3 Construction Programme

3.1 Introduction

3.1.1 This chapter describes the process and programme for constructing Hinkley Point C from the early activities necessary to establish the site through to the main phases of construction and final restoration post construction.

3.1.2 This chapter also sets out the content and approach of the Environmental Management and Monitoring Plan (EMMP), which will be used to manage, monitor and report environmental effects during the construction period. Further information regarding mitigation is detailed within each of the technical chapters.

3.2 Programme Assumptions

a) Enabling Works

3.2.1 The construction programme assumes that Enabling Works will be carried out on the Hinkley Point C (HPC) Development Site from Summer 2010. Enabling works including the removal of spoil mounds on the Built Development Area East will be subject to planning permission or as appropriate. The programme assumes the necessary consents will be secured.

b) Preliminary Works

3.2.2 As set out in Volume 1 Chapter 1, EDF Energy propose to submit two consent applications and accompanying standalone Environmental Statements in advance of the application for a DCO to the IPC:

- a planning application for site preparation works to West Somerset Council (WSC); and
- a Harbour Empowerment Order (HEO) for the construction and operation of a jetty to the Marine Management Organisation (MMO).

3.2.3 Collectively, these developments are referred to as Preliminary Works and are required to facilitate the construction of HPC. It is the intention that these early applications will be made in Summer 2010 and work will commence in early 2011.

c) Main Construction

3.2.4 The programme assumes that the main phase of construction, which the IPC will authorise, will commence after the site preparation in early 2012. Main construction will also include the erection of the accommodation campus.

3.2.5 In the case that Enabling and Preliminary Works are not granted consent, the programme will shift approximately 12 months to align with the expected date for granting of the DCO by the IPC; this is anticipated to be at the end of 2011. For the purposes of predicting and assessing potential significant environmental effects of HPC, it has been assumed that the Enabling and Preliminary Works will be granted consent and commence before the application for a DCO is determined. For the majority of the technical areas, in particular where the environment is more or less in a constant state, the 12 month delay to the programme will not alter the assessment methodology or outcome (e.g. archaeology).
3.2.6 However where the environment or nature of the activity is dynamic, different scenarios have been modelled and assessed, reflecting the assumptions that have been made on the programme of works. This includes the socio-economic assessment; the transport assessment and associated noise and vibration, and air quality impacts. The potential 12 month shift has also been taken into consideration in the cumulative impact assessment when identifying potential temporal overlap for in-combination impacts. Further details on the modelling scenarios and assessment years are provided in the methodology section of each of the technical chapters.

3.2.7 It should be noted that when the application for the DCO is submitted to the IPC, a decision on the site preparation works should have been issued by WSC and the outcome will be reflected within the Environmental Statement to be submitted to the IPC. The decision on the jetty by the MMO is expected in Spring 2011 which is likely to be after the application for the DCO is made to the IPC. Accordingly, the Environmental Statement to be submitted to the IPC will assess both scenarios:

- where consent would be granted by the MMO in Spring 2011; and
- where it is not granted by the MMO but the consent would be granted under the DCO.

3.3 Land Use Phasing

a) Construction Land Uses

3.3.1 The excavation and ground terracing will generate approximately 4.4 million cubic metres of material. This comprises approximately 2.1 million cubic metres which will be generated during the preliminary works including topsoil and other material suitable for re-use in the power station construction. Additional material considered unsuitable for re-use, including cooling water tunnel arisings will be incorporated into the final restoration scheme. To avoid additional road journeys, all the material will be retained on site and will therefore require a considerable area for materials stockpiling and storage.

3.3.2 The excavation and ground terracing will generate approximately four million cubic metres of material, including topsoil and other material suitable for re-use in the power station construction. Additional material considered unsuitable for re-use, including cooling water tunnel arisings will be incorporated into a final restoration scheme. To avoid additional road journeys, all the material will be retained on site and will therefore require a considerable area for materials stockpiling and storage.

3.3.3 The Holford Stream valley provides a significant area of land which could accommodate this material during the construction period and as part of the restored site once HPC is complete. To enable this, Holford Stream is proposed to be culverted and the land will need to be raised, but this will help reduce the overall area of land required.

3.3.4 Much of the area used for stockpiling of excavated material is planned to also be used as contractors’ working areas. The exceptions are the overburden and topsoil storage areas, where the stockpile of overburden material will need to be managed to allow for re-use after construction. The topsoil storage will need to be managed to avoid damage through compaction and to maintain as far as practicable its agricultural potential.

3.3.5 The working areas for some of the contractors, such as the marine works and substation, will be located wholly or partly within the footprint of the Permanent Development Site.

