The Sizewell C Project

6.3 Volume 2 Main Development Site
Chapter 2 Description of Permanent Development

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None provided.

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2. Description of Permanent Development

2.1 Introduction

2.1.1 This chapter of the **Environmental Statement (ES)** (Doc Ref. Book 6) sets out the permanent proposals for the main development site, which comprises the total area needed for constructing and operating the Sizewell C nuclear power station (Sizewell C). The site boundary of the main development site is shown on **Figure 1.1** of **Chapter 1** of this volume.

2.1.2 Details on the construction of Sizewell C are provided in **Chapter 3** of this volume, including a summary of the temporary development required within the main development site to facilitate construction. Details of the commissioning and operation of Sizewell C are found in **Chapter 4** of this volume. Details of decommissioning of Sizewell C are found in **Chapter 5** of this volume.

2.1.3 Further details of the design of permanent buildings and landscape are set out in the **Sizewell C Main Development Site Design and Access Statement** (Doc Ref. 8.1). Further details on the management of ecology and the landscape are set out in the **Outline Landscape and Ecological Management Plan** (Doc Ref. 8.2).

2.1.4 The main development site comprises five components, which are illustrated in **Figure 1.2** of **Chapter 1** of this volume:

- Main platform: the area that would become the power station itself.
- Sizewell B relocated facilities and National Grid land: the area that certain Sizewell B facilities would be moved to in order to release other land for the proposed development, and land required for the National Grid infrastructure.
- Offshore works area: the area where offshore cooling water infrastructure and other marine works would be located.
- Temporary construction area: the area located primarily to the north and west of the proposed site of special scientific interest (SSSI) crossing, which would be used to support construction activity on the main platform.
- Land to the East of Eastlands Industrial Estate (LEEIE): the area to the north of Sizewell Halt and King George's Avenue, which would be used to support construction on the main platform and temporary construction area.

2.1.5 LEEIE comprises temporary development only and therefore details are set out in **Chapter 3** of this volume.

2.1.6 The following additional permanent developments are described in this chapter:

- Off-site sports facilities at Leiston, which would be used during the construction stage as a shared outdoor sports facility for Alde Valley School, the local community and construction workers, as shown on **Figure 1.3** of **Chapter 1** of this volume.
- Fen meadow compensation sites to the south of Benhall and to the east of Halesworth, as shown on **Figure 1.4** and **Figure 1.5** of **Chapter 1** of this volume.

2.1.7 The marsh harrier habitat improvement area (Westleton), if required, would be temporary development and is therefore described in **Volume 2 Chapter 3** of this **ES**.

2.1.8 Other forms of associated development are described and assessed in **Volumes 3 to 9** of this **ES**.

2.2 Overview of the permanent development

2.2.1 Sizewell C would be located immediately to the north of the existing Sizewell B power station and would comprise two United Kingdom European Pressurised Reactor (UK EPR™) units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The new nuclear power station would represent the nationally significant infrastructure project component of the proposed development.

2.2.2 In summary, permanent development at the main development site would comprise the following building, engineering or other operations as shown in **Figure 2.1 and Figure 2.2**:

a) Nuclear islands

- Two nuclear islands, including two UK EPR™ reactor buildings and associated annexed buildings and structures containing the safety systems, fuel handing systems and access facilities, together with the adjacent emergency diesel generator buildings.

b) Conventional islands

- Two conventional islands, each including a turbine hall and associated electrical buildings for the export and distribution of electrical power.

c) Operational building

- An operational service centre (a multi-purpose building), which allows for access into the nuclear islands, including storage areas, workshops, store rooms, laboratories, data centre, offices and associated support and welfare facilities, including the staff restaurant.

d) Cooling water pumphouses and associated buildings

- Two cooling water pumphouses with related infrastructure (one for each UK EPR™ reactor).

e) Ancillary buildings

- Plant, office/access, storage and fuel and waste management.
- National Grid 400 kilovolt (kV) substation, alterations to the existing National Grid substation and associated diversion of overhead lines.
- Relocation of several Sizewell B ancillary buildings including the outage store, training centre; administrative buildings; visitor centre; and, office, canteen and welfare facilities.
- Associated buildings, structures and plant outside of the power station perimeter.

f) Marine works and associated infrastructure

- The cooling water system and combined drainage outfall in the North Sea.

g) Other site structures, infrastructure and works, including highway works and earthworks.

- Overhead power lines and pylons connecting the conventional islands to the National Grid substation.
- Replacement of an existing National Grid pylon and power line south of Sizewell C.
- Installation of a cut-off wall and cut-off wall platform and associated deep excavations within the main platform.
- Vehicular and pedestrian crossing over the Sizewell Marshes SSSI south of Goose Hill in the form of a culverted embankment.

- A beach landing facility (BLF) proposed for freight and abnormal indivisible loads (AILs) arriving by sea.
- Relocation of certain Sizewell B infrastructure, including: outage laydown area; up to 112 replacement car parking spaces; access roads; up to 576 outage car parking space; and, outage car park access roads.
- Diversion of rights of way including Bridleway 19.
- Power station access road, linking the SSSI crossing with a new roundabout onto Abbey Road (B1122).
- Up to 770 operational car parking spaces and up to 600 outage car parking spaces.
- Realignment of Lover's Lane, Eastbridge Road (part) and other highway works.
- Replacement vehicular access from Valley Road to adjoining farmland to the north.
- Realignment of the junction of the B1122 Abbey Road and Lover's Lane.
- Flood defences and coastal protection measures.
- Onshore components of the marine infrastructure.
- Water supply and drainage measures, including realignment of Sizewell Drain.
- Landscape restoration works and planting.
- Additional parking spaces at Kenton Hills car park.
- Fencing, lighting and other security provisions.

2.2.3 In addition to the above permanent development at the main development site, the following permanent off-site developments would take place:

- New sports facilities located on existing playing fields at Alde Valley school in Leiston.
- Fen meadow compensation areas located at Halesworth and Benhall.

2.2.4 Details of a temporary marsh harrier habitat improvement area (Westleton), if required, are set out in **Chapter 3**, **Volume 2** of this ES.

2.2.5 Sizewell C would result in the permanent loss of approximately 7.03ha of land within the Sizewell Marshes SSSI. Further details on individual habitat losses within the SSSI, alongside proposed mitigation and compensation, are set out in **Volume 2 Chapter 14** of this **ES**.

2.3 Controlled flexibility

2.3.1 SZC Co. has adopted a parameters approach which identifies defined envelopes for the permanent development within which future development would be located.

2.3.2 The reason for adopting this approach is to ensure that SZC Co. has enough flexibility to allow detailed designs to evolve and be submitted following grant of development consent.

2.3.3 The parameters are defined on **Figure 2.3** to **Figure 2.6**. The parameters define zones within which each of the buildings listed in **Tables 2.1, 2.2, 2.3, 2.5** and **2.7** would be located.

2.3.4 Parameters for marine elements described in **Table 2.6** are shown on the **Work Plans** (Doc Ref. 2.3) on **Figure 2.7**.

2.4 Main platform

2.4.1 The main platform is where Sizewell C would be permanently located. **Figure 2.2** indicatively shows how the main platform could be designed.

2.4.2 **Tables 2.1 – 2.3** set out the parameters for development on the main platform, which are also secured as a Requirement in Schedule 2 of the **Draft Development Consent Order** (Doc Ref. 3.1).

2.4.3 The tables should be read in conjunction with the parameter plans shown on **Figure 2.4** and **Figure 2.5** of this volume and the text below.

2.4.4 The finished ground level of the main platform would be 7.3m Above Ordnance Datum (AOD), with minor variations as necessary to provide for adequate drainage.

Table 2.1: Parameters for buildings, plant and structures on the main platform.

