0 DEFINITIONS AND STUDY ASSUMPTIONS

3.1 The purpose of this route corridor study (RCS) is to identify potential route corridors in which an alignment for an overhead line can in turn be identified.

Definitions

3.2 The following definitions have been used in considering connections:

Connection Point

3.3 A place on part of the existing or proposed electricity transmission system where there is an existing connection or to which a new electrical connection is proposed.

Route Study Area

3.4 A geographic area containing one or more connection points.

Constraint

3.5 An influence on routeing overhead lines.

Overhead Line

3.6 One or more high voltage electricity transmission circuits suspended from above ground supports. Typically refers to conductors suspended from steel lattice towers (pylons).

Cable Sealing End

3.7 Structures used to transfer transmission circuits between underground cables and overhead lines.

Route Corridor

3.8 A defined linear shape identified on a map which may be of variable width and whose extent at any point is typically defined by constraints or differentiation from other route corridors.

Alignment

3.9 The actual route of an existing overhead line or a proposed detailed route for an overhead line associated with a route corridor. A route corridor may contain a number of possible alignment options.

Option

3.10 A means of making a connection which applies to a route corridor. A route corridor may have more than one option which applies. For example, a transmission circuit may be installed by the option of underground cables or overhead line. A 400kV route corridor based on the route of a 132kV existing line may have the option of a new overhead line built parallel to it or of a new 400kV overhead line built along its route with the existing 132kV line removed.

Study Assumptions

Overhead or Underground Transmission

3.11 National Grid's high voltage electricity transmission network is almost exclusively an overhead line network. National Grid owns and operates approximately 7,200 kilometres of overhead lines and approximately 675 kilometres of underground cables in England and Wales. The very high proportion of overhead lines reflects the very high relative costs of underground cables, in respect of manufacture, installation and operation, and also the more extensive land requirements for underground cables as compared to overhead lines. This approach is consistent with other European countries.

3.12 National Grid has a policy related to the use of underground cables which in summary reserves consideration of their use to areas of high technical constraint and to areas of the highest recognised amenity value. The policy is discussed at paragraphs 5.9 to 5.16 below.

3.13 It is intended that the required connection would be by overhead line, although where National Grid's policy indicates that it is appropriate to do so, detailed consideration would be given to use of underground cables.

Overhead Line Design

3.14 An overhead line for an appropriate connection for Hinkley Point C would be a double circuit 400kV overhead line with triple Araucaria conductors per phase, supported by lattice steel towers (pylons). This means that each tower would have three side arms on two opposite sides, with three sets of conductors (wires) suspended from each of the six side arms of each tower.

3.15 The proposed overhead line would use towers of a new L13 design, which are currently being developed and are likely to be approximately 47m high. These new towers are required to support the Araucaria conductors which are needed to meet the power output on the system. The approved design will resemble previous tower types with the following characteristics:

- Standard height 47m;
- Standard base footprint 10m x 10m (total area enclosed by tower base comprising four stub foundations); and
- Typical span 360m.

3.16 Where an overhead line changes direction and where lines terminate at substations or cable sealing end compounds, stronger towers are required which have heavier steelwork and larger footprints than the standard towers. Taller towers than the standard heights may be required in some locations and these have extensions and may require larger footprints. Longer and shorter spans than the typical span are likely to be needed in some locations, with longer spans often used to oversail potential obstacles and shorter spans on either side of longer spans than typical.

Use of Lower Voltage Line Routes

3.17 Where there is an existing overhead line route running for part or the entirety of a possible route corridor between two connection points (typically a 132kV overhead line suspended from lattice steel towers), it has been assumed that it may be possible for a higher voltage overhead line to use part or all of that route, subject to detailed survey. Detailed survey would demonstrate whether there are appropriate safety clearances from adjacent structures for the higher voltage line and if there are other technical or severe amenity constraints which would be incurred. These constraints may result in adjustments to the existing route to make it appropriate for the higher voltage line or discounting the use of that route as unsuitable for the higher voltage line.

3.18 Where there is the possibility to use the route of an existing overhead line, it is assumed that options are to build the new 400kV overhead line parallel to the existing line and leave the existing line in place; or to build the new 400kV line and remove the existing overhead line.

3.19 Determination of the feasibility of removing the lower voltage line requires liaison with the Distribution Network Operator (DNO) which owns and operates the line as part of the distribution network in any area (in this case Western Power Distribution).

3.20 If a 132kV overhead line is removed, action is generally required to ensure that the remaining 132kV distribution system remains secure and robust following removal of that line. The necessary action in each case would be identified in liaison with the relevant DNO. This may involve the installation of a new 132kV overhead line; underground cables; a new grid supply point (GSP) or a combination of each of these actions. (A GSP in this case is a point of connection between the high voltage transmission system and the distribution network. It would require installation of switchgear and transformers to 'step down' voltage from 400kV used in transmission to 132kV used in distribution.)

3.21 Information on the feasibility of using existing 132kV line routes as corridors and the consequent requirements for actions to maintain distribution supplies is stated in relation to corridors where this is relevant.

Consent and Environmental Impact Assessment

3.22 An authority authorised by statute to grant consent for development is termed a competent authority. For development requiring planning permission under the Town and Country Planning Act 1990 (as amended), the competent authority is generally the local planning authority. For development comprising an overhead line, the competent authority is generally the Secretary of State for Energy and Climate Change (ECC).

3.23 The Infrastructure Planning Commission (IPC) is a national commission established to determine applications for consent for nationally significant infrastructure projects. The IPC was established under the 2008 Planning Act and is anticipated to begin receiving applications in 2010.

3.24 The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 (as amended) require that consideration is given to Environmental Impact Assessment (EIA) for applications for consent for overhead lines of voltages of 132kV and higher made to the Secretary of State for ECC.

3.25 The government has issued a consultation document on the application of EIA to projects submitted to the IPC for consent.

3.26 It is anticipated that an application for consent for the proposed connection of Hinkley Point C would be made to the IPC and that EIA would be required. However the potential consent regime, competent authority for consent and Regulations under which EIA would be considered and undertaken for a connection has not influenced the route corridor study.

4.0 APPROACH AND METHOD

4.1 This Chapter presents the approach and method followed for the RCS which is one part of the overall process of preparing the application for consent.

4.2 Following the review of initial options (see 1.6 above) and identification of the potential connection points, National Grid undertook an initial stage of information exchange, primarily targeted at making statutory agencies including local planning authorities aware of the need for a connection and the start of the RCS. The primary purpose of this was for National Grid to provide information although useful initial responses were obtained from consultees.

Routeing Constraints

4.3 Information from pre-study information exchange was considered in a review of National Grid's guidance and policies on infrastructure siting and routeing. This guidance has been in use and has evolved with experience over many years.

4.4 A brief review of key elements of planning policy was undertaken to identify important aspects that may influence siting and routeing of infrastructure but which was not represented in National Grid's guidance.

4.5 These reviews identified potential constraints and influences on siting and routeing infrastructure including statutory and planning designations. These were collated and analysed from desk study and also considered in site visits.

Landform (Topography and Physiography)

4.6 The Holford Rules (see paragraph 5.7 – 5.8 below) 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.

4.7 Landform has been considered in identifying route corridors by interpreting contour and spot height information on Ordnance Survey mapping. In addition, visualisations of levels and slopes have been prepared in computer software based on Ordnance Survey digital terrain model height information at 10m intervals.

4.8 This information has been used to consider the opportunities for potential route corridors that may produce alignments that comply with the Holford Rules and which have potential to minimise adverse effects on the landscape.

Landscape Character

4.9 There are designations relating to protection of the landscape that include reference to character, although character is not the only factor considered in designation. Reference is made to these designations in the review of National Grid's policy and guidance (see Chapters 5.0 and 6.0 below).

4.10 Prior to the reform of the planning system introduced in the Planning and Compulsory Purchase Act 2004, local planning authorities identified areas of high relative landscape value within their administrative districts in designations such as 'Area of Special Landscape Value' and 'Special Landscape Area'. These were development plan designations in which restrictions on development applied.

4.11 National planning policy guidance issued in Planning Policy Statement 7: Sustainable Development in Rural Areas notes that, whilst it is accepted that there are areas of landscape outside nationally designated areas that are particularly highly valued locally, policies can provide sufficient protection for these areas, without the need for rigid local designations. It advises that landscape character assessment can provide the basis for policies.

4.12 This guidance places emphasis on landscape character assessment as a tool for guiding policy. Landscape character assessments generally identify areas of landscape of a similar character and describe that character referring to aspects and features which, alone or in combination, make it distinct. Assessments typically refer to types of development or activity to which a landscape may be particularly sensitive. For example, in a small-scale intimate landscape characterised by rolling topography and a high degree of enclosure by hedges, low buildings with a large footprint may introduce a scale of development that is inconsistent with defining features. By contrast, this scale of development may be more consistent with a landscape that is open and expansive.

4.13 Landscape character assessments are undertaken and reported at a range of scales, usually to support land use planning at different scales. There are landscape character assessments in England undertaken at national, regional, county and district levels, although coverage at levels below national is not comprehensive. Landscape character assessments also identify aspects of land management not usually covered by land use planning which affect character, such as treatments of hedgerows, walls and fences and agricultural practices.

4.14 In identifying potential route corridors, reference has been made to available landscape character assessments which have been presented on maps. The descriptions of landscape character and sensitivity of landscape have been used to assist in identifying potential overhead line route corridors. It is acknowledged that the scale of development presented by a new 400kV overhead line would inevitably give rise to landscape effects. However landscape character assessments can indicate which landscape characters have greatest ability to assimilate these effects.

4.15 Landscape character has also been considered on site visits, with photographs and notes recording aspects of landscape character and views in the study area.

'Opportunity Corridors'

4.16 The primary basis on which route corridors have been identified are the constraints, considered with topography and landscape character. However where there are existing overhead lines whose routes, completely or in part, have potential to be used for new overhead lines which would make the required connection, these have also been identified. For example a 132kV overhead line

may run on a route which a new 400kV overhead line may be able to take between connection points. These existing routes may affect features identified as constraints to new route corridors, although the scale of change from the existing situation by installing a new line in addition to or replacing the existing line may be lower than a new line in a situation where no line presently exists.

4.17 Where identified, these 'opportunity corridors' have been compared to new route corridors.

Comparison of Route Corridors

4.18 When 'opportunity corridors' have been identified, different options within each corridor, such as a new line parallel with an existing line or building a new line and removing the existing, have been identified (see paragraph 2.9). It has generally been assumed that these are the two options which could apply to any corridor based on an existing line of lower voltage than 400kV.

4.19 Once route corridors and any different connection options within corridors have been identified, route corridors have been compared using judgement applied to their performance against identified constraints, landscape character and landform.

4.20 Identification of the least environmentally constrained route corridor and option has been presented as the completion of this RCS.

Sources of Information

4.21 The study has been undertaken using desk-based information and from site visits undertaken by TEP's specialists in landscape, town and country planning, ecology and archaeology in April and May 2009. (Archaeology was sub-contracted to RSK.)

4.22 The main sources of information were:

- 'shape files' from sources of environmental information as presented in Table 5.2 below;
- Google Earth and Windows Live web based aerial imagery;
- Ordnance Survey Explorer 1:25,000 and Landranger 1:50,000 mapping;
- Local Plans and Unitary Development Plans (local authorities' planning guidance sourced from the internet and hard copies of documents where these were available);
- Reports on landscape character assessments; and
- Landform information derived from Ordnance Survey digital terrain modelling.

5.0 NATIONAL GRID'S ENVIRONMENTAL GUIDANCE

5.1 This Chapter considers National Grid's guidance relevant to identifying route corridors.

5.2 National Grid refers to guidance notes on siting infrastructure when considering options for connections and changes to its network.

National Grid's Schedule 9 Statement

5.3 National Grid has a two-fold duty placed on it under Schedule 9 of the Electricity Act 1989:

- 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
- 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.

5.4 There is also an obligation for National Grid to publish a statement presenting how it will comply with this duty.

5.5 National Grid's Schedule 9 Statement (see Appendix 1) sets out ten commitments under which it takes action to address the obligations under Schedule 9 of the Electricity Act 1989. These 10 commitments and action points are reproduced below:

1. Establishing need, in particular only seeking to build lines along new routes, or substations in new locations, where the existing transmission infrastructure cannot be upgraded to meet transmission security standards, or where National Grid foresees an increase in demand for electricity which will not be satisfied by other means, or where connections to customers are required.

2. Avoiding nationally and internationally designated areas, specifically National Parks; Areas of Outstanding Natural Beauty; Sites of Special Scientific Interest including Special Protection Areas, Special Areas of Conservation and Ramsar sites; National Nature Reserves; Heritage Coasts; World Heritage Sites; and Scheduled Monuments.

3. Minimising the effects of new transmission infrastructure, seeking to minimise the effects of new transmission infrastructure on 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. National Grid will take into account the significance of these and other areas through consultation with statutory bodies and local authorities.

4. Mitigating adverse effects of works. Where works are likely to have an adverse effect on amenity, National Grid will carry out mitigation measures to reduce those effects as far as practicable. It will use environmental impact assessment techniques to assess possible effects and identify opportunities for

mitigation measures, and in the course of this National Grid will consult the relevant statutory and non-statutory consultees together with landowners. Where the effect of works is significant, National Grid will consult affected residents.

5. Compensating where mitigation is not possible
Where mitigation measures cannot fully mitigate against loss of amenity, or where mitigation is not possible, National Grid will offer to undertake practical offsetting measures. These could include landscaping and planting works or other benefits to affected communities.

6. Enhancing the environment around National Grid's works
When undertaking works, National Grid will consider what practicable measures can be done to enhance areas in the vicinity of the works for the benefit of the local community or the natural environment.

7. Monitoring and continuous improvement
Post-construction, National Grid will carry out a review of the environmental impact of its works and consider the effectiveness of its assessment and any mitigation National Grid has undertaken. The results of reviews will be used to improve management practices and to foster continuous improvement in the environmental assessment and management of schemes.

8. Best practice in assessing environmental impact
In determining the environmental impact of its works, National Grid will ensure that it utilises best practice methods, undertaking research to refine its understanding of best practice. National Grid will undertake relevant environmental investigations and report on these in any applications for consent for new works.

9. Consultation and liaison
When planning works that will have a high impact on a residential area or a site valued for its amenity, National Grid will consult with local interest groups and residents, with the aim of identifying key environmental issues which can be taken into account and more effectively mitigated. In order for consultation to be most effective it will be done at a stage where the results can be used to influence the design of the project. When undertaking works, which will have a less significant impact, National Grid will liaise with and inform affected residents according to the severity of that impact. National Grid will take into account local biodiversity action plans and other local initiatives being undertaken by local communities.

10. Reviewing this Statement
National Grid intends to review its Schedule 9 Statement at least every five years. However, as a responsible company practising good corporate governance, it undertakes to review the relevance of this statement annually and report on its website case studies illustrating its Schedule 9 performance.

5.6 Commitments 1, 2 and 3 are those relevant to the identification of route corridors. Commitment 1 refers to the need for the new infrastructure, including the need for new routes. Commitment 2 sets out areas of the highest

sensitivity which National Grid seeks to avoid in siting and routeing new infrastructure. Commitment 3 sets out areas of value on which National Grid seeks to minimise effects of its infrastructure.

The Holford Rules

5.7 In addition to the above guidance on siting all infrastructure, specific guidance on routeing overhead lines is provided by the 'Holford Rules', presented in Appendix 2. This guidance is primarily related to minimising effects on landscape and includes 'rules', explanatory and supplementary notes. The key 7 rules on minimising landscape effects in routeing overhead lines are presented below:

1. **Avoid altogether, if possible, the major areas of highest amenity value.** (An explanatory note states that these designations include Areas of Outstanding Natural Beauty, National Parks, Heritage Coasts and World Heritage Sites.)
2. **Avoid smaller areas of high amenity value or scientific interest by deviation where this can be done without using too many angle towers** (An explanatory note explains that Sites of Special Scientific Interest may require special consideration for effects on ecology. A further explanatory note states that where possible routes should be chosen which minimise effects on the settings of areas of architectural, historic and archaeological interest including Conservation Areas, Listed Buildings, Listed Parks and Gardens and Ancient Monuments.)
3. **Other things being equal, choose the most direct line, with no sharp changes of direction to minimise use of angle towers.**
4. **Choose tree and hill backgrounds in preference to sky backgrounds, wherever possible; and where the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where there is no dip in the ridge, cross directly, preferably between belts of trees.**
5. **Prefer moderately open valleys with woods where the apparent height of towers will be reduced and views of the line will be broken by trees.**
6. **Where land is flat and sparsely planted, keep high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, to avoid 'wirescape'.**
7. **Approach urban areas through industrial zones, where they exist.** When **pleasant residential and recreational land intervenes between the approach line and the substation, consider carefully the comparative costs of undergrounding, for lines other than those of the highest voltage.**

5.8 The Supplementary Note to Rule 5 refers to the desirability of avoiding vegetation including woodlands. A Supplementary Note to Rule 7 states that alignments should be chosen after consideration of effects on the amenity of existing development and on proposals for new development. A further general Supplementary Note advises avoid routeing close to residential areas as far as possible on grounds of general amenity.

National Grid's Undergrounding Policy

5.9 Holford Rule 7 above refers to the consideration of use of underground cables instead of overhead lines. National Grid has a policy referring to the use of underground cables for high voltage transmission circuits which is presented in Appendix 3.

5.10 National Grid acknowledges in its policy the very high cost of installation of underground cables for high voltage transmission as compared to the equivalent overhead line. There are also higher operational costs and greater risks in the event of faults (as faults need to be discovered, excavated and repairs made to circuits below ground). Installation of high voltage underground cables also causes disturbance to large areas of land with adverse effects on land use during installation and subsequent operation and in particular potential risks to areas of ecological and archaeological sensitivity during installation.

5.11 For the reasons outlined in 5.10 National Grid reserves detailed consideration of its use instead of overhead lines for 'exceptionally constrained areas'. The policy gives explanations of these as set out below.

Exceptionally Constrained Urban Areas

5.12 Urban areas where there may be exceptional constraints on siting of overhead transmission lines comprise those locations where the density of residential community and associated development and public open space is such that a reasonably direct overhead route is impracticable.

Exceptionally Constrained Rural Areas

5.13 The policy states that of special concern in the siting of overhead transmission lines in the countryside is the protection of important landscape features in nationally or internationally designated areas of amenity value. These designated areas comprise National Parks, Areas of Outstanding Natural Beauty, Heritage Coasts and World Heritage Sites.

5.14 National Grid's policy explains that exceptionally constrained rural areas comprise locations within or immediately alongside those designated areas where the scale of new high voltage transmission towers and conductors would dominate unspoilt landscape and cause serious damage to major open views or spectacular panoramas, crests of prominent ridges and skylines or attractive small scale valleys seen from important locations within or immediately alongside the designated areas.

Exceptionally Constrained Estuary and Major River Crossings

5.15 The policy states that such crossings occur where the exceptional difficulty and cost of an overhead line would be comparable with or exceed those of an underground cable.

5.16 Detailed consideration of undergrounding will occur when considering alignments within route corridors which include areas of exceptional constraint.

Summary of National Grid's Guidance and Policy on Overhead Line Routeing

5.17 National Grid's guidance on overhead line routeing identifies areas which it seeks to avoid and areas on which it seeks to minimise effects. These are summarised with reference to the aspect of guidance which identifies them in Tables 5.1 and 5.2 below.

Table 5.1: Features National Grid Seeks to Avoid in Routeing

Feature	Reference
National Parks	Schedule 9 Commitment 2/Holford Rule 1
Areas of Outstanding Natural Beauty	Schedule 9 Commitment 2/Holford Rule 1
Heritage Coasts	Schedule 9 Commitment 2/Holford Rule 1
World Heritage Sites	Schedule 9 Commitment 2/Holford Rule 1
Sites of Special Scientific Interest	Schedule 9 Commitment 2
Special Protection Areas	Schedule 9 Commitment 2
Special Areas of Conservation	Schedule 9 Commitment 2
Ramsar sites	Schedule 9 Commitment 2
National Nature Reserves	Schedule 9 Commitment 2
Scheduled Monuments	Schedule 9 Commitment 2
Settlements	Supplementary Note on Residential Areas

Table 5.2: Features on which National Grid Seeks To Minimise Effects

Feature	Reference
Listed buildings	Schedule 9 Commitment 3/Note to Holford Rule 2
Conservation Areas	Schedule 9 Commitment 3/Note to Holford Rule 2
Listed Parks and Gardens	Schedule 9 Commitment 3
Registered Battlefields	Schedule 9 Commitment 3
Areas of archaeological interest	Schedule 9 Commitment 3
Designations of County, District and Local Value	Schedule 9 Commitment 3/Supplementary Note to Holford Rules on Designations of County/District and Local Value
Woodlands	Note to Holford Rules 4 and 5
Local Plan Allocations	Note to Holford Rule 7

5.18 In addition to identifying constraints in the form of specific features designated for protection, the Holford Rules identify guidance on landscape and landform to be considered in overhead line routeing.

5.19 National Grid's guidance has been in use for many years influencing routeing studies and proposals for new overhead lines. It is important to note that National Grid has overhead lines and substations in areas of constraint, including

those listed in Table 5.1 as those it seeks to avoid. For example it has approximately 195 kilometres of overhead lines in National Parks and approximately 440 kilometres of overhead lines in Areas of Outstanding Natural Beauty.

5.20 A national transmission grid connecting areas of demand with areas of generation will inevitably involve crossing areas of constraint, including those features which National Grid seeks to avoid and on which to minimise effects.

5.21 The following chapter identifies which constraints have been taken into account along with landscape and landform in identifying potential route corridors.

6.0 CONSTRAINTS USED IN IDENTIFYING POTENTIAL ROUTE CORRIDORS

Approach to Features Identified in National Grid Guidance

6.1 The constraints listed in Tables 5.1 and 5.2 above have been considered in identifying route corridors. The paragraphs below consider each of the constraints identified from National Grid's guidance in turn.

National Parks

6.2 There are no National Parks in the Bridgwater – Seabank study area.

Areas of Outstanding Natural Beauty

6.3 Areas of Outstanding Natural Beauty (AONBs) are designated under the National Parks and Countryside Act 1949 (as amended) for the purpose of conserving and enhancing the natural beauty of the area. A new overhead line would have an effect on landscape which could affect the objective to conserve and enhance natural beauty. National Grid's undergrounding policy applies to AONBs as areas of exceptional constraint.

6.4 National Grid's undergrounding policy (see Appendix 3) states that use of underground cables will be considered where it will:

(i) outweigh the adverse effects upon other environmental factors;
(ii) justify the high additional cost; and
(iii) where it is technically possible and will not conflict with National Grid's statutory duties.

6.5 The purpose of considering underground cables in AONBs is to consider how this would contribute to the objective to conserve and enhance the natural beauty of the area.

6.6 Installing underground cables brings risks of adverse effects on environmental factors including natural beauty because installation involves a wide swathe of ground disturbance. This can affect other environmental factors including cultural heritage and wildlife. Archaeological remains present would be disturbed by installation and habitat damage can occur. Enduring constraints on tree and hedgerow planting after installation can also affect the objective of conserving natural beauty.

