

Hinkley Point C

Development
Consent Order
Application

**Environmental
Statement**

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Environmental Statement Non-Technical Summary



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Hinkley Point C Non-Technical Summary

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1. INTRODUCTION

- 1.1.1 This document provides a Non-technical Summary (NTS) of the predicted impacts on the environment of the proposed new nuclear power station known as Hinkley Point C (HPC) and associated development required to facilitate its construction and operation (the HPC Project).
- 1.1.2 Full details of those impacts are contained in the Environmental Statement (ES) that EDF Energy has prepared to support its application to the Infrastructure Planning Commission (IPC) for consent for the HPC Project.
- 1.1.3 NNB Generation Company Limited, part of EDF Energy, is the Company that will lead the new nuclear programme in the UK. For the purpose of this NTS, NNB Generation Company Limited is referred to as EDF Energy.
- 1.1.4 This NTS includes an outline description of the Planning and EIA process (Section 2), a description of the HPC Project, (see **Figure 1.1**) and the associated development (Sections 3 and 4), a summary of the key findings of the environmental impact assessment (EIA) and EDF Energy's proposals to mitigate any significant adverse impacts which have been identified, including EDF Energy's proposed management plans (Sections 6 and 7).

Figure 1.1: Proposed Hinkley Point C Development



2. THE PLANNING PROCESS

- 2.1.1 The Planning Act 2008 introduced a new planning regime for nationally significant infrastructure projects (NSIPs), including nuclear power stations. Since 1 March 2010, such projects must be authorised by grant of a Development Consent Order (DCO) from the Infrastructure Planning Commission (IPC).
- 2.1.2 National Policy Statements (NPS), also introduced by the 2008 Act, provide the policy framework against which the IPC is required to make its decision.
- 2.1.3 The Overarching NPS for Energy (EN-1) and the NPS for Nuclear Power Generation (EN-6), which were designated in July 2011, are the relevant NPSs for the purposes of the proposed development. EN-6 sets out the Government's assessment of the need for new nuclear power generating capacity and has been informed by a Strategic Siting Assessment (SSA). The SSA identifies sites that are considered strategically suitable for the construction of new nuclear power stations; Hinkley Point is identified as one of eight sites in the UK.

2.2 Environmental Impact Assessment and Environmental Statement

- 2.2.1 EDF Energy has made an application for development consent to authorise the construction and operation of HPC and associated development. Under the 2008 Act, EDF Energy's proposed application must be subject to an Environmental Impact Assessment (EIA) in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (EIA Regulations). Under the EIA Regulations, EDF Energy is required to prepare an Environmental Statement (ES) that reports on the likely environmental effects arising from the construction and operation of HPC, and to identify appropriate measures to mitigate significant adverse impacts. The resultant ES has been published as a set of volumes together with this NTS.
- 2.2.2 In accordance with best practice, the scope of the EIA was agreed with the IPC and other relevant authorities. The scoping process identifies the potentially significant environmental effects of the proposed development and defines the study area and methodology for assessing environmental impacts.
- 2.2.3 In addition, EDF Energy undertook detailed pre-application consultation with statutory consultees, including the local councils, local communities and the general public. There have been a number of formal pre-application consultations in support of the application for the DCO, during which the latest HPC Project proposals and emerging findings of the EIA studies were presented. Responses received during the formal consultation process have informed the EIA process and details are provided both within the ES and the Consultation Report. Throughout the EIA process, informal consultation has also been undertaken with a range of stakeholders.

2.3 Content of the Environmental Statement

2.3.1 In accordance with the EIA Regulations, the ES contains the following:

- a description of the proposed development;
- an outline of the main alternatives which have been considered;
- a description of the aspects of the environment likely to be significantly affected by the development;
- a description of the likely significant effects of the development on the environment;
- a description of measures envisaged to prevent, reduce or where possible off-set any significant adverse impacts on the environment; and
- an indication of any difficulties encountered in undertaking the EIA and preparing the ES.

2.3.2 The ES describes potential impacts and determines their significance taking into account the value and sensitivity of what may be affected (the 'receptor' e.g. species, people, land uses or infrastructure) and the magnitude of the effect. It also takes into account several management plans (e.g. Air Quality, Water and Noise and Vibration), which will ensure that throughout construction, operation and post-operational phases where applicable, impacts and adequacy of mitigation are monitored on an ongoing basis. A summary of impacts and mitigation is provided for each site within the ES.

2.3.3 Where the assessment has determined a significant impact, EDF Energy has identified measures to avoid, reduce or off-set the impact where possible. Potential in-combination or cumulative impacts across the project and with other developments in the area are also considered.

2.3.4 The assessments for HPC and each of the off-site associated development includes the following environmental topics typical to an EIA:

- socio-economics to include for example impacts on jobs or services;
- transport which considers for example highway impacts or changes in numbers of cars or buses;
- noise and vibration that determines the change in noise and vibration levels created by the development;
- air quality assesses the change in dust or air borne particles;
- soils and land use that determines for example impacts from movement and storage of soils;
- geology, contaminated land and groundwater which assesses the likelihood of impacts and mitigation proposed to deal with contamination impacts such as disturbance of land-filled material or pollution from historic spillages;
- surface water which includes assessment of impacts to local watercourses and changes to flooding capacity;

- ecology which assesses impacts to species and habitats that are present on or nearby the sites;
- landscape and visual assessment that assesses changes to views to and from the sites;
- historic environment that determines if the physical presence or the setting of historic artefacts would be affected by development including intertidal and off-site archaeology where appropriate;
- amenity and recreation that assesses impacts for example, on footpaths or public open land.
- marine environment which assesses changes to coastal processes, water quality and marine ecology where applicable;
- navigation which assesses the risk to vessels using navigable waters around Hinkley Point and Comwich; and
- radiological which assesses the risk to workers and the public during construction and operation of HPC.

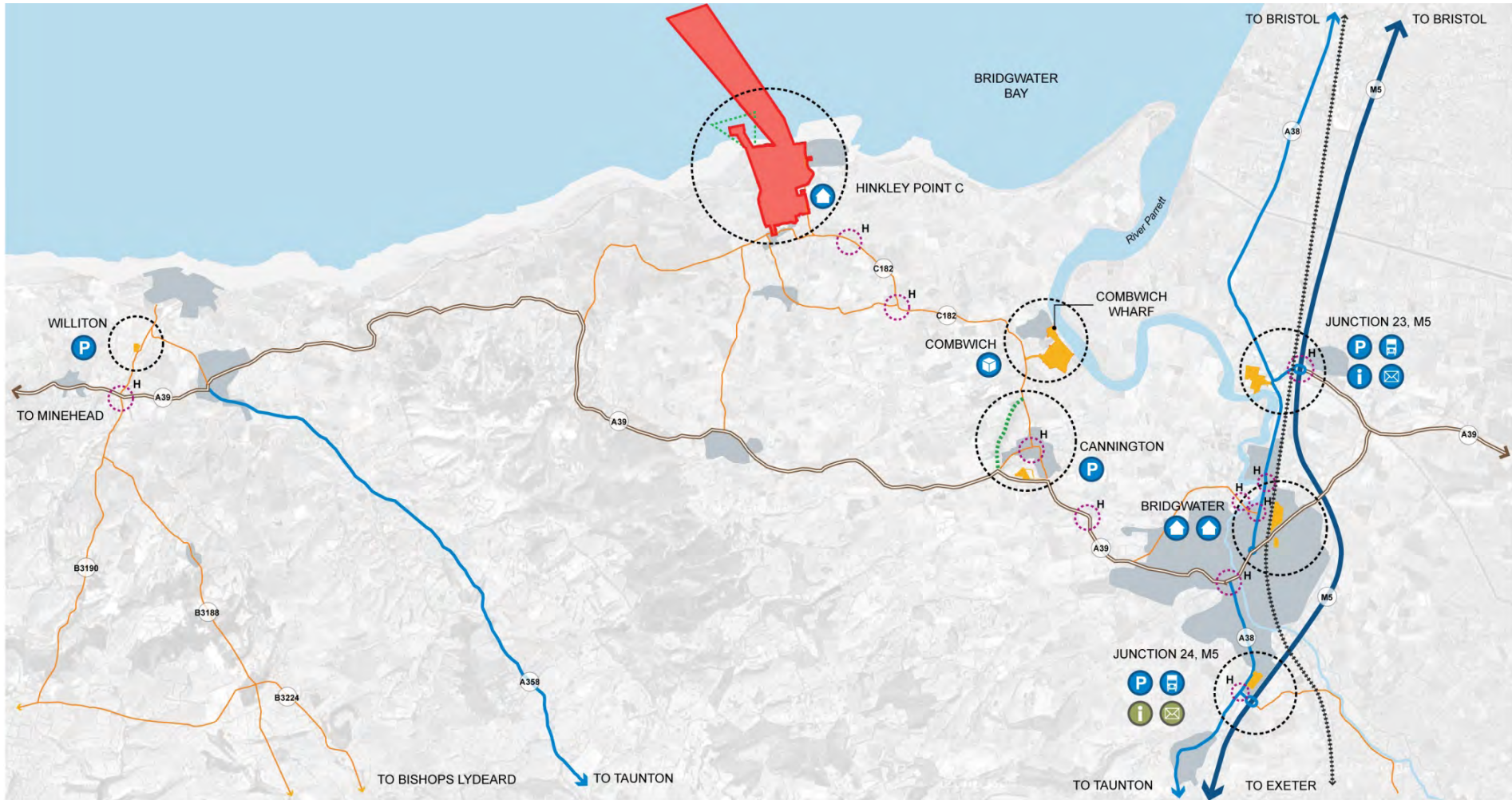
2.3.5 The potential for transboundary effects on other countries has also been considered, particularly in terms of emissions and air quality impacts; marine water quality and ecology impacts on the Severn Estuary; and radiological impacts. Significant transboundary environmental effects arising from the construction and operation of HPC are not considered likely.

2.3.6 The ES has been published as a set of 11 volumes, together with this NTS.

3. LOCATION OF HINKLEY POINT C

- 3.1.1 The site proposed for the new nuclear power station is located at Hinkley Point on the Somerset coast, in a predominantly rural location within the parish of Stogursey in the District of West Somerset, see **Figure 3.1**.
- 3.1.2 The HPC development site occupies an area of approximately 175 hectares. This includes the land required for the construction works which will be used for a variety of uses such as contractor working areas, material stockpile areas, a temporary accommodation campus and environmental screening. The permanent HPC site would occupy an area of 67.5ha.
- 3.1.3 Immediately to the east of the development site, the land is occupied by two existing nuclear power stations, Hinkley Point A and Hinkley Point B (HPA and HPB), which together are referred to as the Hinkley Point power station complex.
- 3.1.4 The closest settlements to the development site are the hamlets of Shurton, Knighton, Burton, Stogursey and Stolford, and the slightly larger settlements of Comwich (about 5km to the south-east) and Cannington (about 8km to the south-east). Further afield are the settlements of Minehead (to the west) and Williton (to the west) and Burnham-on-Sea (to the east).
- 3.1.5 Bridgwater is located 12km to the south-east of Hinkley Point and is the largest settlement in the vicinity, with a population of over 38,600 people. Taunton is located 22km to the south, with a population of 44,500.
- 3.1.6 The development site is located approximately 17km to the west of Junction 24 off the M5 motorway. The main access road serving Hinkley Point is the C182 Rodway, which is an unclassified road that runs south from Hinkley Point through the village of Cannington and then joins the A39 to the south of the village. The A39 is a local strategic road which connects Bridgwater to the east and Minehead to the west. Within Bridgwater the A39 joins the A38, which is also a local strategic road that links to the M5 motorway north and south of Bridgwater at Junctions 23 and 24 respectively.
- 3.1.7 The location of HPC and the associated development sites which are required for the construction and operation of HPC are shown on **Figure 3.1**.

Figure 3.1: HPC Project Site Location Plan



KEY

- Hinkley Point C Development Site
- Off-site Associated Development Sites
- Temporary jetty seaward harbour limits
- Location of facilities
- ⋯ Bypass route
- Motorway
- Network road serving the construction of HPC
- Category A road
- Category B/C and other primary roads
- 🏠 Accommodation campus
- 🚚 Freight management facility
- 📦 Freight laydown facility
- 👤 Induction centre
- ✉️ Postal/courier consolidation facilities
- 📧 Temporary postal/courier consolidation facilities
- 👤 Temporary induction centre
- H Highway Improvements
- - - Mainline railway



4. HINKLEY POINT C PROJECT PROPOSALS

4.1 Hinkley Point C

4.1.1 The new nuclear power station would comprise two UK EPR reactor units (Units 1 and 2) and shared infrastructure and facilities. Heat generated from the reactors will be used to generate steam which will power turbines directly connected to a generator. The generator will be capable of producing around 1,630 megawatts (MW) of electrical power for each reactor giving a total site capacity of 3,260MW which is sufficient to supply the energy needs of approximately five million homes.

4.1.2 The permanent HPC built development and the associated landscaped areas following the completion of construction works are shown in **Figure 4.1** and would comprise:

- two permanent Nuclear Islands housing the UK EPR reactor buildings and other essential buildings;
- two Conventional Islands, including the turbine halls, located adjacent to the nuclear islands;
- a cooling water pumphouse for each UK EPR reactor unit with related infrastructure;
- sea bed cooling water intake and outfall structures together with bored tunnels connecting these to the cooling water pumphouses and turbine halls;
- energy transmission infrastructure to export electricity from the power station to a National Grid 400kV substation;
- fuel and waste management storage facilities;
- ancillary buildings such as office and storage facilities;
- a Public Information Centre to provide education and public facilities;
- a protective sea wall incorporating a public footpath;
- access (including an emergency access route) and parking facilities for workers, visitors and deliveries; and
- landscaped areas (including wildlife habitat and public rights of way).

4.2 Associated Development

4.2.1 EDF Energy has identified eight off-site associated development sites which are required for the construction and in some instances, operation of HPC. Their location and proposed uses have been informed by a range of strategies which are intended to enable the efficient delivery of the HPC Project but also to limit and mitigate the impacts of the project.

Figure 4.1: HPC Site Layout and Proposed Landscaping



4.2.2 These strategies consider how the import of goods and the workforce and their related travel and accommodation needs could be met in such a way so as to minimise impact upon the local road network, accommodation capacity, local residents and the environment. These strategies include:

- a Framework Travel Plan which specifically considers the management and movement of the HPC Project workforce;
- a Freight Management Strategy, which deals with the management of freight movements;
- a Construction Workforce Development Strategy, which looks to provide opportunities to train the local workforce to undertake skilled, non-skilled and specialist roles at all levels, maximising the inherent employment benefits of the project locally; and
- an Accommodation Strategy which is a proactive strategy seeking to accommodate non-home-based workers (i.e. workforce required for the construction of HPC temporarily located in the area), through the supply of

campus accommodation to attract construction workers to the area whilst also ensuring use of spare capacity within existing housing stock.

4.2.3 Achieving the aims and objectives set out in these strategies has brought the need for a series of associated developments. The proposed associated development include accommodation campuses, park and ride facilities, freight management facilities, a road bypass for the village of Cannington and the refurbishment and extension of the existing Combwich Wharf facility. Their locations are shown on **Figure 3.1** and include:

- accommodation campuses for up to 1,510 non-home-based workers which would include an accommodation campus within the HPC development site and two off-site accommodation campuses located in the north-east of Bridgwater (known as Bridgwater A and Bridgwater C);
- park and ride facilities incorporating car parking spaces, mini-bus and van parking spaces, motorcycle spaces, bicycle spaces and bus spaces, that will be built across four sites. The park and ride facilities will be located at Cannington, Williton and Junctions 23 and 24 of the M5 motorway;
- freight management facilities for heavy goods vehicle (HGV) parking spaces, with ancillary facilities to be located across two sites. These sites will be at Junction 23 and at Junction 24 of the M5 motorway;
- an induction centre to be provided for the training of staff in connection with the HPC construction phase;
- a consolidation facility for postal/courier deliveries;
- a bypass around the west of Cannington village; and
- refurbishment and extension of the existing Combwich Wharf and an associated freight laydown facility to provide a location for the storage of Abnormal Indivisible Loads (AILs) and other construction goods being delivered via Combwich Wharf before they are transferred to the HPC construction site. An access road is proposed to link Combwich Wharf with the existing Combwich Wharf access road.

4.2.4 In addition, several highway improvements are proposed to minimise potential impacts on the highway network due to traffic associated with the HPC Project. These include enhanced safety measures such as modifications to existing road alignments, junction or roundabout arrangements.

4.2.5 Most of the proposed associated development will be temporary and will only be required for the construction of HPC. The exceptions are the Cannington bypass and Combwich Wharf, both of which would remain in place permanently.

4.2.6 The IPC cannot authorise the continued use of the temporary associated development. EDF Energy has therefore developed a Post-Operational Strategy which would allow for the positive and sustainable use of the temporary associated development sites after the construction of HPC is completed.

4.3 Phasing of the HPC Project

4.3.1 The ES reports on likely significant environmental impacts predicted to arise during the construction, operation and, where relevant, post-operational phases of the HPC Project.

a) Construction Phase

4.3.2 Construction of HPC would take place over approximately nine years, with the first unit (Unit 1) anticipated to be operational in 2019 and the second (Unit 2) 18 months later in 2020. The construction programme for the HPC Project is presented in **Figure 4.2**.

i. Preliminary Works

4.3.3 A series of preliminary works would be undertaken at the HPC development site, including site preparation works and the construction and operation of a temporary jetty.

4.3.4 The site preparation works include clearance and topsoil stripping, earthworks to create the new platforms for the development site and the creation of soil and rock storage areas.

4.3.5 The temporary jetty is needed early in the construction programme to provide a means for the delivery of bulk construction materials (principally aggregate, sand and cement) to the development site. Early construction of the temporary jetty would minimise HGV construction traffic on local roads and enable construction of HPC to commence as early as possible following the grant of development consent.

ii. Construction of Buildings

4.3.6 Following the site preparation works and further excavations, the first structural concrete would be poured for the main HPC buildings. Material requirements during this period would be mainly sand, aggregate and cement, reinforcing steel and pipework. This phase of construction includes construction of the Nuclear Islands, Conventional Islands, the other remaining plant, ancillary buildings and structures, the National Grid 400kV substation and overhead line transmission infrastructure. The construction of the two units would be staggered by approximately 18 months.

iii. Installation of Plant

4.3.7 Mechanical and electrical plant would begin to arrive on-site about a year after the main construction works have commenced, as it would be necessary to install some of this equipment as the building work proceeds. Main plant installation would commence approximately three years into the construction period, after which commissioning activities would be undertaken.

iv. Land Use Requirements for Construction

4.3.8 Construction of HPC requires the use of substantial areas of land on a temporary basis. The proposed land uses have been designed to ensure the nuclear power station is built in a timely and efficient manner, with due consideration of environmental impacts. In summary, the key temporary land use requirements are:

- contractors' working areas including laydown, workshops, stores, offices, canteen, car parking;
- areas allocated for topsoil and spoil storage;
- construction roads, fencing, lighting and security features; and
- environmental mitigation features e.g. water management zones.

v. Landscaping

- 4.3.9 Following completion of HPC, the development site that is not permanently required for the built development would be landscaped to provide visual screening, new wildlife habitat (grassland, scrub, woodland, wetland and hedgerow) and the return of some land to agricultural use.

b) Operation of HPC

- 4.3.10 The two UK EPR reactor units would be constructed approximately 18 months apart with indicative dates for the operation of Unit 1 scheduled for 2019 and Unit 2 in 2020. Prior to operation each reactor will undergo commissioning which involves a series of tests to confirm that HPC is capable of performing in accordance with its design specification, safety and environmental requirements. Any major project of this scale has inherent uncertainties in the timescales to complete, e.g. the timing of investment decisions, planning processes or adverse weather delays.
- 4.3.11 HPC will have an operational life of approximately 60 years and will have a permanent workforce of 900 staff. At regular periods throughout its operational life HPC would undergo refuelling and maintenance shutdowns (known as 'outages'). The length of these outages will vary according to the maintenance and inspections required but generally would last a month and occur on an 18 month cycle.

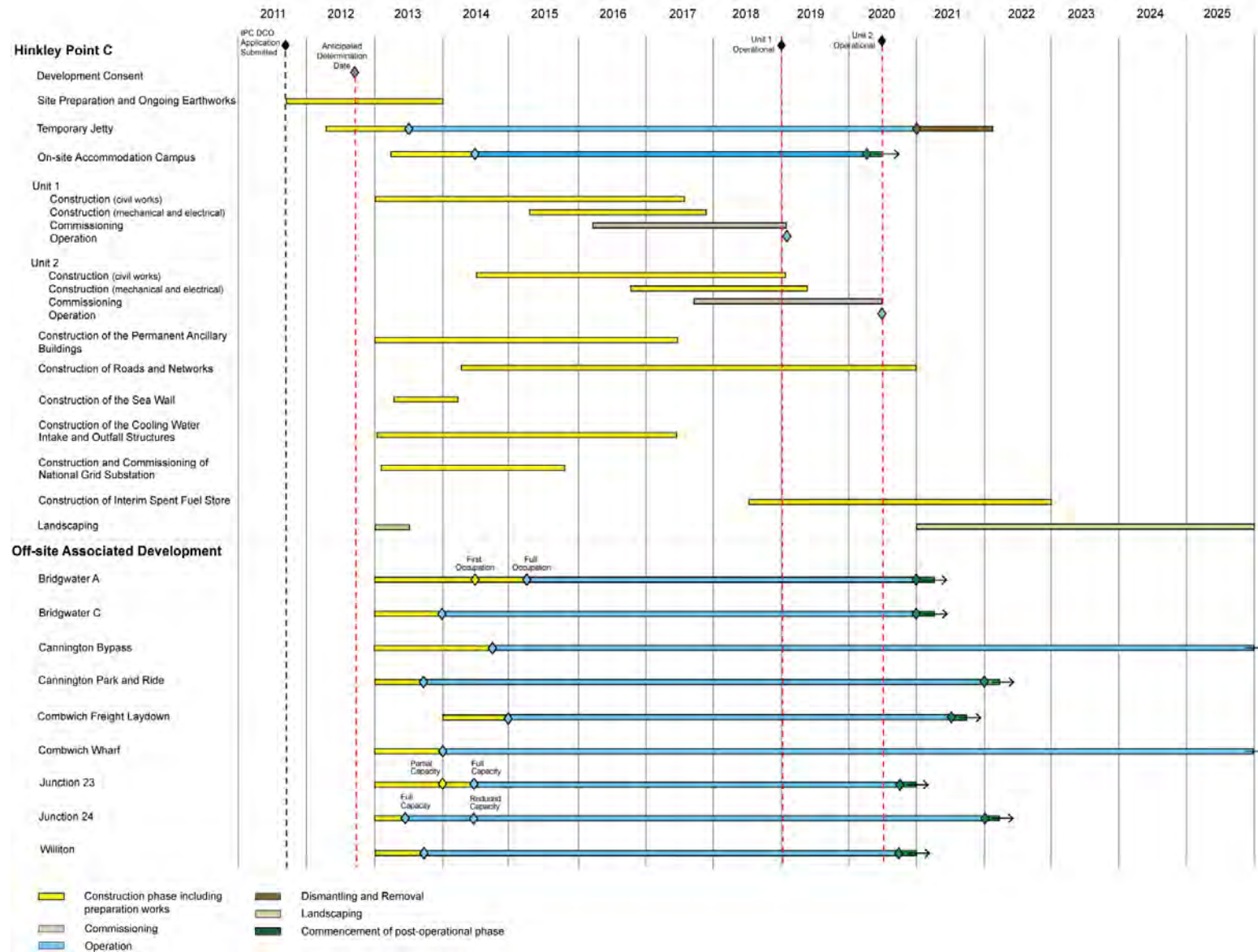
c) Decommissioning of HPC

- 4.3.12 At the end of its electricity generation lifetime, HPC will be decommissioned. Decommissioning will start as soon as practicable after the end of electricity generation and will continue for a period of 20 years until the site is cleared and delicensed. The exception is the interim spent fuel store, which will be retained on site until a Geological Disposal Facility is able to accept the spent fuel for disposal.

d) HPC Associated Development

- 4.3.13 The associated development will be constructed from 2013 and operated in line with the main HPC construction. The individual proposals are described in Section 7.