Building/structure details	Maximum height (mAOD)
Parameter Zone 1A-1 (nuclear islands)	
Fuel building x 2	47
Fuel building hall x2	27
Boron storage building x 2	27
Safeguard building x 8	50

Building/structure details	Maximum height (mAOD)
Nuclear auxiliary building x 2	47
Access tower x 2	37
Radioactive waste storage building x 2	27
Radioactive waste treatment building x 1	27
Hot laundry building x 1	27
Hot workshop, hot warehouse, facilities for decontamination x 1	27
Effluent tanks and refuelling water tanks x 1	27
Emergency diesel generator building x 4	39
Cooling water discharge weir building (type 1) x 2	27
Cooling water discharge weir building (type 2) x 2	27
Parameter Zone 1A-2 (reactor buildings)	
Reactor building x 2	72
Parameter Zone 1A-3 (conventional islands)	
Turbine hall x 2	57
Sky bridges x 2	32
Conventional Island electrical building x 2	35
Power transmission platform: gas insulated switchgear building x 2	35
Power transmission platform: main transformer x 2	35
Power transmission platform: unit transformer x 4	35
Power transmission platform: auxiliary transformer x 2	35
Operational service centre x 1	47
Parameter Zone 1A-4 (cooling water pump house and associated buildings and plant)	
Cooling water pump house x 1	29
Forebay x 1	22
Outfall pond building x 1	22
Filtering debris recovery pit x 1	22
Fire-fighting water distribution building x 1	22
Parameter Zone 1A-5 (cooling water pump house and associated buildings and plant)	
Cooling water pump house x 1	29
Forebay x 1	22
Outfall pond building x 1	22
Filtering debris recovery pit x 1	22
Fire-fighting water distribution building x 1	22

Building/structure details	Maximum height (mAOD)
Parameter Zone 1A-6 – (waste storage)	
Intermediate level waste store x 1	27
Parameter Zone 1A-7 (spent fuel storage)	
Interim spent fuel store x 1	38
Parameter Zone 1A (ancillary buildings)	
Buildings, including (but not limited to): main access control building; auxiliary administration building; emergency response centre, emergency response energy centre, secondary access control building; meteorological station; demineralisation station; valve room for the demineralisation station; auxiliary boilers; hydrogen storage; oxygen storage; hydrazine storage; chlorination plant; service ventilation building; raw water & potable water storage/supply; degassed water storage tanks; cooling water discharge shaft; chemical products storage; garage for handling materials; oil & grease storage; contaminated tools store; sewage treatment plant; conventional island water tanks; nuclear island water tank; conventional waste storage; transit area for very low and low level waste; service access buildings; underground tunnel highpoints; battery load banks; warehouse; interim spent fuel store equipment storage building; other ancillary buildings.	27
Parameter Zone 1B (BLF)	
BLF x 1	6
Parameter Zones P1 – P6 (power station pylons)	
Three monopoles x 2 (Zones P1 and P6)	55
Pylon x 2 (Zones P2 and P5)	75
Pylon x 2 (Zones P3 and P4)	59

2.4.5 Parameter Zone P5 includes provision for a 75mAOD pylon, however it is likely that a 59mAOD pylon will be constructed, subject to the outcome of further technical studies.

Table 2.2: Parameters for stacks on the main platform.

	Coordinates	Centre maximum radius (m)	Minimum height (mAOD)	Maximum height (mAOD)
Parameter zone S1 – nuclear auxiliary building stack x 1	X = 647201 Y = 264182	5	77	79
Parameter zone S2 – nuclear auxiliary building stack x 1	X = 647201 Y = 263952	5	77	79

	Coordinates	Centre maximum radius (m)	Minimum height (mAOD)	Maximum height (mAOD)
Parameter zone S3 – Emergency diesel generator building stack x 3*	X = 647224 Y = 264307 / X = 647243 Y = 264307 / X = 647259 Y = 264307	5	34	39
Parameter zone S4 – Emergency diesel generator building stack x 3*	X = 647224 Y = 264133 / X = 647243 Y = 264132 / X = 647259 Y = 264132	5	34	39
Parameter zone S5 – Emergency diesel generator building stack x 3*	X = 647224 Y = 264075 / X = 647243 Y = 264074 / X = 647259 Y = 264074	5	34	39
Parameter zone S6 – Emergency diesel generator building stack x 3*	X = 647224 Y = 263901 / X = 647243 Y = 263900 / X = 647259 Y = 263900	5	34	39

** Emergency diesel generator building exhaust stacks (S3 – S6) will be above the roof height of the building they are attached to.*

Table 2.3: Parameters for other development on the main platform

Details	Minimum crest height (mAOD)	Maximum crest height (mAOD)
Parameter Zone 1C (sea defence)		
Sea defence x 1	10.2	14.2
Parameter Zone 1D (Northern mound)		
Northern Mound x 1	10.2	14.2
Parameter Zone 1E (SSSI crossing)		
SSSI crossing x 1	7.3	10.5

2.4.6 The maximum crest heights for the sea defence and SSSI crossing shown in Table 2.3 will be constructed to 12.2mAOD and 7.3mAOD respectively at the outset of the operational phase. This is based on the planning requirement to test against a 1 in 1,000 year flood risk event.

2.4.7 However, the Nuclear Site Licence, which is governed by the Office for Nuclear Regulation (ONR), requires flood risk to also be assessed against 1 in 10,000 and 1 in 100,000 year events for its own purposes. The **Main Development Site Flood Risk Assessment** (Doc Ref. 5.2) states that by 2046 the maximum crest height of the sea defence is likely to need to be increased to 14.2mAOD and by 2090 the maximum crest height of the SSSI Crossing is likely to need to be increased to 10.5mAOD. The parameters set out in Parameter Zones 1C and 1E therefore allow for these maximum heights.

a) Nuclear islands (Zone 1A-1)

2.4.8 Each of the two nuclear islands would comprise a reactor building surrounded by its associated access, safeguard, waste storage, waste processing, diesel and fuel buildings together with auxiliary facilities including effluent tanks and discharge weirs. The following sub-sections describe the structures in more detail.

2.4.9 The design approach to the predominantly industrial principal buildings within the nuclear island is to express the large bold forms based on the functional and engineering requirements and materiality as pre-defined by the UK EPR™ model. This results in a neutral grey colour for the reactor buildings and other industrial buildings where the structural finish is concrete.

i. Fuel buildings and fuel building halls

2.4.10 Each UK EPR™ reactor unit would have its own fuel building. The fuel buildings each house a fuel storage pool for new and spent fuel and associated fuel handling equipment. Near to the fuel buildings are the fuel building halls which would be used for the reception of new fuel and dispatch of casks containing spent fuel.

ii. Boron storage buildings

2.4.11 Each UK EPR™ reactor unit would have its own boron preparation and storage area. Boric acid would be stored and prepared to help control the reactivity of the core.

iii. Safeguard buildings

2.4.12 There would be four safeguard buildings per UK EPR™ reactor unit, each containing safeguard systems to control and remove residual heat from the reactor in the event of abnormal operation. The four safeguard buildings would be physically separated to prevent simultaneous common-mode failure of the safeguard systems and therefore, to provide redundancy.

Each safeguard building can perform all the necessary safety functions independently.

iv. Nuclear auxiliary buildings

2.4.13 Each UK EPR™ reactor unit would have its own nuclear auxiliary building, which would house the nuclear operation support systems and the maintenance areas. The main systems installed in the nuclear auxiliary building would comprise:

- the treatment system for primary effluents;
- the spent fuel pool-water treatment system;
- the gaseous effluent treatment system;
- part of the steam generator blow-down treatment and cooling system; and,
- the operational ventilation and chilled water systems of the nuclear auxiliary building.

2.4.14 All air exhausts from the radiological controlled areas are routed, collected, controlled and monitored within the nuclear auxiliary building prior to release through the stacks on the nuclear auxiliary buildings.

v. Access towers

2.4.15 The main function of the access tower on each reactor unit is to enable controlled access to the nuclear islands. Access to the nuclear islands is strictly limited to authorised technical personnel.

vi. Radioactive waste storage, process and treatment buildings

2.4.16 The radioactive waste storage, process and treatment buildings would serve both UK EPR™ reactor unit. They would be used for the collection, storage, treatment and disposal of liquid and solid radioactive waste.