6.7 Technical feasibility may be constrained by features such as built form or ground conditions not suited to cables installation. Conflict with National Grid's statutory duties may arise in relation to its duty to maintain an efficient, co-ordinated and economical system of electricity transmission (see paragraph 1.5), although this would be balanced with its duty under Schedule 9 relating to the preservation of amenity.

6.8 National Grid's guidance says that it should seek to avoid AONBs when siting infrastructure and these are features to 'seek to avoid' in route corridor studies. Where avoidance could not be achieved, it would be appropriate when

considering alignments to give detailed consideration to use of underground cables in accordance with National Grid's policy.

6.9 The Mendip Hills AONB is within the Bridgwater to Seabank route corridor study.

Heritage Coasts

6.10 There are no Heritage Coasts in the Bridgwater to Seabank route corridor study area.

World Heritage Sites

6.11 World Heritage Sites are designated under the 1972 World Heritage Convention which aims for the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. World Heritage Sites vary considerably and include sites of high natural value and also highly modified sites such as cities. It would be appropriate to refer to the nomination information for any World Heritage Site to identify the characteristics of that site in identifying the harm that could be posed by a new overhead line. Greater harm would be posed where a new overhead line would introduce a high level of change discordant with characteristics of a Site.

6.12 World Heritage Site status is ratified by the United Nations Educational, Scientific and Cultural Organization (UNESCO) after a site has been placed on a 'Tentative List' for a period of 5 – 10 years.

6.13 National Grid's undergrounding policy applies to World Heritage Sites as for AONBs discussed above. National Grid's guidance advises that it should seek to avoid World Heritage Sites when siting infrastructure and these are regarded as features to 'seek to avoid' in route corridor studies. Where avoidance is not possible, it is appropriate when investigating alignments within a corridor to give detailed consideration to use of underground cables in accordance with National Grid's policy.

6.14 It would be appropriate to refer to the reasons for which a World Heritage Site has been designated and to assess the effects of a new overhead line on the site.

6.15 There are no potential route corridors within World Heritage Sites in the Bridgwater to Seabank route corridor study although initial discussion with local planning authority officers indicated that a potential World Heritage Site nomination is being considered for part of the Somerset Levels and Moors.

Sites of Special Scientific Interest (SSSIs)

6.16 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 2004. 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 or likely to damage the SSSI interest.

6.17 The nature of the interest for each site varies. The potential effect of an overhead line on a SSSI would vary depending upon the nature of the effect caused and the interest of the sites. The risk of harm to a SSSI from a new overhead line would depend on the nature of the effect considered in light of the special interest of that designated site. Planning Policy Statement 9 Biodiversity and Geological Conservation advises local planning authorities, with regard to preparing policies and exercising development control, that:

> *'Where a proposed development on land within or outside a SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), planning permission should not normally be granted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits 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.'*

6.18 National Grid's guidance advises that it should seek to avoid SSSIs when siting infrastructure and these have been regarded as features to 'seek to avoid' in route corridor studies.

6.19 Where avoidance is not possible, it is appropriate when investigating alignments within a corridor to consider in detail the effects of the overhead line on the interest of the SSSI.

Special Protection Areas (SPAs)/Special Areas of Conservation (SACs)/Ramsar sites

6.20 These sites are all SSSIs but comprise the highest grade of sites of biodiversity importance and are afforded protection under The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations).

6.21 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.

6.22 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 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.

6.23 National Grid's guidance advises that it should seek to avoid Special Protection Areas, Special Areas of Conservation and Ramsar sites when siting infrastructure. These are appropriate to regard as features to 'seek to avoid' in route corridor studies. Where avoidance is not possible, it would be appropriate when investigating alignments within a corridor to consider the nature of effects, particularly with regard to whether the proposed overhead line would be likely to give rise to significant effect on the conservation objectives of the site and with regard to potential effects on integrity of the site.

National Nature Reserves (NNRs)

6.24 NNRs are designated by Natural England under the National Parks and Access to the Countryside Act 1949 and are primarily SSSIs (see above).

6.25 National Grid's guidance advises that it should seek to avoid NNRs when siting infrastructure. These are appropriate to regard as features to 'seek to avoid' in route corridor studies. Where avoidance is not possible, it would be appropriate when investigating alignments within a corridor to consider the nature of effects and the interests of the site as described for SSSIs above.

Scheduled Monuments

6.26 The Ancient Monuments and Archaeological Areas Act 1979 is the legislation protecting archaeological features which appear on the 'schedule' kept by the Department of Culture, Media and Sport. 'Scheduling' is the only legal protection specifically for archaeological sites.

6.27 Scheduled Monument Consent is required from English Heritage, the statutory adviser on the historic environment, for works directly affecting a scheduled monument. English Heritage must be consulted by local planning authorities outside Greater London on applications for planning permission likely to affect the site of a scheduled monument.

6.28 National Grid's guidance advises that it should seek to avoid Scheduled Monuments in siting infrastructure. These are appropriate to regard as features to 'seek to avoid' in route corridor studies. Where avoidance is not possible, it would be appropriate when investigating alignments within a corridor to consider the nature of effects, including on the setting of the monument, on a case-by-case basis.

Listed buildings

6.29 National Grid's guidance summarised in Table 5.2 advises that it will 'seek to minimise effects' on listed buildings. Listed buildings are designated in three categories. The majority are Grade II listed buildings. 5.5% of listed buildings are Grade II* and 2.5% of listed buildings are Grade I.

6.30 Planning authorities are required to consult with English Heritage on planning applications which may affect Grade I and Grade II* listed buildings outside Greater London. The setting of listed buildings is an important consideration when considering effects of development. Grade I and Grade II* listed buildings

have been considered in identifying route corridors to try to ensure that there is sufficient distance between them and potential alignments to ensure effects do not occur or can be minimised. Effects on setting would be considered initially in route corridor preference and in detail when identifying alignments.

Conservation Areas

6.31 Conservation Areas are designated under the Civic Amenities Act 1967 (as amended). They are often, although not exclusively, associated with settlements and may be in their core or embedded within a larger expanse of built form. The setting of Conservation Areas may be particularly important as the designation refers to the overall character of an area and the juxtaposition of buildings, spaces and other features which contribute to its character.

6.32 During identification of route corridors settlements are sought to be avoided and this is likely to minimise effects on Conservation Areas by increasing the separation between them and a new overhead line.

6.33 Conservation Areas have been considered in identifying route corridors. Effects on setting would be considered initially in route corridor preference and in detail when identifying alignments.

Registered Parks and Gardens

6.34 National Grid seeks to minimise effects on Registered Parks and Gardens. English Heritage holds a Register of Parks and Gardens which are listed as being of national importance for their special historic interest. The interest of an historic park or garden may be in a confined area or relate to wider views and vistas and the setting of the park or garden, but is likely to include interest in the landscape.

6.35 An overhead line very close to a Registered Park or Garden is likely cause adverse effects. Registered Parks and Gardens are considered in identifying route corridor preference by seeking to maintain sufficient distance between a corridor or possible alignments within a corridor so that effects can be minimised.

Registered Battlefields

6.36 National Grid seeks to minimise effects on Registered Battlefields. English Heritage holds a Register of Battlefields. There are 43 Registered Battlefields in England.

6.37 The effect of an overhead line on a battlefield site depends upon its location relative to the site and the present status and setting of the battlefield.

Areas of Archaeological Interest

6.38 Above ground archaeological interest is addressed in identifying route corridors by considering Listed Buildings, Scheduled Monuments and Conservation Areas. Development plans indicate areas of archaeological potential and interest. These

are at the scale of a local planning authority's administrative area and typically refer to areas of below ground potential.

6.39 The potential effects of an overhead line on these areas are usually limited to areas of ground excavation which are limited to tower foundations. These areas of archaeological interest will be considered when identifying alignments. Measures to minimise effects would include siting of tower foundations and mitigation such as archaeological investigation during excavation.

Designations of County, District and Local Value

6.40 There are a number of county, district and local designations related to environmental value which are presented in development plans. These typically relate to archaeology, landscape and ecology. Effects on areas of archaeological interest are discussed above.

6.41 National government guidance in Planning Policy Statement 7: Sustainable Development in Rural Areas advises that local planning authorities should move from designations of special landscapes for protection to a criteria-based approach to protecting the best landscapes and promoting enhancement of other landscapes using tools such as landscape character assessment. It advises at paragraph 25 that '*local landscape designations should only be maintained or, exceptionally, extended where it can be clearly shown that criteria-based planning policies cannot provide the necessary protection.'*

6.42 Landscape character has been considered in the identification of route corridors (see 4.9 – 4.15 above).

6.43 Where there are sites of ecological interest at county, district and local level, these have not been considered in identifying route corridors. Minimising effects on these would be considered in identifying route alignments where options to route the line to reduce effects or the use of mitigation such as habitat creation would be considered.

Woodlands

6.44 Table 5.2 notes that Holford Rules 4 and 5 refer to woodlands and their value in providing background to views and advice to avoid cutting extensive swathes through woodland blocks where possible.

6.45 Any form of woodland generally has landscape value whereas ecological value can vary greatly between different types of woodland. A 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 a very high nature conservation asset. Much ancient woodland is SSSI and is protected by that designation.

6.46 Woodland has been considered in the identification of route corridors and ancient woodland has been identified separately. Corridors have been identified which seek to avoid woodland.

6.47 Where woodland is included in an identified route corridor, it is where there is high confidence that at least one alignment can be found within the corridor which would avoid the woodland. Ancient woodland will be identified separately when considering alignments, so that if route corridors include woodland that cannot be avoided, a distinction can be made between ancient and other woodland.

Settlements

6.48 National Grid's guidance states that overhead line routes should avoid residential areas and that developed areas should be treated as areas of exceptional constraint.

6.49 There is no accepted definition of a settlement which has been applied in the route corridor study. However identification of route corridors has sought to avoid areas where there are groups of residential properties with only small gaps between them.

Regional Spatial Strategy Strategic Allocations

6.50 The Supplementary Note to Holford Rule 7 advises that routeing should consider '*effects on the amenity of existing development and on proposals for new development*'.

6.51 The identification of constraints has included strategic housing allocations from the South West Draft Regional Spatial Strategy (RSS) 2006 - 2026 for residential development. These have been treated as if existing residential development in the identification of route corridors.

Local Plan Allocations

Housing Allocations

6.52 Table 3.2 confirms that the Supplementary Note to Holford Rule 7 advises that routeing should consider '*effects on the amenity of existing development and on proposals for new development*'.

6.53 The identification of constraints has included allocations in adopted development plans for residential development. These have been treated as if existing residential development in the identification of route corridors. Other allocations for development, such as industrial and commercial allocations, have not been considered constraints to route corridors.

Mineral Reserves

6.54 Mineral reserves may extend for large areas, particularly where large 'areas of search' have been identified. It would be inappropriate to constrain route corridors to areas which are not in any area of search for mineral reserves. However it would also be imprudent to seek to site a new overhead line on scarce reserves which have a high prospect of being won in the life of the overhead line, as far as that can be determined at this time.

6.55 The approach taken to mineral reserves is to identify active mineral working sites with available reserves and to seek to avoid these areas.

Other Potential Constraints

Individual Properties

6.56 National Grid recognises that its works may have an adverse effect on amenity. Its Schedule 9 Statement's Commitment 4 commits to carrying out mitigation measures to reduce adverse effects as far as practicable. National Grid is committed to using environmental impact assessment techniques to assess effects and identify opportunities for mitigation. It commits to consultation during this process and, where the effect of its works is significant, to consulting affected residents.

6.57 Individual properties have been identified from Ordnance Survey maps and during site visits. Effects on individual properties will be considered in the identification of alignments within corridors.

Airports

6.58 Local plan documents sometimes have consultation or exclusion zones shown around airports and show airfields and airstrips. National Grid undertakes consultation with the operators, the Civil Aviation Authority and the Ministry of Defence when considering alignments. At this stage of the study, the presence of aircraft sites has been noted from Ordnance Survey maps, planning authority documents and from site visits. Where consultation zones are shown in planning documents, these have been considered. In identifying route corridors, judgement has been applied in each case to an appropriate distance to avoid encroaching within airports and airfields.

Green Belt

6.59 Green Belts are designated by local planning authorities through the development plan process. There is Green Belt land to the south of Bristol, within the area where a possible connection to Seabank is under consideration. Planning Policy Guidance Note 2: Green Belts indicates that the fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open, so that there is a presumption against inappropriate development within Green Belts except in very special circumstances.

6.60 PPG2 defines the forms of development that are appropriate and inappropriate in the Green Belt. The guidance does not specifically refer to overhead electricity lines. The construction of an overhead line does not involve the construction of new buildings, as towers do not have the characteristics of buildings. In particular, the towers have no walls or roof; they create no floorspace and provide no enclosure. The construction of an overhead line would be an engineering option, which is appropriate development provided that it maintains openness and does not conflict with the purposes of including land in the Green Belt.

6.61 The 5 purposes of including land in Green Belt are:

- To check the unrestricted sprawl of large built-up areas;
- To prevent neighbouring towns from merging into one another;
- To assist in safeguarding the countryside from encroachment;
- To preserve the setting and special character of historic towns; and
- To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.

6.62 Overhead lines are a form of development that maintains openness and that does not conflict with Green Belt purposes. Although overhead lines may occupy long corridors within Green Belt, with the exception of tower footprints they involve little physical change to the land through which they pass and leave a large majority of the land beneath them free from development and therefore open. The lattice construction of towers is visually permeable and so the perception of openness is maintained as one is able to 'see through' the widely spaced towers and conductors to whatever is beyond.

6.63 Paragraph 3.2 of PPG2 states that:

> *'Inappropriate development is, by definition, harmful to the Green Belt. It is for the applicant to show why permission should be granted. Very special circumstances to justify inappropriate development will not exist unless the harm by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations. In view of the presumption against inappropriate development, the Secretary of State will attach substantial weight to the harm to the Green Belt when considering any planning application or appeal concerning such development.'*

6.64 If the construction of an overhead line was considered to be inappropriate development, consideration would need to be given to whether the harm by reason of inappropriateness was outweighed by other considerations, including the need for the line, its environmental effects and the availability of alternatives.

6.65 Although the quality of landscape within Green Belt is not directly relevant to its purposes of the designation, paragraph 3.15 of PPG2 states *'the visual amenities of the Green Belt should not be injured by proposals for development within or conspicuous from the Green Belt which, although they would not prejudice the purposes of including land in Green Belts, might be visually detrimental by reason of their siting, materials or design'.*

6.66 The purposes of Green Belt mean that the designated land will always be around centres of population which represent areas of demand for transmission supplies. National Grid has many kilometres of overhead lines through Green Belt land and this includes some overhead lines which have been granted consent in Green Belt and some land crossed by overhead lines which has subsequently been designated Green Belt. National Grid considers that overhead lines are not inappropriate development in the Green Belt. Green Belt has not been considered a constraint to identification of potential overhead line route corridors.

Flood Risk

6.67 The importance of flood risk has been emphasised since the severe floods of 2007 and was a key concern raised by the Environment Agency in initial discussion. National Grid considers its siting of installations such as substations very carefully in relation to flood risk. However it is relatively straightforward to build flood resilience into overhead lines by addressing safety clearances from anticipated flood levels in line design. The presence of overhead line towers in areas of flood risk has negligible effect on the risk or displacement of water as the lattice steel construction poses no material changes to water flow. Flood risk has therefore not been considered an influence on overhead line route corridors.

6.68 However, sealing end compounds (large structures used to transfer transmission circuits between underground cables and overhead lines) need to be protected from high flood risk and this influences locations in which undergrounding can be subject to detailed consideration for alignments in exceptionally constrained areas. Under Table D2 of Planning Policy Statement (PPS) 25 proposals for 'essential infrastructure' (which includes electricity generating power stations and grid and primary substations) in flood zone 3 are subject to the sequential and exception tests. These tests aim to steer development to areas at lesser risk of flooding and ensure development remains safe from flooding without increasing flood risk elsewhere.

6.69 The features considered as constraints to route corridors are presented in Table 6.1 below with the data sources from which information (where applicable) was taken.

Table 6.1: Constraints to Route Corridors and Data Sources

Feature	Data Sources
National Parks	magic.gov.uk
Areas of Outstanding Natural Beauty	magic.gov.uk
Heritage Coasts	magic.gov.uk
World Heritage Sites	english-heritage.org.uk
Sites of Special Scientific Interest	gis.naturalengland.org.uk
Special Protection Areas	gis.naturalengland.org.uk
Special Areas of Conservation	gis.naturalengland.org.uk
Ramsar sites	gis.naturalengland.org.uk
National Nature Reserves	gis.naturalengland.org.uk
Scheduled Monuments	english-heritage.org.uk
Settlements	Digitised from Ordnance Survey
Historic buildings (Listed I and II*)	english-heritage.org.uk
Conservation Areas	Development plans
Registered Parks and Gardens	magic.gov.uk
Registered Battlefields	english-heritage.org.uk
Woodlands	National Inventory of Woodlands
Development plan allocations for housing	Development plans
Active mineral extraction sites with reserves	Development plans

Feature	Data Sources
Airfields/airstrips	Digitised from Ordnance Survey and development plans

6.70 The following Chapter describes the study area, referring to these constraints.

7.0 CONSTRAINTS WITHIN THE STUDY AREA

General Overview

7.1 The study area extends from the existing Hinkley Power Stations (A and B) at Hinkley Point northwest of Bridgwater to the existing National Grid 400kV electricity substation at Seabank, north of Bristol. There are existing high voltage overhead lines owned and operated by National Grid in the south of the study area including the 400kV ZG route, which travels west to east between Hinkley Point and Melksham substation and the 275kV VQ route which travels west to east between Hinkley Point and Bridgwater substation. An existing 132kV overhead line owned and operated by Western Power Distribution (WPD) travels through the study area in a north-south alignment between Bridgwater and Seabank substations. The study area is illustrated at Figure 1 and described below.

7.2 The northern and southern extents of the study area are defined by the existing National Grid substations at Seabank and Bridgwater. This is because the overhead lines which run east from Hinkley Point will be reconfigured immediately north of Bridgwater substation for a connection to Seabank, removing the need for additional lines west of this point. The required reconfiguration is explained in the description of route corridors.

7.3 The eastern extent of the study area includes a number of constraints which pose a significant obstacle to overhead line routeing. These include several SSSIs which form part of the Somerset Levels and Moors SPA, SAC and Ramsar site; built development at Wedmore, Axbridge and the City of Bristol; and Bristol International Airport. The extension of the study area further to the east would require a greater overhead line corridor length through the Mendip Hills AONB as this designation extends southeast.

7.4 The western extent of the study area also includes areas of high constraint to routeing including the Severn Estuary SSSI, SPA, SAC and Ramsar site and large settlements along the coast at Burnham-on-Sea, Weston-super-Mare, Clevedon, Portishead and Avonmouth.

7.5 The study area falls within the administrative control of the following district and county authorities:

- West Somerset District Council – Somerset County Council;
- Sedgemoor District Council – Somerset County Council;
- North Somerset Council;
- Bristol City Council; and
- South Gloucestershire Council.

7.6 The area is predominantly rural, with much of the land comprising pastoral fields. Built development is focused along the Severn Estuary in the west of the study area and includes key settlements at Bridgwater, Burnham-on-Sea, Weston-super-Mare, Clevedon and Portishead. Smaller towns and villages are dispersed widely throughout the study area.

7.7 The M5 motorway travels north to south through the study area towards Exeter. There is a network of roads on which the larger towns and villages are sited. The most significant of these are the A370, A38, A39 and the A369. The remainder of the study area includes a network of minor roads and narrow lanes which link smaller villages and isolated properties.

Environmental Constraints

7.8 A description of the study area in relation to the environmental criteria used for identifying route corridors defined in Chapter 6.0 is presented below and illustrated at Figure 2.

7.9 It was noted in Chapter 6.0 that there are no National Parks or Heritage Coasts within the study area.

Areas of Outstanding Natural Beauty

Mendip Hills Area of Outstanding Natural Beauty (AONB)

7.10 The Mendip Hills AONB covers an area of approximately 200km^2 and is an extensive range of limestone hills to the south of Bristol. The hills run in an east to west direction between the coast at Weston-super-Mare and Frome and overlook the Somerset Levels to the south and the Avon Valley to the north.

7.11 The hills of the AONB form prominent landmarks. The designation relates to landscape and scenic importance although the Mendip Hills are also valued for the many industrial archaeological sites reflecting the lead, coal and cloth industries. The AONB is also characterized by an open largely treeless limestone plateau surrounded by gorges, cliffs and escarpment slopes.

7.12 An existing 132kV overhead line operated by Western Power Distribution (WPD) passes through the AONB for approximately 6km. The line enters the AONB to the east of Loxton, passes over lower lying land to the east of the Lox Yeo River and exits between the settlements of Sandford and Banwell.

World Heritage Sites

7.13 There are no World Heritage Sites within the study area.

7.14 As advised by English Heritage in the initial consultation regarding the connection (see Chapter 4.0) a nomination is being prepared for World Heritage Site status for the Somerset Levels and Moors. This nomination is being promoted by Somerset County Council. The indicative boundaries of the site are illustrated at Figure 2 and include large parts of the study area to the south of the Mendip Hills AONB.

Sites of Scientific Interest (SSSI)

7.15 SSSIs are designated as examples of country's best wildlife and geological sites. There are SSSIs dispersed throughout the study area. The most significant of these sites and the reasons for their designation are summarised in Table 7.1.

Table 7.1 – Summary of SSSIs

SSSI	Location / Grid Ref	Reason for Designation
Bridgwater Bay	South of Highbridge (ST 290480)	Bridgwater Bay forms part of the Severn Estuary SPA, SAC, 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. The existing 400kV Hinkley to Melksham overhead line travels through this area to the west and south of the settlement of Pawlett.
The Catcott Edington and Chilton Moors, Tealham and Tadham Moors and Westhay Moors	North east of Bridgwater (ST 390420)	The Catcott Edington and Chilton Moors, Tealham and Tadham Moors and Westhay Moors SSSIs are a collection of adjoining moors which form part of the Somerset Levels and Moors SSSI, SPA, Ramsar to the north east of Bridgwater. These sites comprise diverse habitats which provide feeding and nesting sites for a wide range of birds such as Golden Plover and Lapwing. The existing 400kV Hinkley to Melksham overhead line passes through this area close to development at Burtle and Westhay.
Severn Estuary (also SPA, SAC and Ramsar)	South West Coast	The Severn Estuary lies on the south west coast of Britain at the mouth of four major rivers (the Severn, Wye, Usk and Avon). It is an internationally important site for birds and wildlife habitats and is one of the most important sites in the UK for wintering wildfowl and waders.
Uphill Cliff	South of Weston-super-Mare (ST 318583)	This SSSI forms part of the Mendip Limestone Grasslands SAC and is designated for its species-rich calcareous grassland and rock-face on Carboniferous Limestone.