Figure 4.2: Indicative Construction Programme for the HPC Project



5. ALTERNATIVES AND DESIGN CONSIDERATIONS

5.1.1 Government policy set out in EN-1 and EN-6 establish that EDF Energy did not need to consider alternative sites for the provision of a new nuclear power station as Hinkley Point is one of eight sites designated for nuclear development under a Strategic Siting Assessment.

5.1.2 These policies do not, however, remove the need for EDF Energy to consider alternatives to its development in undertaking the EIA. EDF Energy has considered alternatives in the specific siting and design of the HPC Project.

5.2 Hinkley Point C

5.2.1 As set out in the Government's SSA, one of the principal determining factors in the selection of the most appropriate site for HPC has been the presence of the existing Hinkley Point Power Station Complex. It is preferable to site the new proposed nuclear power station as near to the existing power stations as possible to minimise the landscape and visual impact as the scale of HPC will be similar to the existing adjacent development. Co-locating alongside existing facilities provides other benefits including the ability to use existing infrastructure, for example access roads.

5.2.2 Given the requirement for large volumes of cooling water for the operation of HPC and the prohibitive cost and significant energy consumption requirements associated with pumping water inland, HPC needs to be sited near to the coast either directly east or west of the existing Hinkley Point power station complex.

5.2.3 EDF Energy initially considered both of these options but following an evaluation of the land available, the area to the west of the Hinkley Point A power station was considered to be the most suitable particularly with regards to minimising impacts on ecological sensitivities.

5.2.4 A range of alternative land use and design options have been considered through the iterative design process, resulting in the detailed consideration of a number of design options. For example, whilst the layout and orientation of the plant have been determined by operational considerations, its wider scale presence has been minimised through the selection of temporary and permanent landscape features which provide visual screening. Following consultation and discussions with the residents of surrounding villages on the proposed land uses and the extent of the areas of land required for construction activities, it was also determined that the principal construction activities would not extend to the southern-most point the development site thereby providing a buffer zone to the closest residential properties.

5.2.5 A number of alternative designs have also been considered for the cooling infrastructure design, which includes two intakes to draw water in from off-shore and one shared outfall to discharge water that has been used to condense steam after it has passed through power station turbines. The final siting and design of these structures has been informed by a need to withstand the physical environment of the Severn Estuary and the limited opportunity for maintenance; the need to avoid

interactions with sediment transport in the estuary; and limiting the number of fish that could potentially be caught within the water intake.

- 5.2.6 Similarly, a range of design options and locations were considered for the temporary jetty. The potential ecological sensitivity of the intertidal area and the need to ensure navigational access across a wide range of tidal conditions concluded in the final design of an open-framed pier structure with a small footprint that largely does not affect meteorological, tidal and wave forces.

5.3 Associated Development Sites

- 5.3.1 The identification of the locations for, and layouts of the associated development sites has been informed by consultation, EDF Energy's strategies and environmental considerations, as well as other Government, County Council and local planning authorities' policies. In summary, the sites for the associated development were selected for the following reasons:

- **Accommodation campuses at the HPC development site, Bridgwater A and Bridgwater C:** The HPC campus will minimise the need for all workers to travel to and from the site on the local road network. This campus is on the south-western portion of the HPC site, and as such, its environmental assessment has been included as part of the overall assessment for buildings and development of HPC rather than being treated as a distinct associated development. The Bridgwater accommodation sites on land to the north of the A39 Bath Road, one east of the Bristol to Penzance railway line and the other being on land at College Way are considered the most appropriate and suitable because they are in comfortable walking distance from each other and so may be developed as a linked facility. This means these accommodation campuses would be able to share amenity and recreational facilities, whilst between them providing all the required accommodation campus bed spaces. The sites are also centrally located and in walking distance of the town centre.
- **Cannington Bypass:** The chosen route to the west of the village is most appropriate and suitable as it is the shortest of the route options considered and has the fewest potential environmental impacts. This minimises the amount of land take required and provides a direct and efficient connection between the A39 to the south and the C182 Rodway to the north.
- **Cannington Park and Ride:** The chosen site (land to the south of Cannington, north of the A39) is the most appropriate and suitable for the location of the facility because it will intercept traffic before it enters Cannington village, has the benefit of being within the A39 envelope and is suitably close to Cannington to be within walking distance of the village. The site is sufficiently sized to accommodate the proposed number of vehicles which would use this part of the road network.
- **Combwich Wharf refurbishment and extension and the Freight Laydown Facility:** Combwich Wharf was chosen as the most appropriate and suitable site for the location of the facility because it is the closest site to HPC where a facility to accommodate water-borne Abnormal Indivisible Loads (AILs) could be built or an existing facility upgraded. There is also sufficient land located adjacent to the wharf for the laydown of freight goods and materials before they are transported to the HPC development site.

- **M5 motorway Junction 23 Park and Ride Facility, Freight Management/Courier Consolidation Facility and Induction Centre:** The chosen site (land to the west of the A38 roundabout) is the most appropriate and suitable for the location of the facilities because it is situated close to Junction 23 and has direct access to the A38 roundabout.
- **M5 motorway Junction 24 Park and Ride Facility, Freight Management/Courier Consolidation Facility and temporary Induction Centre:** The chosen site is the most appropriate and suitable for the location of the facilities because it forms part of a corridor of similar and compatible storage/distribution/light industrial facilities, and can be readily modified to the use required by EDF Energy early in the HPC construction phase.
- **Williton Park and Ride:** The chosen site (a former lorry park, on the B3190) is most appropriate and suitable because it would intercept traffic from the west before it enters Williton village and it is a previously developed site. The use of the site would have fewer environmental impacts compared with other potential sites. The site is also sufficiently sized to accommodate the proposed development.

5.3.2 The full consideration of alternatives is presented in **Volume 1** of the ES.

6. SUMMARY OF ENVIRONMENTAL IMPACTS – HINKLEY POINT C

6.1 Introduction

- 6.1.1 The following section summarises the key findings of the environmental assessment which are presented in detail in **Volume 2** of the ES. The summaries below describe the most important aspects of the current environmental conditions of the site and study area and present the predicted environmental impacts resulting from the construction and operation of HPC. Mitigation measures are described where appropriate.
- 6.1.2 The character of the development site is typical of the wider locality, comprising mostly open, gently rolling, mixed lowland farmland with a series of east-west ridges of land climbing steeply again at Green Lane to 35m Above Ordnance Datum (AOD). The ground then falls through several west-east undulations from Green Lane towards the coastal cliffs and Bridgwater Bay within the Severn Estuary which is recognised for its international and national nature conservation importance.
- 6.1.3 There are a number of watercourses within the site, including Holford Stream and Bum Brook which both flow through the southern part of the site.
- 6.1.4 The site contains a network of public footpaths and bridleways, including a section of the West Somerset Coast Path. This path is a 25km walk that links the River Parrett Trail at Steart in Bridgwater Bay with the South West Coast Path National Trail at Minehead.

6.2 Socio-economic

- 6.2.1 The socio-economic assessment addresses the effect of the HPC Project on people and their ability to live, work and use or relate to resources and facilities they may depend upon for a certain expectation of quality of life.
- 6.2.2 The HPC development site is located in a predominantly rural and sparsely populated district of West Somerset. The site is located in Stogursey Parish which has approximately 600 residents living in a number of small settlements.
- 6.2.3 The nearest large town is Bridgwater, which has an industrial heritage but more recently has seen growth in the distribution sector. However, overall the town has lost jobs over the last economic cycle. Parts of the town have relatively high levels of deprivation and unemployment. However there are also ambitious regeneration plans and some major housing development schemes. Other local nearby towns include the coastal town of Burnham on sea, and rural towns of Cheddar and Axbridge.
- 6.2.4 Slightly further afield, the Borough of Taunton Deane contains the county town of Taunton which has a strong concentration of public sector employment. The wider region includes the unitary authority of North Somerset, including Weston-super-Mare, which has a major tourism sector, and Bristol.

6.2.5 The local economy is identified in the baseline study as having a number of vulnerabilities, including low productivity, low employment growth in certain areas, and high levels of public sector employment and therefore vulnerability to public sector spending cuts.

a) Construction Phase Impacts and Mitigation

6.2.6 During the construction phase there will be impacts on the local labour market, economy, availability of accommodation and provision of public services as a result of the large workforce required to build HPC.

6.2.7 The development of HPC will provide a long term economic opportunity for the area both through the nine year main construction phase and subsequently in the operational period.

6.2.8 The size of the construction workforce varies at different stages of the construction, with a peak in 2016 of around 5,600 workers. Over the entire construction phase it is anticipated that 20,000 to 25,000 individual posts will be required. This construction worker demand will bring benefits to the local area in terms of local recruitment, including up to 1,400 Somerset residents at peak, and supply chain opportunities for Somerset and regional businesses. This is predicted to provide £45 million per year in wages and multiplier impacts, and £45 million per year of construction supply chain benefits. It will also provide benefits to the tourism sector through the use of accommodation in off-peak periods, and the attraction of visitors to the new visitor centre.

6.2.9 EDF Energy has produced an Economic Strategy, incorporating a Construction Workforce Development Strategy, a Local Supply Chain Engagement Strategy and an Education Strategy to enhance these positive impacts and is also making a financial contribution to the marketing and promotion of Somerset.

6.2.10 At the peak construction phase, it is anticipated around 1,900 of the workforce will be home-based, living within 90 minutes travel time of the site. Approximately 3,700 workers are expected to move to the area temporarily (defined as 'non-home based workers'). They are expected to stay within 60 minutes travel time of the site, which means they will be located mainly in the areas of West Somerset, Sedgemoor, Taunton Deane, and North Somerset.

6.2.11 It is estimated that the study area has a spare accommodation capacity of around 3,200 places (compared to a peak demand of 3,700 non home-based workers). This demand for the places could potentially have a significant impact upon the supply of accommodation. EDF Energy has therefore planned a campus-based Accommodation Strategy to minimise pressure on local housing markets. This strategy will provide 1,510 campus places across three sites, including an on-site HPC campus and two campuses in Bridgwater.

6.2.12 These accommodation campuses will ensure that the HPC workforce does not exceed available capacity in the area. As part of the strategy EDF Energy's Accommodation Office will direct workers to locations with spare capacity. EDF Energy has also proposed additional precautionary mitigation through a £5 million housing fund, which can be used to support the provision of additional accommodation in the wider area.

- 6.2.13 The assessment considers the potential impacts on public services including education, leisure, emergency services, and health services. In all cases, with the exception of the on-site campus, the worker population is (often significantly) below the average number of people who usually move into the area in any one year. Additionally, because of the worker profile, i.e. mainly single persons of working age, impacts on these local services are predicted to be negligible.
- 6.2.14 EDF Energy has nevertheless taken additional steps to ensure that any potential impacts are mitigated. The proposed mitigation measures include on-site provision of sports pitches and other amenities at the campuses and a package of health support for the workforce to minimise demand for services in the wider area.

Figure 6.1: Public Information Centre



- 6.2.15 EDF Energy will also work with public service providers to identify potential impacts and ensure that measures are in place to mitigate them and, in some cases, provide local enhancements. These measures include contributions to emergency service and health providers based upon the numbers of workers assumed for their area. For education, it includes contributions towards additional school places should these be required and for leisure, EDF Energy has also committed to contributions to enhance the local recreational facilities.

6.2.16 The likely impacts on these areas will be mitigated through workforce or accommodation management and contributions to policing and the public services described above. In some cases such as leisure, local facilities will be enhanced and there will also be benefit from job and business opportunities. However, it is recognised that a concentration of workers could have an impact on the quality of life of some residents. Therefore EDF Energy is proposing a Neighbourhood Support Scheme for residents immediately around the HPC site and a wider Community Fund to spend on local initiatives which enhance the quality of life in local settlements. In addition, a Worker Code of Conduct will be implemented.

b) Operational Phase Impacts and Mitigation

6.2.17 The 60 year operation of the station will also bring major benefits to the area. It is expected that it will employ around 900 people, generating a contribution to GDP of £144 million per annum, wages of £30 million per annum, and indirect long term effects of £40 million supporting 360 jobs. It is estimated that around half of the employees will initially be recruited locally, with the workforce beginning to build up around three years into the construction programme. By the time the plant is fully operational virtually the entire workforce is predicted to live in either of the three districts of West Somerset, Sedgemoor and Taunton Deane. This will be of major benefit to the area providing highly skilled and well paid jobs and injecting significant annual expenditure to the local economy.

6.2.18 In addition to this permanent employment there will also be regular planned outage periods (close down for essential works), which will bring a further temporary workforce of up to 1,000. EDF Energy is also committed to enhancing benefits through work with schools to encourage young people to study STEM (science, technology, engineering and mathematics subjects) through its Education Inspire Strategy (a strategy to invest in skills and employment in the area) and by operating an apprenticeship programme for young people.

6.2.19 The development will also include a Public Information Centre (PIC) (see **Figure 6.1**) which is expected to attract up to 250,000 visitors per year. This would make it the equal most popular tourist attraction (with West Somerset Railway) in the Somerset County Council area.

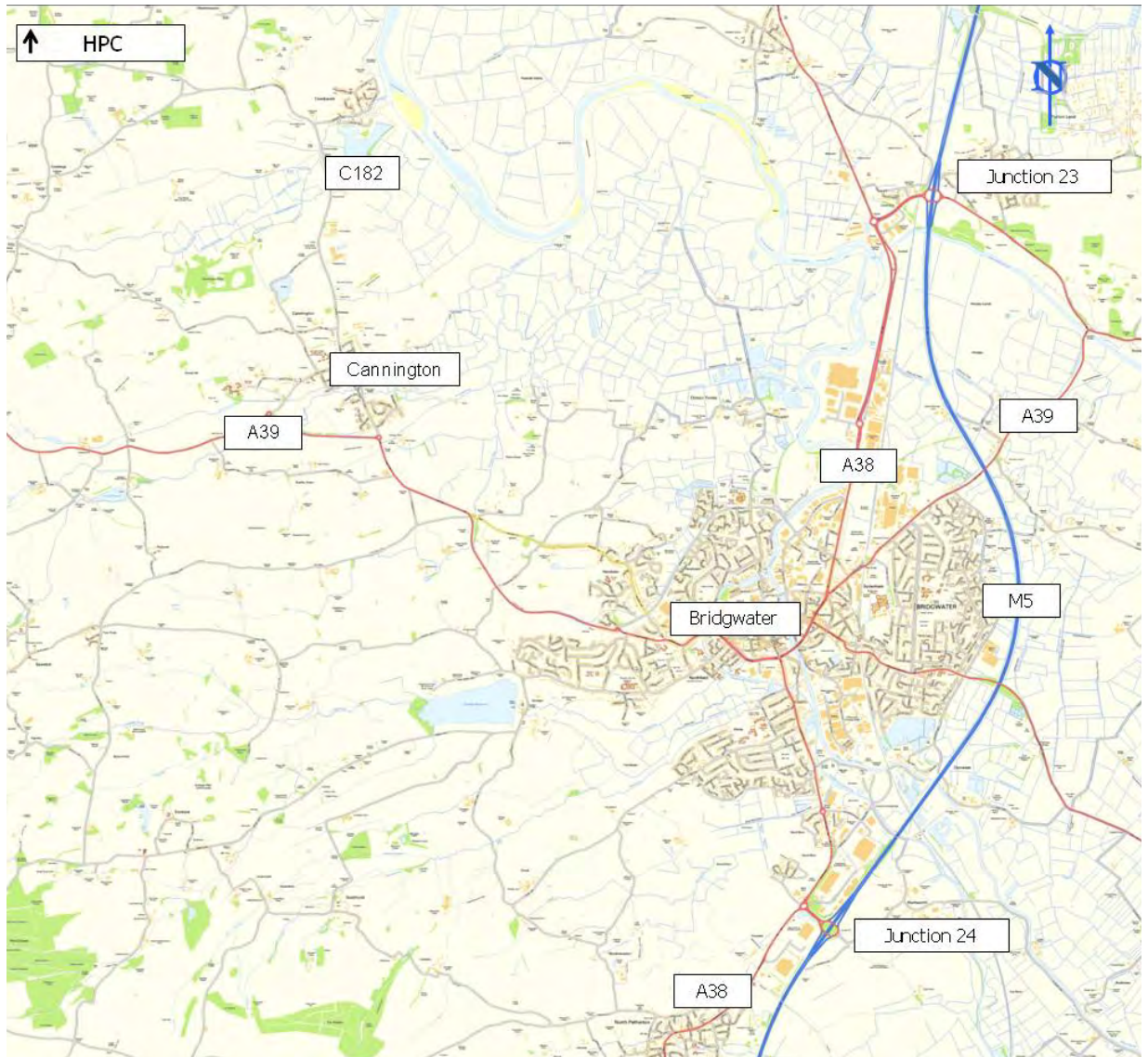
6.3 Transport

a) Construction and Operational Impacts for the Road Network and HPC Developments

6.3.1 The transport chapter of the ES considers the impact of the additional traffic generated by HPC. This part of the NTS includes reference to the associated development due to their interactive relationship with HPC over the local and wider road network. The main transport links off the M5 motorway, A38, A39 and C182 roads are shown below in **Figure 6.2**.

6.3.2 The traffic assessment work has been used to inform the transport strategy, including the proposed highway improvements, which includes measures to assist potential safety as well as capacity issues. The highway improvements have been developed in conjunction with stakeholders and the local community.

Figure 6.2: Existing Transport Links



- 6.3.3 The key potential transport impacts relate to driver delay, severance, and pedestrian amenity. These include the feeling of separation in a community caused by changes in traffic flow and the pleasantness of the journey by foot alongside a road. The changes to road traffic also relate to and are assessed within, the noise and air quality assessments.
- 6.3.4 Most of the traffic associated with the construction of HPC, in particular the HGV traffic, will travel via the M5 motorway and through Bridgwater. The HGVs will pass through the freight management facilities at Junctions 23 and 24 of the M5 and then use the routes shown in **Figure 6.2** to access HPC. Prior to completion of the Cannington bypass HGVs will pass along Cannington High Street; after completion, all HGVs will route via the new bypass. In the early years, when only the freight management facility at Junction 24 is operational, some HGVs will travel from Junction 24 via the M5 to Junction 23 and then use the northern HGV route via Bristol Road and the Northern Distributor Road.

- 6.3.5 For workforce travelling to site, a large majority would travel to and from the site by bus, either from park and ride sites or by direct bus services. The park and ride facilities will be established near to Junctions 23 and 24 of the M5 motorway, and at Cannington and Williton. These will serve both home-based and non-home-based workers who will travel to the park and ride facilities and then be transferred by bus to the HPC development site.
- 6.3.6 The ES considers three representative years for the assessment of impacts as being:
- 2013 when HPC construction has commenced but all the associated development sites are not operational. At this stage park and ride and freight management facilities along with the temporary Induction Centre are operational at Junction 24, but the Cannington bypass is still under construction.
 - 2016 when the construction works at HPC are at their peak. At this stage all highway improvements will be in place including the Cannington bypass.
 - 2021 when HPC is fully operational and some of the associated development sites are being removed.
- 6.3.7 During construction, there will be significant increases in flows on EDF Energy's designated HGV routes from M5 Junction 23 and Junction 24 through Bridgwater. The route from Junction 23 uses the A38 Bristol Road and Western Way (Northern Distributor Road) to Quantock roundabout and then the A39 to Cannington. From Junction 24 the route uses Taunton Road and then Broadway before passing through Quantock roundabout on the way to Cannington. These routes are all on 'A' roads with high existing traffic flows. Given the nature and character of the routes and the temporary nature of the peak construction phase, there is considered to be a significant impact on severance and pedestrian amenity.
- 6.3.8 In 2013 significant impacts are predicted in Bridgwater but these would be less than in later years since there would be less construction workers required at this time. The bypass will be under construction and therefore all HPC construction traffic would be passing through Cannington resulting in a substantial impact. However, this will be for a limited period and once the bypass is constructed there will be substantial benefits to the village. Furthermore, the bypass would not only remove HPC traffic but also non-HPC traffic passing through the village.
- 6.3.9 In 2021 the level of construction activity at HPC would be much less with only the ongoing construction of the interim spent fuel store and landscaping works remaining, however most of the associated development sites would be undergoing removal and the land restored. Hence there would be still HGV flows in Bridgwater. Once the associated development sites have been removed and restored then there would be no material impacts on severance and pedestrian amenity. At this early operational stage of HPC, there would be benefits to journey times within Bridgwater since the highway improvements that would remain more than offset the impact of HPC operational traffic.
- 6.3.10 At Bridgwater A and C accommodation campuses there would be some impacts when the sites are under construction. This would be due to HGVs accessing the sites from the local road network. However, HGVs would, where possible, be routed on 'A' roads. Furthermore, the Bridgwater A site forms part of the consented North East Bridgwater development and therefore there would be construction traffic even

without HPC. In any case, the number of HGV movements per day would be less than 50 and the impact of construction is not considered to be significant.