2.4.17 The waste buildings, which are made of reinforced concrete, would be divided into two sections: one for the storage of solid waste; and the other for liquid effluent and solid waste treatment.

vii. Hot laundry building

2.4.18 The hot laundry building is used to launder radiologically contaminated garments or potentially contaminated garments (i.e. the protective clothing worn by employees when working in contamination-controlled areas). It would be a shared facility for both UK EPR™ reactor units.

viii. Hot workshop, hot warehouse and facilities for decontamination

2.4.19 The hot workshop, hot warehouse and facilities for decontamination are encompassed in a single structure that would be shared between both UK EPR™ reactor units. The hot workshop is the facility for engineering work on radiologically activated or contaminated plant components, such as valves, pipes and pumps.

2.4.20 The hot warehouse is designed to store activated or contaminated tools and components such as the multi-stud tensioner or spare reactor coolant pump motors.

2.4.21 The facilities for decontamination are designed to reduce or remove radioactive contamination of tools, components or wastes. Decontamination of equipment enables reuse of tools and minimises the volume of radioactive materials requiring disposal.

ix. Effluent tanks

2.4.22 The effluent tanks, including the refuelling water storage tank, for the various liquid effluent systems would be located near to the hot laundry building and decontamination facilities and would be a shared facility for both UK EPR™ reactor units. Liquid effluent undergoes different treatment depending on its source: primary effluent treatment, spent effluent treatment or turbine hall drainage water treatment. The different types of effluent are sent to three specific types of tank for temporary storage and checking before discharge.

x. Emergency diesel generator buildings

2.4.23 In order to ensure power is always available to the safety critical infrastructure, even in the event of loss of connection or supply from the National Grid, back-up diesel generators are located on the nuclear island.

2.4.24 Two emergency diesel generator buildings would be provided for each UK EPR™ reactor unit. Each of these buildings would house two emergency diesel generators and an ultimate diesel generator. In total, there would be twelve back-up diesel generators, comprising eight emergency diesel generators and four ultimate diesel generators. Each building would have three vent stacks.

xi. Cooling water discharge weir buildings

2.4.25 The cooling water discharge weirs consist of two buildings per UK EPR™ reactor unit (type 1 and type 2). These buildings perform multiple functions in order to ensure compliance with the UK safety and fire regulations. Their primary function is to permit the discharge of essential service water.

b) Nuclear islands – reactor buildings (Zone 1A-2)

2.4.26 There would be a reactor building housing a reactor unit in each of the two nuclear islands. The reactor buildings would be cylindrical with a dome. The reactor building contains the UK EPR™ reactor and the main components of the nuclear steam supply system. This system produces heat to boil water in a separate secondary circuit, which drives the turbine in the adjacent turbine hall.

2.4.27 The reactor produces heat in a controlled fission reaction contained within a thick-walled steel pressure vessel, containing the nuclear fuel (reactor core) and four cooling loops, each consisting of a reactor coolant pump and a steam generator.

c) Conventional islands (Zone 1A-3)

2.4.28 The conventional island for each UK EPR™ reactor unit would comprise the following: turbine halls; sky bridges; conventional island electrical building and the power transmission platform.

i. Turbine halls

2.4.29 Each turbine hall is located adjacent to the reactor building for each UK EPR™ reactor unit and contains a turbine and generator set (turbo-generator) and the main condensers, together with other components.

2.4.30 The turbine halls would comprise a lightweight superstructure and metallic clad enclosure where the applied colour would be chosen to suit its context within the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB).

ii. Sky bridges

2.4.31 Sky bridges are required to permit direct access between the turbine halls and the nuclear islands. They would be designed to complement the turbine halls and operational service centre.

iii. Conventional island electrical buildings

2.4.32 The electrical building (one per UK EPR™ reactor unit) houses electrical distribution panels, which provide the permanent power supplies to the nuclear island and the conventional island systems, together with the instrumentation and control system which monitors and manages these systems.

iv. Power transmission platform

2.4.33 The function of the power transmission platform (one per UK EPR™ reactor unit) is to transmit the electrical power generated to the National Grid substation. The power transmission platform houses the following key plant items: gas insulated switchgear building; a main transformer platform; two-unit transformer platforms; and an auxiliary transformer platform.

2.4.34 Electricity generated is stepped up to 400kV via the main transformer and this power is then transferred to the National Grid 400kV substation via overhead power cables.

v. Operational service centre

2.4.35 The operational service centre is a multi-purpose building for Sizewell C and a shared facility for both UK EPR™ reactor units. It accommodates access to the nuclear islands, storage areas, workshops and storerooms, laboratories, offices, a data centre, a medical centre and associated support and welfare facilities, including the staff restaurant. It also accommodates training facilities.

2.4.36 The Sizewell C training centre would be located within the operational service centre and would accommodate a full scope simulation of the reactors. It would be the primary tool for training operators and would also contain a range of classrooms.

2.4.37 The operational service centre would be designed with a courtyard arrangement, with offices arranged around an internal atrium which maximises daylight from the interior of the floorplate and reduces the extent of windows to the external façade. The centre would be in operation 24 hours a day, seven days a week.

d) Cooling water pump houses and associated buildings and plant (Zones 1A-4 and 1A-5)

i. Cooling water pump houses

2.4.38 There would be one cooling water pump house for each UK EPR™ reactor unit, which would draw water from the forebays. The cooling water pump houses would contain equipment supplying seawater as coolant for:

- the nuclear and conventional islands' auxiliary and essential cooling water systems; and
- the condenser cooling system that cools the turbine exhaust steam and condenses it to liquid water for reuse as feed water within the secondary circuit.

2.4.39 Each cooling water pump house would contain four distinct supply channels (separated into 10 'trains') fed with water from the forebay.

2.4.40 Furthermore, each cooling water pump house would incorporate screening systems including drum and band screens specifically designed to prevent the blockage of key elements of plant further downstream within Sizewell C. The majority (approximately 91%) of the flow for condenser cooling associated with electricity generation and the band screens filter the remaining flow (approximately 9%) for the auxiliary and essential cooling water systems.

2.4.41 Each drum screen would be made up of a horizontal axis drum whose outer circumference would be made up of panels of a smooth ('fish friendly') fine mesh. A 10mm mesh size is proposed at Sizewell C due to the high risk of clogging from jellyfish swarms. The inner circumference of each drum screen would have 'fish-friendly' elevator ledges or 'buckets', which would lift debris and marine organisms including fish. Continuous wash-water sprays would then flush the collected material into collection troughs which in turn flush into a gutter for onward flow to the filtering debris recovery pit. In normal operation, the drum screens would rotate at a low speed but if there is any indication of blockage both the rate of rotation and the flow rate of wash-water would be increased.

2.4.42 Each of the cooling water pump houses would also have two rotating band screens to remove debris from the lateral train, prior to passage through the fine bore heat exchanger systems that follow. The band screens would be made up of a continuous belt of linked mesh plates which are rotated around two horizontal rollers, one positioned at the foot of the waterway and one above, and similarly aligned with a catch bucket and gully for fish return that discharges into the filtering debris recovery pit.

ii. Forebays

2.4.43 There would be one forebay for each UK EPR™ reactor unit, each served by its own dedicated intake tunnel. The forebays serve to smooth the water flow into the cooling water system accounting for the tidal range of the North Sea. The forebays are also interlinked for safety reasons.

iii. Outfall pond building

2.4.44 All abstracted sea water, which has served its cooling function and would thus have been warmed, would be conveyed back to the marine environment via an outfall pond building, open to atmosphere that discharges into an outfall gallery. The outfall galleries leading from each of the outfall pond buildings (one per UK EPR™ reactor unit) would then join to form a single outfall tunnel, discharging to sea.

iv. Filtering debris recovery pits

2.4.45 Plant for managing screen debris is positioned near to each cooling water pumphouse. It would consist of a pre-discharge section and a pre-discharge basin. The pre-discharge section would involve the continuation of the washwater gulley that would run from the drum and band screens to collect fish and other marine organisms directed from the screens, together with the gutter from the forebay raking screens.

2.4.46 Recovered fish and debris would be returned to the sea under gravity via a dedicated fish recovery and return (FRR) tunnel per UK EPR™ reactor unit.

v. Fish recovery and return system

2.4.47 The FRR system would be fully integrated within the cooling water infrastructure. Its purpose would be to recover fish and other marine organisms that are entrapped in the cooling water system and caught on both the drum and band screens. The system would return them to sea.