SSSI	Location / Grid Ref	Reason for Designation
Crook Peak to Shute Shelve Hill	East of Loxton (ST 385555)	This SSSI lies within the Mendip Hills AONB and comprises an area of approximately 332ha between Crook Peak and Shute Shelve Hill. The site comprises a wide range of habitats including ancient and secondary semi-natural broadleaved woodland and unimproved calcareous grassland.
Banwell Caves	South of Banwell (ST 383588)	This SSSI lies within the Mendip Hills AONB and forms part of the Somerset and Mendips Bats SAC. It is a Geological Review Site and is used as a hibernation site by greater horseshoe bats.
Banwell Ochre Caves SSSI	East of Banwell (ST 407593)	This SSSI lies within the Mendip Hills AONB and forms part of the Somerset and Mendip Bats SAC. The SSSI comprises 5 caves which contain the most extensive and accessible yellow ochre workings in the Mendip Hills.
Puxton Moor, Biddle Street, Tickenham, Nailsea and Kenn Moors	North of the Mendip Hills AONB (ST 440700)	These wildlife sites form part of the Avon Levels and Moors, an extensive area of low lying agricultural land north of the Mendip Hills. The Avon Levels and Moors is drained by a network of rhynes and ditches which act as 'wet fences' providing water for livestock. The combination of management practices and the variation in the soils has resulted in watercourses which support a wide range of aquatic plant communities, many of which are of considerable nature conservation interest. The existing WPD 132kV overhead line travels through Biddle Street, Kenn Moor and Tickenham Moor SSSIs and along the eastern edge of Puxton Moor and Nailsea Moor SSSIs.
King's Wood and Urchin Wood	North East of Congresbury (ST 454645)	King's Wood and Urchin Wood comprises approximately 130ha of woodland renowned for its botanical interest. The woodland supports a particularly high diversity of vascular plants, including populations of the nationally rare plant purple gromwell and nationally important populations of the rare and endangered greater horseshoe bat and dormice.
Gordano Valley	North east of Clevedon (ST 435730)	The Gordano Valley covers an area of approximately 161ha and is an extensive low-lying and poorly drained peat moor situated between Carboniferous Limestone ridges. The area is designated for its national ornithological, entomological and stratigraphic interest.

SSSI	Location / Grid Ref	Reason for Designation
Weston Big Wood	South east of Portishead (ST 455750)	Weston Big Wood is an area of mixed deciduous woodland covering approximately 37ha. The wood lies on the plateau of a narrow ridge of Carboniferous Limestone and various factors suggest the site is the remnant of an ancient forest.

Special Protection Areas (SPA)

Severn Estuary SPA

7.16 The Severn Estuary SPA lies along the western boundary of the study area and 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.

7.17 The site qualifies as an SPA under Articles 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.

7.18 The existing 400kV Hinkley to Melksham overhead line passes through Bridgwater Bay SSSI which forms part of the SPA to the east of Hinkley Point and to the west and south of settlement at Pawlett.

Somerset Levels and Moors SPA

7.19 The Somerset Levels and Moors SPA lies in the south east of the study area and is one of the largest and richest areas of traditionally managed wet grassland and fen habitats in lowland UK. The SPA covers approximately 35,000ha including the floodplains of the Rivers Axe, Brue, Parrett, Tone and their tributaries.

7.20 The existing 400kV Hinkley to Melksham overhead line passes through this designated site close to development at Burtle and Westhay.

Special Areas of Conservation (SAC)

Severn Estuary SAC

7.21 The Severn Estuary SAC lies along the western boundary of the study area and covers an area of approximately 73,000ha. The SAC was confirmed in 1995 and further amended in 2000 under the Conservation (Natural Habitats &c.) Regulations 1994. The site is designated for the important populations of fish and natural habitats present within the estuary.

7.22 The existing 400kV Hinkley to Melksham overhead line crosses the Severn Estuary SAC, approximately 5km east of Hinkley Point in the vicinity of the River Parrett.

Mendip Limestone Grasslands SAC

7.23 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 Selve SSSI is approximately 10km inland from the estuary, in the Mendip Hills.

North Somerset and Mendip Bats SAC

7.24 North Somerset and Mendip Bats SAC is centred on the Mendip Hills. The SAC comprises caves, grassland and woodland and is a composite site spread across a wide area. The component sites include the Banwell Caves SSSI and Banwell Ochre Caves SSSI on the north side of the Mendip Hills with Brockley Hall Stables SSSI and King's Wood and Urchin Wood SSSI further to the north.

7.25 These sites are considered of international importance for their semi-natural dry grasslands, significant blocks of *Tilio-Acerion* forest and the limestone caves of the Mendips which provide a range of important hibernation sites for lesser horseshoe bats. Natural England and North Somerset Council have identified a 5km 'consultation zone' which covers important feeding grounds surrounding the SAC and in which proposals for change are subject to particular scrutiny for potential effects on the designated sites.

Ramsar Sites

Severn Estuary Ramsar

7.26 The Severn Estuary SPA and Ramsar sites cover the same geographical area as each other (approximately 24,000ha) and overlap extensively in the reasons for their designations.

7.27 The internationally important bird populations and the habitats on which they depend are reasons for both the SPA and Ramsar designations. 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.

Somerset Levels and Moors Ramsar

7.28 The Somerset Levels and Moors SPA and Ramsar sites cover the same geographical area as each other (approximately 35,000ha) and overlap extensively in the reasons for their designations. The internationally important bird populations and the habitats on which they depend are reasons for both the SPA and Ramsar designations; the Ramsar designation also extends to cover rare invertebrate populations.

National Nature Reserves (NNRs)

7.29 There are several wildlife sites within the study area designated as NNRs. The majority of these form part of larger sites afforded protection under other ecological designations. The NNRs in the study area are listed below:

- Shapwick Heath (adjacent to Catcott, Edington and Chilton Moors, Tealham Moor and Tadham Moors SSSIs);

- Westhay Moor (within the boundary of the Westhay Moor SSSI);
- Somerset Levels (includes the Catcott Edington and Chilton Moors, Tealham Moor, Tadham Moors and Westhay Moor SSSIs);
- Huntspill River;
- Bridgwater Bay (within the boundary of the Severn Estuary SPA, SAC and Ramsar); and
- Gordano valley (within the boundary of Gordano Valley SSSI).

7.30 The Huntspill River NNR is an artificial river within the Somerset Levels managed by the Environment Agency. The river stretches for 5 miles from Bridgwater Bay to the western boundary of the Catcott Edington and Chilton Moors SSSI.

7.31 The NNR is immediately north of the existing 400kV Hinkley to Melksham overhead line and is crossed at 2 places by existing WPD 132kV overhead lines.

Scheduled Monuments (SMs)

7.32 The south west of England is a region of high archaeological and historical importance and contains over a third of all Scheduled Monuments (SMs) in England. There are SMs interspersed throughout the study area. The majority of these sites are on high ground within the Mendip Hills AONB (with particular clusters around Banwell and Shipham) and close to or within settlements.

7.33 The most prominent of these SMs is Brent Knoll, an Iron Age hill fort with multiple ramparts following the contours of the hill and is adjacent to the M5 to the north east of Burnham-on-Sea. The hill fort dominates the low surrounding landscape of the Somerset Levels and is prominent in views from the Mendip Hills AONB.

Historic Buildings (Listed I and II*)

7.34 There are 18 Grade I and 62 Grade II* listed buildings within the study area. These are predominantly contained within town and village centres. Particular clusters of historic buildings are found within the settlements of Bridgwater, Banwell and Clevedon.

Conservation Areas

7.35 Within the study area there are 49 Conservation Areas. These are generally focused within town and village centres and include Stone Allerton, Lympsham, Weare, Wedmore, Loxton, Christon, Banwell, Congresbury, Nailsea and Avonmouth.

Registered Parks and Gardens

7.36 There are six Registered Parks and Gardens within the study area: Clevedon Court; Tyntesfield; Barley Wood; Grove Park; Barrow Court; and Leigh Court. The largest of these is Tyntesfield which lies to the south of Bristol and is an extensive 19th century estate owned by the National Trust comprising formal gardens and parkland.

Registered Battlefields

7.37 There is one registered battlefield within the study area, the site of the battle of Sedgemoor 1685. This site lies north of Westonzoyland approximately 1km east of Bridgwater substation and does not pose a constraint to overhead line corridors between Bridgwater and Seabank.

Woodland

7.38 There are numerous blocks of woodland interspersed throughout the study area. Several woodlands are also designated as SSSIs.

7.39 The majority of woodlands within the study area are relatively small. However, larger woodlands are found along the slopes of the Mendip Hills, to the east of the Avon Levels and Moors (Kings Wood, Ball Wood and Brockley Wood) and north of Tickenham (Norton's Wood and Lime Breach Wood).

Settlements

7.40 The key settlements within the study area are sited along or in close proximity to the banks of the Severn Estuary and include Bridgwater (approximately 13km north of Taunton), Burnham-on-Sea (approximately 10km north east of Hinkley Point), Weston-super-Mare (abutting the Mendip Hills AONB), Clevedon (approximately 3km south of Portishead) and Portishead (approximately 5km west of Bristol).

7.41 Immediately east of the study area is the City of Bristol which forms part of a continuous band of development that extends to the mouth of the River Avon at the Severn Estuary. This forms a constraint to routeing corridors further east within the study area.

7.42 Other smaller settlements including Nailsea, Congresbury and Yatton are in the eastern part of the study area, north of the Mendip Hills. These settlements are surrounded by and adjoin areas of moorland designated as SSSI and large blocks of woodland.

7.43 There are numerous other villages dispersed throughout the study area, the larger of which are along classified roads. Smaller villages and hamlets are linked by the minor road systems.

Individual Properties

7.44 Individual properties outside settlements are dispersed throughout the study area. Individual properties are typically found to the north and south of the Mendip Hills AONB off networks of narrow lanes and in this area often comprise farmhouses within large areas of moorland.

7.45 There are fewer individual properties within the Mendips Hills AONB. Scattered dwellings within this area tend to lie on higher ground close to the edge of settlements.

Regional Spatial Strategy Housing Development Allocations

7.46 Regional Spatial Strategies identify strategic sites to accommodate future growth and housing development. Within the study area these strategic housing sites largely comprise development within or on the edge of large settlements and do not pose a significant constraint to the identification of overhead line corridors where these avoid settlements.

7.47 The largest of these allocations include: 310 dwellings per annum to the north east of the urban area of Bridgwater; 600 dwellings per annum within and adjoining Weston-super-Mare's urban area; an urban extension accommodating up to 9,000 dwellings to the east of Weston-super-Mare; and an urban extension to south west of Bristol comprising 15,500 dwellings.

Local Plan Housing Development Allocations

7.48 Development plans typically allocate areas of land for future housing development. Within the study area these housing sites largely comprise infill development within or on the edge of large settlements and do not pose a significant constraint to the identification of overhead line corridors where these avoid settlements.

7.49 The largest of these allocations is an area of land to the west of the existing WPD 132kV overhead line on the fringe of Portishead. This site is allocated under Policy H9 of the North Somerset Local Plan for 1131 new residential dwellings.

7.50 Whilst not allocated in the North Somerset Local Plan, site visits have identified a site to the west of Sandford currently being developed for new residential properties. This site lies within 300m of the existing 132kV WPD overhead line between Bridgwater and Portishead.

Minerals Sites

7.51 Within the Mendip Hills AONB, to the north of Axbridge, there are three sites identified within the adopted Somerset Minerals Local Plan (2004) as areas of current or future mineral working. These sites comprise existing crushed rock aggregate quarries (Callow Rock Quarry, Shipham Hill Quarry and Battscombe Quarry) which lie within a wider mineral consultation area. These quarries and the associated consultation zone act as a constraint to overhead line routeing further east within the Mendip Hills AONB.

7.52 Within the Adopted Mineral Working in Avon Local Plan (1993) there are a number of sites identified as areas of current or future mineral working. The largest of these sites is Crooks Marsh a clay extraction site to the north of Avonmouth. This extraction site and its associated buffer zone lie within the Severnside works and act as a constraint to overhead line routeing north of Seabank. Fainlaind Ridge and Backwell Hill to Barrow Hill are carboniferous limestone quarries to the west and south west of Bristol. These extraction areas and their associated consultation zones act as a constraint to overhead line routeing to the east of Bristol International airport.

Airfields/airstrips

7.53 Bristol International Airport lies immediately beyond the eastern boundary of the study area approximately 5km east of Yatton.

7.54 To the east and west of the airport are two public safety zones identified under Policy T/13 of the North Somerset Replacement Local Plan. Development that would prejudice the safe operation of Bristol International Airport (BIA) and more specifically within designated public safety zones will not be permitted. These safety zones lie approximately 3km east of Congresbury and have been considered in the identification of overhead line route corridors.

Topography

7.55 The topography of the study area shows some marked variations and is illustrated at Figure 3.

7.56 In the south of the study area the landscape generally comprises low lying moorland (approximately 6mAOD) forming part of a wider area known as the Somerset Levels and Moors. Within this predominantly flat landscape are areas of higher ground including Brent Knoll, to the north east of Burnham–on–Sea and the Mid Somerset Hills to the east of Bridgwater.

7.57 The Mendip Hills AONB lies in the centre of the study area and rises sharply out of the Somerset Levels and Moors. The AONB comprises a series of limestone hills which pose a significant constraint to overhead line routeing. The only significant break in the hills is the valley of the Lox Yeo River through which the M5 motorway and the existing WPD 132kV overhead line currently travels.

7.58 To the north of the Mendip Hills the topography is more varied and comprises large areas of flat open moorland, a prominent ridge at Tickenham (Tickenham Ridge) and a series of hills to the east of development at Yatton, Congresbury and Nailsea.

Landscape Character

National Landscape Character Assessment

7.59 The study area falls within six of the former Countryside Agency (now Natural England) countryside character areas. These character areas are summarized below and are illustrated at Figure 4A.

Character Area 146 - Vale of Taunton and Quantock Fringes

7.60 Character Area 146 lies in the south western edge of the study area and includes most of Hinkley Point Power Station. The landscape is strongly influenced by the Vale of Taunton which extends from the foot of the steep northern scarp of the Blackdown Hills to the Bristol Channel coast. To the west the vale extends between the Quantock and the Brendon Hills on the edge of Exmoor and to the east between the Quantock Hills and the Somerset Levels and Moors.

7.61 The defining characteristics of this area are low lying fields surrounded by upland landscapes. Farmland is mixed with dense hedges, sparse woodland and

frequent settlement. Other landscape features in this area include narrow winding lanes linking substantial farmsteads and hamlets, red sandstone buildings and cider apple orchards.

Character Areas 142/143 - Somerset Levels and Moors/Mid Somerset Hills

7.62 Character areas 142 and 143 have been amalgamated by the former Countryside Agency and together form the largest character area within the study area. The Somerset Levels and Moors comprises a broad area of low-lying farmland and wetland surrounded and divided up by low hills and ridges which form the Mid Somerset Hills.

7.63 This landscape is predominantly characterised by networks of ditches and rhynes dividing peat moors and clay levels towards the coast. Other important features include prominent hills such as Brent Knoll, rising out of the Levels and Moors.

7.64 In this area settlement is concentrated on ridges with only a handful of dispersed farmsteads on the levels and moors. There is limited tree cover on the levels and moors which contrasts with the woodland, hedges and orchards of the surrounding Mid Somerset Hills.

Character Area 141 - Mendip Hills

7.65 Character area 141 comprises a series of Carboniferous Limestone Hills which rise sharply out of the flat landscape of the Somerset Levels and Moors. The Mendip Hills demonstrate the classic features of a karst landscape with complex ritual, industrial and agricultural landscapes extending from the prehistoric to modern quarrying period. Other important features of this landscape include complex underground cave and river systems, gorges, dry valleys, surface depressions, swallets, sink holes and fast flowing springs.

7.66 The central feature of the Mendip Hills is an open, largely treeless, limestone plateau. On the slopes of the plateau are mosaics of woodland and scrub which lie between small fields and the remnants of sheepwalks. Settlement predominantly comprises a number of compact villages at the foot of steep slopes.

Character Area 118 - Bristol, Avon Valleys and Ridges

7.67 Character area 118 is described as a landscape of 'confused undulations' which is strongly influenced by the Avon Valley, Bristol at its centre and by its industrial history. The key characteristics defining the landscape are shallow valleys which contrast with limestone ridges and scarps.

7.68 In rural areas there are substantial stone farmsteads and a variable hedgerow pattern, with woodlands mainly on steep valley sides. Settlement pattern is generally very dense, especially in the south. Many villages have become enlarged as commuter settlements and have abrupt edges with the countryside.

7.69 Other important features characteristic of this area are waterside mills and reclaimed areas which represent the landscape's industrial heritage.

Character Area 106 - Severn and Avon Vales

7.70 Character area 106 extends into the northern part of the study area and includes development at Avonmouth to the east of the Severn Estuary.

7.71 The character area encompasses the lower valleys of two of the major rivers of lowland England. The rivers are unifying features threading through this large and complex area. The southern side of the character area (falling within the study area) is dominated by the industrial complexes and riverside power stations at Avonmouth.

Local Landscape Character Assessments

7.72 The study area falls within the five local planning authorities listed at paragraph 7.5. Four of these authorities have published Landscape Character Assessments detailing landscape character types. The types identified are: Moors; Lowland Hills; River Floodplains; Farmed Coal Measures; Inter-tidal bays; Sandstone Uplands; Settled Limestone Plateau; Rolling Valley Farmland; Settled Coastal Edge; Limestone Ridges and Combes. The majority of the study area outside of the settlements, rivers and coastal edges comprises Moors, Lowland Hills, Limestone Ridges and Combes and Settled Limestone Plateau.

7.73 The majority of the study area outside of the settlements, rivers and coastal edges comprises extensive low lying moors divided by a network of rhynes and ditches. This area is characterised as a rural landscape framed by intermittent hedgerows and the distinctive skyline of wooded limestone ridges.

7.74 The remainder of the study area comprises a series of hills and prominent limestone ridges rising out of the Levels and Moors. To the south of the study area higher ground is characterised by a series of lowland hills and isolated knolls, often occupied by the remains of early prehistoric settlements. Further to the north and intersecting the central part of the study area is the Mendips Hills. These limestone hills rise sharply from the flat landscape of the Levels and dominate in views from much of the lowland areas.

7.75 There are also a number of elevated limestone ridges to the south of Bristol. These ridges run roughly east west and create a backdrop to the low lying areas. The most prominent of these ridges is Tickenham Ridge which extends east from Clevedon across the study area and is characterized by extensive blocks of ancient woodland.

7.76 The Character Areas are illustrated at Figure 4B and summarised at Appendix 4.

8.0 BROAD ROUTE CORRIDORS

8.1 This Chapter identifies potential route corridors for a Bridgwater to Seabank connection considering the influences and constraints identified in Chapter 6.0 and described in the Study Area in Chapter 7.0.

8.2 There are existing high voltage overhead lines owned and operated by National Grid in the south of the study area including the 400kV ZG route (which travels west to east between Hinkley Point and Melksham substation) and the 275kV VQ route (which travels west to east between Hinkley Point and Bridgwater substation). An existing 132kV overhead line owned and operated by Western Power Distribution (WPD) runs in a broadly north south direction between existing distribution network operator (DNO) substations at Bridgwater and Seabank.

8.3 Potential route corridors have been identified based on the assumption provided by National Grid that a Hinkley Point to Seabank connection will use the existing 400kV Hinkley to Melksham overhead line east from the power stations site to a new tee point on the line north of Bridgwater. In this vicinity the transmission system will be reconfigured to connect the redundant parts of the circuit to the existing Hinkley to Bridgwater overhead line and into Bridgwater substation. Using this existing infrastructure involves overhead line reconfiguration close to the power stations site and north of Bridgwater but removes the need to install a new line east from Hinkley Point. This reduces change in the designated areas through which the existing lines cross when leaving the power stations and avoids installation of a new line in the Steart Peninsula area of proposed managed retreat (see Chapter 3.0).

8.4 As detailed in Chapter 3.0 a desk based assessment supplemented with site visits has been undertaken to consider and identify possible route corridors for the required connection. The following corridors have been identified for further consideration:

- Adopting the corridor of the existing 132kV WPD overhead line between Bridgwater and Seabank; and
- Establishing an entirely new 400kV overhead line route.

8.5 This Chapter presents a description of the route corridors and an assessment against environmental constraints. The corridors described below are illustrated at Figure 5, with photographs representing key aspects presented at Figures 6 - 11.

Corridor 1 – Route along the Existing WPD 132kV Line Bridgwater to Seabank

Overview

8.6 Route corridor 1 is an 'opportunity corridor' which would involve the adoption of the route of the existing WPD 132kV overhead line which travels through the study area in a broadly north-south direction between existing distribution network operator (DNO) substations at Bridgwater via Portishead to Seabank.

The existing 132kV overhead line is supported on lattice steel towers of approximately 27m high (see Figure 12).

8.7 Two potential options have been identified within this corridor. Option 1A would decommission the existing 132kV overhead line and adopt the corridor for a new 400kV overhead line approximately 57km long. The proposed overhead line would use towers of a new L13 design, which are likely to be approximately 47m high. It has been assumed that a new 400kV overhead line would be built closely along the existing alignment to minimise the scale of change.

8.8 However a new 400kV line may not be able to be built very close to the existing 132kV line alignment at certain points as there may be insufficient space for the larger 400kV towers due to environmental constraints. 132kV towers are lower and narrower than 400kV towers as can be seen on the illustrative photos on Figure 6. Diversions may be needed from the route of the 132kV overhead line in places.

8.9 Works are likely to be required to the DNO system and will be subject to agreement with WPD to make this route available to National Grid. The extent of this work will include a Grid Supply Point (400/132kV substation) in the vicinity of Churchill, and appropriate connections between the GSP and the 400kV transmission system and 132kV distribution system.

8.10 Option 1B considers the construction of a new 400kV overhead line approximately 57km long parallel to the existing 132kV line. The 132kV overhead line would not be removed. The proposed overhead line would use towers of a new L13 design, which are likely to be approximately 47m high. The default position would be to establish a closely aligned corridor to the east or west of the existing line. The closest technically achievable distance for paralleling is 50-70m from the existing 132kV overhead line. This close alignment may be difficult to achieve along the full length of the route due to the proximity of environmental constraints, requiring the 400kV line to be offset from a close parallel route in some places.

Route Corridor 1 Description

(*North of Reconfigured Hinkley to Bridgwater Overhead Line)*

8.11 The overhead line corridor commences to the north of Bridgwater with a new tee point on to the existing Hinkley to Bridgwater overhead line to allow the reconfiguration of circuits as described in paragraph 8.3.

8.12 Approximately 2km north east of Bridgwater and 500m west of the settlement of Bawdrip the existing 132kV overhead line passes through the settlement of Knowle. Knowle is a small hamlet comprising a number of properties clustered along the A39.

8.13 At Knowle the route of the existing 132kV overhead line is constrained to the east by a cluster of dwellings at the junction of the A39 and New Road and to the west by residential properties and blocks of woodland which enclose and screen Knowle Hall. The existing 132kV route utilises a gap in built development which avoids the residential properties and blocks of woodland.

8.14 Paralleling in this area would be constrained by and would need to consider scattered properties and areas of woodland, including that surrounding Knowle Hall.

8.15 Avoidance of this area of constraint would involve a deviation of the corridor to the east or west of Knowle. This would result in a greater length of overhead line and would take potential routes closer to the settlements of Woolavington, Bawdrip and Cossington to the east and Puriton the west. A corridor following the route of the M5 is constrained by blocks of woodland to the north and south of the A39 and the settlement of Puriton.