- 6.3.11 At the M5 motorway Junction 23 and 24 sites (park and ride, freight management facilities, courier consolidation and induction centres), the construction impacts are not considered to be significant since the majority of HGVs would be coming from the motorway.
- 6.3.12 At Cannington, the construction of the park and ride site would not affect the village since HGV movements will be on the A39. Construction of the bypass would proceed from both the south and north ends in order to reduce the construction period. There would be some HGV movements through the village; however these are expected to be required for a short period and estimated to be less than 20 vehicles per day.
- 6.3.13 At Comwich, some 300 HGV movements per day are likely to be generated between the freight laydown facility and the HPC development site associated with the delivery of goods and materials for the construction of HPC. However, the C182 in the vicinity of Comwich is not a sensitive area to pedestrian use and therefore the impact is considered low. Construction of the laydown area and refurbishment of the wharf would not generate as much traffic as when the facilities are operational.
- 6.3.14 At Williton, the park and ride site is an existing lorry park and depot and therefore the HGV movements required for construction and any restoration are modest. The only impact during would be some increase in buses through Williton.

6.4 Noise and Vibration

- 6.4.1 The assessment considers the noise from construction and operation of HPC and from associated road traffic on sensitive receptors including household properties and people using amenity local space such as public rights of way.

a) Construction Phase Impacts and Mitigation

- 6.4.2 The assessment of potential construction noise impacts used computer modelling to determine impacts at and around the site. The greatest potential for impacts are from short-term activities associated with the emergency access road construction and landscaping close to the southern site boundary. These activities might result in a slight increase in noise at the nearest residential dwellings. These impacts would however be of short duration and landscaping in the south of the site would help reduce the noise impacts early in the construction phase.
- 6.4.3 All other construction activities would not exceed noise limits agreed with West Somerset Council (WSC).
- 6.4.4 The accommodation campus has been designed so that it is orientated away from the local residents and external noise generating facilities such as air conditioning units will also be directed away from them. Furthermore, a bund has been included in the design of the site to reduce noise pollution and workers will be expected to adhere to a code of conduct that respects the local neighbouring properties. Whilst more significant noise impacts were determined at public amenity areas such as footpaths, due to their transient use the actual disturbance caused to users is low.

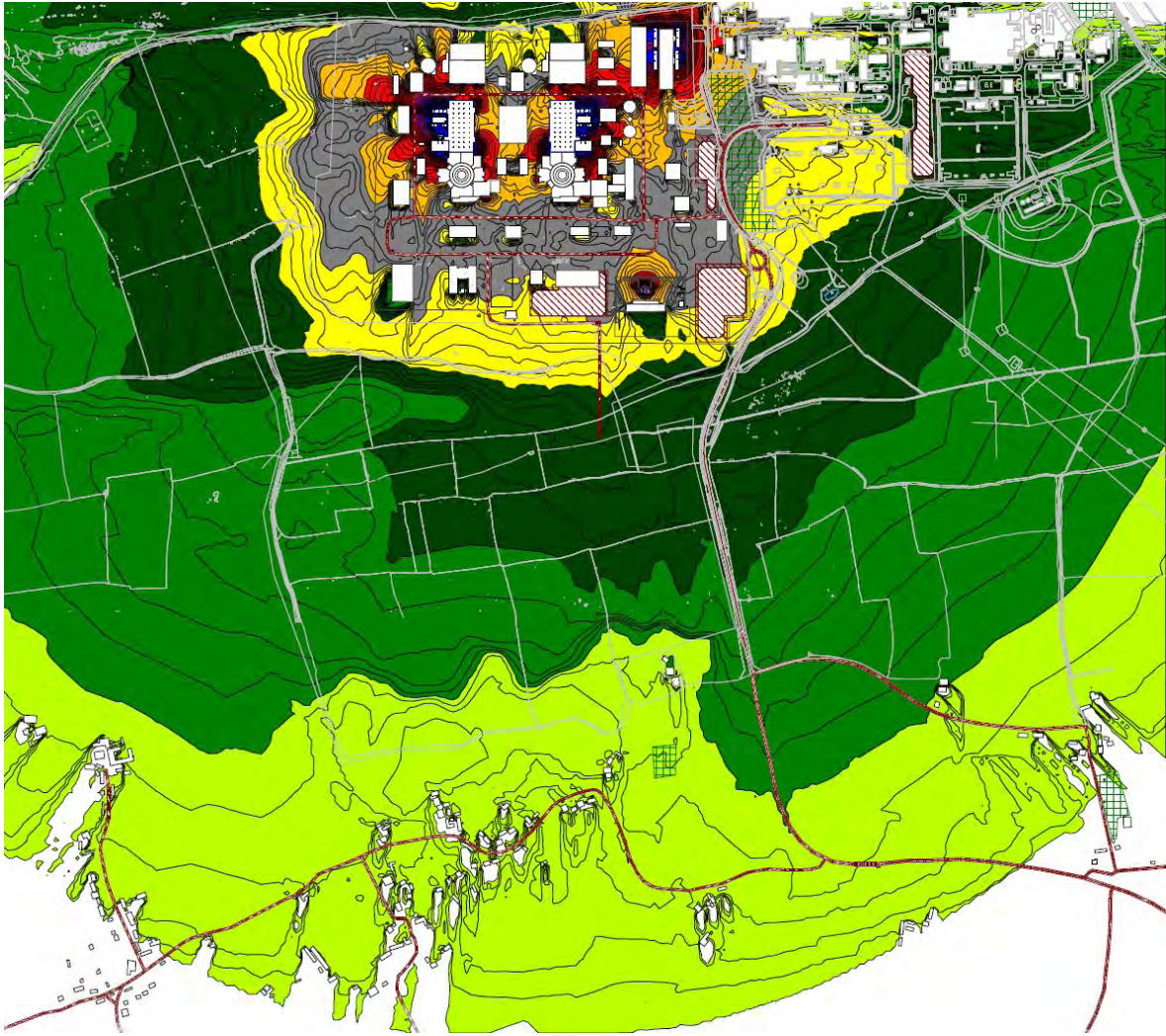
- 6.4.5 As part of the proposed mitigation and control, the Noise and Vibration Management Plan (NVMP) is to be implemented during construction. This plan includes a provision to continuously monitor noise levels at representative residential properties in the villages of Knighton, Shurton, Burton and Wick. In addition, residents can contact a 24-hour noise telephone number so that complaints or concerns can be addressed and dealt with promptly. In recognition of the overall scale of the proposed HPC development construction, EDF Energy has also committed to a voluntary Neighbourhood Support Scheme which allows residential property owners in the nearby villages of Shurton, Burton, Knighton, Wick and Stolford to apply for either secondary glazing or new double-glazing, with acoustic ventilation, to be fitted.
- 6.4.6 During excavations rock blasting may be undertaken, however it has been determined that it would be unlikely to be perceptible within local properties. Blasting would be infrequent and planned at acceptable times of the day to minimise any potential disturbance. Vibration would not result in significant adverse effects and would be much lower than levels at which cosmetic damage to buildings could occur.
- 6.4.7 Potential construction noise impacts from the generation of road traffic on local public highways during HPC construction were also assessed. The assessment was based on traffic modelling predictions for scenarios in years 2013 and 2016 as described in Section 6.3 of this NTS.
- 6.4.8 The 2013 assessment indicates that, prior to construction of the Cannington bypass, the daily road traffic noise impacts would be most significant between the A39 and the HPC site (through Cannington High Street and on the C182 Rodway). For all other assessed road sections, the impact of daily road traffic noise in 2013 would not be significant.
- 6.4.9 During late evening and early morning shift changes, when buses are transporting construction staff to and from the HPC development site, the most significant noise impacts would occur between the A39 and the HPC site over the hours of 05:00-07:00 and 23:00-01:00. Other areas potentially adversely affected by the predicted change in hourly road traffic noise at these times are along the A39, notably between Cannington and Bridgwater, North Street and Broadway in Bridgwater and the Northern Distributor Road (NDR).
- 6.4.10 The 2016 assessment indicates that during the day time, the bypass around the village of Cannington has removed the adverse noise impacts from the centre of the village and would provide a beneficial change to Cannington High Street and the C182 Rodway (south of the bypass roundabout). On the A39 and in Bridgwater the impact of daily road traffic noise in 2016 would not be significant, given the relatively large existing flows using these routes.
- 6.4.11 However, significant noise impacts are estimated to occur along the A39 between Cannington and Bridgwater and within Bridgwater associated with the late evening and early morning movement of construction workers by bus. These impacts are primarily a result of the existing very low number of vehicle movements along these routes at these times. It should also be noted that bus movements would not occur through the night but would be limited to a window of approximately 1.5-2hours. The noise impacts which have been assessed are based on worse-case bus movements and in practice the actual number of buses on many routes is likely to be significantly less than has been assessed at many points in the construction programme.

- 6.4.12 There would also be some noise impacts associated with bus movements through Williton, Strington and Stogursey. However, only minibuses which are required to pick up or drop off construction workers would use routes off the A39.
- 6.4.13 The assessment of hourly traffic noise impacts in the ES takes account of the freight management measures which restrict the movement of HGVs associated with HPC construction, which would be prohibited entirely between the hours of 22:00 and 07:00.
- 6.4.14 HPC related construction traffic noise levels, with the exception of four properties north of Cannington on the C182 Rodway, are not predicted to exceed levels at which there would be a statutory requirement to provide noise mitigation to homes.
- 6.4.15 The scale of adverse road traffic noise impacts is greatest in Cannington prior to the construction of the Cannington bypass. Properties adjacent to the road in Cannington on the HGV route to Hinkley Point would experience both daytime noise impacts from HGV movements and early morning/late evening noise impacts from bus movements which are considered significant.
- 6.4.16 In recognition of the scale of adverse noise impacts which have been assessed, and taking account of the relatively rural/village character of Cannington, EDF Energy will be providing an offer of noise insulation support to those properties in Cannington which are most affected by transport related noise arising from the HPC development construction phase. Detailed eligibility will be based on a careful analysis of the findings of the noise assessment work and further details and communication to eligible residents will take place following submission of the DCO application. The noise insulation scheme would be similar to the support already being offered to properties closest to the HPC construction site referred to above.

b) Operational Phase Impacts and Mitigation

- 6.4.17 The assessment of operational noise sources associated with the power station concluded that during commissioning tests carried out on each UK EPR reactor unit noise generated by high pressure steam release would be audible at neighbouring residential properties. However these events would be periodic, of very short duration (typically no more than a few minutes) and would occur during the daytime only.
- 6.4.18 A computer model was used to predict the overall noise level at the nearest residential dwellings once HPC is fully operational. An example of the graphical output showing predicted contours of noise output is shown in **Figure 6.3**.
- 6.4.19 This model assumed a number of intermittent noise sources operating together with the wind blowing from the site towards the nearest dwellings, and concluded that noise levels would be within acceptable threshold criteria agreed with WSC.
- 6.4.20 The noise and vibration assessment determined that once HPC is operational, the daily and hourly road traffic noise impacts would not be significant. The Cannington bypass would continue to reduce road traffic and noise in Cannington village.

Figure 6.3: Example Computer Model of Predicted Noise Contours from HPC



Note: the outer light green contour is the modelled 30-35dB contour; these noise levels are similar to existing background noise levels in this area.

6.5 Air Quality

- 6.5.1 The assessment addresses the impact of the HPC development upon air quality resulting from construction activities on-site, emissions from vessels using the temporary jetty during construction, operational emissions from the built development (including emissions during commissioning), and off-site emissions from traffic using the road network to access the HPC development site. Examples of air quality elements assessed include nitrogen dioxide from vehicles or small, fine elements referred to as particulates that could, if not properly addressed, lead to health issues.
- 6.5.2 To support the assessment a programme of baseline air quality monitoring (see **Figure 6.4**) has been undertaken in the locality of HPC. This has shown existing air quality to be good, as would be expected given the rural character of the HPC development site and surrounding area.
- 6.5.3 Prediction of pollutant concentrations due changes to the HPC development has been carried out using computer modelling where appropriate.

a) Construction Phase Impacts and Mitigation

- 6.5.4 The principal potential air quality impacts during the construction phase may occur as a result of the generation and dispersion of dust and particulates. A range of construction activities may give rise to dust and particulate emissions including the excavation, movement and placement of soils and rock into stockpiles, traffic use of internal haul roads and general construction and fabrication works.
- 6.5.5 A qualitative assessment of impacts related to dust and particulates has been carried out. This takes into account the meteorological conditions which occur at Hinkley Point, and the occurrence and duration of the construction activities relative to receptors near to the site. These receptors include residential properties, public rights of way and ecological receptors within designated and non-designated sites.
- 6.5.6 As most dust tends to fall out of the air within a short distance of the point at which it is generated and given the location of the HPC development site, impacts on receptors are not anticipated to be significant apart from at Doggetts and Bishops Farm House in the absence of mitigation. However, a range of mitigation and best practice control measures are proposed to minimise the generation of dust and particulates at source and to minimise dust migration beyond the site boundary. These control measures are outlined within the Air Quality Management Plan (AQMP) that will be implemented during the construction works.
- 6.5.7 Emissions of air pollutants from plant and equipment on-site and from vessels using the temporary jetty are not predicted to have a significant impact upon air quality.
- 6.5.8 Pollutant concentrations resulting from HPC construction traffic in combination with other traffic using the road network have also been assessed using predictive modelling. The assessment predicts that there should be no significant impact on human receptors relating to traffic emissions during the construction phase.
- 6.5.9 With respect to ecological receptors, localised exceedences of nitrogen dioxide air quality pollutant criteria levels may occur due to development related construction traffic within the Bridgwater Bay Site of Special Scientific Interest (SSSI) and the Hinkley County Wildlife Site (CWS) very near to the roadside adjacent to the C182 Rodway. The potential impact will be restricted to a corridor within a few tens of metres of the road.
- 6.5.10 During the operation of HPC (including the commissioning phase) emissions of air pollutants will occur from the plant that will be used for back-up power generation for essential power station systems in the event that power to the site is not available. Emissions of air pollutants will also occur from specific plant and equipment during start-up at the commencement of operations and after outages for maintenance. Emissions from these sources (which include, for example, diesel generators) have been modelled to predict their dispersion in the atmosphere and the concentrations that may occur at receptor locations.
- 6.5.11 No exceedences of air quality standards or guidance criteria that are intended to be protective of human health are predicted to occur due to emissions from HPC commissioning or operation and as a result operational HPC emissions are not considered to be significant with respect to human receptors.

Figure 6.4: Monitoring Equipment (Diffusion Tubes) at Hinkley Point



b) Operational Phase Impacts and Mitigation

- 6.5.12 Pollutant concentrations resulting from all HPC Project operational traffic in combination with other traffic using the road network, have also been assessed using predictive modelling. The assessment indicates that there should be no significant impact on human receptors relating to traffic emissions during the operational phase.

6.6 Soils and Land Use

- 6.6.1 Over 85% of the surveyed land within the HPC development site is moderate or poor quality agricultural land, based on Government published criteria. The top three grades, Grade 1, 2 and 3a, are referred to as Best and Most Versatile Land (BMVL). A small proportion of the HPC site is classified as BMVL (ALC Grade 3a). Much of the land within the site is managed under agri-environment schemes, with winter cereals and permanent grassland for cattle grazing.

a) Construction Phase Impacts and Mitigation

- 6.6.2 During the construction phase there would be both permanent and temporary loss of agricultural land and of soils stripped as part of the site preparation works. These impacts will be confined to land within the site. The amount of BMVL directly affected both temporarily and permanently (19.8ha) is an extremely small proportion of the overall amount of such agricultural land in Somerset.

- 6.6.3 Stripped and stored soil materials would be re-used. On completion of the construction phase, the land outside of the permanent development footprint would be restored for agricultural use and ecological habitat creation which would include the sustainable re-use of soil. It is intended that new areas of arable agricultural land, grassland, scrub, woodland, wetland and hedgerow habitat would be created. There would be monitoring of soil conditions within the restored areas over a minimum of five growing seasons (i.e. during the landscape planting establishment) to ensure that appropriate soil and restoration conditions have been achieved.
- 6.6.4 The stripped and stored soils would be managed during storage to ensure they remain in a suitable and viable condition for later re-use. This would be implemented via the Soil Management Plan which would include measures to ensure soil quality and integrity is maintained during the processes of stripping, handling, transporting and storing soils, and their eventual replacement.
- 6.6.5 With these mitigation measures in place, impacts on soils, land use and agriculture during the HPC construction phase would not be significant.

b) Operational Impacts and Mitigation

- 6.6.6 Normal operation of the HPC development would not prevent continued agricultural activity on adjacent land outside the boundary of the operational site and will not lead to any further impacts on soils and land use.

6.7 Geology and Land Contamination

- 6.7.1 The assessment addresses the impact of the HPC development upon the geological features at Hinkley Point and determines the risks and associated direct and indirect impacts relating to contaminated soils.

a) Construction Phase Impacts and Mitigation

- 6.7.2 Ground conditions in the north-western and southern areas of the HPC development site almost exclusively comprise natural soils and rock. The eastern area contains a higher proportion of Made Ground (man made deposits or disturbed natural ground) principally comprising re-worked natural soils, rock and construction/demolition materials. This area was used during the construction of HPA and HPB to accommodate construction and fabrication activities, materials and spoil storage, campuses for the workers and a sewage treatment works.
- 6.7.3 Investigations (see **Figure 6.5**) have confirmed that there is no significant non-radiochemical or radiochemical contamination present within the north-western and southern areas of the development site with soil concentrations generally being at or below, expected background values.
- 6.7.4 Within the north-eastern area, investigations have identified the presence of Asbestos Containing Materials (ACMs) and slightly elevated concentrations of heavy metals, pH, sulphate and hydrocarbons within the Made Ground. This contamination is related to the previous land use for activities associated with the construction and fabrication of the HPA and HPB power stations.

Figure 6.5: Technical Staff Undertaking Ground Gas Monitoring



- 6.7.5 Remediation works are ongoing to deal with the asbestos contamination in the north-eastern area of the site. These works are anticipated to be complete in the early months of 2012. Bulk earthworks for the construction of HPC will not commence in this area until remediation of accessible asbestos contamination is complete. This is the assumed baseline state for the impact assessment with respect to soil contamination. If there is any residual contamination remaining it will be dealt with during the earthworks.
- 6.7.6 In addition to the remediation activities, a large mound feature (formed from spoil generated from the construction of the HPA and HPB power stations) in the north-eastern area of the site will be excavated and materials arising will be used as part of the remediation works to infill the basement of the redundant turbine hall at the HPA station as part of its decommissioning.
- 6.7.7 The rocks that are exposed in the cliffs at the north of the HPC development site will be covered by the sea wall which is required to prevent erosion. There will also be a very small loss of the exposed rock platform in the intertidal zone at the locations of the legs for the temporary jetty and the construction drainage outfall. There will be no loss of geological features within the Blue Anchor to Lilstock SSSI, the boundary of which extends a small distance into the HPC development site.

- 6.7.8 The loss of the cliff exposures has been assessed based upon a detailed geological mapping survey. The survey found that the rocks which are exposed in the cliffs and rock platform at Hinkley Point are replicated within the SSSI to the west of the HPC development site and are not unique in character. As a result their loss will be offset by cliff exposures of similar or better quality which are accessible to the public elsewhere along the coast to the west of Hinkley Point.
- 6.7.9 No significant impacts upon receptors are anticipated with respect to land contamination and standard good practice and control measures will be used to manage soils and other excavated materials during the construction in such a way that they will be appropriate for their proposed use.

b) Operational Phase Impacts and Mitigation

- 6.7.10 During the operation of HPC a range of potentially contaminative materials will be stored and used on-site. These substances have the potential to cause land contamination if uncontrolled discharges to ground occur. However, in accordance with the environmental permitting requirements, pollution prevention measures would be implemented to manage and control the storage and handling of such substances and materials on-site, thus reducing the potential for accidental spillage or leakage and subsequent ground contamination.

6.8 Groundwater

- 6.8.1 The HPC development site is underlain by layers of mudstone and limestone rocks of the Jurassic Blue Lias. Within these rocks groundwater occurs which is designated by the Environment Agency as a 'Secondary A' aquifer. This sort of aquifer is capable of supporting water supplies at a local scale, although it is not used for abstraction in the vicinity of the HPC development site. Groundwater may also connect to surface water features such as streams. The assessment looks to ensure that changes from the proposed development would not impact these types of resources.
- 6.8.2 The groundwater under the proposed HPC site flows in a broadly south to north direction towards the Bristol Channel. Examination of samples taken show very little evidence of chemical contamination, with only some elevated levels of mineral salts, heavy metals, ammonia and nitrate. Tritium (a radiochemical contaminant) has been found in low concentrations (well below levels of regulatory concern) in groundwater monitoring boreholes in the north-eastern area of the HPC development site close to the boundary with the HPA power station. A review of groundwater data from the neighbouring HPA site was undertaken and this identified tritium to be present in groundwater beneath this site.
- 6.8.3 The assessment has examined the impact of the HPC development on these groundwater resources and groundwater contaminant behaviour through the development of predictive computer models.

a) Construction Phase Impacts and Mitigation

- 6.8.4 It will be necessary to dewater the deep excavations which are required for the foundations and below ground structures of HPC to create a safe working environment and allow construction works to progress under dry conditions. To do this, the groundwater level within the excavations will need to be lowered by up to 30m compared to current baseline conditions. Groundwater levels would be affected over a period of several years, leading to localised drawdown (a depression in the natural groundwater level).
- 6.8.5 It is anticipated that the influence of this drawdown will reach outside the HPC development area into the north-western part of the neighbouring HPA power station site. However, it is not anticipated that the dewatering will result in significant groundwater contamination being drawn into the dewatering zone for HPC.
- 6.8.6 There would be no significant increase in the salinity of groundwater as a result of dewatering, except immediately between the HPC development site excavations and the Bristol Channel.
- 6.8.7 Groundwater which is collected during dewatering will be discharged under controlled conditions to the Bristol Channel. Monitoring of the levels of contamination will be undertaken and treatment prior to discharge will be carried out if necessary to meet the requirements of an environmental permit that will be regulated by the Environment Agency.
- 6.8.8 Groundwater modelling has indicated that there will be no significant impact on groundwater levels away from the HPC development site to the west, south and south-east. Groundwater abstractions will not be affected and surface watercourses within Wick Moor (which is part of the Bridgwater Bay SSSI) are not anticipated to be subject to any reduction in flows due to dewatering activities. However, as a precautionary measure, EDF Energy has agreed with the Environment Agency to undertake a groundwater monitoring programme during construction.

b) Operational Phase Impacts and Mitigation

- 6.8.9 Once HPC is complete and operational, a passive drainage system will be in place around the Nuclear Island to control groundwater levels over the operational lifetime of the HPC site. The influence of this drainage system (which will be regularly inspected and maintained) on groundwater levels will be localised and no effects outside the HPC development site boundary are anticipated.