2.4.48 Elements of the FRR system are found in the forebay (i.e. the trash racks and racking system), the pumping station (i.e. the fish 'buckets' fitted to the drum and band screens that recover fish from the pumphouse wells and filtration screens; the very low pressure wash sprays which gently wash fish and biota off the screens into the fish 'buckets'; the collection 'hopper' which receives fish and biota washed off the screens; and the collection of gutters that transfer the fish and biota to the filtering debris recovery building), the filtering debris recovery building (i.e. the fish sampling basin) and the FRR tunnels that return the recovered fish and biota to sea.

2.4.49 The FRR system would be of very similar design as approved by the Marine Management Organisation, Environmental Agency, Natural England and Natural Resources Wales for Hinkley Point C (Ref. 2.1) with two key differences[1]:

- the fish would be discharged back to sea directly from the base of the filtering debris recovery building; and,
- each FRR system would have its own, separate return tunnel.

[1] Due to the very large tidal range at Hinkley Point C the fish need to be raised to platform level using an Archimedes screw to allow discharge to sea under gravity. At platform level the flow from the two filtering debris recovery buildings combine to join one shared tunnel that returns fish and biota to sea. This is not required at Sizewell

2.4.50 The FRR system would be in general accordance with Environment Agency science and evidence publications on fish protection at power stations (Ref. 2.2 and 2.3)

vi. Fire-fighting water distribution buildings

2.4.51 The fire-fighting water distribution buildings, one for each UK EPR™ reactor unit, would provide the fire-fighting water supply and house an emergency water provision for nuclear island facilities' cooling.

e) Waste storage (Zone 1A-6)

2.4.52 This section should be read in conjunction with **Volume 2 Chapter 7** of the **ES**.

i. Intermediate level waste store

2.4.53 Intermediate level waste generated during operation of Sizewell C would be placed in the intermediate level waste storage facility which would be designed for a life of about 100 years. No gaseous discharge stack is necessary. This store is a shared facility for both UK EPR™ reactor units.

f) Spent fuel storage (Zone 1A-7)

2.4.54 This section should be read in conjunction with **Volume 2 Chapter 7** of the **ES**.

i. Interim spent fuel store

2.4.55 The interim spent fuel store is a shared facility that would provide long term safe and secure storage for spent fuel until it is removed from Sizewell C. The fuel store would be designed for a life of at least 100 years. The fuel store would be near to the intermediate level waste storage facility to facilitate security zoning during operation of Sizewell C and after decommissioning of all other buildings associated with Sizewell C.

2.4.56 The interim spent fuel store would comprise a 'dry' fuel store with spent fuel loaded into a metal canister and then welded shut, before being placed and stored in a large, leak-tight steel and concrete cask. No gaseous discharge stack or external heat sink equipment are necessary.

g) Sea defences (Zone 1C)

2.4.57 The permanent sea defence, known as the hard coastal defence feature (HCDF) would be in the form of a landscaped embankment built seaward of the outer security fence for Sizewell C. The baseline crest height of the embankment to protect against wave overtopping would be 10.2m AOD.

2.4.58 As with Sizewell B, an artificial linear dune / sacrificial berm comprising largely of shingle would extend along the frontage of the sea defences at a level on the shore above extreme high water-level spring tides and rising to a height of approximately 5m AOD, known as the soft coastal defence feature. The function of this feature would be to erode and release sediment to the beach face during severe storms and high water levels, thereby slowing overall erosion rates locally and maintaining the protective shingle beach in front of the HCDF.

2.4.59 The HCDF landscaping scheme would take into account landscape, biodiversity and recreational considerations. In order to create a semi-natural and less engineered appearance, and to provide additional screening of Sizewell C from certain public viewpoints along Sizewell beach, the height of the HCDF would vary along its length between 10.2m AOD and 12.2m AOD. The feature would be similar in outward appearance to the Sizewell B sea defence, although its alignment would be further to the east. As with the frontage of Sizewell B, the artificial linear dune fronting the sea defence would be integrated into the landscaping scheme through the creation of semi-natural dune habitats.

2.4.60 Illustrative details of the sea defences can be found at **Figure 2.8**.

h) Northern Mound (Zone 1D)

2.4.61 The Northern mound is an existing substantial landscape feature to the north of Sizewell beach. It is made up of spoil that was extracted during the construction of Sizewell B.

2.4.62 Due to the proximity of this area to the main platform, the Northern mound's function would be expanded from a landscape feature to a sea defence. Therefore, the Northern mound would be rebuilt to be able to withstand the unlikely event of a significant earthquake in the local area.

2.4.63 The rebuilt Northern mound would tie into the Sizewell C sea defences, which in turn would tie into the Sizewell B sea defences to provide a continuous defence structure.

2.4.64 The access road to the BLF would be incorporated into the Northern Mound.

2.4.65 A typical section of the Northern mound is shown on **Figure 2.9**.

i) Beach landing facility (Zone 1B)

2.4.66 A permanent BLF is required for the operational phase for delivery of AILs during maintenance, such as the reactor pressure vessel. The landward

termination of the BLF would be at up to 6m AOD to provide the necessary depth to accommodate the required barges.

2.4.67 The BLF would include a temporary deck structure that can be removed when not in use, leaving minimum visible elements.

2.4.68 Fender piles with cross beams and piled mooring dolphins would be located immediately adjacent to the BLF to aid safe berthing. A linkspan ramp, which would comprise a short steel constructed bridge would provide a connection to the cross beams. A taper section would then provide a ramp onto the barge. If required, fixed structures in the water (i.e. dolphins or lateral pillars) would be lit.

2.4.69 When not in use for extended periods of time, the modular sections of the BLF including the linkspan ramp and the taper would be removed.

2.4.70 When the BLF deck is removed for storage, several elements would remain in situ and be maintained for the operational life of Sizewell C. These would consist of piling structures and a ground beam connection from the BLF to the access road. The height of pile projections, including fender piles and mooring dolphins would be up to approximately 1m above the mean high-water water.

2.4.71 The pile and ground beam furthest into the beach would be located within the existing dunes and so would typically not be visible.

2.4.72 An associated roadway would connect the BLF to the main platform.

2.4.73 To accommodate the safe passage of barges and accompanying tugs to the BLF a navigational channel and grounding area would be required in the nearshore zone occupied by two longshore bars. Plough dredging is the preferred option to create a planar surface for the barges, as the use of a plough dredge minimises sediment extraction from the area. Further details on dredging are set out in **Chapter 3**.

2.4.74 Illustrative details showing how the BLF could look for the majority of the time during operation, when it is dismantled, are shown on **Figure 2.10**.

2.4.75 The BLF is also required for the construction phase and further details are set out in **Chapter 3**.

j) Sizewell C pylons

2.4.76 Electrical connections from the main platform would be made via overhead lines to the National Grid 400kV substation, which in turn would connect into the National Grid high voltage transmission system. Six monopoles and four pylons would be required to make the connections between the

power transmission platforms and the substation. Details of the proposed National Grid pylons are set out later in this chapter.

k) Ancillary buildings and infrastructure (Zone 1A)

2.4.77 Several ancillary buildings would be required to facilitate the operation of Sizewell C. These would include buildings for office, access, plant, storage and other purposes and may include (but not limited to) those set out in **Table 2.4**..

Table 2.4: Description of ancillary buildings

Building details	Description
Main access control building	Primary access and control of daily entrance and exit of personnel and visitors, and vehicles on-site.
Auxiliary administration building	Multifunctional building that includes ancillary facilities for operational staff and administration.
Secondary access control building	A secondary access point to and from Sizewell C.
Emergency response centre	Primary function is to house the site's emergency response centre.
Emergency response energy centre	Primary function is to host power distribution plant and fuel to run the back-up diesel generators and the on-site emergency response facilities and equipment.
Off-site delivery check point	Facility to allow vehicle searching.
Meteorological station	Facility for housing environmental monitoring and recording equipment.
Demineralisation station	Demineralised water storage building.
Valve room for the demineralisation station	Facility to house the valves necessary for the operation of the demineralisation station.
Auxiliary boilers	Provide steam for heating the deaerator and turbine gland sealing for start-up for both reactor units.
Hydrogen storage	Store hydrogen and nitrogen for the turbine generator and the nuclear island.
Oxygen storage	Store oxygen and argon for the nuclear island.
Hydrazine storage	Provided for adding to the secondary circuit water to achieve the correct potential hydrogen (pH) to minimise corrosion.
Chlorination plant	Plant for chlorinating the cooling water system.
Degassed water storage tanks.	Tanks will store degassed water from the Demineralisation Station and provide water supply for the effluent treatment which takes place in the radioactive waste storage building.