8.16 North of Knowle and approximately 270m west of Woolavington the existing 132kV overhead line passes between Martlands Farm and a number of agricultural buildings. To the east the area is constrained by scattered properties and the settlement of Woolavington. However, to the west of Martlands Farm there are large gaps in built development which are included in the route corridor.

8.17 Paralleling in this area would be constrained by and would need to consider scattered properties in the route corridor to the west of Woolavington.

Corridor 1 North of Reconfigured Hinkley to Melksham Overhead Line

8.18 To the east of the M5, Corridor 1 begins with a wide area of land to allow for a new tee point and the reconfiguration of circuits on the existing transmission system (as described at paragraph 8.3).

8.19 This area has few constraints and offers a number of opportunities for the reconfiguration of the existing 400kV network. However, immediately north a potential route corridor is constrained to the west by significant areas of built development at East Huntspill and Burnham-on-Sea.

8.20 Immediately north of the proposed reconfiguration, the corridor crosses the Huntspill River NNR and includes land with isolated properties along the eastern edge of East Huntspill. East Huntspill is a small village comprising a number of properties clustered along the B3141, north of the Huntspill River and approximately 5km southeast of Burnham-on-Sea.

8.21 The existing 132kV overhead line passes within 300m of several residential properties along the eastern edge of East Huntspill. To the east of development at East Huntspill there are extensive areas of open moorland (part of the Huntspill Moor) which are included in the route corridor.

8.22 Paralleling in this area would be constrained by and would need to consider scattered properties on the edge of East Huntspill and the existing masts. The main consideration in this area is the Huntspill River NNR. Detailed alignments would seek to minimise the effects of crossing this feature.

8.23 The overhead line corridor continues north east through areas of open land before passing between properties on Mark Causeway to the west of the village of Mark. Mark is a linear settlement to the north of East Huntspill within a large area of open moorland (Mark Moor). The existing 132kV overhead line passes

within 50m of properties along the B3141 and oversails a caravan storage facility.

8.24 At Mark properties are included within the overhead corridor line corridor where it is considered that separation could be achieved between possible alignments and sensitive receptors. This area is tightly constrained.

8.25 Paralleling in this area would be highly constrained by and would need to consider proximity to properties along the B3141 and the cumulative visual effects associated with the existing masts.

8.26 Beyond Mark, the corridor widens to incorporate extensive areas of open moorland to the east of Brent Knoll SM before passing through gaps in properties along the A38 at Tarnock. There are few gaps in built development along the A38 and at Tarnock the existing 132kV overhead line passes approximately 30m to the west of a car showroom and within 40m of residential properties.

8.27 Paralleling in this area would be constrained by and would need to consider proximity to properties along the A38. A route parallel to the M5 would take potential alignments closer to settlement at Rooks Bridge and to existing masts where there is potential for a confusing 'wirescape' to result.

8.28 To the east of the M5 and west of the Crook Peak to Shute Shelve Hill SSSI the overhead line corridor enters the Mendip Hills AONB. The existing 132kV overhead line enters the AONB along a narrow corridor east of and abutting the M5 between development at Loxton and Webbington before following the floor of the Lox Yeo Valley in a north easterly direction for approximately 6km (see Figure 7).

8.29 Through the Mendip Hills the 132kV line, and Corridor 1 on which it is based, pass to the east of the North Somerset and Mendip Bats SAC which is designated for its populations of lesser and greater horseshoe bats. Natural England has a 5km 'consultation zone' which covers important feeding grounds surrounding the SAC. Detailed alignments would seek to minimise effects on the integrity of the site to which the designations apply through successfully addressing the requirements of a Habitat Regulations Assessment.

8.30 It is not feasible to avoid the Mendips Hills AONB in a reasonable connection route between Bridgwater and Seabank. To the west of the AONB a corridor is constrained by areas of ancient woodland (Hay Wood) and built development at Weston-super-Mare. To the east the Mendip Hills extends for approximately 22km.

8.31 The route corridor represented by the existing 132kV overhead line follows the low ground of the Lox Yeo valley with alternatives all involving climbing slopes onto pronounced higher ground.

8.32 Option 1B of this corridor would result in an additional overhead line within this designated landscape parallel to the existing 132kV overhead line. This would be constrained by and would need to consider scattered properties, areas of

woodland along the Lox Yeo River, areas of residential development to the west of Sandford and effects on the landscape for which the AONB is designated.

8.33 To the west of Sandford, adjacent to the Cheddar Valley Railway Walk an area of residential development is currently under construction (within 300m of the existing 132kV overhead line). Both options identified within Corridor 1 avoid this area of residential development.

8.34 Removing the existing 132kV overhead line (as proposed for Option 1A) is likely to result in the need for additional works to the 132kV distribution network to maintain supplies. This would include the construction of a new 400/132kV grid supply point (GSP) substation in the vicinity of Churchill. Initial studies indicate that the new GSP substation would be optimally located adjacent to the existing 132kV substation at Churchill. This would require a new 400kV connection from the proposed Bridgwater to Seabank overhead line to the new GSP at Churchill. The existing 132kV N Route which runs for approximately 4.5km between the existing 132kV overhead line and Churchill substation would become redundant and its corridor could be utilised for a new 400kV overhead line. Scattered individual properties are included within the corridor only where its width is considered sufficient to enable separation to be achieved between possible alignments and sensitive receptors.

8.35 North of the proposed tee for the connection to Churchill the overhead line corridor passes over moorland between the settlements of Weston-super–Mare, Congresbury and Yatton. In this area potential route corridors are constrained by Puxton Moor, Biddle Street, Tickenham, Nailsea and Kenn Moors SSSI. Route corridors in this area are further constrained by significant areas of built development to the east (Nailsea, Blackwell, Yatton and Congresbury) and west (Weston-super-Mare and Clevedon) of these designated areas.

8.36 The existing 132kV overhead line travels along the eastern boundary of Puxton Moor SSSI before travelling through Biddle Street SSSI. North of Biddle Street SSSI the 132kV overhead line passes between the villages of Kingston Seymour and North End before heading in north easterly direction through Kenn Moor SSSI and along the south eastern and eastern edges of Nailsea Moor and Tickenham Moor SSSIs (see Figure 9). Potential corridors parallel to the M5 are constrained at this point by scattered dwellings on the urban fringe of Clevedon, the split level M5 motorway and large blocks of woodland to the north of Tickenham.

8.37 Scattered properties and small villages pose constraints, however Corridor 1 includes areas of open land outside the SSSIs which may allow avoidance of the designated sites in alignments.

8.38 Paralleling through this area would be constrained by and would need to consider effects on the SSSIs and scattered properties to the north west of Yatton. Although the existing overhead line intersects these SSSIs, paralleling would lead to effects over a much larger areas of the designated sites.

8.39 Tickenham Ridge is a long narrow ridge to the north of Nailsea, extending east from Clevedon, identified in the North Somerset Landscape Character

Assessment. Lying to the south of the ridge is development at Tickenham and Stone Edge Batch (see Figure 9).

8.40 Extending across the ridgeline are significant blocks of woodland, large parts of which are designated as Ancient Woodland or part of the Court Hill SSSI. There are also a number of important cultural and historic sites on the ridge including Cadbury Camp SM and Clevedon Court a Registered Park and Garden.

8.41 Through this area the existing 132kV overhead line parallels a second 132kV line (W Route) passing through a gap in development at Stone Edge Batch. To the north of Stone Edge Batch both overhead lines proceed north east along the slopes of Tickenham Ridge passing between blocks of woodland at Lime Breach Woods.

8.42 This part of Corridor 1 is highly constrained by built development at Tickenham and Stone Edge Batch, scattered properties and large blocks of woodland.

8.43 Paralleling through this area would be highly constrained by and would need to consider effects on the settlements and scattered properties, woodland (particularly Lime Breach Wood to the west and Priors Wood to the east) and the proximity to two existing 132kV overhead lines.

8.44 On the northern side of Tickenham Ridge the existing 132kV overhead line crosses the M5 running parallel to the W Route across the Gordano Valley towards the existing WPD 132kV Portishead substation (see Figure 10). National Grid does not require a connection into the existing 132kV WPD Portishead substation. However, the proposed corridor passes in close proximity to the existing substation due to the presence of constraints to the east and west of the M5 which prevent a direct route corridor parallel to the M5 from Tickenham Ridge to Avonmouth.

8.45 The existing 132kV W Route terminates at Portishead substation. From Portishead substation the overhead line corridor runs parallel to a 132kV overhead line (BW Route) which travels between Portishead and Seabank travelling through Bristol Port Authority land east of the Royal Portbury Docks and across the River Avon.

8.46 At Avonmouth the overhead line corridor widens oversailing large areas of industrial and residential development to the west of the M5. Avonmouth is a continuous band of development to the east of the Severn Estuary (designated as a SSSI, SPA, SAC and Ramsar site) and to the west of Bristol. It is enclosed by the mouth of the River Avon (which forms part of the Severn Estuary designation) to the south and by the M5 to the east.

8.47 Avonmouth is highly constrained by existing built development. The existing 132kV overhead line crosses the Avonmouth Docks complex to the west of the M5 before oversailing large numbers of residential properties. Further technical studies are required to determine the effects of a potential corridor on this part of the DNO network and built development at Avonmouth.

8.48 To the north of Avonmouth the existing 132kV overhead line crosses Mere Bank SM (a medieval flood bank just over 1km long). Route Corridor 1 in this area is constrained by the existing 132kV BW Route and the M5 to the east and built development at Avonmouth to the west.

8.49 Paralleling in this area would be constrained by and would need to consider proximity to large areas of residential development and the Mere Bank SM. The effect of an additional 400kV line on the integrity of the SPA, SAC and Ramsar designations which apply to the mouth of the River Avon would also require consideration through the application of a Habitat Regulations Assessment. Detailed alignments would seek to minimise effects on these areas of constraint.

8.50 The overhead line corridor continues north passing to the west of the settlement of Hallen and travelling west into Seabank substation.

8.51 A summary of the key environmental constraints identified in relation to Corridor 1 (including options 1A and 1B) is presented in Table 8.1.

Corridor 2 – New 400kV Overhead Line Corridor

Overview

8.52 Route corridor 2 considers the construction of a new 400kV overhead line between Bridgwater and Seabank substations separate as far as possible from the existing overhead lines. As for Corridor 1 the proposed overhead line would use towers of a new L13 design, which are likely to be approximately 47m high.

8.53 Corridor 2 seeks to identify a new 400kV overhead line route that would avoid paralleling and creating a 'crowding' of overhead lines and towers. However, this may not be possible in certain locations due to environmental constraints. Where this is the case a distance of 50-70m is considered to be the closest technically achievable distance for the construction of a parallel overhead line and this distance is preferred to limit the extent of influence where complete divergence cannot be achieved.

Route Corridor 2 Description

North of Reconfigured Hinkley to Bridgwater Overhead Line

8.54 In the case of Route Corridor 2 the required reconfiguration of circuits around Bridgwater would be as described at the start of this Chapter.

8.55 However, approximately 2km north east of Bridgwater and 500m west of the settlement of Bawdrip the overhead line corridor passes to the west of the settlement of Knowle. Corridor 2 is constrained at this point to the east by the existing 132kV overhead line and blocks of woodland that enclose and screen Knowle Hall and to the west by residential properties, blocks of woodland and the settlement of Puriton. Scattered individual properties and blocks of woodland (particularly in the vicinity of Knowle Hall) are included within the corridor only where its width is considered sufficient to enable separation to be achieved between possible alignments and sensitive receptors.

Corridor 2 North of Reconfigured Hinkley to Melksham Overhead Line

8.56 Immediately north of the proposed new tee point Corridor 2 travels northeast to achieve separation from the existing 132kV overhead line. Corridors to the west of the existing 132kV overhead line (parallel to the M5) are constrained by settlement at East Huntspill and Highbridge and by proximity to existing 132kV overhead lines.

8.57 The corridor crosses the Huntspill River NNR close to Gold Corner before proceeding north east across large areas of open land (including Huntspill Moor and Mark Moor) and the B3139 at a gap between the settlements of Mark and Blackford.

8.58 The corridor is constrained at this point by the settlements of Blackford and Wedmore to the east and the settlement of Mark and the existing 132kV overhead line to the west.

8.59 Along the B3139 individual properties are included within the corridor where it is considered that separation could be achieved between possible alignments and sensitive receptors.

8.60 Corridor 2 continues over extensive areas of largely unconstrained open moorland (Blackford Moor, Binham Moor and Allerton Moor) to the west of settlements at Chappel Allerton and Stone Allerton and includes scattered properties along the A38 at Biddisham. At this point the corridor is defined by settlements at Badgworth to the east and Biddisham to the west but also by the need to approach the preferred corridor through the Mendip Hills AONB which lies approximately 2km north of Biddisham.

8.61 Along the A38 the corridor includes breaks in development. Scattered individual properties along the A38 are included within the corridor where its width is considered sufficient to enable separation between possible alignments and sensitive receptors.

8.62 To the north of Biddisham Corridor 2 gradually narrows and enters the AONB at the same point as Route Corridor 1. As described for Corridor 1, it is not feasible to avoid the Mendips Hills AONB. To the west a corridor is constrained by the existing 132kV overhead line, the topography of the AONB, areas of ancient woodland (on Loxton Hill and Hay Wood) and built development at Weston-super-Mare. To the east a corridor is constrained by the topography of the Mendip Hills which extends for approximately 22km.

8.63 Within the AONB the corridor splits. The western spur of the corridor travels north west (parallel to the M5) for approximately 4km passing within 80m of Banwell Caves SSSI (part of the North Somerset and Mendip Bats SAC) and to the west of settlement at Banwell. The spur continues north, parallel to the M5 before rejoining Corridor 2 to the north of Yatton. Scattered individual properties at West Hewish are included within the corridor at this point however its width is considered sufficient to enable separation to be achieved between possible alignments and sensitive receptors.

8.64 The eastern spur of the corridor travels north east, based on the route of the existing 132kV overhead line, for approximately 6km along the valley of the Lox Yeo River towards development at Sandford. Both spurs of this corridor would result in an additional overhead line within this designated landscape.

8.65 The North Somerset and Mendip Bats SAC designated for its populations of lesser and greater horseshoe bats would require consideration for both spurs of the corridor as for Corridor 1 above.

8.66 To the west of Sandford, adjacent to the Cheddar Valley Railway Walk an area of residential development is currently under construction (within 300m of the existing 132kV overhead line). Corridor 2 avoids this area of residential development.

8.67 The existing 132kV overhead line is present in this section of the corridor and there would be some paralleling of the two lines (new 400kV and existing 132kV).

8.68 North of Sandford the eastern spur of Corridor 2 splits with options east and west to negotiate Puxton Moor SSSI. The eastern spur of the corridor is constrained by the settlements of Congresbury and Yatton and by scattered dwellings including Stepstones Farm. The western spur of the corridor is constrained by clusters of dwellings at Rolestone, May's Green and Hewish, a minor Romano British Villa SM and by Puxton Moor SSSI.

8.69 The existing 132kV overhead line is present in this section of the corridor. Corridor 2 passes within 200m of the existing 132kV line and a new 400kV line would appear closely parallel in this area.

8.70 To the north west of Yatton the corridor spurs reconnect traveling north east over settlement at North End. Scattered individual properties at North End are included within the corridor at this point however its width is considered sufficient to enable separation to be achieved between possible alignments and sensitive receptors.

8.71 North of Yatton the corridor crosses the southern and eastern extents of Kenn Moor SSSI. Detailed alignment studies would seek to minimise effects on the integrity of the site to which this designation applies.

8.72 Corridor 2 then runs runs approximately parallel with the Bristol to Weston railway through a small gap in development along Station Road between Nailsea and Backwell. This is a tightly constrained area.

8.73 To the east of Nailsea the corridor diverts north crossing scattered properties at Wraxall and areas of woodland to the south of Tickenham Ridge.

8.74 To the north of Nailsea the proposed corridor narrows to avoid a Deserted Medieval Settlement SM (300m east of Wraxall House), a listed building, scattered properties at Wraxall and numerous blocks of woodland on the slopes of Tickenham Ridge. Alignments within this corridor would seek to minimise effects on the setting of this SM.

8.75 The scale of the landscape, scattered properties and woodlands result in this section of the route being more constrained limiting the potential alignments available within the corridor. Corridor 2 runs close to two existing 132kV overhead lines in this area and a new 400kV overhead line would be viewed as closely parallel in places.

8.76 No route corridor has been identified north of Portishead and a route to Seabank would need to follow that identified for Corridor 1. Further technical studies are required to determine the effects of a potential corridor on this local part of the DNO network and built development at Avonmouth.

8.77 A summary of the key environmental constraints identified in relation to the proposed corridors is presented in Table 8.1. Chapter 9.0 presents TEP's analysis of the route corridors against the environmental constraints identified and described in Chapters 6.0 and 7.0.

'Mixing and Matching' of Corridors

8.78 During consultation on the Draft RCS Natural England questioned whether corridors could be 'mixed and matched' to achieve an optimal overhead line route for the Hinkley C connection.

8.79 Corridor 2 represents a new route between Bridgwater and Seabank which would introduce a greater scale of change from the existing situation and increased environmental effects. Corridor 1 option A has been identified based on the assumption that the existing 132kV WPD overhead line is removed and its route utilised for a new 400kV line between Bridgwater and Seabank. This would require localised works to WPD's system to maintain supplies to Weston-super-Mare (including a 400/132kV GSP substation in the vicinity of Churchill and a new 4.5km 400kV overhead line connection to the GSP substation). For Corridor 1 option B and Corridor 2 there would be no requirement to remove the existing 132kV line.

8.80 There is potential to remove the 132kV WPD overhead line and to generally follow its route although at particular areas of constraint within the study area, to identify a different route to avoid or reduce environmental effects. This is particularly apparent in two areas of constraint identified and discussed below.

<u>Knowle</u>

8.81 At Knowle the route of the existing 132kV overhead line is constrained to the east by a cluster of dwellings at the junction of the A39 and New Road and to the west by residential properties and blocks of woodland which enclose and screen Knowle Hall. The existing 132kV overhead line utilises a gap in built development which avoids the residential properties and blocks of woodland. However, the potential requirement to construct a new 400kV overhead line prior to the decommissioning of the existing 132kV line makes Corridor 1 (Options A and B) constrained in this vicinity.

8.82 Corridor 2 adopts an alternative route through this constrained area, passing west of blocks of woodland which enclose and screen Knowle Hall. The corridor continues north where it meets the existing 132kV overhead line to the west of Woolavington. To avoid the area of constraint at Knowle and minimise the environmental effects of a new 400kV overhead line route, Corridor 2 could be followed in the area between the existing 275kV Hinkley to Bridgwater overhead line and Woolavington.

Puxton Moor and Biddle Street

8.83 North of the Mendip Hills AONB the existing 132kV overhead line travels along the eastern boundary of Puxton Moor SSSI before travelling through the western edge of Biddle Street SSSI. To negotiate these areas of constraint and minimise effects on these designated sites, either the eastern or western spur of Corridor 2 could be used as an alternative to Corridor 1 (option A or B).

8.84 The eastern spur of Corridor 2 avoids Puxton Moor SSSI but would take potential overhead line routes closer to the settlements of Congresbury and Yatton and would result in effects over a greater area of Biddle Street SSSI. The western spur of Corridor 2 would avoid both Puxton Moor and Biddle Street SSSI but would take potential overhead line routes closer to dwellings at Rolestone, May's Green and Hewish and would almost entirely surround Puxton Moor SSSI. The Environment Agency noted in its response to the draft RCS that this would not be favorable for the bird or bat populations that use the site.

8.85 The areas of open land outside the SSSIs included within Corridor 1 would allow a number of possible alignments to be identified that would avoid the designated sites. Using either the eastern or western spurs of Corridor 2 is therefore considered to present a less optimal routeing solution than remaining on Corridor 1 in this area.

CORRIDORS → / ENVIRONMENTAL CRITERIA ↓	CORRIDOR 1 (Option 1A) APPROXIMATE LENGTH 56.5KM	CORRIDOR 1 (Option 1B) APPROXIMATE LENGTH 56.5KM	CORRIDOR 2 APPROXIMATE LENGTH 57KM
Areas of Outstanding Natural Beauty	6km of corridor passes through the Mendip Hills AONB using route of existing 132kV line to be removed.	6km of corridor passes through the AONB parallel to the existing 132kV overhead line.	6km of corridor passes through the AONB parallel to the existing 132kV overhead line.
World Heritage Sites	New line would replace the existing 132kV line through the Somerset Levels and Moors between Bridgwater and the Mendip Hills AONB. A nomination for World Heritage Site status is currently being promoted by Somerset County Council. The boundary of this is currently unknown.	Would result in a new 400kV overhead line through the Somerset Levels and Moors between Bridgwater and the Mendip Hills AONB. A nomination for World Heritage Site status is currently being promoted by Somerset County Council. The boundary of this is currently unknown.	Would result in a new 400kV overhead line through the Somerset Levels and Moors between Bridgwater and the Mendip Hills AONB. A nomination for World Heritage Site status is currently being promoted by Somerset County Council. The boundary of this is currently unknown.
Sites of Special Scientific Interest	Potential to deviate from existing alignment to avoid effect on SSSIs. Existing line avoids Puxton Moor Direct effects on Biddle Street, Kenn Moor SSSIs. Effects on the fringes of Nailsea Moor and Tickenham Moor SSSIs. Replacement crossing of the River Avon.	Potential to deviate from close paralleling to avoid effect on SSSIs. Direct effects on Biddle Street, Kenn Moor SSSIs in parallel to existing line. Direct effects on Nailsea Moor and Tickenham Moor SSSIs as a result of paralleling. Third crossing of the River Avon	Direct effects on Kenn Moor SSSI within 500m of existing line. Third crossing of the River Avon
Special Protection Areas	Replacement overhead line crossing of River Avon (part of the Severn Estuary SPA).	Direct effect from third overhead crossing of the mouth of the River Avon (part of the Severn Estuary SPA) parallel to existing 132kV circuits.	Direct effect from third overhead crossing of the mouth of the River Avon (part of the Severn Estuary SPA) parallel to existing 132kV circuits.
Special Areas of Conservation	Replacement overhead line crossing of River Avon (part of the Severn Estuary SAC).	Direct effect from third overhead crossing of the mouth of the River Avon (part of the Severn Estuary SAC) parallel to existing 132kV circuits.	Direct effect from through third overhead crossing of the mouth of the River Avon (part of the Severn Estuary SAC) parallel to existing 132kV circuits.
Ramsar sites	Replacement overhead line crossing of River Avon (part of the Severn Estuary Ramsar).	Direct effect from third overhead crossing of the mouth of the River Avon (part of the Severn Estuary Ramsar) due to paralleling of existing 132kV circuits.	Third overhead crossing of the mouth of the River Avon (part of the Severn Estuary Ramsar) due to paralleling of existing 132kV circuits.