6.9 Surface Water

- 6.9.1 Surface water features on the site mainly comprise agricultural drainage ditches. The assessment considers whether their flow, chemical or sediment levels which may be important to habitats and species such as fish, would be affected by any change resulting from the HPC development.

6.9.2 Holford Stream and Bum Brook are important water supply streams to the Bridgwater Bay SSSI and freshwater wetland habitats which lie to the east of the HPC development site (see **Figure 6.6**). Due to the water dependent nature of this SSSI, Holford Stream and Bum Brook are considered to be sensitive to any potential water quality or flow changes. They are shallow watercourses with a wide variation in water quality and flow characteristics under existing baseline conditions.

a) Construction Phase Impacts on Surface Water and Mitigation

6.9.3 Activities which could potentially impact surface water during construction are:

- changes to natural surfaces, such as removing vegetation exposing bare earth;
- earthworks and landform change to create the development and construction platforms and infilling and culverting of Holford Stream;
- construction of a bridge crossing over Bum Brook for the emergency access road;
- construction and operation of a new drainage system, including Water Management Zones (WMZs) to attenuate and treat the water leaving the site to a suitable quantity and quality; and
- construction of the sea wall in the north of the site.

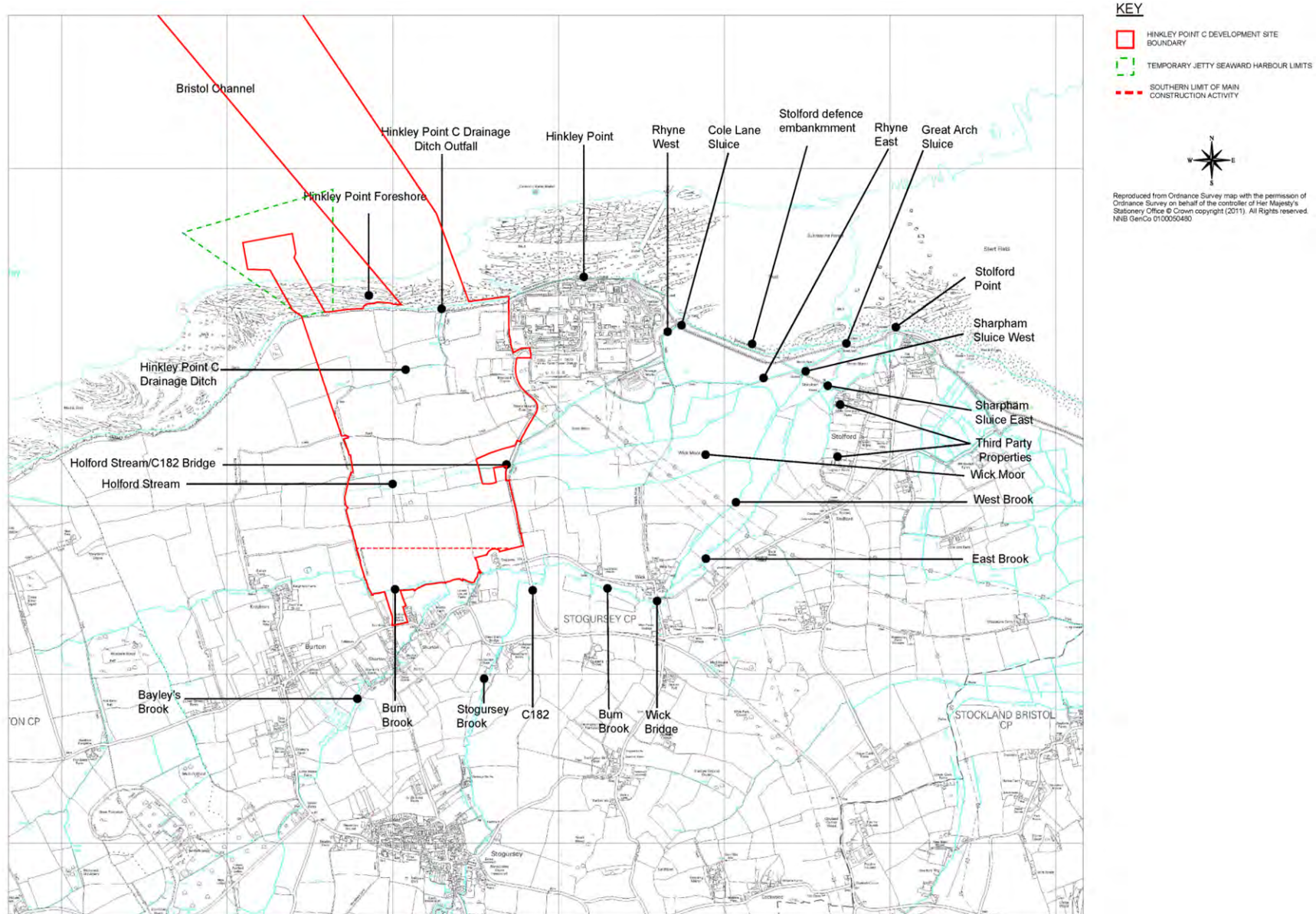
6.9.4 As a consequence of these activities there is the potential for:

- elevated surface water run-off and therefore increased discharges from the site;
- increased flood risk (including tidal, fluvial and surface water);
- risk of increased soil erosion depositing sediment in watercourses and therefore reducing the channel capacity;
- changes to Holford Stream hydraulic conditions due to the proposed culvert; and
- contaminated surface runoff affecting water quality status, including sediment-laden water, hydrocarbon contaminated run-off, concrete leachate, run-off with elevated nutrients and acid rock drainage from stock piles.

6.9.5 The surface water drainage systems across all phases of the development will be fully compliant with applicable legislation, regulations and guidance and subject to environmental permitting. A key design feature of the construction phase drainage system is the provision of WMZ to attenuate and treat to a suitable quality, water requiring discharge from the HPC development site into the local surface water features. A range of mitigation and controls will be implemented including the treatment of sewage effluent, measures to reduce the potential for sediment-laden water and monitoring and treatment of surface waters for elevated nutrient concentrations, low pH and contamination through accidental spillages. These measures would be implemented based on measures described in the Water Management Plan.

6.9.6 The assessment has shown that the land adjacent to Bum Brook could flood as a result of a partial blockage occurring under the emergency access bridge crossing the brook. Accordingly, monitoring and regular inspection of Bum Brook and the bridge will be undertaken to prevent and/or remove any debris from the channel.

Figure 6.6: Local Watercourses at Hinkley Point



b) Flood Risk during Construction and Operation

- 6.9.7 The potential for flood risk to the construction areas, the operational power station platform area, access routes, and off-site receptors including HPA and HPB and nearby properties have also been assessed taking into account future climate change projections. The assessment concluded that there is no flood risk to the development site during construction and operation and whilst there is the potential for occasional flood risk in the future of the main access road to the site, this would only be for a few hours during which time the site could be accessed by an alternative route.
- 6.9.8 Consideration of climate change predictions indicate that some local properties could be adversely impacted by flooding in the future. These properties would flood in any event in this scenario and flood levels would only increase slightly as a result of the HPC development. EDF Energy will develop an appropriate plan with the Environment Agency to manage flood risk impacts to properties in the future.

c) Operational Phase Impacts on Surface Water and Mitigation

- 6.9.9 Once HPC is complete and operational, with the land restored, there are not considered to be any significant impacts on surface water features, particularly as the operational site would effectively be isolated from the local terrestrial surface water environment. Any surface water run-off would be routed to the main cooling water system and discharged to Bridgwater Bay via the cooling water outfall. Nonetheless, monitoring and maintenance of the drainage systems and surface water channels will continue during the operational phase.

6.10 Coastal Hydrodynamics and Geomorphology

- 6.10.1 Coastal hydrodynamic and geomorphology describes the sediment transport processes (the normal transfer of sediments in sea water) operating in the Inner Bristol Channel with an emphasis on the subtidal and intertidal areas around Hinkley Point.
- 6.10.2 The marine environment off-shore to the HPC site experiences an extreme tidal range (approximately 13m between highest and lowest astronomical tides) and predominant west-north-westerly winds, which influence wave activity. Sea levels have been observed to have increased by 4.65mm per year for the past 15 years and it is expected that this rate will increase in the future due to climate change. The large tidal range and strong currents make the sedimentary regime highly dynamic with high turbidity (sediment in suspension) in the water. Sediments covering both intertidal and subtidal areas are routinely resuspended and moved through tidal action. Low rates of cliff erosion have been observed at the HPC site whilst additional material does arise from weathering of the wide intertidal shore platform at that same location.
- 6.10.3 The assessment has been supported by historical studies supplemented by recent marine surveys undertaken as part of the British Energy Estuarine and Marine Science (BEEMS) programme, developed with the Centre for Environment, Fisheries and Aquaculture Science (CEFAS). These surveys have included water depth, sediment type and distribution, waves, tidal currents and suspended sediment concentrations to inform the assessment (see **Figure 6.7**).

- 6.10.4 The construction components of the HPC development identified as having a potential impact are: positioning of the new sea wall (see **Figure 6.8**); construction drainage across the shore; construction, operation and dismantling of the temporary jetty; drilling of vertical shafts offshore for the cooling water intake and outfall structures; establishment of a discharge point for the fish recovery and return system and dredging of the temporary jetty berthing pocket. Due to the localised nature of these activities, their impacts are assessed as being small in scale and they would interfere only slightly with the existing highly dynamic coastal processes.

Figure 6.7: Deploying a Waverider Buoy off Hinkley Point for Data Collection



a) Construction Phase Impacts and Mitigation

- 6.10.5 Measures will however be taken to ensure the effects of construction are mitigated. These will include the use of pre-defined working zones only, limiting any damage caused to the rock in the intertidal shore zone and seabed; restoring and remodelling disturbed features should this prove necessary and using 'microtunnelling' rather than excavating a route or laying pipe-work across the intertidal area for the fish recovery and return system. The main cooling water tunnels will likewise be tunnelled under the intertidal area and the seabed, with no surface disturbance except at the locations of the intake and outfall structures themselves, several kilometres offshore. The effects associated with the temporary jetty and any associated dredging activities are assessed as not having significant impact on hydrodynamic processes.

b) Operational Phase Impacts and Mitigation

- 6.10.6 The operational components identified as having a potential influence on coastal hydrodynamics and/or coastal geomorphology are: the presence of the new sea wall; the abstraction and discharge of cooling water and the presence of cooling water intake and outfall structures on the seabed, including that for the fish recovery and return system. With the exception of the jetty supporting legs, no structures will be present within the intertidal shore zone and is therefore not considered to impact hydrodynamic processes (see **Figure 6.9**).
- 6.10.7 The fish return outfall (separate from the cooling water intake and outfall structures) will be positioned within an area of rocky sea bed below low tide level and cooling water structures will be well offshore where they would have no significant influence on either the tidal or the sediment transport regimes.
- 6.10.8 Monitoring will be undertaken to inform any need to adjust mitigation measures and to maintain an understanding of long-term trends significant to engineering design. Overall, HPC would not have a discernable effect on the hydrodynamics and coastal geomorphology of the Inner Bristol Channel.

Figure 6.8: West Somerset Coastal Path and the Hinkley Point C Sea Wall



6.11 Marine Water and Sediment Quality

- 6.11.1 This section of the assessment considered whether elements of the development could lead to marine water quality being affected during the HPC construction and operation phases in terms of surface drainage and groundwater discharges to the foreshore; treated sewage effluent from temporary sewage works or discharge of commissioning test waters and accidental discharges.

- 6.11.2 A series of marine water monitoring and sediment core sampling campaigns was undertaken in 2009 to define the baseline conditions. Field sampling was undertaken in all seasons and during both spring and neap tides which supplemented information from the published scientific literature as well as assessments, modelling and interpretation undertaken in the BEEMS programme.
- 6.11.3 Three 'pressures' were identified that might impact upon water quality: changes to suspended sediment concentration, changes to chemical quality and changes to thermal regime. It was considered appropriate to assess impacts against water quality sensitivity with regard to the large scale and dynamic nature of the estuarine system off Hinkley Point.
- 6.11.4 Sensitivity was assessed against assigned magnitude scores for each impact (derived in terms of scale and longevity) to determine the significance of identified potential impacts.

a) Construction Phase Impacts and Mitigation

- 6.11.5 Even without mitigation, the assessment concluded that all impacts associated with discharges (via surface or groundwater, from temporary sewage works, commissioning test effluents or accidental discharges) would not be of significance. The assessment also concluded that methods for excavation of the cooling water tunnels would be the same.

b) Operational Phase Impacts and Mitigation

- 6.11.6 Most of the potential operational impacts to marine water were considered insignificant. Thermal discharge (water that is hotter by 10-12.5°C than normal sea water) from HPC via the outfall is likely to be the most significant operational impact on marine water quality because it cannot be mitigated. For HPC operating on its own, the thermal discharge is assessed as being a minor impact, and if combined with the output from HPB, that impact is considered to remain the same. If chlorination is required to clean or de-foul pipeworks, the impact of the discharge is assessed to have a low significance and the likelihood of impact could be reduced further by use of a site-specific chlorination regime.

Figure 6.9: View of the Temporary Jetty



6.12 Marine Ecology

- 6.12.1 The marine ecology assessment considers what impacts may occur to fish and other marine species and habitats. The assessment has considered the impact of changes to water temperature or sediment levels and the trapping ('entrainment') of species from the cycling of large amounts of sea water for cooling purposes.

- 6.12.2 Bridgwater Bay has an extremely large tidal range and local bottom-dwelling species are therefore adapted to the powerful tidal shear forces and a regime involving high levels of suspended sediment (turbidity). Many plants, requiring light to photosynthesise, are unable to tolerate these turbid conditions and are thus limited to only the shallower, intertidal regions. The Inner Bristol Channel contains estuarine habitats typical of British coastal waters but population densities of species are generally comparatively low. Species and habitats which have been given particular attention in the assessment, due to their conservation interest, include a red turf-forming alga (*Corallina*) (see **Figure 6.10**) and a tube worm (*Sabellaria*).
- 6.12.3 Data from the BEEMS programme and long-term monitoring of fish, invertebrate and plankton at the HPB station have been used to characterise the marine ecology of Hinkley Point and surrounds. Surveys of intertidal and subtidal invertebrates living on and in the sediment have been carried out for plankton living in the water column, fish both in the intertidal areas and offshore and from a perspective of influence on their invertebrate prey such as waterbirds.
- 6.12.4 Experience at other power stations has shown that effects from building HPC may be felt at the local level (e.g. disturbance during construction), as well as across a number of kilometres (e.g. the potential area of influence of the cooling water thermal plume). Numerical hydrodynamic models have been developed to predict the behaviour of the thermal discharges and these models have been used to optimise aspects of engineering design, such as the most appropriate positioning of discharge outfalls.

a) Construction Phase Impacts and Mitigation

- 6.12.5 As a result of the construction of the works and placement of structures in the marine environment, there will only be a relative small amount of intertidal and subtidal habitat loss, including a minor loss of *Corallina* and *Sabellaria*. Despite their conservation interest, the loss is not considered to be significant. Physical disturbance during construction was similarly found to be of minor significance, except for the potential impact of delivering rock armour for the sea wall construction which is considered to have a significant impact.
- 6.12.6 Where there is the potential for a significant impact, appropriate means of mitigation have been identified. Without mitigation, noise and vibration associated with piling was found by the assessment to pose an adverse impact on certain fishes and cetaceans (e.g. porpoises). Soft start techniques however, will be used for piling which gradually discourage fish away as the activity intensifies. Strict zoning controls will be used in the intertidal area for the construction of the sea wall, the temporary jetty and when landing rock armour components by sea.
- 6.12.7 Alterations in water quality associated with construction, including the discharge of treated sewage and other effluent or surface drainage, are not considered to have a significant impact on marine habitats or species.

b) Operational Phase Impacts and Mitigation

- 6.12.8 Large amounts of seawater (at a rate of approximately 125 cubic meters a second) would be needed to cool HPC when operational. This water would be discharged via the outfall which extends approximately 1.8km off-shore. The thermal plume formed when this volume of water is released back to sea (10-12.5°C warmer than when extracted) was assessed as having negligible impacts on the crustacean, *Crangon crangon* and the local *Corallina* and *Sabellaria* interests. Non-migratory and migratory fish, and intertidal populations of the invertebrate *Macoma balthica* on Stert Flats, were found to be subject to only minor impact from the thermal plume.
- 6.12.9 Various waste waters will be discharged via the cooling water system, including treated sewage, surface drainage and if necessary, residual biocides used to prevent the biological fouling of the cooling water system. Operational waste streams are generally predicted to have small impact on intertidal and subtidal habitats. The exception, without mitigation is a moderate impact predicted for the influence of the residual biocide on intertidal habitats. To mitigate this impact, a risk-based dosing strategy will be applied.
- 6.12.10 Losses of marine organisms from the cooling water screens without mitigation, were predicted for 14 species of fish, some of which are designated conservation species, and one crustacean. The larvae and eggs of these fish were assessed as being subject to only minor impact from entrainment with the cooling water. The combination of the introduction of a fish recovery and return system, the use of acoustic fish deterrent devices and an intake design that maintains low intake velocity at all times, would ensure these impacts remain low.

Figure 6.10: Corallina on the Hinkley Point Foreshore



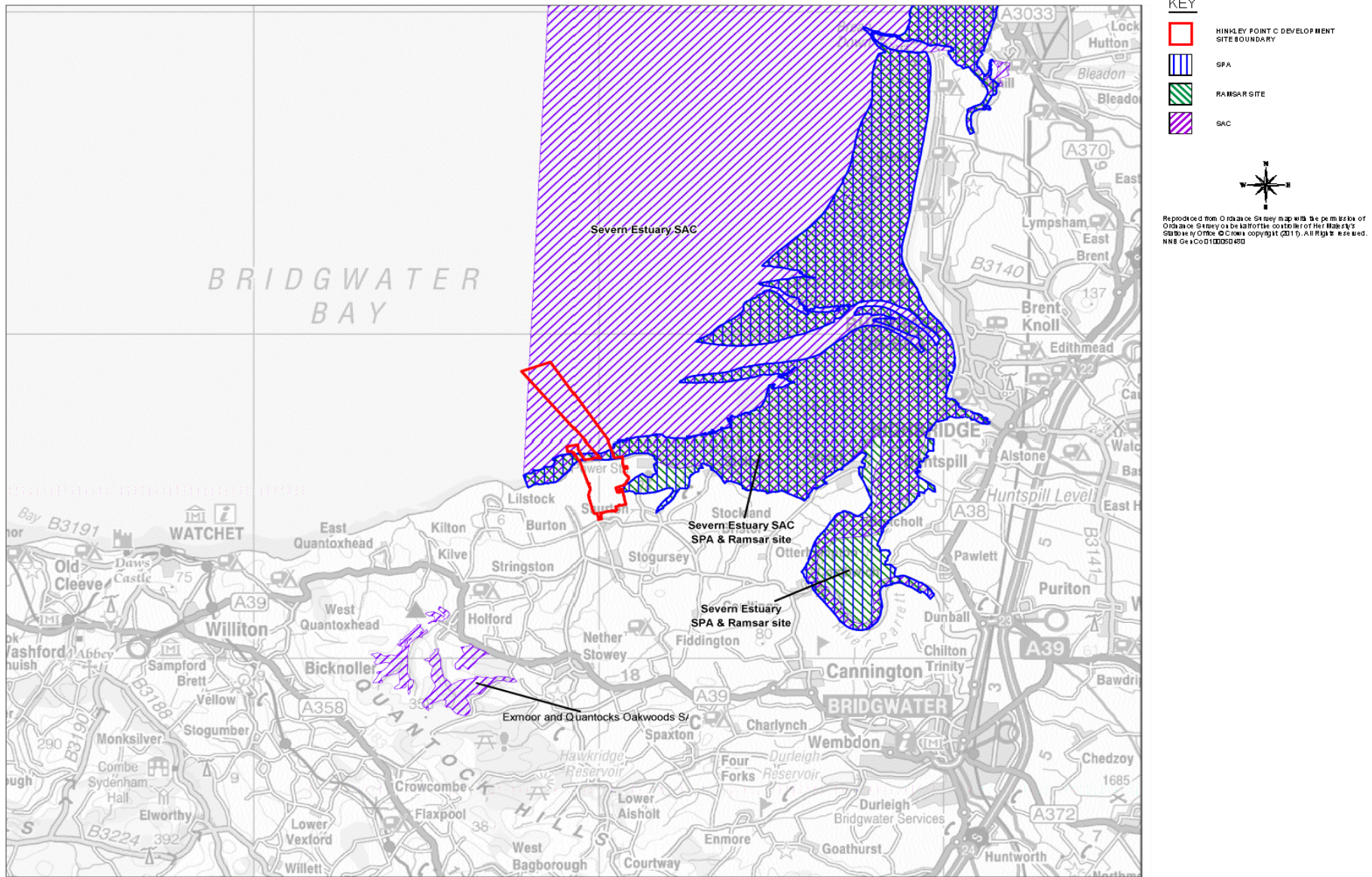
6.13 Terrestrial Ecology

- 6.13.1 The HPC development site and surrounds are characterised by a variety of habitats with potential for the presence of several species of plants, animals and birds, some of which have statutory protection. The assessment has considered what species are present to ensure the development of HPC does not adversely affect them.
- 6.13.2 Information about the wildlife that occurs on or in the vicinity of the proposed HPC development site was collected through desk studies and survey work carried out since 2007.
- 6.13.3 In ecological designation terms, the HPC site is located adjacent to the Severn Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site, and Bridgwater Bay SSSI (see **Figure 6.11**); part of this SSSI is designated as Bridgwater Bay National Nature Reserve. Further afield is the Quantocks SSSI, which forms part of the Exmoor and the Quantocks Oakwoods Special Area of Conservation. None of these statutory nature conservation sites are located within the HPC development site, although there is the potential for them to be indirectly affected by the proposed development.
- 6.13.4 One non-statutory site, Hinkley County Wildlife Site (CWS) is partly within the HPC site. The habitats within this CWS include calcareous grassland (i.e. grassland growing on lime-rich soils), woodland, hedgerows and watercourses. Outside of the CWS, the HPC site mainly comprises arable land and agriculturally improved grassland. There are also additional areas of woodland, together with hedgerows and watercourses. Amongst the wildlife that is supported by the habitats on the HPC site, there are a number of legally protected species, including badger, bats and reptiles.
- 6.13.5 The construction works and proposals for HPC, including the landscaping, have been designed with consideration to sensitive ecological features, and a wide range of measures have been identified to avoid or minimise potentially significant impacts on wildlife, as well as proposals to create extensive new areas of habitats and comply with protected species legislation. The latter includes proposals to create extensive areas of habitat that can be used by barbastelle bats, as well as other bat species and wildlife. Measures have already been implemented in relation to badgers and bat roosts.

a) Construction Phase Impacts and Mitigation

- 6.13.6 Taking account of the wildlife protective measures that form part of the proposed development, EDF Energy recognise that potentially significant impacts on wildlife could result from clearance of vegetation, noise and visual disturbance, lighting disturbance, hydrological changes and air quality changes.
- 6.13.7 The assessment of impacts during the construction phase concludes that the loss of part of the Hinkley CWS and of flower-rich calcareous grassland within the CWS, will be a significant impact. Other impacts on wildlife are likely to be at most, minor (for example, barbastelle bats), because the proposed habitat creation measures during the construction phase mean that only a minor impact is predicted. The same conclusion about impact applies to wintering and passage waterbirds using the Severn Estuary SPA, particularly due to their small numbers and infrequent occurrence alongside the HPC development site.