3.3.6 Following discussions with local residents and in formal response to the Stage 1 consultation, the alignment of the construction fence at the south end of the site has moved some 200m
north to latitudinal line 144750mN. This new alignment will establish a more substantial land buffer between the main areas of construction and Shurton village.

3.3.7 There will be no construction works south of the line during enabling and site preparation and only limited activities carried out during the main phase. These will include some bunding and surface water attenuation associated with the construction of the accommodation campus and the construction of an emergency access road incorporating a bridge over Bum Brook.

3.3.8 Taking the above factors into account, the anticipated principal uses of the overall land area within the development site at the peak phase of construction, in 2016, are present in Table 3.3.1.

Table 3.3.1: Proposed Areas of Land Use During the Peak Phase of Construction

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final permanent power station area</td>
<td>66.6</td>
</tr>
<tr>
<td>Construction site entrance and access roads</td>
<td>16.6</td>
</tr>
<tr>
<td>Landscape and nature buffers/reserves</td>
<td>11.8</td>
</tr>
<tr>
<td>Overburden and topsoil storage</td>
<td>14.6</td>
</tr>
<tr>
<td>Workshops and storage</td>
<td>9.4</td>
</tr>
<tr>
<td>On-site accommodation campus</td>
<td>7.6</td>
</tr>
<tr>
<td>Main civil works contractor</td>
<td>8.8</td>
</tr>
<tr>
<td>Stockpile of material for re-use</td>
<td>7.4</td>
</tr>
<tr>
<td>Low-lying land unsuitable for construction use</td>
<td>2.8</td>
</tr>
<tr>
<td>Nuclear steam supply system contractor</td>
<td>2.1</td>
</tr>
<tr>
<td>Mechanical and electrical erection contractor</td>
<td>2.1</td>
</tr>
<tr>
<td>Main turbine contractor</td>
<td>1.9</td>
</tr>
<tr>
<td>Heavy fabrication workshop</td>
<td>1.1</td>
</tr>
<tr>
<td>Roads and networks contractor</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>153.5</strong></td>
</tr>
</tbody>
</table>

3.3.9 During the construction period, the land uses will change, reflecting the different stages of development activity. For example the area allocated to the civil works contractor will be reduced and the spare land reallocated to the main mechanical and electrical contractors as the balance of work on the site changes.
3.4 Phasing of Construction Activity

3.4.1 A description of key construction activities is provided in Chapter 2 of this Volume. The construction and site restoration programme will span approximately 11 years from Summer 2010 to Summer 2021. For the purposes of the Environmental Appraisal, the programme is divided into four key construction phases and these are illustrated by way of a series of phasing plans:

- Enabling works starting Summer 2010, site preparation activities and the early stages of construction up to first main structural concrete of Unit 1 in early 2013. See Figures 3.1 to 3.5.
- Construction and start operation of Unit 1 late 2017 and ongoing construction of Unit 2. See Figures 3.6 to 3.9.
- Completion and operation of Unit 2 in mid 2019. See Figure 3.10.
- Site restoration by 2021. See Figure 3.11.

3.4.2 The phasing plans provide an indicative chronological order but activities are likely to be subject to overlap and programme change. It should also be noted that within the main construction site areas there will be activities and uses that will remain undefined, including minor temporary facilities and structures.

3.5 Construction Logistics

3.5.1 This section summarises the logistics required to deliver the construction programme outlined above. Indicative resource levels are based on experience gained from other large infrastructure projects including the ongoing construction of Flamanville 3 nuclear power station in France comprising one EPR unit; Sizewell B; Heathrow Terminal 5 and the Olympics.

a) Construction Workforce
   i) Preliminary Works

3.5.2 The construction workforce for the site preparation works will increase over time. It is estimated that approximately 100 people will be required at the start of the site preparation works rising to approximately 500 people towards the end of the works. It is envisaged that the site preparation workforce will work a single shift from 0700 to 1800 weekdays.

3.5.3 It is expected that 60 people will be required to construct the jetty. In order to take advantage of tides, it is envisaged that the jetty construction workforce will work a double shift with the first shift being 0600-1400 and the second shift being 1400 to 2200 weekdays.

3.5.4 There will be the ability for Saturday working (0700 to 1300) but this will not be a requirement unless the Preliminary Works are delayed due to weather or tide constraints etc.

3.5.5 There will be up to 20 parking spaces provided during the early stages of the Preliminary Works and this will rise to up to 100 parking spaces towards the end of the works. A Travel Plan will be implemented by EDF Energy for the preliminary works in order to promote the use of sustainable modes of travel to the HPC Development Site. The restrained parking provision will encourage car sharing and it has therefore been assumed that an average car occupancy of at least 1.6 will be achieved. There will be a need for contractors to bus a proportion of the workforce via minibuses to the site for work.
i) Main Construction Phase

3.5.6 The construction workforce required to construct HPC has been derived from EDF Energy data collated from the construction of similar reactors. It is anticipated it would take approximately nine years to build HPC (including preliminary works), with a stagger of 18 months between Unit 1 and Unit 2.