CORRIDORS → / ENVIRONMENTAL CRITERIA ↓	CORRIDOR 1 (Option 1A) APPROXIMATE LENGTH 56.5KM	CORRIDOR 1 (Option 1B) APPROXIMATE LENGTH 56.5KM	CORRIDOR 2 APPROXIMATE LENGTH 57KM
National Nature Reserves	Replacement overhead line crossing of the Huntspill River NNR.	Direct effect from third overhead crossing of Huntspill River NNR in parallel to 2 existing 132kV circuits.	Direct effect from third overhead crossing of Huntspill River NNR in parallel to 2 existing 132kV circuits.
Scheduled Monuments	Replacement of existing overhead line which passes within 500m of 6 SMs Replacement of existing overhead line crossing of Mere Bank SM.	Existing overhead line passes within 500m of 6 SMs. Paralleling may increase proximity of lines to SM. Direct effect on Mere Bank SM north of Avonmouth if paralleling to the west of the existing line. Effect on SM and its setting requires further consideration at the detailed alignment stage.	Direct effect on Mere Bank SM north of Avonmouth if corridor adopted to the west of the existing line. Effect on SM and its setting requires further consideration at the detailed alignment stage. The corridor passes within 100m of a Minor Romano-British Villa SM north east of Hewish and a Deserted Medieval Settlement SM north east of Nailsea.
Historic Buildings Listed I and II*	2 Listed Buildings within 500m Existing line present in setting.	2 Listed Buildings within 500m Existing line present in setting; new line would parallel.	3 Listed Buildings within 500m. Considered avoidable in identification of alignments.
Conservation Areas	No direct effect 5 Conservation Areas within 500m of the corridor (Loxton, Christon, Banwell, Nailsea and Portishead) Effect of overhead line on setting typically minimised due to location of Conservation Areas within settlement boundaries.	No direct effect 5 Conservation Areas within 500m of the corridor (Loxton, Christon, Banwell, Nailsea and Portishead). Effect of overhead line on setting typically minimised due to location of Conservation Areas within settlement boundaries.	No direct effect 3 Conservation Areas within 500m of the corridor (Stone Allerton, Loxton and Backwell). Effect of overhead line on setting typically minimised due to location of Conservation Areas within settlement boundaries.
Registered Parks and Gardens	N/A	N/A	The corridor passes within 700m of Tyntesfield a Registered Park and Garden.
Woodlands	On Tickenham Ridge the replacement of the existing 132kV overhead line which intersects Mogg's Wood and passes close to Chummock Wood. Potential alignment options highly constrained by woodland.	On Tickenham Ridge the existing overhead line intersects Mogg's Wood and passes close to Chummock Wood. Woodland avoidance more difficult in achieving close synchronised paralleling.	Corridor passes between woodland blocks at Knowle and Wraxall and intersects Prior Wood on Tickenham Ridge. Woodland avoidance more difficult in achieving close synchronised paralleling.
Settlements	Replacement of the existing 132kV overhead line which passes through or adjacent to the settlements of Knowle, Mark, Tarnock, Stone Edge Batch and Avonmouth.	Paralleling the existing overhead line is constrained by and likely to have an effect on the settlements of Knowle, Mark, Tarnock, Stone Edge Batch and Avonmouth.	The corridor passes close to development at Mark, Biddisham, Sandford, North End/Yatton, Nailsea/Backwell, Nailsea, Wraxall and Avonmouth.
Isolated Properties	Scattered farmsteads and dwellings throughout area	Scattered farmsteads and dwellings throughout area	Scattered farmsteads and dwellings throughout area

CORRIDORS → / ENVIRONMENTAL CRITERIA ↓	CORRIDOR 1 (Option 1A) APPROXIMATE LENGTH 56.5KM	CORRIDOR 1 (Option 1B) APPROXIMATE LENGTH 56.5KM	CORRIDOR 2 APPROXIMATE LENGTH 57KM
Development Plan Allocations for Housing	No effect.	No effect.	No effect.
Minerals	No effect.	No effect.	No effect.
Topography	Majority of the corridor passes over low lying land associated with the Somerset Levels and Moors and new line would replace existing 132kV line. Crosses Mendip Hills AONB for approximately 6km along the valley of Lox Yeo River. Passes over a prominent ridge to the south of Bristol rising to approximately 120m AOD.	Majority of the corridor passes over low lying land associated with the Somerset Levels and Moors. Crosses Mendips Hills AONB in parallel with existing 132kV line for approximately 6km along valley of Lox Yeo River. Passes over a prominent ridge in parallel with 2 existing 132kV overhead lines to the south of Bristol rising to approximately 120m AOD.	Majority of the corridor passes over low lying land associated with the Somerset Levels and Moors. Crosses Mendips Hills AONB in parallel with existing 132kV line for approximately 6km along valley of Lox Yeo River. Passes over a prominent ridge in parallel with 2 existing 132kV overhead lines to the south of Bristol rising to approximately 120m AOD.
Landscape Character	The corridor passes through 4 national character areas. Where possible the corridor passes over a largely flat landscape comprising the Somerset Levels and Moors And new lien would replace existing 132kV line. More varied landscapes lying within the corridor include the Mendip Hills and the Bristol Avon Vales and Ridges and new line would replace existing 132kV line.	The corridor passes through 4 national character areas. Where possible the corridor passes over a largely flat landscape comprising the Somerset Levels and Moors and new line would be parallel to existing 132kV line. More varied landscapes lying within the corridor include the Mendip Hills and the Bristol Avon Vales and Ridges and new line would be parallel to existing 132kV line.	The corridor passes through 4 national character areas Where possible the corridor passes over a largely flat landscape comprising the Somerset Levels and Moors More varied landscapes lying within the corridor include the Mendip Hills and the Bristol Avon Vales and Ridges. New line would be parallel to existing 132kV line at Knowle, within the AONB, Tickenham Ridge and at Avonmouth.

9.0 COMPARISON OF CORRIDORS

Introduction

9.1 Chapter 8.0 describes the proposed overhead line route corridors with reference to the environmental constraints which define and would be affected by them. This Chapter provides an analysis of the route corridors in relation to the environmental constraints identified, topography and landscape character.

Comparison of Corridors

Mendip Hills AONB

9.2 The Mendip Hills AONB forms the greatest constraint to the routeing of overhead line corridors within the study area and cannot be avoided in a feasible route between Bridgwater and Seabank. All corridors use one entrance to this designated area (an area of low lying land comprising the valley of the Lox Yeo River).

9.3 Corridor 1 (options 1A and 1B) and the eastern spur of Corridor 2 travel through the AONB for approximately 6km following the Lox Yeo River valley. The western spur of Corridor 2 takes an alternative route through the AONB travelling north west parallel to the M5 motorway.

9.4 Any new structures in the place of the existing 132kV towers or in addition to those already present would seek to minimise their effect on this area designated for its national landscape value. Corridor 1 (Option 1B) and 2 would result in an additional overhead line through the AONB.

9.5 National Grid's undergrounding policy (see Appendix 3) means that consideration would be given to use of underground rather than overhead transmission in 'exceptionally constrained areas'. Topography and access requirements strongly imply that the route of the existing 132kV overhead line through the AONB would be used if underground cables were used instead of overhead transmission, meaning that the designation's influence on the relative positions of route corridors to the north and south would remain if underground cables are considered.

9.6 The route adopted by Option 1A within Corridor 1 is optimal, offering the least degree of change within this designated landscape. However, the effect of a new 400kV line (with larger towers) on the visual amenity of this landscape would be subject to further consideration and detailed assessment.

World Heritage Sites

9.7 As described at paragraphs 7.14 and 4.5, it is understood that there are proposals for the Somerset Levels and Moors to be nominated as a World Heritage Site and that nomination would involve the UK government accepting the site's nomination onto the 'Tentative List' and a period of between 5 and 10 years elapsing before confirmation of the nomination. The indicative boundaries

of the possible site are illustrated at Figure 2 and all corridors would affect this area of potential nomination.

9.8 If the area in which route corridors are proposed is included within the nomination, the nominated site will include existing overhead lines. The effects of introducing additional overhead lines would need to be considered in the context of the reasons for nomination. However Corridor and Option 1A would introduce the least scale of change from the existing situation and represents the lowest level of effect on a putative World Heritage Site.

SSSIs

9.9 There are a large number of SSSIs throughout the study area and the proposed corridors have sought to avoid these areas of constraint. However, a particular cluster of SSSIs to the north of the Mendip Hills AONB, comprising Puxton Moor, Biddle Street, Kenn Moor, Nailsea Moor and Tickenham Moor SSSIs are difficult constraints to avoid in overhead line routeing.

9.10 Corridor 1 (Option 1A) would directly affect Biddle Street and Kenn Moor SSSIs and runs along the periphery of Puxton Moor, Nailsea Moor and Tickenham Moor SSSIs. Areas of open land to the east of Puxton Moor and west of Biddle Street are included within the corridor but there is a high confidence that these designated sites can be avoided in route alignments.

9.11 The effects would arise from construction of the new 400kV line. There would be fewer towers in these sites although tower footprints would be greater. Although the existing overhead line intersects these SSSIs, paralleling (Option 1B) would lead to effects over a larger area of the designated sites.

9.12 Corridor 2 largely avoids these designed sites by routeing to the west of Puxton Moor and through the southern part Kenn Moor. However, this takes the corridor through areas of high constraint including residential properties at North End, Backwell, Nailsea and Yatton and a SM and blocks of woodland at Tickenham Ridge.

SPA, SAC, Ramsar sites

9.13 The corridors and options avoid the Somerset Levels and Moors SPA and Ramsar sites. Corridor 2 passes close to the north western edge of Tealham and Tadham Moors, part of the Somerset Levels and Moors SPA and has potential to give rise to greater levels of effect than Corridor 1. Each of the corridors passes within the 5km consultation zone for the North Somerset and Mendip Bats SAC and as this is a dispersed site there is no substantial differentiation between the corridors with regard to potential effects.

9.14 Corridors 1B and 2 would involve a new crossing of the mouth of the River Avon which is part of the Severn Estuary SPA, SAC and Ramsar site. This would be a third overhead line crossing as there are already two 132kV overhead line crossings. Corridor 1A would involve removal of one of the 132kV crossings and replacing it with a 400kV crossing. The height of crossing would not increase from the existing and Corridor 1A presents the least effects on the Severn

Estuary designations. However this difference between the corridors in respect of effects on SPAs, SACs and Ramsar sites is small.

National Nature Reserves

9.15 There are a number of NNRs scattered throughout the study area (most of which form part of other designated sites) and the proposed corridors have sought to avoid these areas of constraint. However, the Huntspill River NNR which lies immediately north of the existing 400kV Hinkley to Melksham overhead line is difficult to avoid in overhead line routeing. Avoidance of this area of constraint is constrained to the east by the Somerset Levels And Moors SSSI, SPA, Ramsar site and to the west by the Severn Estuary SSSI, SPA, SAC, Ramsar site.

9.16 The route adopted by Option 1A within Corridor 1 is optimal, offering the least degree of change from the existing situation. Option 1B and Corridor 2 would require an additional crossing of this designated site. The degree of benefit from option 1A over other corridors is small.

Scheduled Monuments

9.17 SMs are generally widespread throughout the study area with particular clusters in the Mendip Hills. Detailed alignment studies will seek to minimise effects on these designated sites.

9.18 Corridors have sought to avoid SMs with proximity maximised wherever possible. However, to the north of Avonmouth all corridors would have a direct effect (through oversailing) on Mere Bank SM (a medieval flood bank just over 1km long). The existing overhead line oversails this SM and is present in its setting however paralleling (Option 1B and Corridor 2) would lead to additional effects on the designated site. Detailed alignment studies would seek to minimise these effects. However this would be common to each of the corridors identified. Option 1B within Corridor 1 has greatest potential to introduce effects on settings of other SMs.

Historic Buildings (Grade I and II*)

9.19 Corridors have sought to avoid Grade I and II* listed buildings within the study area with proximity maximised wherever possible. None of the route corridors will have any direct effects upon listed buildings and effects on setting will be minimised through the in detailed alignments. There is no substantial difference between the corridors with regard to listed buildings.

Conservation Areas

9.20 None of the route corridors will have any direct effects on Conservation Areas. The effects of overhead lines on setting are typically minimised due to the location of Conservation areas within settlement boundaries. There is no substantial difference between the corridors with regard to Conservation Areas.

Registered Parks and Gardens

9.21 None of the route corridors will have any direct effects upon any Registered Parks and Gardens. Corridor 2 passes within 700m of Tyntesfield Registered Park and Garden and alignments would seek to minimise effects on the setting of this designated site.

Woodlands

9.22 There are numerous small woodlands, many of which are ancient woodland, with some also designated as SSSIs. Where possible woodlands have been avoided in identifying corridors. However, where corridors are tightly constrained small areas of woodland have been included where it is possible alignments can be identified that avoid them or effects can be minimised. Corridor 2 offers the least potential to avoid woodland by alignment (particularly around Knowle and Tickenham Ridge).

Settlements

9.23 The route corridors have sought to avoid and maximise the distance from all settlements where other constraints allow. The existing 132kV overhead line forming the baseline for Corridor 1 passes close to dwellings in small settlements at Mark and Stone Edge Batch. Due to the close presence of other environmental constraints at North End and Backwell, Corridor 2 passes close to the edge of these settlements. Optimal alignments within corridors would seek to minimise adverse effects. Option 1A within Corridor 1 maximises potential for minimisation of adverse amenity effects on properties.

Individual Properties

9.24 Individual properties have only been included within corridors where it is considered sufficient separation between possible alignments and receptors can be achieved. Corridor 1 runs in closest proximity to scattered dwellings (particularly option 1B).

RSS and Development Plan Allocations for Housing

9.25 None of the route corridors will have any direct effects upon any areas identified in the Draft RSS or development plans for housing.

Active Mineral Extraction Sites

9.26 None of the route corridors will have any direct effects upon identified active mineral extraction sites within the study area.

Airfields

9.27 None of the route corridors will have any direct effects airfields/airstrips or their associated protections zones.

Topography

9.28 All route corridors cross the low lying open landscape of the Somerset Levels and Moors and the higher landscapes of the Mendip Hills and Tickenham Ridge. There is no discernable difference between the corridors in terms of topography.

Landscape

9.29 The corridors run through areas of similar landscape character and are not differentiated by the character areas affected.

9.30 The Holford Rules advise careful consideration of paralleling, particularly when considering overhead lines in open and sparsely vegetated landscapes. This is an issue relevant to identifying a preferred connection corridor between Bridgwater and Seabank due to the open landscape and often sparse tree cover of the Somerset Levels and the presence of existing 275kV (Hinkley to Bridgwater), 400kV (Hinkley to Melksham) and 132kV overhead lines in the study area, together with 132kV overhead lines.

9.31 Option 1A within Corridor 1 proposes use of the route of the existing 132kV overhead line which would be removed. This would minimise the scale of change in the landscape. However, at Nailsea and Tickenham Ridge the new 400kV line would run parallel to another existing 132kV line, albeit in a landscape more characterised by varied topography and woodland where two 132kV lines are presently parallel.

9.32 Option 1B within Corridor 1 proposes closely aligned paralleling along the route of the existing 132kV overhead line between Bridgwater and Seabank to the east or west of the existing line. This may be difficult to achieve for the full length of the route due to the proximity of environmental constraints. West of Nailsea and at Tickenham Ridge the 400kV line would parallel two existing 132kV routes introducing a third closely aligned structure into the landscape.

9.33 Corridor 2 seeks to achieve separation from the existing 132kV lines along its length. However, various environmental constraints present along the route force the corridor close to the existing 132kV overhead line (particularly around Woolavington, the Mendip Hills, Yatton, and Tickenham Ridge). As with option 1B at Tickenham Ridge the 400kV line would parallel 2 existing 132kV overhead lines increasing the scale of change through the introduction of 3 closely aligned structures in to views and the landscape.

9.34 Corridor 1A is considered distinctly preferred in terms of landscape.

Conclusions

9.35 The assessment and comparison of corridors has been based on environmental considerations only. It does not take account of technical or economic factors which will be taken into consideration by National Grid before a preferred corridor is identified to be taken forward.

9.36 TEP has considered the corridors identified for a Bridgwater to Seabank connection in relation to the environmental criteria. The corridors show greatest distinction with regard to their effects on the Mendip Hills AONB and with regard to effect on landscape (including land outside of the AONB designation). These are the primary aspects which influence the ranking of least constrained corridors. A ranking of the corridors in order of their level of overall environmental constraint and the key reasons for the decision is presented below.

Least Constrained Corridor *Corridor 1 (Option 1A)*

9.37 This option proposes to use the route of the existing 132kV overhead line between Bridgwater and Seabank and will not result in any additional overhead lines in the landscape. The 132kV line will be replaced by a higher voltage 400kV line with taller although fewer towers. In formulating detailed alignments within the Mendip Hills AONB consideration will be given to the use of low height towers to minimise visual effects and underground cables in accordance with National Grid's undergrounding policy.

9.38 This is considered to be clearly the least constrained corridor. The relatively wide corridor assumed for much of the route will enable a variety of alignments to be considered to seek to minimise the scale of change and effects on the environment.

9.39 The need for a new GSP substation and a new 400kV overhead line from the proposed Hinkley Point to Seabank overhead line to the GSP substation has been considered in assessing this option. The overall benefit of this option is considered to be retained when these additional works are considered.

Other Corridor *Corridor 2*

9.40 This corridor offers an alternative route between Bridgwater and Seabank seeking as far as possible to be separate from other overhead lines. However, the new 400kV line would parallel the existing 132kV overhead line in some places resulting in two closely aligned overhead lines, including within the Mendip Hills AONB. (In the formulation of detailed alignments consideration would be given to the use of low height towers and undergrounding in the AONB as for Corridor 1 Option 1A above.) In some parts of the corridor there will be 3 closely aligned overhead lines particularly around Nailsea and Tickenham Ridge emphasising the scale of change. This corridor will also result in greater effects on residential dwellings and settlements at Yatton and Nailsea.

9.41 This option is considered more environmentally constrained than Corridor 1A primarily due to the effect on landscape and amenity.

Most Constrained Corridor *Corridor 1 (Option1B)*

9.42 Corridor 1B would parallel the existing 132kV overhead line and will result in a new 400kV overhead line closely aligned to the existing 132kV line from north of Bridgwater to Seabank. This would include a new 400kV line parallel to the existing 132kV line in the Mendip Hills AONB, subject to detailed consideration of the use of underground cables in accordance with National Grid's undergrounding policy. A new 400kV line parallel to the existing 132kV line will

incur additional effects from the new line and will emphasise the presence of both structures cumulatively in the landscape. This will occur throughout but the effect will be most pronounced where the new 400kV line would parallel two 132kV lines around Nailsea and at Tickenham Ridge.

9.43 In addition to these effects, Corridor 1B would result in a greater scale of effect on SSSIs than Corridors 1A and 2.

9.44 This option is the most environmentally constrained option.

9.45 Consultation with key stakeholder agencies and local planning authorities on the RCS has indicated that Corridor 1 (option A) is considered the least environmentally constrained corridor. The relatively wide corridor assumed for much of the route will allow variety of alignments to be considered that seek to minimise the scale of change and effects on the environment. This corridor would also minimise the scale of change and would be less intrusive on the landscape than the alternative options of a parallel line or an entirely new route.

9.46 There are options for Corridor 1 to be adopted with parts of Corridor 2 used where these offer advantages in areas of constraint.

Appendix 2E – Hinkley Point C Connection Project M5 Routeing Study (2012)

nationalgrid

Hinkley Point C Connection Project

M5 Routeing Study

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February 2012

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APPENDICES

Appendix 1 - Q & As

1 INTRODUCTION

1.1 Purpose of the Report

1.1.1 This report has been produced by National Grid Electricity Transmission plc (National Grid) to consider the planning, environmental and technical constraints associated with the routeing and construction of a 400,000 volt (400kV) double circuit overhead line closely parallel to the M5 motorway between Bridgwater and the southern boundary of the Mendip Hills Area of Outstanding Natural Beauty (AONB) in Somerset.

1.1.2 The report has been produced in response to a representation from Tessa Munt MP which suggested that an overhead line route closely parallel to the M5 motorway could be achieved which would affect few residents and would maximise distance from properties (as compared to National Grid's route corridors on which it has consulted).

1.2 Structure of the Report

1.2.1 The report is structured as follows:

- Chapter 2 - explains the background to the proposal, including the need for the connection, National Grid's Route Corridor Study and the selection of a preferred route corridor;
- Chapter 3 - describes the approach and method used to identify an overhead line route which follows the M5 motorway as closely as possible;
- Chapter 4 – describes the environmental constraints that have been considered in the identification of an overhead line route closely parallel to the M5;
- Chapter 5 - identifies and describes potential overhead line route alignments close to the M5 motorway; and
- Chapter 6 - provides a comparison of an overhead line alignment close to the M5 with the preferred route corridor.

2 BACKGROUND

2.1 Introduction

2.1.1 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].

2.1.2 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.

2.1.3 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.

2.1.4 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.'*

2.2 Need for the Connection

2.2.1 In September 2007 National Grid received an application for the connection of a new nuclear power station of 3,600 Megawatts (MW) 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.

2.2.2 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 West, South Wales and Gloucestershire regions and that as a result additional transmission capacity in the region is required.

[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.

[2] National Grid: Hinkley Point C Connection Need Case for the South West and the South Wales and Gloucestershire Regions (August 2011).

2.2.3 The initial strategic optioneering exercise identified and evaluated some 20 technical options at workshops, involving representatives of the electricity network investment, engineering and planning and environmental consents teams from National Grid and its construction partners. In evaluating the options, due regard was given to the need to develop an efficient, co-ordinated and economical system of electricity transmission (as set out in National Grid's statutory and licence obligations) and to National Grid's duty to have regard to the effects of any proposal on the environment.

2.2.4 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].

2.3 Route Corridor Study

2.3.1 Having identified that the preferred connection was 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.

2.3.2 The RCS identified two principal corridors and offered a comparison of them.

- **Corridor 1** is an 'opportunity corridor' which would follow the route of an existing Western Power Distribution (WPD) 132kV overhead line which travels from Bridgwater via Portishead to Seabank. Two options were identified within this corridor: Corridor 1 Option 1A would involve the removing the existing WPD 132kV overhead line and using its corridor for a 400kV overhead line; Corridor 1 Option 1B would involve constructing a new 400kV overhead line parallel to the existing 132kV overhead line. Under Option 1B the existing line would not be removed.
- **Corridor 2** would involve the construction of a new 400kV overhead line between Bridgwater and Seabank separate, as far as possible, from the existing overhead lines. In the area of Corridor 2 between the Mendip Hills and Yatton, three potential options were identified - the western, central and eastern spurs.

2.3.3 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 overhead line with a higher voltage 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].

2.4 Preferred Route Corridor

2.4.1 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

[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).

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 (see Figure 1):

- Horsey to Woolavington (Corridor 2);
- Tickenham Ridge to Portishead (Corridor 2); and
- Avonmouth substation and Seabank substation (Corridor 1B/Corridor 2).

2.4.2 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. The extent and location of these works will be the subject of further studies by WPD and National Grid and will be the subject of consultation during the next stage of the Project. A new substation will also be needed at Aust in South Gloucestershire which will need to be connected to the transmission network.

3 APPROACH AND METHOD

3.1 Introduction

3.1.1 This Chapter presents the approach and method followed for the identification of an overhead line route which follows the M5 motorway as closely as possible.