Figure 6.11: SSSI, SPA and SAC Designations



- 6.13.1 The landscaping proposals for the construction areas, once HPC is operational include an extensive programme of habitat creation work. The habitats to be created will include calcareous grassland, woodland and hedgerows, together with agricultural land. Over time, these habitats would provide an ecological benefit to the development site.

b) Operational Phase Impacts and Mitigation

- 6.13.2 Once the site has been restored, there will be monitoring and management control particularly with respect to selected species and habitats including breeding birds, butterflies, reptiles and bats, and hedgerows or grassland. This would be implemented through the Integrated Land Management Plan.

6.14 Radiological

- 6.14.1 The area surrounding the HPC site has been subject to monitoring and assessment for many years, primarily because of the presence of the existing nuclear power stations (HPA and HPB). EDF Energy has also undertaken surveys of sea water, fresh water, soils and groundwater. These showed no evidence of significant radiochemical contamination.

- 6.14.2 The survey results are consistent with those reported elsewhere including those measured by independent regulators. The low activity levels present do not present a hazard to human and non-human health, and they would not be of regulatory concern.

a) Construction Phase Impacts and Mitigation

- 6.14.3 The survey data indicate that the radiological risk to workers and members of the public during the construction phase of HPC is very low.

b) Operational Phase Impacts and Mitigation

- 6.14.4 The assessment considered the impacts of the discharges of radioactive gases and liquids from routine operation by identifying typical individuals who were representative of those receiving the highest radiation exposure as a result of the discharges and direct radiation. The design of the UK EPR is such that the direct radiation dose from the site is so small that it does not add measurably to their dose. The radiation dose received is well below the regulatory dose constraints and far below the statutory dose limit.

- 6.14.5 The assessment found that the predicted short-term dose, which accounts for the impact of large discharges made over shorter periods of time, is significantly less than that due to continuous long term releases and again, are significantly less than the relevant dose criteria.

- 6.14.6 Taking into account the discharges from the Hinkley Point power station complex (HPA, HPB and HPC), the combined impact on dose levels are calculated to be well below the regulatory dose constraint.

- 6.14.7 The radiological impact on non-human species was assessed using internationally recognised methodology. The radiological impact on non-human species for continuous discharges was found to be below relevant screening level and therefore the impacts are considered to be very low.
- 6.14.8 The facilities have been designed, and will be operated, applying Best Available Techniques (BAT) so as to minimise the discharges of gaseous and liquid effluents. EDF Energy will operate HPC in order to reduce and keep exposures from the release of radioactivity into the environment As Low As Reasonably Achievable (ALARA).
- 6.14.9 In summary, the assessment concluded that with good working practice and through the proposed design and operation standards of HPC, the levels of exposure from radioactive material are satisfactorily under regulatory thresholds. Protecting the environment and people from the potentially harmful effects of radioactive substances is a paramount priority for EDF Energy.

6.15 Landscape and Visual

- 6.15.1 The landscape and visual assessment has considered what the HPC development will look like from a range of locations and if there are adverse visual impacts (for example to local residents' views from their homes or changes to high quality scenery) and proposes mitigation to reduce these impacts.
- 6.15.2 The area which has been assessed for the landscape and visual impacts extends up to 25km from the HPC development site boundary and covers Exmoor National Park to the west, Quantock Hills and part of Mendip Hills AONB, and a southern part of the coastline of Wales. To establish the theoretical visibility of the scheme in the surrounding landscape, computer modelling was undertaken and a Zone of Theoretical Visibility was mapped.
- 6.15.3 For the landscape assessment, national, regional, local and detailed site scale character areas were identified and their characteristics were evaluated following desk studies, site visits and consultation. Site surveys provided detailed evaluation of the site scale landscape character and local landscape elements and features.
- 6.15.4 Visual impact receptors (such as residents or users of public rights of way) with a potential to be affected by the change in views were identified and representative photographs of typical views were taken. Examples are shown in **Figure 6.12**. To minimise construction impacts from the outset, the assessment informed the planning and design process for HPC and influenced the construction site layout, retention of landscape features within the site (especially around the site boundaries) and the creation of landscaped buffers between the construction works and the nearby settlements.

a) Construction Impacts and Mitigation

- 6.15.5 HPC construction would lead to a locally significant loss of landscape features. However, the most valuable landscape features within the site, including the locally prominent ridge of Green Lane and mature site boundary vegetation, would be mostly retained during construction. A temporary and significant adverse change in the local landscape and seascape character would occur.

- 6.15.6 Landscape proposals adjacent to the local settlements to the south of the HPC development site would be implemented in the first phase of construction to provide early screening and reduce adverse impacts on the local community. Temporary screening bunds along the north-western site boundary and off-site planting would also be implemented in the early stages of construction to provide additional screening of the construction works as soon as possible.

Figure 6.12: Viewpoints towards Hinkley Point C



View from the West Somerset Coast Path, Lilstock, Public Right of Way no. WL 24/10



View from Public Right of Way no WL24/8



View from Farrington Hill Lane

- 6.15.7 The construction plant and equipment, including a number of tower cranes and other temporary structures of significant size, would lead to changes in views and affect the character of the local landscape and seascape and have a temporary adverse visual impact on views.
- 6.15.8 The most significant temporary visual impacts would be on the residents of Shurton, Burton, Knighton, Wick and other local properties and also on users of other elevated areas of landscape, such as the north-eastern summits of the Quantock Hills AONB. The temporary screening bund would offer some screening for PRoW users to the west of the site during early phases of construction, and the early implementation of landscape proposals in the southern part of the site would reduce visual impacts on local residents.
- 6.15.9 The temporary visual impacts would decrease in the long distance (5km and above). They would be moderate adverse in the southern areas of the Quantock Hills AONB and along the Burnham-on-Sea to Brean Down coastline reducing to minor adverse in more distant areas, including Exmoor National Park, Mendip Hills AONB and the coastline of South Wales.

b) Operation Impacts and Mitigation

- 6.15.10 Once the HPC development is complete the majority of landscape and visual impacts would decrease due to the removal of construction plant, equipment and temporary buildings followed by the restoration of landscape. However some significant adverse impacts would remain in the local area due to the large scale of the completed HPC development which cannot be completely screened by the restored landform or vegetation, particularly when viewed from elevated areas.
- 6.15.11 The landscape impacts during operation are considered to be predominantly minor due to the landscape restoration proposals which would introduce a number of new and valuable landscape features within the site.
- 6.15.12 In the residential areas around the application site, due to the proximity of HPC, localised major visual impacts would remain and, similarly, for users of PRoW along the coastline adjacent to the site. Some of these impacts would slightly decrease in the long-term when the planting proposals, including off-site mitigation measures, mature.
- 6.15.13 The majority of permanent visual impacts on viewers within the Quantock Hills AONB would be minor adverse, however a localised area of moderate adverse visual impact would exist in the north-eastern part of this AONB due to its high elevation and the angle of view to the HPC site. The visual impacts on viewers located approximately 8km and beyond would not be significant.

6.16 Historic Environment

- 6.16.1 The assessment has determined the likelihood of historic artefacts and archaeological remains being present within the HPC development site, their importance and mitigation proposed for the loss of any features or their setting.
- 6.16.2 The assessment has identified the following features within the HPC development site boundary:

- a range of historic environment assets, dating from the Bronze Age (2,000-700BC) to the post-medieval period (AD1540 onwards);
- a number of surviving historic landscape features such as historic hedgerows, the remains of water meadows and traces of field enclosures pre-and post-dating the 17th century;
- a historic farm track, known as Green Lane, follows an east-west course along a prominent ridge likely pre-dating the 17th century and of medieval origin;
- three historic barn buildings (see **Figure 6.13**) which are not listed but are considered to be of local importance; and
- marine deposits (Holocene).

Figure 6.13: Historic Barn Buildings within the Hinkley Point C development site



- 6.16.3 Assessment was also undertaken to identify potential impacts on the settings of designated heritage assets (e.g. Scheduled Monuments, Listed Buildings or Conservation Areas) within a study area from the HPC development site boundary. The assessment identified 70 such assets but concluded that the HPC site does not form part of the setting of the majority of them.
- 6.16.4 Most of the identified historic environment assets within the site boundary are considered to be of local importance. Buried archaeological remains of Bronze Age, Iron Age Roman and medieval dates are considered to be of regional importance. The historic track way known as Green Lane has been attributed regional importance.

a) Construction Phase Impacts and Mitigation

- 6.16.5 Topsoil stripping and mechanical excavation in advance of construction will result in the removal of heritage assets, including buried archaeological remains, historic buildings and important hedgerows, within the site boundary.
- 6.16.6 Mitigation to limit the impact of removal will include set-piece excavation and archaeological investigation with recording of details in advance of construction, followed by an assessment and analysis leading to publication of the results in regional and national academic journals. The finds and records from the site would be archived in an appropriate museum and some displayed in EDF's Public Information Centre. A programme of public outreach, including schools visits and a published booklet describing the archaeology and history of the site would also be undertaken in conjunction with Somerset County Council Historic Environment Service.
- 6.16.7 Significant impacts to marine archaeological resource have been identified resulting from the construction of the temporary jetty. The combined footprint of the berthing pocket and piles for the jetty structure would remove less than 1% of the area of Holocene deposits identified during the offshore surveys. Although the installation of the structures would represent a permanent, small impact of low magnitude, the importance of the deposits is high. Therefore, EDF Energy has implemented a programme of further research and publication to ensure preservation by record of these Holocene deposits.
- 6.16.8 A small section of Green Lane, including the previously disturbed eastern section, will be removed to allow vehicular access during construction. However, the majority of Green Lane, including the double hedge boundary, will be retained and protected.

b) Operation Impacts and Mitigation

- 6.16.9 The HPC development will have a significant impact on the settings of certain designated heritage assets beyond the site boundary. These include a Scheduled Monument, Wick Barrow, also known as Pixies Mound, which is a prehistoric burial mound of Neolithic – Bronze Age date located to the east of the HPC site.
- 6.16.10 The settings of Fairfield House, a Grade II* Listed Building and its registered park and garden, located to the west of the HPC development site, and Court House, a Grade I Listed Building, located on the Quantock Hills, would also be affected. There would be less impact on the settings of Grade II Listed Buildings in Shurton and Burton and the Stogursey Conservation Area.
- 6.16.11 The Quantock Hills (10km to the west of the proposed HPC site) are the location of many prehistoric sites, in particular barrows and cairns that have been dated to the Bronze Age. Earthworks of an Iron Age hillfort and a Bronze Age bowl barrow are recorded on Dowsborough Hill. Although these sites are located at some distance from the HPC site it is considered that the development would have a significant impact on their settings.
- 6.16.12 Appropriate measures for the mitigation of impacts include screen planting and landscaping that has been designed to minimise visual impacts to the setting of Wick Barrow (Pixies Mound) and preserve important views from the barrow across Wick Moor to the south-east. The Monument Management Plan, which includes proposals

to restore and conserve the earthwork remains, will ensure the long-term preservation of the site and setting of the Scheduled Monument.

- 6.16.13 Landscaping and tree planting in the south and west of the HPC development site, together with mitigation measures designed to reduce noise, air quality, lighting and visual impacts, would minimise the impact on the settings of the Grade II Listed Buildings in Shurton and Burton, Stogursey Conservation Area, Fairfield House, and Court House.
- 6.16.14 The Scheduled Monuments on the Quantock Hills are at an elevation where it would be difficult to negate the visual impact to their setting. The HPC development site would not be fully screened, but the landscaping and planting mitigation would soften the visual impact.

6.17 Amenity and Recreation

- 6.17.1 Amenity and recreation receptors (e.g. Public Rights of Way, public open space, sports and recreation facilities) could be affected by the HPC development (changes to footpaths or loss of open land), for example by potentially detracting from their characteristics that give them the value for enjoyment in the first place. **Figure 6.14**, shows some of the PRow and other features such as common land around the HPC area.

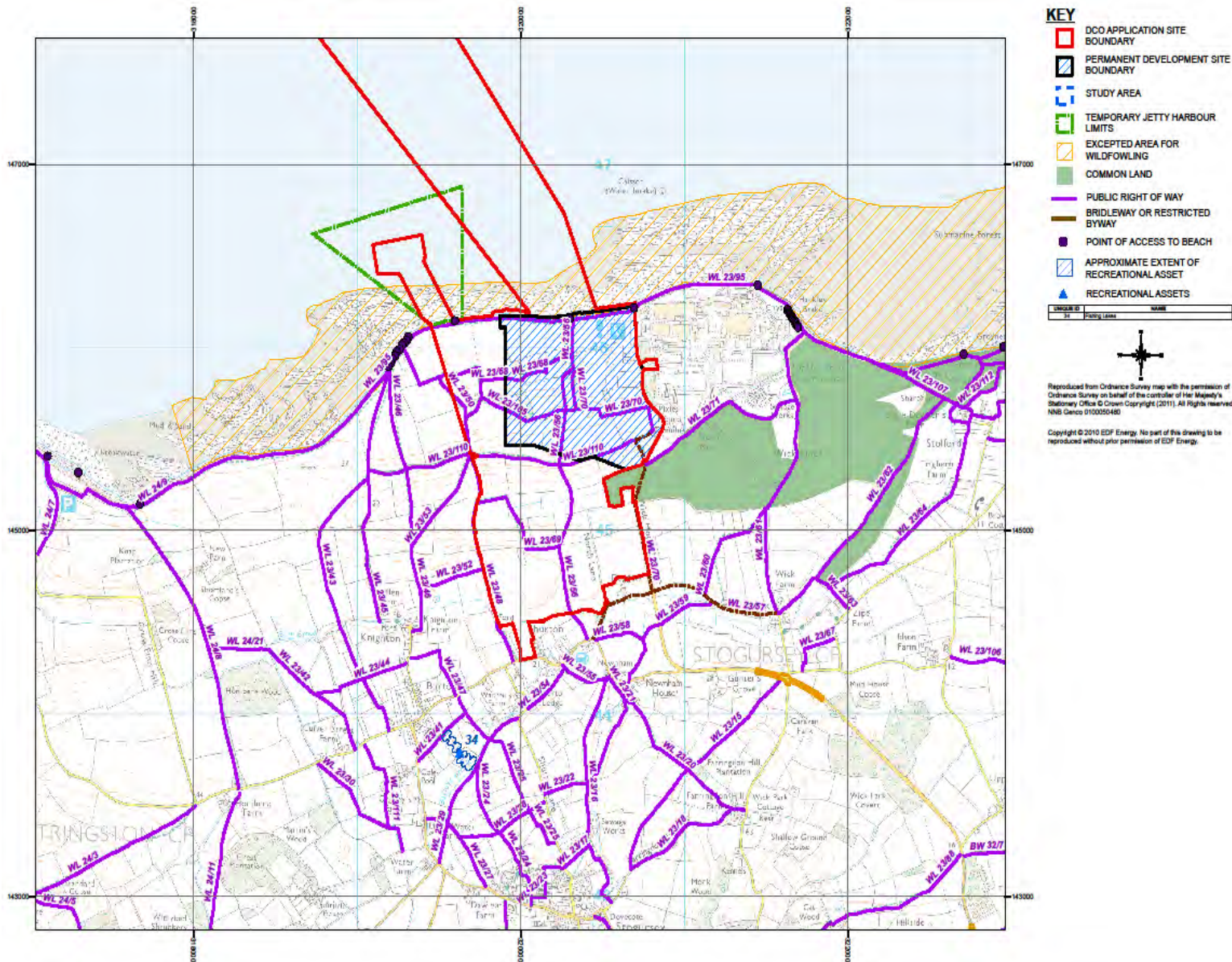
a) Construction Impacts and Mitigation

- 6.17.2 During construction, all PRow within the inner security fence (including the coastal edge) of the HPC site would be obstructed and public access would be prohibited where necessary for health and safety reasons during the construction works. Mitigation measures will be implemented through PRow diversions and alternative routes, wider network enhancements, and reinstatement of the South West Coast Path on completion of the construction of seawall. Furthermore, a 13 hectare area of amenity grassland would be available to the public along a strip between the site and Shurton. As a result, a low impact significance from construction is predicted.
- 6.17.3 No loss or physical disturbance would occur to the area of Common Land or sports and recreation facilities during construction of HPC. However, during construction of the temporary jetty and seawall, access to areas of the foreshore and offshore would be restricted.

b) Operational Impacts and Mitigation

- 6.17.4 During the operational phase all PRow within the built development site boundary would be permanently stopped up. This has been assessed to result in a moderate adverse impact for about 4.7km of the PRow. Mitigation measures to be implemented through PRow diversions and wider network enhancements would reduce the overall loss of PRow to 0.3km and along with the improvement to over 13.3km of PRow, a further 2.3km of permissive paths and bridleways would be created. In addition, the length of bridleways within the Parish of Stogursey would increase from 2.3km to 7.8km. Furthermore, in excess of 100 hectares of land within the HPC development site would be subject to permissive access, forming a nature reserve between the permanent built development site and Shurton. As a result, no significant impact is predicted.

Figure 6.14: Public Rights of Way and Other Amenity Features at HPC



- 6.17.5 No impacts were identified in relation to the obstruction (temporary or not) to PRow, sports and recreational facilities, open access land or public open space along the transport route or off-site highway works during the operational phase.
- 6.17.6 No loss or physical disturbance would occur to the areas of Common Land, sports and recreation facilities and the foreshore and associated uses during the operational phase. The presence of the cooling water infrastructure offshore from the site would leave small areas of the estuary excluded from recreational boating and sailing. However, the extremely small area excluded compared to the area available would result in no discernable impact.

6.18 Navigation

- 6.18.1 An assessment of the potential risks to vessels that use the navigable waters around Hinkley Point (including the River Parrett, Bridgwater Bay and the wider Bristol Channel) has been undertaken considering vessel movements associated with the temporary jetty, Combwich Wharf and the cooling water infrastructure. The assessment has considered the key maritime activities in relation to navigation, including commercial, military, fishing and recreational activities.
- 6.18.2 The risk assessment has been quantified with extensive consultation involving relevant harbour and port authorities, commercial and recreational users of the waters. Other consultations included discussion with the Ministry of Defence (MoD) in relation to defence activities in the area.

a) Construction Risks and Mitigation

- 6.18.3 Potential risks associated with the construction and dismantling of the temporary jetty and construction of the cooling water intake and outfall head structures, would be managed through the implementation of an exclusion zone and possible use of a small patrol vessel.
- 6.18.4 Dredging plant used to create the berthing pocket for the temporary jetty would be routed for disposal off-shore at Cardiff Grounds. Through marine safety and management systems and the issue of a notice to Mariners, the potential risks of passage to other vessels in the area are considered to be low.
- 6.18.5 Construction of the jetty and cooling water intake and outfall structures could cause interference with the Lilstock range firing area exercises and training. However, the implementation of a communications management plan between EDF Energy and the MoD would ensure that any potential for significant disruption in use of the range would be avoided.
- 6.18.6 Presence of construction plant in the water at Combwich Wharf has the potential to interfere with, and pose a hazard to, commercial traffic and recreational users of the River Parrett. During the works, a temporary exclusion zone may be required to safeguard the passing of vessels subject to sanction by the Port of Bridgwater.

b) Operational Risks and Mitigation

- 6.18.7 Presence of the jetty has the potential to interfere with marine activities, however with appropriate signage this risk is considered to be low for most shipping and only a moderate risk is posed to commercial vessels.

- 6.18.8 The jetty would be used by vessels to import materials for construction and their presence and movement could pose a risk to navigation. However the jetty would be marked with navigational lights and a management system would be implemented to ensure vessels berth during suitable weather conditions and tidal conditions, and use appropriate anchorages.
- 6.18.9 The risk for the jetty and cooling water intake/outfall operations to interfere with the Lilstock Range firing area activities is not considered to be significant as a communications management plan would be implemented with the MoD.
- 6.18.10 The presence and movement of maintenance vessels for the intake and outfall structures and similarly, Combwich Wharf vessels and its berth, would cause only minor periodic and short term interference and therefore present a low risk to the majority of marine activities. The risk to commercial vessels can be managed through:
- marking of structures and charted appropriately;
 - the use of an exclusion zones, port directives, public notices and notice to Mariners;
 - repositioning of anchorage areas and restricted access to recreational moorings during dredging operations; and
 - traffic supervision, use of tidal windows and passage planning and berthing procedures.
- 6.18.11 In summary, all potential risks can be managed through good practice, previously established methods and lines of communication between EDF Energy and relevant parties.