3.5.7 During the approximate nine year construction programme it is forecast that the construction workforce for HPC will peak at approximately 5,000 in 2016 as set out in Table 3.5.1. It is envisaged that initially single shift working will be adopted and by the construction peak of 2016 a double shift working will have been adopted. Later on three shift working may need to be adopted. Further details on these are provided within the Chapter 9 of this Volume.

Table 3.5.1: Forecast Composition of the UK EPR Construction Workforce (at peak employment, with 18 month reactor build gap)

<table>
<thead>
<tr>
<th>Workforce Category</th>
<th>Numbers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site services, security and clerical staff</td>
<td>350</td>
<td>7</td>
</tr>
<tr>
<td>Supervisory/managerial¹</td>
<td>850</td>
<td>17</td>
</tr>
<tr>
<td>Civil engineering operatives</td>
<td>1,300</td>
<td>26</td>
</tr>
<tr>
<td>Mechanical and electrical engineering operatives</td>
<td>2,200</td>
<td>44</td>
</tr>
<tr>
<td>(plus operational staff)²</td>
<td>300</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,000</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

¹Assumptions are that approximately 15% of total civils, mechanical/electrical and site services/security will be supervisory/managerial staff; plus 25% of the operational workforce, plus EDF Energy staff.

²Operational staff begin to move to the development site several years before the start of operation. At Flamanville 3, these staff are training on the simulator and on understanding at first hand the construction of the plant.

3.5.8 In terms of skills, the construction workforce can be divided predominantly into civil operatives and mechanical and electrical operatives with the remaining workforce comprising supervisory, managerial and clerical staff, plus site security employees. As detailed in Chapter 8 of this Volume on socio-economic impacts, the existing skills profile in the area does not fully meet the specialised requirements for the construction of HPC and therefore there will be two types of construction workers as follows:

- home-based workers, who will commute to and from work on a daily basis from their home address; and
- non-home-based workers who are unable to commute to and from work on a daily basis from their home address and require temporary accommodation in the vicinity of the site.

3.5.9 The split of home-based and non-home-based workers will change over the course of the construction programme dependant on the nature of the construction activities. As the construction programme progresses, a different more specialised workforce comprising more mechanical and electrical engineering operatives will be required. It is anticipated that approximately 70% of these workers will be non-home-based and will require temporary accommodation. Over the full construction programme however, it is forecast that there will be an average split of 40% home-based and 60% non-home-based workers.
b) Freight Movements

i) Preliminary Works

3.5.10 During the site preparation works the approximate four million cubic metres of material that will be excavated will be used as fill to create the terraces and minimal material will be taken off-site. It is expected that during the site preparation works 360,000 tonnes of suitable granular material will be imported from off-site due to the lack of suitable material on-site. Given that the jetty would not be available at this time, all of this material will be delivered by HGV to the development site.

3.5.11 Other elements of the site preparation works will generate freight movements. Further details on the numbers of freight movements associated with each of the activities are provided in the Transport Appraisal.

3.5.12 Construction of the jetty will also require plant and materials to be delivered to the development site by both sea and road. It is envisaged that 50% of the materials will be delivered by sea and 50% of the materials will be delivered by road.

ii) Main Construction Phase

3.5.13 During the main construction phase of HPC it is estimated that approximately 4.7 million tonnes of materials in total will be required to construct Hinkley Point C site.

3.5.14 Due to the large civil/structural portion of the construction of HPC, approximately 75% of the total tonnage will be in the form of bulk materials (i.e. fill, aggregates, sand and cement) and reinforcement bars.

3.5.15 It is proposed aggregates and other bulk materials will be imported to the development site by sea to reduce the potential volume of road traffic to site during the construction of HPC. Transport by sea to the development site via the jetty could account for approximately 80% of material, with the remaining 20% delivered by road. The materials will be delivered by self discharging dredgers and cement carriers. The jetty will not be operational until the start of the second quarter of 2012 and, therefore, until this point it has been assumed that 100% of material will arrive by road.

3.5.16 Based on this, the jetty alone would provide at least a significant reduction in road borne freight movements to the development site.