3.2 National Grid's Environmental Guidance

3.2.1 As outlined at paragraph 2.1.4 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[6] 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 a route which follows the M5 as closely as possible:

- **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'[7]. This guidance was reviewed by National Grid in 1992 and has become accepted within the electricity transmission industry as the basis for overhead transmission line routeing. Its use is supported in the adopted

[6] National Grid Plc: National Grid's commitments when undertaking works in the UK - our Stakeholder, Community and Amenity policy: February 2010

[7] 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

National Policy Statement for Electricity Networks Infrastructure (EN-5)[8]. 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.

Summary of National Grid's Guidance and Policy on overhead line routeing

3.2.6 National Grid's guidance on overhead line routeing identifies areas which it seeks to avoid and areas on which it seeks to minimise effects. These are summarised with reference to the aspect of guidance with identifies them in Table 2.1 below.

Table 2.1 – Environmental aspects considered in routeing

Feature	Legislation	Routeing Response (and Reference)
National Parks	National Parks and Access to the Countryside Act 1949	Seek to avoid/consider undergrounding (NG Commitments/Holford Rule 1)
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 Rule 1)
Heritage Coasts	n/a	Seek to avoid (NG Commitments/ Holford Rule 1)
World Heritage Sites	1972 World Heritage Convention	Seek to avoid (NG Commitments/Holford Rule 1)
Sites of Special Scientific Interest	Wildlife and Countryside Act 1981	Seek to avoid/verify potential effects (NG Commitments/Holford Rule 2)
Special Protection Areas	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (NG Commitments/Holford Rule 2)
Special Areas of Conservation	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (NG Commitments/Holford Rule 2)

[8] Department of Energy and Climate Change: National Policy Statement for Electricity Networks Infrastructure (EN-5): July 2011.

Feature	Legislation	Routeing Response (and Reference)
Ramsar sites	The Conservation of Habitats and Species Regulations 2010	Seek to avoid (NG Commitments/Holford Rule 2
National Nature Reserves	National Parks and Access to the Countryside Act 1949	Seek to avoid/verify potential effects (NG Commitments/ Holford Rule 2)
Scheduled Monuments	Ancient Monuments and Archaeological Areas Act 1979	Seek to avoid/consider effect on setting (NG Commitments/Holford Rule 2)
Historic buildings (Listed I, II and II*)	Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to avoid/consider effect on setting (Note to Holford Rule 2)
Conservation Areas	Planning (Listed Buildings and Conservation Areas) Act 1990	Seek to avoid/consider effect on setting (Note to Holford Rule 2)
Settlements	n/a	Seek to avoid (Holford Rules Supplementary Note)
Registered Parks and Gardens	n/a	Seek to avoid (NG Commitments/Holford Rule 2)
Registered Battlefields	n/a	Minimise effects (NG Commitments)
Woodlands	n/a	Seek to avoid (Note to Holford Rules 4 and 5)
Landform	n/a	(Holford Rules 4 and 5)
Landscape Character	n/a	Minimise effects

3.3 Environmental aspects 'scoped out' of the appraisal at this stage

3.3.1 There are some environmental factors that do not influence the identification of an overhead line route which follows the M5 as closely as possible. The factors scoped out of the appraisal at this stage are outlined at paragraphs 3.3.2 to 3.3.6 below.

Flood risk

3.3.2 National Grid considers its siting of installations such as substations very carefully in relation to flood risk. However, 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 negligible effect on the risk or displacement of water as the lattice steel construction poses no material changes to surface water flow.

3.3.3 It has been assumed that flood risk would be addressed equally for any installations required and it has not been considered a material factor in distinguishing between options investigated.

Noise

3.3.4 Noise during construction will be temporary and managed by procedures and controls to ensure that it is not unacceptable. Noise during operation will be controlled primarily by separation of sources of noise from noise-sensitive receptors and also by noise-suppression measures as appropriate. The identification of potential overhead line alignments considers whether there is likely to be appropriate distances from settlements and dwellings for amenity reasons which would also allow separation to mitigate effects of noise. The noise sources and measures taken will be applied as required for any alignment and noise is not a material factor in distinguishing between options.

Air quality

3.3.5 New transmission infrastructure will not give rise to any material effects on air quality. Temporary construction works can give rise to dust affecting air quality locally. This will be

managed by procedures and controls to ensure that it is not unacceptable. These measures will be applied as required for any option and air quality is not a material factor in distinguishing between options.

Transport

3.3.6 Construction works will involve transport of materials and workforce to sites. The effects will be temporary and will be subject to management to ensure that effects are not unacceptable. This will be the case for any option and transport is not a material factor in distinguishing between options.

4 CONSTRAINTS WITHIN THE STUDY AREA

4.1 General Overview

4.1.1 The study area lies within the administrative boundary of Sedgemoor District Council and extends for approximately 17km from the existing 275kV Hinkley Point to Bridgwater overhead line (VQ Route) north of Bridgwater to the southern boundary of the Mendip Hills AONB to the south east of Loxton. It is centred on the M5 motorway and includes a 1km buffer to the east and west.

4.1.2 An existing 400kV overhead line owned and operated by National Grid travels through the southern part of the study area in an east-west alignment between National Grid's existing substations at Hinkley Point and Melksham (ZG Route). Existing 132kV and 33kV overhead lines owned and operated by Western Power Distribution (WPD) travel through the study area in a north-south alignment between Bridgwater and the Mendip Hills AONB.

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 an overhead line route as close as possible to the M5 is presented below and illustrated at Figure 2.

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;
- Sites of Special Scientific Interest;
- Special Protection Areas;
- Special Areas of Conservation;
- Ramsar sites;
- Conservation Areas;
- Registered Parks and Gardens; and
- Registered Battlefields.

4.4 Constraints within the study area

Areas of Outstanding Natural Beauty (AONB)

4.4.1 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. The importance of these sites and the protection afforded to them is further highlighted in Planning Policy Statement (PPS) 7. Paragraph 22 of PPS7 states that major developments should not take place in these designated areas except in exceptional circumstances and that such applications will be subject to rigorous examination and should include an assessment of the national need, cost and scope of developing outside the designated area and effects on the environment, landscape and recreational opportunities. A new overhead line through an AONB would have an effect on the landscape which will affect the objective to conserve and enhance natural beauty.

4.4.2 The Mendip Hills AONB lies on the northern boundary of the study area and is an extensive range of limestone hills to the south west of Bristol. The hills of the AONB run in

an east to west direction between the coast at Weston-super-Mare and Frome and overlook the Somerset Levels and Moors to the south and the Avon Valley to the north.

Special Protection Areas (SPA) and Ramsar Sites

4.4.3 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.

4.4.4 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.

4.4.5 There are no SPAs or Ramsar sites within the study area. However, the M5 motorway lies between the Severn Estuary and the Somerset Levels and Moors SPA and Ramsar sites. Each of these sites qualifies as a 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. The internationally important bird populations and the habitats on which they depend are also reasons for the Ramsar designation. The Severn Estuary designation also extends to cover fish populations of the estuarine and river system which is one of the most diverse in Britain.

National Nature Reserves (NNR)

4.4.6 NNRs are designated by Natural England under the National Parks and Access to the Countryside Act 1949 and are primarily SSSIs.

4.4.7 The Huntspill River is the only NNR in the study area. The Huntspill River NNR is an artificial river within the Somerset Levels and Moors managed by the Environment Agency. The River stretches for approximately 5 miles from Bridgwater Bay in the east to the Catcott, Edington and Chilton Moors SSSI in the west.

Scheduled Monuments

4.4.8 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.

4.4.9 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 Scheduled Monuments interspersed throughout the Mendip Hills and the Somerset Levels and Moors. The majority of these sites are on higher ground and close to or within settlements.

4.4.10 The most prominent of these Scheduled Monuments is Brent Knoll. Brent Knoll is an Iron Age Hill Fort with multiple ramparts which lies approximately 800m west of the M5 motorway. The Scheduled Monument is a prominent feature within the predominantly flat surrounding landscape of the Somerset Levels and has panoramic views across the surrounding landscape.

Listed Buildings (Grade I, II and II*)

4.4.11 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 affect a listed building.

4.4.12 There is one Grade I, twenty Grade II and one Grade II* Listed Buildings within the study area. They are often clustered within settlements and there are particular clusters of Listed Buildings in Puriton, East Brent and Rooks Bridge. There are some individual Listed Buildings in more rural areas; these are generally farmsteads and country houses.

Settlements

4.4.13 The key settlements within the study area are sited on hills, ridges and islands and include Puriton (east of the M5 on the ridge of Puriton Hill), Highbridge (west of the M5 on the south eastern edge of Burnham-on-Sea) and Rooks Bridge (east of the M5 approximately 2.5km south of the Mendip Hills AONB) .

4.4.14 There are numerous other villages and hamlets dispersed throughout the study area which are linked by the minor road system.

Individual Properties

4.4.15 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.

Woodlands

4.4.16 Installing an overhead line through woodland would result in the permanent loss of woodland along the length of the connection. 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.

4.4.17 There are many blocks of woodlands interspersed throughout the study area. The largest of these woodlands are on Puriton Hill to the east of the M5. However, there are also a number of smaller woodlands which border the M5 and provide a visual and acoustic screen between the motorway and adjacent properties.

Landform

4.4.18 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.

4.4.19 The landscape in the study area generally comprises low lying moorland (approximately 6m AOD) which forms part of a wider area known as the Somerset Levels and Moors. Within this predominantly flat landscape are areas of higher ground including Brent Knoll Scheduled Monument, to the north east of Burnham-on-Sea and the Mid Somerset Hills to the east of Bridgwater.

4.4.20 The Mendip Hills AONB lies at the northern extent of the study area and rises sharply from the Somerset Levels. The only 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

4.4.21 The study area falls entirely within the former Countryside Agency (now Natural England) countryside character area 142 of the Somerset Levels and Moors. 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.

4.4.22 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.

4.4.23 The character description also notes that settlement is concentrated on hills, ridges and islands with only a handful of dispersed farmsteads.

Local Landscape Character

4.4.24 The study area is also covered by the Sedgemoor Landscape Assessment and Countryside Design Summary[9]. There are three local landscape character areas within the study area: Peat Moors; Levels; and Polden Hills. The character areas are summarised in Table 4.1 and illustrated at Figure 3.

Table 4.1 – Summary of local landscape character areas

Landscape Character Type	Landscape Character Area	Landscape Character Summary
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.

[9] Sedgemoor District Council: Sedgemoor Landscape Assessment and Countryside Design Summary: Revised Edition 2003.

Landscape Character Type	Landscape Character Area	Landscape Character Summary
Levels and Moors	Clay Moors	The Clay Moors character area forms part of the Somerset Levels and Moors, a vast area covering approximately 230 square miles and extending beyond Sedgemoor District further into Somerset. The Moors comprise low-lying areas (generally between 3-5m AOD) characterised by a strong rectilinear pattern of drainage channels and accompanying straight drove roads. The complex system of control of water levels is apparent through the hierarchy of ditches, rhynes and canalised rivers or cuts, with sluices and pumping stations. The area generally contains few buildings other than isolated farmsteads. More commonly, farms and settlement associated with the use of the Moors areas are on islands of higher ground or the lowland hills.
Lowland Hills	Polden Hills	The Polden Hills lie within the Lowland Hills character area which comprises a series of hills and isolated knolls which rise out of the landscape of the Levels and Moors. The Polden Hills form a long low ridge which cuts across the Somerset Levels and Moors. Within Sedgemoor the ridge reaches a maximum height of 98 metres AOD. The topography is variable, with steeper slopes and hillocks on the southern side of the ridge, and shallower gradients on the northern side leading gently down to the Moors. The character description notes the importance of the Polden Hills (particularly the A39 Roman Road) for views over the Somerset Levels and Moors which are sometimes framed by linear patterns of woodland.

5 POTENTIAL ROUTE ALIGNMENTS CLOSE TO THE M5 MOTORWAY

5.1 Introduction

5.1.1 This Chapter identifies and describes potential overhead line route alignments close to the M5 motorway between Bridgwater and the southern boundary of the Mendip Hills AONB. Potential alignments 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 It is possible to build part of a new connection between Hinkley Point and Seabank by reconfiguring existing overhead lines close to the power station site and also north of Bridgwater substation. This avoids the need to build a new overhead line east from Hinkley Point.

5.1.3 The Hinkley Point to Seabank connection will use the existing 400kV Hinkley to Melksham overhead line east from the power station site to a new tee point on the line north of Bridgwater. Potential route alignments have been identified based on this premise. In this area north of Bridgwater, the transmission system will be reconfigured to connect the redundant parts of the Hinkley to Melksham circuits to the existing Hinkley to Bridgwater overhead line and into Bridgwater substation.

5.1.4 A desk-based assessment and site visits have been undertaken to consider and identify possible route alignments close to the M5 motorway. The following alignments have been identified and are illustrated at Figures 4 and 5:

- Overhead line route close and parallel to the M5 motorway (the M5 route); and
- Optimised route[10] close to the M5 motorway (optimised M5 route).

5.2 Technical Parameters

5.2.1 For safety and maintenance reasons it would not be feasible to construct an overhead line within the motorway boundary or for any part of the cross arms on pylons or the conductors (wires) of the overhead line to oversail the motorway. A minimum stand off of 5m is required by National Grid between the outer extent of the overhead line and the motorway boundary.

5.2.2 There is a drainage ditch which lies between 5m and 10m east of the motorway boundary and is approximately 4m wide. A minimum stand off of approximately 5m is required by National Grid between the overhead line pylon and the drainage ditch to allow access for line construction and also for ditch maintenance. As a result the closest distance an overhead line could be constructed to the motorway boundary fence in this area is approximately 20m.

Motorway crossings

5.2.3 When crossing motorways, overhead lines should cross at as close to a 90 degree angle as possible. This is to reduce the amount of the overhead line that will oversail the motorway, allow pylons that do not require taller pylons to be used and minimise the amount of temporary scaffolding required for construction and maintenance.

5.2.4 When an overhead line crosses a motorway or any other major crossing (e.g. river or railway) two large angle pylons on either side of the motorway would be required. This allows the overhead line to change direction and cross the motorway an appropriate angle,

[10] Optimised M5 route – a route which avoids or minimises impacts on residential property and other features of environmental constraint whilst staying as close as possible to the M5 motorway.

before changing direction on the opposite side to maintain its overall direction. To avoid the requirement for taller and larger angle pylons and to achieve the most direct route possible the identification of an overhead line route close and parallel to the M5 has sought to avoid motorway crossings.

5.3 Overhead Line Route Close and Parallel to the M5 (the M5 route)

5.3.1 As outlined at paragraph 5.2.2 above, the identification of an overhead line route close and parallel to the M5 is based on an offset of 20m as this is the closest distance an overhead line should safely and reasonably practicably be constructed to the motorway boundary fence.

North of the reconfigured Hinkley to Bridgwater overhead line

5.3.2 The new overhead line route between the existing Hinkley to Bridgwater and Hinkley to Melksham overhead lines would need to commence in the area to the north of Bridgwater with a new tee point on the existing overhead line.

5.3.3 To achieve a route close and parallel to the M5 this tee point would be within 100m of Horsey Medieval Settlement Scheduled Monument which is preserved as earthworks and is predominantly below ground. The setting of this monument is influenced by the M5 motorway to the west and the existing Hinkley to Bridgwater overhead line to the north and east. The effects of a new tee point and overhead line on views from the Scheduled Monument would require detailed consideration and assessment as part of any detailed connection design studies and environmental assessment.

5.3.4 North of the new tee point the closely parallel alignment would travel through the Horsey Level before crossing Kings Sedgemoor Drain and traversing Puriton Hill. Existing woodland on the slopes and at the foot of Puriton Hill would require removal to achieve an overhead line route through this area. At the summit of the hill taller pylons (with heavier steelwork and a larger footprint than standard pylons) would be required to cross the raised slip road at Junction 23 of the M5. The overhead line would need to oversail a number of residential properties on Puriton Hill and Riverton Road on the western edge of Puriton before descending the hill and following the edge of the motorway to the existing 400kV Hinkley to Melksham overhead line.

North of reconfigured Hinkley to Melksham overhead line

5.3.5 Immediately north of the existing 400kV Hinkley to Melksham overhead line there are two raised motorway crossings (Puriton Road and a dismantled railway) surrounded by blocks of trees. Pylons larger than standard pylons and some tree removal would be required in this area to allow the construction of an overhead line and ensure the necessary safety clearances.

5.3.6 An application has been submitted to Sedgemoor District Council for development of a wind farm in this area comprising 5 wind turbines (application reference 54/11/00004). If the wind farm is granted permission it may not be feasible to define a route through the site which would achieve safe clearances between the line and the wind turbines.

5.3.7 Immediately north of the wind farm site the overhead line would cross the Huntspill River NNR before passing through a narrow gap (circa 30m) between residential properties on Withy Road and the M5 motorway. There is an existing Western Power Distribution (WPD) 33kV overhead line on steel lattice pylons in this area. The new overhead line would be seen in some views with this 33kV line and also with the existing 400kV Hinkley to Melksham overhead line.

5.3.8 North of Withy Road the overhead line would cross open agricultural land for approximately 900m before passing through a gap of approximately 95m between the Somerset Secret World Wildlife Rescue Centre and the motorway. In this gap there is a block of woodland which lies to the north and south of New Road and a raised motorway crossing. To

achieve an overhead line route through this area tree removal and taller pylons would be required to ensure the necessary safety clearances and negotiate the raised motorway crossing.

5.3.9 Taller pylons and tree removal would also be required approximately 400m north of New Road to negotiate the raised motorway crossing of Newbridge Lane. Beyond this, the overhead line would oversail Brent Farm's residential property on Newbridge Lane and Monkton House Farm and its associated buildings on Mark Road.

5.3.10 To the north of Mark Road the overhead line would follow a route closely parallel to the eastern side of the motorway. Tree removal and larger pylons would be required to negotiate the raised motorway crossings at Burnham Moor Lane and Junction 22 of the M5. North of Junction 22 the overhead line would need to pass through a cricket ground before passing through the grounds of The Lodge (a residential property enclosed by mature trees) within 200m of Somerset Court (a Grade II listed building). To achieve an overhead line route through this area it is likely that tree removal would be required in the vicinity of The Lodge and the Harp Road motorway crossing.

5.3.11 The prominent landmark of Brent Knoll Scheduled Monument is approximately 600m west of the M5 in this part of the route. Due to the elevated position of the monument above the flat lowland landscape of the Somerset Levels and Moors an overhead line close and parallel to the motorway is likely to have effects on the setting of the monument, particularly in long views.

5.3.12 North of Harp Road, the overhead line would cross the existing WPD 33kV overhead line. This 33kV overhead line would need to be diverted or undergrounded to achieve a 400kV overhead line route through this area.

5.3.13 Beyond Vole Road and the 33kV overhead line, the land is largely agricultural with few residential properties or buildings. The overhead line would follow a route closely parallel to the motorway for approximately 2.5km before passing between the motorway and an agricultural building and negotiating the raised motorway crossing of Bristol Road.

5.3.14 Immediately north of Bristol Road the overhead line would pass through a block of woodland surrounding Sedgemoor Services and through the motorway services area. To achieve an overhead line route through this area a significant amount of tree removal would be required. Taller pylons are also likely to be required to negotiate buildings within the services, including a petrol station. At petrol filling stations and other sites where flammable materials are stored, where spark discharges can be a safety hazard, appropriate electrical screening and earthing of the site may be required if crossed by a high voltage overhead power line[11]. North of the services the overhead line would oversail a property and residential caravan park to the west of Mendip Road before oversailing agricultural buildings associated with York House and York House Cottage.

5.3.15 North of these residential properties land is sparsely populated and largely in agricultural use. The overhead line would need to negotiate a raised motorway crossing by an unnamed road and a crossing of the River Axe before entering the Mendip Hills AONB to the east of Loxton.

Close and parallel route summary

5.3.16 A new overhead line route as described above designed on the basis of keeping closely parallel to the M5 motorway would be unacceptable in the light of other alternatives available because it would directly oversail residential properties and other buildings and

[11] National Grid Plc: Development Near Overhead Lines planning and amenity aspects of high voltage electricity transmission lines and substations: July 2008.

businesses. It would also involve areas where trees would need to be removed at motorway crossings where they have been planted and established as part of the mitigation for the motorway works. Larger pylons would be needed in these areas to achieve required safety clearances above roads.

5.4 Optimised M5 Route

5.4.1 As outlined above a route parallel to the M5 motorway would require an overhead line to oversail a number of residential properties, a large amount of tree removal and larger pylons to negotiate raised motorway crossings in a number of sections of the route. This section considers and describes an optimised route which seeks to avoid oversailing properties and to minimise other effects whilst maintaining a route as close to the M5 motorway as possible.

North of the reconfigured Hinkley to Bridgwater overhead line

5.4.2 As outlined at paragraph 5.3.2 a new overhead line route would need to commence in the area to the north of Bridgwater with a new tee point on the existing Hinkley to Bridgwater overhead line.

5.4.3 To avoid oversailing properties on Puriton Hill and Riverton Road and to avoid the removal of large numbers of trees on the slopes of Puriton Hill a new overhead line connection would need to follow the preferred route corridor (described in the Selection of Preferred Connection Report[12]) or the route of the existing WPD 132kV overhead line. These routes pass to the east of Puriton and west of Woolavington before making a connection to the Hinkley to Melksham overhead line to the north of Woolavington in the Woolavington Level.

North of reconfigured Hinkley to Melksham overhead line

5.4.4 An application has been made for a wind farm as described at paragraph 5.3.6 above. Immediately north of the wind farm site a number of properties on Withy Road lie adjacent to the eastern and western boundaries of the motorway. To avoid these properties an alignment would need to divert away from the motorway and travel through the potential wind farm site between Rookery Farm, to the south of the Huntspill River NNR, and Withy Bow and Withy Grove Farms to the north of the River.

5.4.5 If the wind farm is granted permission it is likely that an overhead line could not be routed through the site due to the safety clearances required from the wind turbines. As a result the overhead line route would need to commence to the east of the proposed development site in the vicinity of the preferred route corridor.

5.4.6 North of the Huntspill River the potential overhead line route would travel in a north westerly direction through a gap between Colworth House and Withy Road Farm.

5.4.7 Beyond these residential properties the overhead line alignment would continue in a north westerly direction towards the M5 motorway and run parallel with it for approximately 700m passing through a gap of approximately 95m between the Somerset Secret World Wildlife Rescue Centre and the motorway. As outlined at paragraph 5.3.8 tree removal and taller pylons would be required to achieve a route through this area and ensure the necessary safety clearances.

5.4.8 To the north of New Road the optimised M5 route would divert in a north easterly direction to avoid oversailing the residential property of Brent Farm. It would travel through a gap between this property and Westhill Farm caravan park and continue north (approximately

[12] National Grid: Selection of Preferred Connection Report: August 2011

270m from the motorway) through a gap between Monkton House Farm and Durston Cottages on Mark Road.

5.4.9 Approximately 2.5km north of these properties there are a number of residential properties which extend along Harp Road to the eastern boundary of the M5. These properties include The Lodge, Somerset Farm, Chelsea Farm, Chelsea Cottages and Somerset Court (a Grade II listed building). A route closely parallel to the motorway would travel through a cricket ground before passing through the grounds of The Lodge. To avoid this and to maximise distance from this cluster of properties the optimised M5 route would travel away from the motorway towards a gap between Westbrook Farm and Poplar Farm on Harp Road. The existing WPD 33kV overhead line also passes through this gap between properties and would need to be diverted or undergrounded to achieve a 400kV overhead line route through this area.