7. SUMMARY OF ENVIRONMENTAL IMPACTS – ASSOCIATED DEVELOPMENT

7.1.1 The following section summarises the key findings of the assessment which are presented in detail in **Volumes 3 to 10** of the ES for each of the eight associated developments. The summaries below describe the sites and relevant study areas, the likely environmental significant or relevant impacts resulting from the construction and operation and identify mitigation measures where appropriate.

7.1.2 All topics described in Section 2.2 where appropriate have been assessed for each proposed associated development site apart from marine environment which only applies to Combech. In some instances there are no significant impacts found, however some environmental topics have still been described if it was considered that they were of a particular interest or high relevance to the site and its surroundings.

7.2 Bridgwater A Accommodation Campus

7.2.1 The Bridgwater A site is currently a brownfield site with derelict industrial buildings (a former cellophane factory), located to the north of the A39 (Bath Road) and to the east of the Bridgwater to Highbridge (part of the main Bristol to Penzance railway line), see Figure 7.1. Most of this site is occupied by the factory complex, with a smaller area in the south managed as amenity land (sports grounds and associated buildings). Part of the complex is currently being demolished. The development proposals include the demolition of existing buildings and infrastructure and the construction of an accommodation campus for workers associated with the construction of the HPC Project.

7.2.2 Following the completion of the construction of the HPC power station, the Bridgwater A accommodation campus would cease to be operational for EDF Energy's purposes.

7.2.3 Due to the brownfield nature of the site, as well as the built form proposed, no significant impacts would arise in relation to soils and land use, historic environment or ecology.

7.2.4 The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Socio-economic

7.2.5 The main socio-economic impacts of the accommodation campuses in Bridgwater would be the creation of employment opportunities. For the Bridgwater A campus, this would be particularly for the construction and post-operational phases of the development along with the wider opportunities as part of the HPC construction programme. Additionally, the use of the accommodation campus would introduce for a long, but temporary period, a new population of construction workers in the town, who would provide benefits for local businesses through expenditure in shops and services.

Figure 7.1: Bridgwater A Accommodation Campuses



7.2.6 Some potential impacts of the accommodation campus occupants are difficult to assess quantitatively including the perceived effects on community cohesion. Therefore EDF Energy has identified a programme of mitigation through its Community Safety Management Plan (an annex to the ES) which includes the appointment of a Community Liaison Officer, a Worker Code of Conduct, and contributions to local public authorities to manage the potential impacts of the workforce. Through its Construction Workforce Development Strategy and outreach activities, EDF Energy will seek to maximise recruitment of Bridgwater residents to minimise any perceived divides between the workforce and the community.

7.2.7 At present the Bridgwater A site contains the Bridgwater Sports and Social Club with ancillary facilities including pitches for cricket, bowls and football. As part of the Site Preparation Works Planning Agreement, EDF Energy has committed funding to provide additional sports facilities in Bridgwater to mitigate the loss of sports and leisure facilities.

b) Noise and Vibration

7.2.8 Noise from short-term earthworks during construction would be mitigated by using construction hoardings and best construction practice to screen the on-site activities to ensure no significant impacts occur. Potential vibration would be managed

through using best practice techniques and maintaining good communication with local residents to reduce the potential for disturbance.

- 7.2.9 During the operational phase, neighbouring properties would not experience significant noise impacts. However, given the scale of the site and its proximity to residential dwellings, EDF Energy would ensure users of the site are actively managed to keep noise to a minimum.

c) Air Quality

- 7.2.10 An assessment of potential impacts from exhaust emissions (long-term and short-term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013 and 2016.
- 7.2.11 Measures to reduce emissions to air would be provided in the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby houses would then be mitigated by careful dust management measures and the application of standard good practice. With these dust control measures implemented, potential fugitive dust and particulate impacts on human receptors are considered to be of a low significance.
- 7.2.12 Predicted future pollutant concentrations at on-site receptors (campus accommodation) are below the relevant air quality objectives (set by Government) and potential air quality impacts at these locations have been assessed to be not significant. The Bridgwater A accommodation campus site is therefore considered appropriate, in air quality terms, for use by the on-site workers during the site's operation.
- 7.2.13 Vehicular emissions of pollutants associated with traffic generated by the HPC Project during operation of the Bridgwater A site are not significant. The Freight Management Strategy and Framework Travel Plan would be implemented to minimise vehicular movements, and ensure the use of vehicles compliant with emissions standards. All other operational emissions and air quality impacts are considered to be not significant.

d) Geology, Land Contamination and Groundwater

- 7.2.14 Due to access constraints, intrusive investigations have not been undertaken on the site by EDF Energy. However, results from previous investigations in support of a separate planning application indicate the majority of the concentrations of contaminants do not pose a significant risk to human health, ecology, plants, soils, built environment and/or groundwater or surface waters. Samples were also submitted for leachability testing, with some samples exceeding relevant water quality screening criteria.

- 7.2.15 Samples of groundwater from the site contained marginally elevated concentrations of some metal, metalloid and hydrocarbon contaminants slightly above the respective screening criteria. There were elevated concentrations of hazardous ground gases in some locations (e.g. methane and carbon dioxide), however flow rates were typically low, and it is possible that these may be the result of interference from other volatile hydrocarbons.
- 7.2.16 Development of the site would include remediation of localised areas of contamination, as necessary, which would also make it suitable for future use once the accommodation campus has been removed.
- 7.2.17 Given the site's industrial use, the risk of contamination on the site is currently considered to be very likely, but would be reduced and controlled by the remediation works and design and management measures which would minimise the risk of exposure to contamination during the construction, operational and post-operational phases.

e) Surface Water

- 7.2.18 Potential impacts upon water quality during the construction phase would be associated with any potential contaminated or sediment laden run-off from the site. Run-off would be controlled by good construction practice and pollution prevention measures. Site drainage and pollution prevention would be achieved through implementation of the Water Management Plan.
- 7.2.19 A drainage strategy would manage potential surface water and foul water discharges from the site using sustainable drainage systems (SuDS) measures to control discharge rates to greenfield run-off rates. All foul water discharges would be made to a combined sewer.

f) Landscape and Visual

- 7.2.20 During the construction of the accommodation campus, removal of perimeter vegetation would allow clear views into the site from receptors along the A39 (Bath Road). A landscape scheme would be implemented at the end of the construction phase which includes substantial, fast-growing, tree and shrub planting to the east, west and southern perimeters to screen views of the proposed development from publicly accessible areas.
- 7.2.21 New highway lighting, 24-hour security lighting and internal lighting associated with the accommodation campus would be directly visible from some publicly accessible areas. However, to minimise impacts, the lighting would be designed to avoid unnecessary light spillage and would be directed away from sensitive areas, as far as practicable. In addition, the proposed perimeter trees and shrubs should mitigate much of this impact.
- 7.2.22 Perimeter planting would be retained after the operational phase to help screen any removal activities and potentially any future use of the site.

g) Amenity and Recreation

- 7.2.23 There are no Public Rights of Way (PRoW), open access land or public open spaces within or immediately adjacent to the site. Construction of the proposed development site would result in the loss of the Bridgwater Sports and Social Club. However, the funding by EDF Energy as referenced above would enable the replacement of these facilities elsewhere in the Bridgwater area.
- 7.2.24 No impacts were identified in relation to the obstruction (temporary or not) to PRoW, sports and recreation facilities, open access land or public open space during the operational or post-operational phases of the proposed development. The accommodation campus would provide a full-sized outdoor football pitch and two all-weather outdoor 5-a-side football pitches that would be made available to the public during EDF Energy's occupation of the accommodation campus. This would be a positive impact of the development.

7.3 Bridgwater C Accommodation Campus

- 7.3.1 The site is a former landfill which has been redeveloped as amenity land used by Bridgwater and Albion Rugby Football Club and is locally designated as Recreational Open Space (see **Figure 7.2**). The development proposals include the construction of an accommodation campus for workers associated with the construction of the HPC Project. Once the HPC power station is complete the proposed development would be transferred to a third party and used in connection with Bridgwater College.
- 7.3.2 Due to the urban and previously developed nature of the site, as well as the built form proposed, no significant impacts would arise in relation to soils and land use, the historic environment or ecology. The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Socio-economic

- 7.3.3 The main socio-economic impacts of the accommodation campus provision in Bridgwater would be the creation of employment opportunities. For the Bridgwater C accommodation campus, this will be for the construction phase of the development along with the wider opportunities as part of the HPC construction programme. The use of the accommodation campus would introduce for a long, but temporary period, a new population of construction workers in the town, who would provide benefits for local businesses through expenditure in shops and services. In the longer term, it is anticipated that the proposed development would be retained to facilitate future use by Bridgwater College.
- 7.3.4 Some potential impacts of the accommodation campus occupants are difficult to assess quantitatively, including their perceived effects on community cohesion so EDF Energy has identified a programme of mitigation through its Community Safety Management Plan (an Annex to the ES) which includes the appointment of a Community Liaison Officer, a Worker Code of Conduct and contributions to local public authorities, to manage the potential impacts of the workforce. Through its Construction Workforce Development Strategy and outreach activities EDF Energy will seek to maximise the recruitment of Bridgwater residents to minimise any perceived divides between the workforce and the community.

b) Noise and Vibration

- 7.3.5 Noise from short-term earthworks during construction would be mitigated by using construction hoardings to screen the on-site activities to ensure no significant impacts occur. Noise and vibration would be moderately adverse but short-term.
- 7.3.6 During the operational phase, noise levels would not exceed background levels and so neighbouring properties would not experience significant noise impacts. Nonetheless, EDF Energy would ensure users of the site are actively managed to keep noise to a minimum.

c) Air Quality

- 7.3.7 An assessment of potential impacts from exhaust emissions (long-term and short-term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013 and 2016.
- 7.3.8 Measures to reduce emissions to air would be provided in accordance with the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby houses would then be mitigated by careful dust management measures and the application of standard good practice. With these dust control measures implemented, potential fugitive dust and particulate impacts on human receptors are considered to not be significant.
- 7.3.9 Predicted future pollutant concentrations at on-site receptors (campus accommodation) are below the relevant air quality objectives (set by Government) and potential air quality impacts at these locations have been assessed to be not significant. The Bridgwater C accommodation campus is therefore considered appropriate, in air quality terms, for residential use by the on-site workers during the site's operation.
- 7.3.10 Vehicular emissions of pollutants associated with traffic generated by the HPC Project during operation of the Bridgwater C site are not significant. The Freight Management Strategy and Framework Travel Plan would be implemented to minimise vehicular movements, and encourage use of vehicles compliant with emissions standards. All other operational emissions and air quality impacts are considered to be not significant.

Figure 7.2: Bridgwater C Accommodation Campus



- 7.3.11 Samples of groundwater/leachate from the site contained elevated concentrations of some contaminants above respective screening criteria. However these samples were indicative of relatively low contaminant concentrations considering the historical use of the site as a landfill.
- 7.3.12 Ground gas monitoring recorded slightly elevated concentrations of hazardous ground gases (methane and carbon dioxide) but this risk is currently assessed as low. Overall it is concluded that potential impacts on geology or groundwater from land contamination during the construction and operation of the accommodation campus would not have a significant adverse impact.

d) Surface Water

- 7.3.13 Potential impacts upon water quality during the construction phase would be associated with any potential contaminated or sediment laden run-off from the site. Run-off would be controlled by good construction practice and pollution prevention measures. A drainage strategy would manage potential surface water and foul water discharges from the development site using Sustainable Drainage Systems (SuDS) measures to control discharge rates to greenfield run-off rates. Potential impacts to surface waters from construction and operation of this site have been assessed to have a low significance.
- 7.3.14 In agreement with Wessex Water, surface and foul waters would ultimately be discharged to a combined sewer adjacent to the site as part of a new permanent drainage system. A site drainage strategy and pollution prevention controls would be achieved through the implementation of the Water Management Plan.

e) Landscape and Visual

- 7.3.15 Construction of the accommodation campus would result in a temporary loss of a training pitch for Bridgwater and Albion Rugby Football Club, which is designated recreational open space. However the Club is progressing with plans for a replacement facility elsewhere in Bridgwater.
- 7.3.16 Construction activities would be visible from the backs of residential properties along Fairfax Road and the remaining facilities at the Bridgwater and Albion Rugby Football Club and Bridgwater College. A landscape scheme would be implemented at the end of the construction phase which would include substantial, fast-growing, tree and shrub planting to the southern, eastern and western boundaries to screen views.

f) Amenity and Recreation

- 7.3.17 There are no PRoW, open access land or public open spaces within or immediately adjacent to the site. Bridgwater and Albion Rugby Football Club's training pitch is located within the site but is not available to the general public.
- 7.3.18 The construction of the proposed development would result in the loss of one pitch owned and used by Bridgwater and Albion Rugby Football Club. However the Club propose to replace this facility elsewhere in Bridgwater. It has been assumed that this provision is made before the end of the construction phase of the proposed development.

- 7.3.19 The accommodation campus would also provide an all-weather outdoor 5-a-side football pitch that would be made available to the public until the Bridgwater A pitches become available.

7.4 Cannington Bypass

- 7.4.1 The proposed Cannington bypass would be located to the west of the village, within predominately agricultural land (see **Figure 7.3**). The purpose of the bypass is to route construction and operational traffic to the HPC site around Cannington instead of through the village. The route rises with the undulating landform, from the south and low ground at the junction with the A39 to higher ground at Chad's Hill. It cuts through the top of Chad's Hill in a cutting before dropping to lower ground at Rodway, where it joins the C182 Rodway. The bypass would remain as a permanent road, but much of the land included within the site boundary is required only temporarily during construction and would be restored on completion of the bypass to agricultural use.
- 7.4.2 Prior to completion of the Cannington bypass HGVs will pass along Cannington High Street. Construction of the bypass in 2013 would proceed from both the south and north ends meaning that construction traffic will need to access these points on the existing road network through the village. However this method will spread the load and ensure the quickest construction is possible and will only entail approximately 20 vehicles per day. Once completed, the bypass will provide substantial long-term benefits to the village reducing both HPC and non-HPC traffic through Cannington.
- 7.4.3 No significant impacts would arise in relation to soils and land use or socio-economics. The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Transport

- 7.4.4 No significant impacts on traffic and pedestrians have been identified from the construction of the bypass.
- 7.4.5 Significant beneficial impacts would occur during the operation of the bypass, due to the improvements it would deliver to Cannington, particularly for pedestrians. There would also be similar benefits along Cannington Main Road and the C182 (Rodway).
- 7.4.6 Whilst the operation of the bypass would cause pedestrian severance between the village and Brymore School, the assessment concluded this is a low amount of pedestrian activity and is outweighed by the wider benefits stated above within Cannington.

b) Noise and Vibration

- 7.4.7 During construction the nearest residential properties and users of the public footpaths close to the route would experience significant noise; however the exposure time period would be very limited (e.g. strictly controlled working hours and a short duration of construction) and screening to residential areas in Cannington would be provided by earth bunds with planting.

- 7.4.8 Vibration generated by road construction works may occasionally be perceptible inside dwellings close to earthworks and road construction activities, but it is unlikely that the levels would be sufficient to cause any damage to buildings. As far as practicable, the implementation of best practice techniques and good communication with those affected would reduce the potential for disturbance.
- 7.4.9 During peak construction of the HPC development, the assessment determined that significant daily road traffic noise impacts would occur at the closest residential properties adjacent to the bypass route. However, net beneficial impacts would occur within Cannington village as a result of HPC construction traffic and other vehicles using the bypass instead of local roads. During night-time shift changes for construction workers on the HPC development, significant impacts are predicted in the early morning and late evening on the proposed bypass and the routes north and south of Cannington. EDF Energy has committed to a voluntary Noise Insulation Scheme which would allow eligible residential property owners along affected highways to apply for either secondary glazing or new double-glazing.
- 7.4.10 Following the completion of the HPC development, net beneficial impacts would remain in Cannington village as the bypass would be a permanent development. The significance of increases in daily road traffic noise for those residential properties close to the bypass route would be reduced. No significant late evening or early morning noise impacts are predicted once HPC is operational.

c) Air Quality

- 7.4.11 An assessment of potential impacts from exhaust emissions (long and short term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013, 2016 and 2021.
- 7.4.12 During construction, measures to reduce emissions to air would be provided in accordance with the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby houses would then be mitigated by careful dust management measures and the application of standard good practice.
- 7.4.13 The effect on local air quality of the operation of the proposed Cannington bypass would be an increase in emissions from the exhausts of vehicles accessing it. Peak traffic levels would occur during the construction phase of the HPC development. The nearest sensitive receptor locations comprise residential dwellings and schools/colleges in and around Cannington. Traffic related air emissions during both construction and operation of the bypass have been assessed to not be significant.

Figure 7.3: Cannington Bypass



d) Geology, Land Contamination and Groundwater

- 7.4.14 Desk-based and intrusive investigations have been conducted to determine the baseline geological, land contamination and groundwater status of the site and the surrounding area. Whilst there is Made Ground comprising reworked topsoil and clay with some brick and tile in the south-western and central northern parts of the route, no evidence of significant contamination was found in any location.
- 7.4.15 Results from soil samples collected during the intrusive investigations demonstrate that the majority of the samples contained concentrations of contaminants that do not pose a significant risk to human health, ecology, plants, soils, built environment, groundwater or surface waters. Soil leachate tests had slightly elevated concentrations of some heavy metals (e.g. copper, lead and zinc). One sample had a significantly elevated concentration of leachable lead; however this did not affect groundwater samples which showed no elevated lead levels. Slightly elevated concentrations of some heavy metals were recorded in some of the groundwater samples, however, these are not considered to be significant.
- 7.4.16 Impacts on geology, groundwater or from land contamination during the construction and operational phases would not be significant.

e) Surface Water

- 7.4.17 The design of the proposed bypass includes a site drainage strategy and pollution prevention techniques which would be implemented through standard good practice and the Water and Sediment Management Plan. The drainage strategy has been designed to ensure that potential surface water discharges from the development site would be managed effectively. This includes the use of Sustainable Drainage Systems (SuDS) methods to attenuate surface water discharges. The height and vertical alignment of the bypass have also been designed so as to reduce any flood risk. Potential impacts upon water quality associated with sediment laden run-off, contaminated run-off, hydrology and drainage and increased flood risk have been assessed as having a low significance.

f) Terrestrial Ecology

- 7.4.18 The site is not subject to any wildlife designations but is characterised by agricultural fields, hedgerows, mature trees, watercourses and a pond which support a range of wildlife, including protected species (e.g. bats, otters and great crested newts).
- 7.4.19 A range of measures that would avoid or minimise potentially significant impacts on wildlife have been incorporated into the design, such as: retaining the on-site pond and surrounding vegetation and providing a series of wildlife underpasses to allow animals to safely cross the bypass route. Specific measures have also been included to ensure compliance with protected species legislation including otter 'ledges' as part of culvert design and bat crossing points to maintain existing flyways or commuting routes.

- 7.4.20 Development would result in some hedgerow loss and disturbance to wildlife, which is generally assessed as being of minor adverse impact, other than on the barbastelle bat. Potential impacts on this protected species during the construction and operational phases would be mitigated by the use of temporary and permanent planting and crossing points to maintain habitat connectivity across the route. As a result of extensive habitat creation associated with the scheme, there would be minor beneficial impacts on biodiversity over time.

g) Landscape and Visual

- 7.4.21 The bypass would impact on the landscape due to the change of land use and break in landscape connectivity (particularly associated with the requirement to cut through Brymore Avenue with some loss of trees). The road would be visible from the edge of Cannington and local PRow, roads and nearby properties. Lighting has been kept to the minimum requirements for safety (e.g. at junctions but other stretches will be unlit) but would have an impact from the lighting columns and lighting at the junctions at either end of the proposed development.
- 7.4.22 Landscape and visual impacts would mainly occur during the construction phase, when existing vegetation is removed and ground preparation works take place. Such impacts would be mitigated through a landscape strategy including the creation of a vegetated acoustic bund adjacent to the eastern side of the carriageway as it rises up towards the top of Chad's Hill. This would help screen the road from views from the edge of Cannington. Elsewhere the highway boundary would be planted with a hedge with trees and additional planting to provide screening from more sensitive visual receptors. The planting aims to link the proposed development to the surrounding landscape character and enhance visual connectivity across the route. Planting of new trees would also aim to quickly restore the canopy along Brymore Avenue. The landscape character around the site would also benefit from ecological mitigation proposals enhancing wetland habitats and adding visual diversity. Over time, this planting would mature to provide more significant visual screening and integration with the landscape.

h) Historic Environment

- 7.4.23 Three archaeological sites dating from the Bronze Age (2,000-700BC) to the medieval period (AD1066 to AD1540) have been identified within the site boundary. These archaeological sites include an early to middle Bronze Age ditched enclosure, pottery, evidence of Romano-British settlement, and the remains of a cobbled trackway or road. Medieval pottery dating from the 11th-14th Century was recovered from the soil layers above the cobbles, although the cobbled road surface could pre-date this.
- 7.4.24 The route of the proposed bypass crosses Brymore 'ride', a tree-lined avenue leading to Brymore House (now Brymore School), a Grade II Listed post-medieval house with a 15th Century porch, and the former landscaped park, which originally surrounded Brymore House and is now used as arable farmland. The ride is not listed and the former parkland is not a Registered Historic Park.
- 7.4.25 Construction of the proposed bypass would result in the removal of buried archaeological remains and part of the tree-lined avenue leading to Brymore House.

- 7.4.26 The bypass route passes to the south-east of the Iron Age hillfort Cynwit Castle, also known as Cannington Camp, and associated Iron Age-Roman earthworks on the hill slope; both are Scheduled Monuments and there would be an impact on their setting.
- 7.4.27 Appropriate mitigation will include woodland planting and scattered trees planted along the edge of the carriageway would screen the proposed bypass and reduce visual impacts to heritage assets and their setting. For potential buried archaeology, appropriate mitigation would be provided through preservation by record, in accordance with published planning guidance

i) Amenity and Recreation

- 7.4.28 There are no sports and recreational facilities, open access land or public open spaces within or immediately adjacent to the site. One PRoW runs through the site, and another lies close to the site.
- 7.4.29 There would be no impacts on sports and recreation facilities, open access land or public open space during the operational phase of the bypass. The bypass would permanently bisect a PRoW however it would be diverted to allow continued access during the construction and a permanent diversion during operation of the bypass would add a new 40m of PRoW to the area.