3.5.17 In addition to construction materials, the construction period of HPC requires the delivery of abnormal indivisible loads (AILs). As such the Hinkley Point C Project proposals provide for the use of Combwich Wharf to receive and management the onward movement of AILs to the development site. As detailed in Volume 3 Chapter 5, Combwich Wharf will be refurbished, and a freight logistics/storage facility will be developed to accommodate a range of water vessels for delivery of approximately 180 AILs over a four year period and other construction related goods, such as (but not limited to) insulation material, plasterboard, doors, windows, electrical and electronic equipment. It is assumed that there will be a limitation on the number of deliveries to Combwich Wharf during the construction period to 15 deliveries per month.
3.5.18 Whilst EDF Energy seeks to minimise the number of road movements through use of waterborne transport, a proportion of materials will need to be delivered to site by road as summarised in Table 3.5.2 below. The freight movements for the main construction phase generated by the construction of the development site are set out in Table 3.5.2. The HGV movements for the peak quarter in each year have been provided.

Table 3.5.2: Main Construction Phase HGV Freight Movements – HPC Development Site

<table>
<thead>
<tr>
<th>Year</th>
<th>AM Peak Hour (0800-0900)</th>
<th>PM Peak Hour (1700-1800)</th>
<th>HGV Movements Each Way Over a Typical Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HGVs Each Way</td>
<td>HGVs Each Way</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>18</td>
<td>5</td>
<td>153</td>
</tr>
<tr>
<td>2013</td>
<td>18</td>
<td>5</td>
<td>154</td>
</tr>
<tr>
<td>2014</td>
<td>15</td>
<td>4</td>
<td>129</td>
</tr>
<tr>
<td>2015</td>
<td>24</td>
<td>6</td>
<td>202</td>
</tr>
<tr>
<td>2016</td>
<td>19</td>
<td>5</td>
<td>157</td>
</tr>
<tr>
<td>2017</td>
<td>7</td>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>2018</td>
<td>3</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>2019</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3.5.19 In addition to the HGV movements there will be light goods vehicles (LGVs) generated by the main construction phase. A proportion of these trips may be able to be consolidated into a smaller number of larger deliveries with the use of the freight logistics facility near to Junction 23 of the M5 motorway. Further details on these are provided in the Transport Strategy and Transport Appraisal. Potential workforce and freight movements associated with the construction phase are assessed with Chapter 9 of this Volume.

3.6 Construction Waste Management

3.6.1 Construction waste is defined as the following:

- land clearance and demolition debris;
- surplus or unusable excavation material (e.g. bentonite contaminated material from the tunnelling arisings);
- waste associated with contractor compounds and the on-site accommodation campus;
- new build waste; and
- fit out waste.

3.6.2 These waste streams will be managed through a Site Waste Management Plan (SWMP) which will outline how waste will be managed throughout the construction period to minimise impact upon the environment. In line with the waste hierarchy, utilisation of the best available options to minimise the environmental impact of waste will be considered, and as described in Chapter 7 of this Volume on the management of conventional waste, construction waste will be managed through a combination of on-site source segregation, off-site recovery of source segregated materials and potentially energy recovery from waste.
3.7 Management and Monitoring of Potential Environmental Effects

3.7.1 Site preparation and construction activities have the potential to cause temporary nuisances and other disruptions to site users, nearby residents, highway users, pedestrians, flora and fauna, and other sensitive receptors. Detailed assessments of the potential effects of the site preparation and construction activities are considered in Chapters 8 – 25 of this Volume.

3.7.2 It is envisaged that the findings of the formal EIA process for the DCO application as described in Volume 1; legal provisions (e.g. Section 85 of the Water Resources Act 1991); and any subsequent agreements (e.g. Section 61 of the Control of Pollution Act 1974) will identify the environmental issues that need management and for which specific measures may need to be employed during the works. These aspects will be included in an Environmental Management and Monitoring Plan (EMMP) which will cover, as a minimum, the following subject areas:

- social aspects;
- discharges to surface and ground water;
- discharges to land;
- noise and vibration;
- discharges to air;
- waste management;
- ecological resources;
- cultural resources;
- material storage and handling; and
- traffic management.

3.7.3 The EMMP which will be submitted as part of the formal EIA process for the DCO application, will set out the framework and requirements for the management of environmental impacts associated with the construction period of the project. For example, the EMMP will specify a requirement on the construction contractor(s) to comply with the actions set out in the EMMP and demonstrate to EDF Energy how they intend to identify further environmental impacts and implement the detailed mechanisms for managing the environmental impacts of works on site.

3.7.4 Accordingly, the construction contractor should develop and implement an environmental management system to take full account of the environmental issues and manage those accordingly. The key to the successful management of the environmental issues on site lies in a systematic approach, which should be documented in a construction environmental management plan (CEMP). This would set out the specific measures that will be taken to control and manage the environmental impacts that may otherwise occur for each of the environmental topics, such as noise, air quality, surface water, ecology and historic environment.