5.4.10 The optimised M5 route would continue in a north easterly direction to avoid residential properties on Vole Road including Vole Farm, Rookery Farm, Laurel Farm and Mendip View. To the east of these properties the overhead line would divert in a northerly direction back towards the M5.

5.4.11 In this area the optimised M5 route would run close to the motorway for approximately 2km, passing through a gap between Mudgley Wall Farm and the motorway before crossing Bristol Road. As detailed at paragraph 5.3.11 the optimised M5 route would also pass close to Brent Knoll Scheduled Monument and is likely to have effects on its setting, particularly in long views.

5.4.12 To avoid oversailing a property and a residential caravan park to the west of Mendip Road and to maximise distance from York House and York House Cottage the optimised M5 route would divert in a north easterly direction passing through a gap between Leabrook Farm and Last Hope Farm before again diverting north and passing through a gap between York House and Pear Tree Farm.

5.4.13 North of these residential properties and Rooksbridge Road land is sparsely populated and largely in agricultural use. The optimised M5 route would follow the same route as that described above for a route closely parallel to the M5 motorway. It would need to negotiate a raised motorway crossing by an unnamed road and a crossing of the River Axe before entering the Mendip Hills AONB to the east of Loxton.

5.4.14 The optimised M5 route is not consistently close and parallel to the M5 motorway but would successfully address a number of constraints which make the close and parallel M5 route unacceptable. The optimised M5 route performs better than the close and parallel M5 route.

6 ROUTE COMPARISON

6.1 Introduction

6.1.1 This Chapter provides a comparison and analysis of the optimised overhead line alignment close to the M5 (the optimised M5 route) and National Grid's preferred route corridor in light of the influences and constraints outlined in Chapter 3 and described in the study area in Chapter 4.

6.2 Comparison of Optimised M5 Route and Preferred Route Corridor

Mendip Hills AONB

6.2.1 An overhead line along the optimised M5 route or within the preferred route corridor would be present in 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, Bleadon Hill or Wavering Down.

6.2.2 An overhead line within the preferred route corridor would, however, be preferable with respect to effects on views from the AONB and its setting, because it would replace an existing lower voltage overhead line along a similar alignment which would minimise the degree of change within the landscape. The effect of a new 400kV overhead line (with larger but fewer pylons that the 132kV overhead line) on the setting of the AONB would be assessed as part of detailed connection design studies.

Huntspill River NNR

6.2.3 An overhead line along the optimised M5 route or within the preferred route corridor would need to cross the Huntspill River NNR.

6.2.4 The route adopted by the preferred route corridor would be optimal, as it would offer the least degree of change from the existing situation. However, the degree of benefit from the preferred route corridor over the optimised M5 route would be small.

Scheduled Monuments

Horsey Medieval Settlement

6.2.5 As outlined at paragraph 5.3.4, an overhead line close and parallel to the M5 could not be achieved in the area between the Hinkley to Bridgwater overhead line and the Hinkley to Melksham overhead without oversailing properties on Puriton Hill and Riverton Road and the removal of large numbers of trees on the slopes of Puriton Hill. A new overhead line connection would need to follow the preferred route corridor.

6.2.6 An overhead line in the preferred route corridor would maximise the distance from Horsey Medieval Settlement Scheduled Monument and minimise the significance of any adverse effects.

Brent Knoll

6.2.7 Brent Knoll Scheduled Monument is approximately 1.5km from the optimised M5 route and 2km from the western edge of the preferred route corridor. In the area to the east of Brent Knoll the preferred route corridor is approximately 2km wide. The width of the corridor would allow the identification of alignments which would be up to 4km from the Scheduled Monument.

6.2.8 Due to the elevated position of the monument above the flat lowland landscape of the Somerset Levels and Moors an overhead line along the optimised M5 route or within the preferred route corridor would be present in views. However, as the optimised M5 route would be physically closer to the Scheduled Monument and as there is an existing 33kV

overhead line in this area; the optimised M5 route would be likely to have a greater scale of effect on the setting of the monument and views to and from it.

Listed Buildings

6.2.9 The optimised M5 route and the preferred route corridor have sought to avoid Grade I, II and II* Listed Buildings wherever possible. Both routes pass close to a number of Grade II Listed Buildings. However, neither of the routes would have any direct effects on these features and effects on their setting could be minimised through pylon siting and detailed alignments. There would, therefore, be no substantial difference between the routes with regard to effects on Listed Buildings.

Settlements and proximity to residential properties

6.2.10 The optimised M5 route and the preferred route corridor have sought to avoid and maximise the distance from all settlements and individual properties where other constraints allow.

6.2.11 The existing 132kV overhead within the preferred route corridor passes close to residential dwellings in small settlements at Mark Causeway and Rooks Bridge. An alignment within this corridor would seek to minimise adverse effects and as it would replace the existing lower voltage overhead line, would minimise the degree of change within the landscape.

6.2.12 The optimised M5 route would pass close to and through gaps between residential properties in a number of areas including Hackness, Walrow and Rooks Bridge. Although there are fewer properties than within the preferred route corridor the optimised M5 route would introduce a new high voltage overhead line in to areas of the landscape where views from settlements and properties are largely rural in character and there is no existing electrical infrastructure present.

Woodlands

6.2.13 The largest woodlands in the study area are on Puriton Hill to the east of the M5. There are also a number of smaller woodlands which border the M5 and provide a visual and acoustic screen between the motorway and adjacent properties.

6.2.14 The optimised M5 route would result in permanent tree removal within some of the woodland blocks which border the M5 and would require taller pylons to ensure the necessary safety clearances and negotiate the raised motorway crossings at New Road, Mark Road and Bristol Road.

6.2.15 An overhead line within the preferred route corridor would be preferable with respect to effects on woodland, as the corridor contains very little woodland and there would be opportunities to avoid individual trees and hedgerows in the corridor.

Landform

6.2.16 The optimised M5 route and the preferred route corridor both cross the raised ground of Puriton Hill and the low lying open landscape of the Somerset Levels and Moors. However, the optimised M5 route would need to cross localised embanked road crossings which would require taller and larger pylons.

Landscape Character

6.2.17 The optimised M5 route and the preferred route corridor run through areas of similar landscape character and are not differentiated by the character areas affected.

6.2.18 There may be anticipated landscape benefit of having part of the line run adjacent the M5 where there is existing development in an otherwise largely rural area. However the M5 is primarily a development at ground level generally prominent in relatively close views with

its effect on the landscape often diminishing with distance as intervening hedges and woodlands screen its presence.

6.2.19 Routeing a new 400kV overhead line close to the motorway would introduce a different form of development and a greater scale of change than would occur as compared to routeing a new 400kV overhead line along the route of the existing 132kV line. The overhead line would also be visible to large numbers of road users and visitors that use the route as a gateway to the South West region.

6.2.20 The Holford Rules advise careful consideration of paralleling, particularly when considering routeing overhead lines in open and sparsely vegetated landscapes. This is an issue relevant to comparing the optimised M5 route and the preferred route corridor due to the open landscape and often sparse tree cover of the Somerset Levels and Moors and the presence of existing 275kV (Hinkley to Bridgwater), 400kV (Hinkley to Melksham) 132kV (Bridgwater to Seabank) and 33kV (Bridgwater to Weston-super-Mare) overhead lines in the study area.

6.2.21 The preferred route corridor proposes to use the corridor occupied by the existing WPD 132kV overhead line which would be removed. An alignment within this corridor would be viewed cumulatively with the Hinkley to Bridgwater and Hinkley to Melksham overhead lines at its points of connection but would maintain separation from the 33kV Bridgwater to Weston-super-Mare overhead line for its length.

6.2.22 The optimised M5 route would also be viewed cumulatively with the Hinkley to Bridgwater and Hinkley to Melksham overhead lines at its points of connection. However, due to the presence of various constraints it would need to cross the existing 33kV overhead line between Bridgwater and Weston-super-Mare in two places and would run parallel to it in the vicinity of the Huntspill River, Northwick and Brent Knoll. This would increase the scale of change through the introduction of two closely aligned structures into views and the landscape.

6.2.23 The Holford Rules also advise consideration of the most direct route to minimise changes in direction and the number of angle pylons required. Due to the presence of residential properties and other environmental constraints close to the motorway the optimised M5 route changes direction in a number of areas where larger angle pylons would be required. The existing 132kV overhead line within the preferred route corridor adopts a relatively direct route with few sharp changes in direction and due to the width of this corridor an alignment could be achieved which minimises the number of changes in direction whilst maximising distance from areas of environmental constraint.

6.2.24 The preferred route corridor is distinctly preferred in terms of landscape.

6.3 Conclusions

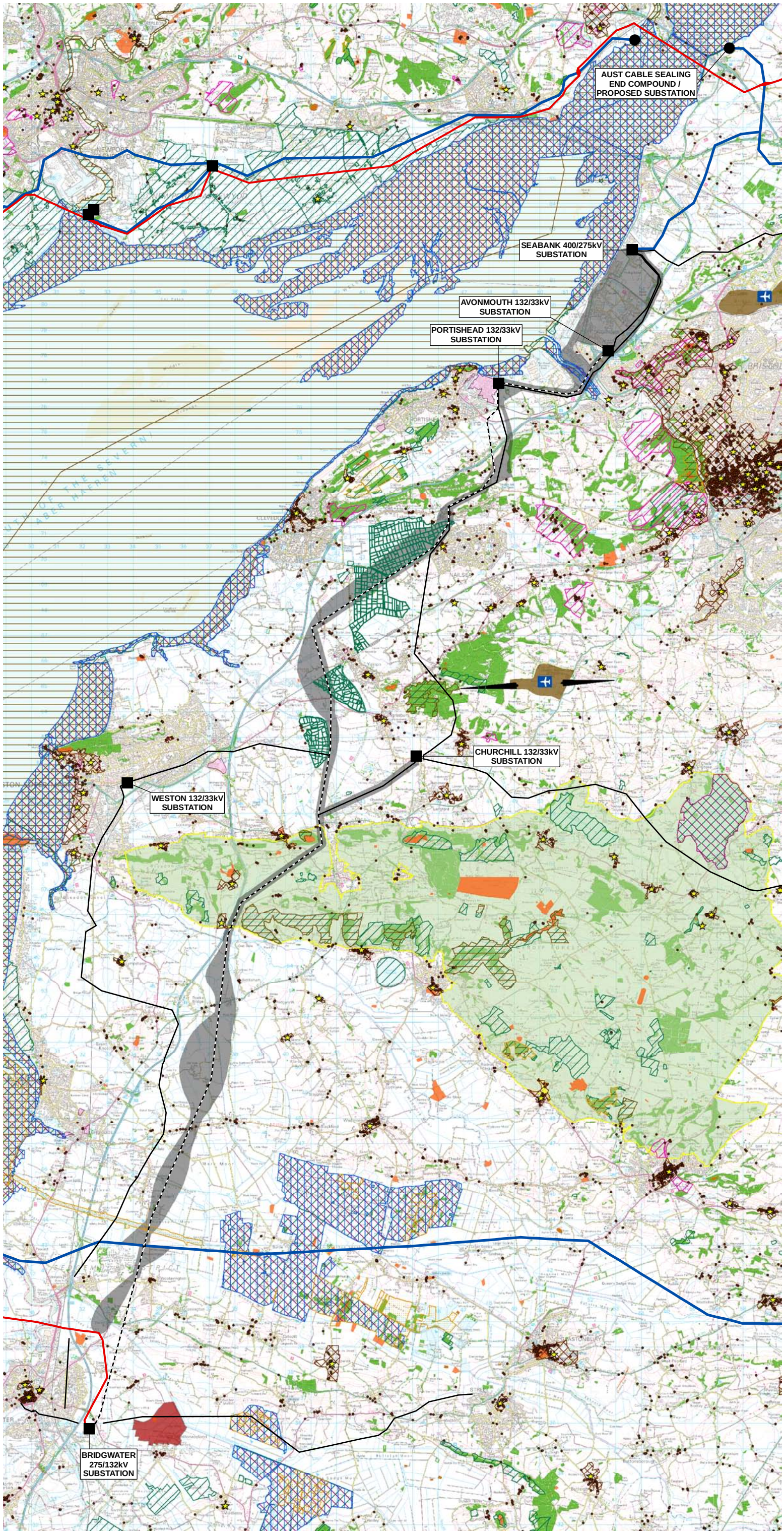
6.3.1 The assessment and comparison of the optimised M5 route and the preferred route corridor has considered the potential routes in relation to a range of environmental criteria. The greatest distinctions between the routes are with regard to their effects on the setting of the Mendip Hills AONB and Brent Knoll Scheduled Monument and with regard to effects on landscape.

6.3.2 The presence of a number of environmental constraints close to the motorway means that a consistently close and parallel route to the M5 would be unacceptable. The optimised M5 route would avoid these constraints and would be technically achievable, but would require taller and larger pylons (heavy angle towers) in a number of areas to change direction and achieve the necessary clearances from raised motorway crossings. The optimised M5 route would also introduce an overhead line in to parts of the Somerset Levels and Moors where views from settlements and properties are largely rural in character and there is no existing electrical infrastructure present.

6.3.3 The preferred route corridor is therefore considered to be the least constrained option for achieving a new overhead line route between Bridgwater and Mendip Hills AONB. The

relatively wide and direct corridor identified for much of the route will enable an alignment to be identified which minimises the degree of change within the landscape whilst maximising distance from areas and features of environmental constraint.

FIGURE 1 – PREFERRED ROUTE CORRIDOR



Key

Proposed Infrastructure

- Preferred Route Corridor

Existing Infrastructure

- Existing Substation
- Existing Cable Sealing End Compounds
- Existing 400kV Overhead Line
- Existing 275kV Overhead Line
- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution 132kV Overhead Line to be removed

Environmental Constraints

- Area of Outstanding Natural Beauty
- Ramsar Site
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest
- Site of Special Scientific Interest (Ditches & Rhynes)
- National Nature Reserve
- Scheduled Monument
- Registered Park and Garden
- Conservation Area
- Registered Battlefield
- Historic Building (Listed I, II* & II)
- Woodland
- Public Safety Zones
- Airfield/Airport
- Housing and Open Space Allocation

NOTE 1:
The following environmental constraints considered in routeing do not occur:
- World Heritage Site
- National Park
- Heritage Coast
- Protected Wreck

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Title:
Figure 1 -
Preferred Route Corridor

Map No.
G1979.329a

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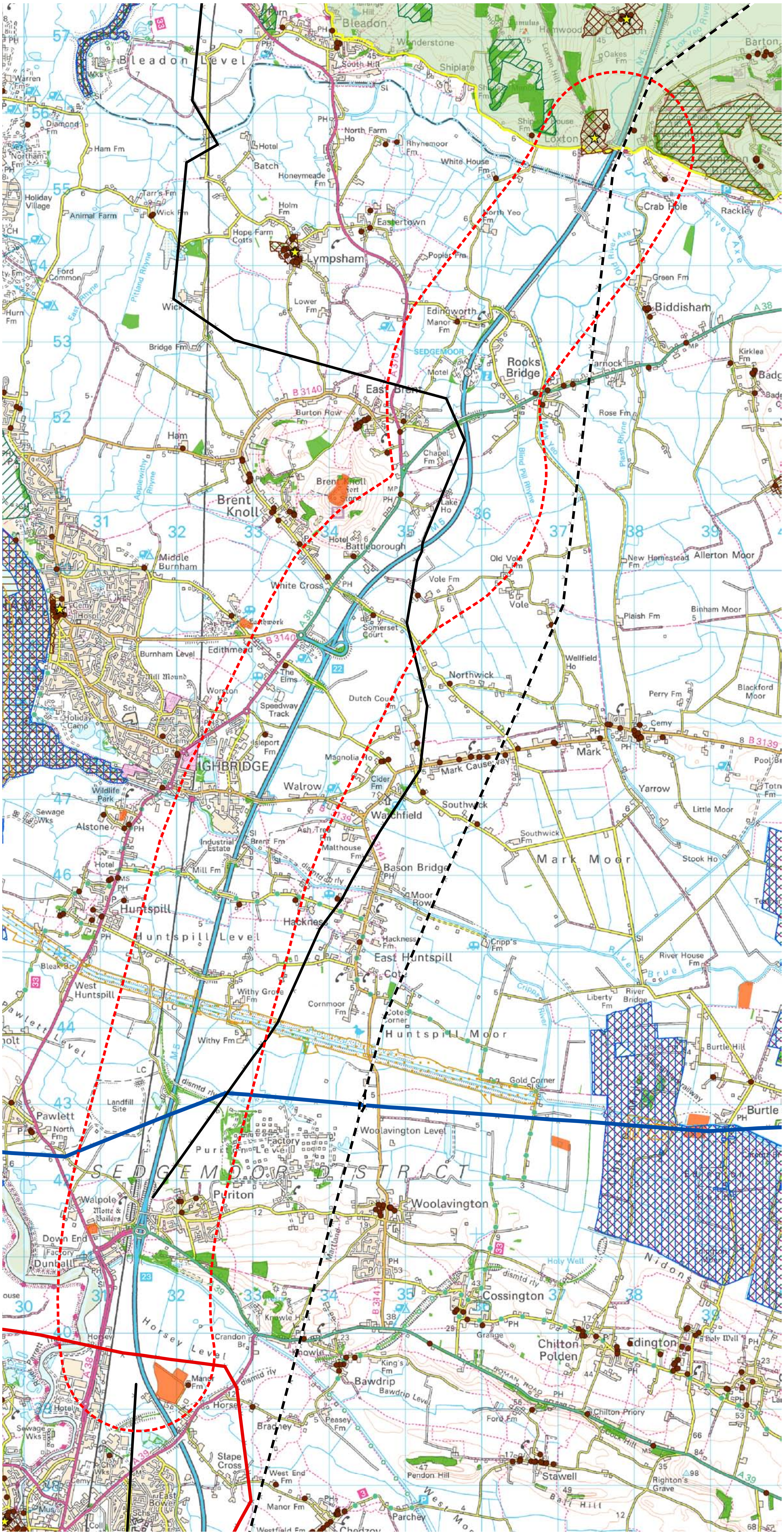
FIGURE 2 – ENVIRONMENTAL CONSTRAINTS WITHIN THE STUDY AREA



Key

Study Area

- M5 Study Area

Existing Infrastructure

- Existing 400kV Overhead Line
- Existing 275kV Overhead Line
- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution 132kV Overhead Line to be removed

Environmental Constraints

- Area of Outstanding Natural Beauty
- Ramsar Site
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- National Nature Reserve
- Scheduled Monument
- Conservation Area
- Historic Building (Listed I, II* & II)
- Woodland
- Housing and Open Space Allocation

NOTE 1:

The following environmental constraints considered in routeing do not occur:
- World Heritage Site
- National Park
- Registered Battlefield
- Registered Park and Garden
- Heritage Coast
- Protected Wreck
- Mineral Reserve
- Mineral Consultation Zone
- Airfield/Airport
- Public Safety Zone

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Title: Figure 2 - Environmental Constraints with the M5 Study Area

Map No. G1979.330a

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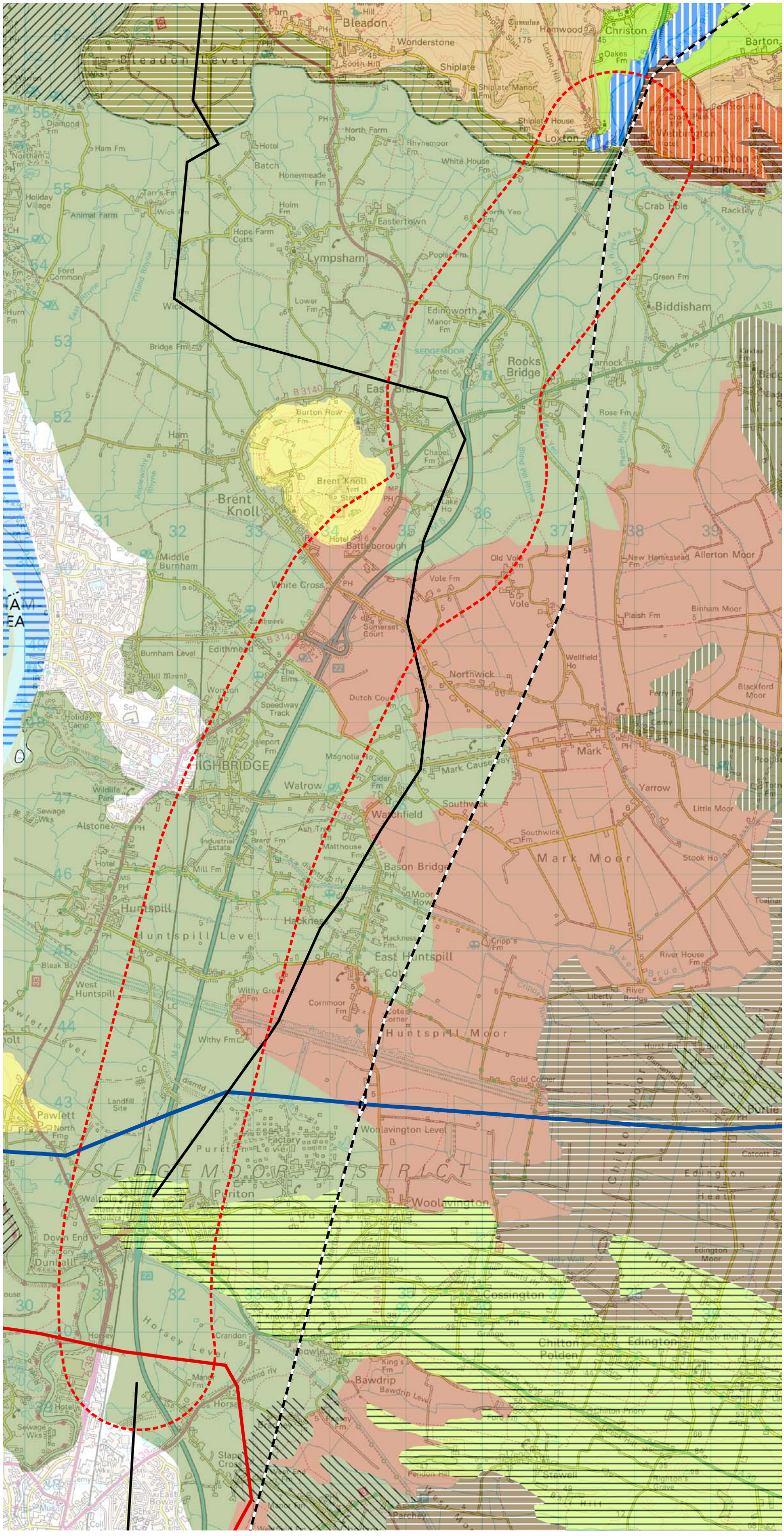
FIGURE 3 – LOCAL LANDSCAPE CHARACTER ASSESSMENT