7.5 Cannington Park and Ride Facility

- 7.5.1 The proposed park and ride facility at Cannington is located between the south of the village and the A39, within an agricultural field surrounded by agricultural land and hedgerows with trees, see **Figure 7.4**. The site would be operational for approximately eight years after which it would be restored to its original agricultural use. The purpose of the facility is to reduce traffic in the vicinity of the HPC site during the construction period.
- 7.5.2 Due to the rural nature of the site and the built form proposed, no significant impacts would arise in relation to soils and land use or amenity and recreation. The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Noise and Vibration

- 7.5.3 No significant noise or vibration impacts on residential properties are predicted during either construction or restoration of the site. Users of the public footpaths within and close to the site would experience higher noise levels during these works, however the period of significant noise exposure would be very limited.
- 7.5.4 During operation of the park and ride facility it has been assessed that the noise impact of car door slams during night-time HPC construction-shift changes would not result in unacceptable disturbance at the nearest residential dwellings. EDF Energy would ensure users of the site are actively managed to keep noise to a minimum. Public footpaths within the site would not generally be used during the night-time and therefore there would be no noise impact on footpath users during operation.

Figure 7.4: Cannington Park and Ride Facility



b) Air Quality

- 7.5.5 An assessment of potential impacts from exhaust emissions (long and short term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013 and 2016.
- 7.5.6 Measures to reduce emissions to air would be provided in accordance with the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby houses would then be mitigated by careful dust management measures and the application of standard good practice. With these dust control measures implemented, potential fugitive dust and particulate impacts on human receptors have been assessed to have a low significance of impact.
- 7.5.7 Vehicular emissions of pollutants associated with traffic generated by the HPC Project during operation of the Cannington park and ride facility are not significant. The Freight Management Strategy and Framework Travel Plan would be implemented to minimise vehicular movements, and use of vehicles compliant with emissions standards. All other operational emissions and air quality impacts are considered to be not significant.

c) Geology, Land Contamination and Groundwater

- 7.5.8 Desk-based and intrusive investigations have been conducted to determine the baseline geological, land contamination and groundwater status of the site and the surrounding area. The geology on the site consists of superficial clays and gravels overlying mudstone. No Made Ground was found on the site. There are four general use groundwater abstractions within the study area but these are over 500m from the site.
- 7.5.9 The results of soil and groundwater analyses show that the site presents no significant risk to human health, ecology, plants, soils, built environment and/or groundwater or surface waters. There would be no significant adverse impacts on geology, groundwater or from land contamination during the construction, operation and post operation phases of the Cannington park and ride facility.

d) Surface Water

- 7.5.10 A drainage strategy has been designed to ensure that potential surface water and foul water discharges from the development site are managed effectively at greenfield rates. This includes the use of SuDS methods to manage and control surface water discharges. Foul water would be managed using a small on-site treatment plant which would discharge to the surface water drainage system under the conditions of an Environmental Permit. The height of the site has been designed so as to reduce flood risk.
- 7.5.11 A site drainage strategy and pollution prevention techniques would be implemented through standard good practice, appropriate design and the Water Management Plan. Potential impacts upon water quality associated with sediment laden run-off,

contaminated run-off, hydrology and drainage and increased flood risk have been assessed as to not be significant.

e) Terrestrial Ecology

- 7.5.12 Information about the wildlife that occurs within the site has informed the design of the proposed development. This includes a range of measures that would avoid or minimise potentially significant impacts on wildlife, such as grassland habitat creation and new hedgerow planting. Specific measures have been included to ensure compliance with protected species legislation including careful timing of vegetation removal (where required) to avoid disturbance to breeding birds, a badger underpass under the internal access road, and a lighting strategy designed to minimise light spill and the possible impacts on bats.
- 7.5.13 Development at this site would result in some hedgerow loss and disturbance to wildlife, which is assessed as being of a low impact. As a result of additional hedgerow and tree planting associated with the scheme, there would be minor benefits to wildlife over the longer-term.

f) Landscape and Visual

- 7.5.14 The proposed development would change the local landscape by adding built elements including roads, small buildings, lighting and CCTV columns and security fencing and additional vehicle movements. Small changes in ground level would be required including a soil bund and water retention pond. The site would also need to be lit at night but it is well screened from the wider landscape by the village of Cannington to the north and east and by strong screen planting to the south adjacent to the A39.
- 7.5.15 The development site is located within existing field boundaries to retain the historic field pattern and landscape character. The hedgerows and trees around the site would all be retained, apart from some loss of planting to create the access to the A39. The proposed development would be visible from receptors close to the site and would have an impact on the local landscape character. To assist with screening of the site, prior to the start of the construction phase, boundary hedgerows would be allowed to grow higher and the hedgerow to the east of the site would be widened with additional tree planting of fast growing species.
- 7.5.16 The proposed development has been designed to keep the height of any built elements to a minimum and landscape and visual impacts would be confined to a small area immediately around the site, primarily associated with the change in use, the higher elements such as the lighting columns and the movement of large vehicles and buses on site. This impact would reduce during the course of the operational phase as planting proposals become established. The lighting requirements would create a night time glow over the site, which would be seen in the context of other lighting in and around Cannington.
- 7.5.17 The soil bund to the west of the site would provide visual screening. New planting of fast growing species would provide visual screening from residential visual receptors and public footpath users to the north and east of the site. After removal and restoration the site would be returned to its existing agricultural use with improved hedgerows and more hedgerow trees.

g) Historic Environment

7.5.18 Desk-based assessment, geophysical survey and subsequent trial trenching have confirmed that there are no archaeological remains within the site boundary. Construction and operation of the park and ride facility may result in temporary impacts from lighting and noise of a very low magnitude on the settings of designated historic environment assets beyond the site boundary including Cannington Conservation Area. The overall residual impact on the settings of designated historic environment assets outside the proposed site boundary would not be significant.

7.6 Combwich Wharf Refurbishment and Extension and Freight Laydown Facility

7.6.1 The Combwich Wharf development comprises refurbishment and extension of the existing wharf so that it can receive large, difficult to manage items or 'Abnormal Indivisible Loads' (AILs) on an infrequent basis from vessels using the River Parrett, see **Figure 7.5**. The freight laydown facility area will enable consolidation of road borne construction goods and materials and AILs. The village and harbour of Combwich have a long history of use for the import and export of goods. The existing wharf (to be modified) was used to support the construction of HPA and HPB. The proposed site for the freight laydown facility is located on agricultural land.

7.6.2 The area to the north of the site, which is now a fishing lake, was until the early 20th century a brickworks with large brick pits, potteries and furnaces. The wharf area also includes Combwich Laboratory, Combwich Motor Boat and Sailing Club (CMBSC), an electricity sub-station, communications mast and Combwich Sewage Treatment Works.

7.6.3 On completion of the construction of HPC, the freight laydown area would be restored to its original agricultural use, while the wharf would remain as a working facility for use by National Grid and EDF Energy.

7.6.4 The nature of the proposed development and its location are such that no significant impacts would arise in relation to soils and land use and few significant impacts for ecology. The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Noise and Vibration

7.6.5 Short-term and intermittent wharf refurbishment works, barge movements (day and night), unloading activities, and HGV movements would have adverse noise impacts at the nearest residential properties, the CMBSC and to users of the public footpath close to the Combwich Wharf access road. The proposed development incorporates an acoustic barrier fence to the west of the wharf to reduce potential noise impacts to some properties on Riverside, Harbour Court and Estuary Park. Potential vibration impacts may occur during piling operations, and the potential for disturbance would be managed as far as practicable through the application of best practice techniques and good communication with those affected.

7.6.6 In recognition of these impacts EDF Energy has committed to a voluntary Noise Insulation Scheme for those residential properties closest to Combwich Wharf.

Figure 7.5: Combwich Wharf Refurbishment and Extension and Freight Laydown Facility



- 7.6.7 Whilst piling would be required to provide a surface that is sufficiently stable to support very heavy loads, construction of the freight laydown facility would not result in significant noise or vibration effects at neighbouring residential or recreational receptors.
- 7.6.8 Freight storage activities at the laydown area could result in short-term adverse noise impacts at the nearest residential dwellings on Estuary Park which would be reduced in part by introducing a noise barrier (earth bund) along the north-western boundary of the freight laydown facility.

b) Air Quality

- 7.6.9 An assessment of potential impacts from exhaust emissions (long and short term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013 and 2016.
- 7.6.10 The potential for fugitive dust and particulate impacts at nearby ecological receptors (Bridgwater Bay Site of Special Scientific Interest/National Nature Reserve and the Severn Estuary Special Protection Area/Special Area of Conservation and Ramsar site) has been assessed. Given the near location of the ecological receptors there is the potential for a range of prevailing wind directions to carry fugitive dust and particulates (PM₁₀) generated by the construction works to these designated sites.
- 7.6.11 The assessment has concluded that vehicular emissions of pollutants associated with traffic generated by the HPC Project during the construction and operation of the Combwich site are not significant. The Framework Travel Plan would be implemented to minimise vehicular movements, and ensure the use of vehicles compliant with emissions standards. The assessment also concluded that the potential impacts of emissions from the operation of marine vessels on both human health receptors and ecological receptors are not significant. All other operational emissions and air quality impacts are not considered to be significant.
- 7.6.12 Measures to reduce emissions to air would be provided in the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and the use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby human and ecological receptors would be mitigated by careful dust management measures and the application of standard good practice.

c) Geology, Land Contamination and Groundwater

- 7.6.13 Desk based and intrusive investigations have been conducted to determine the baseline geological, land contamination and groundwater status of the site and the surrounding area. Made Ground is present across the entire wharf area and part of the proposed freight laydown area, overlying Tidal Flat deposits which in turn overlie the limestone and mudstone (Blue Lias) Formation.

- 7.6.14 Soil analyses from the intrusive investigations showed that none of the samples contained concentrations of contaminants that pose a significant risk to human health, ecology, plants, soils, the built environment and/or groundwater or surface waters. Samples of groundwater were found to contain some slightly elevated concentrations of heavy metals, ammonia, cyanide, chloride and sodium, probably due to saline intrusion and inputs from estuarine water or from natural leaching of metal minerals in the drift and bedrock deposits.
- 7.6.15 However, given the limited nature of below ground construction and the management of any piling operations, there are unlikely to be any adverse impacts on geology or groundwater or from land contamination during the construction, operational and post-operational phases.

d) Surface Water

- 7.6.16 Construction activities that might affect surface water would be managed by good construction practice and pollution prevention measures, controlled where necessary by an Environmental Permit. Site drainage and pollution prevention would be achieved through the implementation of the Water Management Plan and pollution and flood mitigation infrastructure (e.g. attenuation ponds, oil/silt separators and reedbeds).
- 7.6.17 A drainage strategy has been designed to manage potential surface water and foul water discharges during the operational phase. The strategy includes the use of SuDS methods to control discharges limiting them to green field run-off rates.
- 7.6.18 The surface water assessment has evaluated potential hydrology and drainage impacts relating to the potential for increased flood risk at Comwich and impacts to existing or future drainage features, and potential impacts upon water quality. All of the identified potential impacts have been assessed as having no major significance for the construction, operational and post-operational phases at the Comwich Wharf site.

e) Terrestrial Ecology

- 7.6.19 The site is located adjacent to the Severn Estuary Special Area of Conservation, Special Protection Area and Ramsar site, and Bridgwater Bay Site of Special Scientific Interest part of which is also designated as Bridgwater Bay National Nature Reserve. Further afield is the Quantocks Site of Special Scientific Interest, which forms part of the Exmoor and Quantocks Oakwoods Special Area of Conservation. None of these statutory nature conservation sites are located within the proposed development site, although there is the potential for them to be indirectly affected.
- 7.6.20 One non-statutory designated wildlife site (Comwich Brick Pits County Wildlife Site) is located adjacent to the site. The site itself contains agricultural fields, coastal habitats, hedgerows and watercourses which support legally protected species, (including reptiles, otters and water vole), and a diverse invertebrate assemblage.

- 7.6.21 Information about the wildlife that occurs within the site has informed the design of the proposed development. These include a range of measures that would avoid or minimise potentially significant impacts on wildlife, such as new tree and scrub planting and the provision of otter 'ledges' in culverts to maintain the safe movement of otters along watercourses. Specific measures have been included to protect nearby designated sites and to ensure compliance with protected species legislation. These include offsetting the freight laydown area from the Severn Estuary SPA/Ramsar and Bridgwater Bay SSSI by approximately 150m and, during construction, restricting access to coastal habitat within the wharf area to minimise disturbance to intertidal birds.
- 7.6.22 The proposed development would result in some habitat loss and disturbance to wildlife, which is assessed having a minor impact, except in relation to wintering and passage birds that are part of the Special Protection Area/Ramsar site/Site of Special Scientific Interest designation. Specific mitigation measures have been identified to reduce potential adverse impacts on wintering and passage birds during the wharf construction. These measures would also have some minor beneficial impacts on wildlife during the operational and post-operational phases.

f) Landscape and Visual

- 7.6.23 The development would have the greatest visual impact on receptors at Combwich Wharf and the closest surrounding roads, paths and residential properties. There would also be views from the levee immediately opposite the Wharf on the opposite bank of the River Parrett, but little visual impact beyond this, as the levee screens most ground level views.
- 7.6.24 Prior to construction activities starting on site, boundary hedgerows would be allowed to grow higher to provide additional screening. During refurbishment and extension of the Wharf, there would be some vegetation removal to accommodate the access routes and contractors compound and physical changes to the character of the Wharf.
- 7.6.25 The creation of the freight laydown facility at approximately 1m above the existing ground level and the change in use would alter the existing landscape and views. The design retains the maximum amount of hedgerows and rhynes possible for ecological and landscape benefit, but some hedgerow removal would be required for access through to each field. Building heights have been kept low to reduce their impact on the local landscape and views. Stored goods on the site would be to a maximum of two containers high (approximately 5.2m) above the platform level in the container storage area and approximately 10m above the ground level in the AIL storage area.
- 7.6.26 During the construction phase impacts would be primarily associated with ground clearance and the movement of large vehicles on site.
- 7.6.27 During the operational phase, a noise barrier (earth bund) along the north-western side of the laydown facility would screen glimpses of the laydown area from the north. Planting with fast growing, locally occurring native species would be used to screen low level views of the site. The most significant visual impacts would be limited to the section of the River Parrett Trail, footpaths immediately opposite the site, the footpath on the levee on the opposite bank and from the River Parrett itself. The planting on the north-eastern side of the site, viewed from the River Parrett Trail, would be located on low bunds to increase its screening benefit.

- 7.6.28 This screening would also be of use during the removal of the laydown facility. The laydown area would then be restored to agricultural land with some trees retained, including pollarded willows to complement local landscape character.
- 7.6.29 During operation, the landscape impacts of the proposals at the wharf would be primarily associated with the arrival of vessels, off-loading of goods and associated vehicle movement. Some limited lighting would be required for the arrival and departure of vessels.

g) Historic Environment

- 7.6.30 Desk-based assessment, geophysical survey and subsequent trial trenching have confirmed that there are no archaeological remains within the site boundary of the proposed freight laydown facility at Comwich. Desk-studies and geotechnical site investigation have confirmed that there are no surviving traces of the Roman port and medieval harbour recorded at Comwich Pill (the small creek off the River Parrett), within the site boundary for the proposed Comwich Wharf refurbishment. There would be no impact to the settings of Listed Buildings in Comwich arising from construction.
- 7.6.31 Construction and operation of the freight laydown facility would result in a temporary visual impact, of a very low magnitude, on the setting of the Scheduled Monument, Cynwit Camp. The overall residual impact on the setting of the Cynwit Camp would be of minor significance.

h) Marine Environment

- 7.6.32 The construction and operation of the wharf would result in the loss of a small area of intertidal habitat and minor changes in turbidity due to sediment re-suspension. There could be potential for impacts on water quality due to accidental spillages, while noise and vibration from piling have the potential to affect fish. By adopting appropriate construction methods, complying with established good practice and controlling the timing of works, these impacts would not be significant.
- 7.6.33 During the operation of the wharf, wash from vessel operation (with the potential to cause erosion) and periodic clearance of silt from the barge berth bed (causing temporary increases in turbidity) would be avoided or minimised through specific working protocols agreed with the relevant authorities.
- 7.6.34 The Wharf development would change the hydrodynamics of tidal water flowing into and out of Comwich Pill and the tidal channel into Comwich Pill would be displaced slightly. It is predicted that a new, stable channel would form quickly, without causing any adverse effect on flood defences or valued habitat, with minimal longer-term erosion in the immediate vicinity of the wharf. However, in view of the importance of protecting flood defences, a post-construction programme of monitoring would be implemented, so that action could be taken at an early stage to protect defences in the unlikely event that this proved necessary.
- 7.6.35 Surface water drainage from the freight laydown facility would be discharged to the Parrett Estuary through Tuckett's Clyce. SuDS will form part of the design for this facility and would protect the marine environment from any significant effects during its construction, operation and post-operational phases.

i) Amenity and Recreation

- 7.6.36 There are no areas of open access land or public open space within or immediately adjacent to the site. One PRoW (the River Parrett Trail - BW25/31) runs through the site. Comwich Motor Boat and Sailing Club (CMBSC) activities are located near Comwich Wharf and Comwich Pill is part of the local recreational waters.
- 7.6.37 During construction, temporary obstruction of the River Parrett Trail would be mitigated through the provision of a 12 month temporary diversion. Movement of vehicles during construction would cause temporary inconvenience to users of the PRoW as they stop for vehicles to pass and overall a minor adverse impact is predicted. As the proposed works have the potential to affect access to and activities of the CMBSC and activities in Comwich Pill, measures have been included as part of the proposed development to avoid obstruction to access and these activities. Measures include providing a new access for CMBSC, and minimising the extent of construction works, albeit there would be the potential for obstruction to recreational vessels entering or leaving Comwich Pill during the construction and operation phases. This would be avoided by providing recreational users of Comwich Pill with advance warning of construction activities and schedules of vessel arrivals/departures during the operational phase.
- 7.6.38 During the operational and post-operational phases, the movement of vehicles along the Comwich Wharf access road would result in an intermittent and temporary obstruction of users of the River Parrett Trail, whilst users await the passage of vehicles, which would result in a minor impact. No permanent obstruction to access or loss of boat storage area would arise for CMBSC during the operational or post-operational phases.

7.7 Junction 23 Park and Ride Facility, Freight Management Facility, Consolidation Facility and Induction Centre

- 7.7.1 The proposed park and ride, freight management postal/courier consolidation facility and induction centre would be located at Junction 23 of the M5 motorway. The objective of this facility is to reduce and manage vehicle movement on local roadways during construction of HPC and provide an induction facility for HPC construction workers.
- 7.7.2 The proposed site at Junction 23 is currently agricultural land adjacent to industrial development (featuring industrial sheds and large areas of concrete hard standing) and the River Parrett (see **Figure 7.6**). On completion of the operational phase of the proposed development, the site would be either restored fully back to agricultural use, or retained in part to allow future use by a third party.
- 7.7.3 No significant impacts would arise in relation to soils and land use, recreation and amenity and few significant impacts for ecology. The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Noise and Vibration

- 7.7.4 There would be no significant noise or vibration impacts to residential properties during either construction or post-operational activity of the Junction 23 site. Users of the public footpaths close to the site would experience higher noise levels during the works for a temporary period. EDF Energy would ensure users of the site are actively managed to keep noise to a minimum.

b) Air Quality

- 7.7.5 An assessment of potential impacts from exhaust emissions (long and short term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013 and 2016.
- 7.7.6 Measures to reduce emissions to air would be provided in the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby houses would then be mitigated by careful dust management measures and the application of standard good practice. With these dust control measures implemented, potential fugitive dust and particulate impacts on human receptors are considered to be of negligible significance.
- 7.7.7 Vehicular emissions of pollutants associated with traffic generated by the HPC Project during operation of the Junction 23 site are not significant. All other operational emissions and air quality impacts are considered to be not significant.

c) Geology, Land Contamination and Groundwater

- 7.7.8 Desk-based and intrusive investigations have been conducted to determine the baseline geological, land contamination and groundwater status of the Junction 23 site and the surrounding area.
- 7.7.9 There is Made Ground along the eastern boundary of the site and at several other locations across the site. The Made Ground is underlain by natural Tidal Flat deposits up to approximately 26m in depth comprising clay with varying amounts of, sand, silt and gravel. The solid geology below is at about 26m to 27m below ground level and comprises mudstones and siltstones with occasional thin limestone beds.
- 7.7.10 Soil and groundwater analyses from samples collected during the intrusive investigations show that none of the samples contained concentrations of contaminants that pose a significant risk to human health, ecology, plants, soils built environment and/or groundwater or surface waters. One groundwater sample contained elevated arsenic on one occasion only and two samples contained slightly elevated boron. The boron exceedences were marginal and therefore not considered to be significant.

Figure 7.6: Junction 23 Park and Ride Facility, Freight Management/ Courier Consolidation Facility and Induction Centre.



7.7.11 Through appropriate design and the lack of significant contamination issues on site, the assessment has concluded that impacts on geology, groundwater or from land contamination during the construction, operational and post-operational phases would be low.

d) Surface Water

7.7.12 A site drainage strategy and pollution prevention techniques would be implemented through standard good practice, appropriate design and the Water Management Plan. The drainage strategy would ensure that potential surface water discharges from the development site are managed effectively at greenfield run-off rates. This includes the use of SuDS methods to attenuate surface water discharges from the site. Foul water would be treated using a small on-site package treatment plant prior to discharge to the surface water system under the conditions of an Environmental Permit.

7.7.13 Potential impacts upon water quality associated with sediment laden run-off, contaminated run-off, hydrology and drainage and increased flood risk have been assessed as of low significance.

e) Terrestrial Ecology

7.7.14 The site is located near to the Severn Estuary Special Area of Conservation, Special Protection Area and Ramsar site, and Bridgwater Bay Site of Special Scientific Interest (part of this Site of Special Scientific Interest is also designated as Bridgwater Bay National Nature Reserve). None of these designated sites are located within the site, although there is the potential for them to be indirectly affected by the proposed development.

7.7.15 The site contains agricultural fields, hedgerows and watercourses and a pond which support a range of species including legally protected species (bats and great crested newts), and a diverse range of invertebrates.