Building details	Description
Cooling water discharge shaft	Provides an access point for a remotely operated vehicle to be sent to the outfall tunnels, to safely inspect and maintain the tunnels over the life of the power plant.
Sewage treatment plant	Provides dedicated treatment of sewage generated on-site prior to discharge.
Conventional island water tanks	Storage of water for use in the conventional island.
Nuclear island water tank	Storage of water for use in the nuclear island.
Service access buildings	Provides access to the underground network of service tunnels.
Service ventilation buildings	Provides ventilation to the underground network of service tunnels.
Battery load banks	Equipment used for testing of electrical systems.
Warehouse	To support the operational logistics of the site and would be used as a workshop and warehouse throughout the life of the power station.
Garage for handling facilities	Fenced compound used for the garaging of special handling equipment and vehicles.
Chemical products store	Store for process of chemicals for use in the plant.
Oil and grease storage	Building for the storage of oil and grease during operation. The building would also accommodate the vehicles for the transfer of the oil to the required locations.
Raw water and potable water storage/supply building	Facility which provides a balancing (buffer tank) for the raw water supply from the local water company and would also supply raw water to downstream users.
Contaminated tools storage	Fenced compound for contaminated tools.
Conventional waste storage	Store for conventional waste.
Transit area for very low-level waste and low-level waste	Fenced compound for sorting and interim storage before collection and removal off-site.
Interim spent fuel store equipment storage building	Storage for transportation and handling equipment used to transfer the spent fuel to the interim spent fuel store.

2.4.78 In addition to the buildings set out above, there is a network of underground service tunnels within the main platform, which enable cabling, pipework and other services between buildings and plant.

2.4.79 A perimeter fence would enclose most of the main platform. Additional high security area fencing would be provided around the nuclear island.

2.4.80 The main road access within the main platform would be provided by a ring road around most buildings (the main circulatory road). This would be

supplemented by additional roads to service ancillary buildings and secondary roads for vehicle access to buildings. All pedestrian routes would be segregated from vehicular access.

2.4.81 The cut off wall installed during the construction period would be retained for the permanent development as seen in **Chapter 3** of this volume which provides construction details. The realignment of Sizewell drain would be retained, as illustrated in the typical section shown on **Figure 2.13**.

2.5 Sizewell B relocated facilities and National Grid land

2.5.1 A number of existing Sizewell B facilities would need to either be relocated from the main platform or relocated within Sizewell B because of relocation from the main platform. These facilities have a broad range of functions including industrial, workplace, education, cultural and infrastructure; some of which would need to be upgraded to comply with current standards and regulations.

2.5.2 Planning permission under Town and Country Planning Act 1990 (application ref. DC/19/1637/FUL) for the Sizewell B relocated facilities has been granted by East Suffolk Council's (ESC) Strategic Planning Board. The **ES** for that application is appended to this **ES** at **Volume 1 Appendix 2A.**

2.5.3 **Chapters 8 to 28** in this volume typically cross-refer to the relevant chapter within **Volume 1 Appendix 2A** of the **ES** for a detailed assessment of effects and description of mitigation associated with the Sizewell B relocated facilities, where relevant. Impacts arising from the Sizewell B relocated facilities are also summarised in the above chapters directly, where applicable, together with an explanation of the implications of relevant project design changes made since the preparation of the Sizewell B relocated facilities ES. These design changes include the removal of the previously proposed footpath between the outage car park on Pillbox Field and the Coronation Wood development area and an alternative junction arrangement for the new access road to the outage car park on Pillbox Field and Sizewell Gap.

2.5.4 Parts of the Sizewell B relocated facilities and National Grid land require flexibility to allow detailed designs to evolve and be submitted following grant of development consent. **Table 2.5** sets out the parameters for this flexibility and should be read in conjunction with the parameter plan shown on **Figure 2.6** and the text below.

Table 2.5: Parameters for Sizewell B relocated facilities and National Grid land.

Building/structure name	Maximum height (mAOD.
Parameter zone 1G (National Grid substation)	
Substation	27
Unspecified amount of associated plant, buildings and infrastructure	22
Parameter zones 1H and 1I (Sizewell B relocated facilities)	
Offices, canteen and welfare facilities*	29
Visitor Centre**	29
Parameter zone P7 (National Grid pylon)	
National Grid pylon	67
Parameter zone P8 (National Grid pylon)	
National Grid pylon	67

** Maximum floorspace of new development: 11,500m² GEA.*

*** Maximum floorspace of new development: 2,000m² GEA.*

vi. Sizewell B relocated facilities offices, canteen and welfare facilities (Zone 1H)

2.5.5 The Sizewell B relocated facilities proposed development also includes: office accommodation for operations and outage staff and an associated mess facility; canteen; general storage; a civils store and workshop; a general store and changing facilities; and a 'front of house' for staff and visitors to the Sizewell B power station.

2.5.6 Outline parameters have been identified for the proposed uses (see **Table 2.5**). The detailed design of the zone would respond to the functional requirements and consider the extent of existing facilities currently located within this zone.

2.5.7 Building materials and appearance would be in keeping with the existing ancillary buildings. The buildings would be operational for seven days a week, on a 24-hour basis.

2.5.8 Foundations for these proposals would likely only require ground bearing solutions.

vii. Visitor centre (Zone 1I)

2.5.9 The existing Sizewell B visitor centre would be replaced with a permanent, modern educational facility for visitors, including school groups. It is proposed that the new visitor centre would be located at the north-east of the Coronation Wood development area, adjacent to the proposed Sizewell B training centre.

2.5.10 The design of the facility would use some of the same elements, materials and form of the existing ancillary buildings, but would articulate these differently to reflect the public facing function of the building and its location.

2.5.11 The internal lighting of the building would be designed to minimise light spill to the external area, with further mitigation measures such as motion sensors and blinds considered as part of the detailed design process. The design of the building would seek to minimise any windows to the western façade to reduce light spill into the adjacent Sizewell Marshes SSSI. The upper floors of the building would be mostly solid, with openings limited to the north façade, primarily to gain views of Sizewell B and Sizewell C.

2.5.12 The visitor centre would typically operate the same hours as the existing visitor centre, typically being 09:00 to 16:00 hours from Monday to Saturday but may extend beyond these hours for specific events. The occupancy of the building would vary daily, depending on visiting groups and events. It is anticipated that the total maximum occupancy would be approximately 135 people. Groups would be predominantly pre-booked to visit, however the facility would also be open to walk-in visitors.

a) Sizewell B relocated facilities development where the design is fixed

2.5.13 Where designs for the Sizewell B relocated facilities are at an advanced stage, details are submitted in full.

i. Sizewell B outage store

2.5.14 The outage store would be used for the storage of general and specialist plant, equipment and materials for use during outage periods. Office space would be provided for staff to carry out work both during and outside of outage periods.

2.5.15 The outage store would be relocated within the existing Sizewell B station perimeter at the current location of a general store.

2.5.16 The outage store would include inspection areas for contamination and radiation.

2.5.17 The building would be accessed by pedestrians through a main entrance on the north side of the building. Vehicular access is provided through two vehicle doors on the north façade.

2.5.18 The outage store would be slightly taller than the neighbouring facilities at an elevation of 35m AOD, though lower than the Sizewell B turbine hall and in keeping with the overall building heights at Sizewell B power station.

2.5.19 The design of the outage store would be in keeping with the existing ancillary buildings and consist of grey profiled aluminium cladding.

2.5.20 The foundations for the outage store would be based on a ground bearing solution, with no permanent piles required.

ii. Sizewell B laydown area

2.5.21 The laydown area comprises a general storage facility and working area for use primarily during outages. It would be located at the southern end of the Coronation Wood Development Area[2] and would be used for the storage of plant and equipment. Use of the area would also require mobile workshops, temporary office accommodation and the storage of shipping containers, which would be limited to a maximum height of 6m. Any fabrication that would take place within the laydown may require temporary cover. Certain activities would be constrained by the presence of the 400kV overhead lines running over its western side.