Key

Study Area

- M5 Study Area

Existing Infrastructure

- Existing 400kV Overhead Line
- Existing 275kV Overhead Line
- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution Overhead Line to be removed

Sedgemoor Landscape Character Areas

- Strawberry Belt and Footslope Villages
- Significantly Built Up Areas
- Sea Edge/Intertidal Zone
- Scarp Slope, West Mendip Summits and Cheddar Gorge
- Polden Hills
- Peat Moors
- Levels
- Levels - Islands
- Levels - Estuarine
- Isolated Hills
- Isle of Wedmore
- Clay Moors

North Somerset Landscape Character Areas

- Bleadon Moor
- Lox Yeo Rolling Floodplain
- Lox Yeo Rolling Valley Farmland
- Mendip Ridge

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Title:

Figure 3 -
Local Landscape Character Areas

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Scale:	Date:
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FIGURE 4 – OVERHEAD LINE ROUTE CLOSE AND PARALLEL TO THE M5 MOTORWAY

POTENTIAL WIND FARM SITE

Key

Proposed Infrastructure

- M5 Study Area
- Theoretical overhead line route close and parallel to M5 Motorway
- Preferred Route Corridor

Existing Infrastructure

- Existing 400kV Overhead Line
- Existing 275kV Overhead Line
- Existing Western Power Distribution Overhead Line on Pylons

Environmental Constraints

- Scheduled Monument
- Historic Building (Listed I, II* & II)
- Woodland
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
- World Heritage Site
- National Park
- Area of outstanding natural beauty
- Ramsar Site
- Special Area of Conservation
- Site of Special Scientific Interest
- Special Protection Area
- National Nature Reserve
- Conservation Area
- Heritage Coast
- Registered Park and Garden
- Registered Battlefield
- Airfield/Airport
- Public Safety Zone
- Protected Wreck

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Title:
Figure 4 - Theoretical Overhead Line Route Close and Parallel to M5 Motorway Inset 1

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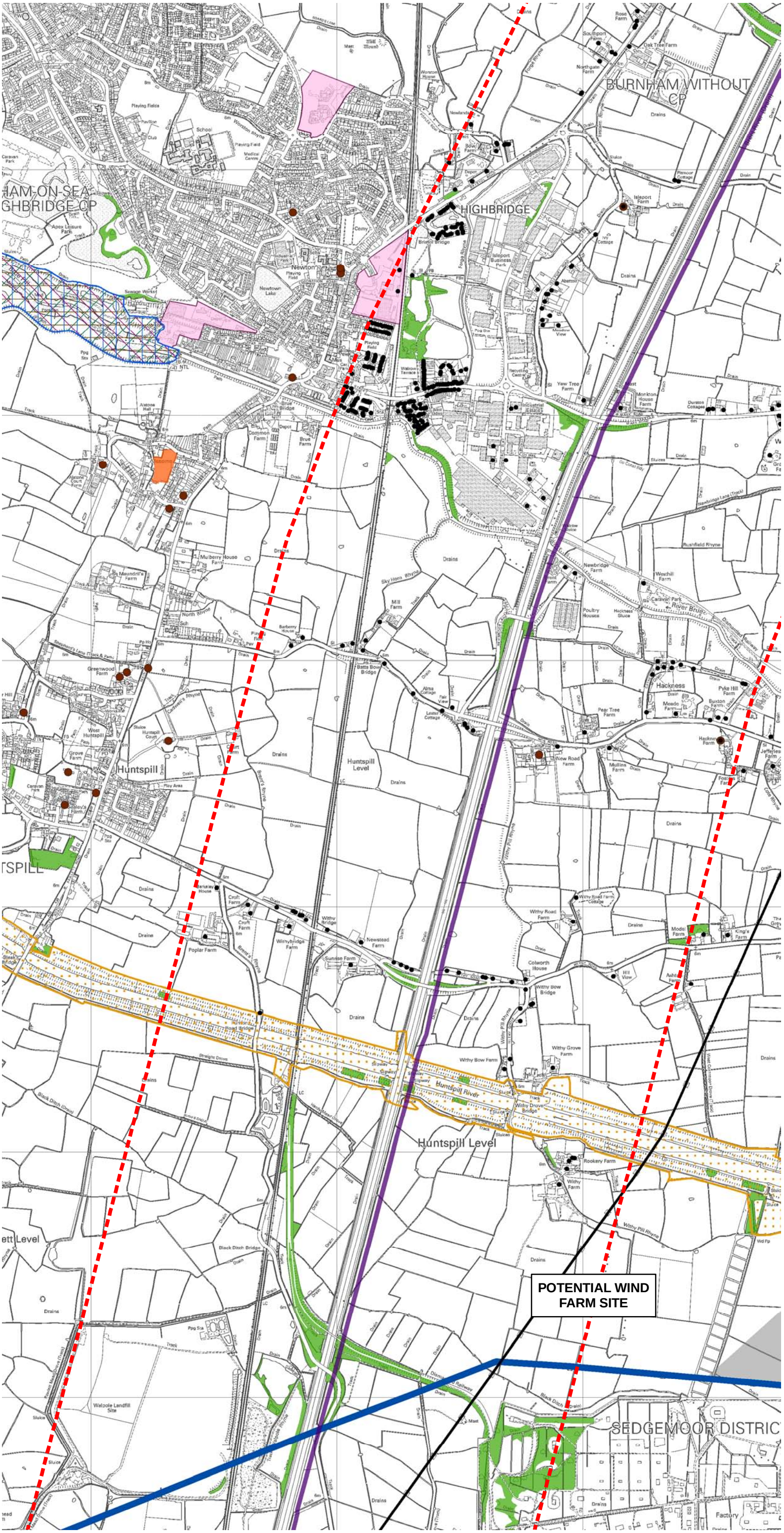

Key

Proposed Infrastructure

- M5 Study Area
- Theoretical overhead line route close and parallel to M5 Motorway
- Preferred Route Corridor

Existing Infrastructure

- Existing 400kV Overhead Line
- Existing Western Power Distribution Overhead Line on Pylons

Environmental Constraints

- Ramsar Site
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- Scheduled Monument
- National Nature Reserve
- Historic Building (Listed I, II* & II)
- Woodland
- Housing and Open Space Allocation
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:
The following environmental constraints considered in routeing do not occur in this insert:
- World Heritage Site
- National Park
- Area of outstanding natural beauty
- Conservation Area
- Heritage Coast
- Registered Park and Garden
- Registered Battlefield
- Airfield/Airport
- Public Safety Zone
- Protected Wreck

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Project:
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Title:
Figure 4 - Theoretical Overhead Line Route Close and Parallel to M5 Motorway Inset 2

Map No.
G1979.337a

Scale:	Date:
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Key

Proposed Infrastructure

- M5 Study Area
- Theoretical overhead line route close and parallel to M5 Motorway
- Preferred Route Corridor

Existing Infrastructure

- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution Overhead Line to be removed

Environmental Constraints

- Scheduled Monument
- Historic Building (Listed I, II* & II)
- Woodland
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
- World Heritage Site
- National Park
- Area of outstanding natural beauty
- Ramsar Site
- Special Area of Conservation
- Site of Special Scientific Interest
- Special Protection Area
- National Nature Reserve
- Conservation Area
- Heritage Coast
- Registered Park and Garden
- Registered Battlefield
- Airfield/Airport
- Public Safety Zone
- Protected Wreck
- Housing Allocation

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0 0.2 0.4 0.8 Km

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Project:

Hinkley Point C Connection

Title:

Figure 4 - Theoretical Overhead Line Route Close and Parallel to M5 Motorway Inset 3

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Key

Proposed Infrastructure

- M5 Study Area
- Theoretical overhead line route close and parallel to M5 Motorway
- Preferred Route Corridor

Existing Infrastructure

- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution Overhead Line to be removed

Environmental Constraints

- Historic Building (Listed I, II* & II)
- Woodland
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
- World Heritage Site
- National Park
- Area of outstanding natural beauty
- Ramsar Site
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- National Nature Reserve
- Scheduled Monument
- Conservation Area
- Woodland
- Heritage Coast
- Registered Park and Garden
- Registered Battlefield
- Airfield/Airport
- Public Safety Zone
- Protected Wreck
- Housing Allocation

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0 0.2 0.4 0.8 Km

Rev	Description	Dwn	Appvd	Date

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Genesis Centre
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Warrington WA3 7BH
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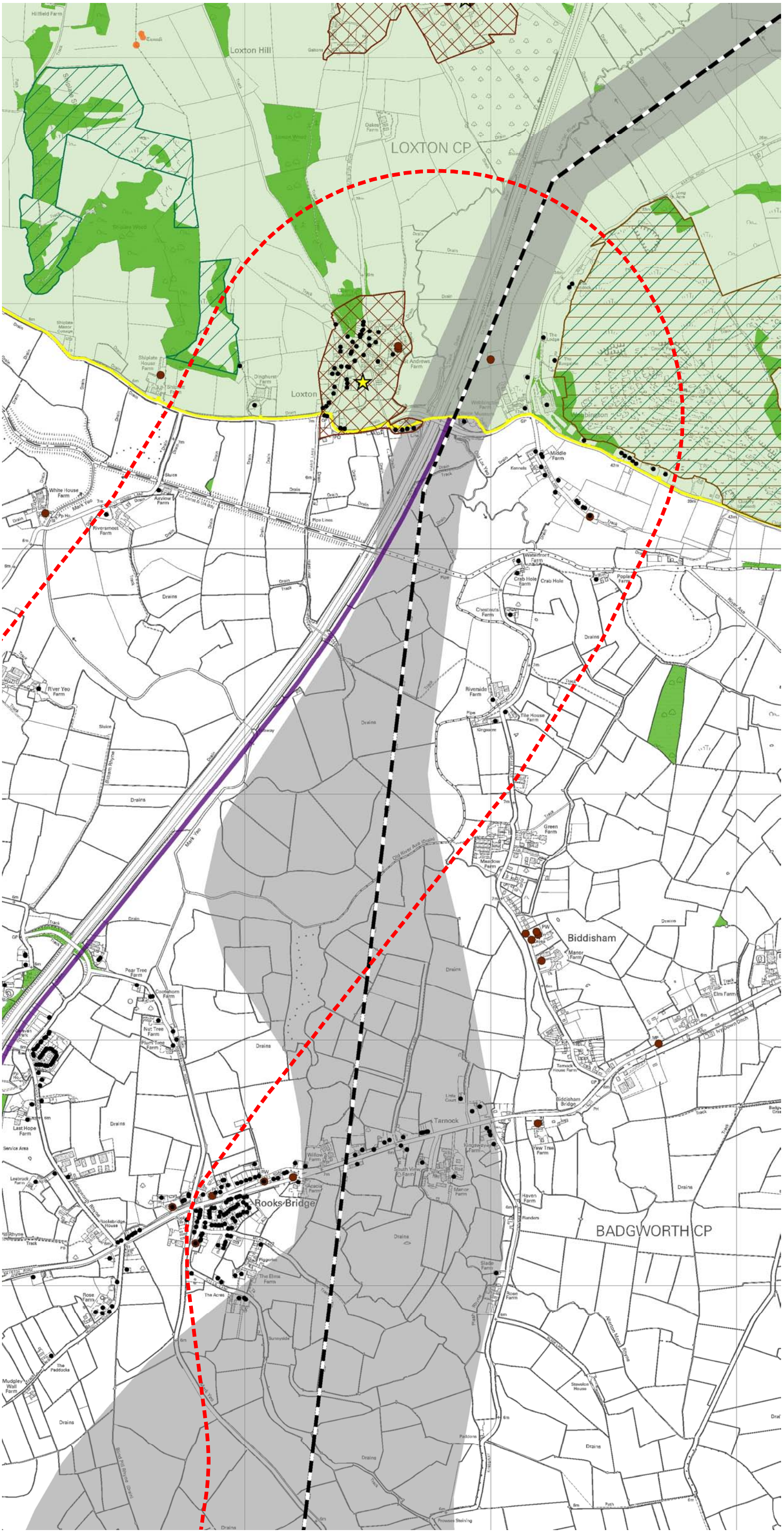
Project:

Hinkley Point C Connection

Title:

Figure 4 - Theoretical Overhead Line Route Close and Parallel to M5 Motorway Inset 4

Map No.		
G1979.335a		
Scale: 1:15,000 @ A3		Date: Feb 2012
Drawn: CB	Checked: CC	Approved: CC



Key

Proposed Infrastructure

- M5 Study Area
- Theoretical overhead line route close and parallel to M5 Motorway
- Preferred Route Corridor

Existing Infrastructure

- Existing Western Power Distribution Overhead Line to be removed

Environmental Constraints

- Area of Outstanding Natural Beauty
- Special Area of Conservation
- Site of Special Scientific Interest
- Scheduled Monument
- Conservation Area
- Historic Building (Listed I, II* & II)
- Woodland
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
- World Heritage Site
- National Park
- Ramsar Site
- Special Protection Area
- National Nature Reserve
- Heritage Coast
- Registered Park and Garden
- Registered Battlefield
- Airfield/Airport
- Public Safety Zone
- Protected Wreck
- Housing Allocation

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Project:

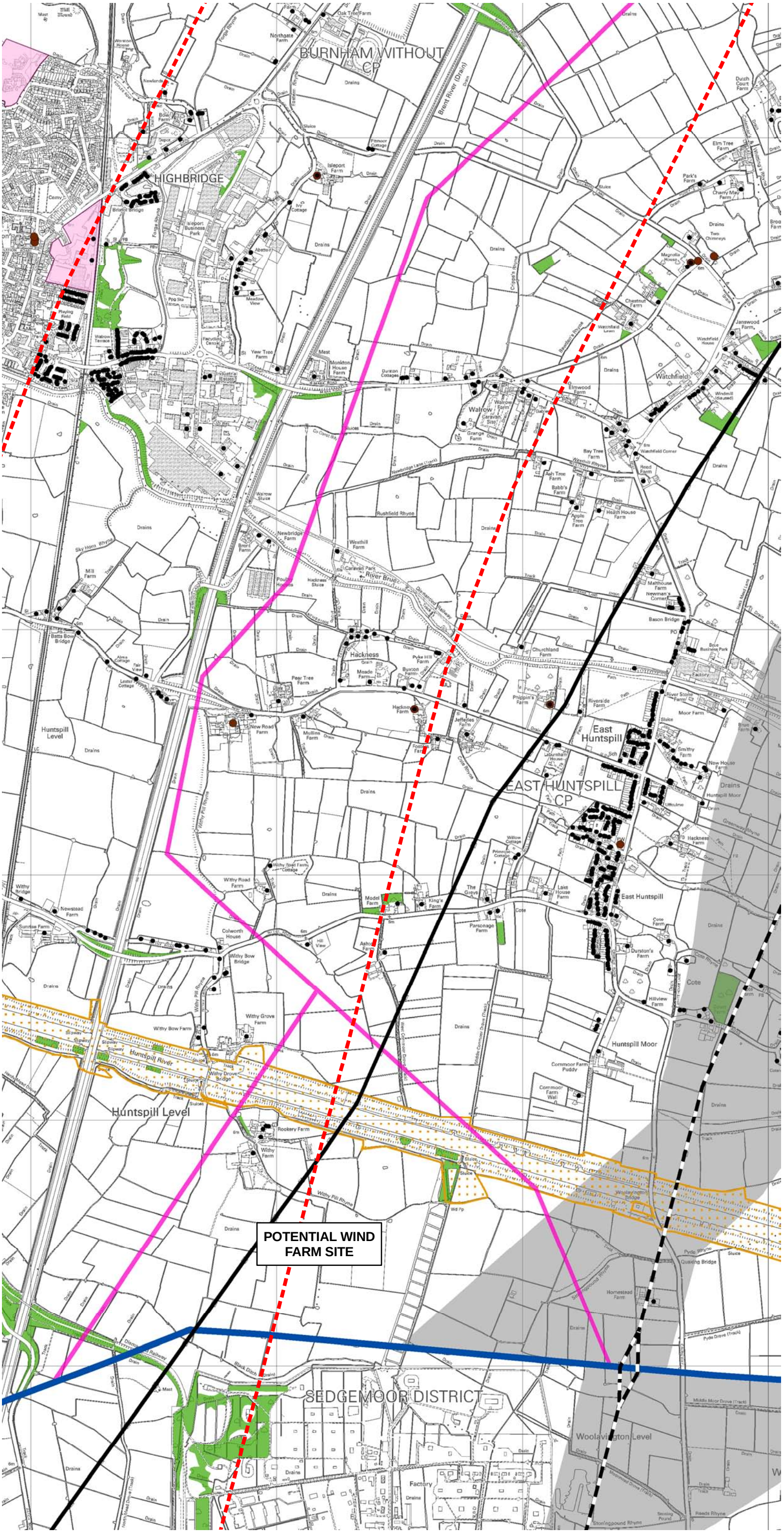
Hinkley Point C Connection

Title:

Figure 4 - Theoretical Overhead Line Route Close and Parallel to M5 Motorway Inset 5

Map No.		
G1979.334a		
Scale: 1:15,000 @ A3		Date: Feb 2012
Drawn: CB	Checked: CC	Approved: CC

FIGURE 5 – OPTIMISED M5 ROUTE



Key

Proposed Infrastructure

- M5 Study Area
- Theoretical Optimised M5 Motorway Overhead Line Route
- Preferred Route Corridor

Existing Infrastructure

- Existing 400kV Overhead Line
- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution Overhead Line to be removed

Environmental Constraints

- National Nature Reserve
- Historic Building (Listed I, II* & II)
- Woodland
- Housing and Open Space Allocation
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
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- Area of outstanding natural beauty
- Ramsar Site
- Special Protectection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- Conservation Area
- Scheduled Monument
- Heritage Coast
- Registered Park and Garden
- Registered Battlefield
- Airfield/Airport
- Public Safety Zone
- Protected Wreck

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0 0.2 0.4 0.8 Km

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Title:

Figure 5 - Theoretical Optimised M5 Motorway Overhead Line Route Inset 1

Map No. G1979.342a

Scale:	Date:
1:15,000 @ A3	Feb 2012

Drawn:	Checked:	Approved:
CB	CC	CC

Key

Proposed Infrastructure

- M5 Study Area
- Theoretical Optimised M5 Motorway Overhead Line Route
- Preferred Route Corridor

Existing Infrastructure

- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution Overhead Line to be removed

Environmental Constraints

- Scheduled Monument
- Historic Building (Listed I, II* & II)
- Woodland
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
- World Heritage Site
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- Area of outstanding natural beauty
- Ramsar Site
- Special Area of Conservation
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- Conservation Area
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- Registered Battlefield
- Airfield/Airport
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- Protected Wreck
- Housing Allocation

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0 0.2 0.4 0.8 Km

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Project:

Hinkley Point C Connection

Title:

Figure 5 - Theoretical Optimised M5 Motorway Overhead Line Route Inset 2

Map No.		
G1979.341a		
Scale: 1:15,000 @ A3		Date: Feb 2012
Drawn: CB	Checked: CC	Approved: CC

Key

Proposed Infrastructure

- M5 Study Area
- Theoretical Optimised M5 Motorway Overhead Line Route
- Preferred Route Corridor

Existing Infrastructure

- Existing Western Power Distribution Overhead Line on Pylons
- Existing Western Power Distribution Overhead Line to be removed

Environmental Constraints

- Historic Building (Listed I, II* & II)
- Woodland
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
- World Heritage Site
- National Park
- Area of outstanding natural beauty
- Ramsar Site
- Special Area of Conservation
- Site of Special Scientific Interest
- Special Protection Area
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- Registered Battlefield
- Airfield/Airport
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0 0.2 0.4 0.8 Km

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Project:

Hinkley Point C Connection

Title:

Figure 5 - Theoretical Optimised M5 Motorway Overhead Line Route Insert 3

Map No.		
G1979.340a		
Scale: 1:15,000 @ A3		Date: Feb 2012
Drawn: CB	Checked: CC	Approved: CC

Key

Proposed Infrastructure

- M5 Study Area
- Theoretical Optimised M5 Motorway Overhead Line Route
- Preferred Route Corridor

Existing Infrastructure

- Existing Western Power Distribution Overhead Line to be removed

Environmental Constraints

- Area of Outstanding Natural Beauty
- Special Area of Conservation
- Site of Special Scientific Interest
- Scheduled Monument
- Conservation Area
- Historic Building (Listed I, II* & II)
- Woodland
- Residential Dwelling Including Hotels, Boarding and Guest Houses, Residential Institutions and Educational Establishments.

Only residential dwellings shown within M5 study area, preferred route corridor or land in between. Dwelling locations to be confirmed by site visit.

NOTE 1:

The following environmental constraints considered in routeing do not occur in this insert:
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- Ramsar Site
- Special Protection Area
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0 0.2 0.4 0.8 Km

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Project:

Hinkley Point C Connection

Title:

Figure 5 - Theoretical Optimised M5 Motorway Overhead Line Route Inset 4

Map No.: G1979.339a

Scale: 1:15,000 @ A3

Date: Feb 2012

Drawn: CB

Checked: CC

Approved: CC

APPENDIX 1 – Q & AS

APPENDIX 1 – QUESTIONS AND ANSWERS

What are the differences in length for the 'optimised' M5 route (pink) and the preferred route corridor?

Optimised M5 Route = 19.2km

Preferred Route Corridor = 17.0km

What are the costs for the different options if overhead lines and underground cables were used?

Optimised M5 Route

IET/PB Costs		
	Capital Cost	**Lifetime Cost**
19.2km overhead line[1]	£32.3m	£78.7m
19.2km underground cables[2]	£333.2m	£370.6m
19.2km GIL[3]	£480.1m	£516.5m

Preferred Route Corridor

IET/PB Costs		
	Capital Cost	**Lifetime Cost**
17km overhead line[1]	£28.6m	£69.7m
17km underground cables[2]	£295m	£328.1m
17km GIL[3]	£425m	£457.3m

How many residences would be oversailed by the purple route?

The total number of residential properties that would be oversailed by the overhead line route close and parallel to the M5 motorway (purple route) would be between 8 and 10 depending on the exact positioning of the pylons and route of the overhead line.

[1] IET/PB - 15km, Med Capacity (p30-31). Calculations are pro rata.
[2] IET/PB - 15km, Med Capacity (p50-51). Calculations are pro rata.
[3] IET/PB - 15km, Med Capacity (p94-95). Calculations are pro rata.

Why would a route immediately west of the motorway be unacceptable?

An overhead line route close and parallel to the western side of the M5 motorway would be unacceptable in light of alternatives as it would oversail residential properties, buildings and businesses in the following locations:

- Pawlett Road (between the M5 motorway and the Bristol – Exeter railway);
- Withy Road;
- New Road;
- An industrial estate on the edge of Highbridge;
- Mark Road;
- A large caravan park (off the A38 at Junction 22 of the M5);
- Industrial buildings immediately north of Junction 22 of the M5;
- Sedgemoor Services;
- The grounds of Rookery Manor Hotel; and
- Properties on Cowslip Lane on the southern boundary of the AONB.

In addition to the above constraints, a route close and parallel to the western side of the M5 would pass immediately adjacent to Brent Knoll Scheduled Monument (resulting in effects on its setting). It would also require tree and vegetation removal and larger than standard pylons in a number of areas to negotiate a number of raised motorway crossings and achieve the required safety clearances above roads.