7.7.16 Information about the wildlife that occurs within the site has informed the design of the proposed development. This includes a range of measures that would avoid or minimise potentially significant impacts on wildlife, such as creating new water bodies, tree, shrub and grassland planting and new hedgerows which would provide additional habitat connectivity and benefits to a range of invertebrate species. Specific measures have been included to ensure compliance with protected species legislation including trapping and translocating great crested newts (to be carried out under a licence from Natural England) away from construction areas, and using exclusion fencing to keep protected species out of working areas.

7.7.17 Development at this site would result in some habitat loss and disturbance impacts to wildlife, which is assessed as being of no greater than minor adverse, except in relation to wigeon duck (qualifying features of the Special Protection Area/Ramsar site/Site of Special Scientific Interest designation in the River Parrett estuary). Mitigation measures to protect wigeon during the construction phase are proposed including habitat creation and enhancement. As these habitats mature, some minor beneficial impacts on wildlife would occur during operational and post-operational phases.

f) Landscape and Visual

- 7.7.18 Landscape planting in advance of and at the end of the construction phase would include a bund planted with fast-growing native trees and shrubs on the southern part of the site to screen views into the site from the River Parrett National Trail and other public footpaths to the south. Planting to strengthen existing perimeter hedgerows and three new hedgerows would also help to minimise the perception of changes to the landform and screen views into the site from the north, east and west.
- 7.7.19 There would be impacts on the character of and views out from the River Parrett National Trail and other local public footpaths, the raising of the landform within the typically flat Levels and Moors landscape character area and the loss of existing mature hedgerows and agricultural grassland. Lighting associated with the proposed development would have an impact despite the local area being already highly lit by highway lighting around the junction with the M5 motorway and security lighting at nearby industrial sites.
- 7.7.20 There would be visual and landscape impacts during the construction phase when site clearance would be visible and before the landscape planting has matured.
- 7.7.21 After the operation phase is complete, planting at the perimeters of the site would be retained to screen post operational activities.

g) Historic Environment

- 7.7.22 Desk-based assessment and subsequent trial trenching have confirmed that the only known archaeological remains in the site ground are old flood defences that are possibly medieval cutting across the modern day field boundaries (drains) in the south-eastern section of the site. Alluvial deposits, relating to the palaeoenvironment of the River Parrett have been identified at depth within the site boundary. The archaeological value of these are assessed as of low importance.
- 7.7.23 The earthwork remains of a medieval motte and bailey castle, a Scheduled Monument known as Chisley or Chidley Mount, are located approximately 100m from the proposed development site, on the opposite side of the A38 (Bristol Road). The earthworks are screened from the proposed development site by mature planting alongside the A38. There would be no impact to the setting of the Scheduled Monument.
- 7.7.24 Construction would potentially result in the loss of a small proportion of the alluvial deposits recorded below the site. Appropriate measures for the mitigation of this impact would be preservation by record, in accordance with published planning guidance. The agreed mitigation would ensure that the overall residual impact would be limited in significance.

7.8 Junction 24 Park and Ride Facility, Freight Management Facility, Consolidation Facility and Temporary Induction Centre

- 7.8.1 The site proposed for the Junction 24 development is within the Huntworth Business Park and was previously used as a storage and distribution facility see **Figure 7.7**. Once operational activities cease, appropriate measures would be carried out to allow the site to be available for storage/distribution purposes.

7.8.2 Due to the presence of previous development at the site, no significant impacts would arise in relation to noise, landscape, soils and land use, hydrology, the historic environment, recreation and amenity, ecology and recreation. The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Air Quality

7.8.3 An assessment of potential impacts from exhaust emissions (long and short term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013 and 2016.

7.8.4 Measures to reduce emissions to air are outlined in the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby houses would then be mitigated by careful dust management measures and the application of standard good practice. With these dust control measures implemented, potential fugitive dust and particulate impacts on human receptors are considered to be of no more than minor significance.

7.8.5 Vehicular emissions of pollutants associated with traffic generated by the HPC Project during operation of the Junction 24 site are not significant. All other operational emissions and air quality impacts are considered to be not significant.

b) Geology, Land Contamination and Groundwater

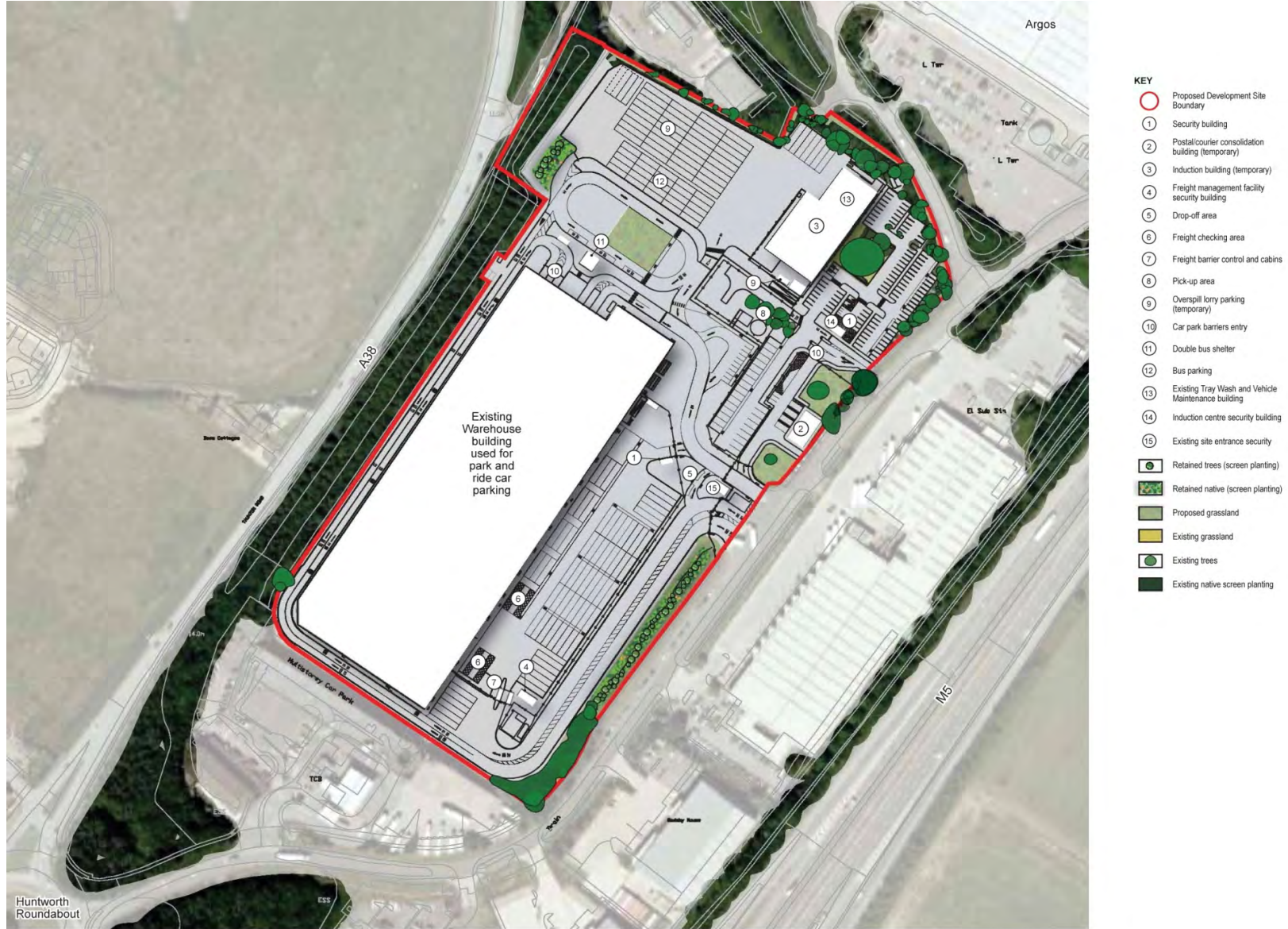
7.8.6 Desk-based investigations have been conducted to determine the baseline geological, land contamination and groundwater status of the site and the surrounding area.

7.8.7 No Made Ground is indicated on the geological map for the site. Any Made Ground is likely to be associated with the hardstanding and any services/foundations at the site. The geological map for the area indicates that the majority of the site is underlain by superficial deposits comprising sands and gravels in the south-eastern part of the site, with a thin spur of alluvium comprising clay, silt, sand and gravel in the northern area of the site. The map indicates that the remainder of the site area is underlain directly by rocks of the Mercia Mudstone Group.

7.8.8 No site-specific soil or groundwater contamination testing information was available however, on the basis of the desk based assessment the likelihood of significant soil and or groundwater contamination at the site is considered to be unlikely and the corresponding risk of existing contamination on the site is considered to be very low.

7.8.9 The impacts on geology, groundwater or from land contamination during the construction, operation and post-operational phases at the Junction 24 site are therefore considered to be very low.

Figure 7.7: Junction 24 Park and Ride Facility, Freight Management/Courier Consolidation Facility and Temporary Induction Centre.



7.9 Williton Park and Ride Facility

7.9.1 The land proposed for development has recently been used as a lorry park, depot and storage area. There is an existing building to the south of the site, which would remain and share an access with the proposed development, see **Figure 7.8**. Upon completion of the HPC construction phase, the site would be reinstated back to its current use as a lorry park, depot and storage area.

7.9.2 Due to the existing developed nature of the site no significant impacts would arise in relation to soils and land use, the historic environment, recreation and amenity and ecology. The following paragraphs describe either the significant impacts or the assessment of the most relevant environmental topics to the site and development.

a) Noise and Vibration

7.9.3 Noise impacts during construction (from short-term earthworks), and during site restoration after operational activities are complete, would be reduced to acceptable levels by the erection of construction hoardings which would act as noise barriers. There would be no adverse vibration impacts. Although Smithyard Cottage is the nearest property receptor, the assessment has concluded that with good practice techniques, no significant impacts would occur during operation.

7.9.4 EDF Energy would ensure users of the site (e.g. car, HGV and minibus drivers) are actively managed to keep noise to a minimum.

b) Air Quality

7.9.5 An assessment of potential impacts from exhaust emissions (long and short-term nitrogen dioxide and particulate emissions) associated with construction traffic and on-site plant and machinery and operational traffic has been carried out to compare the predicted change between 'with' and 'without development' scenarios for future years 2013 and 2016.

7.9.6 Measures to reduce emissions to air would be provided in the Air Quality Management Plan, and would follow best practice guidance and measures typically employed on construction sites including dust management techniques, traffic management, phasing of construction activities, and use of plant and vehicles compliant with current emissions standards. The potential impact of fugitive dust and particulate matter at nearby houses would then be mitigated by careful dust management measures and the application of standard good practice. With these dust control measures implemented, potential fugitive dust and particulate impacts on human receptors are considered to not be significant.

7.9.7 Vehicular emissions of pollutants associated with traffic generated by the HPC Project during operation of the Williton site are not significant. The Freight Management Strategy and Framework Travel Plan would be implemented to minimise vehicular movements, and ensure use of vehicles compliant with emissions standards. All other operational emissions and air quality impacts are considered to be not significant.

Figure 7.8: Williton Park and Ride Facility



c) Geology, Land Contamination and Groundwater

- 7.9.8 Desk-based and intrusive investigations have been conducted to determine the baseline geological, land contamination and groundwater status of the site and the surrounding area.
- 7.9.9 The geology of the site consists of Made Ground underlain by mudstone bedrock.
- 7.9.10 Soil samples from across the site have been analysed for a range of common contaminants. The results demonstrate that with the exception of two samples in the south-eastern corner of the site which contained some asbestos fibres, none of the samples contained concentrations that pose a significant risk to human health, ecology, plants, soils, built environment, groundwater or surface waters.
- 7.9.11 Samples of groundwater were also found to contain very low concentrations of contaminants below screening standards with the exception of one sample which contained slightly elevated barium. The one exceedence was very marginal and is therefore not considered to be significant.
- 7.9.12 Impacts on geology, groundwater or from land contamination during the construction, operation and post-operation phases would therefore be no significant impacts.

d) Surface Water

- 7.9.13 A drainage strategy has been designed to ensure that potential surface water and foul water discharges from the Williton site are managed effectively. This includes the use of SuDS methods to attenuate surface water discharges from the site. Foul water would be managed using a small on-site treatment plant which would discharge to the surface water drainage system under the conditions of an Environmental Permit.
- 7.9.14 Potential impacts upon water quality associated with sediment laden run-off, contaminated run-off, hydrology and drainage and increased flood risk have been assessed as not having significant impacts. A site drainage strategy and pollution prevention techniques would be implemented through standard good practice, appropriate design and the Water Management Plan.

e) Landscape and Visual

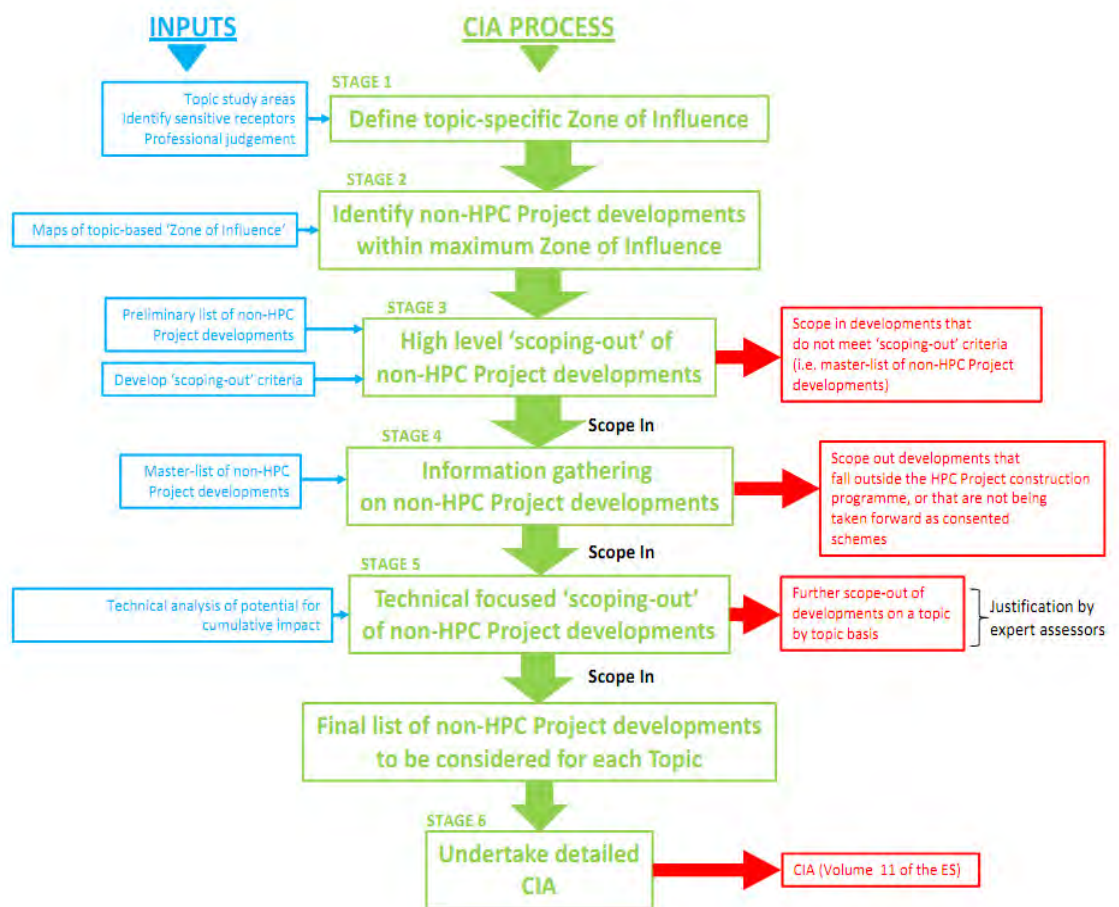
- 7.9.15 The site is screened by existing bunding to the north and east and a mature tree and shrub screen to all boundaries. Construction activities would not be visible through existing bunding and screening vegetation.
- 7.9.16 The main impacts would be from increased traffic along rural roads at night and views from the PRoW.

8. CUMULATIVE IMPACTS

a) Methodology

- 8.1.1 An assessment of the cumulative impacts of the HPC Project as a whole (the 'Project Wide Cumulative Impact Assessment'), and an assessment of the HPC project with other non HPC developments (the 'wider cumulative impact assessment') occurring or likely to occur within the local vicinity, were undertaken.
- 8.1.2 The methodology that was adopted for the wider cumulative impact assessment is shown on **Figure 8.1**.

Figure 8.1: Cumulative Assessment Methodology Flow Chart



- 8.1.3 With relation to the project wide cumulative impact assessment, the process started only at Stage 5 which meant that all components of the HPC Project were subject to technical cumulative impact assessment.

b) Summary of Significant Cumulative Impacts

- 8.1.4 The significant cumulative impacts that have been assessed as arising both from the 'project wide' and 'wider' cumulative impact assessments undertaken are shown in the table below. Changes in levels of significance (both increased and decreased) from those same impacts assessed individually within the ES, occurred only for receptors associated with landscape character and views. For all other topic areas the level of significance of the impact is the same as when the impact was assessed individually in the relevant chapter of the ES.

Receptor and Description of Impact	Cumulative Developments
Noise and Vibration	
Impact of construction noise on dwellings	Cannington bypass; Cannington park and ride Bridgwater A and Bridgwater C accommodation campuses and associated facilities
Impact of construction noise on PRoWs	Cannington bypass; and Cannington park and ride
Impact of operational noise on dwellings	Cannington bypass; and Cannington park and ride
Historic Environment	
Impact on the setting of designated heritage asset Cynwit Castle Scheduled Monument	Cannington bypass; Cannington park and ride; and Combwich freight laydown facility
Construction impact on the setting of the Scheduled Monument Wick Barrow (Pixies Mound)	HPC development site and the National Grid Hinkley Point C overhead line entries
Operational impact on the setting of the Scheduled Monument Wick Barrow (Pixies Mound)	HPC development site and the National Grid Hinkley Point C overhead line entries
Landscape and Visual	
Impact on the landscape character of the Levels and Moors LLCA	Combwich site and Junction 23 park and ride
Impacts caused by changes in the composition of views for: <ul style="list-style-type: none"> Users of West Somerset Coast Path and other local PRoW Residents of Wick, Stolford, Stockland Bristol and other surrounding local settlements Users of PRoW in the Quantock Hills AONB Users of PRoW on elevated areas of Isolated Hills (Puriton Hill, Brent Knoll) and Mendips 	HPC development site and National Grid Hinkley Point C overhead line entries; decommissioning of HPA; decommissioning of Hinkley Point B; development of a wind farm by Next Generation; and a wind farm by EDF Energy

9. CONCLUSION

- 9.1.1 The main HPC construction works are anticipated to take approximately nine years, with Units 1 and 2 operational in 2019 and 2020 respectively. A number of associated developments are proposed to enable the efficient delivery of the construction of HPC, and also limit and mitigate the potential impacts arising from the workforce accommodation and transport needs of the HPC Project. The associated developments include accommodation campuses, park and ride facilities, freight management facilities, a bypass around the west of Cannington, and the refurbishment and extension of an existing facility at Combwich Wharf.
- 9.1.2 The ES reports on the diverse range of local, regional and national assets and environmental characteristics and provides details of the assessment of potential impacts resulting from the HPC Project.
- 9.1.3 The EIA, its findings and the outcomes of the consultation process, have been integral to the iterative design of the HPC Project, where possible designing in mitigation measures to prevent or minimise potential adverse impacts, and identifying additional mitigation measures where required. The EIA has also identified the potential for enhancements which are proposed as part of the project proposals thus increasing the wider benefits of the HPC Project. In summary, key findings of the EIA for the HPC Project include:
- the provision of long-term economic opportunities for the area;
 - the employment of up to around 5,600 people on-site during the construction of HPC and employment of around 900 people during the operation of HPC, indirectly supporting 360 jobs with consequent impacts on the local labour market, economy and provision of public services;
 - increases in traffic and associated increases in noise levels on the local road network as a result of the construction works, with the traffic predominantly comprising workforce bus movements and HGVs transporting materials to site;
 - a transport strategy, including proposals for highway improvements, that has been developed to manage traffic impacts;
 - increased noise levels at residential dwellings near to the HPC development site from short-term activities associated with the emergency access road construction and landscaping close to the southern site boundary. However these early landscaping works would help to reduce any overall, ongoing noise impacts;
 - a significant (but temporary) impact on landscape character and visual receptors during construction. Although the majority of these impacts would decrease with removal of construction machinery and landscape restoration post construction, some significant impacts would remain in the local area due to the scale of the completed HPC development; and
 - large amounts of seawater needed to cool HPC which would be discharged to the marine environment at an elevated temperature. The intake of water could entrain marine organisms, including fish, however potential impacts will be mitigated through the design of the intake; provision of a fish recovery and return

system and acoustic fish deterrent devices. No significant impacts are anticipated as a result of the elevated discharged water.

- 9.1.4 It has been identified that the development proposals would have a variety of impacts, not all of which are adverse and significant, but for those that are, the EIA process has identified mitigation measures to avoid such impacts, where possible. The EIA has also highlighted where, with the right management, the proposals would have positive benefits too, for example in long-term job creation.
- 9.1.5 For a full report of the EIA process, its findings and EDF Energy's response and proposals, please refer to the ES.
- 9.1.6 The full ES including the NTS can be viewed and downloaded from the IPC website at: <http://infrastructure.independent.gov.uk/projects/south-west/hinkley-point-c-new-nuclear-power-station>
- 9.1.7 A hard copy of the ES will be available for inspection during opening hours at the following addresses:
- EDF Energy, 14 King Square, Bridgwater TA6 3DG.
 - Sedgemoor District Council Bridgwater House, King Square, Bridgwater TA6 3AR.
 - West Somerset District Council, West Somerset House, Killick Way, Williton Taunton TA4 4QA.
 - The Library, Paul Street, Taunton, Somerset TA1 3XZ.
- 9.1.8 Printed copies of the NTS are available free of charge from EDF Energy, 14 King Square, Bridgwater TA6 3DG.
- 9.1.9 Printed copies of the ES (**Volumes 1 to 11**) and other submission documents are available on request from EDF Energy at the address above, but please note a reasonable charge will be applied to cover production and distribution costs.