2.5.22 When Sizewell B is not in an outage, the area would be used flexibly for operational activities including maintenance work and storage, as required.

2.5.23 The laydown area would require a secure perimeter and would be attended by a yardsman, with accommodation provided in a yardsman's hut up to 3m high.

2.5.24 The laydown area has been designed so that it can be accessed by vehicles from the existing site access road (primary access), where the yardsman would be stationed, with a secondary access from the western access road which would be gated. Pedestrian access to the laydown area would be segregated from vehicle access.

2.5.25 The laydown area would be used all year round, with peak activities occurring on a 24-hour basis during outages. Accordingly, the area would be lit by asymmetric 8m lighting columns with shorter columns underneath the overhead lines. The lighting arrangements would provide localised lighting of up to 100 lux when needed for certain tasks as provided in **Appendix 2B** of this chapter. When lighting is not needed in an area, the lights can be switched off to minimise the overall lighting levels.

[2] The Coronation Wood Development Area comprises the proposed western access road, Sizewell B training centre, Sizewell B laydown area and replacement Sizewell B car park.

iii. Sizewell B replacement car park

2.5.26 The Sizewell B replacement car park would be located to the west (and north) of the Sizewell B training centre and would provide approximately 112 car parking spaces. It would replace the existing 63 spaces at the technical training and 'pool car' car park, the existing 16 spaces at the existing visitor centre car park and the existing 21 spaces to the north of Coronation Wood. An additional six enlarged spaces and six accessible spaces would be provided to comply with current standards.

2.5.27 Vehicular access would be provided from a dedicated entrance off the proposed western access road, with a new pedestrian link created from the replacement car park to access the Sizewell B training centre, Sizewell B power station main entrance and neighbouring facilities. Eight charging points for electric vehicles would be provided.

2.5.28 The replacement car park would be surfaced with a heavy-duty permeable block paving and/or provided with catchpit soakaways that would allow full infiltration of surface water run-off into the subsurface, thereby negating the need for an independent drainage network. Oil/ hydrocarbon/ silt interception systems (e.g. as permeable paving or an oil separator) would be provided to avoid the pollution of controlled waters from surface water run-off.

2.5.29 The car park would be lit by asymmetric 4m lighting columns. Lighting levels would be at the minimum required for car parking areas (20 lux).

iv. Sizewell B training centre

2.5.30 The Sizewell B training centre would combine the existing Sizewell B training arrangements into a single building. It would be located between the proposed laydown area to the south, the proposed visitor centre to the north, and replacement car park to the west.

2.5.31 The three-storey training centre would be the main facility where Sizewell B staff would receive inductions and training for site related activities.

2.5.32 The training centre has been designed for an average occupancy of 150 people, with a peak occupancy of 350 people. The building would be open seven days a week, from 07:00 to 19:00 hours on non-outage days and 24 hours a day during outage periods and when otherwise required. The main entrance is on the northern façade, to ensure connection with the visitor centre and rest of Sizewell B.

2.5.33 The design of the training centre would be in keeping with the existing ancillary buildings, although the materials chosen would ensure a softer appearance to the more industrial buildings of Sizewell B station. The

building is orientated such that the shorter western façade facing the wider AONB and Sizewell Marshes SSSI is windowless, thereby minimising light spill in this direction.

2.5.34 Shallow, pad foundations would be provided under columns, with a suspended ground floor slab spanning between pads. Foundation depths would typically be 1-2m below ground level.

v. Sizewell B western access road

2.5.35 A western access road is proposed on the western edge of the Coronation Wood Development Area, adjacent to the proposed laydown area and replacement car park. The road would follow the alignment of an existing access track to the south of Coronation Wood Development Area and then head north to join the existing Sizewell B approach road and roundabout.

2.5.36 The western access road would reduce interfaces between pedestrians and vehicles on the main access road to Sizewell B during both construction and operation, and thus improve safety.

2.5.37 The proposed two-way western access road would be 355m long and 6m wide and surfaced with asphalt. The road would be lit by 4m lighting columns at minimum lighting levels required for roads, with lighting fixtures directed away from the Sizewell Marshes SSSI.

vi. Sizewell B outage car park

2.5.38 The Sizewell B outage car park would be relocated to the northern end of Pillbox Field (outside of the existing Sizewell B power station site perimeter) for use during outages only (both scheduled and unscheduled). It would provide 576 car parking spaces, which is the same as the existing provision. Vehicular access to the outage car park would be via a new junction from Sizewell gap into Pillbox Field. During outage periods, the car park would be in use 24-hours a day to meet Sizewell B's operational requirements. In line with the planning conditions attached to the Sizewell B relocated facilities planning permission, a pedestrian access route from the outage car park on Pillbox Field to the Sizewell B power station is to be agreed with ESC prior to the first use of the outage car park facility.

2.5.39 The car park would be a surface level car park constructed with a grass reinforcement system base (a rigid system of interlocking plastic reinforcement cells that allow the growth of grass under intensive vehicular and/or pedestrian traffic). The grass reinforcement system would provide a high strength structure of which a large proportion of the surface could be infilled, enabling the system to be visually unobtrusive and contribute towards achieving a sustainable urban drainage system.

2.5.40 Cars would access the outage car park from Sizewell Gap road via a new junction.

2.5.41 The outage car park would be lit to allow for adequate coverage across the car park given the types of vehicles anticipated. Directional lighting would be installed to minimise obstructive light. The car park would not be lit when not in use.

2.5.42 The ground levels of the outage car park have been designed to deliver a solution that balances earthworks volumes against the potential visual impact of the car park upon the surrounding environment. Reprofiling of the field to extend the existing ridgeline to the east, as well as planting around the southern and south-eastern edges of the car park, is proposed to provide screening. Planting is also proposed along the eastern edge of the outage car park access road for this purpose.

b) National Grid land

i. National Grid substation (Zone 1G)

2.5.43 An extension to the existing National Grid 400kV substation would be required to accommodate the additional generation output of Sizewell C. The overhead lines that currently terminate at the existing National Grid 400kV substation would be diverted into a new substation building built alongside and interconnected with the existing substation building, so that the electricity generated by both the existing Sizewell B and new Sizewell C power stations can be exported to the National Electricity Transmission System.

2.5.44 The National Grid substation may include the key equipment listed below. The final equipment to be utilised will be determined during detail design of the National Grid substation:

- gantries (up to 6): which are structures that support electrical conductors as they transition from the overhead line pylon to the National Grid substation allowing them to connect to the busbars and other equipment within the National Grid substation;
- cable terminations/sealing ends: used where high voltage underground cable joins onto busbars allowing their connection to equipment within the National Grid substation;
- switchgear (air insulated or gas insulated): which includes circuit breakers, disconnectors, earth switches and other equipment (some of which is described below), which switches, controls and protects the high voltage electrical circuits and equipment within the National Grid substation;

- circuit breakers: an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to clear a fault condition by breaking the electrical circuit which would immediately discontinue electrical flow;
- disconnectors: which allow a physical break in the electrical circuits to be introduced which isolates the substation during periods of maintenance;
- earth switches: which allows safe maintenance of the National Grid substation equipment;
- busbars, connectors and post insulators: air insulated or gas insulated, which form the high voltage electrical circuit to allow the flow of electricity around the National Grid substation;
- current and voltage transformers: which convert electrical current and voltage to levels which can be safely measured by the National Grid substation's control and protection equipment;
- surge arresters: which protect key equipment by providing a path to earth when triggered by an abnormal voltage condition such as a lightning strike;
- series reactors/inductors: an item of wound plant forming part of the electrical circuits which limits electrical current during a fault condition to ensure switchgear can operate safely within its design capability,
- emergency generator: which provides standby low voltage electricity supply to the National Grid substation in the event of a failure of the local electricity supply;
- earthing system: which provides a grounding mat below the earth surface at the National Grid substation which equipment is connected to, protecting equipment and personnel from voltage surges and lightning strikes by safely transferring current to ground;
- ancillary buildings: which may include a small workshop/store, welfare, control room, incoming power and protection/telecom/metering room(s); and
- security fence: which will comprise a perimeter fence with an electrified fence installed along its inner boundary to maintain security of the National Grid substation.

2.5.45 External lighting would also be installed at the substation which may entail:

- general lighting around the perimeter fence and within the National Grid substation for the purposes of security and to provide adequate lighting levels for access and inspection of equipment; and
- task related flood lighting within the National Grid substation which may be necessary from time to time during repair/maintenance activities.

2.5.46 Whilst the above lighting is provided, the substation would not normally be lit during hours of darkness.

ii. National Grid pylons (Zones P7 and P8)

2.5.47 The National Grid substation will connect into each of the four circuits on the National Grid 400kV overhead lines. To facilitate these connections, modifications to the existing overhead lines will be required which will include a new pylon (Zone P7), modification of an existing pylon (Zone P8), removal of an existing pylon and the permanent realignment of a short section of the overhead line to connect to the new National Grid substation.

2.6 Offshore works area

2.6.1 Parameters for the offshore works area are set out in **Table 2.6** and should be read in conjunction with **Figure 2.7** and the text below.

Table 2.6: Coordinates for offshore works.

Headworks	Coordinates	Headworks centre max. radii
Intake headworks (Work Nos. 2B) (Two of three positions to be selected)	X = 650722 Y = 263320 X = 650525.76 Y = 263359.68 X = 650624.00 Y = 263341.00	25m
Intake headworks (Work Nos. 2D) (Two of three positions to be selected)	X = 650726.00 Y = 264261.94 X = 650826.00 Y = 264264.00 X = 650925.98 Y = 264266.06	25m

Headworks	Coordinates	Headworks centre max. radii
Outfall headworks (Work No. 2F)	X = 651080.00 Y = 264125.00 X = 651155 Y = 264125	25m
FRR headworks (Work Nos. 2H and 2J)	X = 647980 Y = 264000 X = 647980 Y = 264300	25m
Combined drainage outfall headwork (Work No. 2L)	X = 647980 Y = 264340	25m

2.6.2 Seawater for cooling would be abstracted via a series of intake structures and tunnels. Approximate dimensions identified below are assumed for the purposes of environmental assessment.

2.6.3 Each UK EPR™ reactor unit would have a single dedicated 6m internal diameter intake tunnel that connects to the forebay on the main platform (Work Nos. 2A and 2C). At the seaward end of each tunnel two vertical shafts would extend upwards to provide a connection to the sea via a seabed-mounted intake head (one head per shaft).

2.6.4 Each intake tunnel would terminate in two concrete headworks with dimensions of approximately 8m (height) x up to approximately 50m (length) x 10m (width), protruding approximately 4m above the seabed (Work Nos. 2B and 2D). The coordinates stated in **Table 2.6** relate to the centre-point of each headwork.

2.6.5 A single 8m internal diameter outfall tunnel serving both UK EPR™ reactor units would return the cooling water to the sea from the outfall pond buildings (Work No. 2E), with a pair of vertical shafts at its seaward end, each leading upwards to a single outfall headworks, again mounted on the seabed. The outfall headworks are likely to be 8m (height) x 16m (length) x 16m (width), protruding approximately 3m above initial seabed level (Work No. 2F). The coordinates stated in **Table 2.6** relate to the centre-point of each headwork.

2.6.6 The intake and outfall tunnels would extend approximately 3km from the shore, at depths of approximately up to 30m below ordnance datum (Newlyn).

2.6.7 The Fish Recovery and Return (FRR) outfall headworks would comprise a concrete block approximately 4.5m (height) x 3m (width) x 3m (depth). They would be buried approximately 2m into the sediment (Work Nos. 2H and 2J). The coordinates stated in **Table 2.6** relate to the centre-point of each headwork.

2.6.8 The two fish return tunnels (Work Nos. 2G and 2I), with an internal diameter of approximately 0.65m, would commence at the filtering debris recovery pits and be tunnelled below the seabed level before rising to the seabed to connect with the FRR outfall headworks. The coordinates stated in **Table 2.6** relate to the centre-point of each headwork.

2.6.9 The combined drainage outfall tunnel, with a diameter of approximately 1.2m (Work No. 2K) would be connected to a concrete outfall headwork structure (Work No. 2L), anticipated to be of similar dimensions to the FRR headworks. The coordinates stated in **Table 2.6** relate to the centre-point of the headwork.

2.7 Temporary construction area, including Upper Abbey Farm

2.7.1 Parameters for permanent development in the Upper Abbey Farm area, forms part of the temporary construction area, are set out in **Table 2.7** and should be read in conjunction with the parameter plan shown on **Figure 2.5**, as well as the following text.

Table 2.7: Parameters for buildings, plant and structures in the Upper Abbey Farm area.

Building details	Maximum height (mAOD)
Parameter zone 1F (access control)	
Off-site delivery checkpoint	18
Parameter zone 1M (emergency equipment storage and associated plant)	
Emergency equipment store	32
Back-up power generation plant	36 (plus 3.5m tall stack)
Parameter zone 1N (ancillary substation compound)	
Ancillary substation compound	27

a) Power station access road, junction with the B1122 and car park

2.7.2 A permanent two-lane access road, with a segregated route for cyclists and pedestrians would be provided. A corridor similar in character to a country road would be established, while maintaining safe access/egress. The access road would be a private thoroughfare for Sizewell C operations only.

Lighting would be present at the junction with the B1122 and at the operational car park and at associated facilities in this area as necessary.

2.7.3 The access junction to the B1122 would become part of the adopted highway and would comprise a four-arm roundabout as shown in **Figure 2.1**, reduced from five-arms during the construction stage.

2.7.4 A car park would be provided at the eastern end of the access road and would accommodate up to 1,370 spaces divided between permanent parking spaces for day-to-day operation and the training facilities (approximately 770) and spaces required during outage periods (approximately 600), as shown in **Figure 2.2**. Cycle parking and electric vehicle charging points would be provided.

b) Off-site delivery checkpoint (Zone 1F)

2.7.5 The primary function of the off-site delivery checkpoint is to accept deliveries to the site at a secure central location for sorting prior to onward site-wide distribution, as shown in **Figure 2.2**.

c) Vehicular and pedestrian causeway crossing Sizewell Marshes SSSI

2.7.6 The SSSI crossing provides an essential pedestrian and vehicular connection across Sizewell Marshes SSSI, linking Sizewell C with the new access road. The design comprises an embankment with a culvert, through which the Leiston drain would flow.

2.7.7 Following the completion of the construction phase, the western-most access route across the causeway would be maintained to provide operational access to the power station. The easternmost part of the causeway would be appropriately landscaped, helping to create a landscape boundary between the power station development and its surroundings, as shown in **Figure 2.11**.

2.7.8 The width of the embankments at road level would be up to approximately 35m and the overall width of the crossing at its base would be up to approximately 65m.

2.7.9 The culvert would be of sufficient size to leave the bank and channel of the Leiston drain completely intact. A ledge would be installed to enable passage by otters.

d) Emergency equipment store and backup generator at Upper Abbey Farm (Zone 1M)

2.7.10 An emergency equipment store would be required close to Sizewell C to enable a rapid response to an emergency event. It would be approximately

located adjacent to Upper Abbey Farm farmhouse in the location of an existing building.

2.7.11 The design of the emergency equipment store would be driven by engineering requirements as this building would be required to withstand extreme external hazards. Consideration would be given to the setting within the Upper Abbey Farm complex.

2.7.12 A backup power source to the emergency equipment store would be provided.

e) Electrical substation south of Upper Abbey Farm (Zone 1N)

2.7.13 A new substation is proposed to provide an electrical supply during the construction phase. The substation would be retained during the operational phase to complete the electrical connection between the Leiston substation at Sizewell Wents and certain site buildings.

2.7.14 The location for the substation is to the south of Upper Abbey Farm within a field west of Bridleway 19. The facility would be surrounded by secure fencing accessed by a road extending south from the power station access road, as shown in **Figure 2.2**.

2.7.15 The substation design would be based on a standard UK Power Networks 132/11kV outdoor substation. It would be enclosed by security fencing. The compound would contain:

- a switch house;
- outdoor transformers, switchgear, and busbars; and
- internal roads, footpaths, parking spaces, ancillary cabinets and equipment enclosures.

2.7.16 The electrical supply cable from this substation would be installed during the construction period as detailed in **Chapter 3** of this volume, and retained during the operational period.

f) Kenton Hills car park

2.7.17 The car park and access into Kenton Hills woodland would be improved to enhance the visitor experience. The development would comprise:

- provision of up to 15 additional parking spaces;
- additional signage and picnic tables; and
- selective vegetation removal.

g) Lover's Lane junction realignment

2.7.18 To provide the necessary amount of space between the level crossing and other road junctions during construction as detailed in **Chapter 3** of this volume, the junction of the B1122 (Abbey Road) and Lover's Lane would be moved approximately 100m to the south of its current location. This would be a permanent re-alignment of Lover's Lane, to improve visibility at this junction for all road users.

2.8 Fen meadow compensation areas

2.8.1 The fen meadow compensation areas at Benhall and Halesworth created during the construction phase would be retained permanently to compensate for fen meadow permanently lost from Sizewell Marshes SSSI as a result of the development.

2.8.2 The two fen meadow compensation areas would provide fen meadow habitats to compensate for the permanent loss of approximately 0.7 ha of fen meadow habitat from within Sizewell Marshes SSSI. In order to create the habitats, minor changes to existing watercourses and field drains may be required to raise water levels. Taking both sites forward maximises the likelihood that fen meadow habitats would be created.

2.8.3 Further details on the fen meadow compensation areas are set out in **Volume 2, Chapter 14** of this **ES**.

2.9 Leiston off-site sports facilities

2.9.1 The Leiston off-site sports facilities would be provided during the construction stage as detailed in **Chapter 3** of this volume, as a shared facility for Alde Valley School, the local community and construction workers. These would be retained as a permanent development and left as a legacy for the school and local community. As shown in **Figure 2.12** the facilities would include:

- one full-size 3G pitch, 400-millimetre (mm) pile, rubber crumb surface suitable for football, non-contact rugby and hockey; and
- two multi-use games areas suitable for basketball, netball, tennis and football.

2.10 Proposed design strategies

a) Outline drainage strategy

2.10.1 An outline drainage strategy has been developed based on the following strategic criteria:

- Drainage facilities to provide no surface flooding from a 1 in 30-year return period rainfall event, in accordance with accepted guidelines, combining a range of techniques e.g. Infiltration systems, permeable paving and surface drainage structures to remove water from paved or semi-paved surfaces (e.g. storage areas) with no ponding for a 1 in 30-year rainfall event.
- Store or safely convey the run-off from exceedance storm events greater than 1 in 30-year return period, without putting public or property at risk.
- Reduce if possible, or at least not increase, the pre-development risk of flooding.
- Determine the impact and store on site the volume of water generated from a 1 in 100-year rainfall event to prevent escape into adjacent areas.
- Remove/Treat any contaminants within surface water runoff before discharge.
- Provide amenity and ecological enhancement, if practicable.
- Protect the environment, minimise the use of finite natural resources and energy and provide value to those involved in its design, construction and operation.

2.10.2 Further details are set out in **Appendix 2A** of this chapter.

b) Lighting management plan

2.10.3 A lighting management plan has been developed based on the following objectives:

- Provide a safe working environment, meeting statutory requirements and standards.
- Allow 24-hour working (when required).
- Provide site security lighting.

- Mitigate the impact of artificial lighting on the surrounding environment as far as reasonably practicable.

2.10.4 Further details are set out in **Appendix 2B** of this chapter.

c) Landscape

2.10.5 The landscape masterplan, as set out in detail in the **Sizewell C Main Development Site Design and Access Statement** (Doc Ref. 8.1) indicatively establishes the spatial arrangement of broad planting areas, comprising:

- mixed woodland;
- dry Sandlings grassland;
- semi-improved grassland;
- arable land;
- amenity landscape;
- marsh, fen and reedbed; and,
- vegetated dunes and shingle beach.

2.10.6 Specific objectives, which will guide long-term management of the landscape, are set out in the **Outline Landscape and Ecological Management Plan** (Doc Ref. 8.2):

- To create a transition from a managed farmland landscape at the western edge of the site, which grades into open Sandlings grassland and then the coastal zone along the site's eastern boundary. This transition from a farmed to a more natural and biodiverse landscape would be subtle and not interrupted by sharp boundaries.
- To return areas of the temporary construction area in the west of the site (Land to the East of Eastlands Industrial Estate (LEEIE) and fields around Upper Abbey Farm) to arable and semi-improved pasture agriculture respectively.
- To reinforce and expand existing linear wooded corridors and create others to provide greater long-term connectivity for bats and other species. Specifically, native woodland would be created along the margins of the Sandlings grassland linking existing woodland areas at Kenton Hills, Goose Hill and Ash Wood.

- To create an expansive area of Dry Sandlings Grassland habitat using soils inherited from the construction phase. The intention is to source seed from adjacent areas of acid grassland (such as the restored acid grassland at Retsom's and the Studio Field – both within the site). In the longer term, this area would be managed as a diverse mosaic of dry summer parched grassland with patches of neutral grassland, scrub and scattered trees – potentially with a similar structure and species assemblage as sites in the surrounding landscape such as Leiston Common and Westleton Common/Walks.
- Within the northern area of the Dry Sandlings Grassland habitat, opportunities will be sought to manage the habitat for the benefit of breeding stone-curlew (Burhinus oedicnemus).
- To re-establish wetland habitats temporarily lost by the realignment of sections of the Sizewell and Leiston drains within the Sizewell Marshes SSSI and minimise long-term severance effects on Sizewell Marshes SSSI.
- To maximise the capacity of wildlife and landscape to cope with climate change, using a planting palate of species resilient to drought and disease that are not reliant on irrigation measures.
- Once established, to integrate the management of the new habitats (coastal, grassland, woodland and wetland) with the management regimes for the existing and retained habitats within the EDF Energy Estate.

2.10.7 Works to construct Sizewell C would result in a net surplus of excavated materials at the end of the construction programme. The end-use strategy for surplus spoil (including stripped topsoil and subsoil) is to re-distribute the majority of the material across the restored landscape rather than to transport it off-site.

2.10.8 The majority of surplus materials would be distributed within the area between Dunwich Forest to the north and Kenton Hills to the south, and the coastal fringes around Goose Hill in the east to Bridleway 19 in the west. Additional mass haul of materials would also be required to complete the non-structural component of the sea defences and to restore small land parcels to existing levels where disturbed during construction. Landforms would be tied into features including the: vertical and horizontal alignment of the site access road; edges of retained landscape, with sufficient offsets to protect rooting zones of boundary vegetation; crossing point at the SSSI Crossing; and, Bridleway 19 to the west.

d) Rights of way and access

2.10.9 Sizewell C would have an impact on various public rights of way, including temporary and permanent closures and diversions. SZC Co. has therefore developed a strategy for the operational phase of development based on the following principles:

- To restore to at least their original standard any PRoW, permissive footpaths, access land, promoted cycle routes and all other pre-existing linear and area access, on the coast and inland affected by the development, where practicable.
- To comply with the legal requirements of the Equality Act 2010 and the Countryside and Rights of Way Act 2000, in terms of any new or existing access infrastructure and management, by ensuring that there are no barriers without lawful authority and that reasonable adjustments are made to facilitate access to all.
- To ensure that all new linear surfaces are easy to use.
- To apply and maintain best practice in terms of on-site signage and other information provision, and to enhance visitor enjoyment and safety.

2.10.10 Further details on the proposals are set out in the **Rights of Way and Access Strategy** contained within **Volume 2 Chapter 15 Appendix 15I** of this **ES**.

References

2.1 EDF Energy (2017) Hinkley Point C Cooling Water Infrastructure Fish Protection Measures: Report To Discharge DCO requirement CW1 (Paragraph 1) and Marine Licence Condition 5.2.31 V2.0

2.2 Environment Agency (2005) Screening for Intake and Outfalls: a best practice guide

2.3 Environment Agency (2010) Cooling Water Options for the New Generation of Nuclear Power in the UK